Evolvement of commercialization plans through interaction with multiple stakeholders
- Patterns identified from Public-Private Innovation Projects

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Abstract

Recent studies show that commercialisation planning is often dynamic in nature when innovating new solutions. Plans are elaborated due to learnings on markets and gained experience in an ever-evolving trial-and-error journey. In this rein we show that stakeholders play a crucial role for how commercialization plans develop and is realized. Through stakeholder interactions innovator firms cultivate their commercialization plans, so they come to realize how to turn the developed invention into a successful innovation at the market and society. The paper contributes to recent commercialisation literature emphasising the dynamic nature of commercialisation planning by showing how innovator firms' develop their commercialisation plans through stakeholder interactions. Overall two findings are identified: 1) Firms' understanding of the prospective target market and how to reach it is refined or changed over time as firms' through interaction with various stakeholders get insight into the stakeholders' needs and the context in which the stakeholder's are embedded. More, 2) firms' commercialisation plans follow distinct paths which may not be intended.

Key words: commercialization, trial-and-error journey, stakeholder interaction, public-private innovation projects.

1. Introduction

It is becoming commonly accepted that a successful innovation often is not developed through wisely predetermined decisions but via an ever-evolving trial-and-error journey (e.g., Garud et al., 2011; Lynn et al., 1996). The approach emphasizes elaborative features of realizing 'the innovation' (Coviello and Joseph, 2013; Lynn et al., 1996) as opposed to the linear and predictive approach otherwise described in research. Recent research show that a similar journey exist with regard to commercialization as commercialization plans also often is developed over time when innovating a new solution; firms learn how to define a market, segment and target their customers, identify and position themselves towards competitors and enter or build the supporting ecosystem around the new solutions via an ever-evolving trial-and-error journey parallel to that of the innovation journey (Aarikka-Stenroos & Lehtimäki, 2014). All these refinements enable firms to figure out how to commercialize their solutions eventually and identify a winning combination between the technology and market and thereby chase the commercial potential (Aarikka-Stenroos & Lehtimäki, 2014). In this rein stakeholders may play a crucial role: as their perspectives have noticed to be relevant for development activities on innovating (e.g. Driessen & Hillebrand, 2013, Coviello & Joseph, 2013), likewise we assume that stakeholder interactions with innovator firms can also cultivate firms commercialization plans, by prompting how to turn the developed invention into a successful innovation at the market and society. Therefore *this paper focuses on how stakeholder interactions influence the developing and realization of commercialization plans in innovator firms*.

The elaborative features of commercialization planning are based on the assumption that commercialization is a dynamic phenomenon, i.e. decisions can be elaborated due to learning on markets and gained experience (Costa et al., 2004; Aarikka-Stenroos & Lehtimäki 2014; Lynn et al., 1996; Coviello & Joseph, 2012). Furthermore, in order to create an adequate commercialization plan, firms might need to unlearn existing conventions of conducting business and develop totally new combinations within the industry (see Aarikka-Stenroos & Sandberg, 2012; Möller & Svahn, 2009). Thus, developing commercialization plans for new solutions is not necessarily a straightforward progression; instead, it might include regressions and loops and what might initially be considered a good solution at one moment, can generate unintended problems later (Garud et al., 2011; Aarikka-Stenroos & Lehtimäki, 2014). Our approach then continues seeking alternative ways to perceive 'commercialization' that is different from the traditional conceptualization of commercialisation as a 'latter' phase of the innovation process that aims to disseminate the innovation (e.g. Story et al., 2011; Chiesa et al., 2009). Contrary to conventional perceptions, this study employs a wider approach arguing that commercialization is a process that comprises divergent strategic decisions, realizing more practical tasks to facilitate awareness and adoption among customers and other stakeholders, and to induce sales (Aarikka-Stenroos & Lehtimäki, 2014), to realize the full benefits of the new solution for the customer (Athaide et al., 1996), and achieve diffusion (see Garcia and Calantone, 2002). Hence, the study will emphasize the dynamic and developmental nature of commercialization plans: firms have initial intentions and goals in their commercialization plans but then they need to modify and amend them based on feedback and other contributions received from the surroundings. More, firms may not be fully capable of absorbing the opportunities given to them or pointed at to them through stakeholder interactions at first, as they may be in a phase where they need to unlearn before they can fully understand the feedback from the stakeholders.

In this learning approach to develop commercialization plans, multiple network actors, here framed as stakeholders, can be advantageous. The stakeholder approach to commercialization is extremely

crucial, as firms tend to neglect the ability of customers and other stakeholders to contribute to innovation throughout the process (Aarikka-Stenroos & Sandberg, 2012; Costa et al., 2004; Coviello & Joseph, 2012; Partanen et al., 2011; Talke & Hultink 2010). Research emphasizing interorganizational networks has shown that the collaboration with suppliers, distributors and customers is crucial in order to advance innovation success (Aarikka-Stenroos and Sandberg, 2012; Partanen et al. 2011; Perks & Moxley, 2011, Story et al., 2011). The extant literature has for decades shown that interaction with customers and R&D collaborators can improve innovation development activities (Coviello & Joseph, 2013, Ritter and Gemünden, 2003), but recent research has increasingly noted that customers, partners and other stakeholders also can enhance commercialization activities by articulating customer needs and issues on market structures and assisting to re-define the market (Aarikka-Stenroos et al. 2014, Perks & Moxey, 2012, Story et al. 2011; Tolstoy & Agndal 2010), and thereby improve success turning the developed invention to a commercially successful innovation. Also recent research on commercialization has noted that it is critical to interact sufficiently early with relevant stakeholders to improve strategy and tactics for commercialization (e.g. Aarikka-Stenroos & Lehtimäki, 2014; Costa, 2004).

