

**WHAT'S IN IT FOR ME?**  
**CHALLENGING A PRIVATE FIRM PERSPECTIVE ON**  
**PUBLIC-PRIVATE INNOVATION**

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**ABSTRACT**

This paper sets out to investigate private firms that repeatedly engage in public-private innovation (PPI). Particularly, it is exploring how this group of firms reaps the potential benefits related to their engagement in 'serial' public-private innovations. Seven case firms are investigated through a qualitative study. The sparse PPI literature focuses mostly on the challenges related to building relationships between public and private partners. Whereas overcoming the differences in values and objectives between private and public actors could be considered a mutual task, the consequences of failing this task is in the literature argued to primarily become imposed on private firms. Therefore, the focus of this paper is to study two aspects of 'serial' firms as we look for 1) the benefits they gain from building relationships with their public partners and 2) the specific abilities of firms engaging in serial PPI. To fully grasp these two aspects we apply a theoretical framework based on the IMP approach to relationships. It is argued that it is possible to use PPI relationships as devices and assets emphasizing how relationships can be used to reap a variety of benefits, tangible as well as intangible. The last issue is typically not referred to in the PPI literature. As such the findings contribute to the PPI literature by specifically emphasizing the less tangible but very valuable benefits obtainable from PPI relationships. Further, the findings also hint to new and elaborated insights contributing to our understanding of actors' engagement in relationships.

**Keywords:** *Innovation, Public-Private Innovation, Relationship, Public sector*

## WHY DO BUSINESS ACTORS ENGAGE IN PUBLIC-PRIVATE INNOVATION?

In recent years, there has been an increased focus on how private firms can be involved in solving public challenges by jointly creating new products and services with public organizations. Typically through so-called public-private innovation (PPI) partnerships, which can be defined as relationships between public and private actors that jointly explore innovative solutions providing the base for solving jointly defined problems (Dittmer et al., 2009). From a societal perspective, public-private innovation is often argued to be a valuable source for welfare innovations and a means to create economic potential for developing business by integrating the strengths of public and private actors (Klijn & Teisman 2003). It is thus the expectation that PPIs can rethink and develop innovative public welfare solutions by combining the abilities that cut across the public and private sectors.

The literature on PPI is still in its formative years (Munksgaard et al., 2012), and experiences with this kind of projects are still limited. Some of the issues related to PPI that have gained early academic attention concern the potential public benefits obtainable from PPI (Borins, 2002; Rowe et al., 2004; Kearney et al., 2008); public management as related to PPI (Anderson, 2012; Saz-Carranza & Longo, 2012; Edelenbos, 2007); potential barriers for implementing innovation in the public sector (Borins, 2002; Kearney et al., 2008) as well as the challenges in running PPI projects due to differences in values and objectives between the public and private partners (Hartley, 2005; Drejer & Jørgensen, 2005; Currie et al., 2008; Schmidt, 2008). In general, the literature on PPI has to a great extent taken the view of the public sector. Only few attempts have been made to fully understand how private firms perceive the potentials of PPI along with their abilities for being able to participate. Too little is known on how firms manage innovation conducted in relationships with public partners and the challenges related hereto (Nissen et al. 2012). Some publications have highlighted the potential benefits obtainable for private firms. Typically it is argued that PPI relationships are valuable for private firms as they gain access to unique public sector knowledge and public markets, creating various advantages such as financial, material, image and knowledge development (Klijn & Teisman, 2003). However, these benefits are typically thought of as reimbursements which private firms can reap by participating in single PPI projects. Practice however shows that these benefits typically do not show during single PPI projects. Thus, in general it has been difficult to verify the direct outcome in terms of increasing sales, market share or profit for private firms engaging in PPI. This is particularly the case when the outcome of single PPI projects is assessed.

Whereas we could expect that these hesitant outcomes do provide less incentive for private firms to join PPI projects, we are facing a growing trend among private firms repeatedly investing and engaging themselves in PPI – at least in a Danish context. This leads us to argue that we need to investigate a broader variation in potential benefits other than tangible ones (such as sales, market share and profit). And further to increase our understanding of private firms' abilities to reap these benefits.

