



Servitization and Outsourcing in Defense Organizations. The Mediation Role of Procurement Structures

Quentin Commine

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Fakulta managementu

Rigorózna práca

Bratislava 2020

Quentin Commine

Univerzita Komenského v Bratislave
Fakulta managementu

Servitization and Outsourcing in Defense Organizations.
The Mediation Role of Procurement Structures

**Servitizácia a outsourcing v armádnych organizáciách. Sprostredkovateľská
úloha štruktúry obstarávania**

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Školiteľ: doc. Ing. Jana Kajanová, PhD.

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Abstrakt

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Hlavným cieľom tejto rigorózneho práce je analyzovať ústrednú úlohu organizácií verejného obstarávania v rezorte obrany a potvrdiť ich úlohu pri vytváraní rovnováhy medzi stále viac zadávanými verejnými zákazkami (v dôsledku nových metód verejnej správy) a rastúcou tendenciou partnerského odvetvia pridať služby v oblasti predaja tovaru alebo ponúkajú integrovaných riešení kombinujúcich dodávky tovaru a služieb v rámci servisu. Outsourcing je jav, ktorého význam v oblasti ozbrojených síl nikdy neklesol. Kontext novej verejnej správy je faktorom, ktorý vedie k vlnám racionalizácie v obrannom sektore a silnej tendencii zadávať určité funkcie externe. Pokiaľ ide o priemysel, dodávka tovarov a služieb pre verejný sektor sa neustále prispôsobuje ponúkaním balíkov tovarov a služieb zameraných na prispôsobenie ponuky pre verejný sektor. Rola obstarávacích organizácií je tu prejednávaná ako ústredná téma znižovania transakčných nákladov spojených s externým zadávaním. Táto práca ako prvé navrhuje štúdiu prípadu britských ozbrojených síl a verejnej agentúry DES zodpovednej za vzťahy medzi silami a priemyslom. Ako druhé prípadová štúdia nemeckého Bundeswehru a dvoch agentúr, pôvodne GEBB a BAAINBW, poskytuje odlišný pohľad na túto otázku. Závěry tejto štúdie objasňujú rolu v oboch krajinách a potvrdzujú prínosy obstarávajúcich organizácií v rámci ekonomiky transakčných nákladov.

Kľúčové slová: servitizácia, outsourcing, armádne organizácie

Abstract

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The main purpose of this thesis is to analyze the central role of public procurement organizations in the defense sector and to confirm their role in creating a balance between increasingly outsourced public capacities (due to new public management methods) and the partner industry's increasing propensity to add services to the sale of goods or to offer integrated solutions combining the supply of goods and services within the framework of servitization. Outsourcing of capabilities is an important but not new phenomenon in of the armed forces. The context of New Public Management has led to a rationalization wave in defense and to strong trends to outsource certain functions. The role of procurement organizations is discussed here as central to reducing transaction costs associated with meeting public outsourcing willingness and suppliers servitization offers. This thesis first proposes a study of the case of the British armed forces DES organization in charge of relations between the forces and the industry. Secondly, the case study of the German Bundeswehr and two procurement agencies, the former GEBB (now BW Consulting) and BAAINBW, provides a different perspective upon the researched issue. The conclusions drawn by this study enlighten the role of procurement organizations in both countries and confirm the benefits of these organizations within the scope of transaction costs economics.

Key words: servitization, outsourcing, defense organizations

Foreword

The purpose of this thesis is to study a phenomenon already well addressed in the existing scientific literature but in which few publications exist on the notion of Servitization and on the balance created between Servitization and the desire to outsource in the armed forces sector. This thesis explores, in an empirical and concrete way, how the nexus of contracts can be managed by procurement organizations and how these organizations are necessary in order to converge the two trends (Servitization and public outsourcing). This thesis is intended for researchers interested in applications of transaction costs economics and the issues related to the two trends previously mentioned.

The realization of this thesis has been an exciting experience and I would first of all like to thank the entire team of the Faculty of Management of Comenius University for the help that has been provided to me. I would like to thank Mrs. PhDr Viera Bennarova for her kindness during the whole application process and for her patience in answering my many questions. I would also like to thank Mrs. Prof. Jana Kajanova PhD for her passionate supervision and for the way she helped me during this rigorous procedure: your support brought me to widen my vision and I am grateful for that. I would also like to thank all those who contributed to my research and to further my reflection.

Finally, I would like to thank my Emilie for all her love in having been there for me during all this process and for the last thirteen years. As usual: you are the one who makes everything possible.

“Your vision is not limited by what your eyes can see, but by what your mind can imagine”

Ellison Onizuka (1946-1986)

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List of abbreviations and symbols

ACR : Administration Costs Regime

BAAINBW: Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr

BPA : Business Process and Assurance

BTE: Bespoke Trading Entity

BWB : Bundesamt für Wehrtechnik und Beschaffung

BWI: Bundesamt für Informationsmanagement und Informationstechnik

DES : Defense Equipment and Support

DLO : Defence Logistic Organisation

DMAé : Direction de la Maintenance Aéronautique

DPA : Defence Procurement Agency

DGA : Direction Générale de l'Armement

FSS: Full-Service-Support

FTSA: Future Strategic Tanker Aircraft

GAO : General Accounting Office

GEBB: Gesellschaft für Entwicklung, Beschaffung und Betrieb

GOCO: Government Operated, Contract Oriented

MEO : Most Efficient Organization

MOD : Ministry of Defence

MRTT: Multi Role Tanker Transport

NAO : National Accounting Office

NPM : New Public Management

OBC : Outcome-Based Contracts

PFI : Private Finance Initiative

PPP: Public Private Partnership

PSS : Product-Service System

RAF : Royal Air Force

RGPP : Révision Générale des Politiques Publiques

SHS : Schulungshubschrauber

SIAé : Service Industriel de l'Aéronautique

VFM : Value for Money

WLC : Whole Life Cost

Introduction

This thesis deals with the issue of outsourcing and public-private partnerships (PPP) in the defense world; more particularly, it focuses on the role of consultancy and intermediation agencies and on the technical nature of certain cases. The notions of efficiency and effectiveness are omnipresent in the background of all of these considerations, and public officials are considered to have the rationales of "private" economic agents (Dewatripont, 2005). Since the 1990s, the conceptualization of new public management (NPM) has been strongly implemented in most Western jurisdictions (Brignall et al., 2000). This managerial ideology implies a human, material, and economic management centered on the yield. Ekström (2012) shows that this new public management necessarily implies a "disaggregation" of administrations, as such leading to the creation of sequences of production units. Also, the concept of VFM (for "value for money") induces the notion of profitability as an objective of administrations. Disintegration and VFM are described by Ekström (2012) as two "driving forces." An illustration of the concept of VFM and of these considerations comes from the Royal British Public Treasury, which defines VFM as: "The optimum combination of whole life cost (WLC) and quality (or fitness for purpose) to meet the user's requirements."¹ The implementation of rationalizations of public policies introduced by NPM have also been accompanied by a logic of establishing "contractualization" policies with private providers, sometimes resulting from massive privatizations in the context of drastic decreases in administrations (Osborne, 2010). These situations sometimes lead governments to attempt regulatory actions — in particular for the purpose of providing public services — which face new logic oriented towards profit and profitability. The example of the privatization of British rail and its opening up to competition, framed by the British government, clearly shows this state of possible ambiguity and the associated problems (Preston, 2006, Paulley et al., 2006). As stated by Tirole and Maskin (2008), "indeed, the market increase in PPP contracts worldwide is often attributed less to the intrinsic qualities of such contracts than to government's attempts to evade budget constraints by taking liabilities off the balance sheet." These assertions put a very particular perspective on PPPs in considering them as way, a for governments, to "blur" budget constraints (Campagnac, 2009 ; Marty et al., 2006 ; Marty et al. 2013). This consideration is very interesting in the case of armed forces, due to the

¹Her Majesty's Treasury (2007). « Managing Public Money » (MPM, The stationery officer; London UK, http://www.hm-treasury.gov.uk/d/mpm_whole.pdf, p. 24

evidence of a relationship between budget constraints and outsourcing in the military as described by Voisin (2002): “facing the reduction of their military budget, the major Western countries have to re-examine the format and the missions of their forces. During the past decade, reductions of 20 to 30% of military personnel were observed in France, Germany, United Kingdom and the United States, while coalition operations helped to promote a model of fewer forces, easily projectable and technologically superior to their potential adversaries. In this context, the refocusing of armies on their main mission and the budgetary downturn led the defense ministries to entrust an increasing number of their activities in the market. This process goes beyond the tradition of outsourcing, practiced by the forces for a long time.”

A study of NPM and outsourcing within the German Federal Armed Forces by Richter (2009) shows via two dimensions (internal and external to the organization) the influence of the new modes of management and administration on the propensity of the public person to use outsourcing and services related to the production of manufactured goods from private providers (servitization of products). The following table summarizes these different dimensions and associated modernization elements.

Table 1 Study dimensions of New Public Management

Internal dimensions of NPM	Modernization items
Products	-Description of the administrative services as products, resulting from a catalog of services. -Considers citizens as clients of public administrations.
Finances	-Go from an "INPUT oriented" cameral logic to an OUTPUT-oriented logic focused on production. -Flexibilization management practices of public budgets. -Implementation of a cost/production control logic.
Management	-Integrate technical and "resource-oriented" responsibilities. -Define accurate objectives, use benchmarks and implement new management practices: "management by objectives."
Organization	-Decentralize decision levels (subsidiarity). -Flexibilization of hierarchical relations.
Personnel	-Career evolution based on merit and enhancing the motivation of employees. - “Sensitization” of human resources management.

External dimensions of NPM	Modernization items
Privatizations Outsourcing	-Privatization of materials and equipment. -Privatization/outsourcing of tasks. -Private-Public Partnerships (PPPs).
« Market-oriented » public management	-Market studies on customers.

Source: Richter, 2009

Thus, this modernization of managerial practices leads to a reorientation of the prism of actions and considerations regarding the politics and management of administrative and public affairs. The general idea is to describe administrations as deployment entities subject to periodically defined objectives. These objectives being expressed not only in terms of results but also in terms of costs results in more flexibility in the management of different cost variables, such as personnel and equipment (Dunleavy et al., 1994, Hood, 1995). Ferlie et al., 1996). The approach is also focused on feedback and customer satisfaction through a process approach (Barzelay 2001, Lane 2002).

In parallel with this new managerial orientation, the outsourcing policies within the armed forces correspond to a new industrial orientation that is marked by the addition of services to the production of a good, as shown by Voisin (2002):

"In Indeed, industrial firms are now tending to offer services upstream or downstream of their sector in order to extend their market area and maximize value creation in this profitable segment. The air transport sector reflects this evolution: the companies no longer buy reactors, but hours of flight guaranteed by the engine manufacturers; some are no longer even owners of their fleet, but rent hours of turnkey flights to specialized pools. The interest of the offer of this type of benefits is multiple. For the customer, the integrated offer means a single interlocutor, bound by an obligation of result. (...) From the point of view of his client, the role of prime contractor makes him solely responsible for the proper performance of the contract. (...) For the service provider, an integrated offer makes it possible to win new customers. In a market where the life cycle of equipment is measured in decades, the maintenance of a continuous flow of services to the customer will anticipate its future expectations, identify its needs and more generally its market behavior. He will then be able to adapt his services and the productions they incorporate to his needs. Customer loyalty in the service market may be extended by subsequent sales of equipment. "

The procurement function (and associated entities) is a strategic function in companies and also in the armed forces because of the cost, duration, and scope of the programs concerned. This thesis thus proposes the study of these functions in the framework of the confrontation between outsourcing and the product servitization vaults for the manufacturing industries. The general context, as defined above, will be that of the armed forces. Before tackling the definition of servitization, it appears fundamental to address the make or buy decision and, more generally, outsourcing.

1 Outsourcing and the make or buy decision

As explained by Barthélémy et al. (2007, p. 2), outsourcing has always existed in organizations but has increased lately: “The phenomenon of outsourcing is not new. Faced with the problem of arbitrage between internal resources and external resources, companies have always outsourced certain activities. However, the number of outsourcing operations has increased significantly in recent years.” This part focuses mainly on the definition of outsourcing in general terms. Indeed, understanding the theme precedes the definition of a suitable theoretical framework. This part focuses on defining outsourcing motivations and practices in general terms and then on discussing this topic in the context of the armed forces, taking into consideration their specificity.

1.1 Outsourcing: a definition

First and foremost, it seems necessary to give a generic definition of the outsourcing phenomenon. The concept of outsourcing can be defined as follows (Quélin, 2003):

“Outsourcing can be defined as the fact of entrusting an external service provider with an activity that was previously performed internally. Our definition therefore highlights the two great originalities of the problem of strategic outsourcing: On the one hand, the function or activity outsourced must necessarily have been part of the portfolio of the company to claim to be outsourced; On the other hand, outsourcing is often accompanied by a transfer of equipment and personnel to the provide.”

Based on the existing literature Quélin (2003) also states four characteristics:

- recourse to an external service provider for an activity previously shall be performed internally;
- transfer of material and/or human resources;
- externalization is long-term in its perspective;
- it requires a contractual framework.

Above all, it is necessary to define the type of outsourcing. According to experts, it is sometimes static and sometimes dynamic. The dynamic definition is particularly relevant to this research, so here we can quote Barthélémy (2007): “For other authors, outsourcing is defined more dynamically as the decision to entrust an external partner with an activity that was previously internalized.” Barthélémy (2007), also quotes Foss (1996), who calls it “a form of vertical disintegration” and introduces the idea that “the emergence of qualified partners and the shortening of the life cycles of products and technologies” have led to a

redefinition of business-to-business roles as part of a production process, and thus a modification of the B2B boundaries. Burkholder (2006, p. 10) defines the advantages of outsourcing by the following main items:

Table 2 Advantages of outsourcing

- Focus in-house resources on core functions.
- Allow personnel cost savings.
- Improve quality of information system services.
- Increase flexibility.
- Increase access to new technology.
- Provide alternatives to in-house costs.
- Stabilize information-systems costs.
- Achieve technology cost savings.
- Reengineer processes.
- Reduce technological obsolescence risk.

Source: Burkholder, 2006, p. 10

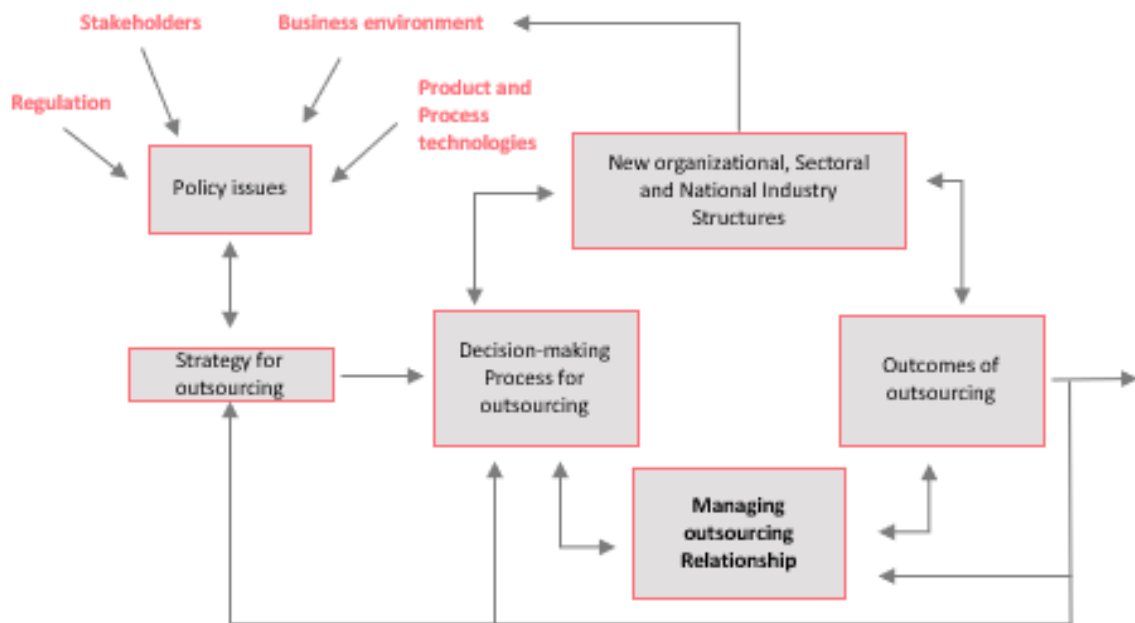
Another question would be to discuss the difference between outsourcing and privatization. According to Wichmann 1994), privatization can be defined in this way:

"Privatization in the narrower sense means the transfer of public ownership (especially public enterprises) to private ownership (privatization of ownership of capital) through sale of equity holdings on the stock market, non-participation of the state in capital increases or direct transfer of ownership to private buyers. In the case of the privatization of public property once created by nationalization, this is called re-privatization. In a broader sense, privatization is understood to mean the transfer of services previously provided by the public sector or the provision of ancillary services needed by the public administration to private providers. The transfer of public companies to private ownership without changing ownership is only a formal privatization, but it can prepare a material privatization."

Privatization and outsourcing differ in the definition of control over the delivered service. Upon privatization, control is completely handed over to the private provider. In outsourcing, the public manager retains control and he or she can exercise the applicable policy with equal bargaining power. Outsourcing is talk of a "partial privatization," The

difference between the two terms is the level of control by the “client.” Nevertheless, the process of outsourcing capabilities takes place in a very strategic orientation that considers environmental factors but also internal-managerial ones, as described in the following figure.

Fig. 1 The outsourcing framework



Source: Harland et al., 2005, p. 844

The decision-making process and the management of the outsourcing of a production function is made up of several key stages and in particular three major phases according to Fimbel (2002). Thus, the process leading to outsourcing consists of three phases and seventeen steps. This process breaks down as follows:

Phase I: Pre-decision phase

I.1: The problem is raised: emergence of factors

I.2: Explanation of the desire for outsourcing

I.3: Multidimensional study: technical, economic, human and social studies (especially relating to the "social and sociological management of outsourcing"), organizational (such as defining the reorientation and reorganization of the company).

Phase II: Implementation Phase

II.1: Outsourcing decision

II.2: call to the market (refers to the public procurement procedure developed in this study) and choice of service provider

II.3: formalization and contracting of outsourcing

II.4: implementation of outsourcing, technicolor-operational implementation

Phase III: Operation Phase

III.1: Setting into operation

III.2: Exploitation of outsourcing, here we distinguish the enjoyment of the outsourcing contract, the management of the process and the management of relations with the remaining "internalized,"

III. 3: measurement of the contract, performance measurement during execution and at the end of the contract. This last measure is essential when the process of renewing the outsourcing contract.

This approach also ties in with the work of Momme and Hvolby (2002) who define the unfolding of a 6-step outsourcing process:

- 1) Skills Analysis
- 2) Evaluation of the project and, if applicable, approval of it
- 3) Negotiation of the terms of the contract and finalization of the contractualization
- 4) Implementation, execution of the project with transfer of competences and responsibilities on the provider
- 5) Management of the concluded partnership (refers to the importance of a good intermediary, discussed below)
- 6) Finalization of the project (phase requiring the definition of good indicators of performance measurement).

The outsourcing of production functions is a difficult thing to define in its modalities. Many examples of studies exist but the benefit of the principle of outsourcing drops rapidly in some configurations. (Barthélémy, 2003, Cabral et al., 2014). It therefore seems essential to define the mechanisms at the origin and involved in the control of outsourcing operations. The case of the public sector is particularly interesting because the benefits of outsourcing can in some cases and in certain configurations be measured. Outsourcing public capacities can be also considered as a political topic (Verkuil, 2007). The approach to outsourcing in the public sector depends on each nation and appears as a cultural variant. The defense sector, a sovereign function par excellence, is the most eloquent here.

Outsourcing is an old but growing concept in the public sector, especially in the armed forces. This thesis attempts to understand one of the essential components to the realization of major outsourcing programs: the constitution and the middle-managing role of procurement agencies in the public sector.

1.1.1 Outsourcing in the military: state of the art and trends

The world of defense and the economic agents present on the market show ever closer convergences of interests lending more and more possibility of cooperation. Thus, it is no longer unusual to note that private service providers take over the production of goods and / or services for the national defense sector. The concept of outsourcing, far from being an innovative idea although sometimes seen as a "fad", is in reality the heir of old practices as Burkholder (2006) shows: "It was the first time a carpenter paid someone else to cut down a tree for wood. We therefore deduce that the "productive" paradigm linked to "outsourcing" (and thus to the Anglo-Saxon concept of "servitization" (of goods or products) is an old practice whose only practical and technical modalities have evolved with time, adapting to each era, Barthélémy (2004) shows that "the problem of the arbitrage between internal resources and external resources has always arisen" and that "companies have gradually outsourced low-sensitive activities such as general services," In 1795, General Bonaparte-whose operational logistics were provided by private companies such as Beidt or Lanchere-was already complaining to the Directory of the benefits then considered deplorable of this company, which he accused it of starving his soldiers (Ayl, 2006). These considerations will later lead the young Bonaparte, then Emperor of the French, to create the "Train des équipages" for the operational supply of French troops deployed on the battlefield. It is clear that the practices of outsourcing/insourcing are not new and always closely linked to the quality of the services provided by the subcontractors, correlated to the essentiality of the benefit for the main employer. Militaries like the US military have always been ahead in the field of outsourcing and this advance can be explained - in the case of the United States - by the near absence of conscription since the creation of the US military. We can recall the definition of Burkholder (2006) which remembers in an "extreme" way (the "soldiers of fortune") what Outsourcing is: Outsourcing, whether in the form of call-centers of soldiers of fortune, is simply The benefits, then, are obvious: a business assembly, a global assembly line, The benefits, then, are obvious: which, in turn, creates new, often higher paying jobs. In the public sector,

outsourcing takes place within the framework of "Public-Private Partnerships" (PPP) and allows the public economic agent to obtain a "finished product" in terms of the production of goods or services. PPPs are a legal and legal framework for outsourcing in a legitimate and supervised manner.

As aforementioned, the most important parameter in outsourcing is related to the "make or buy" decision. Voisin (2002) states that the financial parameter is the most important one and refers to the American methods of cost-comparison by the General Accounting Office (GAO) and its A76 directive in which cost assessment and comparison methods are realized in order to determine whether in-house or outsourced capabilities can be considered as most efficient and as "Most Efficient Organization" (MEO). Voisin (2002) also states that a (minus) cost differential from 10% is decisive to outsource a capability.

All these elements make it necessary to go on the main reasons for outsourcing in defense. The study of outsourcing, for the defense, allows to enjoy the following advantages (Voisin, 2002):

- focus on his key skills and his "core business"
- acquire more flexibility and "flexibility"
- when there is no "interest" or "profitability" to develop a function of its own.
- Avoid hiring (or training) expensive specialists in complex environments.

The scientific literature and the documents produced by the public services (French example) show that if the establishment of contractual links with the private sector seems profitable, they must answer four fundamental criteria² :

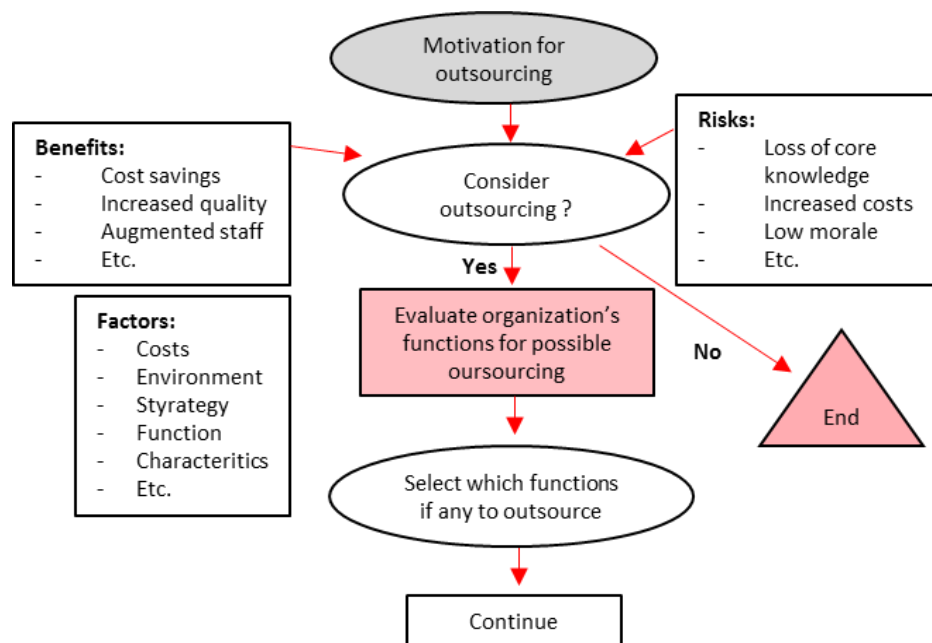
- "The ability of armies to fulfill their operational missions should not be affected by the establishment of these partnership contracts,"
- "The gains resulting from the so-called outsourcing process must be significant and sustainable (it is a question of observing an economically viable process), it is essential here to study the costs "in control" but also by outsourcing by comparing the total costs."
- "A process of outsourcing should not, because of the sovereign aspect of the defense, "leave out" the personnel hitherto employed to control this service,"
- "One of the most important points in the creation of these outsourcing contracts is to avoid the creation of dominant positions at the subcontractor,"

² Cour des comptes, (2009) Le coût et les bénéfices attendus de l'externalisation au sein du ministère de la défense.

Indeed, the loss of know-how of the "principal" (towards his agent) as well as the asymmetry of the information in the production system, can induce a situation of "dependence" of the principal towards the agent. This is particularly damaging for, for example, a situation of renegotiation of partnership contracts.

As such, the process of outsourcing (motivations, risks, contextual elements and process elements) can be represented and summed up by the following figure from Kremic et al. (2006).

Fig. 2 The process of outsourcing



Source: Kremic et al., 2006, p. 468

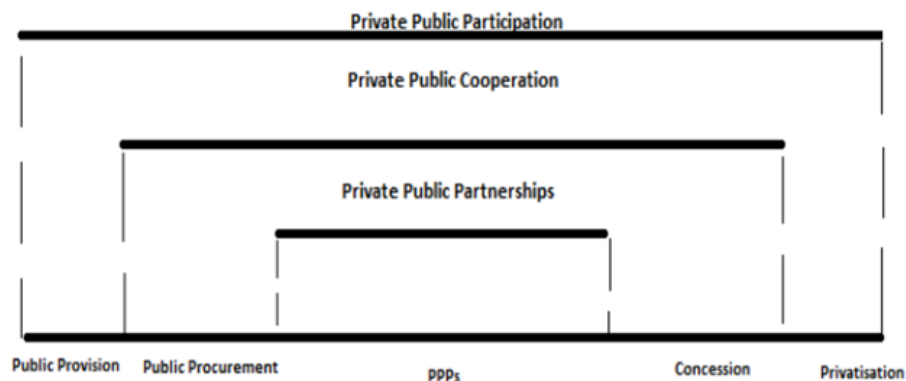
In the first place, it is shown that outsourcing in defense is not a contemporary phenomenon. It began (under other names) a long time ago and concerned the support of forces (if we do not consider the *mercenaries* as a form of outsourcing). During the 1990s, many countries (especially Anglo-Saxon ones) understood the contributions that can be represented by partnership contracts in defense. The study of current mechanisms, against a backdrop of budgetary tension, represents the ultimate part of understanding and addressing this issue. This opens on the next point pertaining to the reasoning for this research. With the end of the Soviet threat and the suspension of the national service, the British military has undergone a major transformation during the last thirty years. A significant area for the armed forces, the theme of outsourcing raises many issues in the higher spheres of the State, with actions from the "purchasing" function expected to

refocus activities on the missions' so-called "core business" while obtaining a service of identical quality at a lower cost. The French example shows a real surge in outsourcing movements as of 2013, which represented the period of *Rationalisation Générale des Politiques Publiques (RGPP)*. These measures of rationalization of the state budgets then acted as a real catalyst for movements leading to outsourcing operations within French ministries, particularly in the field of defense. To another extent, the example of the US military is more extreme. We can recall the definition of Burkholder (2006), which cites an "extreme" (the "soldiers of fortune") definition of what outsourcing is:

“Outsourcing, whether in the form of call-centers or soldiers of fortune, is simply a classic economic principle, the division of labor taken to its logical conclusion: a global assembly line in a global factory. The benefits (of outsourcing), then, are obvious: a business which, in turn, creates new, often higher paying jobs”.

In this case, it is necessary to highlight the advantages to be had from outsourcing essential but non-core functions on the tactical level. It is also necessary to evoke current or future projects and to define their outlines. The purpose of this final question, besides addressing the problem, is to give the limits to these types of partnership contracts in order to use this concept without abusing it. In defining the dynamics of outsourcing partnerships, many theories exist for the study of this phenomenon. One can mention the use of game theory, which represents a originality because other theories are used much more often. Or we can mention the theory of the firm, of transaction costs, of incomplete contracts, of the resource, or of core competencies. By its decision-making aspect and its description of the factors involved, game theory is a useful tool from a static point of view, but it also echoes the theory of incentives. The choice of the transaction costs economics will be explained later in this thesis. Concerning contracting in public management, many types of contracts are explained by Ekström (2012) in the following figure.