Despite the obvious nature of dynamic commercialization planning and the stakeholders' potential to bring in critical inputs to it, this aspect has remained unstudied; Studies focusing on commercialization (e.g. Maine et al. 2012) have seldom studied commercialization as a dynamic phenomenon during which plans are elaborated. Further studies on commercialization with a dynamic approach (e.g. Aarikka-Stenroos & Lehtimäki, 2014, Costa 2004) has not focused on nor analysed the stakeholder contributions to form development of commercialization plans in detail. Research on stakeholders' contributions has mostly focused on development activities (e.g. Driessen & Hillebrand, 2013), not the development of commercialization plans. Some recent studies have noted stakeholders' contribution potential to commercialization (see Aarikka-Stenroos et al. 2014), but this research has been conceptual or been focusing on mere customers. With regard to commercialization research, there are still only a handful of studies revealing the dynamic and elaborative features of how commercialization plans are developed.

Based on the discussion above, this paper focuses on how firms develop their commercialization plans when they develop innovative solutions during participation in innovation projects by interacting with various stakeholders. Our detailed research questions are twofold: 1) *How do firms' commercialization plans develop due to stakeholder interactions?* This research question is solved by analysing what are the inputs from stakeholders and what changes they trigger when comparing the intended commercialization plan to the final plan. *2) What are the patterns for commercialization plan development due to stakeholder interactions?* To answer this question, we analyse which types of paths firms' commercialization planning take triggered by stakeholder interactions.

Both research questions will be analysed based on 15 cases of public-private innovation (PPI) projects from Denmark. The PPI context profoundly sets some challenges for commercialization.
Our findings aim to contribute to recent developments in commercialisation literature emphasising the dynamic nature of commercialisation planning. Since firms' challenges with reaching commercial success with new solutions have both academic and managerial relevance, we believe that research on commercialization development based on stakeholder interaction will enrich understanding of how to improve innovation success.

2. Combining commercialization and stakeholder literature

2.1. Commercialization development

Developing commercialization plans often is thought of as a process that entails both strategic and tactic decisions and activities focusing on marketing aspect of innovation, the ultimate aim of the process being to initiate and develop sales according to the chosen marketing strategy and thus to disseminate the innovation and make profit with it (e.g. Aarikka-Stenroos & Lehtimäki 2014).This traditional perception of commercialisation includes strategies of marketing, targeting, segmentation, positioning, identification of competitors and entering/building the supporting ecosystem around the innovation. Tactic commercialization follows tightly the strategic commercialization decisions and is comprised of pricing, developing the 'whole solution' configuration, establishing the distribution channels, communicating the benefits of the innovation and, building awareness for the solution (Aarikka-Stenroos & Lehtimäki 2014). Some of these commercialization decisions can originate exogenously, for example, from regulations and some of them are made endogenously (see Chiesa & Frattini, 2011; Costa et al., 2004; O'Connor & Rice, 2013b).

Due to the processual and learning features of commercialization development, we propose that the above strategic and tactic considerations develop less intentional and linear. On the contrary commercialisation develops much more iterative as many decisions can be repeated and accomplished in a variety of orders (see Aarikka-Stenroos & Lehtimäki, 2014). Thus, we rely on teleological process theory by Van de Ven (1992), and note that there are several possible paths to reach the end goal of making profit. We argue for this approach as commercialization often is complicated; initiating sales for early adopters and developing sales for early majority is difficult since an early market comprises technology enthusiasts and visionaries who are willing to employ state of the art technologies whereas later majority may require different approaches as they tend to require information on the functions of innovation in broad user base, customer references to which they can relate, and evidence that the future of the innovation is secure (Moore 2002). The benefits in involving users who are open to new solutions, is that firms can seek out early customer reactions, collect feedback, observe how customers use the product (Lynn et al., 1996) and thus also assist developing the commercialization. To mobilize extensive dissemination, firms need internally to scale up production and distribution networks, integrate the innovation into the mainstream business and production setting (see e.g. Story et al., 2011), and externally inspirit the whole value chain and complementary and supportive market actors (Aarikka-Stenroos & Sandberg, 2012; O'Connor & Rice, 2013b; Talke & Hultink 2010). This requires that commercialization plans for example are based on understanding how an innovation fits into an overall system of use with other products and into the environment of usage.

We acknowledge that a firm's features, such as experience and size, may shape the process of commercialization development and the actual plans. Innovator firms with good financial resources are in a better position to bear the costs and acquire more resources for commercialization, while small and novel innovator firms often lack the necessary resources and experience and therefore need support from their relationships (Partanen et al., 2011; Sorescu et al., 2003; Tolstoy & Agndal, 2010).

2.2. Stakeholders and their roles and contributions to innovating

Divergent stakeholders can be involved in new product development and innovating in general. Stakeholders in general refer to 'any group or individual who can affect or is affected by the achievement of the organization's objectives' (Freeman, 1984: 46). According to Driessen &

Hillebrand (2013), stakeholders related to new product development/innovating can be divided into 'market stakeholders' (comprising customers, competitors, suppliers, and retailers) and 'non-market stakeholders' (comprising e.g. regulators and special interest groups). These stakeholders follow divergent logics. Thus, a challenge is that public and private stakeholders may follow different logics and values that result in divergent challenges and tensions in innovating and interactions (Nissen et al. 2014; Driessen & Hillebrand, 2013)

In recent line of research it is recognized that customers and other external stakeholders are increasingly taking on the role of innovators in the development of value propositions and that innovation projects with customers are increasingly important for the development of new products and services (Greer & Lie, 2012, Mustak et al., 2013). Customers can contribute to the development of innovation (e.g., Coviello & Joseph, 2012; Lettl, 2007) but also to commercialization as they provide feedback and trigger learning on, for example, benefits, adoption barriers, and development of sales, and thus enable a firm to develop and focus on commercialization activities that fit the characteristics of the innovation, the markets, and the resources of the innovator firm (Aarikka-Stenroos & Lehtimäki, 2014).