Building on an IMP approach to relationships (e.g. Ford et al. 2011; Hakansson et al. 2009) challenges the benefits that private firms can reap from engaging in PPI projects. The approach discusses a variety of benefits, tangible as well as intangible, whereas the latter typically is not referred to in the PPI literature. Concretely, the approach offers benefits related to analytical levels of the organization, relationship and network (Anderson et al. 1994; Hakansson & Snehota 1995). This corresponds with the purpose of understanding the abilities of the private firm, the benefits obtainable from specific relationships with public actors and from engaging with partners in the wider public sector or network. Further, we

draw on an understanding of relationships and networks as embedded in processes and structure (Ford & Hakansson 2005; Ford & Hakansson 2006). Accordingly, we can include the potentials of benefits, as relationships and projects evolve, as well as the structural setting of the public sector to identify if and what types of benefits private firms can obtain from engaging in serial PPIs.

As such the purpose is to investigate how firms evaluate their participation in ‘serial’ PPI by pointing out the benefits they seek and gain from relationships with their public partners in joint innovation projects. Also the purpose is to identify the abilities of firms repeatedly engaging in PPI. Accordingly, this paper aims to contribute to the PPI literature by taking an explicit firm (opposed to public sector) perspective and to contribute to the IMP approach by elaborated insights contributing to our understandings of actors’ engagement in relationships. The paper investigates the following research question: *What are the benefits private that firms obtain from engaging in serial public-private innovation, and what abilities are important for these firms?*

The following sections constitute this paper: Firstly, a brief discussion of public-private innovation relationships, and secondly an outline of the theoretical framework for discussing private actors’ perception of benefits obtained from relationships with public partners. The third section introduces the methodological considerations underlying our study, whereas the last sections present the empirical material and concluding discussions.

#### A THEORETICAL FRAMEWORK FOR UNDERSTANDING RELATIONSHIPS IN PPI

Relationships between private and public actors differ on some central dimensions compared to relationships between private actors (e.g. business to business relationship). Firstly, public procurement is subject to governmental regulations and legislation which make exchanges between public and private actors less simple even for standard products and services. Further, laws on public procurement may hinder the developments of close and long-term relationships. Secondly, interaction can be more complex as the public sector is typically characterized by several layers of decision makers. In other words, the buying center in the public sector is rather complex as various professions may hold different meanings on what and how to buy just as the buying decision may be influenced by different political agendas. Thirdly, interaction can be rather difficult as the exchange partners in the public and private sector build their business on diverse sets of value.

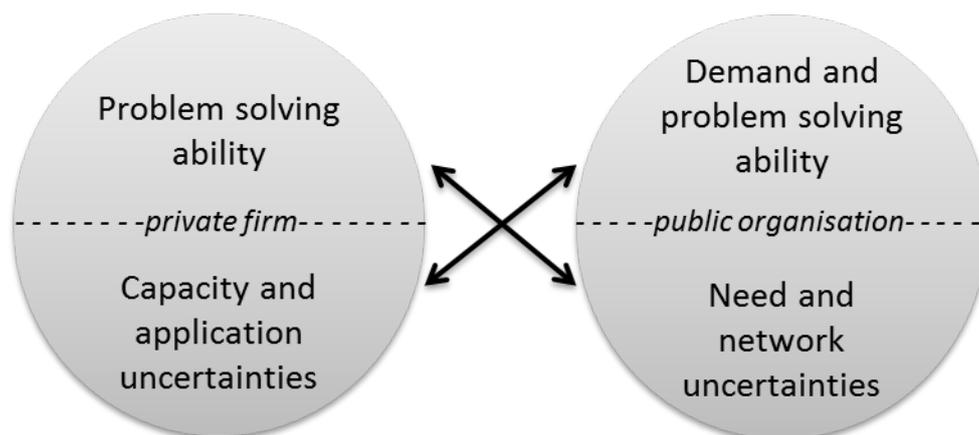
For the present purpose we are interested in those features of relationships between public and private actors and in examining in more detail how private firms develop their abilities for repeatedly engaging in relationships with public organizations. For this we draw on a theoretical framework presented by Ford et al. (2011). This framework discusses relationships as problems, devices and assets. Potential problems in PPI relationships have already been discussed in the previous section. For the present purpose we focus on the notion of relationships as devices and relationships as assets. Accordingly, the following section discusses the abilities that firms need to develop to engage in multiple and serial PPI projects and the potential benefits they may obtain.

## Public-private relationships as a device

Just as in business-to-business relationships the interaction in PPI relationships will be influenced by exchanges and actions by the partners as well as the partners' perception and interpretation hereof (Ford & Hakansson 2005). Firms will thus seek to handle, influence and control the process and outcome of joint efforts – utilizing relationships with others as a device to obtain goals. Ford et al. (2011) argue that relationships can be considered devices for:

1. increasing efficiency in terms of linking activities between partners that can reduce costs of e.g. operations, logistics and handling
2. achieving innovation by combining and developing the firm's resources in conjunction with that of its partners
3. influencing others to reach own as well as joint goals.

