

# Performance Based Contracting Capabilities – A Pre-study of Swedish Defence Acquisition

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## Abstract

The Swedish Armed Forces and the Swedish Defence Materiel Administration (FMV), i.e. the Swedish Defence Procurement Agency (DPA), are currently undergoing a radical transformation. The transformation involves shifting roles and responsibilities, and transfer of resources, including personnel, from the Armed Forces to the DPA. To a large extent, the transfer of resources involves the merger of parts of the Swedish Defence Logistics Organisation (DLO) with the DPA. In the new business model, the DPA will assume responsibility for defence equipment from a life-cycle perspective, i.e. both equipment and support, whereas previously, the DPA was only responsible for acquisition of equipment, and the Armed Forces was responsible for operations and support.

This paper reports on a conceptual pre-study that was conducted in order to explore the concept of “*performance-based contracting (PBC) capabilities*”, as well as to examine what types of capabilities the Swedish defence agencies should consider in order to implement a performance-based defence acquisition and logistics model. In addition, the pre-study was aimed at identifying relevant theoretical perspectives and conceptual frameworks for empirically studying, as a next step, capability development in performance-based contracting.

The pre-study proposes a definition of PBC capabilities, identifies three key types of PBC capabilities, and highlights four theoretical perspectives as potentially relevant and useful for studying capability development in performance-based acquisition and contracting.

*Key words: defence transformation; military logistics; supply chain; support chain; defence acquisition; Business Model; performance based contracting.*

## Introduction

An underlying key change in the way Swedish Armed Forces (Försvarsmakten, FM) acquire equipment and logistics services is the shift of emphasis towards a performance-based acquisition model. Under the new model the Swedish Armed Forces will order equipment and materiel from the Swedish Defence Procurement Agency (DPA) (Försvarets Materielverk, FMV) at a higher system level, after which the DPA will take a life cycle and capability perspective on the acquisition of equipment. The intention is to streamline the management and client business as such and that the orders of higher system levels create additional conditions for the DPA to meet the needs of the Armed Forces for effective and efficient solutions (FM and FMV workgroup report, 2013). By streamlining the tasks and roles, where the Armed Forces will be responsible for the functionality of procured solutions and military capability development and the DPA will have a clear responsibility for defence logistics, it is believed that increased effectiveness and efficiency in this area is possible. This also means that the defence industry’s role will probably be elevated, as defence equipment suppliers may in the future be asked to offer turnkey, integrated solutions of equipment supply and service support (FOI, 2013).

The restructuring entails a change of responsibilities between authorities in accordance with government decision. In broad terms, the DPA will have a much greater responsibility for groundwork preparation and

decisions within the overall equipment and logistical supplies. This will also require higher interaction between the authorities that relate to the Armed Forces' capability development, overall system management as well as the joint production planning, implementation and accounting (FM and FMV workgroup report, 2013).

The implementation of a performance-based model of acquiring materiel, equipment and logistics services is supported by a reformation of Swedish defence and a transition towards a new organisational structure to support this paradigm shift. The aim of the reformation project is to reduce the cost of support activities (defence logistics services and equipment acquisition) and to free up resources for the Swedish military to build up its organisation and achieve its missions. In the context of an expanding role of the Swedish Armed Forces in accordance with requirements to be involved in international peace keeping operations in addition to defending national borders, this transfer of resources to "*core activities*" is crucial (Ekström, 2012).

Therefore, the key driving force underscoring the restructuring project is cost reduction in logistics and acquisition activities supporting the Swedish Armed Forces. As part of this reform a large part of the Swedish Armed Forces' Defence Logistics Organisation (DLO) (Försvarsmaktens Logistik, FMLOG) and its activities will be transferred to the DPA so that a more efficient allocation of roles and responsibilities is achieved. Another key feature of this reform is the development of an internal defence market, with the Swedish Armed Forces being the customer having overall responsibility for the development of military capabilities and the DPA being the provider of acquisition and logistics services that support the Swedish Armed Forces in accomplishing its missions. Similar initiatives for creating internal markets in public services include the merger of the Defence Logistics Organisation and the Defence Procurement Agency into a new authority in 2007, which was named Defence Equipment and Support (DE&S) in the UK (Ekström, 2012).

The reformation is well underway, and personnel, activities, and responsibilities, in some cases even entire organisational units, were transferred from the DLO to the DPA during 2013. Overall, this transfer meant that the number of employees within the DPA doubled. The personnel, activities, and responsibilities transferred to DPA from the DLO were organised as a new profit centre called "*Supply, storage, service and repairs*" (Förråd, Service och Verkstäder, FSV).

The shift towards a performance-based acquisition process continues during 2014, and the final objective is that the Swedish Armed Forces will focus on defining its capability requirements and the DPA will have greater responsibilities for buying the best solutions fulfilling these capabilities. Annual savings (in the areas of acquisition and service support of equipment) of 760 million SEK are required starting from 2015.

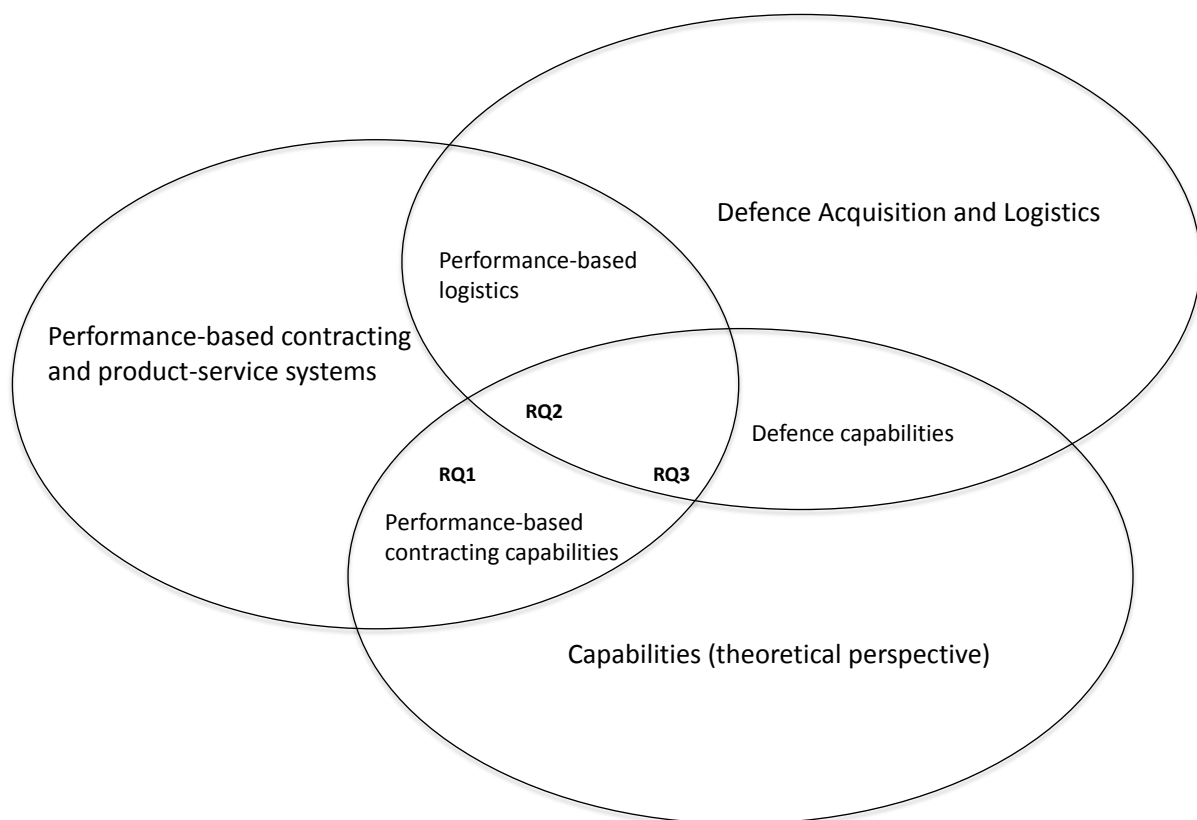
This paper reports on a conceptual pre-study that was conducted in order to explore the concept of "*performance-based contracting (PBC) capabilities*", as well as to examine what types of capabilities the Swedish defence agencies should consider in order to implement a performance-based defence acquisition and logistics model. In addition, the pre-study was aimed at identifying relevant theoretical perspectives and conceptual frameworks for empirically studying, as a next step, capability development in performance-based contracting. In line with this dual purpose of the pre-study, three distinct research questions (RQs) were formulated:

- RQ1: What are performance-based contracting capabilities?
- RQ2: What types of capabilities should Swedish defence agencies consider to design and manage performance-based contracts as part of the transition towards performance-based defence acquisition?
- RQ3: Which theoretical perspectives and/or conceptual frameworks are useful for empirically studying capability development in performance-based contracting in the Swedish defence context, and why?

## Methodology

The pre-study is largely based on a systematic review and synthesis of the academic literature (Tranfield *et al.*, 2003) in the areas of performance-based contracting, performance-based logistics, product-service systems and servitisation of manufacturing and related business models. Building on systematic literature reviews, analyses and syntheses of existing research already conducted by Selviaridis (2011) and Ekström (2012, 2013), the concept of performance based contracting is defined, and discussed. A conceptual framework of performance-based contracting is also offered, based on the identification of three key building blocks of the concept, namely performance, incentives and risk. The framework provides the basis for discussing and analysing the requisite capabilities for designing and managing performance-based contracts.

In addition, a comprehensive review and analysis of theoretical perspectives on capabilities was conducted. The aim of the literature review was to map the state of the art (with emphasis on academic state of the art), to conceptually explore the concept of performance-based contracting (PBC) capabilities and to identify potentially useful theoretical perspectives and conceptual frameworks for studying capability development in PBC in the context of the Swedish defence acquisition. The overall study framework and the research focus are depicted in Figure 1.



**Figure 1:** The overall study framework (Source: Selviaridis, 2014).

Several secondary data sources were consulted to complement the systematic literature review activity and improve the understanding of the research problem from a practical viewpoint. More specifically, several reports authored by the Swedish Government, the Swedish Agency for Public Management, as well as the Swedish Defence Research Agency (DRA) (Totalförsvarets Forskningsinstitut, FOI), the Swedish Armed Forces and the Swedish DPA were taken into account to build up background knowledge and ensure relevance of the study. In addition to practitioner reports, website search and analysis of relevant academic projects and memos was conducted.

Extensive discussions with peer academics as well as practitioners within the Swedish defence sector, including industry, were also useful in providing background information and for understanding the context

of defence market. These discussions also helped in putting the research efforts into perspective, particularly with regards to the shift towards a performance-based defence acquisition paradigm and the challenges facing defence equipment suppliers in this respect.

### Performance based contracting

*“Performance based contracting”* (PBC) has emerged as a promising strategy for effective and efficient sourcing of goods and services as well as integrated bundles of product-service offerings (Datta and Roy, 2011; Kim *et al.*, 2007). It is closely associated with the shifting emphasis towards buying/selling *“performance”*, *“results”*, or *“outcomes”* in both manufacturing and service industries and across private and public sector settings (Hooper, 2008; Hypko *et al.*, 2010). The underlying logic of PBC is an emphasis on the specification and evaluation of outputs or outcomes (what is to be achieved) rather than inputs, activities or processes required to achieve that performance (what is needed and how to do it) (Martin, 2007).

An early and oft-cited example of PBC is Roll Royce’s *“Power by the Hour”* (PBH) business model, where the company is paid for providing aero engine maintenance services based on availability of the engine, in terms of flight hours, rather than based on the cost of labour and spare parts (Neely, 2008). Outcome-based pricing schemes are also emerging in business service markets such as logistics where service provider compensation is linked to supply chain cost savings or revenue increases by the customer.

Performance oriented contracting has long been prominent in public sector settings. Within the context of *“New Public Management”* (NPM) and the public services privatisation rhetoric (Greiling, 2006), government agencies and local authorities in developed and developing countries are increasingly urged to implement performance-oriented contracts to improve accountability for public spending. *“Business-to-Government”* (B2G) services operating under outcome-based contracts include, amongst others, healthcare, social care, employment services, offender management, defence, and public transportation services. In the context of the US and UK healthcare systems, for instance, *“pay for performance”* (P4P) programs provide financial incentives to healthcare providers to improve the quality of care (Christianson *et al.*, 2008). PBC is of high relevance also to defence markets where *“Contracts for Availability”* (CfA) and *“Contracts for Capability”* (CfC) have been adopted by the US and European defence agencies as a performance-oriented acquisition strategy (Ng *et al.*, 2009; Sols *et al.*, 2007).

Advances regarding PBC in management practice are reflected in the growing numbers of academic literature published on the topic (Selviaridis, 2011). PBC is gaining academic attention insofar as it is linked with research on the servitisation of manufacturing and incentives for implementation of result-oriented *“Product-Service Systems”* (PSS) (Baines *et al.*, 2009). However, the literature appears to be highly fragmented. Unconnected pockets of PBC research tend to focus on specific disciplines or contexts, e.g. healthcare, social welfare, transport, and defence (e.g. Hooper, 2008; Martin, 2007; Meterko *et al.*, 2006; Ng *et al.*, 2009). To address this deficiency, Selviaridis (2011) conducted a systematic review of the literature across disciplines and industry contexts with the aim of integrating and holistically evaluating existing research on PBC. The research resulted in the development of an integrative framework of performance-based contract design and management. This framework is also useful for practitioners insofar as it highlights key competence areas PBC design and implementation.

### Definitions of performance based contracting

There is a rich PBC terminology depending, e.g., on discipline and contextual application. Multiple terms, including, amongst others (Ekström, 2013, identified 36 very closely related concepts), *“performance based contracting”* (PBC), *“outcome based contracting”* (OBC), *“Power by the Hour”* (PBH), *“pay for performance”* (P4P), and *“performance based logistics”* (PBL) are often used interchangeably to emphasise in broad terms the shifting emphasis towards buying/selling results and outcomes (Martin, 2007). Selviaridis (2014) provide example definitions employed across the main application domains.

A key observation based on extant literature is that authors largely treat *“performance based contracting”* and *“outcome based contracting”* as synonymous and do not explicitly distinguish between outputs and outcomes (for exceptions see Martin, 1999; Ng and Nudurupati, 2010). However, based on Axelsson and

Wynstra (2002), “*performance*” is defined in this paper in terms of outputs and/or outcomes. “*Outputs*” are seen as the results of the service activity or production process itself, whereas “*outcomes*” are seen as the customer value derived from a given service or product. Such customer value need not be quantifiable in monetary terms (Axelsson and Wynstra, 2002), but may well include “*soft*” elements that are hard to quantify, e.g. citizen welfare outcomes (Heinrich and Choi, 2007). The notion of outcome, as defined here, include also Ekström’s (2012) efficiency dimension in terms of “*Value for Money*” (VfM).

A second point is that the definitions employed tend to refer to different analytical levels. As an example, “*performance based financing*” focuses on budget allocation in public agencies, and “*output-based subsidies*” concerns the macro-level financing of countries by international donors (Tineo, 2007). However, the term “*pay for performance*” in healthcare includes incentives directed both to individual professionals and private care organisations.