When firms co-develop with stakeholders, they gain access to customer knowledge and an understanding of their values and needs. Through interactions, insight can be gained into the context the stakeholders are embedded in and, in this way the firms can form meanings and reasons to support their customers' values and needs. This knowledge offers the opportunity to exploit and to co-develop value. Collaborating with technological partners and suppliers for creating and delivering new products, technologies, or services can also be valuable and give firms access to resources, assets, and potentially greater value capture (Chesbrough, 2007; Chesbrough & Schwartz, 2007).

2.3. Integrating the commercialization process and stakeholder perspective into a framework

Bringing together the complexity of developing a successful innovation based on an effective commercialization plan (e.g., Aarikka-Stenroos & Lehtimäki, 2014; Chiesa & Frattini, 2011; Costa et al., 2004; O'Connor & Rice, 2013b) and stakeholders' contribution potential to innovation (Driessen & Hillebrand, 2013, Coviello & Joseph, 2013; Aarikka-Stenroos et al. 2014) it is assumed in the study that, the innovator firms need to develop the required successful commercialization activities and decisions through interaction with stakeholders. Hence, our framework emphasizes the dynamic and processual nature of commercialization planning comprising development of commercialization strategy and all the tactics that enable adoption among the customers and other stakeholders as well inducing and increasing the actual sales (see Figure 1). The discussion above builds our framework for the commercialization planning development through stakeholder interactions aiming to identify market and disseminate the innovation successfully to market/society. Our interest is particularly on the arrows (see Figure 1) as we examine the inputs from stakeholders and what changes they trigger to the intended commercialization plans (see the small arrows pointing stakeholder contributions) and secondly what in the commercialization plan and how is developed (see the large arrow of displaying areas of commercialization planning and its development).

With this analytical framework, we will empirically investigate how commercialization plans by innovator firms (more experienced innovator firms vs. less experienced innovator firms) develops as stakeholders make their contributions.

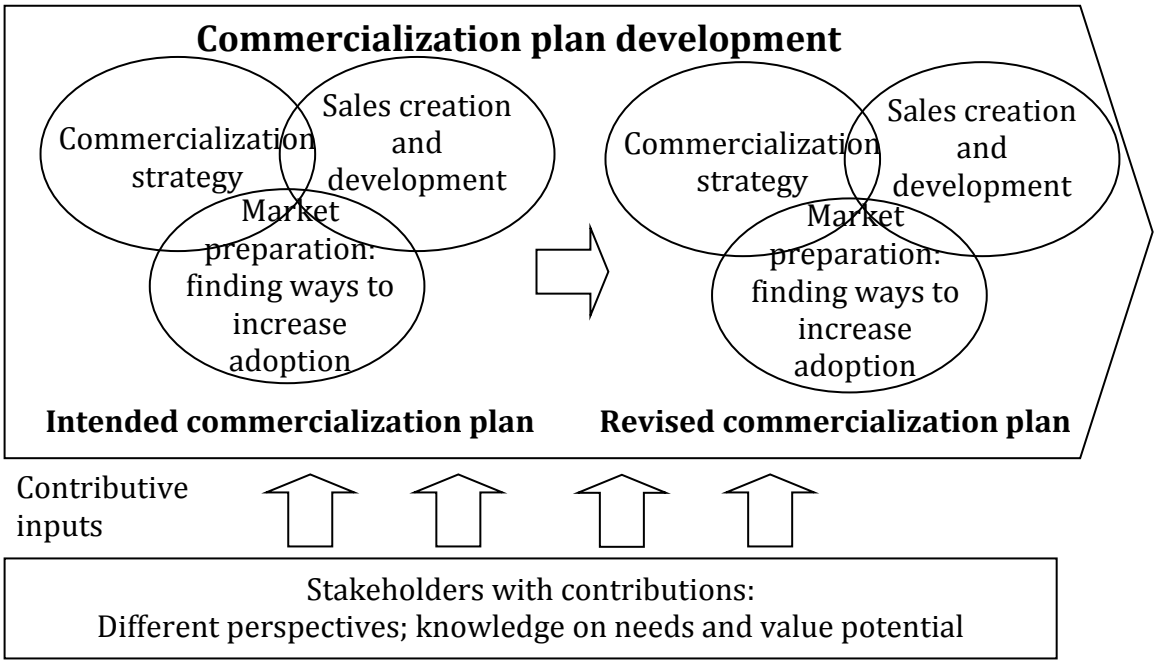


Figure 1: A framework for studying commercialization planning development with stakeholder interactions

The figure 1 is more iterative then what we have been able to illustrate. Thus the figure should be understood as comprised of three *interrelated* zones that needs to be 'passed' in order to succeed with the innovation – however the zones may be 'passed' several times in an ever-evolving trial-and-error way. The zones firms have to pass is framed here as 1) a strategic zone that fixes perceptions on how to bring an innovation to market and on defining the concept and market, which sets the starting point for other activities. 2) a market creation and preparation zone grounded on understanding and then finding ways to target the antecedents of adoption in a particular market, building credibility for the innovation and the innovator, and developing the innovation ecosystem, and 3) a sales creation and development zone.