Related to the third point on utilizing relationships as a device to influence others, Ford et al. (2011) argue for the relevance of scrutinizing the mutual uncertainties and abilities to problem-solving as held by the partners. This is illustrated and related to a PPI setting in figure 1.



*Figure 1: Uncertainties and abilities of private and public actors engaging in PPI*

In the special case of relationships between public and private actors, the uncertainties and abilities characterizing their interaction will be affected by this specific setting. Drawing on the conceptualization from Ford et al. (2011) we discuss the uncertainties and abilities of public and private partners respectively. Accordingly, we are studying the needs and network uncertainties of public actors and the corresponding supply abilities for problem-solving of private firms engaging in PPI. Further, we study the capacity and application uncertainties of the private firms and the corresponding demand and problem-solving fulfillment abilities of the public partner. Through this, we can discuss public-private relationships as a device.

It lies in the definition of PPI that the partners interact to explore and find new solutions. But even when relevant technologies already exist, the challenge is more whether the public actor is able to characterize the problem to be solved. In general, two approaches are apparent in Denmark when problems and needs in PPI are defined. One is when the project from its

beginning has a declared goal. In this particular case, the public organization has a rather clear understanding of the problem to be solved and can be explicit on which partners are required in the project. The other is when the project from its beginning has a declared means – e.g. to increase the use of user-driven innovation for developing welfare solutions. In this situation, the public organization will be less clear on which partners to involve (Clarke et al. 2011). The uncertainty, related to which private partners to invite to participate in a certain PPI project, is to a large degree influenced by existing legal requirements for public procurement where at least three issues are of interest: existing procurement regulations, problems related to implicit state support and IP-rights (Indén & Olesen 2012). Since PPI is characterized by not only potentially complex problems but also complex settings, private firms considering engaging in PPI to a higher degree require strong problem-solving abilities.

When aiming for entering the public market, private firms will face several uncertainties. Firstly, many PPIs are novice-projects and one-off sales and even if a solution is developed, it is not certain that other public actors will need the exact same offering. Accordingly, PPI is not to be considered a way to utilize spare production capacity. Further, the application of a new welfare solution can be uncertain for a longer period as the project partners try out different possible solutions. In other words, the private actor cannot be certain to which extent the project may lead to a concrete sale. Here the public partner's ability to engage in continuous dialogues can be considered essential for the private firm to sustain its involvement.

Developing relationships with public organizations thus renders some uncertainties to which private firms need to grow specific abilities to handle. Whereas several studies report how firms face challenges from further engagement in PPI, this study is examining the specific abilities of private firms to leverage relationships with public partners as a device.

#### Public-private relationships as assets

Innovation relationships are important assets for e.g. developing new ideas, for accessing partners' knowledge or technology, for getting access to new markets, etc. Seldom, however, will an entirely new relationship be a valuable asset from its out spring. This is due to relationships developing through an incremental process which demands resources in terms of time, financing and technology. Only over time the investment in relationships can be harvested. Further, a firm's portfolio of different relationships may pose different assets and benefits.

As argued by Ford (1980), a relationship will put different demands on the firm at different phases of its development. In PPI the pre-relationship phase will be characterized by questions such as who to involve as well as what to invest and gain from the relationship. Since public and private actors hold different organizational values – as discussed in the introduction – a matching of expectations proves particular important (Clarke et al. 2012). Due to the fact that PPI is often new projects engaging new partners, the relationship process will start over and over again – even for a firm who engages in several successive PPI projects. This is equivalent to discussions in research on interaction and relationships in business projects (Lind 2006). Still, a firm engaging in serial projects will build another starting point in a new project than a firm becoming involved in PPI for the first time. In

other words, the firm will be more experienced in accordance to how the PPI process develops and what demands and uncertainties that can exist.

In the following phases of exploring and developing relationships, private firms in PPI will use resources to invest in the relationship, build knowledge of particular partners and make necessary adaptations – just as in any other business to business relationships.

Discussing assets further includes considerations of the portfolio of relationships in which a single PPI relationship is part of. Dealing with their portfolio of relationships the private firm engaging in PPI must work in such a way that their problem-solving is compatible with that of their various counterparts (Ford & Hakansson 2006).