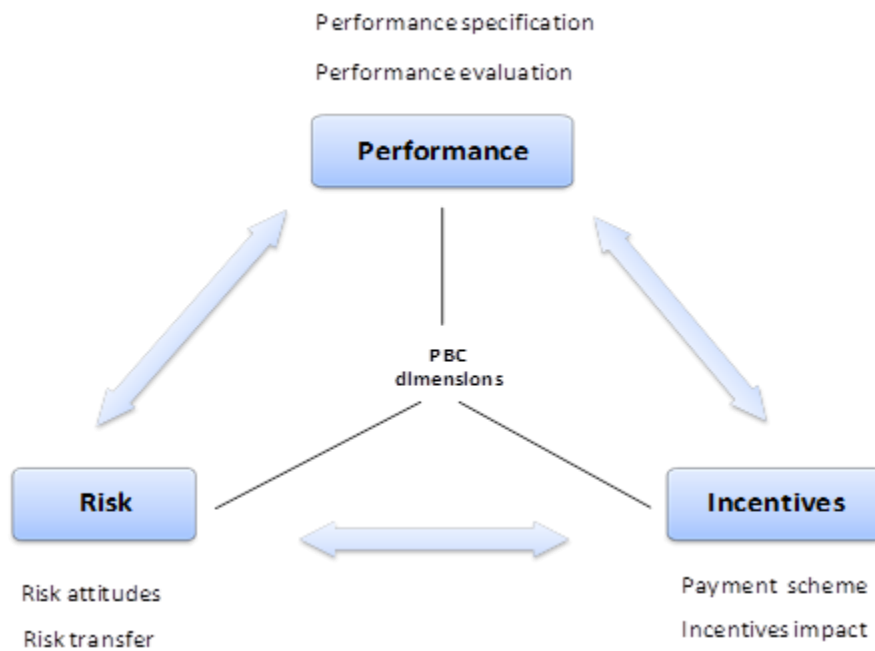
Analysis of PBC definitions suggests that, despite their particularities, the definitions appear to emphasise certain features (see Selviaridis, 2014) on which any performance based contract should be based:

- Specifying performance in terms of required outputs and/or outcomes.
- Designing incentives to link supplier payment and/or non-financial rewards to the achievement of specified outputs and/or outcomes.
- Transferring risk to the supplier side since its reward is contingent upon output and/or outcome.

### ***A conceptual framework of performance based contracting***

The analysis of PBC definitions suggests that existing definitions emphasise the themes of performance specification, incentives, and transfer of risk to the supplier. Building upon such initial insights, PBC can be conceptualised in terms of three key dimensions and their sub-dimensions (see Figure 2):

- **Performance:** focuses on the processes and practices of specifying, measuring, evaluating, and reporting performance
- **Incentives:** addresses the structure of incentives as well as their impact on supplier behaviour. The design of the payment mechanism is a key to the success of PBC.
- **Risk:** focuses on allocation of financial and operational risks depending also on the risk preferences of contracting parties. A key feature of PBC is risk transfer to the supplier.



**Figure 2:** A stylised conceptual model of performance based contracting (Source: Selviaridis, 2014).

The literature review suggests that the above three PBC dimensions are closely interrelated. Relevant outputs and/or outcomes need to be specified and linked to supplier payment to offer incentives for achieving desired performance and to foster incentive alignment (e.g. Martin, 2007). This also presupposes the development of reliable systems of collecting and analysing related data, and measuring and reporting performance. PBC also entails transferring risk to the supplier side to the extent that payment is linked to achievement of output and/or outcome specifications. The extent to which suppliers are willing to bear increased risk depends partly on how performance is specified (e.g. in terms of clarity and intensity of specified output or outcome targets) and whether or not performance is measurable, verifiable, and attributable to supplier input and behaviour (e.g. Else *et al.*, 1992; Kim *et al.*, 2007; McLellan *et al.*, 2008). The structure and intensity of contractual incentives may also influence the suppliers' risk perceptions and preferences depending, for example, on the extent to which buyers are willing to balance increased risk against proportionate rewards (e.g. Heinrich and Choi, 2007; Hooper, 2008). The structure of incentives clearly impacts supplier behaviour, either positively by enabling incentive alignment and performance improvement or negatively by directing supplier effort away from the assigned key objectives (e.g. Behn and Kant, 1999; Christianson *et al.*, 2008; Lu and Donaldson, 2000).

The simplified model presented in Figure 2 forms the basis for proposing a framework for classifying and mapping out PBC research (see Table 1). In addition to the emphasis on performance specification and evaluation, payment scheme design and its impact on supplier behaviour as well as risk allocation and attitudes, the framework stresses additional themes such as PBC design influencing factors as well as PBC benefits, pitfalls and implementation success factors. With consideration also to the theoretical perspectives employed to study PBC, e.g. “*Principal Agent Theory*” (PAT), management control theory, “*Transaction Cost Economics*” (TCE) and the “*Service-Dominant Logic*” (SDL), the literature is classified in terms of two key phases of the contracting process i.e. *contract design* and *contract management*.



**Table 1:** A proposed classification framework of PBC research (Source: Selviaridis, 2014).

	<b>Contract Design</b>	<b>Contract Management</b>
<b>Performance</b>	Specification of outputs/outcomes and design of metrics	Performance measurement and reporting systems
<b>Incentives</b>	Payment scheme design Positive/negative incentives	Incentives impact on supplier behaviour
<b>Risk</b>	Risk transfer to supplier Risk attitudes/preferences	Risk management capacity
<b>PBC antecedents and outcomes</b>	PBC design influencing factors	PBC benefits, pitfalls and implementation success factors

## Performance

Performance contracting entails specification of outputs and outcomes rather than inputs and processes of the required service (Straub, 2007). However, performance specification and the design of associated measures are dependent on the extent of performance measurability and verifiability during the contract period (Heinrich and Choi, 2007). Simply put, the harder it becomes to measure outcomes, the higher the chance that performance is specified based on “*hybrid*” specifications based on surrogate outputs, processes, or even inputs (e.g. Martin, 2002; McNamara, 2005).

A potential specification challenge is a gap between the strategic mission of the buying firm, its objectives, and the performance metrics designed (Behn and Kant, 1999). For instance, measures such as “*capacity utilisation*” are more of a means to achieve service outcomes (Smith, 2010). In this sense, it is crucial that the needs of end-users are reflected in performance indicators since the aim is to develop service systems that satisfy those needs (Enquist *et al.*, 2011; Falisse *et al.*, 2012). Performance indicators can include both qualitative and quantitative elements (Jacobson and Neuman, 2009; McLellan *et al.*, 2008) and can also be adjusted over time to take into account supplier learning effects and to ensure appropriate reward levels (Ozbek and de la Garza, 2011).

Performance-based specifications entail significant investments in developing sound data collection and analysis, performance monitoring, and reporting systems to increase supplier accountability (Faith *et al.*, 2010; Morse *et al.*, 2008; Panet *et al.*, 1998). Performance evaluation can be conducted at different levels: a) at the supplier level service the financial performance against specific indicators is assessed; b) at the end-user level the service impact on beneficiaries is assessed (Gates *et al.*, 2004). In cases of information asymmetry, the relative performance of suppliers is reported and evaluated in a way that introduces competition (Petersen *et al.*, 2006). Measurement methodologies should be developed (Byrnes *et al.*, 1997; Ozbek *et al.*, 2010) and these often require technological capabilities in order to capture and analyse data (e.g. Anastasopoulos *et al.*, 2009; Saeideh *et al.*, 2012). Glaser and Tolman (2008), for instance, propose the use of sensor technology to validate and monitor performance and to facilitate maintenance planning, and Stenbeck (2009) discusses how data collection technologies enable measuring the effect of winter severity with regards to highway maintenance contractor compensation.

However, performance evaluation can be problematic in terms of selection of measures, data collection, reporting and evaluation routines (Curtin *et al.*, 2005; Meezan and McBeath, 2011; Sikka, 2007). Performance measurement systems entail high transaction and administrative costs and stress budgets (Doerr *et al.*, 2005; Lane, 2005). Participation in performance-based contracts may be discouraged if the costs of collecting data and setting up reporting and monitoring systems outweigh the buyer and supplier benefits (Straub, 2009). Overall, it is suggested that the development of performance management and reporting systems is an evolutionary process with measures and methods of evaluation adjusted accordingly as experience and learning accumulates (Jacobson and Neuman, 2009).

### Incentives

Financial rewards and/or penalties are tied to specified outputs or outcomes, thus providing incentives to suppliers to focus their efforts in performance achievement (Hünerberg and Hüttmann, 2003). One literature stream focuses on matching contract payment types to buyer- and supplier-related incentives (e.g. Dey *et al.*, 2010). Information asymmetry, risk attitudes and renegotiation expectations of contracting parties (Hooper, 2008; Hypko *et al.*, 2010b) influences payment scheme design. The literature compares PBC with other contract types such as fixed-price and cost-plus, and their variants (Kim *et al.* 2007). However, it should be noted that performance-based payment schemes are, in fact, themselves such variants, since they include fixed price, and even cost-plus, elements in combination with incentive fees (Ekström, 2012; 2013). PBC-oriented charging appears to be more appropriate in complex and knowledge-intensive contexts when it is hard to *ex ante* evaluate quality and when supplier expertise input is required (Roels *et al.*, 2010).

Service outputs/outcomes may be non-verifiable and providers are too often reluctant to agree to contracts where payment is totally linked to such measures due to the ensuing financial risks (McLellan *et al.*, 2008). Instead, payment models may reflect hybrid specifications and tie provider compensation to a mix of input, process, and outcome targets (Martin, 2005). This model is also known as “*milestones contracting*” where emphasis is on rewarding progress towards the achievement of primary outcomes (Gates *et al.*, 2004) to address the supplier’s cash flow-related risks (Gruneberg *et al.*, 2007). Milestone contracting, however, does not seem to provide performance improvement incentives in the case of non-verifiable outcomes. An alternative approach is to tie performance to non-financial incentives such as professional reputation, supplier recognition through performance publication, contract renewal, and favourable treatment in future tenders (Custers *et al.*, 2008; Gonzalez-Diaz and Sanchez, 2011). Reputational effects negate provider incentives to decrease costs and compromise performance (Hensher and Stanley, 2008).

Payment scheme design entails the definition of bonus and penalty payments as well as “*dead zones*” representing acceptable levels of performance within which suppliers are neither penalised nor extra-rewarded (Brown and Burke, 2000). In cases of using multiple metrics to evaluate performance, “*proportionality zones*” can be used to reflect acceptable performance and supplier compensation levels among metrics when there is over-performance for some and under-performance for others (Sols *et al.*, 2008). The mix and intensity of financial bonuses and penalties are linked to minimum and maximum performance standards (e.g. Sols *et al.*, 2007) and often reflect suppliers’ financial risks by delimiting penalty payments to reasonable levels or excluding penalties for specific measures altogether. This is a crucial issue since suppliers are often reluctant to bear risks for outcomes/outputs influenced by external, uncontrollable factors (Buchanan and Klingner, 2007; Fearnley *et al.*, 2004).

The structure and intensity of financial and non-financial incentives impact supplier behaviour (Huntington *et al.*, 2010; Nicholas *et al.*, 2011). Performance based bonuses and penalties result in incentive alignment and performance improvement (Kim *et al.*, 2007). Incentive fees can be tied to specific effectiveness and efficiency targets in a way that meet broader social and environmental goals. Considering the example of passenger transport services, bus operators are offered financial incentives for service improvement which in turn entails reduced use of private cars and less traffic and pollution in cities (Hensher and Stanley, 2003).

Performance based incentives may also create several unintended consequences (Dellarocas, 2012; Grinblatt and Titman, 1989). Badly designed incentives may direct provider effort away from performance achievement according to all customer segments or service aspects. In the context of public transport, for instance, Fearnley *et al.* (2004) discuss how a punctuality-related penalty undermined transport safety since



operators shifted their emphasis towards on-time services. Suppliers may either target easy-to-serve service user populations or discriminate against difficult-to-serve customers (“*creaming*” effect) to maximise bonus payment or avoid financial penalties respectively (Shen, 2003). They may also intentionally misreport their performance (“*gaming*” effect) to receive full payment (Lu, 1999; Lu and Ma, 2006). Performance improvement may also be undermined when the supplier is incentivised to consider the cost trade-off between incremental service improvements and imposed financial penalties for under-performance (Crew, 1997). Successful incentive systems should reflect a good balance between rewards and the increased risks borne by suppliers in connection to PBC design (Nowicki *et al.*, 2008).

### Risk

PBC entails financial risk transfer to suppliers insofar as their compensation is tied to the achievement of performance (Brown and Burke, 2000; Straub, 2007). Under performance-based payment, suppliers assume extended responsibilities in designing appropriate service systems to meet specified outputs or outcomes (Hünerberg and Hüttmann, 2003; Randall *et al.*, 2010). Performance-based contracts appear to be suitable in the cases of buyer risk aversion and willingness to transfer financial risk to the supplier side (e.g. Caldwell *et al.*, 2009; Hypko *et al.*, 2010a). The amount of risk transferred to the supplier increases as we move towards purely outcome-based contracts (Martin, 2007). Despite the fact that transfer of financial risk under PBC is regarded as something beneficial for buyers, in many contexts such transfer is, by default, restricted. This is because the buyer (public sector agency) in such settings is still held accountable for operational failures. For instance, in the defence setting it is questionable whether operational risks can really be transferred to private sector contractors at all (Doerr *et al.*, 2005; Ekström, 2012).

The underlying assumption of the above discussion is that suppliers will be willing to assume the increased risk passed onto them by the customer organisation. The supplier’s willingness to accept increased risks, though, is influenced by factors such as the clarity, measurability, and level of specified performance (Billinton and Feng, 2007; Else *et al.*, 1992; Towse and Garrison, 2010). In line with agency theory predictions, provider risk aversion might be an inhibiting factor in the implementation of PBC (Floricel and Lampel, 1998; Hypko *et al.*, 2010b). Providers can be risk-averse especially when they perceive themselves as having limited capacity to manage increased financial risks associated with performance-oriented agreements (Kanakoudis and Tsitsifli, 2012). Supplier attitudes towards bearing operational and financial risks affect choices of outsourcing models and contract design strategies (Buchanan and Klingner, 2007; Doerr *et al.*, 2005). That is, the less risk the provider is willing to accept, the lower the intensity of positive incentives (for instance in terms of contract length) should be (Doerr *et al.*, 2005). Provider risk aversion may also lead to payment and incentive schemes that link a limited portion of performance targets to financial rewards and penalties (Buchanan and Klingner, 2007). However, risk premium payments and rewards against pre-defined milestones can incentivise suppliers to accept increased risk levels (Kim *et al.*, 2007; McInerney, 2010).

### PBC antecedents and outcomes

The design of PBC schemes can often be inhibited by a lack of contracting capabilities in terms of defining measurable and attributable outcomes to avoid “*free-riding*”, designing “*win-win*” incentives, and imposing financial penalties to suppliers (Jacobson and Neuman, 2009; Roels *et al.*, 2010). Since performance incentives should be sustainable over long service periods, PBC projects are not appropriate for short-term planning horizons, i.e. one-year contracts (Lane, 2005). It is suggested that certain contractual flexibility is necessary to allow for adjusting performance measures and financial incentives as PBC-related competence accumulates (Behn and Kant, 1999; Sikka, 2007).

PBC in the context of B2G service provision may be compromised by the competitive tendering ethos of public procurement, since extensive collaboration with private contractors is restricted. The literature examines how this contradiction affects the design of PBC. While some authors suggest that PBC can complement competitive tendering (Fearnley *et al.*, 2004), others suggest that competitive approaches to PBC do not result in performance, and as a result claim that truly collaborative relations among stakeholders are needed (Behn and Kant, 1999; Lindkvist, 1996). Other authors suggest that a negotiated approach results in lower transaction costs when re-tendering for services (Hensher and Stanley, 2003). Successful PBC

design also depends on a supporting governance structure integrating contractual and relational exchange mechanisms (Lewis and Roerich, 2009).