3. Methods

3.1. Research strategy and case selection criteria

The data presented is based upon a multiple case study approach (Yin, 2003), which is appropriate to make use of when issues are complex and in cases where alternating between the empirical field and different theoretical frameworks can be useful for generating additional insights (Orton, 1997; Yin, 2003). The case study comprises of 15 private firms engaged in various public-private innovation projects (PPI) situated in Denmark. Projects has been included from the year 2006 up to 2015. The cases were selected using theoretical sampling with focus on the research question and theoretical gap(s) identified in order to be able to extend emergent theory (Eisenhardt, 1989; Eisenhardt and Graebner, 2007) on commercialization development based on stakeholder interaction. More, the cases have been selected to achieve maximum variance when comparing between the 15 cases (Flyvbjerg, 2006). The cases selected includes private firms that have prior experience with either the Public Sector or previous PPI projects (so called serial firms) as well as private firms with no prior experience with the public sector or PPI-projects (so called side-stepper firms). We employ a case selection strategy proposed by Seawright and Gerring (2008:300) when arguing that diverse cases are particular appropriate when exploring how a phenomenon changes over time. To be able to identify 15 appropriate cases we have in line with Seawright and Gerring (2008: 294) been aware of how to select the cases based on a broader population of background cases. These background cases are not integrated into the study we conduct, but they play a role for

the analysis in an informal way as they secure that we choose the 15 cases purposively and not randomly or pragmatically (Eisenhardt, 1989: 537); thus the 15 cases are chosen as they are information-rich. Based on Danish reports, networks and continuous PPI-research, the 15 cases have been selected among a wider range of informative cases, all engaged in PPI-projects in Denmark. However what makes the 15 cases unique compared to the others is that they for certain have been able to commercialize their welfare, that means brought the product to market and managed to sell to one or more customers. The purpose with the multiple case study approach is to emphasize depth rather than breadth (Piekkari, Welch and Paavilainen 2009), as we set out to explore how commercialization plans can be developed differently within the same context. Doing this, we are aware of the challenge a multiple case study approach can result in when we have to stay within spatial constraints while at the same time convey both the emergent theory (the research objective) and the rich empirical evidence that supports the theory (Eisenhardt and Grabner, 2007: 29).

The 15 cases have all been engaged in PPI-projects in Denmark. However, it is relevant to state that PPI is not only a governance mode used in Denmark; rather it is a new way to organize the support of public sector innovation in many countries (Hartley et al., 2013). Worldwide Governments are under pressure to reduce spending and at the same time the demand for public service are increasing (Micheli et al., 2012). Per se, PPI is used to develop new welfare products and services that can help solve multiple challenges faced by the public. A main argument for PPI projects is that it is necessary to combine skills that cut across the public and private sectors to develop new welfare services and products (Evald et al., 2014). Despite the potential, PPI projects contains many challenges related to differences in objectives, practices and competing logic between actors in the public and private sectors (Nissen et al., 2014).

The challenges firms face is for instance the need to interact with public markets that are characterized by multiple public stakeholders with different logics. Such market context is complex and uncertain for firms to engage in. Firms that sell to a public sector need to cope with diverse stakeholders from multiple autonomous levels (e.g. political level, management level, employee level, procurement department level; both national and supranational levels setting laws, standards, EU directives etc.) and take their differing perspectives into account. Stakeholders from these different levels often have different values and incentive structures. More, developing and commercializing services and products to public sector markets seems to require much interaction among firms and public actors over a long period of time. Thereby, success of innovation is relatively highly dependent on co-creation with different public actors and understanding/integration of the different logics of different stakeholders. To summarize briefly, the multiple public stakeholders with different logics and preferences make commercialization of new welfare solutions a complex task as the buyer's decision to buy a new solution is scattered across different levels within the public sector.

3.2. Descriptions of the 15 cases

The 15 cases are innovation projects (so-called public-private innovation projects) taken place between public and private firms. The public parties in all the projects include Danish hospitals or municipalities. The aims of all the PPI projects are to solve challenges in the public sector by exploring new and radical solutions. That means that the PPI projects are not incremental in nature, but can range from next generation of existing solutions to new to the world solutions. Data from 15 firms involved in PPI-projects is presented in the below table.

Table 1: Description of the 15 cases

Firm no.	The private firms divided into serial or sidestepper firms and sizes	Description of the PPI solution and the period of the PPI-project	The Business area of the private firm and age of foundation	Employment of the interviewees
F1	Side-stepper, small	Development of a tele medical solution aiming to provide treatment and control of a Hospitals' Chronic obstructive pulmonary disease (COPD) patients. The PPI-project started in 2006 and lasted three years.	Manufacturer of healthcare products with special focus on tele medical solutions. The firm was founded in 2006 as a spin-off of an incumbent firm, with no previous experience with the public sector.	Head of department
F2	Serial, large	Development various features, such as weighing and lightning, to an intelligent bed primarily targeted hospitals. The PPI-project started in 2010 and lasted 2½ year.	Designing and manufacturing electric solutions. The firm was founded in 1976.	Key account manager, Medline & Careline
F3	Serial, small	Development of a tele medical application to be used for communication between ambulances and hospitals. The PPI-project started in 2002 until 2005.	Manufacturer of software and hardware products for the healthcare sector. The firm was founded in 1980s by a group of researchers.	Managing director
F4	Serial, large	The aim of this project was to investigate heart patients in order to clarify if one should stop using blood clot dissolving medicine and instead do an angioplasty right away. The PPI-project started in 2002 and ran for about 1½ year	Provides services within 4 areas of business: Assistance, Emergency, Healthcare and Training. The firm was founded in the early 1900s	Regional manager
F5	Side-stepper, small	Development of a self-propelled person lifter for patients who are extremely overweight in hospitals. The PPI-project started in 2007 and ended in 2008	Manufacturing of healthcare products such as lifts. The firm was founded late 1990s	Managing director
F6	Side-stepper, small	Development of a transport system for transportation of blood samples in hospitals. The PPI-project started in 2008 and lasted 1½ year.	One business area based on a transport pipe invention for the internal transport of blood samples in hospitals. The firm was founded in 2008 as a spin-off of an incumbent firm, who neither had previous experience with the	Sales manager