#### METHODOLOGICAL CONSIDERATIONS

To get a detailed insight and understanding on PPI relationships from a firm perspective, this paper adopts an explorative and qualitative approach. As argued by Dubois and Gadde (2002:554) ‘the interaction between a phenomenon and its context is best understood through in-depth case studies’. The empirical data for the present study is rooted in two larger research projects in Denmark including in-depth case studies of a total of 13 PPI projects. For the present purpose, qualitative interviews with firms engaged in PPIs constitute the empirical basis. Seven Danish firms with experiences from engagements in several successive innovation projects in the public sector are included in the study. A project manager or managing director from these firms were interviewed on: their perception of PPI relationship potentials and obstacles; activities and resources related to carry through such projects; developing and selling innovations; and their approach to managing such relationships vis-à-vis their public partners. Each interview lasted for 1 ½ - 2 hours and 2-3 of the authors participated in each interview which took place at the firm. All of the interviews were digitally recorded and transcribed.

The selected firms are all informative cases since they – in spite of the general argument in the PPI literature related to challenges in innovative private-public relationships – repeat their engagement in multiple and serial PPI projects. The growing group of serial firms thus seems to disregard general arguments for private firms not to invest in PPI projects. As a first step of analysis the case description section presents the 7 firms, and their characteristics are discussed in more detail.

As a second form of analysis, a computer-aided textual software Leximancer was utilized on transcripts of interviews to allow for systematic and comprehensive analysis of firms’ perception of PPI participation and benefits. By automatically coding the text, Leximancer undertakes a content analysis of the interviews. Based on the interview transcripts Leximancer will generate, without intervention, concepts that characterize the transcribed interview-text using statistical information on co-variation between high-frequency words used by informants. A ‘concept’ in Leximancer is a set of words that are used in conjunction with each other by informants. Specifically, the software breaks the text into blocks of two sentences (by default); these blocks are marked with the concepts that they contain so that words are weighted according to how often they occur in relation to a concept compared to how often they occur elsewhere. Further, the co-occurrence between concepts is measured. (Based on the co-occurrence between concepts these are clustered in themes.) The

components of each ‘concept’ are placed in a ‘thesaurus’ that contains the words’ relative importance in the concept generation. The ‘thesaurus’ contains high-relevance evidence words that occur commonly in the contexts where the concept appears in the interview text and rarely where it is not.

Smith and Humphreys (2006) argue that computer coding of interview transcripts results in an objective conceptual framework which provides a stronger ground for successful qualitative interpretation. Using machine learning to automatically and entirely code the text rather than utilizing the researchers’ interpretation to do so, adds reliability. Our analysis follows the recommended Leximancer procedure (Leximancer 2011).

### CHARACTERISTICS OF PRIVATE FIRMS REPEATEDLY ENGAGING IN PPI

The PPI case-projects included in this study are typically characterized by technology development. Either technology is being developed for a particular project or – more often – adjusted to be utilized for new public welfare solutions. Other PPIs are aiming at improving efficiencies and strengthening efficiency in welfare processes. In this section, we take a closer look at the characteristics of private firms who repeatedly engage in PPI. Details are summarized in table 1 and discussed in more details below.

Firm description	Key resources in PPI	Participation in PPI – outcome focus
<p><b>Case 1 Falck</b></p> <p><u>Core business:</u> Ambulance and rescue service.</p> <p><u>Business size:</u> Large (16,000 employees).</p> <p><u>International/domestic:</u> International.</p>	<p><u>Financial:</u> Extensive resources.</p> <p><u>Knowhow:</u> Long term expertise in servicing the public health care sector.</p> <p><u>Network:</u> The firm has an inherent (historical conditioned) access to the health care sector.</p>	<p><u>Long term perspective on PPI participation:</u></p> <p>Focus is on testing a new product/service in DK aiming at export and not a one off sale after the project period.</p>