Fig. 3 Forms of contracting



Source: Ekström, 2012

One of the problems of partnership contracts is related to one of their advantages: flexibility. Contracts are not made to cover a fixed period: their duration is limited in time. This allows renegotiation of these contracts at regular intervals.

The problem, from the point of view of defense, is the loss of know-how. A contract negotiated for the first time, when "in-house" capacity still exists, is generally optimal. The subcontracting firm satisfies the so-called capacity normally produced by the defense entity, and the latter finds it a more profitable situation than when it was itself carrying out the mission. In the public sector, outsourcing is carried out in particular under the framework of "Public-Private Partnerships" (PPPs; in particular the PFIs in the British example). It allows the public economic agent to obtain a "product" that is finished in terms of production of goods or services. This dimension is addressed in the next section, which deals with PPPs and, in a British version, with the so-called PFIs as tools for iso-effectiveness and greater efficiency. PPPs can be seen as a middle way to outsource efficiently, this represent an issue that is addressed in the next subsection.

1.1.2 Public-Private Partnerships: a tool for efficiency

In this thesis, we propose to define the typology of PPPs/PFIs through the widespread existing literature on British PFIs. This perspective is also based on the long-term experience with PPPs/PFIs in the UK. PPPs are defined by Hodge et al. (2007) as "cooperative institutional arrangements between public and private sector actors." Alshawi (2009) defines the notion of PFIs in public construction contracts (and their relationship with the concept of PPP) as follows: "PFI (Private Finance Initiative) is a public service delivery type of PPP (Public Private Partnership) where the responsibility for providing public services is transferred from the public to the private sector for a considerable period of time." The PFI principle is the foundation of the UK's budget and finance policy, including its obligation of justifying budgetary commitments and being sincere about the amount, the global costs, the intensity, and the diversity of outsourcing projects that can be undertaken in the public sector. A very broad and precise definition of a PFI can also be quoted from Hall (2003, p. 6): "PFI projects are usually long-term contracts for services that include the finance and construction of associated facilities or properties. Under the contract, the private sector entity will have responsibility for financing and constructing the

building or facility and maintaining and servicing it throughout the contract term. It is used mainly for the construction of new buildings such as hospitals, prisons, or waste disposal plants, but also for software systems.” As shown by Allen (2003), PFIs also represent a very useful fiscal policy optimization tool for smoothing tax constraints: «The PFI helps government to overcome a perceived fiscal dilemma: it enables the government to increase public investment through higher capital spending while maintaining a tight fiscal stance. ” Akbiyikli et al. (2004, p. 1270) define public authorities as “granting authorities” that have moved from “provider of services to purchaser of the services.” The concept of PFI, which is considered as a generic classifier for all types of ‘construction’ PPP, is also a means of using private finance and skills to deliver capital investment projects traditionally provided by the public sector.” As frameworks that allow for outsourcing in a legitimate way, PPP/PFIs are governed by very strong legal and contractual provisions, Morledge et al. (1998) define two main criteria for PPPs: They must provide “a genuine transfer of risk to the private sector and Value-For-Money to the taxpayer.” Ke et al. (2010, p. 343) define a PPP as follows: “A public-private partnership (PPP) is defined by the National Council for Public-Private Partnerships, USA (2009) as ‘a contractual agreement between a public agency federal, state, or local and a private sector entity,’ through which the skills and assets of each sector are shared in delivering a service or facility for the use of the general public,”

We can retain constants related to the nature of these contracts which give them this stability. Jackson (2004) introduces the notion of risk management in contracting through six different categories of risks: (1) demand risks, (2) design risks, (3) construction and development risks, (4) operating cost risks, (5) performance and availability risks, and (6) residual value risks. PPPs/PFIs must be considered by taking into account a processual view based on three items (Fischbacher et al., 2003): (1) separation of design and implementation of the project, (2) transaction costs in interorganizational interactions involved, (3) significant duration of partnerships. PFIs can be seen as a way of mitigating operating risks by transferring them from a public customer to a private provider. Eaton (2003) identifies two components in risk management: (1) identify risks and (2) determine options to mitigate them. Indeed, Campagnac (2012) shows that PPPs (and PFIs) have finance-led governance structures. This kind of stability needs lead to the consideration that the duration of PPPs must be long enough to enhance investment possibilities by private contractors. Conversely, Saussier et al. (2012) quoting Williamson (1985) deduces that long-term contracts are incomplete. Thus, contractual aspects of the implementation of

these contracts generally cover an long period, ranging from 20 to 30 years on average. This duration is defined exactly, according to the duration of the investments to be made for the service provider, the criticality of the outsourcing, and the duration of depreciation. The following diagram shows an example of some PFI durations:

Table 3. Duration of major PFIs in the UK's defense

Project	Description	Value of contract (£m)	Duration (years)
Allenby/Connaught	Re-development of garrisons around Salisbury plain and Aldershot	845	30
Skyenet 5	Range of satellite services	682	n.a.
Tri-Service White Fleet	Lex defense management to supply MoD's commercial vehicles	500	10
Main building re-development	Redevelopment of MoD main building, London	208,6	30
Roll-on/Roll-off strategic sealift	Provision of strategic sealift services: six vessels	950	25
Tank transporter	Heavy equipment transporters for army	290	20
Armoured vehicle training Services	Provision of gunnery and specialist driving AFV training services	102.4	30
Tri-service airfield support services	Fire/crash cover; fuelling; movements; airfield clearance; air traffic control	350	25
Medium support helicopter aircrew training facility	Training for Chinook, Merlin Mk3 and Puma	105	40
Attack helicopter training service	Training to support apache attack helicopter	165	30
Defense fixed telecommunications Service	Telecommunications services consisting of six services	70	10
Joint service command & staff college	Construction, IT, Furnishing and support, including some academic support	80	30
RAF Lossiemouth Family Quarters	Re-development of 279 married quarters	38.3	21

Source: MoD

Launched in 1992, Private Finance Initiative programs became Public Private Partnerships in 1997 within the framework of making enforceable contracts that could encompass whole life-cycle costs and innovation by private firms (Hartley, 2004). The contract is usually global, implying the financing, construction or repair of the infrastructure. (In this dimension and on this point, PFIs are closer to the German experience of PPPs.) The benefits of outsourcing are multiple in nature: they cover the entire duration of the contract and are defined according to the services performed and aggregate additional sources of income. Nevertheless, risks remain in terms of disparity in profitability and the sensitivity of projects to exogenous shocks.

To define the phenomenon of public-private partnership concisely, one can cite the work of Ekström (2012). Thus, PPPs can appear in the following three major forms:

- "Contracting out of service." These are contracts related to the production of a service by

the service provider that can be classified according to three axes: "facility management," "contractor support to operations," and "outsourcing."

- "Alternative financing solutions." Here the savings are made by alternative financing methods that reduce costs. Leasing is differentiated from other types of financing (as in PFIs).

- "Partnership solutions." These are partnerships with a private agent who initially offers a "project alliance" and then conducts a "strategic partnership" in a second term.

We can also detail the phenomenon using the following table from Hall (2003):

Table 4 Different forms of outsourcing: the example of the UK

		Outsourcing	PFI	Concession	Lease	BOT*
Operation	Operation of service	X	X	X	X	X
Finance	Capital investment financed by private operator		X	X		X
	Recouped by user charges			X	X	
	Recouped by contract from municipality	X	X			X
Construction	Construction of asset by private company		X	X		X
Ownership	Public during and after contract	X	X	X	X	
	Private during contract, public after			X		X
	Private indefinitely					

*BOT: (Build, Operate, Transfer)

Source: Hall et al. (2003)

The implementation of partnership contracts can be following a process of decision leading to a faster and simpler implementation of the solution. Indeed, a PPP/PFI can be implemented if the costs of achievements or of "running the process" for public actors are too high compared to the solutions offered by the market, or if the project has to be realized too quickly in comparison with public capabilities. These notions refer to the issue of transaction cost economics and the costs of "running the process" as cited by Williamson (1975). In the very particular case of the MoD and the British military, PPP contracting induces the conception of PFIs as a strategic contracting system for measure performance, as quoted by Parker et al. (2003): « PPPs including in the UK 'private finance initiative' (PFIs) are part of a wider policy of 'privatization' based on the expectation that the private sector provides services more efficiently and more effectively

than the public sector. PPPs/PFIs permit an expansion of infrastructure beyond what the state on its own could achieve given budgetary constraints and a lack of project management skills ». It should also be noted that the existing literature reports better accounting practices when PFIs are used (Deakin et al., 1996, Nielsen et al., 2015). In other European countries (e.g., France), the implementation of partnership contracts follows a very basic decision process that leads to very simple implementation possibilities (Campagnac, 2012). Indeed, a PPP can be put in place there if it meets one of the following three conditions³:

- “The complexity of project execution is too high”;
- “The project must be carried out with a speed that is unattainable by the state in the case of a realization governed”;
- “The project efficiency is better by outsourcing”.

PPPs thus seem to be a way to reduce costs for public administrations because of the global aspects and the governance structure of these contracts (Campagnac, 2012). However, they result in extreme effects on staff reductions when they are taken in the context of a policy of rationalization of public budgets. PPPs exist in all branches of public management. For example, the high-speed railway line between Tours and Bordeaux shows that this type of project has to be optimized in terms of its process management (i.e., organization but also efficiency and speed of implementation). Because of the complexity of the process, outsourcing practices in the form of a PPP have been designed (Crozet, 2015). Following this reasoning, if the public administration exercises strict control over the preparation phases and monitors the execution of these projects very carefully, the desired efficiency would rapidly decrease in the case of a public, in-house execution. As explained by Lagarde (2008) in front of the French Senate, PPPs are also seen as "bespoke" solutions with an exceptional character in their implementation:

"How to explain this craze relatively weak for this new mode of public order? Simply because public-private partnerships have been conceived as an exceptional way and they have been used in an exceptional way. The legal conditions to follow this path are very restrictive: it is necessary to prove the urgency or the complexity of the project. Moreover, in these two cases, the use of the partnership contract is penalized, in the current state of things, by a more stringent legal and fiscal regime than that which is in force for the methods of handover of the traditional public order. Therefore, to the extent that public-

³ Campagnac, 2012.

private partnerships are more difficult to establish, more costly and more restrictive in terms of remedies, it is not surprising that they are used exceptional."

In the military in France and in Germany, it is particularly interesting to note that the majority of the tasks that are today the most outsourced are those that were once fulfilled mostly by conscription staff (Stöber, 2012). This dimension naturally appeals to the German case of this thesis and forms a basis for a better comprehension of this particular case.

In the UK, PFIs and their updated variant (PF2) are contractual forms of PPPs. Moreover, reports from the UK's National Accounting Office have shown that PFI's conclusion have been drastically reduced since the 2008 financial crisis, leading to the return in updated form of PF2s from 2011⁴. The British approach to PFI contracting is based on the "value for money" principle. In this particular context, the concept of VFM can be explained by the NAO's definition of "3 + 1E":

Table 5. Principles of VFM

- | |
|--|
| <ul style="list-style-type: none"> -Economy: « spending less » -Efficiency: « spending well » -Effectivity: « spending wisely » -Equity: « spending fair » |
|--|

Source: NAO report, 2018

Limits about PPP/PFIs have been raised by Marty (2013) in taking into account exogenous factors like market accessibility, finance costs, possibilities of financial crisis, and political or social evolutions. Although all of these (non-exhaustive) factors must be taken into account, they cannot be completely integrated within the framework of long-term contracts that are, according to Williamson (1985), mostly incomplete or too expensive (in terms of transaction costs) to make them "as complete as possible." Mostly introduced at the very beginning of the 90s⁵, PFIs can be seen as flexibility instruments for the United Kingdom's budget policy in permitting « aimed contracting ». They are also optimized and specialized to maximize the profitability of these kind of contracts, which exist in all areas of British public administration, including the Ministry of Defense.

⁴ See NAO report 2018

⁵

Concerning PPPs, Campagnac et al. (2012, p. 13) address a core question of this thesis: “Have global contracts (induced by a PPPs) really enabled a successful management of ‘interface problems’? Is there really a better integration of the design, construction, and long-term maintenance functions?” This question will be explored alongside the other research questions of this thesis.

The process of meeting outsourcing demands from public administration, the servitization of products (by offerors), and the long-term relationship between customers and providers can be considered a « principal–agent » problem. It will be explored in the next subsection.

1.1.3 Outsourcing and servitization: a principal–agent relationship

Outsourcing practices have evolved from “hardware” to “total solution.” The latter item refers to a bundle of manufactured goods and an inclusive provision of services (Lee et al., 2003). Exactly what servitization refers to can be shown in the following table.

Table 6. Evolution of outsourcing in the IT sector

Year	Outsourcing Focus	Outsourcing Approach
1960's	Hardware	Services and Facility Management
1970's	Software	Facility or Operation Management
1980's	Hardware and Software Standardization	Customization Management
1990's	Total Solution	Asset Management

Source: Lee et al. (2003)

In a related way, the phenomenon of product servicing in the military is linked both as a cause and as an effect of outsourcing crackdowns. Indeed, these induce the

transformation of the army's relations with the civilian economic world, leading to a relationship with the service provider of the "principal-agent" type and an exposure of the "principal" to the risk of "moral hazard," caused by the fact that the principal cannot observe the agent's actions acutely in order to fulfill their contract (general definition by Grossman et al. [1983], and application to outsourcing by Elitzur et al. [2012]). As stated by Lamy (2017), this was the case at the *Assemblée Nationale*, concerning the duration of the 400-hour visits concerning the TIGRE weapons system carried out by the *Service Industriel de l'Aéronautique d'Etat* (SIAé) and by Airbus Helicopters: "for a Tiger helicopter, a periodic visit should therefore theoretically last 183 days, which is already enormous. In practice, it lasts an average of 383 days"⁶. In particular, it is explained that 30 to 42% of the immobilization problems faced by the TIGRE fleet manufacturer depend on Airbus Helicopters (thus inducing this perverse effect of moral hazard). This state of affairs is explained by the fact that an industrialist does not necessarily take public interest into account in this case: "when an industrialist receives a helicopter from Total and another from the state, he may sometimes make an economic choice." This constitutes a very relevant illustration of the "principal-agent" problem of the outsourcing phenomenon. The decision of this "semi-outsourcing" is⁷ within the state's industrial prime contracting department, and these contracts with Airbus Helicopters show a clear correlation between the performance of a contract and the initial terms and conditions provided for its conclusion. The term "semi-outsourcing" seems inappropriate here, in the sense that this maintenance is not carried out by a private actor but is carried out in "external" mode and centralized in the case of the SIAé. On the other hand, preventive and periodic maintenance actions carried out during visits at Airbus Helicopters are part of services provided by the manufacturer; therefore, they are a form of outsourcing and a kind of product-service on the industrial side (referring to servitization). The report of Lamy (2017) explains that both the industrial and SIAé approaches are different and that it seems novel for Airbus to offer maintenance services, as this industrial company used to focus on "selling aircraft and spare parts." This example is interesting and relevant. Indeed, many reports show that the creation of the SIAé aims precisely to protect the French armed forces from massive and total outsourcing of the aeronautical maintenance: "Several of your Special Rapporteur's interlocutors stressed the need for the Ministry of Defence to

⁶Avis fait au nom de la commission de la défense nationale et des forces armées sur le projet de loi de finances pour 2017 (n°4061), Tome IV, Défense préparation et emploi des forces: forces terrestres.

⁷ <https://www.senat.fr/rap/r07-352/r07-3528.html>, consulté le 11/03/18

retain some of its direct intervention capabilities, citing the example of the United Kingdom, which they said had excessively outsourced the maintenance of its aircraft in a way that was difficult to reverse.” The example given of periodic checks on combat helicopters is therefore a relevant instance of a meeting between the servitization of manufactured products and outsourcing in the context of a main agent problem, the consequences of which do not appear to be favorable to the public entity. The two following tables from De Legge (2018) illustrate the delays from industrial partners for the helicopters NH90 CAIMAN and EC665 TIGER (in French).

Tab.7 Timeframes for periodic visits of the NH90 and EC665

		Objective	SIA	Gap	Industry	Gap
NH90 Caïman	TTH	7 months	10.3 months	+3.3 <i>months</i>	11,3 months	+4,3 <i>months</i>
	NFH	9 months	15.5 months	+ 6.5 <i>months</i>	16 months	+ 7 <i>months</i>
EC 665 TIGRE		6 months	10 months	+ 4 <i>months</i>	6,5 months	+ 2.5 <i>months</i>

Source: De Legge (2018)

The case of the French SIA does not represent the phenomenon of outsourcing per se; it refers rather to a broad practice of departmental rationalizations meant to safeguard in-house production capabilities and to avoid reliance on industrial outsourcing entirely. However, this example illustrates very well one of the many issues related to outsourcing — namely, the comparison of two factors in a make-or-buy decision-making process. On the one hand the profitability of a project must be truly evaluated, while on the other hand, rationalized management solutions must be evaluated systematically in order to not depend on a principal–agent configuration in facing an industrial provider with potential bargaining power.

The general concept is to draw up a dimensional analysis linked to all items at stake within the decision-making process. This analysis is paramount because it is intrinsically linked to many consequences, such as reversibility or transferability (Kremic et al., 2006). Once dependent on private industrial providers, it is almost impossible for a public customer to shortly re-insource previously outsourced capabilities in case of a provider failure or other exogenous changes (Law, 2013; Avcic, 2017; Nagpal, 2015) . Furthermore,

almost all outsourcing decisions induce more or less long-term contracts. Hartley (2007, pp. 6-7) quotes the NAO's report concerning the following twelve core principles for establishing virtuous outsourcing processes:

- Define needs and expectations, focusing on results and not on the means to be used. (The point here is not to limit the available choices.)
- Limit the scope of contractual options and smooth offers (with the aim of standardizing and simplifying the associated offers).
- Clearly identify the scope of the risk transfer.
- Put pressure on competitors.
- Create a public service comparator to compare offers.
- Carry out a multi-criteria evaluation of suppliers and give subsidiarity to suppliers to meet the requirements.
- "Value for money on PFI contracts requires appropriate risk allocation between the public and private sectors."
- Determine a period short enough to allow the client to change service providers, if necessary, and a long enough period to allow investments to be made by the contractor to ensure a certain level of return on investment.
- Define an evolutionary contract that allows renegotiations and changes.
- Reduce uncertainties about possible changes between the conclusion of the contract and the implementation phase of the contract.
- Introduce mechanisms to smooth out the partner's earnings, or even to share them.
- Use external advisors.

The last notion refers to the main topic of this thesis. In addition to the transaction cost economics, it is necessary to study the phenomenon of the outsourcing relationship through the principal-agent problem, particularly relying on the understanding of the service provider reliability and depending on the information asymmetry in the execution of a contract. In the case of an analysis through the theory of provider reliability, the concepts developed at the beginning of the section are repeated and explained to understand the phenomenon induced by the "principal-agent" relationship. It is possible to define this problem as follows:

The principal does not always know (except in case of outsourcing between two different public entities, where the problem of "adverse selection" almost does not exist) how the agent will fulfill all obligations. In this case, it can be spoken of "adverse

selection," which is defined as follows: A "principal" (the principal) enters into a contract with an "agent" (the service provider) to perform a task. This agent has two options:

1) to carry out the task in a satisfactory manner, possibility named: θ

2) to carry out the task unsatisfactorily, possibility named: θ'

The production costs of an "inefficient" agent are usually higher (due to losses in control and yield) than those of a better-quality agent, which gives the following relationship for a given quantity q of product in the contract with the agent (Coubluq and Martimort, 2009):

$$\theta < \theta' \leftrightarrow C \theta q < C \theta' q$$

However, this observed fact is subject to the conditions of the moment. Coubluq and Martimort (2009) show that these conditions can be reversed in the case of an "exogenous shock." Indeed, an exogenous shock corresponds to a sudden change in the initial conditions. This concept can be interpreted in the case of outsourcing with the following example:

A sudden increase in the prices of raw materials may very harmfully affect a provider (given it is much smaller than the public entity and therefore more sensitive to market fluctuations than the latter) and will lead to an increase of its production costs. This will have the effect of "asphyxiating" the small provider and/or increasing its prices in the longer-term during renegotiations or if the contract allows this possibility. This matter of fact would harm a customer in a relationship of short-term dependence, due to the outsourcing of a capability.

It is considered that a provider is reliable with a certain degree of probability p , whereas its sensitivity to a possible "exogenous shock" can occur with a certain probability $(1-p)$ (Coubluq and Martimort, 2009). The amount of available information for the principal is therefore essential because it allows the latter to better adjust its contracting proposals and to mitigate risks. In this case, good reputations of agents play a paramount role (Charreau, 2015). Indeed, a good "agent" whose reputation is known and acknowledged by the principal leads the principal to a contracting process and sets requirements for optimal contract terms and conditions. In the case of lack of information, a principal with a certain risk aversion will not have the same propensity to trust an "agent" and to outsource. Following this method, the agent has to give "guarantees" to its potential customer in order to enhance its outsourcing willingness. Terra (2015) defines adverse

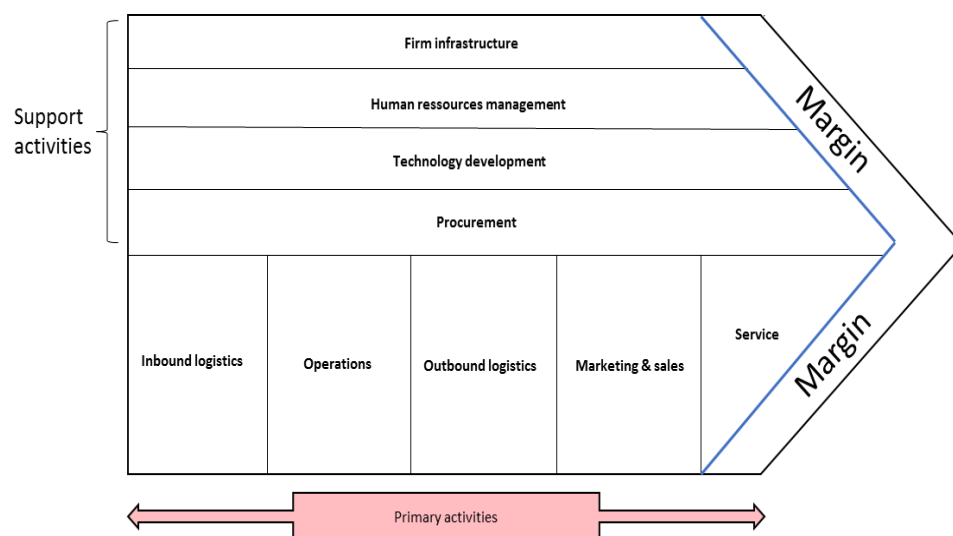
selection as “a term attributed to a situation where one agent does not have information regarding characteristics of another agent, characteristics that can affect the transaction gains.” Adverse selection is therefore a fundamental problem in the case of outsourcing, because the principal is “based” on an agent whose true reliability and true skills are not always integrally known (Salanie, 1990; Keil, 2005). It is therefore necessary to develop contracts in full cooperation and with transparency, with clear and formalized conditions of implementation in the clauses of the contract in order to secure the agent’s future rent and the customer utility. Based on standards such as ISO 9001, quality certifications use certification audits to show quality and reliability for a service provider in a formalized way, and they contribute to minimizing the phenomenon of adverse selection for the potential customer (so much so that the risk of exogenous shocks can be mitigated enough to secure the contract benefits of both parties). These elements are described as “signaling” the market (Ross, 1977; Keil, 2005) to encourage future customers to overcome their uncertainty. It could be inferred that adverse selection can be linked to the pricing of initial public offerings (Allen et al., 1989), but according to Michaeli et al. (1994) it has not been proven. Tadelis (2012) also show that public agents prefer negotiations with large suppliers rather than using competition: “In the public sector, statutes such as the U.S. FARs (and the many statutes that are modeled after the FARs) strongly favor the use of open competitive bidding. As explained earlier, complex projects that have incomplete designs and specifications are ill suited for fixed-price contracts awarded through competitive bidding. Instead, negotiating a more flexible cost-plus contract with a reputable supplier maybe the preferred course of action.” After having discussed the adverse selection, the phenomenon of “moral hazard” (and its potential consequences in outsourcing strategy) must be discussed. Defined on the basics of Adam Smith’s works (Smith, 1759), the notion of moral hazard defines the lack of broad and (sometimes long-term) vision of an economic agent involved in an action without bearing these action-related risks. Mostly applicable to the principle of outsourcing, this principle largely explains why companies deciding to outsource do so in order to “transfer risks” to their provider and make contractual arrangements. Ben-Shahar et al. (2013) and Rowell et al. (2012) also show that insurance and signaling can counterbalance the risk of moral hazard, just as in the case of adverse selection. Thus, these two basic notions of adverse selection and moral hazard nevertheless make it possible to explain the associated-risk factors within an outsourcing decision-making process. While risk transfer is one of the major benefits of outsourcing capabilities to external agents, “exogenous” shocks are an adverse selection factor. Moral hazard

incorporates the notion of risk transfer in the scope of the agent's behavior. Procurement organizations can be seen as intermediate organizations between the client and the provider that lessen the risks of adverse selection or moral hazard. Reputation-building and good contracting practices based on cooperation and quality insurance decrease the risks of adverse selection and moral hazard. It is now necessary to define the theoretical framework of outsourcing through the theory of transaction costs.

1.1.4 Procurement Organizations

As quoted from Thai (2001), public procurement is, academically speaking, a very large field of research: "Academically, public procurement has been a neglected area of study even though governmental entities and public procurement practitioners have diligently worked to improve public procurement practices." Public procurement and outsourcing both play a very large role in strategic aspects for considering organizations in a "Porterian" perspective. As such, Porter (1996) writes: "companies must be flexible to respond rapidly to competitive and market changes. They must benchmark continuously to achieve best practice. They must outsource aggressively to gain efficiencies and they must nurture a few core competencies in the race to stay ahead of rivals." Porter (1996) places outsourcing among the strategic tools for organizations: "total quality management, benchmarking, time-based competition, outsourcing, partnering, reengineering, change management." Procurement is one of the five main dimensions of the Porterian value chain, as described in the following figure.

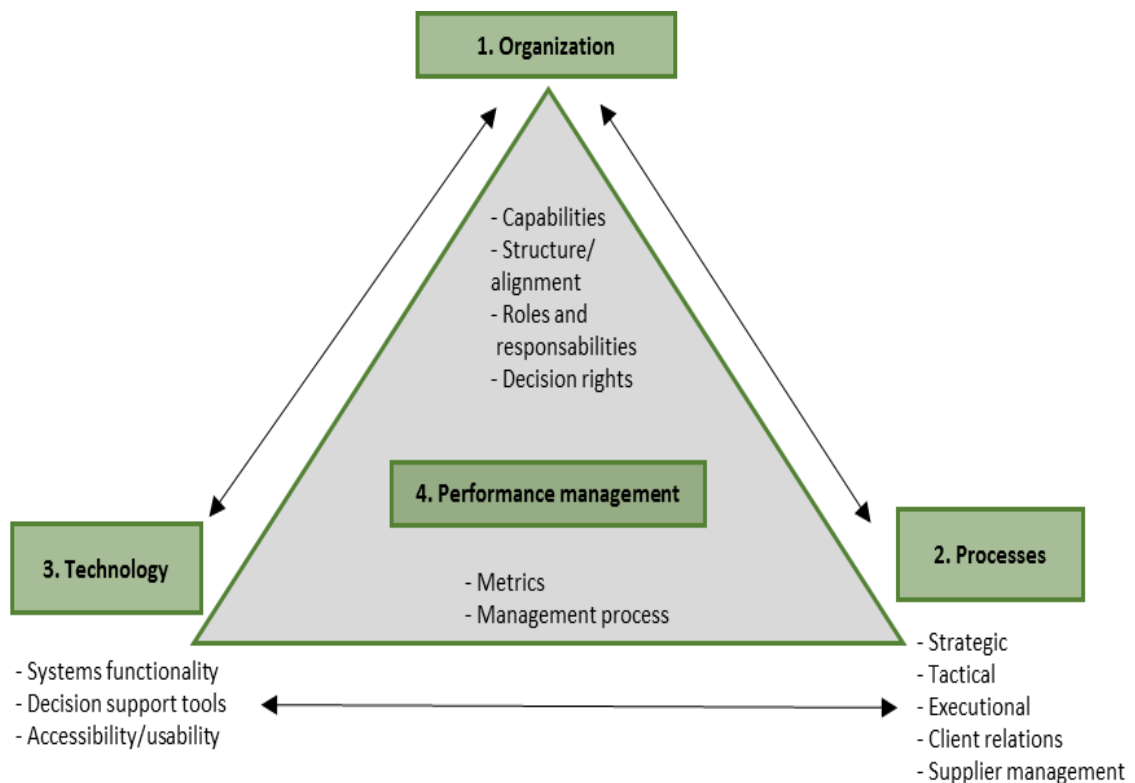
Fig. 4 Porter's value chain and procurement



Source: Porter (1985)

Mevel et al. (2014) introduced the management utility of procurement organizations in defining how the practice of vertical integration and pooling reduces transaction costs by avoiding outsourcing logistical capabilities to external providers. On the other hand, an analysis by Lessassy (2007) of central purchasing organizations discusses the transaction costs due to frictions in price negotiations between suppliers and distributors. This study shows that the strategic aspect of some products can give producers an advantage in price bargaining but that the conflict exacerbates their costs: procurement organizations are a means to hinder bargaining conflicts and to facilitate negotiations. Procurement is a multidimensional process, and its operating model can be explained by the next figure.