			public sector.	
F7	Serial, medium	Development of an intelligent bed for hospitals. The PPI-project started in 2012 and lasted three years.	Manufacturer of beds, side tables and related products for hospitals and nursing homes. The firm was founded around 1970s.	Managing director
F8	Serial, large	Development of lifts for shower facilities in health care. The PPI-project started in 2009 and lasted until 2010	Manufacturer of products and services within two main areas: beds and lifting equipment and a product range which includes ramps, lifting platforms and small lifts. The firm was founded in 1980	Regional manager
F9	Serial, large	Development of a tele medical solution aiming to provide treatment and control of hospitals' chronic obstructive pulmonary disease patients. The PPI-project started in 2009 and lasted approximately until 2012	Manufacturer of healthcare products with special focus on tele medical solutions. The firm was founded in 1972 and after several acquisitions with Scandinavian firms it was sold to an international incumbent firm in 2012	Biomedical engineer
F10	Serial, medium-sized	Development of LED lighting control systems and wireless lighting control systems for hospitals and public offices. The PPI-project started in 2011 and lasted until 2013	Manufacturer of intelligent lighting control equipment. The firm was founded in 1950s and was later sold to an international firm	R&D Manager
F11	Side-stepper, small	Development of a tele medical solution for virtual home visits at the homes of patients with Chronic obstructive pulmonary disease (COPD) after they are released from the hospital. The PPI-project started in 2010 and lasted until 2011.	Developer of platforms for tele medical solutions. The firm was founded in 2004	Managing director
F12	Side-stepper, medium-sized	Development of software for nursing homes (where demented people are placed). The aim is to improve the employees' electronic time schedules and to map movement patterns of the demented people through the use of motion sensors, which are placed on these people. The PPI-project started in 2012	Developer of software solutions to the health care sector, transport sector and agricultural sector. The firm was founded in early 2000s	Managing director

		and is to be closed in 2015		
F13	Side-stepper, small	Development of a new soap dispenser for the future bathrooms in hospitals. The PPI-project started in 2011 and lasted until 2013	Developer of intelligent hygiene solutions with special focus on intelligent soap dispensers for bathrooms. The firm was founded around 2010	Managing director
F14	Side-stepper, small	Development of a preventive and sustainable hospital mattress The PPI-project was started in 2012 and lasted until 2014	Developer of intelligent textiles The firm was founded before 1900	Managing director
F15	Serial, large	Development of shifting 'comfortable' light for birth delivery rooms at hospitals. The PPI-project was started in 2011 and lasted until 2013	Manufacturer of intelligent lighting control equipment. The firm was founded before 1900	Stakeholder relations manager

NOTE: The classification of the size of the firms is based on the European Union's legislation on SME. Small firms have less than 50 employees, medium sized firms have less than 250, and large firms have more than 250 employees

3.3. Data gathering and analysis:

Our main data-collecting method was interviewing. Overall, interviews (focused interviews and in some instances follow-up interviews) and secondary data were gathered with the purpose to identify and understand how different commercialization plans is developed. The focused interviews where gathered based on a semi-structured interview guide (Turner, 2010) to make certain that the issue of commercialization was touched upon. Also various secondary data was gathered as background information for the interviews, to make sure that central events, taken place in the single PPI-projects, was known to the interviewers before the interview. The focused interviews lasted 2-3 hours, whereas the follow-up interviews lasted shorter as the follow-up interviews only had the purpose of filling out missed information or validate information (see the below table).

Table 2: Number of interviews conducted

Focused interview	Follow-up interviews
F1-15	F1, F4-F8, F15

NOTE: The number 1 posit a focused interview and the number 2 posit both a focused and a follow-up interview

The interview data is collected over a short period, reconstructing events, interactions, and efforts made back in time. Traditionally, retrospective longitudinal data is looked upon as potentially open to recall biases, self-justification biases, and survivorship biases (Cassar 2007: 91; Chandler and Lyon 2001: 112). The retrospective design is however preferred as it fits well to the purpose of the article, which is to explore how firms' commercialisation plans during and after ending the PPI-projects is developed. Per se, the retrospective design makes us able to select cases: (1) where data are collected after significant events have already occurred (making sure the selected cases had been engaged in PPI-projects resulting in a market ready solution), (2) where there are access to

both first-person accounts and archival data (making sure that central events is not forgotten by respondents), and (3) where the final commercial outcome - successful sale to some extent - is known on beforehand when data collection takes place (making sure that commercialization have taken place to some extent in each selected case). But to overcome the legitimate reservations toward a retrospective design, we further took special precautions in our study to ensure the quality of the data. In line with Zahra and Covin (1995: 51) we adopted the advice to guarantee confidentiality to make sure that the respondents felt safe to talk freely. Finally, we reconstructed the history of the PPI-project drawing on secondary data to ensure that the respondent only had to remember a limited number of issues (Chandler and Lyon 2001). Having taken these precautions it is reasonable to expect that the respondent remembers the relevant details that are necessary to provide the study with valid data.