Firm description	Key resources in PPI	Participation in PPI – outcome focus
<p><b>Case 2 Medisat</b></p> <p><u>Core business:</u> Development of healthcare products with special focus on tele-medical solutions.</p> <p><u>Business size:</u> Medium (49 employees)</p> <p><u>International/domestic:</u> Only situated in Denmark.</p>	<p><u>Financial:</u> In the first PPI project, the firm had limited resources and few employees. After exporting the tele-medical solution developed in the first PPI project, the firm attained more financial resources.</p> <p><u>Knowhow:</u> IT expertise.</p> <p><u>Network:</u> Network within the hospital sector in the firms' geographical area. Their tele-medical solutions are often developed in close collaboration with practicing doctors from Odense University Hospital (OUH).</p>	<p><u>Short and long term perspective on PPI participation:</u> In the first PPI project, the firms' focus was on a one-off sale. During the following years, the firms' perspective has changed to a long term perspective with focus on export.</p>
<p><b>Case 3 Judex</b></p> <p><u>Core business:</u> Development of a wide range of software and hardware products for the healthcare sector.</p> <p><u>Business size:</u> Small (20 employees).</p> <p><u>International/domestic:</u> Only situated in Denmark.</p>	<p><u>Financial:</u> Limited resources.</p> <p><u>Knowhow:</u> IT expertise.</p> <p><u>Network:</u> Network within the university sector (Biomedical Engineering).</p>	<p><u>Short term perspective on PPI participation:</u> Focus is aimed at a one-off sale.</p>
<p><b>Case 4 LINAK</b></p> <p><u>Core business:</u> Designing and manufacturing electric linear actuator solutions for workplaces as diverse as offices, hospitals, comfort furniture, farms and industry.</p> <p><u>Business size:</u> Large (1,600 employees).</p> <p><u>International/domestic:</u> International.</p>	<p><u>Financial:</u> Extensive resources.</p> <p><u>Knowhow:</u> Expertise in hospital beds.</p> <p><u>Network:</u> Networks with other firms within the medical industry and with Danish hospitals.</p>	<p><u>Long term perspective on PPI participation:</u> Focus is on testing a new product/service in DK aiming at export and not a one off sale after the project period.</p> <p><u>Network:</u> Connections within the health care sector. Opportunity to participate in new PPI projects.</p>

Firm description	Key resources in PPI	Participation in PPI – outcome focus
<p><b>Case 5 Servodan</b></p> <p><u>Core business:</u> Development of intelligent lighting control equipment.</p> <p><u>Business size:</u> Medium (50 employees).</p> <p><u>International/domestic:</u> International (since 2008 the firm has been a part of Belgian Niko Group).</p>	<p><u>Financial:</u> Serveral resources.</p> <p><u>Knowhow:</u> Expertise in lighting technologies.</p>	<p><u>Short and long term perspective on PPI participation:</u> In some PPI projects focus is related to a one-off sale, and in other projects focus is on long term product development and creating new public relations.</p> <p><u>Network:</u> Connections within the health care sector. Opportunity to participate in new PPI projects.</p>
<p><b>Case 6 Pressalit</b></p> <p><u>Core business:</u> Development of toilet seats.</p> <p><u>Business size:</u> Large (400 employees).</p> <p><u>International/domestic:</u> Only situated in Denmark.</p>	<p><u>Financial:</u> Extensive resources.</p> <p><u>Knowhow:</u> Expertise in the technology and production of toilet seats and bath room equipment.</p> <p><u>Network:</u> Networks with other firms within the medical industry and with Danish hospitals.</p>	<p><u>Long term perspective on PPI participation:</u> Their focus is on testing a new product/service in DK aiming at export and not a one off sale after the project period. Product development is also a main reason for participating.</p> <p><u>Network:</u> Connections within the health care sector. Opportunity to participate in new PPI projects.</p>
<p><b>Case 7 Tunstall</b></p> <p><u>Core business:</u> Provider of telehealthcare solutions.</p> <p><u>Business size:</u> Large (1,100 employees).</p> <p><u>International/domestic:</u> International (part of the English Tunstall Group).</p>	<p><u>Financial:</u> Extensive resources.</p> <p><u>Knowhow:</u> IT expertise.</p> <p><u>Network:</u> Network within the hospital sector in the firms' geographical area and within the university sector.</p>	<p><u>Long term perspective on PPI participation:</u></p> <p>Focus is on learning and product development and creating new public relations.</p> <p><u>Network:</u> Connections within the health care sector. Opportunity to participate in new PPI projects.</p>

Table 1: Details on firms interviewed for the present study

### Key resources

Some firms possess both tangible and intangible resources to a high degree when they participate in PPI projects. They possess tangible resources especially in the form of financial and human resources and intangible resources in the form of knowhow and large networks (both within and external to the firms) from where they can draw a wide range of expertise. Others do not have the same amount of resources and networks within the firm as they do not contain the same amount of human resources. However, these do possess a large amount of intangible capabilities. For example, firms like Medisat and Judex are characterized by having knowhow and expertise central to the PPI projects they participate in. Judex has a

strong network within the university sector which may enhance their expertise in relation to the products they are capable to develop. Medisat, on the other hand, is characterized by having a strong network to health professionals with important features (e.g. decision making power) within the health care sector, especially within the firm's geographical area.