Fig. 5 Today's procurement operating model

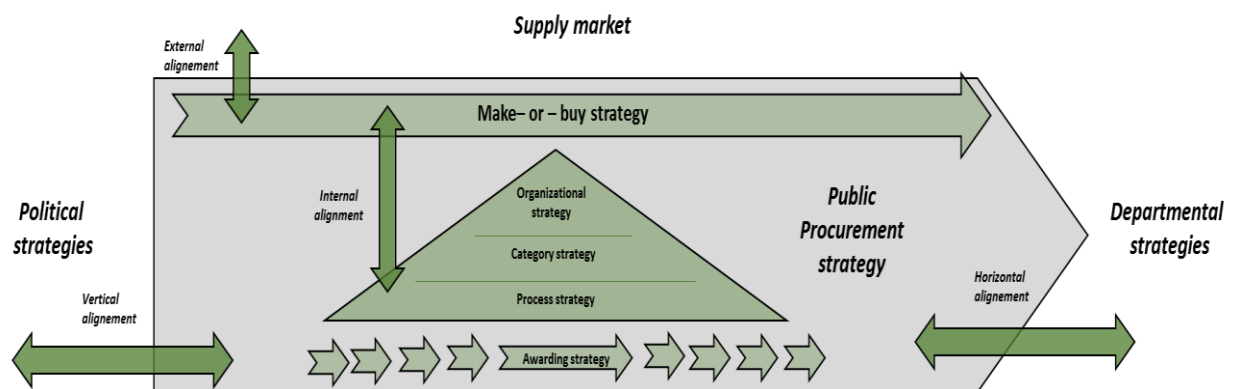


Source: PwC website: <https://www.strategyand.pwc.com/report/procurements-operating-model>; retrieved on 22/07/19.

It is now necessary to consider the topic of public procurement more precisely. The first concern is to define this concept and to differentiate between public procurement and procurement organizations. Giunipero and Sawchuck (2000) define procurement as follows:

“[it] comprises the actions taken by the purchasing organization to integrate supply chain in order to reduce costs and time and increase productivity.” Procurement practices are strategic for organizational performance (Oyuke and Shale, 2014), and they take place in an integrative process. Patrucco et al. (2017) describe the strategic role of public procurement in the following table.

Fig. 6 Public procurement and organizational strategy



Source: Patrucco et al. (2017, p. 2)

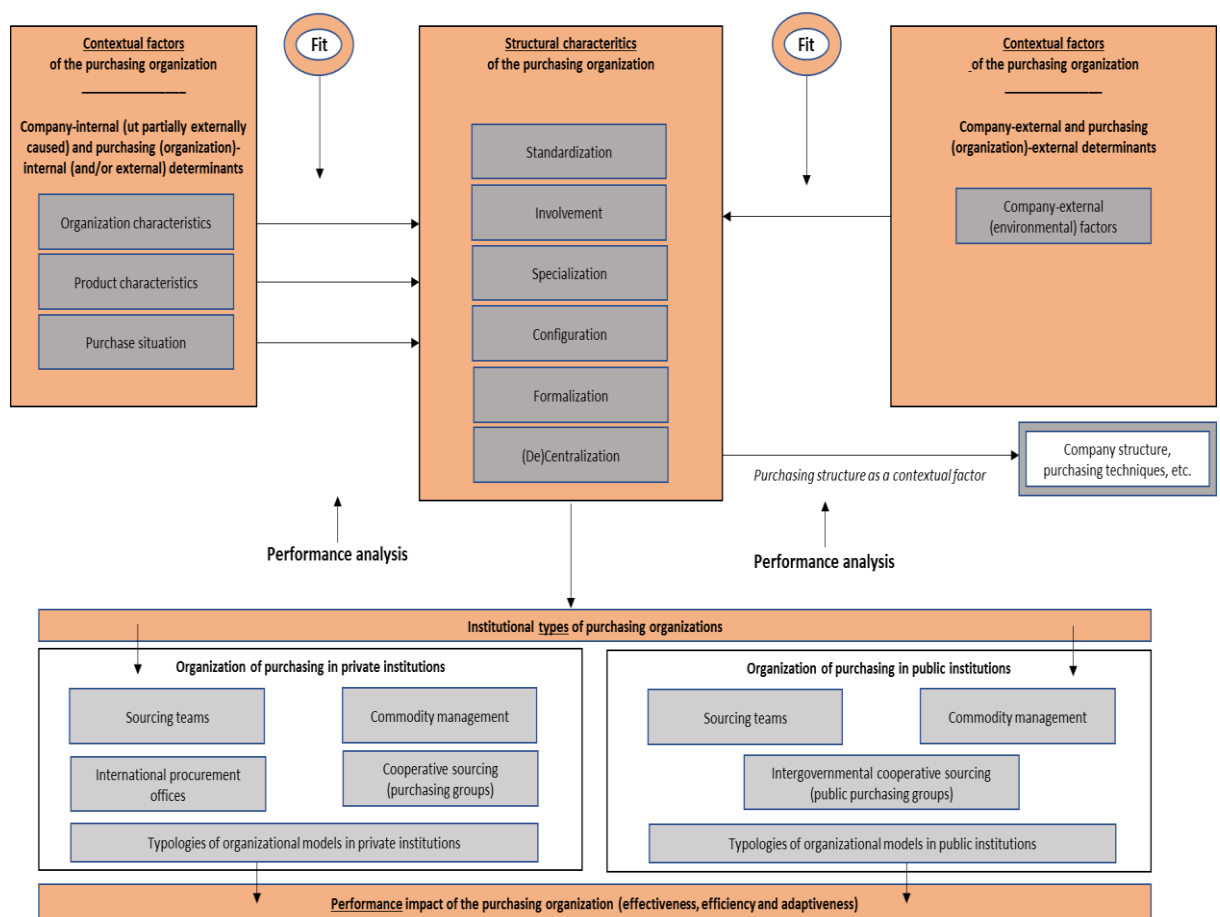
Procurement organizations have been reviewed by many studies. Telgen et al. (2012), who conducted a meta-analysis of public procurement, state that it differs from private procurement by having 20% of different demands. These differences are regrouped into five major types of demands (Telgen et al., 2012, pp. 17-19):

- External demands: (1) transparency, (2) integrity, (3) accountability, and (4) exemplary behaviors are the first dimension that make public procurement so particular.
- Internal demands: (1) diversity of the demands (Telgen et al., 2012, quoted from Murray, 1999): “Public organizations have to serve many goals at the same time”; (2) Political stakes and goals also have a strong influence on public procurement; (3) Many stakeholders are involved in public procurement.
- Context-related demands: (1) budget constraints; (2) “open budgets”; (3) “mutually dependent budget situations”; (4) “specific cultural settings.”
- Process-related demands: (1) strict limits and restrictive legal obligations; (2) uncertainty concerning the evolution of laws and regulations; (3) no interdiction of “cooperating with other public entities.”
- Extended roles for the public organization: (1) public organizations are often very big

buyers; (2) as public organizations, they have a very particular role within their environment because of their governing activities; (3) a public organization can determine “the rules and regulations according to which it has to operate” and they can audit their processes (Telgen and al; 2012, p. 7).

While these conceptions appeal to social considerations of public procurement (Blau, 1970), they also refer to the influence of internal/external environment factors upon public procurement (Lewin and Donthu, 2005). Based on meta-analysis, Glock and Hochrein (2011) proposed an analytical framework to replace public procurement and to see how public purchasing might be accomplished.

Table 8 Analytical framework of purchasing organizations

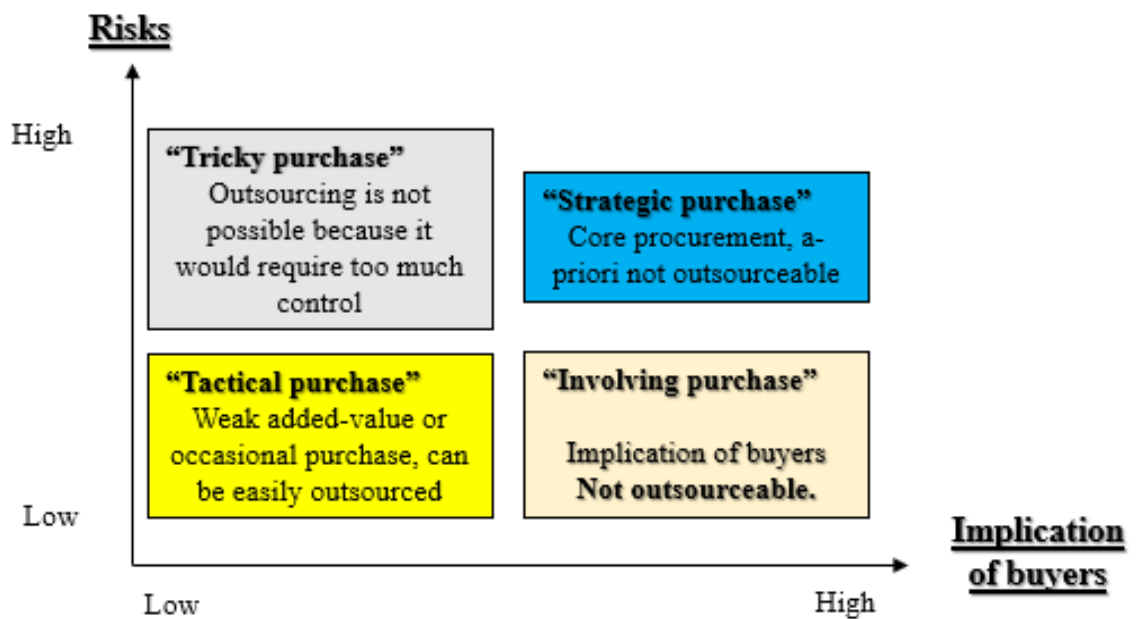


Source: Glock and Hochrein, 2011, p. 153

Carter et al. (2014) underline the paramount role of procurement organizations in outsourcing but how can procurement organizations also be outsourced? Outsourcing procurement organizations has been very well researched in the existing literature (e.g.,

Sals, 1989). Guiennet et al. (2009) define an actual stand on this question: “This approach is particularly suitable for non-strategic purchases that do not correspond to the core business, such as non-production purchases (telecommunications, transport and logistics, marketing and communication, investments, MRO, etc.) (...) Purchasing outsourcing primarily concerns non-production purchases (...) This often includes so-called ‘class C’ purchases (non-strategic, low-value, non-recurring purchases) generating significant administrative costs. Outsourcing is then partial and does not concern the entire purchasing function. The objective in this case is to reduce these management costs, to make purchasing gains, but also to free up time for buyers to refocus on higher value-added purchases or purchasing process activities. Outsourcing also reduces the number of non-strategic suppliers involved.” Procurement outsourcing (PO) can also be seen as too “risky” by some organizations that fear a loss of control in their procurement activities (Fernandez et al., 2007). Procurement outsourcing is a question related to the intrinsic nature of purchased items, as shown by Guiennet et al. (2009) in the following diagram.

Fig. 7 Purchased items and procurement outsourcing: a matrix



Source: Guiennet et al., 2009, p. 31

Considering this diagram, procurement “a priori” cannot be outsourced if it concerns strategic purchases, although cases of outsourcing of strategic PO exist. If risks or implications are too high, procurement cannot be outsourced. The only “easy” way to outsource procurement activities concerns “tactical purchases” because of their non-lasting

nature and because they do not belong strategic value chains.

As a result, three factors of performance can be attained through using purchasing organizations: effectiveness, efficiency, and adaptiveness. Procurement outsourcing must be considered within the framework of its environment and of its related market (Lepage et al., 2000). These performance impacts can be analyzed through the reduction of direct and indirect costs, and these kinds of costs are analyzed by transaction costs economics (TCE), a well-known theory to deal with outsourcing. In using TCE to make a model of PO, this thesis is in line with the continuity of Brewer et al. (2014).

1.2 Transaction costs economics and outsourcing

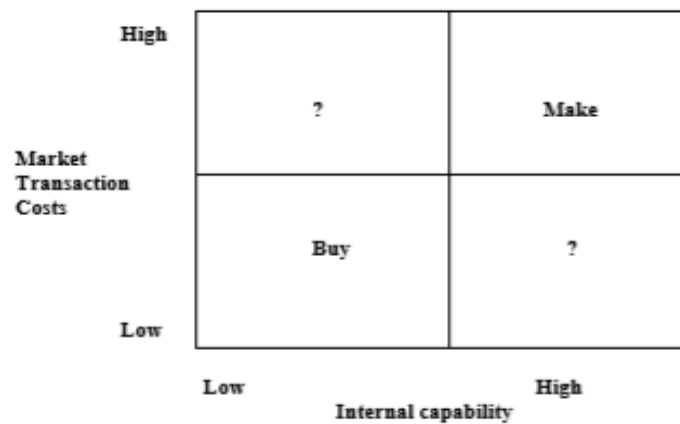
Outsourcing or insourcing projects can be seen through the prism of and defined by different theories. Different ways of analyzing the scope of such a complex phenomenon exist, and this thesis proposes to use one in particular: transaction costs economics (TCE). This approach has the advantage of enabling the understanding of different dimensions based on the study of costs in the general sense (direct and indirect costs). Transaction costs are a concept often ignored by outsourcing decision-makers and outsourcers, even though this theory is widespread. To illustrate this, Hartley (2007) shows that in the case of the UK's MoD: “Competitive tendering also involves transaction costs which are often ignored by the supporters of contracting-out (e.g., costs of organizing a competition, negotiating, policing and monitoring the contract).”

1.2.1 Theoretical frame of outsourcing

The basis of the theoretical reflection in this thesis rests on the theory of the firm as introduced and actualized in recent articles from Galiègue (2012), Argyres et al. (2012), and Tadelis et al. (2012) that reflect on the founding articles of Coase (1937, 1960). It then exerts a critique of the hypotheses relating to the homogeneous nature of exchanges and transactions regulated by the price mechanism that can be considered precursors of transaction costs economics (Williamson, 2008). It raises the question of the existence of the firms (Alvarez and Barney, 2007) and the study of the costs of organizations in an uncertain universe, which then makes it possible to explain why certain firms succeed better than their rivals. These considerations lead to the polluter-pays principle to fight against negative externalities in reducing transaction costs (McCann, 2013). This principle shows how a negotiation between polluter and payer makes it possible to reach a higher

balance in the Pareto sense because of a possible absence of transaction costs. As a result, the criticism in 1960 of the hypotheses of no transaction costs by Coase himself was fundamental in the initiation and development of the transaction cost theory (TCT) integrated by Williamson (1983, 2008, 2010, 2013) in the context of incomplete information. Therefore, it is asymmetrical with the concept of opportunistic transactions within the company that generate imbalances (non-Pareto optimal) in favor of one of the parties. Contractual provisions are seen as a way to mitigate the lack of information in outsourcing (Susarla et al., 2010). Nevertheless, although very strongly related to agency theory, the concept of opportunism is defined more generally by encompassing notions of moral hazard and adverse selection (Williamson, 1993; Grossman and Hart, 1992) and applies to relations within the company but also between rival firms (Rindfleisch et al., 2010). This relationship between opportunism, adverse selection, and moral hazard is particularly relevant to contractual environments in the military (Oudot, 2009). These successive works have introduced the theory of transaction costs and justify the existence of firms in the place of rational agents dealing with each other individually. This view of the company as a centralizer allowed TCT to evolve into the theory of “the nexus of contracts” with the founding works of Jensen et al. (1976) and more recently by McGaughey (2015), which incorporate elements of agency theory into the analysis of corporate finance by capital and debt. In addition, this funding generates responsibilities to creditors and shareholders who face conflicts of interest. Thus, control mechanisms with contractual incentives must be put in place, which thus define the role and existence of the firm as a nexus of contracts that take place within a legal framework that designates a firm as a “state-created” entity (Hoyden et al., 2011). Williamson (2008) examines the outsourcing decision (a function of a cost analysis) in the case of the company's vertical integration of production and puts forward the fact that transaction costs must be included in this outsourcing decision. Other authors, such as Everaert et al. (2010), draw additional perspectives on the outsourcing decision in exploring more “cultural” issues, such as the educational level of CEOs or the level of trust by decision-makers in external partners. The assumption of transaction costs economics in drawing a model of outsourcing (in the form of a “make or buy” decision process) can be summed up in the following figure.

Fig. 8 Transaction costs economics and outsourcing



Source: Parker et al., 2003, p. 100

This thesis is based on a study analyzed through the theory of transaction costs economics, but this theoretical axis must first be explained more widely. First, it is possible to illustrate this matter of fact in using the following example from the French ministry of the armed forces (*Ministère des Armées*) that clearly displays an example of the inherent difficulty of outsourcing:⁸

“Clauses of the contract require ‘efforts of interpretation,’ For example, the maintenance of the mess equipment is performed by the provider and is billed to the defense base on a piecemeal basis, if the unit cost of the operation exceeds 100 € HT. In fact, all the quotations offered by the claimant are more than € 100 HT. Beyond the difficulties of setting up quotes (is the labor included in the price, is it a unit price or is it applicable to a set of parts of the same family ?), the procedure is cumbersome because it constantly requires going back and forth between the provider and the base for the examination of quotations, thereby delaying the repair of the materials. For this reason, the provider was asked, in agreement with the finance purchase platform, to take over the entire maintenance service of the equipment, without this 100 € clause, even if he reconsidered his price proposal”.

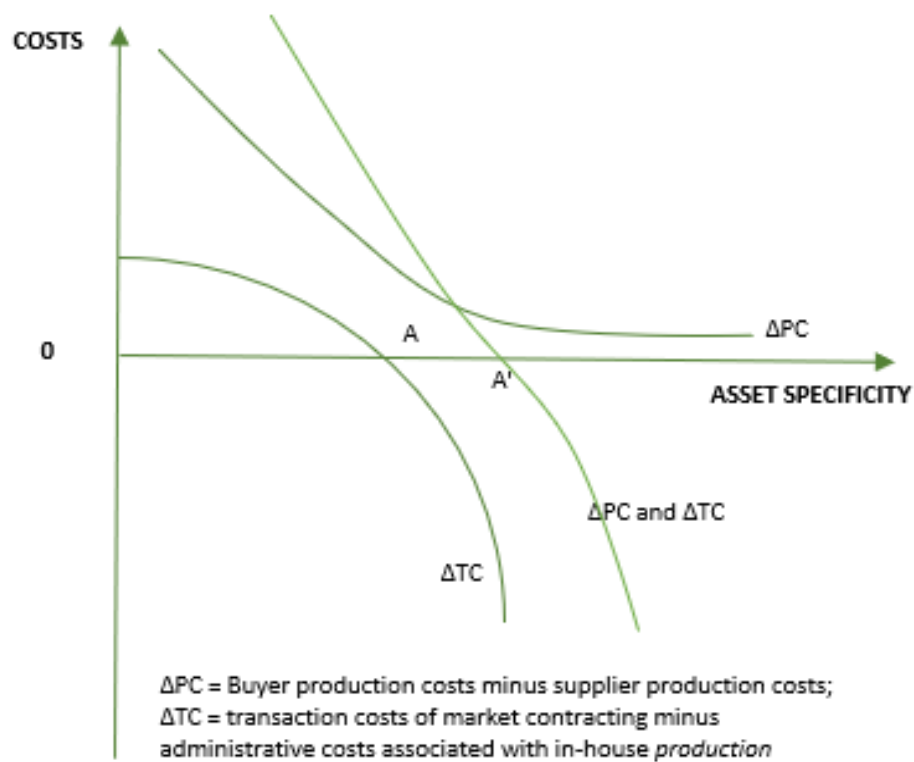
These costs are also interpreted as "relational efforts," as in the aforementioned example. Indeed, transaction costs are largely at basics of the model advocated by this thesis explaining outsourcing and/or internalizing behavior in the military.

The “military fact” is not a common production function because of the fluctuating nature of the notion of "core business" and "core competence" of its activities and

⁸ Rapport du Sénat. Bases de défense: une réforme à conforter. Partie F. « Faut-il davantage externaliser le soutien ? », URL: <http://www.senat.fr/rap/r11-660/r11-66012.html>, consulté le 18/06/2018

members and because of the state-related character in safeguarding the interests of a state's policy (Mazzucotelli, 2012). Defense is a public good characterized by its non-exclusive character and by significant non-rivalry (Irondelle, 2008). The way to define defense economic performance is also very complex and, in most cases, very incomplete. The fluctuating and highly cyclical geopolitical nature of defense policy, strategic direction, and operational missions creates great difficulties and uncertainty in the implementation of outsourcing. Interestingly, transaction cost economics takes into account the "operating costs of the economic system" and the aspects of "asset specificity" or transaction frequency that are strongly inherent in the military state. Indeed, TCE defines an increase in transaction costs with an increase in specificity, which could be a barrier to outsourcing (Williamson, 2008). This dimension is described in the following diagram:

Fig. 9 Relationship between asset specificity and transaction and production costs



Source: Canbäck (2006) adapted from Williamson, 1981: 560

The question of the "management" of these specificities by procurement agencies can therefore be raised. Galliègue (2012) discusses the role of new technologies for information and communication as a turning point in managing outsourced structures:

“Finally, the development of new information and communication technologies (NICTs) has also given rise to a multitude of studies demonstrating the gains they have made in terms of transaction and integration costs” (p. 23). Empirical analyzes of TCE are numerous, but the defense field has so far remained relatively unstudied, including in a "targeted" way, based on a case that may support a first specific modeling approach (Hartley, 2006). Because the results of the defense production function cannot be fully quantified, due to the complexity of arriving at a clear definition of performance factors, the TCE is more utilitarian and adaptive in addressing cost-comparison factors that favor or minimize the opportunity for outsourcing projects. O’Flynn (2007) also mentions a strong link between New Public Management's economic policies and the TCE (Muhlenkamp, 2006). Illustrated by the following quote: “Transaction cost economics is part of the New Institutional Economics research tradition” (Williamson, 1985, p. 16), it reaffirms this preponderance of behavioral factors: « transaction cost economics is more microanalytic, is more conscious about its behavioral assumptions » (Williamson, 1985, p. 18). The TCE is therefore an interesting global theory for its adaptive aspects, general and broad acceptance, and its ease of use. The TCE is not the only one of its kind to study inter-agent interactions of this type: other theories more or less related to the TCE or to the concept of transaction costs describe outsourcings’ relationships on "the market" or through "a firm" described as the meeting point and links between contractual relations. Sometimes it is defined as a "nexus of contracts" (Jensen, 1976 ; Weinstein, 1995) but not only that: according to Coase (1937), it can be defined in the following way: "(1) Firms and markets are two profoundly different modes of coordination; (2) What is fundamentally characteristic of the firm is the existence of authority; it is a hierarchical organization"⁹. According to Oudot (2007), the military actually fits into these conditions entirely, and this observation enlightens the role of defense procurement organizations, which seems to be paramount not only for contracting but also for renegotiating contracts efficiently, because of the established relationship between defense procurement organizations and industrial partners. Because of the high number of existing theories for exploring outsourcing, it is now necessary to define why this thesis uses transaction costs economics as the theoretical framework for its study of the role of procurement organizations between outsourcing and servitization in defense.

⁹Ibid, quoting: Coase R. (1937), « The Nature of the Firm », *Economica*, vol. 4, n° 16, novembre, traduction française: « La nature de la firme », *Revue française d’économie* n° 2, hiver.

1.2.2. Various theories: Why TCE?

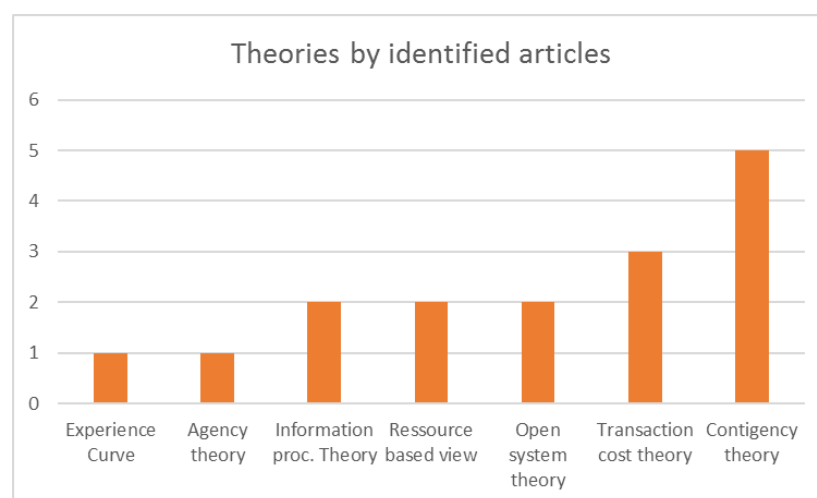
Outsourcing and insourcing are defined fully through different theories. Both the varying theoretical lenses used to analyze the phenomena and the spectrum of analyses are wide. Transaction cost economics has the advantage of understanding a cost-based dimension in a general sense. Among all of the numerous theoretical approaches, the three main theories in the context of the study of the "firm" are evaluated in a complementary way in this thesis, namely: (1) Agency theory, (2) Transaction costs economics, (3) Incomplete contracts theory.

First, agency theory includes elements that are relevant to this thesis, such as the principal-agent problem, information asymmetry, or opportunistic attempts of agents. An agency relationship can be defined as follows: "A contract in which one or more persons use the services of another person to perform on their behalf any task, which implies a delegation of a decision-making nature». This theory therefore partially explains the problem of outsourcing (especially for the risks of dependence on the provider or the occurrence of any negative externalities generating costs, as in the ethical field with the actions of some private military companies).

Incomplete contract theory provides another perspective while adding some, if not all, dimensions to an extension of TCE. This theory is also interesting to include in the study carried out on outsourcing phenomena by the prism of TCE. Incomplete contract theory refers to the informational incompleteness of the customer and the supplier and is based on the great difficulty for the customer in checking the performance of their supplier, due to the lack of property rights of the assets. This theory thus enters the field of TCE by inducing certain costs related to contracting, and it is particularly interesting in the case of the state partnership contract with the British forces (DES case). This study of the completeness of contracts plays a particularly interesting role in the context of the renegotiations taking place in this thesis. These elements join other theories, less developed here, but whose author takes up some basic concepts: theories of information and incentives and more generally, the game theory. This last theory is not used as a framework like TCE for a simple reason: TCE describes certain concepts and it is sometimes insufficient in the case of armies, and it is because of these shortcomings that this theory is chosen to develop the model of this thesis. All of the reasoning in this thesis is covered by the concept of bounded rationality." Developed by Simon (1947), it states that agents have only incomplete access to the information available and that their means of "processing" it

is insufficiently adapted to psychological, organizational, environmental or even a number of psychological factors. Simon's (1947) phrase "information available includes" signifies that the task is to replace the global rationality of economic man with a kind of rational behavior that is compatible with the access to information and the computational capacities that are actually possessed by organisms, including humans, in the kinds of environments in which such organisms exist. This concept is central to the evaluation of outsourcing policies in the military, and the factors behind this "bounded rationality" are also behind the definition of the tendency to outsource. It is therefore now necessary to define different economic variants at the foundation of outsourcing operations in the armies and to arrive gradually at the observation that TCE is not completely adapted to the study of the phenomenon in the context of the military action and this theoretical view, even if TCE constitutes the theoretical foundation of this research (notably, with the founding works of Coase and/or Williamson). One of the major differences between the civil sector and the armed forces also lies in the relationship and sociological motivations intrinsically linked to the military state, which counter the idea of an entrepreneurial notion of "core business" transposed to the military state. Nevertheless, TCE is still used in this thesis because it allows the truest representation of the role of buying agencies as carriers of the contract nexus, who thus reduce transaction costs for agents. To the same extent, the following diagram shows that TCE is also one of the most used theories in the study of public procurement, as in the meta-analysis of Glock and Hochrein (2011), among many other theories.

Fig. 10 Theories used in research on the organization of purchasing



Source: Glock and Hochrein, 2011, p. 154

It is therefore appropriate now to put in parallel outsourcing and servitization, which together are the object of the following section.

1.3 Outsourcing and servitization

Outsourcing and servitization are two very close concepts. The first allows an agent to entrust a third party with an activity then carried out in-house, whereas the second allows the third party to offer beforehand the possibility of outsourcing to the agent by adding services to the production of a well. This part aims first to define servitization from a more general point of view and as a means of attaining a «PSS" type system, then to put this theory into the dynamics of outsourcing.