To compare the 15 cases, a grid analysis was conducted (Basit, 2003). This technique allows the team of researchers to categorize interview data within and across the cases based upon predetermined themes (e.g. a provisional start list recommended by Miles and Huberman, 1994), as well as explore new themes grounded in the empirical data. The themes in the grid analysis were extracted by literature on commercialization and stakeholder literature. The predetermined theoretical themes were: 1) how do stakeholder interaction shape the commercialization plans from the intended to final commercialization plans? and, 2) what are the patterns for commercialization plan development due to stakeholder interactions? The predetermined theoretical themes has inspired and made it possible to explore different plans the firms have taken when it comes to developing commercialization plans.

4. Findings based on 15 cases

Overall two main findings can be presented based on the 15 cases. The *first finding* show that firms' commercialisation plans develop based on stakeholder interaction. But the development of the commercialisation plans seem to be dependent on the variety of stakeholders the firms interact with and how capable the firms' are of learning from these interactions. It seems that those firms that are more open to opportunities and expose themselves to various stakeholders, besides those directly involved in the PPI-projects, learn and move relatively faster in conceptualizing the target segments they address with their solutions. Based on these findings a *second finding* can be derived from the 15 cases showing that the firms seem to follow four different paths of commercialisation – paths that is not necessarily in alignment with the intended plans the firms had from initiation.

4.1. First finding

Overall the findings show that all the firms have comprehensive multiple stakeholder interaction throughout the innovation process in order to understand the partner and needs and values of various stakeholders. The high degree of interaction may be related to that the public sector is a complex system to understand, with multiple stakeholders with different and commonly conflicting needs.

In the below table there is an explicit focus on what commercial plans the firms entered the PPI-projects with and what commercial plans the firms ended up with short after the closing of the PPI-project and on the longer run. Further the below table show how stakeholders have influenced the firms during their commercialisation journey; the influence is not always direct or intentional, rather in some cases the influence should be seen over time as firms may not be fully capable of absorbing the opportunities given to them or pointed at to them, as they may be in a phase where they need to unlearn before they can fully understand the feedback from the stakeholders.

Table 3: The development of commercialization plans based on stakeholder inputs

Firm no.	Intended plan **'BEFORE'**	Stakeholder interaction **'INPUTS'**	Revised plan from ending the project to the years after	
			'SHORTLY AFTER'	**'AFTER A LONGER TIME'**
F1	Target the market for Danish hospitals	The firm is mainly focused on its direct project partner – a hospital. At first the firm interacts with a local doctor to get access to the hospital. The doctor mediates contact to the hospital management. After entering the hospital the firm interacts with stakeholders, such as nurses, belonging to the ward where the solution is developed and tested. The inputs from stakeholders are concerned with local needs.	Sold the solution to one hospital – their public partner	Shortly after the hospital purchased the product from the firm the parties decided on an operating agreement in running the telemedicine solution. Also, the firm tried to sell their solution to other hospitals in Denmark, but failed. After some time the firm changed their commercialisation strategy to target international markets.
F2	Target the market for Danish hospitals, nursing homes at municipalities and international markets.	Due to the interaction with various stakeholders (porters, nurses and doctors) at the hospital (their direct public partner), different high potential concepts were developed. Direct input was created at 5 workshops and work-flow-analysis. In refining and testing the concepts with various stakeholders from an intensive care ward the firm realises that their intended target market had a financial model that makes it impossible to sell the solution and the firm switch its commercial plans to target international markets.	The firm launches its solution at international markets	The firm sells its solutions to international markets
F3	The plan is to target the market for Danish hospitals	The stakeholder involvement was based on a close dialog with a research manager and a Chief physician from a hospital in order to understand the needs and problems they wanted to solve. Also, the firm used dialogues and workshops with other stakeholders in order to gain sparring, test prototypes and further developed them. For instance firm developers went on trips with ambulance drivers to get a deep understand of how the solution had to function in the daily life – up to twice a week firm developers followed ambulance drivers. The stakeholders become ambassadors for the solution and are valuable in communicating about the solution to others.	The firm sold the solution to all hospitals in a region – their public partner	Eventually the firm sold its solution to other hospitals belonging to other regions in Denmark, but the selling was delayed for seven years as they had to wait for a national tender.
F4	The firm engages in PPI-projects for two	Stakeholder interaction happens through numerous channels. For once a local doctor is actively communicating the project results to	The firm sells the solution to a region – their public partner	Slowly after they one by one sell their solution to other hospitals in Denmark. Today all hospitals in Denmark have