There seems to be disagreement in the literature regarding the effects of PBC initiatives. Several authors report that PBC has positive effects in terms of service delivery and cost efficiency (e.g. Rodriguez *et al.*, 2009; Rusa *et al.*, 2009). Others emphasise pitfalls of performance-based contracting approaches (e.g. Ssenkooba *et al.*, 2012). A third group of studies suggests that the realisation of accrued PBC benefits is contingent on how incentives are designed and managed (e.g. Guthrie and Neumann, 2007; Johnson and Dinakar, 2010).

Key benefits identified in the literature include increased efficiency, alignment of buyer-supplier incentives, improved public spending accountability, service/product and process innovation, budget flexibility for negotiating payment levels in line with service levels, and inclusion of social objectives into specified outcomes without linking them to additional rewards (Anastasopoulos *et al.*, 2010; Arur *et al.*, 2010; Soeters and Griffith, 2003). Tying performance to financial compensation levels tends to achieve a more efficient allocation of resources and better customer-supplier matching as compared to fixed-price contracting (Lu and Donaldson, 2000). In the context of B2G services, PBC is more effective in terms of maximising Value-for-Money and social surplus insofar as social and environmental objectives are aligned with economic goals. In the context of public transport for instance, provider payment can be partly dependent on reduction of congestion and CO2 emissions (Hensher and Wallis, 2005).

However, PBC also carries its own pitfalls such as incurring high costs of setting up measurement systems and monitoring performance, failing to translate strategic outcomes to operational metrics, inhibiting experimentation and innovation in case of high uncertainty, and restraining continuous improvement mentality. With regard to the latter, it is argued that despite its emphasis on ongoing performance monitoring, PBC tends to undermine continuous improvement mentality since performance exceeding upper targets is rarely rewarded (Behn and Kant, 1999; Else *et al.*, 2002). PBC may also instigate its own, particular “*creaming*” and “*gaming*” effects, as discussed previously (Lu and Ma, 2006; Shen, 2003).

The literature also stresses several success factors of PBC implementation. Operational factors such as information integration and sharing between buyers and suppliers, service demands, product or service usage, service technologies, and access to customer resources are often discussed (Kim *et al.*, 2010; McBeath and Meezan, 2010; Ng and Nudurupati, 2010; Randall *et al.*, 2010). PBC also entails a number of behaviour changes within and between organisations. Internally, factors such as establishing a performance-oriented and customer-centric mind-set, developing a service culture, and securing political support and necessary funding have been stressed (Datta and Roy, 2011; Randall *et al.*, 2011). Inter-organisational relationships based on collaboration and teamwork, trust, and information integration are also emphasised as key to success (Guo and Ng, 2011; Hensher and Stanley, 2003).

### **PBC and Product-Service Systems**

Performance-based contracting is closely associated with concepts such as “*Product-Service Systems*” (PSS) and “*servitisation of manufacturing*” (Baines *et al.*, 2009; Neely, 2008). The term PSS is used to describe the general trend in many industrial sectors towards offering combinations (bundles) of products and services as integrated solutions to customer problems (Davies *et al.*, 2007; Oliva and Kallenberg, 2003). In a similar vein, Baines *et al.* (2009) define servitisation as the “*the innovation of an organisation’s capabilities and processes to better create mutual value through a shift from selling products to selling PSS*”. Tukker (2004) classifies PSS in terms of product-oriented, use-oriented and results-oriented services.

Despite the apparent close association between PSS, servitisation and PBC, the existing academic literature has failed to clarify how, and in which specific ways, these concepts interrelate. Only a few studies explicitly address how performance based contracts function in the context of servitised business models. More specifically, Datta and Roy (2011) argue that the servitisation of manufacturing has led to the application of performance-based contracts (interpreted by the authors as results-oriented product-service systems) which in turn requires reformulation of the operations strategy. A framework is developed to guide the development of operations strategy for result-oriented PSS taking into account contractual aspects. In particular, the

authors stress contract definition, customer and provider operations strategy and service delivery strategy as key elements of result-oriented PSS.

Hypko *et al.*, (2010a) discuss PBC design and implementation in manufacturing industries in terms of performance provider background, asset ownership during and after the contract, responsibility for personnel, payment models, and location and exclusiveness of operations. They identify four potential payment mechanisms such as pay-on-availability (independent of equipment utilisation), pay per unit of machine output (linked to machine utilisation), pay-per-use of equipment and payment based on customer economic results (savings, revenues). In a similar vein, Hünérberg and Hüttmann (2003) examine the application of performance-based pricing strategies to the capital goods industry. Three main pricing approaches are discussed: Input-based (e.g. times used, time machine used); Output based relating to performance (e.g. uptime, max output of machine/hour); and Output-based in relation to economic results of the customer (cost savings, revenues generated, and contribution to margins).

PBC is mostly related to risk-sharing and financing methods of pricing with supplier responsibility and risk levels increasing. However, the results of the study show little use of output-based pricing relating to economic results exactly because they are perceived as riskier by suppliers of product-service offerings (Hünérberg and Hüttmann, 2003).

Hypko *et al.* (2010b) discuss PBC in terms of two types of product-related services offered in manufacturing industries: maintenance (availability of machine) and operation (availability plus responsibility for the machine's output, which increases the provider's risk). Factors affecting PBC design include customer risk aversion, high-powered incentives, alignment of manufacturer-customer preferences to performance effectiveness, outcome uncertainty, customer loyalty, productivity increase and cost decrease.

Despite the above, we need a much better understanding of how performance-based contract design and management fits within servitisation strategies and the associated capability development requirements. The existing servitisation literature appears to focus on the operational and service design- and delivery-related capabilities that suppliers of product-service systems need to develop (e.g. Davies *et al.*, 2007; Oliva and Kallenberg, 2003). These capabilities are either available within the firm or they need to be acquired externally through relationships with suppliers, customers and business partners (Bastl *et al.*, 2012; Spring and Araujo, 2009; Windhal and Lakemond, 2006). However, the servitisation/PSS literature offers limited insights with regards to: a) the role of contracting capabilities for implementing product-service business models across extended supply networks (Bastl *et al.* 2012), and b) the capabilities required by the buying organisations to design, manage and control performance-oriented contracts and inter-organisational performance management systems. It is suggested that future empirical research on PBC should direct attention to these areas. Much work remains to be done to gain in-depth insights regarding:

- What capabilities does the buying organisation need to acquire product-service solutions and make the shift towards a performance-based acquisition paradigm?
- What types of contracting capabilities are required to design and manage performance-based, product-service offerings?
- What challenges and potential changes in terms of organisational structure, allocation of responsibilities, tasks, resources and capabilities among different functions internally (users vs. buyers) the buying organisation faces? How should those challenges and changes be managed to enable capability development in PBC design and implementation?

## The capability view of organisations

There exist a number of theoretical perspectives which can collectively be labelled as “*capability-based perspectives*”. These are the following: the “*organisational routines perspective*”, the “*Resource-Based View*” (RBV) of the firm, the “*Extended Resource-Based View*” (ERBV) of the firm, the “*Knowledge-Based View*” (KBV) of the firm, the dynamic capabilities perspective and, the literature on indirect capabilities. The aim with this review is to identify capability-based theories that offer potentially useful lenses for studying the development of performance-based contracting capabilities. Rather than providing an

exhaustive account of these perspectives, the focus here is on key conceptual elements that are relevant for the study and its objectives.

### **A note on definitions**

There is an abundance of terms and definitions used in the academic literature, such as “resources”, “routines”, “capabilities”, “skills”, and “competences”, which often create conceptual confusion. For the purposes of the research reported in this paper, a capability is understood as “*the reliable capacity to do something as a result of intended action. Capabilities fill the gap between intention and outcome, and they fill it in such a way that the outcome bears a definite resemblance to what was intended*” (Dosi *et al.*, 2000).

Capabilities are associated with the notion of organisational routines (Nelson and Winter, 1982). Routines differ from capabilities at least in terms of: a) scale of application and analytical unit, and b) conscious choice and purpose. While capabilities refer to a large-scale unit of analysis (what organisations do to earn a living) and clearly defined outcomes that are supposed to be enabled, routines may also be associated with lower levels of organised activity (e.g. what functions within an organisation do) and may entail no deliberate action or conscious choice (Becker, 2004; Dosi *et al.*, 2000; Salvato and Rerup, 2011). Some routines can be equated with capabilities (Barney, 2001), but not all routines are capabilities.

Capabilities, similarly to routines, are collective entities and thus differ from the skills and competence sets of individual managers. Furthermore, capabilities should not be equated with resources and the literature tends to draw a clear distinction between the two concepts. According to Amit and Schoemaker (1993) resources are “*stocks of available factors that are owned or controlled by the firm*”, whereas capabilities “*refer to a firm’s capacity to deploy resources, usually in combination, using organisational processes, to effect a desired end*”. In addition, capabilities encapsulate both explicit processes and those tacit elements (e.g. know-how and leadership) embedded in the processes. Hence, capabilities are often firm-specific and are developed over time through complex interactions between the firm’s resources (Amit and Schoemaker, 1993).

Taking a hierarchical approach, resources can be conceived as the zero-level order factors forming the basis for sustainable competitive advantages, whereas capabilities are first-order constructs reflecting the firm’s ability to deploy resources to attain its goals (Wang and Ahmed, 2007). Capabilities also encapsulate routines; more specifically, capabilities are often conceived as firm-level assemblages of lower-level routines that are developed and deployed to achieve specific outcomes (Dosi *et al.*, 2000; Salvato and Rerup, 2011).

### **Organisational routines**

The notion of routines originates in the field of evolutionary economics and refers to the idea that organisations collectively develop repetitive patterns of actions and cognitive regularities to do things (Becker, 2004; Salvato and Rerup, 2011). Routines are useful for understanding economic and organisational changes by observing incremental changes in routines (Becker, 2004). The notion of routines is most often associated with the work of Nelson and Winter (1982), who studied evolutionary change in organisations and the economy at large by focusing on the mechanisms through which routines are varied, selected and retained with the aim of creating sustainable competitive advantages. Their main argument is that organisations vary in the routines they have developed to conduct their business. In a highly competitive landscape, some of these routines are selected and retained as being more efficient and effective than others. The least efficient and effective routines are discarded or adjusted to fit the environmental context within which organisations compete (Nelson and Winter, 1982).

Routines have been commonly studied as “*black boxes*”, and as a functional whole (e.g. hiring employees). However, more recent studies suggest that routines have internal structure and dynamics which it is worth exploring (Pentland and Feldman, 2005; Salvato and Rerup, 2011). Routines can be defined both as cognitive regularities which are quite abstract and help guide actions within organisations (e.g. formal procedure of how to hire employees), and as behavioural patterns of action through which the rules are enacted by specific individuals, in specific contexts, places and times (Salvato and Rerup, 2011). In other words, a distinction is drawn between the ostensive (cognitive regularities) and performative (behavioural



patterns of action) aspects of organisational routines. In addition, artefacts such as written rules and standard operating procedures play an important role as indicators of the ostensive aspects of routines, or as efforts to codify the ostensive aspect (Pentland and Feldman, 2005).

However, the performativity of routines entails that actual actions might diverge from how the routine is codified by the rules, standard procedures or other artefacts. Since abstract cognitive regularities are almost always open-ended and allow for interpretation and discretion by individuals enacting the routines, divergence between the rules and how things are actually done may exist (Pentland and Feldman, 2005). Such divergence is theoretically interesting insofar as it helps to understand how organisations reflect upon what they do (within the bounds of a specific routine), as well as how they learn and evolve their routines and capabilities (Salvato and Rerup, 2011). Variation from the rules and guidelines during routine enactment may also result in lessons learned which can in turn be fed back to re-frame what organisations do and adjust the rules and guidelines accordingly, e.g. allowing interviews with job candidates to be done online as part of the hiring routine (Feldman and Pentland, 2003).

### ***The resource based view of the firm***

The “*Resource-Based View*” (RBV) of the firm is one of the dominant theoretical frameworks within strategy literature to date (Kim and Mahoney, 2005; Peteraf, 1993). The RBV developed as a complement to the industrial organisation (I/O) view focusing on the structure–conduct–performance paradigm and suggesting that the industry’s structure has a significant bearing on firm performance. Being positioned against this view (Barney, 2001), the RBV explicitly focuses on how the resources within the firm can be used to create sustainable competitive advantages. The aim is to explain why firms in the same industry might achieve different levels of performance (Kraaijenbrink *et al.*, 2010). The RBV is a theory about the nature of firms, as opposed to theories such as transaction cost economics (TCE), which seeks to explain why firms exist (Lockett *et al.*, 2009).

Broadly speaking, the RBV stands on the heterogeneity and immobility of competitive capability-producing and rent-earning (i.e. profit-generating) resources (Barney, 1991). It advocates a resource perspective into how organisations can achieve diversification. Its underlying assumption is that resources are leveraged by diversification, rather than by rentals or sales (Wernerfelt, 1984). RBV focuses on the firm’s internal resources as the primary unit of analysis and suggests that organisations that possess resources that are valuable, rare, inimitable and/or non-substitutable (often summarised by the acronym VRIN) are bound to develop and sustain an edge over competitors (Barney, 1991; Lockett *et al.*, 2009). Valuable resources can be used to exploit opportunities and/or neutralise threats in a firm’s environment. Rare resources are those that are limited in supply and not equally distributed across a firm’s current and potential competition. Inimitable resources are difficult to replicate by other firms. The extent of inimitability also determines how sustainable competitive advantages are. Non-substitutable resources are those resources which cannot be simply replaced (or substituted) by another one (Barney, 1991).

The RBV assumes that resources and capabilities are heterogeneously distributed across firms and that such heterogeneity may persist over time. Firms’ bundles of resources and capabilities provide a competitive advantage as long as they are valuable and rare, and for such advantage to be sustainable over time, they must also be costly to imitate and non-substitutable (Barney, 1991; Peteraf, 1993). Firms that build their strategies on path dependent, causally ambiguous, socially complex, and intangible assets outperform firms that build their strategies only on tangible assets (Barney, 1991; Dierickx and Cool, 1989; Peteraf, 1993). Makadok (2001) distinguishes this perspective focusing on how firms exploit their valuable, rare, and costly to imitate resources and capabilities to generate economic profits (which he calls “*resource-picking theories*”) from a perspective (the so-called “*capability building theories*”) drawing on evolutionary approaches and emphasising how firm capabilities change over time and what the competitive implications of such change are (Barney, 2001). This latter variation of the resource-based logic formed the basis for the development of the notion of “*dynamic capabilities*”.

The RBV also stresses the role of managers and their perceptions with regards to resource functionality, recombination and creation (Lockett *et al.*, 2009). Managers, as entrepreneurs, play a crucial role in sensing



and seizing productive opportunities and deploying and using resources to realise those. They have significant input in obtaining information (which is asymmetrically distributed) and predicting *ex ante* (i.e. in advance) the future value of a particular resource, which can form the basis for developing competitive advantages. Such advantages can be sustained by developing mechanisms for avoiding resource imitation by competing firms (Rumelt, 1984). Also, managers should identify potential combinations of resources that are complementary and can create value as well as take into account the path dependent nature of resource creation when making decisions about the growth of the firm (Lockett *et al.*, 2009).

The theoretical underpinnings of the RBV theory can be traced back to the seminal work of Edith Penrose (1959) on the growth of the firm. Penrose (1959) was the first to conceptualise the firm as a collection of productive resources which can be used in potentially different ways and with different productive outcomes. By emphasising the use and creation of new knowledge over time, Penrose (1959) argued that the productive resources controlled by the firm should not be seen as a fixed set of attributes, available as public knowledge, but as a bundle of possible productive services, that the collection of firm resources can deliver.