1.3.1 A definition of servitization

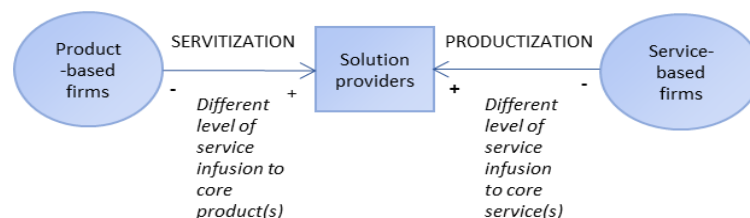
The concept of servitization of products refers to a global offer integrating the addition of services to a product offering to increase added value (Baines et al., 2014). This dimension takes place within a strategic value chain such as that of Porter (1996), constitutes a tool to enhance corporate incomes (Neely, 2008) and is a part of the concept of service operation management (Kleemann, 2011). Servitization of products is a widely known concept, but it is quite unstudied within the framework of outsourcing (Fontagné et al., 2017). However, it does provide perspectives to explain the phenomenon of outsourcing: when carried out by manufacturers of specific products (such as aircraft), servitization of products makes it easier to negotiate outcome-based contracts. Servitization of products also reflects the propensity of some organizations to expand their core competences and widen their offerings to maximize their economic rent, but also their propensity to develop themselves through outsourcing measures (Raddat et al., 2016). In meeting both outsourcing and servitization, an "optimal" intersection of both of these dynamics can result from a proper allocation of the roles and involvement of each of the stakeholders. This thesis therefore integrates the notion of servitization to explain the crossover between the public administration's propensity to outsource competences and capabilities and the manufacturer's propensity to get the maximum return on investment on its production by providing services to products. Servitization of products (as well as productization of services) is part of an overall organizational strategy as primary activity (Porter, 1996; , Lay, 2014 ; Rabetino et al., 2017) and is now at the heart of a marketing orientation that

ensures a beneficial customer-focused relationship (Oliva et al., 2003; Zhang et al., 2017) over the entire lifecycle of the manufactured product considered. Various factors explain this shift towards the service of the manufacturing industry, including the search for competitive advantages and the search for increased financial profitability (Lee, 2016). The role of the intermediary organizations can be deemed essential in order to provide an interface to limit direct and indirect costs on both sides and to achieve maximum overall benefits (Lessassy, 2007). As shown by Penttinen et al. (2007), the servitization of products (as well as productization) leads to major changes in interfirm relationships. After defining the overall process, this reflection will be complemented by a definition of the concept of servitization of products and the concept of productization of services that can be subject to the same considerations as an addition of products to a service offer. In order to give a definition of servitization, we can quote Baines et al. (2013): "Servitization is much more than simply adding services to existing products within a few large multinational companies. It's potentially about viewing the manufacturer as a service provider. A service provider that sets out to improve the processes of their customers through a business model rather than product-based innovation. The manufacturer then exploits its design and production-based competences to give widespread improvement in efficiency and effectiveness to the customer."

Servitization of products can be seen here as a specific philosophy within the company that focuses on adaptative solutions, as also defined by Davies (2004) or Neely (2007) as "integrated solutions" or, according to Barnett et al. (2013), as: "the move by firms to gain value from service associated with their products, which requires a strategic rather than incremental change in the provider firm." These elements show that for the customer servitization means an added value following the purchase of a product (or service) by a company that offers a "continuation" of its production through the aforementioned various means. For the manufacturer, it allows extended benefits and expanded income opportunities with increasingly "blurred" boundaries between goods and services (Gallouj et al., 2009) and by "capturing" customers in increasing customer loyalty (Baines et al., 2010). Servitization is also a factor in enhancing (and therefore increasing the pricing) of value of the manufactured product concerned (Vandermerve et al., 1988; Ahamed, 2013). If servitization can be defined as the way in which a "supplier" offers additional services, it should also be stated that the opposite logic (focused on services) exists: productization of services. The latter is a concept that consists of adding an offer of additional goods related to already produced services (Baines et al., 2013). It is defined by

Baines et al. (2007) as: "the evolution of the services component to include a product or a new service component marketed as a product." The main purpose of servitization and productization is about quality—differentiating the quality of a company on its addressable market (Rouse, 2001). Productization refers to the upgrading of service offers with the inclusion of a product or the materialization of a service or expertise (Jaakkola, 2011). A good example of productization of services can be found among telephone companies which offer new phones for customers entering into new packages. Some operators are able to improve their market positioning and image by offering high-ranked phones to their loyal customers. These packages confirm that productization of services or servitization of products can make it possible — by improving an operator's branding and its image — to enable the latter to offer its services at higher prices to "committed customers." This example is in line with a study by Davies et al, (2007) on the telecommunications sector. In another case, Valminen et al. (2007) studied productization in small firms (such as law firms and architects) in Finland and had the following findings: the implementation of productization clarified the pricing of services and improved the service experience for clients through customization and adaptative offers. All this has permitted the establishing of a long-term B2C relationship that leads to an increase in created value. Similarly, the productization of services seems to allow an integrated offer leading to the outsourcing of some of the customer's capacities (as shown in the case of DHL) and a logistics offer providing the company's own communications gears, structures and networks and optimized for the proposed service (Vandermerwe and Rada; 1988; Leoni, 2015). Servitization of products and productization of services are converging dynamics leading the producer to become a « solution provider », as shown by Leoni (2015) in the following figure.

Fig. 11 The solution provider model

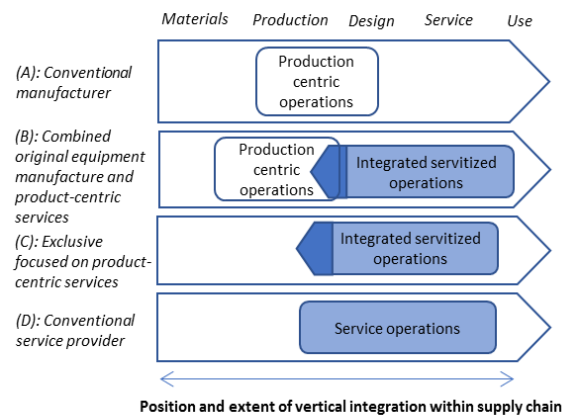


Source: Leoni, 2015, p. 14

Productization and servitization are tied together as converging “solutions.” Servitization of products can be therefore understood as a conceptual iteration in the choice

of a middle path in the process of producing of goods or services (Mahut, 2017). This theoretical notion can integrate a "production centric" type of behavior, as described in the following diagram reported from Latonen (2017) and derived from Baines et al. (2011).

Fig. 12 Vertical integration practices for production, servitizing, and service operations



Source: Baines et al. (2011)

According to Baines et al. (2012), the servitization of products includes three levels of achievement: "Base," "Intermediate," and "Advanced" services. These three steps increasingly correspond to different levers for the "dematerialization of offered services," from product-related ones to income insurance ones. These are described in the following table.

Table 9 Mega-clustering of service offerings

Relative characteristics of cluster

	Principle on which cluster is defined	Range of service activities	Extent of risk	Revenue payment	Examples of services offerings within cluster
Base services	Focus on product provision	Narrow: activities centered on and around production competences	Low: easily delivered for an Enterprise with manufacturing competences	Point: largely on completion of contract	Product/equipment provision, spare part provision
Intermediate services	Focus on condition maintenance	Broadenings: based on the exploitation of production competences to assure state and condition of equipment	Medium: increased exposure to the consequences of equipment faults	Periodic: some upfront and/or on completion. Maybe with interim payments	Scheduled maintenance, technical helpdesk, repair, overhaul, delivery to site, operator training, condition monitoring, in-field service
Advanced services	Focus on outcome assurance	Extended: stretching the manufacturing enterprise to take on activities that are usually internal to the customer	High: financial penalties incurred almost immediately if equipment fails to perform a specified	Linear: pay-through-use with period adjustments in rate	Customer support agreement, risk and revenue sharing contract revenue-through-use contact, rental agreement

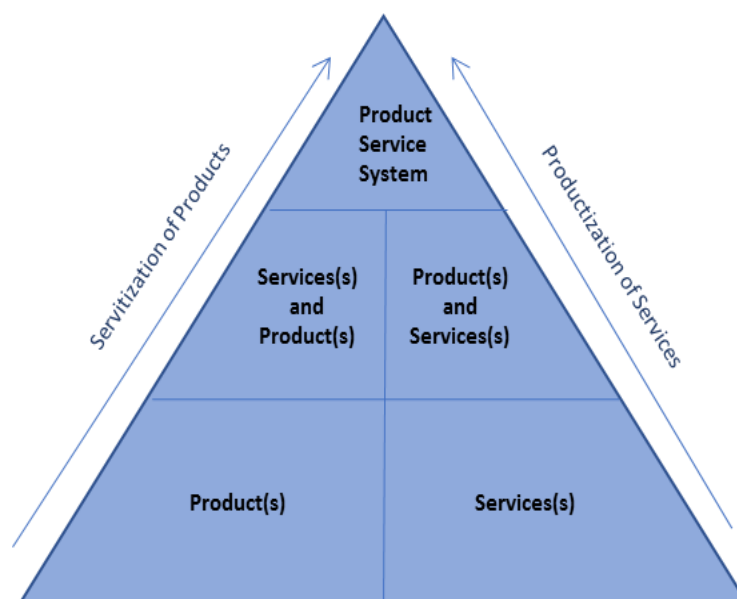
Source: Baines et al., 2012, as quoted by Latonen (2017)

A very relevant illustration of servitization can be found in the case study of the firm Xerox and the photocopier industry (Visintin, 2014). The photocopier manufacturer was indeed a pioneer in the concept of product servitization. Therefore, this company was one of the first to offer, in addition to the delivery of its photocopiers, customized maintenance services of these products. This is to illustrate the hypothesis that the opportunity for outsourcing projects is encouraged by the provision of "complete" solutions from the manufacturer of an asset. The concept of a product–service system can therefore be defined in using the two aforementioned components to define the dynamics towards a single product–service offer (Baines et al., 2007). The contribution and purpose of servitization toward a product–service system will now be covered in the next section.

1.3.2 The goal of servitization: The Product-Service-System

Velamuri et al. (2011) describe the purpose of servitization (productization) as leading to the creation of "hybrid value," defined as: "The process of generating additional value by innovatively combining products (tangible component) and services (intangible component)." Baines et al. (2013) also indicate that Xerox describes itself as a "service-led technology company" and refer to the final concept of "Product Service System", whose pathway can be described as a "two-way triangle" in the following figure:

Fig. 13 Servitization and productization, two ways to PSS



Source: Baines et al., 2009, p. 4

As in Tukker's (2004) article, the following definition of the product–service system concept can be used: “a product–service system (PSS) can be defined as consisting of ‘tangible products and intangible services designed and combined so that they jointly are capable of fulfilling specific customer needs” (Tischner et al., 2002). Another definition of PSS can be quoted from Goedkoop (1999): “a marketable set of products and services capable of jointly fulfilling a user’s need. The product/service ratio in this set can vary, either in terms of function fulfilment or economic value.”

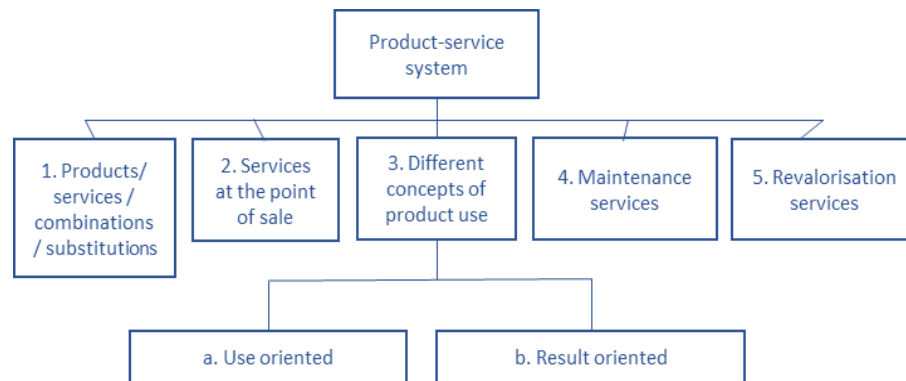
These definitions clearly highlight the positive effects of servitization and/or productization processes in terms of the adjustment of capabilities as closely as possible to the customer's requirements and needs. The diagram clearly illustrates the PSS as an outcome of both processes, which are intended to lead to a complete synergy, as well as to a convergence of these two productive dimensions. The case of aircraft maintenance performed by manufacturers fully fits into these three types of PSS as described by Benedetti et al. (2015), where the addition of services is adapted to the customer's needs as well as to the different phases of the life cycle of the manufactured product. This study therefore shows three types of expression for each of the two orientations chosen for the different types of processes used. Benedetti et al. (2015) describe a classification of the PSS concept according to three types:

- “Product oriented”: this category includes services related to the offered products during their lifetime or in their end-of-life period. It also includes using advisory services to improve customers’ experiences.
- “Use oriented”: the good remains the property of the provider, who offers access and use services to it according to different procedures: leasing, rental and product sharing, pooling.
- “Result oriented”: Outsourcing or activities management where the supplier "acquires" an activity formerly performed by the customer, Benedetti et al. (2015) speaks of a "pay per service unit," in which "the supplier sells a final result most often in abstract terms, without specific prescription of the type of technology or product to be used.”

It is straightforward to conclude that while these three dimensions are significant, the third ("result oriented") dimension corresponds quite closely to the practice in many inter-organizational partnership contracts, such as those related to the provision of pilot training aircrafts, forcing the provider to ensure optimal technical operational availability

of training aircraft (Olsson, 2013). Another definition of the PSS is given by Mont (2002), as explained by the following diagram.

Fig. 14 Classification of a PSS

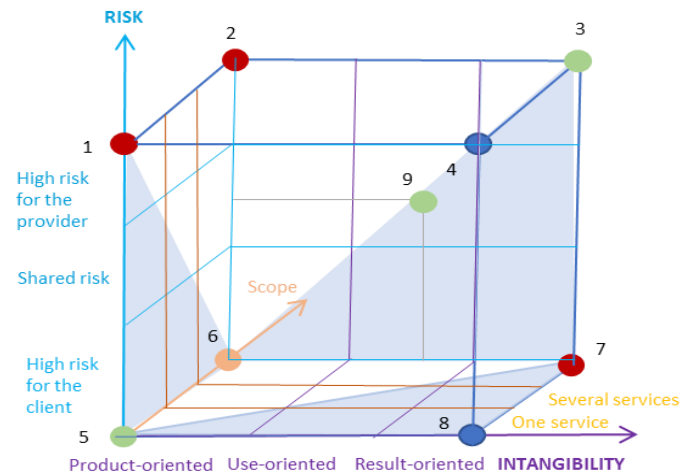


Source: Mont, 2002

This diagram uses the previous definition but focuses on the "product-oriented" dimension, whereas the two other concepts are grouped together in Box 3. The latter is particularly noteworthy because it illustrates the case of customer service provided by the manufacturer (for example, as in the case of helicopter maintenance provided by Airbus Helicopters). Box 2 can be illustrated by the home delivery services of department stores. To a certain extent, Box 5 can be included in the case of aircraft retrofits or specific modifications and overhauls made by the manufacturer.

Mont (2002) implies that reaching a PSS induces deep society changes: "(1) the sale of the use of the product instead of the product itself, (2) the change to a 'leasing society', (3) the substitution of goods by means of service machines, (4) a repair-society instead of a throw-away society, (5) the change in consumer attitudes from sales to service orientation." In the graph below, Benedetti et al. (2015) provide a description of the risks (and their positioning from the side of the customer or service provider) and of the "intangibility" describing the placement of the type of contract concluded between the two contracting sides. All this is weighted by the intensity of the contracts (i.e., the relative proportion of services that are left to a service provider). Taken from a research article on energy supply, this example is worth mentioning because the strategic aspect of the energy sector is reflected in all types of support services dedicated to the armed forces.

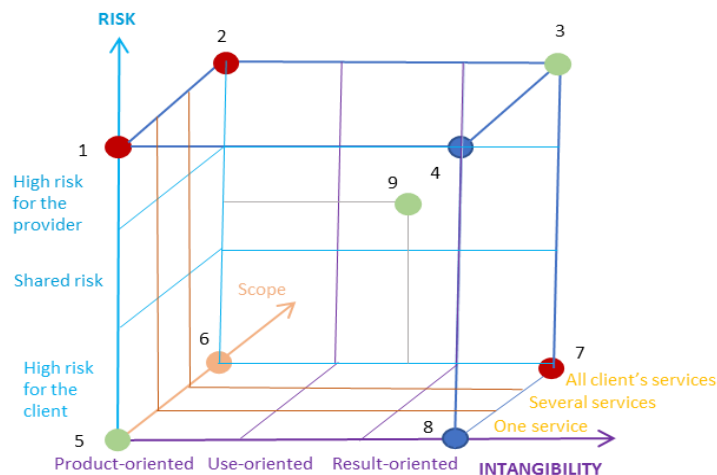
Fig. 15 Classification of services in energy



Source: Benedetti et al., 2015, p. 255

This classifications in this graphic illustrate the "scope" according to Sorell's (2007) definition, which induces the number of "vectors or services" (Benedetti et al. 2015, p. 254) according to the three types of contracts and their orientation on the products or services that are included in the contract. The research by Benedetti et al. (2015) results in the following "cube":

Fig. 16 Key points of PSS-related contracts: the case of energy providing

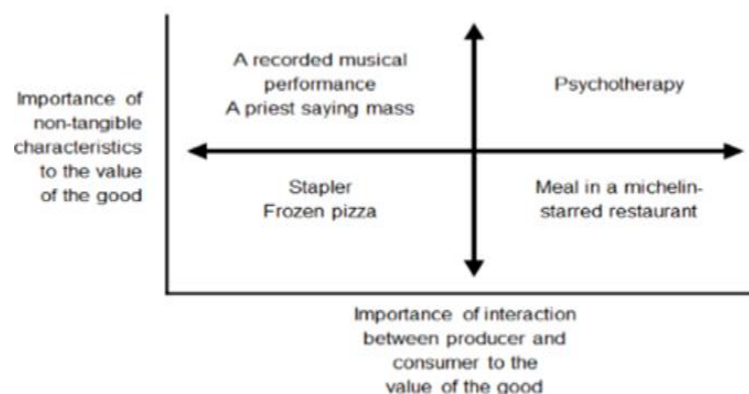


Source: Benedetti et al., 2015, p. 256

In addition to this study, it can be concluded that the adequacy of the positioning of the risks and the type of contracts is based on the "scope" that demonstrates this integration. The "high risk" category on the supplier's side is acceptable in the case where the supplier fulfils a "result-oriented" type of contract, which gives them total freedom in the use of

their resources to meet the customer's needs. In the very particular case of energy supply, the provider can achieve scale economies (Benedetti et al., 2015, p. 255). In the case that the risk is high for the considered category of client, a product-oriented contract is preferred. The product–service system is therefore a "mixture" of both the production and supply of goods and services. These relative shares can be measured in the framework of a PSS. For example, according to an Aston Business School case study of the Xerox company, goods represent a 46% share, while 54% are related to services. In the case of Rolls-Royce, both trends are equal, with 50% of goods and 50% of services.¹⁰ The definition and achievement of these relative shares is specific to each company's respective objectives. Goedkoop et al. (1999) summarize the meaning of the PSS as a "system that consists of products and services that fulfill user needs." The description of a PSS and its evolution is based on two main dimensions (Gemser et al., 2010): intrinsic value (which is similar to the "intangible" aspects of Benedetti's [2015] definition), which can be defined as the "importance of non-tangible characteristics to the value of the good," and interactions between the provider and its end-customer. Therefore, it has to be understood as a simplified, two-dimensional evaluation of the systemic aspect of the production of a good and/or a service. This dimensional assessment can be done using the following two-dimensional matrix, which can be used to determine the type of needs met by the service provider, especially in the context of the study of an outsourcing contract. The following diagram from Gemser et al. (2010) very briefly defines this typology of market placement and customer relationship.

Fig. 17 Positioning matrix



Source: Gemser et al., 2010, p. 6

¹⁰Aston Business School (2013). Servitization impact study: how UK based manufacturing organizations are transforming themselves to compete through advanced services, p. 16

The "customer" orientation of an activity is then both readable and quantifiable within the framework of the PSS and enables the specific characteristics of the demand to be studied, the latter corresponding to the specific logic and interests of the producing organization. The situation of outsourcing involves a transfer of capabilities, sometimes requiring the use of a "central vector" in the implementation of these capabilities (such as the case of the aircraft used in pilot trainings). The case of aircraft maintenance and, in a broader sense, the improvement of aircraft technical readiness corresponds to an improvement of the characteristics of the previously mentioned vector. That is the main reason why this thesis mainly refers to product servitization in both of the cases explored. This approach is part of a complementary concept described in the literature; namely, that of "Servitization of Business" as in Vandermerwe et al. (1988), where "modern corporations are increasingly offering fuller market packages or 'bundle' of customer-focused combinations of goods, service, support, self-service and knowledge" with the aim (for producers) of "sharpening their competitive edges." This vision confirms the adaptive goal of a provider towards its customer. This ability to be adaptable, within the framework of the PSS, makes it possible to differentiate an offer on the market and to be attractive enough to be considered by public procurement organizations and stimulate an interest in the "uniqueness" and the "novelty" of what is being offered.

1.3.3 Servitization of products: a competitive tool in the context of outsourcing in the public sector

In the history of the development of the concept of servitization, it is possible to imagine a "timeline" from the early 1960s to the present day. The central characteristic of the "servitized" proposal is a strong customer orientation, which differentiates it from the more "production-oriented" approach. More concretely: the provider produces what the customer demands and refines the production variables as precisely as possible in order to meet the customer's exact needs as closely and as efficiently as possible. This consideration would further compel the customer to buy "what exists," so the provider would no longer deprive itself of a category of customers who would otherwise never have had sufficient incentive to choose the good or service offered. The thinking behind service-oriented approaches is therefore consumer-driven. This issue can be explained using a Japanese case and the expansion of the case-related production model in the period considered here (Yorozu, 2014). This conception of service complementarity is perceived as the keystone of the

notion of marketing mix (Sipper et al., 1998). The market evolution at the end of the 1980s and during the 1990s enabled a rethinking of the logic and philosophy related to the production of services, which appeared as a novelty in the global production process. Two central notions are used to characterize this evolution:

- An evolution of the relationship to the product life cycle, particularly in the industrial context (Lewitt, 1965);

- A value migration (Slywotzky, 2003).

Outsourcing in the public sector began to increase soon after this global market evolution (and even more so in the military). In the case of France's military, it has been mentioned that the "outsourcing train" was accentuated and accelerated with the professionalization of the armed forces consecutive to the suspension of the draft in France, a measure taken by President Chirac in 1996. We can therefore deduce a "crossroads of approaches" between the desire to professionalize the armed forces and refocus them on their core operational activities and the rise of the concept of servitization in production and supply from private providers. This evolution concerning sourcing issues naturally pushed potential service providers to differentiate themselves by using outsourcing offers as tools for competitive differentiation (Prahalad et al., 1990), particularly in the case of public procurement in the context of New Public Management. By taking advantage of the service offers of private providers, public authorities can outsource selected skills, particularly support skills, and thus continue to exercise sovereign prerogatives in a context of particularly high efficiency (Quinn et al., 1990). Vandermerwe et al. (1988) also specify that servitization makes it possible to meet more customers' needs in the "accelerative and accelerating" context of markets: "Servitization is happening in almost all industries on a global scale. Swept up by the forces of deregulation, technology, globalization and fierce competitive pressure, both service companies and manufacturers are moving more dramatically into services" (Vandermerwe et al., 1998, p. 315). The aforementioned concept of "servitization of business" specific to Vandermerwe et al. (1988) has been schematized as adding goods and/or services to the initial provision of a good or service in order to obtain a final global product (a "solution") composed of the good (or service) supplemented by an additional and complementary service (or other good), or for instance by a consulting service (customer support). In the case of asset maintenance services, the example of "In Service Support" (or "ISS") constitutes a transfer of knowledge through training and support services (case of industrial technicians support during the implementation of new generation helicopters). Finally, the notion of "self-service", that

offers the customer the possibility to define and readjust his needs during the production process and also during the use of the service (Vandermerwe et al., 1988, p. 316), also forms a core part of the concept of servitization. In a context of outsourcing (particularly in a public one), the differentiation dimension related to the "servitization of business" allows other key functions to be identified and adjusted by the customer during the production process and also during the use of the service (Vandermerwe et al., 1988, p. 316).

These dimensions can be related to the notion of customer loyalty due to the relations between the client and the service provider, in particular during the renegotiation of the partnership contract¹¹. The competitive advantage induced by servitization is achieved through the prism of several dimensions:

- It enables competitive barriers to be overcome: the provision of services leads to a specialization of the offer that differentiates the service provider's offer from that of its competitors. The relationship built with the customer allows the chosen provider to deepen this area of expertise. Ultimately, this deepening enables them to acquire (in the eventuality that the performance is satisfactory) an historical legitimacy with the customer. This kind of relationship also allows the provider to better appreciate the evolution of the customer's needs (Griffin et al., 1995). Hence, this is a "knowing first" approach through which the selected provider can stay one step ahead of other potentially competing providers (Griffin et al., 1995).
- The possibility of building barriers and specificities with "third parties" enables a relationship between different agents in order to maintain a level of "know-how."¹²
- Limits are built in customer behavior by mapping the market to "block" potential entrants. The purpose here is to introduce contractual and economic dispositions to foster "enforced" customer loyalty¹³.
- Incentives exist to foster innovation: the intention of suppliers to be innovative in their offer of goods or services encourages them to invest in research and development functions and thereby enables the contractor to benefit primarily from these innovations. The contractor is also able to strengthen the customer's loyalty through the value created and the time spent ahead of its services. This can be profitable to the entire economy through the introduction of new practices and technical/scientific innovations into the marketplace (Vandermerwe et al., 1988, pp. 320-321). Servitization methods and processes such as

¹¹Ibid, p. 316 et p. 320

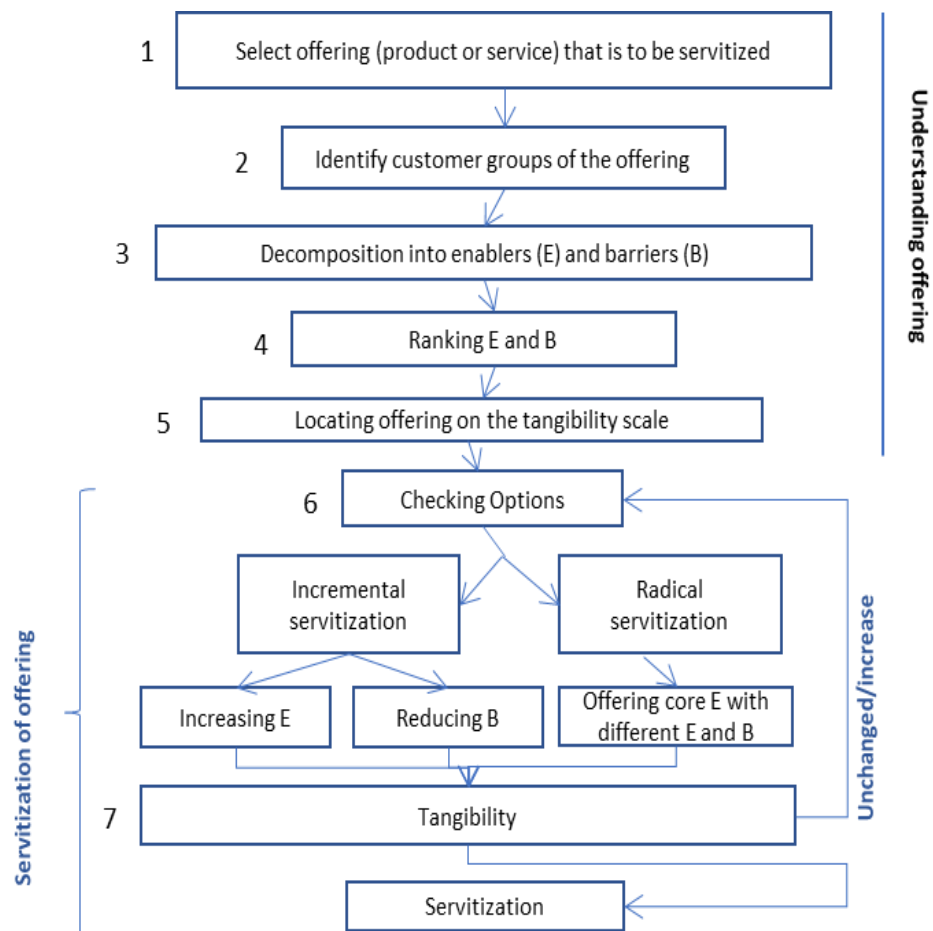
¹²Idem, p. 319

¹³Idem, pp. 319-320

those used in public outsourcing and that concern "technical" capabilities (such as purchasing new equipment) are in accordance with the "product life cycle" process and incorporate the same dimensions as those used by private actors.

As a conclusion, servitization is induced by several main reasons: "retaining" the customer, "pushing back" competitors, and enhancing the level of differentiation (Gebauer, 2008, 2012). Therefore, we can quote (Latonen, 2017): "Lock in customer and Lock out competitors and Increased level, close customer relationship plays a significant role in the delivery of successful and sustained advanced services contract." Through the servitization process, the interaction and communication between customer and supplier increases (Bastl et al., 2012). Servitization methods are described by Tauqueer et al. (2018) as following seven different steps, from "understanding offering" to the "servitization of offering" and inducing a pivotal point on tangibility of offering (Guangjie et al., 2007). This model is displayed in the following figure.