### Outcome focus

Participating in PPI projects can be a time consuming process, and often the private firms are not rewarded financially for their participation in PPI projects. This may affect the firms' outcome focus. However, the empirical data drawn from the interviews shows that these firms repeatedly participating in PPI project hold a strategically and long term focus. They do not expect a one off sale right after the project has finished. Instead, they perceive PPI as an opportunity to obtain access to public organizations and users in order to test innovative products or services – either in relation to the firms' strategies concerning product development or export. In the following quote from the firm Pressalit, the outcome focus in relation to new products is exemplified: *What we are looking for is not a one off sale and the payment of 4 million kroner for some delivery. We are looking for the sustainable business model where we can become smarter and gain a new product supply which we can make a living off in the future and keep developing and offering.*

Some more internationally oriented firms tend to have their main focus on export. Accordingly, PPI is mainly used as a device in order to test products/services. The export focus which characterizes the large firms is exemplified through the following quote from Falck: *We have a strong hospital system at home and we have great experiences, and I think this is well acknowledged throughout the world. So when we later can come out and brand the solutions and say they have been tested on Skejby (a large Danish hospital), we can brand ourselves and say the solutions have been tested in large Danish hospitals and document the effects, this is something that weighs heavily and we can see possibilities in that.*

Variations in the export focus can be found in the firm Mediasat. The firm expected a one off sale after the first engagement in a PPI. However, the firm met some challenges in relation to the diffusion within the health care sector of the product developed. This made the firm shift focus in relation to its participation in PPI projects. It started to focus on exporting the products developed in these projects.

### PRIVATE FIRMS REAPING THE BENEFITS OF PUBLIC-PRIVATE INNOVATION

This section reports our findings on how private firms use relationships as device for reaping the benefit of PPI. In other words, we discuss how the case firms perceive their participation in PPI and the requirements needed to actually reap potential benefits. As explained in the methodological section, these findings are presented in form of a content analysis on our interview data utilizing the software Leximancer. As such, we gain insights on the semantics used by informants on their PPI participation.

The recommended Leximancer analysis procedure was followed (Leximancer 2011), using 'discovery' mode to let Leximancer automatically generate 'concepts'. Further, simple post 'discovery' intervention was carried out. Firstly, to delete words from analysis that provided no semantic meaning (e.g. 'today', 'inside'). Secondly, after checking the meaning of

Leximancer concepts, similar concepts were combined for clarity (e.g. patient and patients, firm and firms, hospital and hospitals).

To understand in more detail the important issues related to firms engaging repeatedly in PPI, table 2 presents the frequency and importance of the 10 most frequently occurring concepts identified by Leximancer. The table shows that the most frequently appearing concepts are ‘project’ and ‘hospital’ with 236 and 189 two-sentence blocks comprising words indicating these concepts respectively. Relative counts explain the percentage of text coded for any specific concept, as compared to the most frequently occurring concept (e.g. the concept ‘firms’ has 52% as many counts as does the concept ‘project’).

Concept	Count	Relative count	Thesaurus	Co-occurrence
<b>project</b>	236	100%	project, ending, briefing, running	specific, money, initiating, continuation
<b>hospital</b>	189	80%	hospital, Skejby, Holstebro, community nurse	Region, patients, running
<b>portfolio</b>	144	61%	projects, select, forum, participation	Region, running
<b>initiating</b>	138	58%	initiate, effective, inquiry, request	time, products, projects
<b>firms</b>	123	52%	firms, private, business community, profit	difficult, public, better, Region
<b>time</b>	115	49%	time, nurse, Region	Before, utilizing, running
<b>running</b>	114	48%	running, run, returning, specialists	Time, equipment,
<b>Denmark</b>	107	45%	Danish, English, national, healthcare	better, time
<b>money</b>	85	36%	Earnings, payment, cheap, costs	law, participating
<b>patients</b>	84	36%	patients, belonging, including	specific, time, equipment

Table 2: Frequency, nature (thesaurus) of concepts and co-occurring concepts

To discuss in more detail the concept of ‘project’, we examine the thesaurus showing how relevant words for ‘project’ are related to issues of that specific PPI project a firm is engaged in (including words such as ‘project’, ‘briefing’ and ‘running’). Since ‘project’ is the most frequent concept extracted from the interviews, we infer that the handling and management of each single project is considered important to firms involved in successive PPI.