Richardson (1972), taking a capability-based perspective to explain the organisation of economic systems and the boundaries of the firm, extended Penrose's (1959) analysis and replaced the notions of "*resources*" and "*productive services*" with the concepts of "*capabilities*" and "*activities*" respectively. The key argument made by Richardson (1972) is that organisations tend to focus their efforts, and specialise in, productive activities for which their capabilities offer some sort of comparative advantage.

The relationship between capabilities and the productive activities they entail have been subject to scrutiny and it appears that two contrasting views exist in the literature. Some authors suggest that organisational capabilities are tightly linked to productive activities. For instance, Ulaga and Reinartz (2011) discuss capabilities for selling integrated product-service solutions in terms of sales, service-related data and interpretation and risk management activities. In the same vein, Brown and Potoski (2003), as well as Yang *et al.* (2009), equate contracting capacities with the activities that public buyers have to perform during the contracting process.

An alternative approach, however, argues that there is no one-to-one relationship between capabilities and the productive activities associated with them (Araujo *et al.*, 2003). Drawing on Penrose's definition of resources as a bundle of possible services, Spring and Araujo (2013) study how manufacturing firms develop and market service offerings. Because capabilities evolve over time and can be creatively combined, integrated or adapted, they entail a number of *potential* activities. Resources and capabilities such as production knowledge, methods and technologies are treated as future potentialities i.e. giving rise to a number of potential product-related services (Spring and Araujo, 2013).

### ***The extended resource based view of the firm***

RBV theory has been criticised for its over-emphasis on resources residing within the firm and the fact that it sidesteps profit-making opportunities through inter-firm resource integration (Barney *et al.*, 2011). This deficiency has recently been addressed by studies extending their analysis into resource development and sharing among organisations in economic and industrial systems (e.g. Lavie, 2006). Such studies can be collectively referred to as the "*Extended Resource-Based View*" (ERBV) of the firm.

Taking an extended approach, Mathews (2003) proposes a resource economy framework within which resources and know-how are configured and shared among economic actors. He adopts a dynamic view of resource development and use for productive purposes and identifies five distinct processes, namely resource propagation, diffusion, imitation, replication and recombination. These processes are evolutionary in nature and entail variation, selection and retention of resources. Entrepreneurial action entails resource recombination taking into account the dynamics of industrial development. This extended resource based view suggests that resource complementarities with firms in the broader network can be leveraged to create competitive advantage. Lavie (2006) draws on the notion of network resources to develop the argument that the value of resources is determined by their complementarities with other resources spanning the firm boundaries. It follows that relational rents (i.e. profits attributed to inter-firm collaboration) can be generated by sharing resources with external organisations that are part of the same alliance network (Lavie, 2006).

The argument that competitive advantages may lie in inter-firm cooperation and resource combination is inspired by the “*relational view*” proposed by Dyer and Singh (1998). In brief, the relational view suggests that the firm’s critical resources may span its boundaries and may be embedded in inter-firm resources and routines. Dyer and Singh (1998) unpack the mechanisms and associated processes which help create relational rents: relationship-specific assets, knowledge sharing routines, complementary resources and capabilities and formal and informal governance mechanisms. The authors propose that the creation of relational rents through knowledge sharing can be facilitated by rich prior alliance experiences and partner-specific absorptive capacity, which is the ability to recognise and assimilate value knowledge from a specific alliance partner. Relational rents are also dependent on the firm’s ability to search and evaluate resource complementarities with partners, and the ability to obtain timely information from the surrounding socio-economic networks regarding potential capability complementarities with alliance partners (Dyer and Singh, 1998).

Lavie (2006) extends the relational view by considering unilateral rents (i.e. profits made by one of the collaborating parties) that spill over from the shared and non-shared partner resources and uncovering the mechanisms of value creation for these two different types of resources. In other words, sharing resources between organisations may entail joint benefits as well as unilateral rents that are spilled over.

It is worth noting at this point that the Industrial Marketing and Purchasing (IMP) Group has long theorised about the formation and development of long-term business relationships through which firms share and combine their resources and activities to create value (Ford *et al.*, 2003). Resource constellations in the business networks and their evolution over time can explain, amongst other things, technological innovation and the development of new products and services (Håkansson and Snehota, 2002).

### ***The knowledge based view of the firm***

Several scholars working within the resource-based paradigm have emphasised the role of knowledge as a strategic resource that has a bearing on the development of distinctive firm capabilities and superior performance. This literature stream, although far from homogenous, is often referred to as the “*Knowledge-Based View*” (KBV) of the firm (Foss, 1996). The knowledge-based perspective is closely associated with the RBV as argued by Conner and Prahalad (1996): “*The resource-based view generally addresses performance differences between firms using asymmetries in knowledge and in associated competencies or capabilities [...] a resource-based theory of the firm thus entails a knowledge-based perspective*”.

The knowledge-based view proposes a theory of the firm alternative to the contractual one advocated by transaction cost and property rights perspectives, largely by breaking part with opportunism assumptions (Conner and Prahalad, 1996; Kogut and Zander, 1992). It emphasises the role of learning as well as knowledge, as an outcome of the learning process (see Kogut and Zander, 1992), in the development and evolution of organisational capabilities (Kale and Singh, 2007). Knowledge possessed by organisations can thus help explain a) why some firms realise competitive advantage while other firms do not, and b) how such organisations are more successful than others when it comes to diversification and innovation (Foss, 1996).

Knowledge-based contributions reject the idea that the existence of the firm and its boundaries are determined by property rights and opportunistic behaviour considerations (Conner, 1991; Kogut and Zander, 1992). Rather than simply being conceived as a nexus of contracts, organisations can also function as repositories of distinct productive (technological and organisational) knowledge. Foss (1996), however, argues that knowledge-based and opportunism-based explanations of the boundaries of the firm could very well function as complements.

Organisations, in the same vein as individuals, learn and build up their knowledge over time. Such knowledge stocks are associated with differential efficiencies, and are accumulated in a path-dependent way, i.e. incrementally (Foss, 1996). Firms exist not as a response to moral hazard and incentive alignment, but due to their role as repositories of knowledge that is tacit, socially produced and path-dependent (Kogut and Zander, 1992). Firms know more than their contracts can say. Since such knowledge is tacit and path-dependent, it is more efficient to organise it within the firm. In other words, firms know how to create and transfer knowledge more efficiently than markets do. Firms' advantages over markets derive from their

*“higher order organising principles”*. These principles include mechanisms to codify technological knowledge, shared codes as well as languages among individuals that the market fails to provide, and in which the members of the organisations are embedded (Kogut and Zander, 1992).

Kogut and Zander (1992) also provide insights into how capabilities develop and evolve over time by emphasising the notion of *“combinative capability”*, i.e. the ability to synthesise and apply current and other knowledge acquired. They suggest that firms learn new skills by coming up with alternative, creative combinations of their current capabilities. Such processes of capability (re)combination are social in the sense that they draw upon cooperation and leveraging existing social relationships among individuals within the same firm, who have differing knowledge bases and competence sets. They are also path-dependent and entail cumulative knowledge development in the sense that present and future capabilities also depend on what the firm was able to do in the past.

Conner and Prahalad (1996) stress, in turn, the irreducible knowledge differences between individuals as key explanation for the existence of the firm. The underlying assumptions of that are the limited cognitive abilities on the part of individuals (bounded rationality), and the absence of opportunism. The choice of organisational mode (firm or market contracting) determines the extent to which the more valuable knowledge is being applied to business activity.

Grant (1996) conceives the firm as an institution for integrating knowledge. Knowledge is viewed as residing within the individual, and the primary role of the organisation is *“knowledge application”* rather than knowledge creation. Grant (1996) explores the coordination mechanisms through which firms integrate the specialist knowledge of their members. These mechanisms are: a) rules and directives, b) sequencing of productive activities, c) routines that the organisation establishes, and d) group problem solving and decision making. The establishment and implementation of these mechanisms require the development of common knowledge within the firm. This common knowledge is based on shared meaning, language and commonality of specialised knowledge. Grant (1996) conceptualises organisational capabilities as the outcome of integration of knowledge of individuals. The extent to which firms develop distinctive capabilities depends on accessing and integrating the specialised knowledge of its employees through the integration mechanisms described above.

In a similar vein, Zollo and Winter (2002) stress the fact that organisations make deliberate efforts to learn how to *“articulate and codify collective knowledge”* which is relevant for undertaking complex organisational tasks. These deliberate efforts act as a basis for improving the organisation’s competences to manage those complex tasks. In other words, these processes of learning and knowledge accumulation reflect a higher-order capability through which a firm systematically generates and modifies its operating routines or skills in pursuit of improved effectiveness with the task at hand. This higher-order capability is dynamic in nature and may be particularly important when organisations need to develop know-how to manage tasks that occur repetitively (Zollo and Winter, 2002).

### **Dynamic capabilities**

The literature on *“dynamic capabilities”* emerged in response to criticism directed towards RBV for being a static theory not considering the highly dynamic business environment within which firms operate (Barreto, 2010). However, dynamic capabilities need not only be useful in highly dynamic environments, but could be developed in moderately dynamic or relatively stable contexts (Barreto, 2010; Eisenhardt and Martin, 2000). Dynamic capabilities stress the evolutionary nature of firm resources and capabilities (Zahra *et al.*, 2006) and complement the RBV by identifying firm and industry-specific mechanisms and processes by which heterogeneous resources create competitive advantages (Wang and Ahmed, 2007).

Barreto (2010) comments that dynamic capabilities have been defined as abilities or capacities (e.g. Teece *et al.*, 1997), organisational processes (e.g. Eisenhardt and Martin, 2000) or routines comprising learned and stable patterns of collective activity (Zollo and Winter, 2002). Dynamic capabilities can be defined as *“the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”* (Teece *et al.*, 1997). Another influential definition has been provided by Eisenhardt and Martin (2000), who conceive dynamic capabilities as *“the firm’s processes that use resources –*

*specifically the processes to integrate, reconfigure, gain and release resources – to match and even create market change”.*

However, the research stream on dynamic capabilities is far from homogenous. In their large scale bibliographic analysis of the literature, Vogel and Guttel (2013) conclude that dynamic capabilities is far from a well-defined construct, underpinned by coherent theoretical frameworks and strong empirical research. They attempt to reclassify the literature on dynamic capabilities and they conclude that the main literature stream refers to “*strategic learning and change*”. The focus is on learning capabilities and relates them to firm performance, thus integrating organisational learning and strategic management perspectives.

The first attempt to conceptualise dynamic capabilities is attributed to Teece *et al.* (1997) who drew attention to the role of organisational and managerial processes (resource coordination and reconfiguration mechanisms), learning, as well as company positions in terms of asset ownership and path dependencies in assessing the competitive advantage of the firm. Teece *et al.* (1997) stress the role of dynamic capabilities in rapidly changing environments and posit that these capabilities are embedded in organisational processes that are shaped by firms’ asset positions and the evolutionary paths they have adopted in the past. In the same vein, Wang and Ahmed (2007) submit that dynamic capabilities are embedded in explicit and codified processes of combining resources. More recently, Teece (2007) suggested that dynamic capabilities entail resource reconfiguration, sensing and shaping opportunities and threats as well as seizing opportunities.

Dynamic capabilities have been conceptualised as the higher-order ones directly influencing performance in the long run and operating to adapt and change the lower-order capabilities and operating routines of the firm (Barreto, 2010; Ambrosini and Bowman, 2009). Wang and Ahmed (2007) present resources as the “*zero-order*” element of the hierarchy which can provide the basis for creating competitive advantages if they have VRIN features. Capabilities are “*first-order*” elements and entail the ability to deploy resources to attain a desired goal. Core capabilities are “*second-order*” and are a bundle of a firm’s capabilities that are strategically important to its competitive advantage at a certain point in time. Dynamic capabilities are, finally, “*third-order*” capabilities that entail the organisational efforts to reconfigure, renew or re-create internal resources and capabilities in the face of environmental change (Wang and Ahmed, 2007).

Wang and Ahmed (2007) identify three components of dynamic capabilities: adaptive, absorptive and innovative capability. “*Adaptive capability*” refers to the ability to adapt to environment changes and align internal resources with external demands, as well as to identify and capitalise on emerging market opportunities. “*Absorptive capability*” relates to the ability to recognise the usefulness of new information, to assimilate and to apply it. This ability is also a function of prior knowledge (Cohen and Levinthal, 1990) and determines the rate of learning and adoption of advanced technologies that lead to superior performance. Firms exhibiting absorptive capability tend to commit resources in the long-run, learn from other partners, develop and use complementary technologies and know-how and share new knowledge into multidisciplinary teams. “*Innovative capability*” refers to the ability to develop new products or markets through aligning strategic innovation orientation with innovative processes and behaviours. The more innovative a firm is, the more it possesses dynamic capabilities. Adaptive, absorptive and innovative capabilities “*underpin the firm’s ability to integrate, reconfigure, renew and recreate its resources and capabilities in line with external changes*” (Wang and Ahmed, 2007).

In connection with the notion of absorptive capability, Wang and Ahmed (2007) discuss “*absorptive capacity*” as a dynamic capability pertaining to learning and knowledge utilisation that enhances the firm’s ability to gain a competitive edge. They discuss absorptive capacity as a multidimensional construct and propose four elements of absorptive capacity: a) knowledge acquisition (which is also a function of prior investments, experience and knowledge and exposure to diverse knowledge bases), b) knowledge assimilation (through comprehension of links with existing knowledge bases), c) knowledge transformation, and d) knowledge exploitation.

Zahra and George (2002) relate the four elements of absorptive capacity with a distinction between “*potential and realised absorptive capacity*”. Whereas potential capacity is manifested through knowledge acquisition and assimilation (reflected also in Cohen and Levinthal’s 1990 definition), realised capacity refers to knowledge transformation and exploitation. Realised capacity reflects the firm’s capacity to



leverage knowledge that it has absorbed and can result in improved performance and innovation. Despite the limited empirical attention it has attracted, potential capacity provides firms with the strategic flexibility needed to adapt and evolve in dynamic market environments (Zahra and George, 2002).

Ambrosini and Bowman (2009) provide a list of the main antecedent factors (in terms of internal and external enablers and inhibitors) which impact on the development and deployment of dynamic capabilities. Such factors include the pace of change in an industry, the role of managers and their perceptions of the business environment and its changes, firm paths and positions both internally (in terms of resource base) and externally as well as trust, social capital and leadership.

Multiple mechanisms regarding the creation and evolution of dynamic capabilities have been proposed in the literature (Barreto, 2010). For instance, Zollo and Winter (2002) stress the importance of deliberate learning and explicit cognitive efforts to codify such learning. The processes of knowledge articulation (e.g. through performance reviews) and knowledge codification and their contribution to development of dynamic capabilities when the experiences related to a specific task are limited or heterogeneous are discussed. Eisenhardt and Martin (2000) suggest that the main mechanisms are likely to be repeated practice (and experience), past mistakes, and the pace of experience. Variation and selection mechanisms are both important for dynamic capability evolution, in moderately dynamic markets and rapidly changing markets respectively. Zahra *et al.* (2006) argue that experiential learning helps established firms build their dynamic capabilities, while trial and error and improvisation processes are more relevant in innovative contexts (new ventures).

The existing literature also draws attention to the impact of dynamic capabilities on firm performance. Although some authors suggest a direct link between dynamic capabilities and firm performance (Teece *et al.*, 1997), the majority appears to argue that competitive advantages result from dynamic capabilities in an indirect fashion. More specifically, performance outcomes depend on the way dynamic capabilities are deployed and used by managers or by the resource reconfigurations they entail (Barreto, 2010). In support of the latter view, Wang and Ahmed (2007) argue that the relationship between dynamic capabilities and performance is mediated by capability development, which is underlined by the path-dependent nature of dynamic capabilities (Wang and Ahmed, 2007). In other words, Wang and Ahmed (2007) conceptualise dynamic capabilities as an antecedent of capability development.