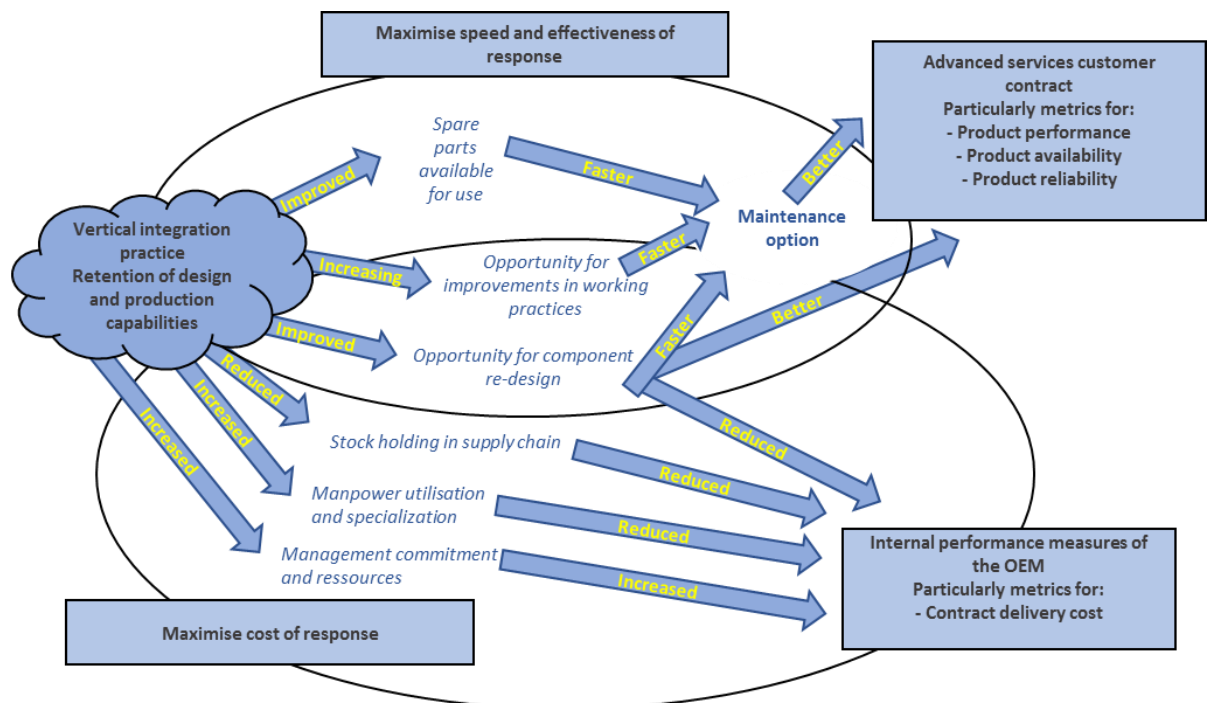
Fig. 18 Methods of servitization of products



Source: Tauqueer et al., 2018, p. 5

The provision of additional services to the sale of goods thereby makes it easier for customers to be able to purchase them. This notion also optimizes the delivery of goods, makes the performance more competitive, and adds subsidiary support services, such as knowledge transfer related to the use of the product. Servitization is a cross-over solution that can meet the armed forces' outsourcing needs and thereby provide a "win-win" solution for public administrations and contractors. Indeed, it is also well known that outsourcing is a growth lever for the private sector (Bellais et al., 2009) and makes it possible to develop civil-military actions (Bellais et al., 2009). It has nevertheless been established previously that the military sector cannot be completely outsourced, due to its specific characteristics, its sovereign aspects, and the influence of regulations and laws that can prohibit mercenaryism (Chapleau, 2013). Latonen (2017) illustrates an interaction between a trend toward vertical integration and a "pressure" to obtain "advanced" services within the framework of new contractual approaches, as represented in the following diagram:

Fig. 19 Vertical integration vs. contracts extension



Source: Baines et al. (2011) quoted from Latonen (2017)

Servitization can be seen as a modality related to the outsourcing of capacities by the customer. This concept therefore focuses on the general customer's utility in relation to the enjoyment of an asset and not necessarily on its ownership. In addition, it allows, through the transfer of responsibilities to the service provider, a better consideration of risks and less uncertainty, particularly in the case of maintenance services (Latonen, 2017). Servitization is a process that can perfectly be tied to the make or buy approach. As shown by Saccani et al. (2014), “servitization implies that manufacturers make decisions about the *make or buy* of the capabilities required to develop and deliver the service elements of their offerings, and about how to shape and manage supplier relationships.” This dimension is shown in the following table:

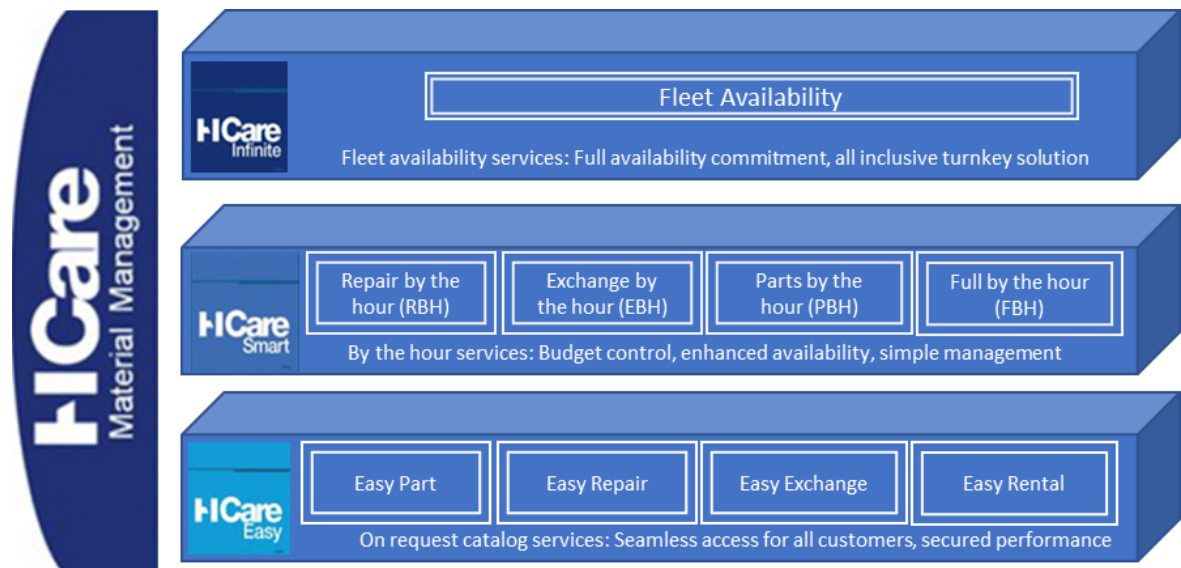
Table 10 Make or buy approach correlated to service offering

<i>Make-or-buy approach</i>	In-house (make)	(1) After-sales services seller	(3) Life-cycle solution seller
	Integrator (mixed or buy)	(2) After-sales offering integrator	(3) Life-cycle solution orchestrator
		After-sales	Lifecycle/Customer
		<i>Service offering extension</i>	

Source: Saccani et al. (2014)

Outsourcing and servitization are tied together, leading to a “factor-free economy” (Fontagné and Harrison, 2017) where both trends help to meet the needs of different types of customers, making business more and more competitive on a global market (Kastalli et al., 2013). In the case of aircraft maintenance, the example of the Airbus material management proposal can be used to show how different services added to manufactured goods can help produce a product-service system. In this example, Airbus proposes three types of material management solutions, from catalogue services (“aimed outsourcing”) to fleet availability services (global solutions, outsourcing).

Fig. 20 Servitize to make others outsource: Airbus HCare material management



Source: <https://www.airbus.com/helicopters/services/material-management.html>, retrieved on 15/07/2019.

When delivering high added-value and highly technical products, servitization implies a relationship where the customer relies significantly on the service provider (Brown et al., 2005, p. 22). This concept is particularly relevant and cost-effective for products with a particularly long-life cycle, such as in the case of aircrafts, where the life cycle perfectly overlaps with the "ideal" length of an outsourcing contract (Turunen et al., 2012, p. 2). According to Alivzos et al. (2010), the servitization of products generates value, in particular by complementarity with outsourcing: "In this sense, servitization may be understood to be deployed along two dimensions. The first would be perceived value enhancing or value adding dimension and the second, a customer cost-reducing or outsourcing dimension." This crossover of concepts is also consistent with a comparison of placement and technology strategies. Welch et al. (1992) set out an inter-essential principle in the context of confrontation and convergence between servitization and outsourcing, called the Strategic Sourcing Model (SSM), under which a sector's approach when facing various providers is based on three main axes: to investigate the technological process and what it brings to the market placement of the customer (Tasseda et al., 2012).

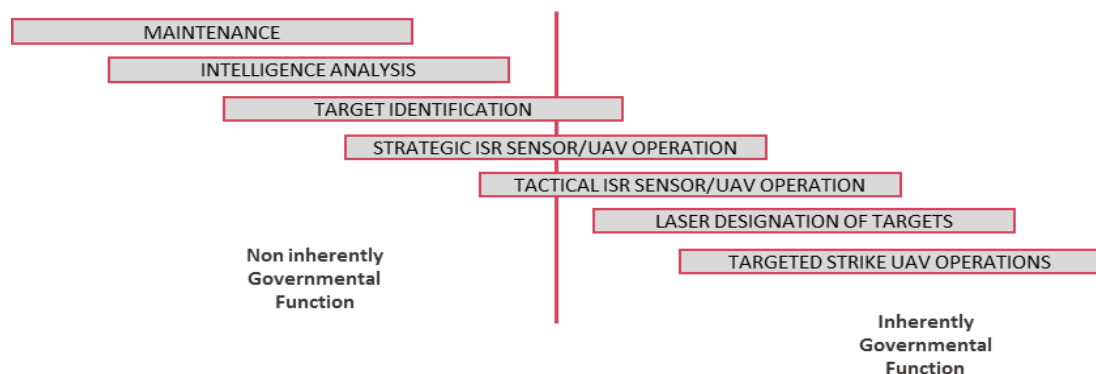
Consequently, this approach recommends the hiring of a service provider in situations where the customer does not have a "technological advantage" that can be transformed into a "competitive advantage" (which would imply keeping in-house sectors

where the customer is competitive from a technological point of view). This approach seems interesting in a sector with a high technological value, such as military aircraft maintenance. It is indeed a sector that has a close relationship with the industrial sector and a high technological value. However, this theorization does not correspond to what is expected in a comprehensive way in the armed forces: it does not mention organizational and process-oriented barriers, which are particularly important area for them.

Thus, a strictly technological approach is incomplete and must therefore be complemented by a TCE-type approach. In addition, servitization is also receiving criticism because of its approach in terms of profitability. Indeed, the research done by Gebauer et al. (2005) examining the operating modes of 30 manufacturers resulted in a "service paradox" in which the increase in production costs of the servitization process is not totally counterbalanced by the additional revenue obtained.

This configuration is challenging in the context of the armed forces. Indeed, when combined with outsourcing measures, it applies to a strategic sector. As a consequence, certain skills that could theoretically be part of a servitization process cannot (in practice) be fulfilled by any other means than those of the armed forces. The clear boundary between what may be done and what no longer needs to be done varies from one country to another, but there is a common and general borderline: the decision and implementation processes for resorting to the use of force against an enemy on the battlefield. A study by Clanahan (2012) on outsourcing in the US Air Force's use of UAVs indicates a clear limit in the use of outsourced tasks, as described in the following diagram:

Fig. 21 Boundary between outsourceable and non-outsourceable functions: the case of American UAVs



Source: Clanahan (2012)

It is noteworthy here that the example of aircraft maintenance is once again a potentially outsourced field in which the propensity of manufacturers to "servitize" is very high and may be very interesting, depending on the operational context.

The servitization of products makes it possible, in the various kinds of modalities offered, to reduce significantly the financial burden related to the acquisition and maintenance of specific assets (here, the US Air Force's UAVs) and therefore to specialize certain of the partners (Matthysenssa et al., 2000). This complementarity — although balanced and even sometimes strongly limited by operational requirements — is one of the fundamentals of what is most frequently observed in the context of outsourcing involving military aircraft maintenance programs. In France (for example), these measures can be formalized within the framework of public-private partnerships (PPPs) and follow specially defined legal provisions, based on a wide range of contractual arrangements, called "*code de la commande publique*." Because legal and regulatory frameworks for PPPs have been very broadly studied in this thesis already, it is now worthwhile to define the role of an intermediary organization for the procurement of weapons and equipment programs in the defense sector. In the case of French defense, for example, the main procurement organization is an autonomous entity composed of a directorate made of military engineers (a French particularity), and the organization is called the *Direction Générale de l'Armement (DGA)*¹⁴. This authority acts as a technical and financial intermediary with both civilian and industrial providers, and data on offers, requirements and procurement criteria can be consulted on the IXARM website. The DGA therefore plays an intermediary role in the contractualization of PPPs and facilitates communication with manufacturers through its "technical and scientific sensitivity." Three types of contracts have been studied previously, as part of the Product-Service System. The third type is "result-oriented" and is of specific interest in the context of this study of the intersection between service provision by private agents and the public administration's outsourcing intentions. An article by Irene et al. (2010) discusses a particular type of contract based on a "result-oriented" approach; namely, "outcome-based contracts" (OBCs). These contracts are used in the context of maintenance, resource, and overhaul functions (MRO) in the aircraft and defense industry. This case is particularly relevant for this thesis because it theorizes essential concepts for understanding the phenomena that will be covered in the case studies. This paper (Irene et al., 2010) first outlines the industrial

¹⁴ Website: <https://www.defense.gouv.fr/dga>, retrieved 12/07/2019.

transformation that has taken place since the 1970s in the defense and aerospace market. Indeed, these manufacturing entities have been gradually transforming their production methods, which were previously only focused on aircraft manufacturing and on providing spare parts. They are now turning to more global production, resulting in an "effect to be obtained," in which the aircraft is the main component but not the only driver. Manufacturers have therefore gradually added services such as maintenance (or the transmission of their maintenance know-how) to their deliveries of new combat aircraft for the armed forces. OBC contracts follow apparently simple approaches because of the fact that the customer only pays for what has been provided. However, this fact must be challenged because this comprehension of OBC depends on the mode of concluding the contract and in particular on the way in which the customer is "involved" in this type of production. Indeed, production relationships in which the customer "co-produces" alongside the provider constitute a disruptive approach: "The legacy of linear, one-direction and clearly bordered thinking from a manufacturing-based environment needs to be replaced with interactive, fluidly bordered, multi-dimensional thinking of a complex service system" (Irene et al., 2010, p. 657). Servitizing products, in the meaning of offering more or improved services, can also be seen as a primary source of competitive advantage (Lusch et al., 2007, reported by Ordanini et al., 2013). The examples of a higher propensity for provider innovation, particularly in the case of the one related to information technology, can be seen as parallel to the British military's outsourcing process in the field of telecommunications, which has enabled its military to move from small and outdated networks to a multitude of modern and functional network possibilities (Voisin, 2002, p. 185).

All of these considerations converge to a lack of information about outsourcing in the existing literature. Indeed, outsourcing concerns not only the "make or buy" decision (Barthelemy, 2007), it also concerns its decisionmaker. This question is paramount, because effective leaders have to adapt and sometimes to think "against their instinct" to make evolutive and effective decisions (Snowden et al., 2007) — although they can also undergo an alteration of their rationality in strategic decision-making processes (Elbanna et al., 2007). In big public organizations, this entity who makes these strategic decisions is often represented by procurement organizations. In another perspective, the link between outsourcing and servitization has been newly considered and is little explored in the existing state of the art.

This thesis uses transaction cost economics to add new theoretical considerations about outsourcing, servitization, and procurement and to draw an adaptable model between these three conceptions. The contributions of this thesis are theoretical and can help to fill managerial implications very easily. The next part deals with the precise aims of this scholarly work.

2 Aim of the scholarly work

After having discussed theoretical issues in the last chapter, it is now necessary to go on the managerial issues that could be solved in using the model proposed herein. Managerial implications of this work are related to the outsourcing decision-making process. Deciding whether a function should be outsourced or not can always be seen as unsure processes. This thesis aims to address the effects of procurement organizations in public outsourcing as well as facing servitization offers by industrial partners.

Indeed, this thesis analyses procurement agencies as an intermediary to meet the best agreement between offered servitization by a manufacturer and the outsourcing willingness of an agent. From a theoretical viewpoint, the thesis employs TCE to describe the issue of maintaining optimum relations among contracting organizations. TCE explains how procurement agencies reduce transaction costs and lead public administrations to adopt market-oriented solutions instead of internal solutions. No scientific study within the TCE literature has captured the phenomenon of procurement agencies as this thesis does. In general, this thesis takes the case of procurement agencies in the defense industry in Europe. It is an original choice because of most of the economic literature deals with civilian capabilities or organizations. More particularly, the thesis examines the cases of the British Ministry of Defense with DES and of the German administration with BW Consulting. No scientific study has reviewed them thoroughly. The results of this thesis will contribute, in general, to the debate about efficient ways to allocate public funds for the provision of public services. It also examines the efficiency of the procurement agencies in governing the transactions and the contracts.

The position of the researcher as a practitioner induces an essentially abductive methodology. The abduction corresponds to the constant observation of different phenomena in the professional environment of the researcher confronted with the establishment of a theoretical framework and leading to a reflection evolving from a "background theory" (Aliseda, 2006) calling for a first deductive approach, which the researcher will develop during the study. Using abduction allows the establishment of a "cognitive niche" with a strong explanatory aspect and an originality inherent to the particular positioning of the search, we can quote: "abduction can select or create new explanations that account for certain signs gold clues (sic), but can be seen as a non-explanationist process strictly related to action (or to the 'best' action)" (Magnani et al., 2008). Thus, the case study of this thesis results from a research-intervention process

within an organization carried out in a context of economic rationalization and inscribed in a particularly dense technical and industrial environment, imposing a competitive approach (Plane, 2005). Before going further in the analysis, the main goal of this thesis and its related partial goals should be clearly defined.

2.1. Main goal of the scholarly work

The main purpose of this thesis is to analyze the central role of public procurement organizations in the defense sector and to confirm their role in creating a balance between increasingly outsourced public capacities (due to new public management methods) and the partner industry's increasing propensity to add services to the sale of goods or to offer integrated solutions combining the supply of goods and services within the framework of servitization. This main objective is reflected in the following research question:

Research question

How can procurement agencies help to reduce transaction costs between manufacturers offered servitization and defense organizations' willingness to outsource their own capabilities?

An accurate analysis of this phenomenon has also to be refined in defining partial goals of this work.

2.2 Partial goals of the scholarly work

Partial goals of this work can be defined as follows:

- To create an original combination of case studies in European militaries.
- To analyze (using concrete cases) the role of public procurement organizations.
- To prove their role in meeting the servitization supply and the public customers' demand.
- To confirm this role in defense organizations.

Besides these partial goals, several ***research subquestions (RSQ)***, were chosen, namely:

<u>RSQ1</u>	Can the meeting of both servitization offer and outsourcing willingness of an agent be considered as converging trends?
<u>RSQ2</u>	Can procurement agencies be considered as hybrid governance of contracts?
<u>RSQ3</u>	How do industrial partners enhance public outsourcing in selling services additional to the manufacturing of goods?
<u>RSQ4</u>	What is the benefit of having procurement agencies to facilitate outsourcing?
<u>RSQ5</u>	In facilitating the exchange of information between a customer and its providers, do procurement organizations help to lower transaction costs in outsourcing projects?
<u>RSQ6</u>	If they have organizational ties with their end-user, are procurement organizations efficient?
<u>RSQ7</u>	If they are not directly related to their end-user, are procurement organizations effective?
<u>RSQ8</u>	If they permit a good comprehension of the concerns of the industrial partner, are procurement organizations effective?

Drawn from these research questions, the managerial implication is to illustrate the importance of the customer/supplier relationship in reducing transaction costs. This thesis thereby questions and demonstrates the usefulness of procurement organizations in the scope of public organizations in crossing servitization and public outsourcing. As this thesis aims to fill lacks in the existing literature but also to better illustrate management practices, it has been decided to use a two-case study and a very particular methodology, as explained in the next part.

3 Methodology and research methods

This section now focuses on the subject of this thesis and the means used to answer the research questions. This thesis is based on the study of a qualitative material through two cases and not on statistical variables. The method for addressing these case studies should therefore be discussed, after having established which cases are involved. The main characteristics of the examined object will now be underlined in the following subsection.

3.1 Characteristics of examined object

The cases related to the Bundeswehr and the British forces are emblematic of the question of consulting and procurement agencies in the armed forces within the framework of outsourcing. Taking into account the social and economic context of these militaries, both of them have contracting actions within the framework of strong industrial relationships. This context makes both cases very interesting for the study of outsourcing and servitization behaviors in defense contracting. Proceeding further along this spectrum, both militaries have counselling, consulting and procurement agencies in the form of « bespoke trading entities ». In this thesis, a multiple case study is used to describe how procurement agencies in the German administration and at the British Ministry of Defense deal with outsourcing issues. TCE helps us to understand how procurement agencies reduce transaction costs and lead public administrations to adopt market-oriented solutions instead of internal solutions. Researching defense is original, because most existing papers deal with civilian capabilities or organizations. Outsourcing defense is not new, but it still raises many issues because of ethical and strategic considerations. The British way of outsourcing defense has been already very researched but not throughout the scope of DES. The German example has been very little researched, even though Germany has the second largest military in Europe. This thesis enlarges on previous research papers such as Voisin's (2002) studying contractual aspects of outsourcing in British and German defense in a "direct relationship" scope. This thesis enlarges the previous theoretical framework of outsourcing in European militaries. In this manner, the cases of the British Defense Equipment and Support and of the German BW Consulting / BAAINBw perfectly enlarge this conception of procurement in defense organizations.

3.2 Working Methods

The use of several case studies is recommended by Yin (2008, 2009) to vary the search angles, and this is the basis for the choice of the study of two situations whose configurations are also very different. Yin (2009) specifies that having two (or more) cases in a case study helps to avoid incorrect conclusions. The diversity of the cases investigated, which nevertheless belong to a homogeneous group (European defense), makes it possible to establish a reliable axiology. Beside of the number of cases studied, the nature of the sources and data and the way they were obtained will be described.

3.3 Method of obtaining data and sources used

Multiple case-study is the best way to draw empirical conclusions, by avoiding putting all pieces of evidence in a single case that could appear to be non-relevant. This method is justified in this thesis by the absence of specific scientific literature on BW Consulting and DES, the procurement agencies in two of the first three largest military forces in the European Union. The data will be retrieved from semi-directed interviews and documentary sources. The findings will be obtained through logical inference from the data through abductive reasoning.

The various empirical sources used in this thesis serve to describe the cases and to explain their articulations. These follow the prescriptions of Yin (2003, p. 99) who lists six main sources of data for the case studies: documentation, archival records, interviews, direct observation, participant-observation, and physical artifacts. Yin also implies that each kind of source has to be associated “with an array of data or evidence.” These sources are of two natures: the primary one is documentary, with the second highlighting the role and experiences of the actors (Blumer, 1937) through non-directed interviews. Documentary sources are mainly used to describe the context, the environment, and the "mechanical" and "dynamic" provisions of outsourcing contracts.

3.4 Methods of evaluation used and interpretation of results

Here, only two case studies were used, in order to "circumscribe" two subjects in a broad way and to be able to enter a degree of granularity, thus allowing the developed modeling of the outsourcing processes to be found. The use of a double case study is therefore justified by the need to have a clear and detailed statement while sticking to the principles

of Yin, which advocate at least two cases. A case study can be defined by quoting Hartley (2004):

"case study research consists of detailed investigation, often with data collected over a period of time, of phenomena, within their context. The aim is to provide an analysis of the context and processes which illuminate the theoretical issues being studied. The phenomenon is not insignificant in its context (as in, say, laboratory research). research questions which require detailed understanding of social or organizational processes. (...) A case study is not a method but a research strategy."

Thus, in its empirical aspects a case study occurs in a social field and is coupled with a process analysis, an excellent way to address the topic of outsourcing in the field of defense. Yin (2009) defines and confirms this point of view: "Not surprisingly, the case study has been a common research method in psychology, sociology, political science, anthropology, social work, business, education, nursing and community planning. Case studies are even in economics, in which the structure of a given industry or the economy of a city or region may be investigated." The research method follows the direction given by Yin (2009) in the sense that the choice of authoritative literature in this type of subject prepares for the empirical phase of the case studies. Indeed, Yin (2009) defines "case studying" as firstly to "collect case evidence," then to "analyze case study data" and finally to "compose a case study report." These case studies consist partly of interviews drawn up in the appendix of this document and carried out in the form of semi-directed interviews. This approach is also part of the Yin (2009) case study process, which lists the main usable documents, such as written documents, archival collections, interviews, direct observation, "participatory observation," and artifacts. The design of case study research is fully linear but follows an iterative process. The primordial stages of such a journey are numerous but synthetic. The main dimension (and the most important one) lies in having a well-defined and usable plan like a red thread throughout the study. Yin (2009) defines three axes in the elaboration of a plan:

- The main research question must be clearly identified.
- The necessity and clarity of the use of a case study must be ensured.
- Understanding the advantages and disadvantages of a case study must be fully integrated by researchers.

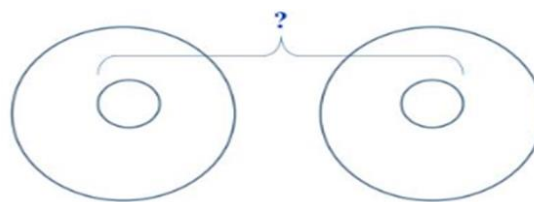
Yin defines the plan as the foundation of all scientific work. To another extent, Yin defines several central issues in a case study, some of which are included in this study:

- "Why and how": Why are we outsourcing? And to what extent can we / do we do it? How does the servitization of products fit into this logic and how do you outsource in a "virtuous" way?

The choice of contemporary examples also responds to the casuistic research design advocated by Yin (2009) to define the endogenous and exogenous mechanisms of these processes. The choice of different examples in their implications also meets the requirements of Yin (2009), with the aim of obtaining the best results: "In general, criticisms about single-case studies usually reflect fears about the uniqueness or artefactual conditions surrounding the case (e.g., special access to a key informant)."

This thesis also analyzes and compares "cases within different cases." This phrase refers to the "What is a case?" definition of Dumez (2013), who implies that case comparison can also occur between subcases that belong to related cases, as described in the following figure.

Fig. 22 Comparative work between internal elements belonging to several related cases.



Source: Dumez (2013)

Pertaining to this concept, Dumez (2013) also explains that the analysis of subcases from different and distinct cases must take into account when they are part of different nations and different socio-economic contexts. The analysis of subcases from different and distinct cases must take into account this phenomenon when they are part of different nations and different socio-economic contexts. As Dumez (2013) reports from Locke et al. (1995), such a subcase comparison must concern "sticking points."

The position of the researcher as a practitioner induces to this memory an essentially abductive methodology. The abduction corresponds to the constant observation of different phenomenon in the professional environment of the researcher confronted with the establishment of a theoretical framework and leading to a reflection evolving from a "background theory" (Aliseda, 2006) calling first for a deductive approach, which the researcher will evolve during the course of the study. Using abduction allows the

establishment of a "cognitive niche" with a strong explanatory aspect and an originality inherent to the particular positioning of the search. As observed by Magnani et al. (2008) "abduction can select or create new explanations that account for certain signs or clues but can be seen as a non-explanationist process strictly related to action (or to the "best" action)." Thus, the case study of this thesis results here from a research-intervention process within an organization carried out in a context of economic rationalization and inscribed in a particularly dense technical and industrial environment, imposing an approach of competitiveness (Plane, 2005). The case study here is of a unique nature and makes sense in the confirmation, reversal, or "re-adjustment" of the existing theoretical framework applied to the case study (Yin, 2003). If the unique case study fits perfectly in an abductive context (Dumez, 2014), is a method already proven in many works and the results of which allow important theoretical advances (Gagnon, 2005), a two-cases case study (such as in this thesis) can be used in order to achieve a better triangulation (Shandana et al., 2016).

After having defined the founding principles of the theoretical reflection of this thesis, a model is developed based on the use of simple principles of TCE. After having defined the founding principles of the theoretical reflection of this thesis, a model is developed based on the use of simple principles of game theory. The case study confirms the use of the model by refining some of its elements. The problems encountered by the researcher are many:

- The field (Defense Equipment Support) is not easy for a foreigner to access. The problem was solved thanks to the benevolence of some of the actors contacted who were kind enough to submit to the interviews. As a result, the vast majority of the data for this thesis comes from secondary sources.
- The researcher's approach (i.e., from a different cultural perspective) can lead to cognitive biases.
- The researcher's geographical distance and professional activity required major adjustments to conduct this research.

Likewise, while the position of practitioner-researcher allows privileged access to the field, it also includes the presence of various biases whose consideration is essential to avoid pitfalls in the study of a case that the researcher may confront on a daily basis. The main bias encountered by the researcher during the development of this thesis is of a cognitive nature, due to a "self-influence" of these cognitions due to its positioning within the organization and a "permeability" between his status as a researcher and practitioner.

The study of the phenomenon must therefore correspond to an "enactment" (Courtial, 2009) to avoid problems of cognitive bias by placing the researcher in a reflexive posture detached from any bias that affects the reasoning. After having defined how this study will be carried, both cases shall be presented.

4 Results of the work and discussion

This section examines both the British and German cases. The purpose here is to highlight the main characteristics of procurement organizations in each of the defense systems of these two countries. As British and German cultures are quite distant in terms of defense and outsourcing: a combined study of these two cases seems likely to yield promising and worthwhile results.