The following quotes from the interviews further indicate how single PPI projects may lead to benefits for the involved firm. The firm Mediasat states: *we only engage in a project when we see some real possibilities*. The firm Pressalit declares: *we are more interested in getting new customers, than just profit*. These quotes illustrate the potential benefits of gaining access to new opportunities and markets. Further, firms seem to consider PPI participation as a way of bringing their skill and competences into play. Related hereto, Pressalit argues: *if*

*partners approach us, it shouldn't simply be because we have funding or are a private firm – but because they appraise our skills.*

Further, looking into the concepts that 'project' most often co-occurs with reveals that especially the start-up as well as the potentials for passing on experiences from project to project is considered vital for reaping (financial) benefits (since co-occurring concepts include 'initiating', 'continuation' and 'money'). In other words, the private firm engaged in PPI needs project management abilities. Since both the start-up and the continuation of the project are emphasized, it can be argued that abilities for problem-solving as well as for fulfilling project milestone are important.

The concept 'hospital' refers to specific public actors as the thesaurus contains words such as proper nouns of hospitals in Denmark (among others 'Skejby' and 'Holstebro') as well as 'community nurse'. This is further accentuated through the co-occurring concepts referring to both 'patients' and 'Region'. From this we infer that different public counterparts – e.g. the hospital, the Region as well as involved patients and nurses – play an important role in specific projects. In other words, building relationships with these partners is beneficial to private firms and a way to gain access to knowledge and other resources relevant for concrete PPI projects.

Three other concepts seem related to similar issues – these are 'patients', 'initiating' and 'running'. By studying the thesaurus of the two latter concepts, we learn that the startup as well as daily running of projects is related to establishing contact and developing interaction between public and private partners (including thesaurus words such as 'inquiry', 'request' and 'returning'). Further, specific patients and their participation in projects render complexity as well as evolvement. Based on the thesaurus words 'patients' and 'belonging' it can be argued that firms perceive patient involvement as complex, since it is not always clear to which healthcare authority the patients belong at a given moment. The thesaurus word 'including' relate to how the involvement of patients in a project means that the project has evolved to a stage where it can be tested by patients. Whereas this complexity contains challenges, the interaction with patients also seems to bring valuable insights to private firms e.g. related to how new technology can be applied. Accordingly, involving patients in PPI can give benefits in terms of reducing application uncertainties.

The concept 'portfolio' refers (through the thesaurus words 'projects', 'select', 'forum' and 'participation') to private firms' experiences with various projects. Important issues are how to prioritize and select which PPI projects to engage in as well as how to use knowledge gained in previous project when arguing for starting up new ones. Further, it is considered an advantage to participate in various forums as a way to get to know different public actors. Through the participation in various forums and fraternizing with different public actors, private firms obtain the benefit of using these relationships for discussing/testing ideas or concepts, for adapting based on specific requests from potential partners or for initiating contacts for developing new relationships with other potential partners in the public sector, etc. This is illustrated in the following quote from the firm Linak: *(we visited) one of those innovation conferences (hosted by the Region) where actors from the public and private sector meet. Here we met two passionate employees from the Hospital and they really liked our ideas.*

A related concept from the Leximancer analysis is 'money'. Scrutinizing the thesaurus of this concept (containing the words 'earnings', 'payment', 'cheap' and 'costs') reveals that reaping benefits in terms of an actual profit from engagements in PPI is based on engagements in development projects supported by national or European funds. The findings show that public partners (local and regional authorities as well as hospitals) are in general looking for ways to cut costs so the funds necessary need to be obtained from other sources. The firm Judex is very much aware of their vital role in the effort to apply for external project funding: *We are important for obtaining funding. When applying for funding in the EU, it is crucial to include commercial partners.*

Examining 'firms' reveals that this concept covers the private actors engaging in PPI (as the thesaurus includes 'firm', 'private' and 'business community'). Further, this concept co-occurs with 'difficult', 'public actor' and 'better'. The following quotes illustrate the variances in firms' perception of their engagement with public partners. The firm Linak states: *Communication is a great barrier, often we have to meet over and over again... we feel like we are engaging with a system that is really different from ours.* The firm Medisat is overcoming some of these challenges: *We gain more easy access to information and knowledge now... (in this project) we can do testing at their facilities because we have a good working relationship. This is worth its weight in gold!* This indicates how developing relationships with public actors – as seen from a private firm perspective – may prove challenges but that potential ways for overcoming these lie in abilities not only related to understanding the need for a concrete development (technology or product), but also in understanding the essential differences between public and private partners. One opportunity that seems predominant for private firms to build this ability is to engage with enthusiastic public employees willing to devote their time to the realization of concrete projects. Thus, Medisat further claims: *it is incredible for a private firm to know that the individuals in the other end of the relationship are just as eager as we are...that they carry it through at the other side; that they obtain cost benefits – this is really important.*

Finally, the concept 'Denmark' include the words 'Danish', 'English', 'national' and 'healthcare system' in its thesaurus. From this it can be inferred that the Danish public market is used for testing welfare innovations, since this give credibility for the value of the products. The firm Linak expresses: *we can prove the value of collaboration (with a Danish partner) and then sell it in Germany or The States.* The firm Tunstall ponders: *Denmark is a small country and we have our own public structure, which in many ways resembles the British.* In other words, a way to build a solid business and commercialize from PPI newly developed products and concepts is exporting. Taking into account the potentials of exporting already from the project outset seems to be vital together with a profound understanding of the special requirements set for competitive bidding and public procurement related to private firms' engagement in PPI.