Similarly, Zahra *et al.* (2006) stress that dynamic capabilities affect performance by helping change the substantive capabilities of the firm over time. The authors also warn against the inappropriate use of dynamic capabilities, though: the deployment of dynamic capabilities may damage rather than improve a firm's performance if they are used when there is no need for them (Zahra *et al.*, 2006). Finally, Ambrosini and Bowman (2009) emphasise that dynamic capabilities do not equate with sustainable competitive advantage and that the word “dynamic” refers to the environment (context) rather than the capability. This contingency approach is in line with Colis (1994), who suggested that it shouldn't be taken for granted that organisational capabilities lead to sustainable competitive advantages insofar as such capabilities may be superseded by higher order, learning-to-learn capabilities. In other words, the value of capabilities depends on the industry and specific point in time that these capabilities are deployed.

### ***Indirect vs. direct capabilities***

The literature stresses not only capabilities required to undertake productive tasks but also the know-how needed to draw on resources and capabilities outside the organisation. Loasby (1998) draws an important distinction between “*know what*” and “*know how*”, with the latter referring not only to knowledge and skills but also to when and where these should be applied. Capabilities are constituted by know-how, both direct and indirect. Building on that, he also draws a distinction between direct and indirect capabilities. “*Direct capabilities*” are equated with “*knowing how to do something*” and “*indirect capabilities*” with “*knowing how to get something done by others*” (Loasby, 1998). In other words, indirect capabilities refer to the know-how required to get access to the capabilities and productive knowledge of other firms such as customers, suppliers and their partners (Araujo *et al.*, 2003; Spring and Araujo, 2009).



Firms can be seen as a set of direct and indirect capabilities (Loasby, 1998). Access to external capabilities is gained through the market and inter-firm relationships, which is a key mechanism to coordinate productive activities that are complementary but are also based on dissimilar knowledge bases and competences (Richardson, 1972). In cases where such capabilities are not available in the market or are very costly to access, firms may decide to integrate forward or backwards to acquire such know-how. The costs associated with gaining access to external capabilities have been referred to as “*dynamic transaction costs*”, that is, “*the costs of persuading, negotiating, coordinating and teaching outside suppliers*”, or alternatively “*the costs of not having the capabilities you need, when you need them*” (Langlois and Robertson, 1995).

Mota and de Kastro (2004) draw on a dynamic evolutionary perspective to explain the boundaries of the firm. As an alternative to transaction cost explanations of asset specificity and opportunism, a capabilities perspective suggests that the boundaries of the firm are influenced by the division and integration of knowledge among firms in an industry. An industrial market is seen as a network of connected inter-firm relationships whereby firms not only access each other’s capabilities, but they may also combine their resources and activities and productive knowledge.

Mota and de Kastro (2004) argue that firms’ vertical boundaries reflect their relationships with specific counterparts and the way they address the division and integration of knowledge through configurations of direct and indirect capabilities. Beyond merely accessing external know-how, firms may try to influence the capability development of their counterparts and hence the division of labour in the industry through processes of learning. This view is also supported by the industrial network (IMP) theory’s notion of relationship connectedness i.e. relationships with a specific counterpart affect and are being affected by relationships with others (Ford *et al.*, 2003; Axelsson and Easton, 1992).

Araujo *et al.* (2003) examine the problem of economic organisation (markets vs. firms) from a capability perspective, suggesting that the hold-up problem emphasised by transaction cost and property rights theories cannot fully explain the definition of firm boundaries. They draw on the work of Loasby (1998) to argue that the boundaries of the firm are determined by the capabilities necessary to undertake productive activities (i.e. direct or core capabilities) as well as by the capabilities the firm requires to interact with, and get access to the resources of its customers, suppliers and other external actors (i.e. indirect or ancillary capabilities, see Langlois and Robertson, 1995; Loasby 1998).

The above suggest that gaining and organising access to external capabilities is a capability in itself. Accessing complementary capabilities requires different types of indirect capabilities depending on whether the form of access can be described as market or relationship-based (Araujo *et al.*, 2003). The more firms rely on complex inter-firm relationships to access complementary capabilities, the more the boundary of the firm will have to expand, to incorporate indirect capabilities mutually specialised to relevant partners. Conversely, the more firms rely on markets to access dissimilar but complementary capabilities, the more the boundaries can contract and the less specialised the range of indirect capabilities the firm needs to retain (Araujo *et al.*, 2003).

The corollary to this argument is also that the firm’s boundaries can contract or expand without matching on a one-to-one basis the capabilities and knowledge that a firm possesses. Vertical integration leads to the development of in-house capabilities, but outsourcing of production does not necessarily entail divesting in capabilities that previously supported in-house production. In other words, make or buy decisions does not directly reflect needs in productive activities and often firms need to “*know more than they make*” (Brusoni *et al.*, 2001), since they may need to retain broader technological competences and capabilities. Indeed “*indirect capabilities allow us to understand how firms “know more than they do” and why boundary decisions at the product level do not match the boundaries drawn from a capabilities perspective*” (Araujo *et al.*, 2003).

The empirical observation that organisations may know more than they need to know for strict productive purposes suggest that they have the “*absorptive capacity*” (Cohen and Levinthal, 1990) which helps the firm to decide how best to use and combine external capabilities with its own capabilities for productive purposes (Wang and Ahmed, 2007). Such absorptive capacity can also manifest itself through partner-specific learning and creative combination and exploitation of the capabilities of the partners.

Araujo *et al.* (2003) suggest that the notion of indirect capabilities could incorporate capacities into specifying and procuring a productive resource, capabilities to design and test purchased inputs as well as capabilities to coordinate and integrate internally and externally generated inputs into effective products and production systems (systems integration capability).

### **(Out)sourcing capabilities**

The above discussion suggests that capabilities related to outsourcing and procuring external resources and capabilities are key indirect capabilities. Outsourcing of corporate functions is a complex task with considerable effect in organisational performance and requires the development of procurement know-how in order to design and manage successful outsourcing relationships. The literature on capabilities required to outsource and procure external resources and capabilities is dispersed and tends to use different terms and definitions such as sourcing, procurement, and contracting capabilities.

Axelsson *et al.* (2005) adopt the term “*sourcing capabilities*” to discuss firm-level capabilities (which differ from skills of individual purchasers), processes, technologies and measures related to firms’ procurement activities. Key sourcing capabilities include know-how regarding supply market analysis, individual supplier analysis, organisation and execution of the procurement process, cost management/engineering, supplier performance measurement and review of current contracts. Such know-how requires considerable effort to develop, maintain and upgrade according to changing circumstances (Axelsson *et al.*, 2005).

Selviaridis *et al.* (2011) discuss sourcing capabilities as a function of prior outsourcing experiences, technical expertise and operational knowledge of the outsourced service, supply market and knowledge and testing, as well as capacity to comprehensively specify the service and to measure and evaluate service provider performance. The level of sourcing capability impacts on the stability of service specifications during the procurement process. In the same vein, Selviaridis *et al.* (2013) stress the importance of sourcing capabilities and examine one specific class of such capabilities, namely the ability to define service requirements. In the absence of such capabilities, service providers may have an increased involvement in shaping the object of service exchange and co-developing service specifications in joint with the buying firm.

This is in line with recent research on acquisition of complex products and services suggesting that in the absence of internal expertise, such sourcing capabilities could be accessed through relationships with external partners such as consultants (Flowers, 2004). Buyer organisations faced with infrequent sourcing tasks, high rates of technological change and solution complexity appear to “*know less than they buy*” (Flowers, 2007) and make use of contingent capabilities of consultancies and other parties during the acquisition process. The use of external expertise can refer both to strategic issues (e.g. need identification) and tactical areas such as specification development and technical data analysis (Flowers, 2004).

Ordanini and Rubera (2008) suggest that the development of distinctive capabilities in procurement has a bearing on firm performance and they identify two key “*procurement capabilities*”: “*procurement process efficiency*” and “*procurement process integration*”. The former refers to the ability to reduce costs while maintaining relationships with external suppliers and internal activities complementary to the purchasing transaction. The latter refers to the ability to effectively incorporate procurement in the whole supply chain, reducing time-to-market and increasing the fit with market needs. They find that process efficiency and process integration capabilities provide a significant (and equally important) contribution to firm performance, but there are no complementary effects between them.

### **Contracting capabilities**

Türksever and Wynstra (2013) use the term “*contracting capabilities*” to refer to those “*capabilities that enable organisations to analyse situational characteristics of outsourcing, select the optimum contract specification method, design the appropriate contract (ex-ante), and manage, adjust and eventually terminate the contract effectively (ex-post)*”. In short, those organisational capabilities aimed at creating sustainable advantages from the Purchasing and Supply Management function through successful contracting in the context of outsourcing. Based on their literature review, Türksever and Wynstra (2013) identify three classes of contracting capabilities which exist at different organisational levels, namely the individual, team-

level and organisation level: “*capabilities of processing and managing knowledge*”, “*capabilities of coordination and collaboration*”, and “*capabilities of learning and improvement*”.

Contracting capabilities can also be classified as indirect capabilities since they contribute to shaping and managing inter-firm exchanges of productive resources and capabilities (e.g. Mayer and Salomon, 2006). Although not well articulated in the literature, the notion of contracting capabilities can be related to Argyres and Mayer’s (2007) discussion of “*contract design capabilities*”. Drawing on resource-based explanations of the firm, the authors suggest that capabilities in contract design may constitute a source of competitive advantage. Developing contract design capabilities entails learning about the required level of extensiveness and sophistication of contractual provisions in response to exchange attributes as well as potential contingencies and hazards. Capabilities for designing specific contract terms reside differentially within the firm and among managers, engineers and lawyers (Argyres and Mayer, 2007).

Within the field of public administration, the notion of contracting capacities has been put forward to stress that public agencies contracting out services need to have appropriate contracting capabilities in order to ensure performance in terms of effectiveness and cost efficiency (Yang *et al.*, 2009). Brown and Potoski (2003) stress the need to study the organisational capacities in the contracting process as an imperative for improving contract performance. They identify three types of “*contract management capacities*” based on the three typical contracting phases: “*feasibility assessment capacity*”, “*implementation capacity*”, and “*evaluation capacity*”.

Brown and Potoski (2003) suggest that the level of investment in developing and sustaining contracting capacities may explain differences in success of outsourcing projects and contract performance. Contracting experience, transaction costs, characteristics of government structure and its external environment have a bearing on contract management capacity. Prior contracting experiences affect the level of investment in capacity development e.g. negative experiences and numerous outsourcing projects in the pipeline increase the likelihood of substantial investment in contracting capacity. Higher transaction costs for some types of goods/services outsourced entail higher investment in contract management capacity.

Expanding on Brown and Potoski (2003), Yang *et al.* (2009) conceptualise contracting out as a policy choice consisting of four stages—agenda setting, policy formulation, policy implementation, and policy evaluation. Corresponding to these four contracting stages, there are four types of “*contracting capacities*”: “*agenda setting capacity*”, “*contract formulation capacity*”, “*contract implementation capacity*”, and “*contract evaluation capacity*”.

Yang *et al.* (2009) suggest that such contracting capacities are associated with contract performance in terms of cost, quality and efficiency gains. The development of contracting capacities entails both benefits and costs (Yang *et al.*, 2009). It should be noted however that the empirical study conducted by the authors focuses on contracting activities and processes that underpin contracting capacities, and therefore only indirectly captures the requisite capacities. In other words, it is assumed that contracting capabilities are tightly related to contracting activities.

The above, however, provide a rather static view of (performance) contracting capabilities since it does not address how they can evolve over time (Vanneste and Puranam, 2011). Indeed, empirical research on contracting capabilities (Yang *et al.*, 2009) suggests that dynamic effects of provider and buyer learning should be considered when a public agency contracts out activities. Such effects can be either positive in the sense that organisations learn how to collaborate and increase service effectiveness, or negative meaning that contractors learn how to take advantage of their incomplete contracts and information asymmetry or monopolistic power.

### Relational capabilities

The literatures both on indirect capabilities (e.g. Araujo *et al.*, 2003) and on contracting capabilities (e.g. Argyres and Mayer, 2007) appear to emphasise capabilities to manage and leverage relationships with exchange partners, beyond mere outsourcing and procurement know-how as well as contract design and contract monitoring capacities and related activities. Araujo *et al.* (2003) stress the need to analyse what type of relationships firms need to develop with their suppliers and customers to get access to their

capabilities. Moreover, they suggest that this issue is closely associated with the division of labour in inter-firm networks. As they put it, “*the problem of organising access to capabilities the firm does not control cannot be divorced from the decision of where the boundaries should be drawn... and organising access to external capabilities requires its own set of capabilities and may involve a focal firm in actively attempting to influence the development of capabilities in specific counterparts*” (Araujo *et al.*, 2003). In the same vein, Türksever and Wynstra (2013) suggest the ability to actively manage inter-firm relationships is a key to success of contracting processes.

The emphasis on relational capability development is also in line with the broader exchange governance literature suggesting that contractual governance is complemented or even substituted at certain points during a long-term exchange by relational mechanisms based on social capital, trust, and flexibility (Klein-Woolthuis *et al.*, 2005). Contracts are incomplete either by design, or due to inability to foresee all potential contingencies and the prohibitively high costs associated with writing extensive contracts (Collins, 1999). Therefore, relational governance mechanisms are often deployed to support contract management and improve exchange performance (Poppo and Zenger, 2002). Trust, rather than contractual governance, may be of critical importance when firms work on cooperative projects and gain access to each other’s technological capabilities and accumulate knowledge about market situations and the working methods of partners (Bosch-Sijtsema and Postma, 2009).

Relational capabilities are instrumental for knowledge development and innovation. In their study in the context of biomedical innovation, Swan *et al.* (2007) find that even large pharmaceutical companies do not possess all of the resources necessary to successfully develop new medicine and they, therefore, need to collaborate formally and informally to acquire the necessary resources. In this context, mechanisms linked to relational capabilities include aligning interests and expectations, building upon existing networks to generate resources and sustain more risky projects, using networks to shape regulations and ensure innovation approval (Swan *et al.*, 2007). Relational capabilities also refer to know how to manage relationships with employees within the firm insofar as those affect the collective competence of organisations to manage external relationships. In particular, satisfied and loyal employees are better in developing relationships with customers and strategic partners (Theoharakis *et al.*, 2009).

Pagano (2009) finds that the most recent literature recognises the increasing complexity of managing relations with external partners and highlights the need to uncover those organisational capabilities supporting such interactions. Studies across disciplines increasingly stress the role of the processes and capabilities within the organisation as opposed to attributes pertaining to a specific exchange relationship. Such studies bring forth the notions of “*alliance capability*” (Kale *et al.*, 2002), and “*relational capability*” (Kale and Singh, 2007; Lorenzoni and Lipparini, 1999), and emphasise three main features of relationship management capabilities: a) the experience accumulation and learning processes through which the firm is able to acquire and develop knowledge about how to manage its network of relations, b) the establishment of specific organisational mechanisms concerning the management of external relations. Such mechanisms represent a complementary to mechanisms of trust and communication and may be difficult to imitate, and c) the integrated approach to managing inter-firm relationships through deploying common organisational mechanisms (Pagano, 2009).