4.1 The case of the German armed forces

This thesis investigates the role of procurement organizations in managing the relationship between the Bundeswehr and industry. The case of the German Bundeswehr seems very particular in Europe because of the convergence of strong industrial and political interests. Thus, in contrast to France or the UK, Germany's war material exportation is politically hindered. This led to a necessity for German industries to adhere to the German government's needs in order to provide for the domestic market before trying to export war material. Indeed, the domestic market remains indispensable for the survival of German industry, since the state is the first customer for any defense systems or prototypes developed. Glas (2017) also shows that the German military can be seen by industrials as a very reliable partner, thus leading to preferential treatment. In this very particular framework, outsourcing and servitization play a very original role. The size, the socio-economic context, and the international role played by the German Bundeswehr seem to encourage political decision makers to outsource more and more capabilities related to the German military. The author's research clearly reveals a cultural and country-specific propensity that not only consists in the support of German industry but above all in a partnership-based relationship. A more distant example of these collaborations and cooperation is the high-level education of officers at military universities (Universität der Bundeswehr¹⁵), which most often follows six years of service in the forces before the trained officers join the industry. This cultural difference was questioned by the researcher (who comes from France, where officers are career officers). The answer given on the German side is that of an enrichment of society produced by the Bundeswehr and propagated in the community through the short duration of the first engagement of its officers. This state of the art will be presented in the next part.

¹⁵ Two of them exist in Germany: one is located in Munich, the other is located in Hamburg.

4.1.1 Outsourcing in the German military

Germany's "outsourcing landscape" is very particular because of a hybridization of outsourcing relationships between governmental agencies and private corporations and the building of long-term partnerships within the framework of public procurement (Essig et al., 2005). Despite in-house capabilities remaining strong, the framework of the German outsourcing policy in the defense sector is part of a public dimension and is based on a close partnership between the German Ministry of Defense and German industry. Between 2008 and 2012, outsourcing's expenditures increased by 128%. In 2000, a framework agreement (*Rahmenvertrag*) was signed between the German armed forces and approximately 300 corporations and manufacturers to enhance partnership possibilities between private offers and defense needs¹⁶. Within the framework of new public management, the German Bundeswehr operates a process of "economization" (*ökonomisierung*), consisting of adjusting whether capabilities are outsourced or not (Pajon et al., 2009). Since the end of conscription in Germany, outsourcing has kept competences and capabilities that were previously operated by draftees (Kümmel, 2012) within the framework of a new strategic orientation of the Bundeswehr, which has shifted from a defense force to an expeditionary one (Seliger, 2006). Outsourcing in Germany offers a possibility to enhance the accuracy of costs assessment and to transfer non-critical risks to private actors, as in the UK or the US (Voisin, 2002; Kümmel, 2012). In another perspective, defense outsourcing in Germany is also regarded as "*Auftraggeber Bundeswehr*" — i.e., as a way to support German strategic defense corporations (Voisin, 2002). Two organizations play a role in outsourcing programs in Germany: the Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr (BAAINBw), responsible for acquisitions and support design, and the Gesellschaft für Entwicklung, Beschaffung und Betrieb (Gebb). According to the researcher, this duality makes it possible to separate the functions of designing armaments and equipment programs (and their corresponding logistical and technical support), from the design of the organizational processes associated with the implementation of these programs. The German defense thus dissociates the technical aspects from the organizational ones. This perspective makes it possible to fully integrate certain product service offerings offered by industry into German

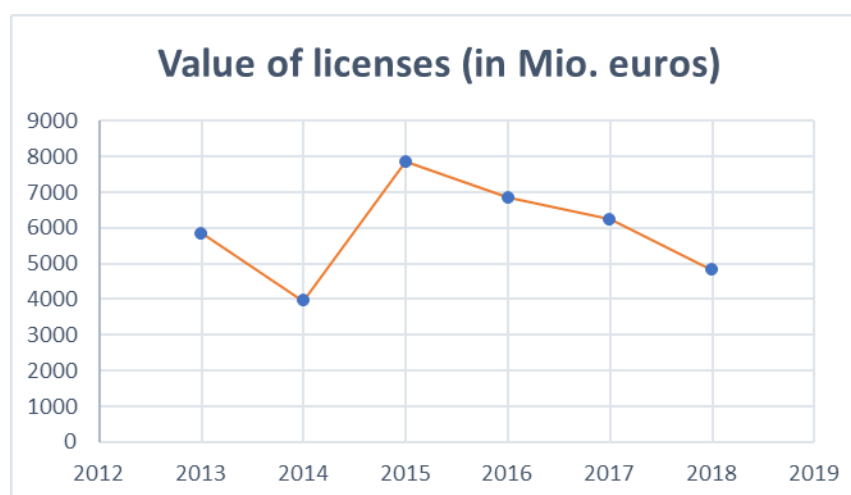
¹⁶ See: Innovation, Investition und Wirtschaftlichkeit in der Bundeswehr" (Rahmenvertrag): Umsetzung, BArch, BH 37/38, Heeresunterstützungskommando (HUKdo), 1995-2003 Aktenführende Organisationseinheit: Abt. I 1 (1),

defense. The resulting organizational component of this implementation is thus considered separately. Relevant examples of working contracts have to be presented.

4.1.2 Defense-related suppliers in Germany

German government defense spending has continuously declined and is expected to do so in the coming years. Indeed, according to the budget plan for the period 2019–23, the budget allocated to the Bundeswehr will first represent 1.37% of GDP in 2020, 1.33% in 2021, then 1.29% in 2022, and finally 1.25% in 2023. Germany has a large industrial base in terms of armaments and defense components. Even if Germany can be considered as one of the largest defense equipment producers in the world, political issues have hindered its potential in exporting weapons and equipment. The late example of its embargo toward Saudi Arabia illustrates how Germany’s exports can be influenced by political and ethical issues. Between 2013 and 2017, Germany was the fourth main armament exporter, representing 5.8% of all exports in the world.¹⁷ In the meantime, German exports decreased from 2015 to 2018, as represented through the scope of individual licenses for the export of armaments in the following data.

Fig. 23 Value of individual licenses for the export of armaments from Germany from 2008 to 2018 (in millions of euros)



Years	2013	2014	2015	2016	2017	2018
Numbers	1	2	3	4	5	6
Value	5846	3961	7858	6848	6242	4824

¹⁷ SIPRI's Year Factbook 2018, p. 8.

The main German distributors are as follows:¹⁸

- AIRBUS (European, 11% German): the most important defense supplier in Europe.
- KRAUSS MAFFEI WEGMANN
- RHEINMETALL DEFENSE
- THYSSEN KRUPP MARINE SYSTEMS
- CARL WALTHER GMBH SPORTWAFFEN
- DIEHL DEFENCE
- HECKLER & KOCH
- GERMAN NAVAL GROUP
- MAUSER
- LÜRSSEN
- KORTH
- HOWALDTSWERKE-DEUTSCHE WERFT
- MBDA
- ABEKING & RASMUSSEN (A&R)

Outsourcing is based on partnership. Indeed, industrial partners have been offered possibilities to reach interesting contracting conditions under the condition of a rent capped by 5%. The German model provides for a non-competitive partnership and maintains capabilities within the defense sector. The Bundeswehr is therefore able to maintain reactivity. All contracts include strong controlling possibilities for the administration and preserve operational capabilities. In contrast to UK's armed forces, Germany has kept its own military personnel and its own operational capabilities. Also, the concluded contracts are backed by being embedded within defense capabilities. As a result, German servicemen are incorporated into industrial work teams. These embedded servicemen are deployable at any time, thus securing minimum response capabilities for deploying German forces in case of necessity.

The very high number of German defense manufacturers contrasts with Germany's historical, political, social, and legal context. While the Bundeswehr's support for its industry is a cornerstone of the German system, its financial capacity is currently destined to decline steadily. Outsourcing can be analyzed in this context as a means of achieving savings in terms of defense spending and as a means of supporting industry. The work of

¹⁸ Data from Observatoire Economique de Défense.

Voisin (2002) describes outsourcing as possibly being an unconstitutional practice if applied to Bundeswehr personnel.

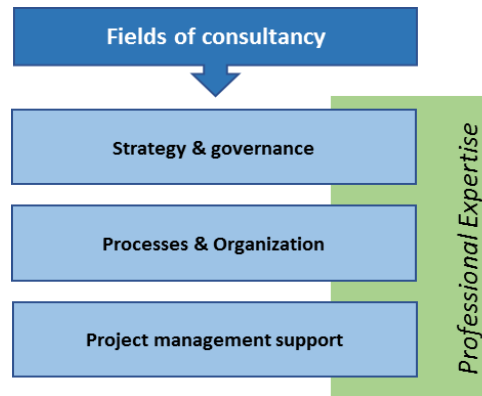
The German defense structure also has several levels of industrial performance monitoring at all contractual levels, helping to reduce transaction costs. The first of the two organizations involved in outsourcing, BW Consulting, constitutes the actualization and the modernization of the former GEBB GmbH.

4.1.3 BW Consulting, the actualization of G.E.B.B. GmbH

Before talking about BW Consulting, it seems paramount to discuss the case of the “ancestor” organization: the *Gesellschaft für Entwicklung, Beschaffung und Betrieb* (GEBB). GEBB's status is that of a private company. It is headquartered in Cologne, and its capital is 100% owned by the German federal state. Created in May 2000, the GEBB's diverse tasks included a complete reorganization of the operating activities of barracks, clothing activities, automobile transport (*Fuhrpark der Bundeswehr*), information systems and technology exploitation, and the implementation of private management. GEBB has a mission to advise and assist the German ministry of defense, by orienting its actions, after prior analysis, either towards the implementation of an optimized inhouse management system or towards a public-private partnership contract. From 2000 to 2002, the GEBB received a budget of 40.9 million euros from the Defense budget, and it generated an economy of 89 million euros compared to the in-house management mode of the Bundeswehr. Even if these cost savings seemed to be an advantage for the GEBB, they did not meet the original expectations from the German *Verteidigungsministerium* (Ministry of Defense). In 2003, the GEBB also helped conclude the HERKULES contract for 6.5 Bn euros — one of the biggest outsourcing contracts ever made. In 2017, the GEBB was transformed into a consulting agency: BW Consulting. The objectives for this new organization are related to an appropriate and optimum use of Germany's Ministry of Defense. Thus, BW Consulting's procedural approach is directly prioritized by the steering committees of the federal Ministry of Defense, which include both the Inspector General of the German Armed Forces (Chief of Staff) and both related state secretaries. This organizational process therefore ensures that the issues tackled by BW Consulting are up to date and that its capacity to respond and advise is increased, in the interests of the German Federal Armed Forces (BW Consulting's web site). More than a new brand, the creation of

BW Consulting introduced new focusses. These are based on three main axis and supported by experts, as presented in the following diagram.

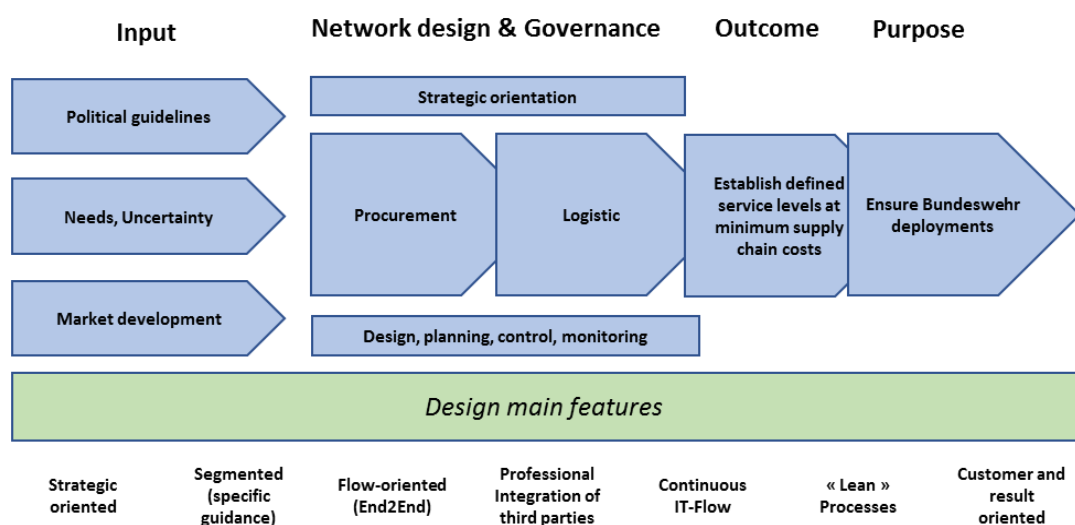
Fig. 24 BW Consulting: main axis



Source: <https://www.bwconsulting.de/aus-g-e-b-b-wird-bwconsulting-mehr-als-eine-umbenennung/>;

As shown in some of the conducted surveys, it seems easier to outsource within certain functions, such as supply chain management. In the German case, the role played by BW Consulting is very significant. In this case, it provides counselling on processes implementation in supply chain management. BW Consulting also endeavors to enhance collaboration between civilian providers and the Bundeswehr to create efficient solutions in supplying deployed German forces abroad. As an illustration, the following figures presents all of the steps and the entire spectrum of BW Consulting's actions.

Fig. 25 Process design by BW Consulting: the example of supply chain management



Source: <https://www.bwconsulting.de/supply-chain-management/>; retrieved 17/07/19.

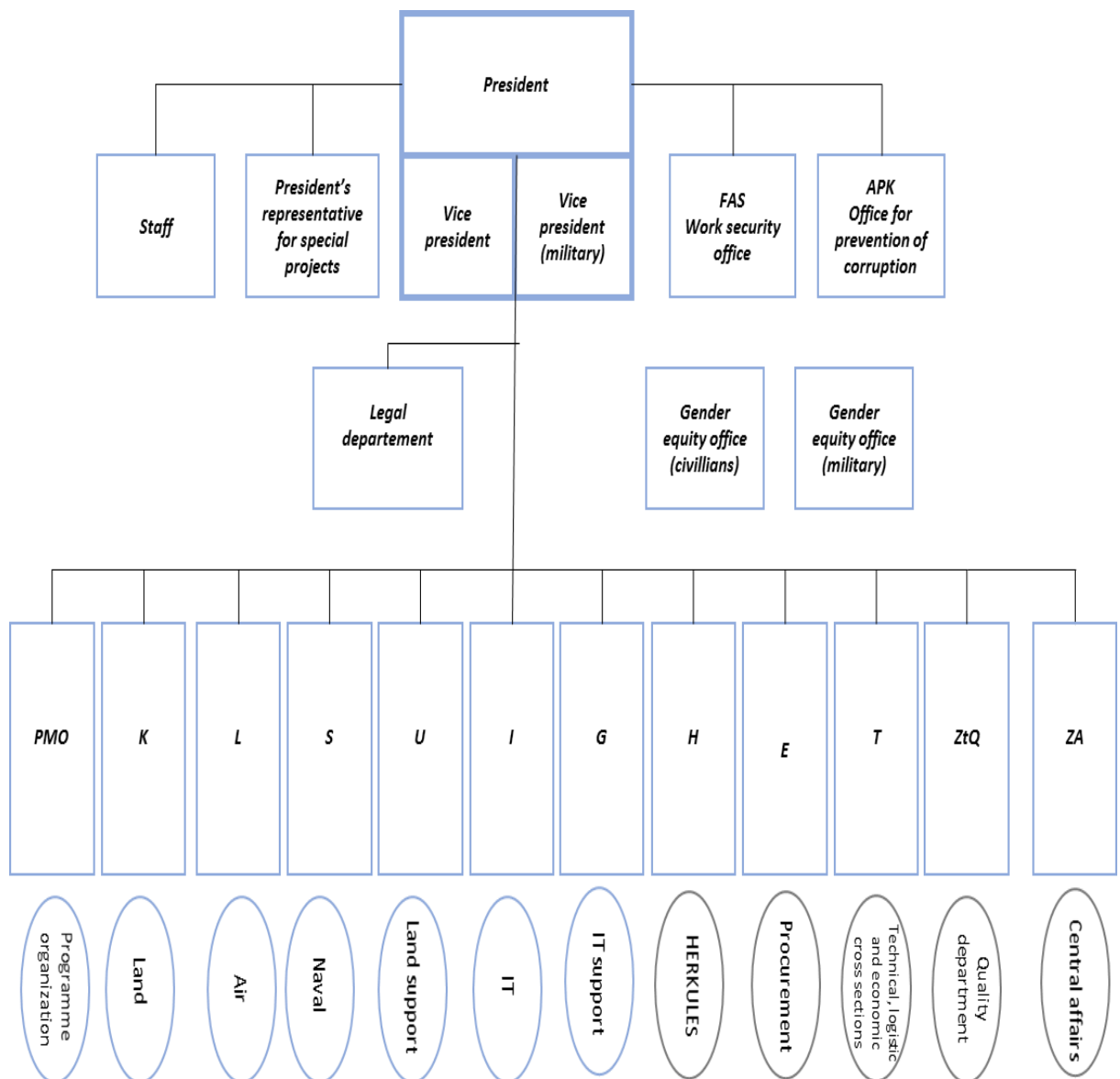
As retrieved from one of the conducted interviews, BW Consulting is not a “DES-like” organization, if we try to compare both German and British cases. The German army also has its own technical military procurement agency: The *Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr* (BAAINBw). The full state aspect of BAAINBw and its focus on the technical aspects of equipment contracts also refers to another similar organization (albeit more autonomous in terms of structure and subordination): the French *Direction Générale pour l'Armement* (DGA). These organizations shall now be presented in the following part of this case study.

4.1.4 BAAINBw: A broad organization for broad tasks

The life-cycle perspective of all weapons programs leads to the design of initial support from the very beginning of the product's design phases. It is at this stage that the industrial partners make their first proposals to add maintenance services as part of an integrated offer. An interview with an Airbus Helicopters manager shows that all new equipment offers are accompanied by studies aimed at also maintaining what is in their purview in operational condition. Integrating maintenance solutions seems to be a very efficient solution for the customer, as efficient management of contracts brings a low level of transaction costs.

BAAINBw was created in 2012 from the merger of both *Bundesamt für Wehrtechnik und Beschaffung* (BWB) and *Bundesamt für Informationsmanagement und Informationstechnik* (BWI). BAAINBw is currently located in Koblenz and is directly subordinate to the German Ministry of Defense. Its role is to provide equipment and weapon systems evaluations to the Bundeswehr and to design efficient support models. BAAINBw is composed of many branches, as shown in the following table:

Fig. 26 Organization of BAAINBw



Source: BAAINBw website

BAAINBw is a large organization that aims for efficiency and synergy. Of all its branches, the “air” department (*Luft*) is one of the biggest. The original targeted personnel strength should be about 9600 (1400 service members). Because of BAAINBw’s actions, the German Bundeswehr sees itself as “*Auftraggeber Bundeswehr*” and as an active role player in the German industrial and economic landscape. BAAINBw can be compared to the French DGA. Like DES, it underwent similar questioning about outsourcing this organization. As revealed in *Der Spiegel*, a confidential report from the consulting agency

Ernst and Young recommended the creation of a new private organization called “BW Services” to co-exist within BAAINBw, which would be much more cost-effective in dealing with military procurement. This example is similar to the British trend towards GOCO in the case of DES and the preservation by the French state of a state owned and operated DGA (although it would use newer, more "agile" processes).

4.1.5 Meeting outsourcing and servitization

This section provides two cases of the equilibrium gained by procurement organizations when meeting servitization and outsourcing. The first case deals with aeronautical maintenance (FSS and spare part contracts) and the second one deals with Bechtle (IT sector). Both of these cases are related to the role of procurement organizations.

4.1.5.1 The case of aeronautical maintenance capabilities

This part deals with an example of servitization within the German military: the full-service support contract for the EC135 flight training helicopters (*Schulungshubschrauber / SHS*) in Bückeburg (Army aviation training center / *Heeresfliegerwaffenschule*).

This contract was first designed in 2000 in cooperation with the BWB (*Bundesamt für Wehrtechnik und Beschaffung*), the preceding organization of BAAINBw. Its capabilities include the following:

- Line maintenance: Preflight checks, refueling, servicing and debriefing.
- Base maintenance: light and heavy repairs.

Signed in 2005, this outsourcing contract has had very good outcomes (6000 flight hours a year have occurred and a technical readiness of around 95% has been observed, as well as a daily average of 11 out of 14 aircrafts available for training use). More precisely, this contract implies a permanent on-site maintenance team and total readiness of the Cassel-Calden Airbus maintenance center for maintenance and for logistics.

The FSS contract is also an illustration of the importance of partnership and long-term relationships between contract holders. The FSS contract has a performance control stage which allows mechanical remuneration by the hour of flight, and this stage is now represented by BAAINBW (formerly BWB). Procurement organizations not only contribute to lower transaction costs during contractualization, but also during the execution of the contract in maintaining an optimal link with the service provider.

4.1.5.2 The case of Bechtle

As illustrated by the example of Bechtle, the role of BAAINBw in meeting defense-related outsourcing and servitization can be very effective. This example can be found very easily on the internet, which makes it very interesting for this study. First, it is necessary to define Bechtle: it is an IT company that provides components but also services. The cooperation between BAAINBw and Bechtle was created to promote a strong relationship between both entities. Concerning the contract itself, it covers the following branches: personal computers, monitors, printers, multiple kinds of peripherals, and servers. The Bechtle contract also includes additional assets, such as network planning services and the construction, installation, and operation of IT networks, concerning both the client and the server. This kind of contract illustrates perfectly the concept of servitization as a product/service bundle.¹⁹ Bechtle has been involved in a consultancy approach with BW Consulting to optimize the configuration of Information Technologies within the German armed forces²⁰. We can highlight the facilitating role of BW Consulting in the implementation of optimization strategies. Through an analysis based on transaction costs, this case confirms BW Consulting's role in reducing such costs and in optimizing the relationship between industry and the Bundeswehr in a process-oriented rather than a technical way. As such, BAAINBw can be seen as a “technical entity” that works in tandem with the GEBB (today BW Consulting) to implement the right processes in “using the best” from private companies to carry out efficient outsourcing projects.

4.1.6. Conclusion of the case

As a conclusion, the German case seems to be very influenced by a strong partnership between German companies and state organizations such as the Bundeswehr. Many German (or European) companies propose to service their manufactured goods, and bespoke German trading organizations as well as BW Consulting (for management issues) or BAAINBw (for technical and engineering processes) help quite efficiently to implement servitization within the framework of outsourcing in the Bundeswehr, so that the military can use the expertise of private actors, save on budgets, and concentrate on their core competencies. The German model uses a two-pronged perspective to explore

¹⁹ <https://www.bechtle.com/ueber-bechtle/presse/pressemeldungen/2017/bechtle-schliesst-zum-dritten-mal-rahmenvertrag>; retrieved 17/07/19.

²⁰ <https://www.bechtle.com/at/ueber-bechtle/referenzen/it-strategie-inhouse-beratung-bundeswehr-bwconsulting>; retrieved 17/07/19.

each case, through a highly "civilized" organization (BW Consulting) for consulting activities and a military organization focused on the implementation of each project (BAAINBw). The German defense sector seems to have developed a sustainable outsourcing model through complementarity of these two organizations within the framework of a partnership relationship. After having reviewed the case of the Bundeswehr, this thesis will next deal with the different case of the United Kingdom.

4.2. The United Kingdom and Defense Equipment Support

The British example shows a multitude of configurations and interactions in the field of outsourcing that are particularly suitable for each contractual context. The British cultural context is characterized by a liberal and trade-oriented socio-economic approach. For instance, it is historically asserted that Napoleon called the United Kingdom "a nation of shopkeepers." Conversely to Germany (where drafting was abolished in 2011), the United Kingdom suspended it in 1966. These two factors seem to have catalyzed the phenomenon of outsourcing in the British armed forces.

Outsourcing in the British military took place in the framework of the personnel cuts of the late '90s. This outsourcing trend reflected an organizational change of "partnering" between the MoD and private businesses, and also permitted the latter to reduce personnel expenses. In the case of aircraft maintenance, a reduction by 50% of the total workforce was observed due to these crackdowns. These trends could have been observed in the increased expenses within the framework of "Contractor Logistic Support and Integrated Operational Support Contracts for Equipment Support." As an example, these expenses increased from 375 million (7.7% of equipment support expenses) to 1.2 billion pounds (21%) between 2008 and 2012. First implemented in 1983, the UK's defense outsourcing policy actually covers a broad spectrum of competencies within the MoD. Hartley (2004, p. 1) shows that: "policy aimed to ensure that defense support functions were undertaken by the private sector unless it was operationally necessary or more cost-effective to keep the work in-house (Cmnd 675-1, 1989, p. 35)." On the other hand, the MoD's industrial power has been proven, as well as its monopolist aspect (Smith, 1990). Even if financial savings due to outsourcing crackdowns have been observed, and reported, much criticisms exists about the reliability of private corporations taking over MoD capabilities because of the possibility of poor quality and unreliable services. Private contractors are sensitive to uncertainty corresponding to emergencies and can be liable to

default, strikes, and bankruptcy (Hartley, 2004, p. 3). Other criticisms refer to opportunistic behaviors that could lead private contractors to exaggerate in bidding lower prices in order to be more competitive than “in-house” workforces, leading to a situation of “hold-up” in which cost savings are short-term ones because of their propensity to lower market prices and produce “attractive” offers that eliminate in-house capabilities and the bargaining power of the MoD (2004, p. 3).

PFI/PPPs are only a part of all the MoD’s procurement mechanisms, which are defined by Hartley (2004, p. 5) as follows:

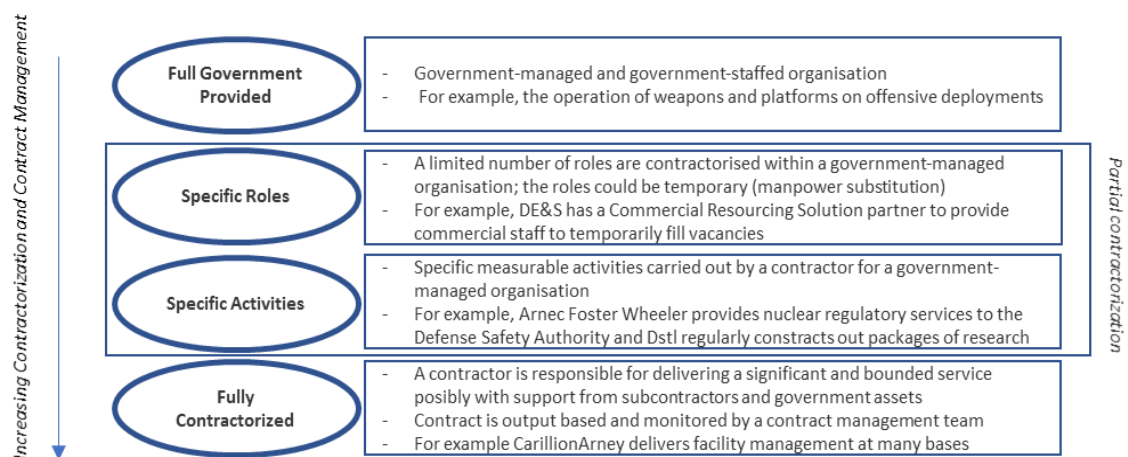
- 1) Privatization;
- 2) Contracting out;
- 3) PFI;
- 4) Joint ventures;
- 5) Partnering and framework agreements;
- 6) Separate contracts for construction/development and operation; and
- 7) Traditional procurement.

4.2.1 Outsourcing in the British military: a unique case in the world

Much research and study has been done on outsourcing in Her Majesty's Armed Forces. Across the English Channel, outsourcing is a culturally embedded and long-standing phenomenon that influences virtually all of the capabilities of the armed forces. This section therefore focuses first on framing and marking out this case study. Outsourcing in the British armed forces has been researched extensively in the current scientific literature (Hartley, 1998; Parker et al., 2002; Uttley, 2005; Rosenbloom et al., 2002). Alongside the outsourcing purposes of Germany and the US’s armed forces, British MoD practice is a leading-edge experiment (Voisin, 2002). Following this principle, the UK was also the first European country to regulate the use of mercenaries by releasing ‘Private Military Companies: Options for Regulation’ in 2002 (Krahmann, 2005). The special purpose of this thesis deals with defense equipment and support (DES) and its special role in managing a very high number of outsourcing contracts, which makes UK defense so special as a matter of research. Outsourcing at the MoD began by the outsourcing of flight simulators and instructors for the Hawk Synthetic Training Facility in Anglesey in 1998 (Krahmann, 2005). The partnership relationship between an increasingly inventive and solution-generating industry and the Ministry of Defense is an evolving process. By creating “sponsored reserves,” outsourcing in the British armed forces has led to a very

tight and original level of cooperation between the MoD and industrials This concept was created by Reserve Forces Act (Part V, 1996), which enables contractors to provide support services in conflict situations and to prevent a loss of capability caused by dependency towards the outsourcing partner. When committed, sponsored employees become members of the Volunteer Reserve Forces and are subject to the Service Discipline Acts and service regulations just as any other British soldier (Krahmann, 2005, p. 4). This unique case of sponsored reserve represents a job opportunity of great interest to the industrial partner, as noted by the researcher during the interview. Theoretically, the sponsored reserve can encompass all types of situations. However, it has the disadvantage of inducing higher expenditure and control costs for the public administration. The sponsored reserve is therefore also a factor in terms of transaction costs. These can be high in the case of instability and therefore may be a poor solution for the administration. Outsourcing and contracting are summarized in the following figure.