## CONCLUDING DISCUSSION

Most research on public-private innovation (PPI) highlights the outcome potentials in regards to welfare innovations in a general perspective, mainly focusing on the benefits available on a societal level and public sector level. Benefits related to private firms are lesser explored. In the rare cases where private firm benefits are discussed, these are typically tangible

neglecting other more intangible but highly relevant benefits. Even though PPI challenges on project level is a mutual concern between private and public actors, the costs of not handling these challenges are typically viewed as more damaging for private firms as they bear the immediate costs of failing PPI. This makes it difficult to reap the immediate benefits of gaining access to unique public sector knowledge and public markets.

We have challenged this ‘gap of knowledge’ by taking an explicit perspective of what benefits private firms’ gain from engaging in ‘serial’ PPI as well as the abilities private firms require for doing so. We have applied a relational perspective on private firms engaging in PPI. This relational perspective provides a first-understanding of how relationships in PPI can be understood, but also highlights those particularities that exist in PPI relationships that makes PPI relationships differ from typically business-to-business relationships.

There is a growing trend among private firms to invest and engage in PPI in serial and multiple ways. The purpose of this article was therefore to follow those serial firms to fully understand how private firms perceive the potentials of PPI along with their abilities to reap the benefits from participating. To fully understand which benefits private firms gain from engaging in PPI, we have built upon an IMP approach to relationships which through the dimensions of devices and assets identify the types of benefits private firms can obtain from engaging in serial PPIs. Based on this theoretical framework we contribute with new knowledge of the potential benefits obtainable for private firms engaging in multiple and serial PPIs. As such the following will highlight our preliminary findings and present a theoretical implication for the IMP approach.

The presented findings stem from a study of seven firms engaging in serial PPI providing insights of the relationship uncertainties met by these firms and the ability requirements for reaping potential benefits from participating in PPI. Thus, these findings counterbalance the predominant view on challenges related to private firm participation in PPI found in the literature. In other words, the findings provide insights on a number of abilities which private firms seem to make use of when they engage in multiple and serial public-private innovation relationships and the benefits they obtain. What is special about the benefits is that they are not directly related to increased sales, market share or profit. Instead ‘serial’ firms emphasize benefits such as marketing/branding effects and developing possibilities to export solutions developed in a public sector context.

In more detail our findings suggest that ‘serial’ firms engaging in PPI utilize their relationships with different public actors as devices to build innovations in general. But also to influence others e.g. when testing solutions with patients to reduce application uncertainty. Further, the problem solving ability of the private firm increases – through the building of PPI project management skills – in repeating projects, making it possible to spot project possibilities and potential partners in the wider public sector network. Finally, relationships are used as devices to build a knowledge and understanding of the needs and demands of the public sector. Firms who repeat their engaging in PPI use their public actor relationships as assets in the following way: Firstly, when being repeatedly participating in PPI, the private firms seem to be building abilities to start-up new relationships more easily. This means that the firm becomes part of a larger network where new ideas can be tested and the firm may more easily become involved in large applications for funding PPI projects. Finally, the firm meets single individuals working in the public sector holding the engagement and willingness to carry through specific activities in concrete projects.

The study has also resulted in a theoretical implication which partly challenges the theoretical framework of devices and assets inspired by the IMP approach. Underlying the theoretical framework based on the IMP approach to relationships, is an assumption of being able to develop the same relationship between private and public actors. However, in the PPI setting, based on our empirical findings, we spot that regulations and rules make long-term relationships with public actors very difficult. Also the nature of PPI project as being temporary development projects makes it difficult to invest in relationships on a longer basis. Even though the foundation for long-term relationships is fragile and difficult, 'serial' firms do seem to reap the benefits of devices and assets as they use single relationships to public actors to build up a long-term relationship on a system-level ensuring that their engagement is recognized and communicated at system-level. This ability to transform relative simple unlayered relationships to individual actors to multiplex and multilayered relationships makes the serial firms able to reap the benefits of PPI partnerships on a short and longer basis.

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