With respect to the above features, Lorenzoni and Lipparini (1999) study the process of vertical disintegration and focus on the ability to coordinate competencies and combine knowledge across corporate boundaries. They stress the role of “*relational capability*” (i.e. the ability to interact with other companies) in accelerating the knowledge access and transfer and enabling growth and innovation. The ability to integrate knowledge residing both inside and outside the firm’s boundaries emerges as a distinctive organisational capability. The implication of this is that supplier networks can be deliberately designed over time with the focal firm focusing on a core set of distinctive competencies (Lorenzoni and Lipparini, 1999).

Kale *et al.* (2002) stress the importance of creating a dedicated alliance function as an organisational structure that facilitates retention, assimilation and sharing of alliance know-how within the firm. In broader terms, such higher-level organisation principles and processes are useful for integrating and coordinating knowledge across different units and functions within the firm. This forms the basis for developing alliance capability by capturing, sharing and disseminating the alliance know-how associated with prior experiences



and lessons learned. Firms that have greater alliance experience and invest in dedicated alliance functions are more successful in their strategic alliances. An investment in a dedicated alliance function can enhance a firm's alliance capability by: a) acting as a focal point for learning and leveraging both explicit and tacit lessons from prior and ongoing alliances; b) keeping numerous stakeholders, including investors, apprised of new alliances and successful events in ongoing alliances; c) improving internal coordination and resource support of alliances; d) monitoring and evaluating alliance performance. All these activities should help the firm in generating greater value and success with its alliances.

Kale and Singh (2007) shows how the relationship between the alliance function and alliance success is positively mediated by an *"alliance learning process"* that involves four stages, namely articulation, codification, sharing, and internalisation of alliance management know-how. Conceptually, each of these aspects of the alliance learning process is somewhat distinct in terms of the manner in which it facilitates learning and accumulation of alliance know-how. Each of these aspects emphasises learning and accumulation of alliance management knowledge within the firm. Draulans *et al.* (2003) extend the work of Kale *et al.* (2002) and Kale and Singh (2007) by not only looking at a dedicated alliance function (the alliance specialist as the individual who has expertise and knowledge of multiple alliances), but also at specific methods to gather alliance knowledge. These methods include alliance training (both internal and external training is considered) and evaluation of alliance capabilities (evaluation both per alliance and across all the alliances that the firm is involved in).

## PBC capabilities in Swedish defence acquisition

### *The defence acquisition context and process*

The acquisition of equipment and associated service solutions and the provision of logistical support contribute to the development and deployment of military capability. Military capability can be defined as *"the continuing ability to generate a desired operational outcome or effect which is relative to the threat, physical environment and the contributions of coalition partners. Capability is not a particular system or equipment. Capability is delivered by Force Elements i.e. ships, aircrafts, army formations and other military units and force enablers, combined into packages by Joint Force Commanders and tailored for particular operations or missions"* (Ekström, 2012).

In the context of Swedish defence, military capability is seen as a system comprising different elements: military units, functional chains, technical systems, functional objects and operations control competences (FM and FMV workgroup report, 2013). All of these are controlled to varying degrees by the Swedish Armed Forces. The *"functional chains"* ensure that all units of FM can function together effectively and describe how military resources interact to realise a military capability. FM appears to be following the UK MoD in terms of investing in and establishing the defence lines of development such as doctrine, organisation, materiel, information, and logistics. *"Technical systems"* describe the system configurations which FM uses in the formation of units and joint forces. The concept of the *"functional object"* describes a collection of supplies required for operations (e.g. the kit that soldiers need). It describes the minimum functionality that the Swedish Armed Forces would manage in a modular way. Function objects are linked to supply solutions, which includes how the supply of the goods takes place and associated services. Functional objects are basically unit-independent and can thus be used in all types of units that have requirements for current functionality. Function objects are validated for interoperability in all relevant functional chains. Finally, the concept of *"operations control"* refers to how the equipment is used and to the rational decision-making process and prioritisation of requirements taking into account operational conditions.

Acquiring equipment such as tanks, aircrafts and battle ships is a complicated process due to the long term operational implications of decisions and the significant investments made by the defence authorities and governments. It has been suggested that a large part, in fact the lion's share, of the acquisition budget is spent on equipment support since such equipment has long life cycles and the costs related to maintenance, repairs, upgrades and refurbishment can be quite high (Howard and Miemczyk, 2010). Defence authorities in different countries have therefore recognised the importance of taking a life cycle perspective when considering equipment acquisition and support. In the UK, for instance, reference is made to the concept of



*“Through Life Capability Management”* (TLCM) as a tool for stressing a whole life cycle approach to defence acquisition as well as the long terms implications of equipment acquisition (Ekström, 2012). In addition, it is crucial to integrate equipment acquisition decisions with other important components of capability such as training, equipment, personnel, information, concept and doctrine, organisation, infrastructure and logistics (TEPID OIL) in order to be able to seamlessly deliver the required military capability (Ekström, 2012). In the US, the corresponding acronym is DOTMLPF, which translates to doctrine, organisation, training, materiel, leadership, personnel, and facilities, whereas NATO also adds interoperability into the acronym DOTMLPFI. In the UK, these components of capability are called *“Defence Lines of Development”*, DLoDs).

In line with the emphasis on TLCM and long-term performance implications of defence equipment acquisition, there has been increasing interest in *“Performance-Based Contracting”* (PBC) schemes such as *“Contracts-for-Availability”* (CfA) and *“Contracts-for-Capability”* (CfC), although the latter type hasn’t really been taken up yet (Caldwell and Howard, 2010; Datta and Roy, 2011; Ekström, 2012). These types of performance-oriented contracts change the incentives of private suppliers. More specifically, under transaction-oriented contracts suppliers of equipment were gaining additional revenues for providing spare parts and doing maintenance and repairs work when a system failed. However, under performance-oriented contracting schemes (e.g. Rolls Royce’s *“Power-by-the-Hour”*, PBH, offering) suppliers assume operational responsibility and financial risk for the equipment’s quality and availability in the sense that spares parts are provided and maintenance and repairs activities are conducted at the supplier’s cost. Hence, defence suppliers have an incentive to reduce system/equipment failure rates and associated support costs (Datta and Roy, 2011; Ng *et al.*, 2009).

The above trends are also, to a large extent, applicable in the context of the Swedish defence acquisition. The ongoing restructuring project entails that FMV will be responsible for acquisition of equipment and support services (including logistics services) taking a life-cycle perspective into account. The aim is to reduce total cost of equipment ownership while fulfilling the military capability requirements of the Swedish Armed Forces. Similarly, the Swedish defence authorities have made some progress towards adopting and designing contracts for availability of military equipment (Ekström, 2012). Such an example is the availability contract FMV signed with SAAB for the supply and support of the SK-60 trainer aircraft (Dorn and Ekström, 2014).

Within the Swedish defence context a new model of defence acquisition is currently in the making. The new model requires that the Swedish Armed Forces work closely with FMV to enable a logical and hierarchical flow from military capabilities, functions, and functionality chains to resources (such as personnel and equipment), and finally the organisation (such as the different units). This means that capabilities need to be defined before the functions and resources, and finally resources before the choice of organisation (FM and FMV workgroup report, 2013).

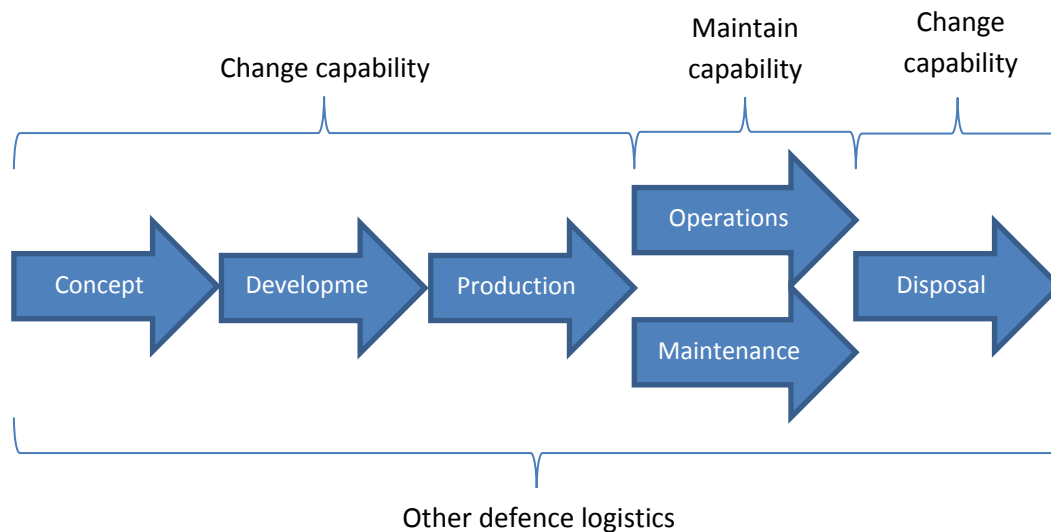
FMV is responsible for business coordination, systems development, and configuration management related to functional objects and detailed technical systems and its service support solutions. This includes all the defence logistics that FMV provides to the Swedish Armed Forces. FMV ensures technical interoperability in units and functional chains for equipment and logistics and business coordination within FMV support solutions. FMV will ensure that market opportunities are utilised. It also supplies equipment, materiel and logistics systems and associated service support solutions for inclusion in the Swedish Armed Forces fixed configurations of units (i.e. it provides total solutions integrating both goods and services).

FMV has technical design responsibility, which involves determining design for allowable configurations of technical systems (including maintenance solutions) that meet legal requirements, set objectives and other requirements in terms of performance, functionality, information and system’s life cycle. The concept of *“maintenance preparation”* is used to ensure that a technical system together with its support solution meets the highest standards of reliability and life cycle costs. The final lifecycle plan includes an estimation of *“Life Cycle Costs”* (LCC), which forms the basis for FMV’s requests for quotation, the Swedish Armed Forces investment decisions and the mandate for future maintenance. In other words, through life costs are taken into account during the acquisition of equipment and support solutions (FM and FMV workgroup report, 2013).

## Performance Based Contracting Capabilities – A Pre-study of Swedish Defence Acquisition

The process of defence acquisition is often framed as one comprising several key stages which reflect the life-cycle of the bought equipment, materiel and/or associated services. Ekström (2012) provides an overview of the defence acquisition process in the UK. Although a distinction is drawn between the process of equipment acquisition (CADMID) and services acquisition (CADMIT), the main stages of the two processes are common (for further details see Ekström, 2012): concept, assessment, demonstration, manufacture (for equipment) / migrate (for services), in-service, disposal (for equipment) / termination (for services).

The Swedish defence acquisition process in the making, as defined by FM and FMV's joint report (2013), also takes a life cycle perspective (see Figure 3). The established lifecycle applies to all relevant authorities and to acquisition of capabilities, functional chains and resources such as function objects, technical systems / items / services and support solutions. When in use, all of these are defined in terms of their content.



**Figure 3:** The key stages of the Swedish defence acquisition process (Source: FM and FMV workgroup report, 2013).

Throughout all stages a joint dialogue is centred on the optimisation of DOTMLPFI for units and Armed Forces' functional chains. Each agency brings its expertise and takes responsibility for their deliverables. In brief, the acquisition process includes the following stages (FM and FMV workgroup report, 2013):

**Concept:** the Swedish Armed Forces uses its experiences in defence planning, resource monitoring and military units to identify the need for changes in capability, based, for instance, on requests for performing new tasks, or existing tasks that require new solutions. The Swedish Armed Forces specifies its requirements in terms of capabilities, functional requirements, and emergency preparedness and availability requirements over time and defines what would be appropriate solutions at a high level. FMV is responsible for proposing solutions that fulfil these functional demands in terms of equipment and materiel supply, support services and logistics.

**Development:** the Swedish Armed Forces and FMV focus on creating solutions within a main option chosen in the concept phase. During the development of the functional chain and services, the Swedish Armed Forces works with dependencies within other defence lines of development and resources (DOTMLPFI) and FMV focuses on identifying and elaborating upon requirements and dependencies within and between functional objects or parts of services. FMV identifies possible configurations for the ongoing development of existing functions, or for new function objects in terms of input supplies and its associated support solutions. This work also includes the identification of possible acquisition forms for new technology

systems and its support solutions. In this phase, supplier selection tasks, such as developing a preliminary design of the configurations of equipment and associated support solutions, developing the LCC-plan, and setting up the quotation aims and benchmarks, also take place.

**Production:** the Swedish Armed Forces is responsible for production of resources (DOT(M)LPFI) and FMV is responsible for the supply of equipment and materiel, parts of the *"information element"*, and associated logistics and other services not directly related to the military capabilities. FMV delivers the allowable configurations design of functional objects for use in joint design, verified against both functional chains and units. It also delivers additional/modified substance of the requested change in function objects with associated defence logistic support solutions (including the LCC-plan), systems documentation, and precise costing for equipment and services.

**Operations and maintenance:** the equipment and associated services and support solutions are used in-service. As a result of their use, there is a need for maintenance and repair of established allowable configurations. The Swedish Armed Forces requirements regarding unit production, exercises, preparedness and response are fulfilled from a materiel and logistics perspective with varying requirements on operations and maintenance. After the official joint preparation and based on its requirements, the Swedish Armed Forces prepares materiel supply chain orders (MFO), based on which FMV provides the Swedish Armed Forces base organisation and its external customers with materiel and associated services. FMV implements the operational control and maintenance planning for an optimised materiel usage and delivers other required services and supplies.

**Disposal:** The decision to carry out impact assessment before decommissioning is taken during the operations and maintenance phases. During the disposal phase, the Swedish Armed Forces and FMV evaluate whether the configuration of systems and services should be disposed of or re-used.

The different stages of the acquisition model correspond to different types of "orders": The order pattern *"Change capability"* refers to orders for operations up to the production stage as well as the decommissioning stage. The purpose is to develop and apply major changes to military capabilities and/or services that are indirectly linked to those capabilities. The Swedish Armed Forces is responsible for military capability development and defining which units and functions are needed, whereas FMV provides support in terms of supply and logistics and is responsible for proposing applicable support solutions which the Swedish Armed Forces decides upon later. The order pattern *"Maintain capability"* refers to orders for maintenance, which are valid for the operations and maintenance phases. The main aim is to provide cost effective solutions for maintenance and support of equipment and systems bought, according to the LCC-plans. The extent of equipment use affects the maintenance costs and the LCC-plans should be revised accordingly. The order pattern *"Other defence logistics"* refers to orders of support services to the Swedish Armed Forces units and base organisation such as acquisition, postal and travel and accounting services.

The new model attempts to draw a clear distinction of responsibilities between the Swedish Armed Forces and FMV. According to the report, the Swedish Armed Forces is responsible for producing military units in its entirety, whereas FMV is responsible for delivering the physical and logistical content of units in accordance with set configurations up to a specified transfer point. The Swedish Armed Forces is responsible for configuration of operational capabilities, functional chains, joints and the base organisation. FMV, on the other hand, is responsible for configuration of functional objects, technical systems with support solutions coordinated with the Swedish Armed Forces configuration management of the functional chains and joints. Configuration management takes place in the context of a long term planning horizon.

### **PBC capabilities**

One of the key aims of the reported research has been to examine performance-based contracts from the perspective of capabilities that buying organisations require in order to successfully design and manage them. Such a perspective has been underplayed by existing academic research (Selviaridis, 2011). As highlighted earlier, the literature on product-service systems puts emphasis on the capabilities that *suppliers* of integrated product-service solutions should develop to effectively design and sell such customer value-oriented solutions (Davies *et al.*, 2006). However, this research stream primarily focuses on non-contractual

aspects and capabilities related to operations, service design and delivery (e.g. Araujo and Spring, 2009; Johnstone *et al.*, 2009; Oliva and Kallenberg, 2003).