	purposes: PPI-projects with the public sector make the firm able to brand it and also pave the way for new solutions. Target markets is Danish hospitals and other industries (home market and international markets)	other Hospitals and doctors in Denmark. This is done by travelling around and presenting face-to-face, but also through dissemination of research in high-estimated journals. The doctor plays a central role in creating legitimacy around the project and the role the firm plays in the project. Also the firm themselves tell about the project and the promising results through political lobbyism. This is an effective way to communicate to 5 regions in Denmark, which each have their own systems. At the operational level, the firm is also gaining legitimacy from the operating staff, which is trained to use the solution: The operating staffs use their professional network to inform relevant players in Denmark about the project and the obtained results.		the solution. Further the solution is also sold to other industries
F5	The plan is to target the market for Danish hospitals	During the project period the firm interacts with health professionals and patients in order to identify challenges, user needs and experiences by e.g. observing the workflow of a hospital porter and interviewing patients and health professionals. In the final part of the project the focus was on testing and develop documentation of the user-benefits the product.	Sold the solution to their public partners - three hospitals	The firm experienced problems in selling to other Danish hospitals and a year later the firm started to seek public funding in order to gain better tests and documentation opening up for internationalisation. The received public funding made it possible to test the product at 10 Danish hospitals. Later on the firm succeeded in selling their solution to USA.
F6	The plan is to target the market for Danish hospitals	The firm interacts with stakeholders at the hospital involved in blood sampling – nurses and laboratory technicians. A local doctor mediates between the firm and multiple layers and actors operating in the hospital, such as the management and purchasers, which also have a saying about implementing the solution. The doctor possess the ability to identify and get access to key-informants at the local hospital, and further have the ability to articulate the different needs and demands of various users at the hospital. The doctor becomes an ambassador for the solution.	Sold the solution to one hospital – their public partner.	Quickly after the solution is sold to other hospitals in Denmark one by one. Also rather quickly international markets become interested in the solution. Today the solution has been sold to more than seven international markets.
F7	The plan is to target the market for Danish hospitals	During the PPI-project the firm organised several workshops and brainstorm meetings with stakeholders such as nurses and occupational therapists. Also the firm invited new external partners into the project as they became aware of new	Sold their solution to different hospitals – their public partners.	The bed of the future is soon ready to be sold to other Danish hospitals, and is prepared for the extended sales to municipalities.

		challenges. As a result of collaborating with stakeholders from municipalities, operating in a context with needs that was better understood by the firm, the firm began to change their bed concept. The concept was diversified to fit both the hospital sector and the municipality sector.		
F8	The plan is to target the market for Danish municipalities (nursing homes)	The firm focuses on the three municipalities engaged in the project – corrects the solution after the feedback from their direct partners – care assistants and the municipality purchasers. The firm believe that a documentation report, developed by an independent management consulting firm, will spur the interest among municipalities for their solution. Also the firm uses lobbyism, through a trade organisation to support the need for new innovations in the area.	The firm succeeds in selling the solution to three municipality units – all a part of the project.	Despite a very positive report, conducted by the independent consultant firm showing that the solution is cost-effective, creates a better work-environment for the nursing assistants and creates a more ethic way to handle the patients, the firm are still waiting for other municipalities to buy their solution – interest exists among other municipalities, but yet none have bought their solution. The firm come to realize that it is not able to sell in the short run, rather they have to influence the market on the longer run
F9	The plan is to target the market for Danish hospitals	The firm interacts with various stakeholders during the project, such as private doctors, hospitals and home nurses from municipalities and health centres. During the project the firm also gets valuable input from 3 technology sub-suppliers – the purpose is through cross-sectoral actors to work together in new ways and thereby break boundaries and create new systems. Initially important stakeholders were doctors and nurses that had define what information they needed from patients self-monitoring at the hospital, private doctors and municipalities. Studies of patients in their homes were undertaken, as well as interview with patients and later workshops. Also, analysis of workflows between the different stakeholders was made. Later other stakeholders that visit the patients in their home was involved e.g. physiotherapists as well as family members. The solution was tested in practice between the patients in collaboration with health personnel through various scenarios.	The firm sold the solution to their public partners	After the first sale the firm managed to seek new founding to enrol other hospitals in similar projects to be able to sell their solution. However the firm has realized that they are dependent on project finances and only is capable of financing their solution as an operating agreement during the project period. Parts of the solution is sold at international markets
F10	The plan is to target the	Initially the firms contacts two middle managers to get access to	The firm succeeds to sell the solution	The impartial report slowly opens up doors for selling to

	market for Danish hospitals and municipalities. When the Danish market is tested, international markets will be approached.	facilities. The deal is that the firm organizes the light and that the hospital and the municipality through some dedicated time provide feedback on the lightning to the firm. The firm gathers user feedback from nurses, radiologists and municipality employees – at first in an exploratory way to get as many impressions as possible, and later on in a structured manner through interviews. The top-management is not approached.	based on project finances to a local hospital and one municipality – their public partners.	other hospital units and municipalities in Denmark. Entering international markets is still not realistic.
F11	The plan is to target the market for Danish hospitals	In the project they worked with a row of stakeholders at the hospital for testing and developing their solution further. Very soon during the project the firm realizes that their solution is systemic, as it crosses different healthcare systems in Denmark thus the firm realizes they also has to work strategically with other stakeholders such as municipalities and regions (representatives of hospitals). Thus the firm engages in lobbyism to pave the way for their solution – there is a need for changing the system.	Sold the solution based on project finances to a local hospital – their public partner	After the sales to the hospital the firm managed to establish a good and solid business based on the technology by diversifying into other industries. The firm also sells to the Danish health care market.
F12	The plan is to target the market for Danish hospitals	Due to the interaction with numerous stakeholders at the hospital through user driven innovation workshops the firm come to realize that the demands of proof of evidence is very difficult to satisfy at hospitals. A meeting with a municipality and the less complicated project process influenced the firm to also test its concept at nursing homes – this lead the firm to target other public markets as well during the project	Sold the solution based on project finances to a municipality (nursing home)	After further developments of the solution the firm is selling their solution to both Danish hospitals and municipalities
F13	The plan is to target the market for Danish hospitals	During the project user driven innovation is used to gather data and feedback from various stakeholders – patients and employees. Several workshops is organised to test the solution and refine it.	Sold the solution to a hospital – their public partner.	The solution will in 2015 be launched through a distributor to the Danish Health care market (hospitals and nursing homes in municipalities).
F14	The plan is to target international markets	Stakeholder involvement has been in form of interviews with hospital staffs including nurses, service people, therapists, and people responsible for cleanliness. Workshops were held to understand needs and later to experiment with different prototypes. Finally user-related tests were conducted to demonstrate the solutions characteristics and effects on health. A professional partner facilitated the processes.	Sold the solution to two hospitals – their public partners	After ending the project the mattresses has been sold to other hospitals in Denmark and international markets