Fig. 27 Different forms and levels of contracting in UK defense



Source: Edwards, 2018, p. 11

Voisin (2002) explains that outsourcing largely differs in the UK from practices in the US. This difference mainly concerns the use of contractors in security and operational training issues (Cusumano, 2015) and sets the UK military as a “realistic” example for western European countries within the framework of policy recommendation because of the economic and operational context of the UK as an intermediate military, even if both militaries followed the same scheme in the implementation of defense outsourcing (Danet, 2002). PFI and PPP are both means to ensure transparency and reliance from both sides of the contracts under the auspices of New Public Management (Ortiz, 2010). The use of PFI

and PPP aimed to make savings up to 30%, compared to the same tasks done inhouse (Hartley, 2002, citing Cmnd 675-1, 1989). These differences in outsourcing defense activities are shown in the following table.

Table 11 Outsourcing practices in the US and in the UK

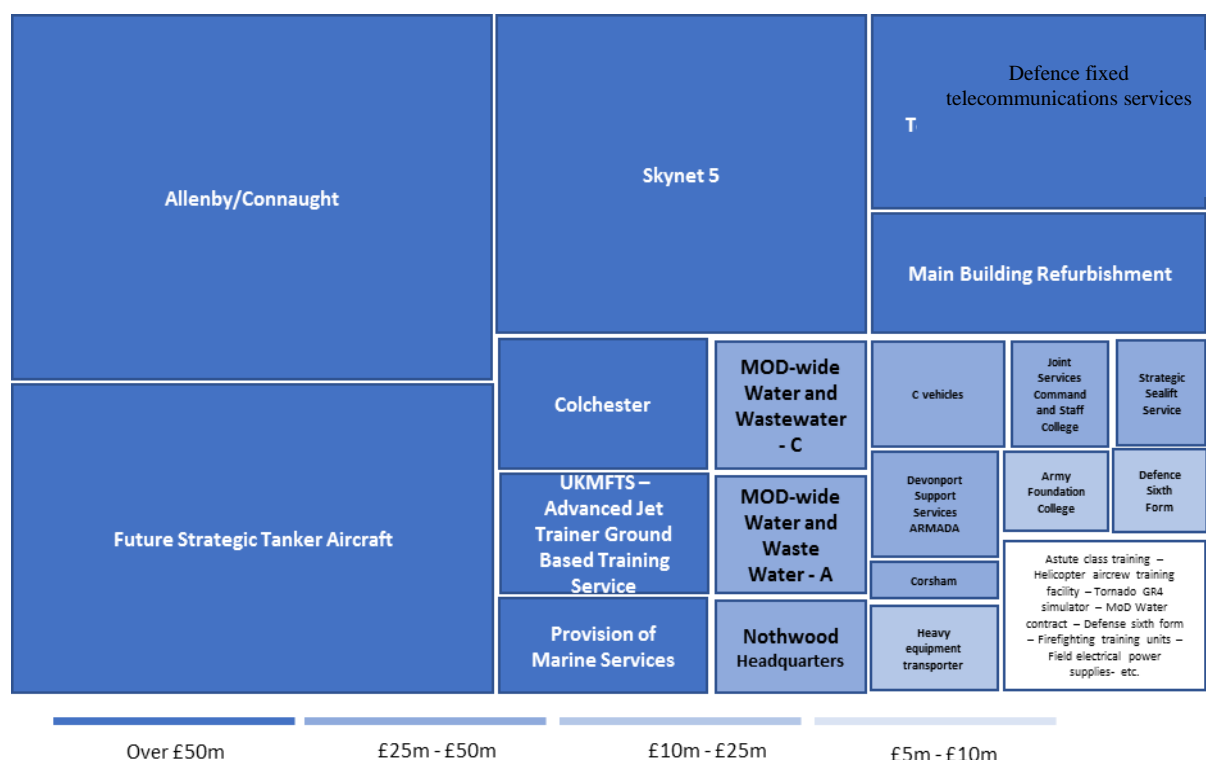
	Role conception	Scope of contractor support
United States	Combat in conventional operations and in high intensity, non-conventional operations	-Base support -Transportation -Communication and equipment support -Static, personal and convoy security -Foreign military training
United Kingdom	High- to low-intensity non-conventional operations. Including conflict prevention and stabilization.	-Base support -Transportation -Communication and equipment support -Static, personal and convoy security -Armed security outsourced only 'in exceptional circumstances'

Source: Cusumano 2015, p. 230

Led by economic liberalism, the historical and cultural economic context in Britain enhances outsourcing projects (Mongrenier, 2005). Public considerations about defense budget cuts, “market testing,” and “contracting-out” have been topics of concern there since the late seventies (Uttley, 2004). Hartley (2004) describes outsourcing to conduct equipment projects as an alternative to the “equal misery” option described as: “programme delays or training rationalization.” As an added fact to the notion of cultural context, the UK did not sign the 1989 UN Convention against the recruitment, use, financing, and training of mercenaries (Percy 2006, 2009). For example, within the framework of MoD aircraft maintenance, all kinds of base and depot maintenance have been outsourced: the only MoD maintenance capability remaining is line maintenance. Because of the expeditionary vocation of the UK armed forces, an industrial workforce can be also deployed to provide base maintenance and support to the committed British forces, even if distant technical support is provided by industrial partners to avoid sending personnel into dangerous locations. Supply chain operations are also managed by private companies supplying “hole in the wall” supply chain management. According to Marty (2007), the example of the use of PPPs in the form of PFIs in the UK’s military is an accurate representation of outsourcing in militaries because of the hindsight of this phenomenon in the UK. Outsourcing contracts within the MoD’s equipment policy takes

Conversely, scores of industrial contractors depend on their partnerships with the MoD, including QinetiQ, Babcock, and BAE. According to MoD publications, QinetiQ is the most dependent of the MoD's partners because of the purchase of its US services business in 2014, which represented 30% of the global revenue of QinetiQ. In the years 2017– 2018, 62% of QinetiQ's income came from MoD contracts. In comparison, BAE Systems dependency toward the MoD was about 19.1% in 2018, whereas Babcock received 38% of its revenue from it. However, these three examples are among the MoD's 10 main suppliers. Concerning the remaining 7 suppliers, MOD sales accounted for less than 10% of their global revenue. It can be concluded that outsourcing practices in the UK have resulted in a mutual dependency between public actors and private partners. The Private Finance Initiative seems to have led to secure contractual frameworks, and both this resulting dependency and the PFI's usefulness seem to explain why and how so many PFI projects have been (and are being) created in the UK. Concerning PFI projects, the MoD's 2018 statistics report the main PFI initiatives in the following table:

Fig. 30 Main MoD PFI projects in 2018



Source: MoD (2018)

Edwards (2018, p. 6) reports that the Modernizing Defense Programme (MDP) underway in 2018 references two workforces that deal with outsourcing in the armed forces:

-Workstream 2: “Efficiency and business modernization: providing confidence in the MoD’s ability to realise existing efficiency targets, and a set of options for future efficiency and business modernisation investments.”

-Workstream 3: “Commercial and industrial approach: assessing how the MoD can improve on commercial capability and strategic supplier management.”

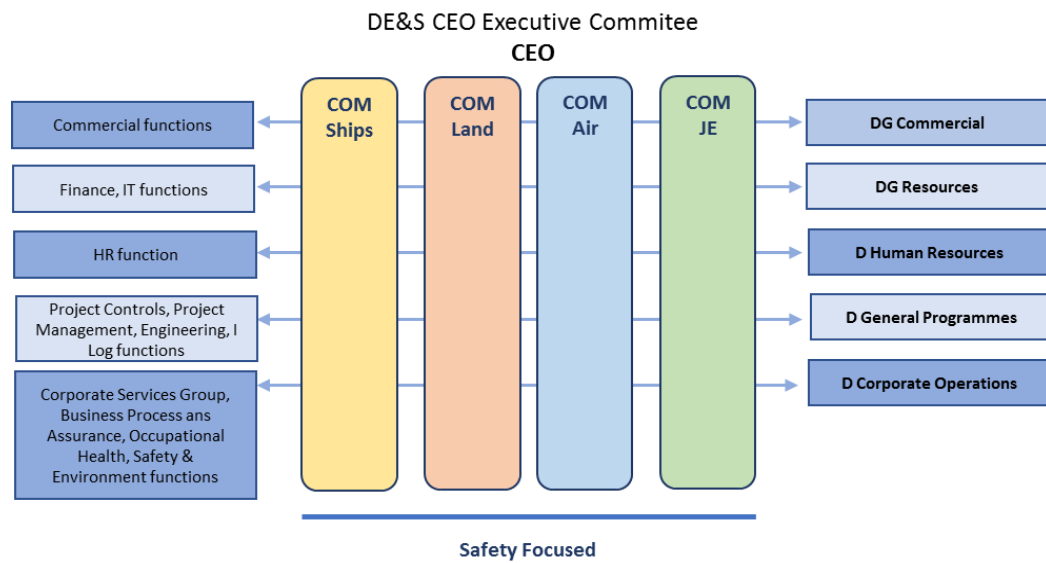
Transaction costs economics and outsourcing contracts management can be explained by quoting Hartley (2002): “This might be a strategic policy in which the winning contractor bids low with the aim of renegotiating later when the MoD’s capability is disbanded and other contractors cannot enter quickly and take-over the service. Overall, the transaction costs analysis shows that the costs of managing contracts, including arranging bids, monitoring outcomes and taking legal action for contract failures, may offset any efficiency savings” (Hartley, 2002, from Kavanagh et al., 1999). This role is held by a public procurement organization, Defense Equipment and Support, that will be defined in the next part of this thesis.

4.2.2 DES, a hybrid organization between defense and industry

Based in Bristol, Defense Equipment and Support (DES) was created on April 2, 2007, from the merger of the Defense Procurement Agency (DPA) and the Defense Logistic Organisation (DLO). DES is part of the Defense Equipment Programme, placed under the responsibility of the Ministry for Defense Procurement. DES can be defined as a “professional defense acquisition organization which manages a range of complex programs that provide vital equipment and enduring support to the UK’s armed forces. We are part of the Ministry of Defense (MOD) but operate as an arm’s length body. We have a unique Bespoke Trading Entity (BTE) status, which allows us to operate in a more commercial way to improve the quality of delivery to our military customers.”²² The DES’s BTE status allows this organization to sit outside the wider Administration Costs Regime (ACR), making it very special as a public procurement agency. Its structure is divided into four types of “customers” (a notion referring to New Public Management): Land committee (for the Army), Air committee (for the Air Force), Ships committee (for the Navy), and Joint Enablers. All of these committees and their interactions are represented in the following figure.

²² UK Ministry of Defense (2018), Defense Equipment & Support Annual Report and Accounts 2017-18 Equipping, p. 8.

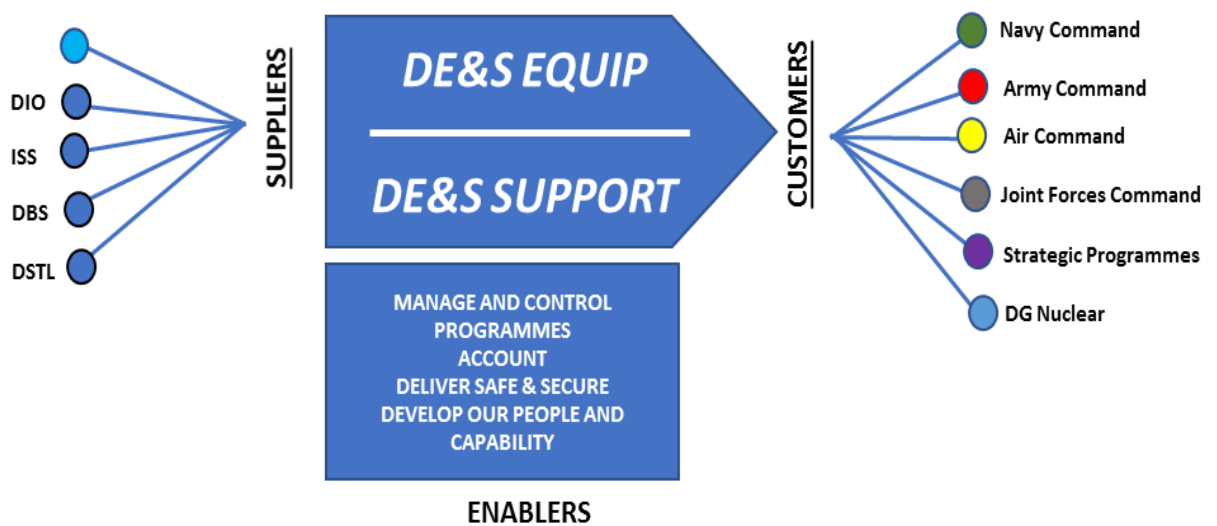
Fig. 31 Structure of the DES²³



Source: UK Ministry of Defense (2018), p. 9.

The DES is a crossing organization between private companies as well as industrial partners and six kind of customers: Army, Navy, Air Force, Joint Forces Command, Strategic Programs, and DG Nuclear. These interactions are represented in the following schema.

Fig. 32 Process of operations at DES²⁴



Source: UK Ministry of Defense (2018), p. 8.

²³ Ibid, p. 9.

²⁴ ibid, p. 8.

Government-operated, DES is an arm's length body of the UK's MoD. The very particular context of outsourcing in the UK has led some stakeholders on the materiel strategy programme to conduct studies on transforming the status of DES, whether from a fully government operated organization to a "GoCo" (Government operated, Contract oriented) agency, or towards an enhanced organizational (public) model known as DES+. Marty (2007) defines a GoCo as when "a private entity provides a service by exploiting an infrastructure that remains publicly owned." GoCos have been used in the United States, where they have been proven to have two advantages. On the one hand, they allow the government to establish its mission areas independently; on the other hand, they allow private operators to decide on the implementation of the best business practices. In orienting their operations toward business practices, GoCos seem to help reduce transaction costs, which can be seen as an advantage in public procurement and outsourcing. According to Masson (2014, p. 5), since 2010 and during David Cameron's term, DES has lost more than half of its workforce, from 29,000 to 12,500 in mid-2014. If the GoCo has been considered a serious option, none of the potential partners could be selected, because all of them were under the influence of American groups. They were therefore inappropriate in the context of the outsourcing of DES in the form of a GOCO. This situation has therefore led to the implementation of the DES+ option and to a wave of costs rationalization and personnel cuts within DES, making this organization overheated. Following this path to efficiency, DES began a three-year transformation program to become "match fit" by 2017²⁵. The MoD has defined "match-fit" in the following terms:²⁶

- equipped to deliver its promises and on the right track to becoming a leader in defense acquisition and in-service support;
- able to deploy its people functionally and flexibly to task;
- using standardized ways of working to help staff maximize their time and minimize wasted effort;
- supported by a pay and performance system that rewards good performance; and
- developing a management information system underpinned by the principle of input once and use many times.

After having presented DES as an organization, the next part will be based on a "case within the case" about DES outsourcing and PFI management tasks. The next part of

²⁵ Brooke-Holland, L. Defense Equipment and Support (DE&S), House of Commons Library Standard Note, SN06903, 3 June 2014.

²⁶ Ministry of Defense and DE&S, Defense Equipment and Support - Corporate Plan 2016–2019, p. 16

this thesis will now deal with strategic air transport and refueling. This case can be seen as a “British,” and it illustrates perfectly the singularity of outsourcing in the UK.

4.2.3 DES-managed PFIs: The case of AirTanker

First, it is necessary to introduce AirTanker Ltd. This project belongs to the Future Strategic Tanker Aircraft (FSTA) program, which is the second largest outsourcing program in the British armed forces. This private operator is a consortium bringing together five companies: Airbus (40%); Rolls-Royce as aircraft engine manufacturer (20%); Cobham for supplying refueling pods (13.33%); Thales for aircraft systems avionics (13.33%); and Babcock, in charge of the military communication systems and maintenance of the fleet at the main Brize Norton base (13.33%). This contract secures the availability of the Airbus A330 Voyager for carrying military personnel and air refueling. According to the FSTA contract, Air Tanker is responsible for operating the Multi Role Tanker Transport (MRTT) fleet until 2035 (27 years), which makes this contract a “long duration” PFI. Among the fourteen MRTs, five Voyagers can be operated by civilian operators (and are leased to Thomas Cook Airlines for civilian transport during periods of military inactivity²⁷), even if the RAF remains the main and the priority user. Once dispatched for the use of the RAF, the aircraft are managed by military personnel and have a ZZ3xx registration, while Air Tanker personnel remain responsible for managing civil flights.

The choice of AirTanker Ltd takes place within the framework of the Future Strategic Tanker Aircraft (FSTA) program (PFI proposal launched in 1997; PFI contract signed in 2008 and managed by the former Defense Procurement Agency, now DES). It permits the RAF to obtain modern air refueling aircraft capabilities under a PFI worth £13bn and to replace the former RAF's fleet of VC10 and Tristar air refueling air transport aircraft. Managed by Defense Equipment and Support, the FSTA program encompasses access for the RAF to fourteen Voyager Airbus A330 aircrafts: “nine of which are held in the core fleet with a further five held in reserve to meet demand as required.”²⁸ To manage the contract, DES sets up the DE&S Voyager Delivery Team that comprises forty full-time members at both locations: MOD Abbey Wood Bristol (for planning and overall

²⁷ <http://www.airtanker.co.uk/news-centre/news-item/2014/06/24/airtanker-and-thomas-cook-airlines-agree-landmark-civil-leasing-deal>; retrieved 17/07/19.

²⁸ See DES website :: <https://des.mod.uk/what-we-do/raf-procurement-support/a330-voyager/>; 17/07/19.

supervision) and at RAF Brize Norton (control and partnership with AirTanker Ltd).²⁹ In all contracts, DES provides Business Process and Assurance (BP&A) to ensure good practices and efficacy in management processes.

Fig. 33 AirTanker A330 aircrafts operated by the MoD and Thomas Cook Airlines



Source: AirTanker official website under:<https://www.airtanker.co.uk/news-centre/news-item/2014/06/24/airtanker-and-thomas-cook-airlines-agree-landmark-civil-leasing-deal>; retrieved 18/07/19.

According to the DES website, this contract includes the provision of infrastructure, maintenance, spares, aircrew and ground crew training (including training school and instructors), and fleet management services³⁰. AirTanker can be considered, in TCE, as a hybrid organization made of a consortium of manufacturers and service providers. More than providing an aircraft, AirTanker provides integrated solutions and falls into the scope of a Product Service System. The amount and the diversity of competences involved in this contract removes the role of a coordinating structure (DES) from the end-user (the RAF). As a conclusion, if an organization such as such DES allows the efficient management of a great diversity of projects, it is this same property that is at the origin of its greatest weakness: the management of a very large number of contracts with different characteristics and the resulting overheating of this organization, which is the subject of the following subsection.

²⁹ Ibid.

³⁰ Ibid.

4.2.4 DES, an overheated organization

Criticisms of DES and an “overheated” military procurement program have been raised several times. One of the most well-known instances came in 2013 from Phillip Hammond as Secretary of State for Defense, based on Gray’s 2009 report. This report sees DES and the whole British equipment program as “overheated” because of three root causes: “an overheated programme, a weak interface between Defense Equipment and Support and the rest of the MOD, too often leading to repeated changes to the requirement and a lack of business skills in DE&S.”³¹ These considerations take place in the context of transforming DES into a “more agile” organization (through GoCo). Parallel to this consideration, Marty (2013) also highlights the role played by exogenous factors such as economic and financial conditions. It should be mentioned that because of “the additional cost induced by the increase in financial costs (on average an increase of 6 to 8% of the amount of annuities related to the contract), the new government, in the person of the Chancellor of the Exchequer considered in November 2011 that PFI contracts can prove to be ‘too costly, inflexible and opaque’ (House of Commons, 2012).” Another example of exogenous constraints was revealed by Marty (2013) in political changes, financing costs, or standardization evolutions. Based on Hodges et al. (2012), Marty (2013, p. 2) explains as follows: “combined effects of political alternation, rising cost of private financing and the adoption of IFRS for UK public wealth accounting, leading to recognition of the vast majority of PFI commitments in the public accounts, hypothesize the future of the latter or at least lead to a clear re-evaluation of their employment doctrine.” Transaction costs economics explain these facts because of the importance of the supported “nexus of contracts” that can lead to a “burden” and to such an overheated organization. If we consider Gray’s report under the scope of transaction costs economics, “the costs of running the economic system” (Williamson, 1975; Hartley, 2007) are carried by a lone organization that comes to a non-coordination level depending on the variety of the programs managed, the number of personnel, and the diversity of all tasks that have to be managed. In the case of DES, the advantage of having a bespoke trading entity carrying all transaction cost for the armed forces reaches a limit in considering that too much diversity in the “contracting landscape” leads to overwhelming transaction costs because of information, coordination, and negotiation-related indirect costs.

³¹ See: <https://www.gov.uk/government/speeches/defense-procurement>, retrieved on 15/07/2019.

4.2.5 Conclusion of the case

It seems impossible to deal with outsourcing in defense without dealing with the case of the British MoD, which remains the backbone many studies on this topic. Considering procurement agencies, the role of Defense Equipment and Support seems paramount and brings much positive experience in terms of contracts and relationships with industrial and business partners. Nevertheless, many criticisms have been raised toward “too much” outsourcing in defense and that some of these outsourcing crackdowns have been “forced” by budget constraints. In the case of DES (and considering the “optimization” carried out during the last few years), these difficulties of managing and carrying the “nexus of contracts” show one thing: the limitations of outsourcing in defense and the blurred definition of core competencies in the military.

4.3 Discussion

In this part and lastly before the conclusion, general trends will be addressed in order to discuss the results of both of these case studies. First, a theoretical confrontation between TCE and procurement organizations will be made in order to apply these considerations within the comparison of both English and German cases. The above will lead to recommendations and to the conclusion of this thesis.

4.3.1. Transaction costs economics and procurement agencies

By pooling the resources available to buyers and confronting them in order to negotiate with bidders, central buying and bargaining is a mode of aggregating contract nodes that forms a typical structure of a hybrid organization (Williamson, 1975, 1981, Reid, 1995, Glock and Hochrein, 2011). The two case studies in this thesis echo previous work on the case of the Finnish industry, in which it is shown that the action of the buying agencies is in the trend to reduce transaction costs in reducing overall costs following the action of central purchasing bodies (Tella and Virolainen, 2005). Arnold (1996) also shows the "positive" effects resulting from the mediating action of the buying agencies. If this thesis confirms that, in the defense context, the "ideal" buying agencies act in reducing transaction costs and grouping the contract nodes (Valentinov, 2005), the constitution of hybrid governances by procurement organizations can be considered as a backbone for “low transaction costs” contracts. The meaning of the transaction cost theory also induces

the construction of a long-term relationship and dialogue structures of cooperation, allowing exchanges during the realization of the contract and the avoidance of opportunism (Schotanus et al., 2010), which can cause adverse effects. The role of purchasing agencies can therefore also be extended to the management of the partnership throughout the duration of the contract. On the other hand, excessive complexity of procurement areas and procedures is a source of inefficiency for these organizations (Tella and Virolainen, 2005). This issue has led to a massive increase in coordination costs (Johnson, 1999), requiring organizational change to allow for greater flexibility and expanded control capacity (Schotanus, 2005). Procurement organizations are a significant asset because they do not require the end customer to have direct negotiations with the private partner. By bundling the management of all contracts, these organizations allow a much more wide-ranging perspective and the swiftest possible use of the good practices that have been experienced in other or previous contracts. By setting up stable levels of supervision and control, they also make it possible to establish a lasting customer–supplier relationship that is strengthened by the experience acquired on other contracts. One of the interviews conducted in this research shows that the main weakness of the armed forces is the high turnover of the staff in charge of contract management. This problem seems to be reduced in the case of these organizations. Procurement organizations allow, in addition to cost rationalization, a rationalization of experiences and relationships, and thus produce a significant decrease of transaction costs.

4.3.2 A comparison of the German and British cases

Germany and the United Kingdom have completely different visions of outsourcing for their defense system. While Germany seems to be pursuing a strategy of mutualization, rationalization, and outsourcing of functions (mainly focused on support with the constitution of 'a partnership with the industry'), the United Kingdom reasons in terms of effects to obtain and protects the essential combat functions only. The first and main difference between the two countries is therefore cultural and socio-economic. Equally, the operational context of the two countries is very different in terms of their operational commitment, although this factor is qualified by the fact that the British and German armies are now second-class military powers.

Outsourcing, in terms of procurement agencies, differs in these two countries. If the United Kingdom integrates the technical and managerial components into a single entity

(Defense Equipment and Support), Germany (which used to have a consulting entity entirely devoted to outsourcing) uses a consulting company in terms of process and organizational optimization (BW Consulting) as well as BAAINBw, a technical military organ responsible for the design of the operations of armament and the initial support and in-services of these armaments. This duality, in the German case, seems to allow a more marked process differentiation and less "overheating" than in the case of DES, where the centralization of the outsourcing processes to be managed is so important that it reduces the efficiency and the effectiveness of this organism. Also, the complexity of certain processes within the German army associated with their complex and joint aspect are a source for criticisms when the effectiveness of BAAINBw is lessened by complex projects. This has led to existing political views to support an outsourcing project of this organization. This last thing nevertheless leads to the cultural dimension of outsourcing in Germany, which does not (yet) overbid on externalization, and therefore to an externalization of BAAINBw.

Conclusion/limitations

In conclusion of this research, the notions of outsourcing in the armed forces sector have been linked to that of servitization (and productization) in the industrial sector through an original link represented by the purchasing and procurement organizations working for the benefit of the armed forces. The role of these organizations, from the perspective of transaction costs economics, seems to allow the constitution of hybrid governance structures, to reduce transaction costs, and to allow a healthy transfer of the management of the contract node represented by entanglement of different outsourcing contracts in the wide variety of areas addressed in the armed forces. The British and German examples show notable differences between the governance structures implemented in each of these nations. The British model, which is more integrative, seems to allow a particularly inventive and effective type of contractual engineering in a sector as critical as the armed forces. This is partly due to the action of its equipment organization, Defense Equipment and Support. Nevertheless, this integrative aspect induces tensions within DES, due to a contract node that is too large to manage and a "contagion effect" aimed at thinking of an optimization of DES through its externalization. The German model, although showing similar inclinations towards an extension of outsourcing in the forces, is much more circumspect. It also focuses on organizational optimization and rationalization measures, possibly accompanied by contractual extensions. In this context, the managerial components (supported by BW Consulting) and technical ones (supported by BAAINBw) constitute the backbone of any industrial optimization. It has also been observed in both cases of this thesis that many outsourcing contracts concern integrated services and "solutions" proposed by the private sector. Product servitization (or productization of services) seems to be a natural way for the private sector to incentivize the public sector to outsource.

In the two cases studied, procurement organizations play a key role and, in the sense of the TCE, seem to be the driving forces behind all contracting and outsourcing of capacities, while showing in particular their usefulness in the long-term management of contractual relationships.

In this research, five research sub questions have been stated. These now have to be addressed, as the results of this thesis and the answer to the main research question about procurement organizations, outsourcing in the public (defense) sector, and servitization of products. These research sub questions are repeated in the following matrix.

	Questions	Results
<u>RSQ1</u>	Can the meeting of both servitization offer and outsourcing willingness of an agent be considered as converging trends?	Outsourcing and servitization are two converging logics: when an agent decides to have recourse to the market to execute a capacity and if this need is linked to a physical asset, then the supplier of this asset can differentiate itself on the market by topping up one or several services to the provision of the asset in question.
<u>RSQ2</u>	Can procurement agencies be considered as hybrid governance of contracts?	Procurement organizations make it possible, in terms of transaction costs, to reconcile the expectations of the end customer by adapting the contractual proposal and maximizing the contract rent by managing the cultural aspects of the supplier. Procurement organizations do not in themselves constitute a hybrid form of governance when they belong exclusively to the client. When these organizations are themselves outsourced or privatized, they constitute a separate entity dedicated to market governance and thus can be considered as a hybrid governance.
<u>RSQ3</u>	How do industrial partners enhance public outsourcing in selling additional services to the manufacturing of goods?	By offering services directly in addition to the supply of goods, manufacturers avoid the public decision-maker's costs to find a suitable service proposal because of their all-inclusive offers; thus, they promote outsourcing by reducing transaction costs generated by this type of offer.
<u>RSQ4</u>	What is the benefit of having procurement agencies to facilitate outsourcing?	Procurement organizations make it possible to facilitate communication as an interface and thus, through their ambidextrous knowledge of the culture of both the public customer and the industrial sector, they enable innovative contracts to be drawn up.
<u>RSQ5</u>	In facilitating the exchange of information, do procurement organizations help to lower transaction costs in outsourcing?	By reducing cultural gaps, procurement organizations reduce the costs of research, translation, negotiation, contracting, and monitoring. These organizations thus reduce transaction costs.
<u>RSQ6</u>	If they have organizational ties with their end-user, are procurement organizations efficient?	Procurement organizations, by being strongly linked to their clients in an organizational way, generate higher transaction costs to understand the leverage of maximizing contractual rent. This type of orientation does not make them less (or

		more) efficient in an absolute way, but in the case of an organization tempted by more outsourcing, a non-optimal maximization of contractual rent (by a deeper comprehension of the supplier's culture) can make procurement organization less efficient.
<u>RSQ7</u>	If they are not directly related to their end-user, are procurement organizations effective?	Procurement organizations, by not being directly linked to their clients in an organizational way, generate higher transaction costs to understand the leverage of maximizing contractual rent because of less comprehension of the main reason of their existence: the customer. Conversely, they can leverage the servitization propensity of the manufacturers perfectly. This type of orientation does not make them more (or less) efficient in an absolute way, but in the case of an organization tempted by more outsourcing, a non-optimal maximization of contractual rent (by a deeper comprehension of the supplier's culture) can make procurement organization efficient.
<u>RSQ8</u>	If they permit a good comprehension of the concerns of the industrial partner, are procurement organizations effective?	Procurement organizations first have to be concerned about the needs of their end customer. The effectiveness of procurement organizations in managing outsourcing and servitization is a trade-off between the expected level of outsourcing (and its acceptance), the optimal proposed level of servitization (from the manufacturer), and the sensitivity of the organization considered toward outsourcing.