More specifically, Oliva and Kallenberg (2003) propose a phased process model for developing capabilities for servicing the installed base (capital equipment). This entails consolidating product-related services, entering the installed base service market, expanding to relationship-based services and process-focused services and even taking over end-customer's operations. In the same vein, Davies *et al.* (2006) examine the required service capabilities and organisational design implications of offering integrated solutions and they emphasise the importance of building up back end capabilities through standardisation and codification of business process and offerings in different projects. Structural aspects such as technology, service capacity and supply chain positioning of suppliers as well as infrastructural factors (e.g. human resources and service quality control) are also emphasised (Baines *et al.*, 2009). The literature also suggests the suppliers of integrated product-service offerings need to develop competence in networking and relationship management in order to be able to draw on the complementary capabilities of external parties such as customers, suppliers, and business partners (Bastl *et al.*, 2012; Spring and Araujo, 2009; Windhal and Lakemond, 2006).

This literature stream focuses on the supplier's side and fails to consider the capabilities that buying organisations require to procure performance-based solutions entailing combinations (bundles) of products and support services (e.g. availability contracting). What is more, the capability view of providing integrated product-service solutions provides limited empirical insights into contractual aspects and what types of contracting capabilities are required.

Servitisation has increased the complexity of contracts and that has clearly created challenges for both the suppliers and buyers of product-service solutions. Empirical evidence of the use of risk and revenue sharing agreements has been provided (see Bastl *et al.*, 2012), but it is much less clear how such formal contracts can be designed and managed in an effective way. As an exception, Datta and Roy (2011) link the servitisation trend with the increased application of performance-based contracts (interpreted as results-oriented product-service systems). They particularly stress the importance of specifying and evaluating performance through “Key Performance Indicators” (KPIs), designing a good contract including in it appropriate incentive systems (penalties and additional rewards for the supplier in exchange for increased risk taking).

Against this research background, and given the scope and purposes of the reported pre-study, the paper focuses on the contracting capabilities that buying organisations require to design, manage and control performance-oriented contracts. Such capabilities are examined in the context of (out)sourcing equipment and support services (e.g. maintenance, repairs, overhauls, and associated logistics support services) to fulfil functional requirements within the buying organisation i.e. the Swedish defence authorities in this case.

The concept of PBC-capabilities is closely related, and draws upon, similar concepts featuring in the literature such as “(out)sourcing capabilities” (Axelsson *et al.*, 2005, Selviaridis *et al.*, 2011; Selviaridis *et al.*, 2013), “contract design capabilities” (Argyres and Mayer, 2007), “contract management capacities” (Brown and Potoski, 2003) and “contracting capacities” (Yang *et al.*, 2009). More specifically, all these concepts appear to converge in terms of their emphasis on core sets of knowledge and competences of the buying organisation regarding specification, supplier selection, contracting and post-contract evaluation and management of supplier relationships.

In particular, the definition of contracting capabilities provided by Türksever and Wynstra (2013) appears to provide a suitable frame for conceptualising PBC-capabilities. Türksever and Wynstra (2013) define contracting capabilities as the “capabilities that enable organisations to analyse situational characteristics of outsourcing, select the most suitable contract specification method, design the appropriate contract (ex-ante), and manage, adjust and eventually terminate the contract effectively (ex-post)”.

The conceptualisation of PBC-capabilities can be narrower than the above definition of contracting capabilities insofar as the emphasis here is on the design and management of a specific type of contract, i.e. a performance-based contract. Hence, the following working definition is proposed:

*“Performance-based contracting capabilities are the capabilities and knowledge sets that enable organisations to contractually specify, evaluate and manage required performance, design appropriate*

*performance-oriented incentives systems, and allocate and manage financial and operational risks associated with performance attainment”.*

Drawing also upon the conceptualisation of PBC in terms of the interplay of performance, incentives and risk aspects (see Figure 2), it can be argued that the notion of PBC-capabilities places at centre stage sets of competence and know-how with regards to both contract design and management. Indeed, a closer look at the PBC literature reveals that a few studies have stressed critical capabilities that organisations need to develop to successfully design and implement PBC. Such capability sets include drawing output/outcome-based specifications and crafting well-defined service level agreements, setting up performance measurement systems and monitoring supplier performance on an ongoing basis, allocating and managing risks in an appropriate way, as well as designing well-balanced incentive schemes (Barret *et al.*, 1992; Behn and Kant, 1999; Else *et al.*, 1992; Hannah *et al.*, 2010).

Performance-based contracts may often be applicable in the context of decisions to (out)source complex bundles of products and services (Datta and Roy, 2011; Hypko *et al.*, 2010). Specifically in the context of defence acquisition, such decisions may entail the deployment of availability contracts for the provision of defence equipment and cost-efficient support solutions throughout the useful life of such equipment. However, PBC-capabilities need not necessarily focus on the outsourcing decision (make or buy) as such, which is also addressed during the early stages of the defence acquisition process (i.e. concept and assessment). This is because decisions and choices regarding contract types, definition and selection of KPIs (e.g. definition of availability), design of contract payment schemes and risk transfer to selected defence suppliers are not elaborated upon until the decision to outsource is approved.

PBC-capabilities can be conceived as indirect capabilities (Araujo *et al.*, 2003; Loasby, 1998). That is, PBC-capabilities refer to contracting know-how which helps the buying organisation to gain access to external capabilities and resources of its suppliers.

In the specific context of defence acquisition, the main type of direct (productive) capability of the Swedish Armed Forces is military capability, as defined by Ekström (2012). In other words, the Armed Forces have in place a set of core capabilities that help them fulfil their mission and strategic objectives, in terms of defending the national borders of Sweden, participating in peace keeping operations internationally and/or handling domestic emergency situations (Ekström, 2012).

In order to accomplish their strategic aims, the Swedish Armed Forces make use of equipment such as tanks, aircrafts and ship, soldier units and associated military equipment. A military unit is, so to speak, the “carrier” of military capability. The equipment and the associated support services that help military units maintain the levels of performance and operational availability are externally acquired. That is, the Swedish Armed Forces, FMV and other defence authorities make use of the external capabilities of defence suppliers and other related organisations within defence markets. This also entails that the Swedish Armed Forces and FMV need to have in place (out)sourcing and contracting capabilities to be able to successfully carry out this equipment acquisition and support tasks and, in this way, contribute to the development and long term sustenance of military capability of the Swedish Armed Forces.

Contracting capabilities can thus be conceived as indirect or ancillary capabilities (Loasby, 1998). In the same vein, PBC capabilities are a specific class of indirect capabilities that are critical for successfully contracting for equipment and associated support services based on “availability” (CfA) and/or “capability” (CfC) outcomes. In line with the above analysis, the initial working definition of PBC capabilities can be refined as following:

*“Performance-based contracting capabilities are the indirect know-how and capabilities that enable organisations to specify, evaluate and manage required performance, design appropriate performance-oriented incentives systems, and allocate and manage financial and operational risks associated with performance attainment. The development of these indirect capabilities entails articulation and codification of knowledge regarding performance-based contract design and management, considering also the broader context of the outsourcing decision”.*



### ***A proposed classification of PBC capabilities***

This paper proposes a classification of performance-based contracting capabilities. In connection to the crafted definition of the concept of PBC capabilities, this classification is built upon the concepts of performance, incentives and risk (see Figure 2) as the key conceptual building blocks of PBC and it also takes into account the design and management phases of the contracting process (see Table 1). In addition, the stage of “*performance-based contract assessment*” is taken into consideration for both ex-ante and ex-post processes of contracting know-how articulation, codification and sharing that enables organisational learning regarding performance-based contracting.

Table 2 exhibits the proposed classification of relevant PBC capabilities in the context of defence acquisition projects. As can be seen, the classification relates to the specific stages of the defence acquisition process (still in the making, see Figure 3) to ensure relevance for the Swedish defence authorities. As a reference point, the corresponding stages of the UK defence acquisition process are shown in brackets.

## Performance Based Contracting Capabilities – A Pre-study of Swedish Defence Acquisition

**Table 2:** A proposed classification of PBC capabilities in the context of Swedish defence acquisition (Source: Selviaridis, 2014).

	PBC design	PBC management	PBC assessment
<b>Concept</b>  (Concept)	<ul style="list-style-type: none"> <li>• Specification of functional requirements of end users</li> <li>• Definition of the through life equipment plan in terms of costs and servicing needs</li> </ul>		<ul style="list-style-type: none"> <li>• Definition of required expertise and key functions and managers to be involved in different project phases</li> <li>• Formation of cross-functional acquisition and contracting teams</li> </ul>
<b>Development</b>  (Assessment and Demonstration)	<ul style="list-style-type: none"> <li>• Specification and technical system and associated system support requirements</li> <li>• Design of performance metrics, KPIs and service levels (e.g. availability)</li> <li>• Specification of life cycle costs and target costing</li> <li>• Design of payment mechanism and its specific structure</li> <li>• Design of financial penalties/bonuses in terms of structure and intensity in terms of thresholds</li> <li>• Identification of performance-related risks (both financial and operational)</li> <li>• Allocation/transfer of financial and operational risk to supplier</li> </ul>		<ul style="list-style-type: none"> <li>• Leveraging performance-based contracting know-how from previous acquisition projects, supplier experiences (avoiding doing the same mistakes)</li> </ul>
<b>Production</b>  (Manufacture/ Migration)	<ul style="list-style-type: none"> <li>• Configuration capability: linking performance of acquired system/support solution with systemic performance, considering all defense lines of development.</li> </ul>	<ul style="list-style-type: none"> <li>• Implementation capability: ensuring smooth transition (especially for support services)</li> <li>• Monitor supplier delivery performance against set milestones (for equipment)</li> </ul>	
<b>Operations and Maintenance</b>  (In-service)		<ul style="list-style-type: none"> <li>• Measuring and monitoring supplier performance against set KPIs</li> <li>• Monitoring planned repairs/refits/upgrades against set milestones</li> <li>• Administering financial penalties/bonus payments</li> <li>• Ongoing management of financial and operational risks</li> </ul>	<ul style="list-style-type: none"> <li>• (Re)assessing the impact of designed incentives on supplier behavior and adjusting performance metrics, target levels and penalty/bonus thresholds</li> <li>• Learning capability: articulation of lessons learned regarding the ability to design good performance-based contracts</li> </ul>
<b>Disposal</b>  (Disposal/ Termination)		<ul style="list-style-type: none"> <li>• Ensuring smooth contract termination and that asset disposal/transfer goes as planned</li> </ul>	<ul style="list-style-type: none"> <li>• Codification of lessons learned from specific projects</li> </ul>

### Performance-based contract design capabilities

Performance-based contract design capabilities refer mainly to the “*concept*” and “*development*” stages of the defence acquisition process. They are related to know-how regarding the specification of required performance, the design of incentive systems and the identification and allocation of risks between the buying organisation and the defence supplier(s). Performance requirements are specified both in terms of (life-cycle) cost efficiency and operational performance (e.g. operational effect, operational availability, or in terms of availability or readiness of acquired equipment). Such requirements must then be “*translated*” into a set of measurable and “*easy to communicate*” KPIs. These need to be clearly defined in terms of their meaning (e.g. what do we mean by “*equipment availability*” or “*operational readiness*”?), the targeted performance levels and the minimum and maximum acceptable thresholds.

The buying organisation also needs to have know-how regarding the design of incentive systems in terms of financial penalties and/or bonuses. Such incentives need to be directly linked to the specified KPIs and they should be clear in terms of their administration (e.g. when does the supplier receive a fine and under what conditions?). An appropriate intensity level of financial incentives should also be achieved in line with the specified performance. Targets that are either too easy or too difficult to hit may discourage suppliers from actively seeking to, e.g., improve operational performance or reduce total life cycle costs. In addition, potential choices of performance-based payment mechanism types (e.g. fixed-price incentive fee contracts, target cost contracts, or risk and revenue sharing agreements) need to be analysed and a final decision regarding the structure of payment needs to be made.

In connection to the design of incentive systems, the buying organisation requires know-how with regards to identification and allocation of all financial and operational risks associated with performance. In particular, a key feature of PBC is the transfer of performance-related risk to defence suppliers. However, such risk transfer should take into account the balancing of risks and rewards provided to the suppliers, as well as the extent to which such risks (especially operational risks) can really be transferred to private operators given the restricted access of civilians to designated areas of operations (see Doerr *et al.*, 2005; Ekström, 2012).

### Performance-based contract management capabilities

Performance-based contract management capabilities refer mainly to the “*production*”, “*operations*”, “*maintenance*”, and “*disposal*” stages of the defence acquisition process. During the production stage in particular, performance-based contract implementation capability (Türksever and Wynstra, 2013; Yang *et al.*, 2009) is relevant since the buying organisation needs to ensure that the equipment manufacturing milestones are met and that there is a smooth transition and implementation in cases of acquiring associated support services.

Contract management capabilities refer to know-how in relation to setting up performance measurement and reporting systems, as well as evaluating and monitoring supplier performance against the set performance target levels. This often entails investing in systems and developing operational procedures for collecting performance-related data, analysing those and producing performance reports. However, a lot of these tasks can actually be outsourced to suppliers which may have appropriate technological solutions in place that help them reduce their financial exposure induced by PBC (see for instance Rolls Royce’s engine health management solutions which allows collecting data regarding the use of engines). In addition, capabilities in terms of reviewing and managing operational and financial risks on an ongoing basis, as well as administering the payment of financial bonuses or the collection of performance-related fines from the suppliers, are required. Effective performance-based contract management should also entail expertise regarding the disposal of assets and the termination of service contracts taking into account the life cycle cost plans in place.

### Performance-based contract assessment capabilities

A third category of PBC capabilities relates to performance-based contract assessment. Such know-how and competences cut across all the stages of the defence acquisition process (see Table 2). Broadly speaking, this category refers to what Türksever and Wynstra (2013) define as capabilities for processing and managing knowledge (regarding acquisition and contracting) as well as capabilities for learning and improving by

leveraging prior experiences and making use of lessons learned over time. More specifically, in the early stages of the defence acquisition process it is essential to *ex-ante* assess and identify the types of expertise required for successful project management and to form cross-functional acquisition and contracting teams accordingly. For example, it could be appropriate that key personnel from the Swedish Armed Forces and FMV work in teams to discuss key milestones and decisions, e.g. with regards to specifications of functional and system requirements both in terms of acquired equipment and associated support services. During the development stage knowledge management capabilities in terms of re-using lessons learned from previous experiences with the same supplier or in similar equipment acquisition projects can be critical for avoiding costly mistakes. In addition to codifying and re-using earlier internal experiences, “*Commercial Best Practices*” (CBP) can be taken into consideration here.

Learning capabilities are also very important *ex-post* during the operations and maintenance (in-service) phase to ensure appropriate design of PBC and rectification of any mistakes and/or omissions during the contract design phase. More specifically, the buying organisation benefits from articulating any contracting lessons learned (see Mayer and Argyres, 2004) in terms of badly designed incentives that instigate inappropriate supplier behaviour or inappropriate specification of performance levels and risk allocation (e.g. availability targets too easy or too difficult to hit). It is also important that after the end of the acquisition cycle any lessons learned are also codified in a structured way so that the collective know-how regarding PBC design and management increases over time. Such knowledge articulation and codification processes are meta-type, dynamic capabilities (Zollo and Winter, 2002) that help to develop, sustain and improve PBC capabilities.