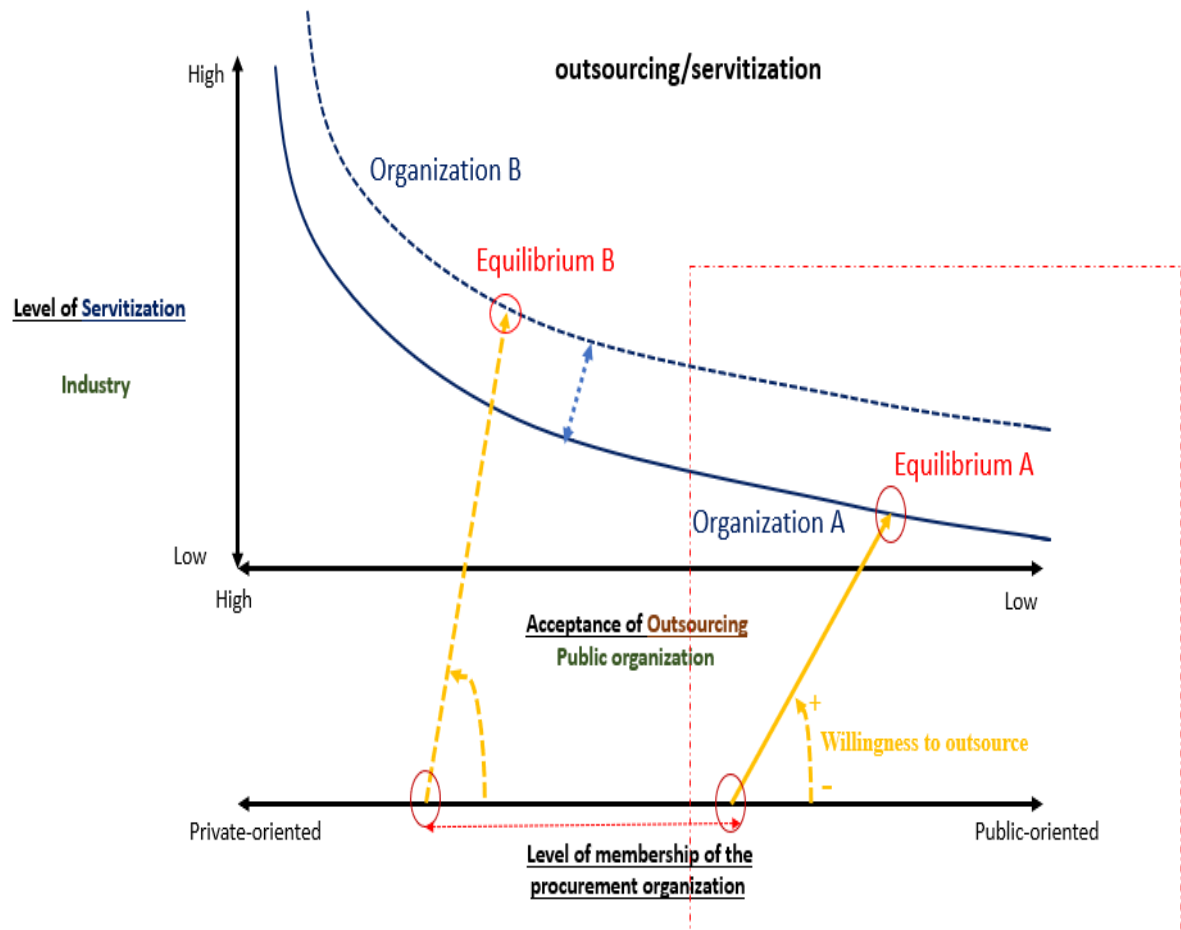
In a broader sense, applications can be found in this thesis for cases different from that of the armed forces. These results seem to be applicable in public organizations in a very broad sense. This leads to the theoretical and practical contributions of this work, beginning with contributions for theory.

Contribution for theory

The relationship between customer and supplier is a fundamental thing in the case of outsourcing. Between the operator or "end user" and the manufacturer, many perspectives may differ. It is within this framework that procurement organizations can act

to reduce different perceptions and goals. The findings of this thesis can be seen in the following diagram.

Fig. 34 Modelization of the role of procurement organizations



Source : own model

The model so described is the formulations of four variables affecting three actors (the industrial partner, the customer organization and the procurement organization).

These four variables are: (1) the level of service provided by the manufacturer, (2) the level of acceptance of outsourcing by the public organization, (3) the level of membership of the procurement organization, and (4) the willingness to outsource of the organization which is carried out by the procurement organization.

Two organizations are represented in this graph: Organization A and Organization B. They model the following situation: Organization B shows a higher relationship between service and outsourcing: the same acceptance of outsourcing is induced by a higher service offer by the manufacturer. From the point of view of the procurement organization, it is

more private-oriented in case B than in case A, with a higher likelihood of outsourcing in the case of organization B than in A. The result of these two situations is different equilibrium points. While each organization has its own sensitivity to service offerings by industries, procurement organizations make it possible to reflect the propensity to outsource in order to obtain the associated level of outsourcing and service. Procurement organizations that are more “private oriented” seem to be more likely to result in a higher acceptance of outsourcing than in the case of more “public oriented” procurement organizations.

The summarization of the theoretical findings of this thesis are as follows: Procurement organizations bear the “translation” of the organization’s outsourcing willingness and bear the transaction costs that the organization would bear itself without having a procurement organization. Procurement organizations reduce the uncertainty about industrial partners and because of their deep comprehension of industrial concerns; they reduce the uncertainty felt by corporates about future evolutions of the public organization.

Contribution for practice

The practical implications and conclusions of this research are quite tangible and concrete because they are defined through a model with mechanical and dynamic characteristics. Understanding the embeddedness of procurement organizations allows two managerial perspectives on procurement, outsourcing and servitization: (1) for the decision-maker and public managers, to consider an outsourcing project in the context of the market orientation of their procurement organization and considering that the more civil-oriented the organization is, the more likely it is possible that outsourcing projects can be completed; (2) for the potential supplier, having an indication on the orientation of a procurement organization would enable it to provide suitable service offers with the highest likelihood of completion. The following trends can be used for practice:

- 1) Defense procurement organizations are public entities and must remain public in order to maximize their effectiveness.
- 2) Procurement organizations, as bespoke entities, help to reduce transaction costs because they are not directly a part of their end-customer, although they are public organizations.

- 3) Servitization offers can be very useful but must be adapted to the actual needs and sociocultural context of customers.
- 4) Servitization and outsourcing can be crossed to reach a trade-off that provides solutions for public organizations.
- 5) Procurement organizations (even if they remain public) are necessary and separate entities from organic bodies of the end customer.

As an enlargement and a broader perspective to this study, another example of this model can be found comparable with the case of French defense that concerns In Service Support (ISS) activities and aircraft maintenance. In 2018, the former Air Force–led *Structure Intégrée de Maintien en condition opérationnelle des Matériels Aéronautiques de Défense* (SIMMAD) was transformed into a more industrially oriented procurement organization: The *Direction de la Maintenance Aéronautique* (DMAé). The creation of this new procurement organization, which is mostly staffed by DGA personnel, has been tied to the acceleration of outsourcing projects within the framework of “Verticalization of contracts.” The most well-known example of this wave of new contracts can be illustrated by the outsourcing of the maintenance for the FENNEC helicopters at the Army Aviation Training School at le Luc-en-Provence. Transforming the SIMMAD into the DMAé seems to have been an effective way to enhance contractual possibilities and to optimize the customer/supplier relationship. This trend should be observed in the years to come as a case that can be considered as a very tangible illustration of the model represented in this thesis.

This thesis therefore has managerial implications enabling the actors to understand their contractual environment by characterizing the positioning of the relationship between the actors in their contractual environment and with respect to it. The results of this thesis will now be discussed briefly.

Discussion and limits

Transaction costs are a very useful theoretical way to understand this theoretical issue. It would be possible, in a future study, to explore this relational perspective through approaches other than transaction cost economics.

This thesis nevertheless presents certain limits due to the complexity and the magnitude of the subject. In order to restrict the study and better circumscribe the subject, some cases were not discussed, such as that of the French *Direction Générale de*

l'Armement (DGA), practices of outsourcing in American defense (the American administration makes a frequent use of GoCos), or the Italian *Agenza Industrie Difesa* (AID), whose structure can be considered similar to that of DES and can be related to BW Consulting in terms of management practices.

Each country has its own culture and its own way to consider its armed forces, which has consequences for outsourcing practices and the related procurement agencies. These examples could make it possible to verify the validity of the present thesis in the framework of subsequent works, as this thesis has already designed a model of this kind of procurement organization. Also, the exogenous aspect of many of the constraints on the armed forces means that the two cases explored should be considered in the current observation context only. A longer-term study could also be done in order to delineate more accurate trends on this phenomenon.

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Supplement

Servitization around the world



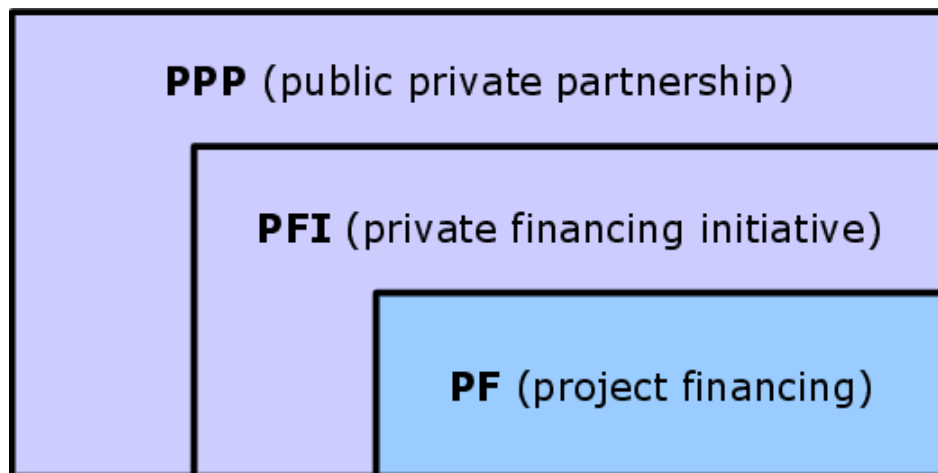
Source : Mastrogiacomo et al. (2019)

FSS contract EC 135 helicopters



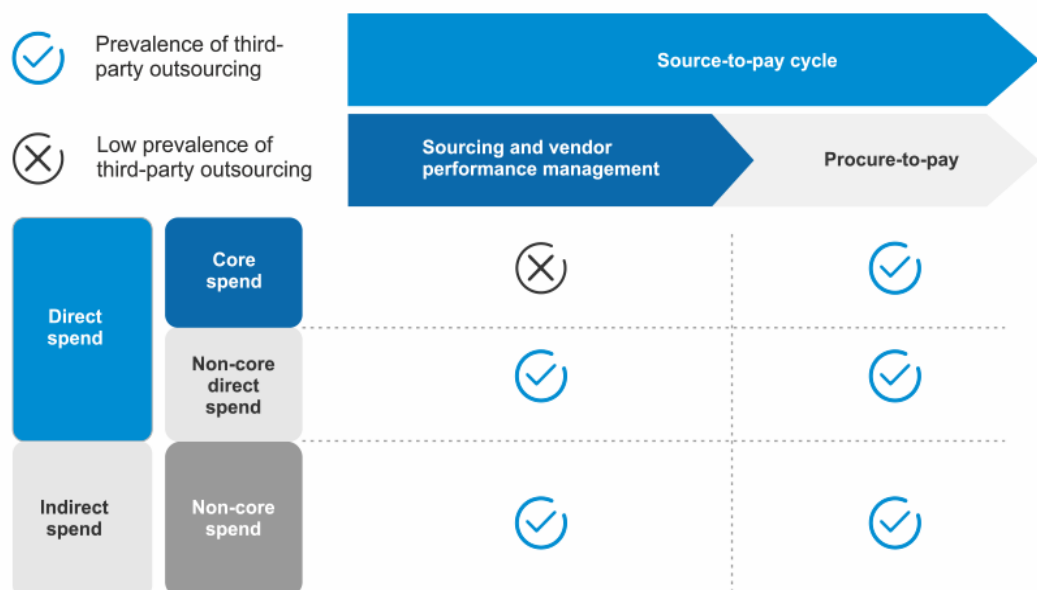
Source : Bundeswehr

Relationship between PPP/PFI/PF



Source : Beria et al., 2016

Top 5 best practices in procurement outsourcing



Source : GEP

Thesis summary

Introduction

Outsourcing in defense is not a new topic but a very genuine one because of the current context of western armed forces. Ekström (2012) shows that this new public management necessarily implies a "disaggregation" of administrations as such, it leads to the creation of sequences of production units. An illustration of the concept of value for money (VFM) and its considerations come from the Royal British Public Treasury which defines the VFM as: "The optimum combination of whole life cost (WLC) and quality (or fitness for purpose) to meet the user's requirements". These situations sometimes lead governments to attempt regulatory actions - in particular in an effort to provide public services - which face new logic oriented towards profit and profitability. The example of the privatization of British rail and its opening up to competition, framed by the British government, clearly shows this state of possible ambiguity and the associated problems (Preston, 2006, Paulley et al., 2006). During the past decade, a decrease of 20 to 30% of military personnel was observed in France, Germany, the United Kingdom and the United States, while coalition operations helped to promote a model of fewer forces, easily deployable and technologically superior to their potential adversaries. In this context, the refocusing of armies on their main mission and the budgetary downturn led the Departments of defense to entrust an increasing number of their activities in the market. This situation explains why outsourcing has become one of the hottest topics and the backbone of many studies in defense economics. Toward outsourcing, another phenomenon -called servitization- has to be presented as an adding service to manufactured goods. Voisin (2002) illustrates this phenomenon and this trend toward profitability for industrial corporations: "Indeed, industrial firms are now tending to offer services upstream or downstream of their sector in order to extend their market area and maximize value creation in this profitable segment ». In reaching an equilibrium between public outsourcing and servitization, public procurement organizations play a paramount role that need be explored in this thesis.

Theoretical frame of the thesis

This thesis is based on several theoretical guidelines and explains the role of public procurement organizations according to one theoretical frame: Transaction Costs Economics (TCE). TCE is used in this thesis because it allows the truest representation of the role of buying agencies as carrier of the contract nexus and thus reducing transaction costs for agents. After having defined public outsourcing and industrial servitization, this thesis defines the nature and the role of public procurement organizations before putting in relationship public outsourcing, procurement organizations and industrial servitization. TCE is one of the most used theoretical frameworks to study outsourcing. This « study-proven » theory seems to be the most relevant to get reliable results and to focus on empirical research.

Goals of the thesis

This thesis aims to implicate the effects of procurement organizations in public outsourcing as well as facing servitization offers by industrial partners. Indeed, this thesis analyses procurement agencies as an intermediary (?) to meet the best agreement between offered servitization by a manufacturer and the outsourcing willingness of a public agent. From a theoretical viewpoint, this thesis uses TCE to describe the issue of maintaining optimum relations among contracting organizations. TCE explains how procurement agencies reduce transaction costs and lead public administrations to adopt market-oriented solutions instead of in-house solutions. More particularly, this thesis examines the cases of the British Ministry of Defense with Defense Equipment and Support and of the German administration with Bundeswehr Consulting and BAAINBW. No existing scientific literature has reviewed this phenomenon thoroughly. The results of this thesis will contribute, in general, to the debate about efficient ways to allocate public funds for the provision of public services. In order to come to a proper model of the researched phenomenon, partial goals of this work have to be defined as:

- (1) To create an original combination of case studies in/ among European armed forces.
- (2) To analyze (in using concrete cases) the role of public procurement organizations.
- (3) To prove their role in reaching the servitization supply and the public customer's demand.

- (4) To confirm this role in defense organizations.

Five hypotheses form/constitute the core reflection of this thesis and these are:

- (1) If industrial partners sell additional services to the manufactures of goods, then it will enhance public outsourcing.
- (2) In facilitating the exchange of information between a customer and its providers, procurement organizations may help to lower transaction costs in outsourcing projects.
- (3) If they have organizational ties with their end-user, then procurement organizations are efficient.
- (4) If they are not directly related to their end-user, then procurement organizations are effective.
- (5) If they enable a good comprehension of the concerns of the industrial partner, then procurement organizations are effective.

Methodology

The use of several case studies is recommended by Yin (2008, 2009) in order to vary the perspectives of the research and this is the basis for the choice of the study of two situations whose configurations are also very different. A multiple case study is the best way to draw empirical conclusions and avoids putting all pieces of evidence in a single case that could appear to be non-relevant. These follow the prescriptions of Yin (2003, p.99) that lists six main sources of data for the case studies: documentation, archival records, interviews, direct observation, participative observations, and physical artifacts. These sources are of two different natures: the first and the main one is documentary and, the second highlights the role and the experiences of the actors (Blumer, 1937) through non-directed interviews.

Here, only two case studies were taken in order to "circumcise" two subjects in a broad way and to be able to enter a degree of granularity allowing to find the developed modelling of the outsourcing processes. The use of a double case study is therefore justified by the need to have a clear and detailed statement while sticking to the principles of Yin, which advocates at least two cases. A case study can be defined by quoting Hartley (2004): "Case study research consists of detailed investigation, often

with data collected over a period of time, of phenomena, within their context". Thus, a case study is in its empirical aspects in a social field coupled with a process analysis, an excellent way to address the topic of outsourcing and this, in the field of defense. Yin (2009) defines and confirms this point of view: "Not surprisingly, the case study has been a common research method in psychology, sociology, political science, anthropology, social work, business, education, nursing and community planning". The research method follows the direction given by Yin (2009) in the sense that the choice of authoritative literature in this type of subject makes a work of preparation of the empirical phase of the case studies. Indeed, Yin (2009) defines "case studying" so as firstly "collects case evidence" then "analysis case study data" and finally "composes a case study report". This approach is also part of the Yin (2009) case study process, which lists the main usable documents such as: "written documents, archival collections, interviews, direct observation, participatory observation, and artifacts". The main dimension - and the most important one - lies in having a well-defined and usable plan like a red thread throughout the study. The choice of different examples in their implications also meets the requirements of Yin (2009) with the aim of obtaining the best results: "In general, criticisms about single-case studies usually reflect fears about the uniqueness or artefactual conditions surrounding the case".

This thesis uses an abductive reasoning. Abduction corresponds to the constant observation of different phenomena in the professional environment of the researcher confronted with the establishment of a theoretical framework and leading to a reflection evolving from a "background theory" (Aliseda, 2006) calling for a first deductive approach, which the researcher will evolve during the course of the study. The case study here is of a unique nature and makes sense in the confirmation, reversal or "re-adjustment" of the existing theoretical framework applied to the case study (Yin, 2003). If the unique case study fits perfectly in an abductive context (Dumez, 2014) and is a method already proven in many works and whose results allow important theoretical advances (Gagnon, 2005), this thesis uses a two-cases case study in order to achieve a better triangulation (Shandana and al., 2016).

After having defined the founding principles of the theoretical reflection of this thesis, a model is going to be developed/ based on the use of simple principles of TCE.

As a result, the vast majority of the sources for this thesis come from secondary data.

- The researcher's approach with a different cultural perspective can lead to cognitive biases - The researcher's geographical distance required major adjustments to conduct this research. Likewise, while the position of practitioner-researcher allows privileged access to the field, it also includes the presence of various biases whose considerations are essential to avoid some pitfalls in the study of a case to which the researcher may be confronted on a daily basis.

Empirical part

In this thesis, two cases will be studied: the German case of Bundeswehr Consulting and BAAINBW and the case of Defense Equipment and Support.

Bundeswehr Consulting was created after the GEBB. Created in May 2000, the GEBB's tasks were very diverse such as a complete reorganization of the operating activities of the barracks and of clothing, automobile transport (Fuhrpark der Bundeswehr), information systems and technology exploitation and all kind of implementation of private management. More than a new brand, the creation of BW Consulting introduced new focusses which are based on three main axis and are supported by experts. Standing for "Bundesamt für Ausrüstung, Informationstechnik und Nutzung der Bundeswehr", BAAINBw was created in 2012 from the merge of both Bundesamt für Wehrtechnik und Beschaffung (BWB) and Bundesamt für Informationsmanagement und Informationstechnik (BWI), (.) BAAINBw is currently located in Koblenz and is directly subordinate to the German ministry of defense. Its role is to provide equipment and weapon systems considering to the Bundeswehr and to design efficient support models.

DES can be defined as a "professional defense acquisition organization which manages a range of complex programs that provide vital equipment and enduring support to the UK's armed forces. We have a unique Bespoke Trading Entity (BTE) status, which allows us to operate in a more commercial way to improve the quality of delivery to our military customers". Its structure is divided in four types of "customers" (notion referring to New Public Management): Land committee (for Army), Air committee, Ships committee (for Navy), Joint Enablers.

The case of the German Bundeswehr seems very particular in Europe because of the convergence of strong industrial and political interests. This led to a necessity for

German industries to stick to the German government needs in order to provide the domestic market before try to export war material. Indeed, the domestic market remains indispensable for the survival of the German industry since the state is the first customer of any development of defense systems and prototypes. Glas (2017) also shows that the German military can be seen by industrials as a very reliable partner, this leading to preferential treatment. The actual size, the socio-economic context and the international role played by the German Bundeswehr seem to encourage political decision makers to outsource more and more capabilities related to the German military.

The studied examples of this part are the Full-Service Support (with Airbus Helicopters) and Bechtle IT expertise, both have been outsourced and servitization contracts that concern the German Bundeswehr.

The British example shows a multitude of configurations and interactions in the field of outsourcing that are particularly suitable for all contractual contexts. This trend toward outsourcing has implied an organizational change that led to the use of “partnering” between the MoD and private businesses and allowed to reduce personal expenses too. These trends could have been observed in the increase of expense within the framework of “Contractor Logistic Support and Integrated Operational Support contracts for equipment support”. Hartley (2004, p.1) shows that: “policy aimed to ensure that defense support functions were undertaken by the private sector unless it was operationally necessary or more cost-effective to keep the work in-house (Cmnd 675-1, 1989, p35)”. If financial savings due to outsourcing crackdowns have been observed and reported, lots of criticism exist about the reliability of private corporations taking over on MoD capabilities because of the possibility of poor quality and unreliable services because private contractors can be liable to default, strikes, bankruptcy and are sensitive to uncertainty corresponding to emergencies (Hartley, 2004, p.3). Other criticisms refer to opportunistic behaviors that could lead private contractors to exaggerate in bidding lower prices in order to be more competitive than “in-house” workforce, leading to a situation of “hold-up” as shown by Hartley (2004, p.3): “Critics also claim that any cost savings are short-lived: low bids can be used to ‘buy into’ an attractive new contract and eliminate the in-house capability, so that the MoD loses its bargaining power”.

Researched examples of this part are AirTanker and the role of DES in managing this contract.

Findings:

Findings of this thesis can be divided in three categories: empirical findings, managerial findings and theoretical findings.

Empirical findings can be divided in two parts: the German and the British cases.

As a conclusion, the German case seems much influenced by a strong partnership between German industries and state organizations such as the Bundeswehr. Many German (or European) companies propose services in addition to their manufactured goods and German bespoke trading organizations as well as BW Consulting (for management issues) or BAAINBw (for technical and engineering processes) help quite efficiently to implement servitization within the framework of outsourcing in the Bundeswehr so that the military can use the expertise of private actors, save budgets and concentrate on their core competencies. The German model uses a two-headed perspective to explore each case through a highly "civilized" organization (BW Consulting) for consulting activities and a military organization focused on the implementation of each project (BAAINBw). The German defense sector seems to have developed a sustainable outsourcing model through the existence and complementarity of these two organizations within the framework of a partnership relationship.

Considering procurement agencies, the role of Defense Equipment and Support seems paramount and brings a lot of positive experiences in terms of contracts and relationship with industrial and business partners. Nevertheless, many criticisms have been raised toward "too much" outsourcing in defense and the fact that some of these outsourcing crackdowns have been "forced" by budget constraints. In the case of DES (and considering the "optimization" that has been carried on during the last years), these difficulties of managing and carrying the "nexus of contracts" show one very thing: the limit of outsourcing in defense and the blurred definition of core competencies in the military.

Managerial findings:

- 1) Procurement organizations are public entities and must remain public in order to maximize their effectiveness.
- 2) Procurement organizations, as bespoke entities, help to reduce transaction costs because they are not directly part of their end-customer although they are public organizations.

- 3) Servitization offers can be very useful but have to adapt to the current needs and to the sociocultural context of customers.
- 4) Servitization and outsourcing can be crossed to reach a trade-off that provides solutions for public organizations.
- 5) Procurement organizations are necessary and must be separate entities from their customer organization.

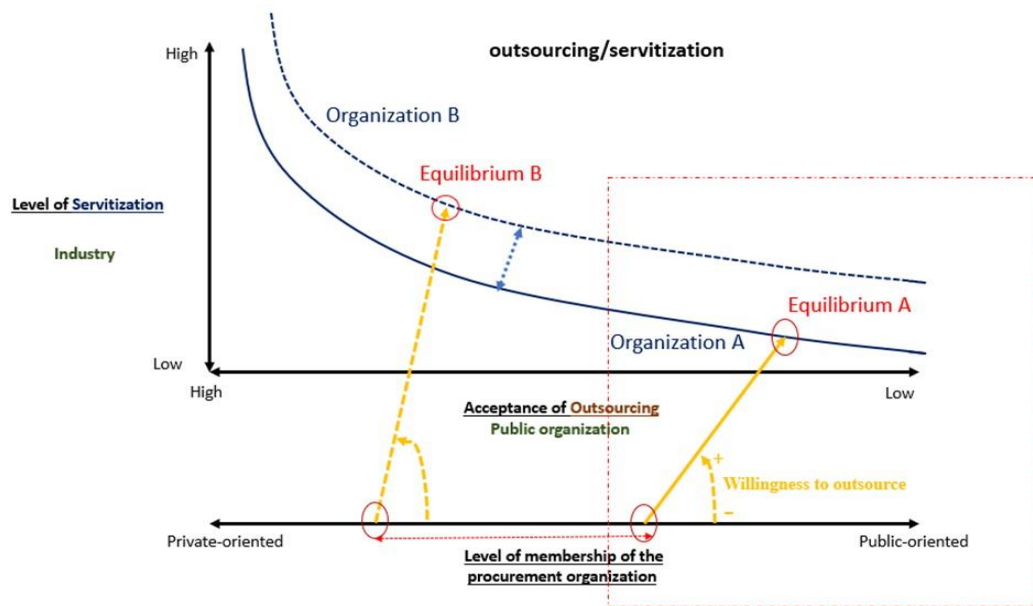
Theoretical findings:

The described model incorporates four variables affecting three actors: the industrial partner, the customer organization and the procurement organization.

These four variables are: (1) the level of service provided by the manufacturer, (2) the level of acceptance of outsourcing by the public organization, (3) the level of membership of the procurement organization and (4) the willingness to outsource of the organization, which is carried out by the procurement organization.

Two organizations are represented in this graph: Organization A and organization B. Organization B shows a higher relationship between service and outsourcing: the same acceptance of outsourcing is induced by a higher service offer by the manufacturer. From the point of view of the procurement organization, it is more private-oriented in case B than in case A with a higher likelihood of outsourcing in case of organization B than in case A. While each organization has its own sensitivity to service offerings by industries, procurement organizations make it possible to reflect the willingness to outsource in order to obtain the associated level of outsourcing and service. Procurement organizations bear the “translation” of the organization’s outsourcing willingness and bear the transaction costs that the organization would bear itself without having a procurement organization.

Model designed by this thesis



This thesis thus provides an innovative model for the crossing of servitization, procurement and outsourcing in the public sector. Procurement organizations induce a stronger trend towards outsourcing if they are "civil oriented" and a greater caution when they are "public oriented". This factor, combined with the organization's willingness to outsource, explains the range of outsourcing opportunities that exist within the organization and that differ between organizations. This thesis opens many perspectives using a simple theoretical framework and it can be applied to a large number of other procurement organizations.

Specification of the scholarly work approved by an authorized person

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