### ***Theoretical frameworks for studying PBC capability development***

In light of the shift of emphasis of Swedish defence authorities from a transaction-based to a performance-based acquisition paradigm, the role of performance-based contracting is expected to be elevated. Swedish defence authorities would therefore benefit from building up knowledge and developing capabilities in designing and managing performance-based contracts in the context of outsourcing complex bundles of defence equipment and associated services (e.g. maintenance and logistical support).

The departure point of the following discussion is the theoretical and conceptual perspectives presented earlier in this paper. More specifically, the aim here is to conceptually explore how some of these perspectives and frameworks could fit the current challenges facing the Swedish defence authorities in relation to the reformation project and the transition towards a performance-oriented acquisition model.

Before proceeding to discuss and present potentially useful theoretical frameworks, it is important to issue a note of caution regarding the relevance of some of the theories presented and discussed earlier, which do not seem to fit well the empirical context of defence markets. In other words, the ontological and epistemological assumptions (see Easterby-Smith *et al.*, 2002) underpinning theories such as the RBV, the ERBV and theories of alliance capabilities appear not to be fit for purpose.

More specifically, RBV and ERBV both assume a highly competitive business and market environment where the aim of organisations is to develop sustainable competitive advantages by nurturing and maintaining unique and inimitable resources and capabilities (e.g. Barney, 2001; Lavie, 2006). This might be less relevant for Swedish defence authorities, and even defence suppliers, who face much less competition in this industry setting. In a similar vein, the notion of alliance capability (Kalle *et al.*, 2002), although interesting and to some extent useful for the current study, is less relevant for public sector settings where public acquisition laws and regulations apply and where defence authorities such as FMV are restricted in terms of developing close, collaborative relationships and strategic alliances with defence suppliers.

Finally, one could even question the relevance of the notion of “*dynamic capabilities*” insofar as this applies to highly dynamic business environments where organisations need to often recombine and reconfigure their capabilities to maintain a competitive edge. Clearly a defence market context is not very dynamic from this point of view, given the monopsonistic power of governments and defence authorities, and the relatively stable relationships with a limited number of defence suppliers. Technological changes are also less frequent as compared to hi-technology industries. However, it has been suggested that dynamic capabilities may well



be applicable in moderately dynamic or even relatively stable industry contexts (e.g. Baretto, 2010; Eisenhardt and Martin, 2000) to emphasise how organisations learn to develop and reconfigure their capabilities in response to external environmental changes. In this sense, dynamic capabilities appear to be relevant for the purposes of the present study.

The following theories and conceptual frames would seem to be applicable in studying capability development in performance-based contracting.

### Indirect capabilities perspectives

The notion of indirect capabilities is clearly relevant insofar as capabilities in designing, managing and assessing (both *ex-ante* and *ex-post*) performance-based contracts contribute to gaining access to the external resources and capabilities of defence suppliers and third parties. Indirect capabilities refer to “*know-how to get things done by others*” and stress the role of appropriate knowledge application (“*know-how*”, rather than merely “*know-what*”). Indirect capabilities here refer not only to contract design and management know-how, but also to capabilities of managing inter-firm relationships with suppliers.

The notion of indirect capabilities and the related literature on (out)sourcing capabilities, contracting capacities and contract design capabilities have been already drawn upon to identify key categories of PBC capabilities. Given that access to the capabilities of defence suppliers is organised through market-based, transactional relationships (Araujo *et al.*, 2003) due to the restrictions imposed by public acquisition laws and regulations, it is interesting to examine: a) to what extent Swedish defence authorities make use of suppliers’ know-how when it comes to contracting and performance management, b) to what extent do they draw on the capabilities and expertise of third parties such as consultancies to assist them in the acquisition process, and c) to what extent Swedish defence authorities (the Swedish Armed Forces and FMV mainly) maintain internal knowledge related to the outsourced tasks (e.g. technological knowledge about equipment and support services, including logistics).

### Knowledge-based perspectives

A knowledge-based perspective would also be relevant and useful since it puts at centre stage the notion of learning and knowledge (as the outcome of the learning process) and their roles in the development of performance-based contracting capabilities. A knowledge-based approach stresses the design of appropriate organisational structures, processes and mechanisms of learning (Grant, 1996; Kogut and Zander, 1992; Zollo and Winter, 2002) that the Swedish defence authorities should establish to enable capability development in performance-based contracting and the management of relationships with defence suppliers. More specifically, Kogut and Zander’s (1992) notion of combinative capability could help uncover how defence agencies learn and develop their performance-based contracting capabilities and how individuals, specific divisions/functions and even whole authorities (e.g. FMV) come together to (re)combine and integrate their know-how (Grant, 1996) and develop the new capabilities associated with the performance-oriented acquisition model.

In light of the ongoing reformation project and the shift of responsibilities, resources, personnel and skill sets among defence authorities, such an approach appears to be interesting and highly relevant since it also emphasises the role of tacit knowledge and organisational routines, as well as the path-dependent and social nature of knowledge creation and capability development (Kogut and Zander, 1992). Potential questions to ask here include: How will the restructuring project and the merging of authorities affect tacit knowledge and routines of the new organisation? To what extent such tacit knowledge and routines can be transferred to the new structures (e.g. FMV)? What is the role of path-dependency in terms of capability development within FMV? What are the main challenges and opportunities in relation to the development of capabilities in performance-based acquisition and contracting, considering also the complexity of the ongoing restructuring project?

### Dynamic capabilities perspectives

A dynamic capabilities perspective would be potentially useful to study whether there are deliberate processes and mechanisms of articulation, codification (Zollo and Winter, 2002) and sharing of performance-

based contracting knowledge and experiences among the reformed defence authorities. How can such know-how be articulated and codified? What is the rate of learning, given the organisation's absorptive capacity (Zahra and George, 2002) and its prior know-how in this area (Wang and Ahmed, 2007)? Do defence authorities such as FMV retain know-how internally (i.e. know more they do) regarding the outsourced equipment/systems and how does this affect performance-based contract design, management, and assessment capabilities as well as Value-for-Money?

Furthermore, the PBC literature stresses that designing and managing PBCs is a learning process (Else *et al.*, 1992; Faith *et al.*, 2010). In the context of outsourcing social welfare services for instance, Heinrich and Choi (2007) explain how public agencies can make use of experience gained to prioritise performance measures through adjusting their weighting and adapt financial incentives (e.g. risk premium payment to the service provider can be reduced to reflect early insights that service targets can be hit easily).

A dynamic capability perspective is relevant in the sense that it stresses the role of trial and error, experiential learning and experience accumulation processes (Eisenhardt and Martin, 2000; Zahra *et al.*, 2006). Examination of such processes could help develop an understanding of how PBC capabilities develop and evolve over time. The work of Mayer and Argyres (2004) is also useful here: setting out to amend TCE's lack of emphasis on learning effects, these scholars point out that prior experience and lessons learned matter for inter-firm contracting (Argyres *et al.*, 2007). Organisations learn how to contract with each other as they gain experience and learn about exchange-specific contingencies and hazards over time. Such knowledge is used to modify, adjust or extend contractual provisions in successive contracts and increase exchange efficiency and effectiveness. In this sense, contracts can serve as repositories of knowledge (Mayer and Argyres, 2004).

Applying this dynamic approach to PBC means that early experiences of defence authorities during the in-service/use phase as well as supplier-specific knowledge can be used to refine output/outcome measures, service level thresholds as well as adjust financial bonus/penalty payments to increase overall contract efficiency and effectiveness (Behn and Kant, 1999; Else *et al.*, 1992). This dynamic approach is also consistent with Türksever and Wynstra's (2013) conceptualisation of contracting capabilities as the ability to learn and improve by taking into account prior experiences and knowledge.

### Organisational routines perspectives

Another interesting and potentially fruitful avenue for empirically studying organisational learning and capability development in performance-based acquisition and contracting is taking an organisational routines perspective (Becker, 2004; Dosi *et al.*, 2000). More specifically, such an approach would focus on routines regarding acquisition and contracting tasks within the relevant defence authorities (e.g. FMV), drawing a distinction between ostensive and performative aspects of relevant routines and the role of relevant artefacts (Pentland and Feldman, 2005).

Studying ostensive aspects would, for instance, entail focusing on artefacts such as acquisition process guidelines, business case documents, tenders, contracts and standard operating procedures and rules regarding the acquisition process (a lot of which are currently in the making due to the introduction of the new acquisition model). Empirical examination of performance aspects of acquisition /contracting routines would focus on how the Swedish Armed Forces and FMV key managers and personnel enact such rules and operating procedures, how they interpret them, and whether they diverge from them or they elaborate upon them, e.g. in relation to the specific requirements and aims of each acquisition project.

The interaction between ostensive (abstract, cognitive regularities indicated by things such as rules and standard operating procedures) and performative aspects (how managers enact those in specific times, places, and contexts) could provide a useful theoretical lens to explore how Swedish defence authorities (e.g. FMV) learn and develop their capabilities over time. For instance, it would be interesting to empirically investigate how the enactment of the generic and abstract rules and working procedures (e.g. managing and controlling contractual relationships with defence suppliers) in specific projects produces new insights and lessons learned. And whether those lessons learned and experiences are fed back to the description of routines through the formal documents (e.g. acquisition process model), or they affect the conceptualisation and

interpretation of what FMV employees and managers do, i.e. their interpretative schema (see Salvato and Rerup, 2011).

### Conclusions and recommendations

The purpose of the reported pre-study was to explore and increase awareness of the concept of “*performance-based contracting capabilities*”, as well as to examine what types of capabilities the Swedish defence agencies should consider for implementing in a performance-based defence acquisition model. In addition, the study aimed at identifying relevant theoretical perspectives and conceptual frameworks for empirically studying, as a next step, capability development in performance-based contracting. In line with this dual purpose of the pre-study, three distinct research questions (RQs) were formulated:

- RQ1: What are performance-based contracting capabilities?
- RQ2: What types of capabilities should Swedish defence agencies consider to design and manage performance-based contracts as part of the transition towards performance-based defence acquisition?
- RQ3: Which theoretical perspectives and/or conceptual frameworks are useful for empirically studying capability development in performance-based contracting in the Swedish defence context, and why?

In the context of Swedish defence acquisition, performance-based contracting capabilities are conceived as indirect or ancillary capabilities (Loasby, 1998), as opposed to the direct, military capabilities of the Swedish Armed Forces that help them fulfil their strategic missions and purposes, e.g. defend Sweden and participate in international peace keeping operations as part of their international obligations.

PBC capabilities are a specific class of indirect capabilities that are critical for successfully contracting for equipment and associated support services based on “*availability*” and/or “*capability*” outcomes. In particular, and as an answer to RQ1, the following definition of PBC capabilities is proposed:

*“Performance-based contracting capabilities are the indirect know-how and capabilities that enable organisations to specify, evaluate and manage required performance, design appropriate performance-oriented incentives systems, and allocate and manage financial and operational risks associated with performance attainment. The development of these indirect capabilities entails articulation and codification of knowledge regarding performance-based contract design and management, considering also the broader context of the outsourcing decision”.*

By way of answering RQ2, three key types of PBC capabilities are identified. First, performance-based contract design capabilities refer mainly to the “*concept*” and “*development*” stages of the defence acquisition process. They are related to know-how regarding the specification of required performance, the design of incentive systems and the identification and allocation of risks between the buying organisation and the defence supplier(s).

Second, performance-based contract management capabilities refer mainly to the “*production*”, “*operations*”, “*maintenance*”, and “*disposal*” stages of the defence acquisition process. They mainly relate to know-how in implementing the performance-based contract, measuring, monitoring and managing supplier performance, monitoring the implementation of scheduled equipment refits/upgrades, administering financial incentive payments, as well as managing financial and operational risks in an ongoing fashion.

Third, performance-based contract assessment capabilities cut across all the stages of the defence acquisition process. This category refers to capabilities of processing and managing knowledge (regarding purchasing and contracting) as well as capabilities of learning and improving by leveraging prior experiences and making use of lessons learned over time. These capabilities are important both *ex-ante* (i.e. contract design) and *ex-post* (i.e. contract management). *Ex-ante* capabilities include identifying and integrating the types of expertise required for successful project management, forming cross-functional acquisition and contracting teams, and (re-)using lessons learned from previous experiences with the same supplier, similar equipment acquisition projects, as well as commercial best practices. *Ex-post* learning and adaptation capabilities ensure

appropriate design of PBC and rectification of any mistakes and/or omissions during the contract design phase (e.g. adapting performance and/or financial bonus/penalty levels). They also entail codifying any lessons learned in a structured way so that the collective know-how regarding PBC design and management increases over time.

In order to address RQ3, four theoretical perspectives have been highlighted as potentially relevant and useful for studying capability development in performance-based acquisition and contracting. These are the notion of indirect capabilities, the knowledge-based view of the firm, the dynamic capabilities perspective and the organisational routines approach.

Other theories such as the RBV, the ERBV and the alliance capability perspective are deemed as not applicable in the defence market context; the ontological and epistemological assumptions underpinning those perspectives (e.g. the assumptions of a highly competitive business environment, the centrality of sustainable competitive advantage and the leveraging of inter-firm alliances) do not fit the public sector context of defence acquisition.

This reported pre-study is based on research of a conceptual nature, i.e. review of academic literature on PBC, related theoretical (capability-based) perspectives, and reports produced by the Swedish government and defence authorities. Further studies of empirical nature are required to validate and potentially refine the developed definition and classification of PBC capabilities and ensure that those are relevant for the targeted agencies. In addition, further empirical research should be conducted to study how Swedish defence authorities can develop their capabilities in performance-based acquisition and contracting.

In addition, for the sake of simplicity this report has treated the buying organisation as a collective entity. As a next step, and considering the ongoing restructuring project within the Swedish defence, the empirical study should draw a distinction between the requisite capabilities of each defence authority (the Swedish Armed Forces and FMV) with regards to performance-based acquisition and contracting. Such an empirical investigation can also examine the interactions with other types of capabilities (e.g. internal competences in logistics and equipment support services) and how these affect acquisition and contracting know-how.

Taking into account the current challenges and opportunities facing Swedish defence authorities and in line with the previous discussion about potentially useful theoretical perspectives to study PBC capability development, the following recommendations for empirical research are made:

Focus on the learning processes, structures and mechanisms by which Swedish defence agencies develop their know-how and capabilities in performance-based acquisition and contracting. Are there any explicit processes and mechanisms in place? How is such know-how articulated and codified, if at all? What is the rate of learning, and how is that affected by the organisation's absorptive capability and prior knowledge?

In light of the ongoing reformation project and the shift of emphasis towards a performance-based acquisition model, focus on how individuals, specific divisions/functions and even whole authorities (e.g. the Swedish Armed Forces and FMV) come together to (re)combine and integrate their know-how and develop the new capabilities associated with the performance-oriented acquisition model. It will also be interesting to investigate the role of path-dependence and tacit knowledge in this process of capability development.

Focus on the role of trial and error, experiential learning and experience/knowledge accumulation in PBC capability development and evolution over time. Capability development in PBC presupposes the existence of dynamic, meta-capabilities of learning and adapting in light of experiences from previous acquisition projects and suppliers as well as within cross-organisational and cross-functional acquisition teams.

Focus on organisational routines regarding acquisition and contracting tasks within the relevant defence authorities (e.g. FMV). Such a study would try to empirically investigate the ostensive and performative aspects of such routines and how their interactions may affect learning and know-how development over time. For instance, how enactment of formal acquisition guidelines and procedures guides actual practices and whether any divergence and lessons learned from acquisition project experiences are fed back and reflected in the adjusted formal rules. Also, insofar as the reformation project entails changes in rules and standard operating procedures regarding acquisition and contracting, it would be interesting to examine how



such rules are decided, by whom, and how they attempt to codify the ostensive aspects of performance-based acquisition routines.

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