F15	The firm engages in PPI-projects for two reasons: to gain brand itself and sell to Danish hospitals and other industries	In the project a row of stakeholders was involved. Part of the patient travel through the hospital and the different phases of a hospitalization, ethnographical studies and general co-creation between the different parties, family members and the staff at the hospital. Further monitoring of the effect of the different prototypes.	The solution was sold to two birth delivery rooms at Danish hospitals	Afterwards the solution has been sold internationally and the solution has been applied in other units at Danish hospitals.

The findings show that firms' stakeholder interaction has an effect on how firms comprehend and plan their commercialisation efforts. However the behaviour are different between the sidesteppers (typically firms, with no prior experience with public markets, sidestepping into the public market through an innovation project for the first time) and serial firms (typically serial firms with prior experience of dealing with the public sector).

Overall the group of firms, called side-steppers, focus on the local project partners through the innovation and commercialisation processes. They tend to develop commercialisation plans in accordance to the needs and values of their immediate public project members. They interact less with stakeholders outside project context, which have an impact on diffusion of solution afterwards. They use extensive time to understand the public sector and are largely dependent on the knowledge the partners have. Only in some instances the side-stepper firms targeted their commercialisation plans to other target markets or segments because of the local stakeholder interactions. This typically happens when the side-stepper firms are challenged and face numerous problems in relation to their solutions, such as failing to secure the right evidence.

For some side-stepper firms a public project member becomes important for their commercial success; what happens is that a local public project member takes the role of a broker/mediator and helps the firm understanding of the public context and open doors in the hospital sector. In the earlier faces to interview, observe and make workshops with relevant stakeholders e.g. patients, personal, purchasers or managements. Later help access to stakeholders in order to further develop prototypes and finally to support test and documentations. The broker is often in form of a local doctor as in the case of F1, F6, and F11. In some cases the broker also helps in the later commercialisation and sales of the product. An example of such a public broker is a dedicated and well-respected doctor, who due to his national and international reputation and network has been able to lift the potential of one of the side-stepper firm's solution into other hospitals then the local market in target. But dedication from a local public project member is not always enough. Another example, a less fortunate side-stepper firm, point out that even though this firm also had a dedicated local doctor, the doctors reputation only was local embedded. The doctor had no means (legitimacy, prestige and power) to open up doors at other Danish hospitals. As such the side-stepper firm have struggle since the ending of the PPI-project to commercialize their solution.

Opposite side-stepper firms, serial firms tend to succeed in commercializing their solutions to other markets than the immediate project partners market either shortly after or in the longer run. This may be due to prior experiences with public sector as they more conscious and deliberate interact with various stakeholders at multiple layers to create opportunities. By interacting with various stakeholders at different layers in the public sector they become more knowledgeable of the potential market, and based on this knowledge they decide which target markets they want to work

with on the short and longer run. Some of the side-steppers manage during the project to consider how to sell the product to other hospitals or municipalities. They did this by inviting central stakeholder from other hospitals or municipalities into the project and invite them to participate in workshops. Hereby they learn how the stakeholders' needs and values varied across hospitals or municipalities. Furthermore, importantly by inviting these stakeholders the firm gained commitment and legitimatize from future customers, which for several firms eased the later adoption.

Inviting a broader range of stakeholders from other potential markets into the project resulted in identification of new needs and in some case firms have construct the product in such a manner that they easier later can penetrate other markets with an adjusted product. An example is F7 where stakeholders from municipalities became involved, which made the firm realise that there was a new potential market and they adjusted the product so they later relatively easy can meet the needs of municipalities. Another example is F2 that during the interaction with stakeholders realise that the solution they have developed is to expensive to sell in Denmark due to the way the economy system is constructed at Danish hospitals and they direct their attentions to the international market and stakeholders.

The serial firms are generally relatively proactive in finding suitable markets for their solutions, but typically also think more strategic when assessing which possible markets is suitable for their solutions; therefore the serial firms also typically work on a longer basis. Hence their engagement in lobbyism: Through lobbyism the firms try to get politicians and powerful individuals to look at how the healthcare area can be amended. Parallel to this the serial firms typically think of different alternatives besides the local market that their immediate innovation partners are within.

Which stakeholders are involved and how seems to vary based on the nature of the projects. The cases show that firms understanding of the target market and how to reach the target market are refined or changed over time as the firms' gain better insight into the stakeholders' needs and context through interaction. In most cases prototypes have been applied extensive to support interaction with stakeholders to further and adjust understanding of needs and values as well as priorities the various feature in the product. Knowledge gained of various stakeholders needs and values have supported firms' commercialization plans and increased understanding of how to later communication value of product to the different public layers. Further, some firms managed through the interacting with stakeholders to prepare the market for acceptance of the product and improved the adaptation in other markets.

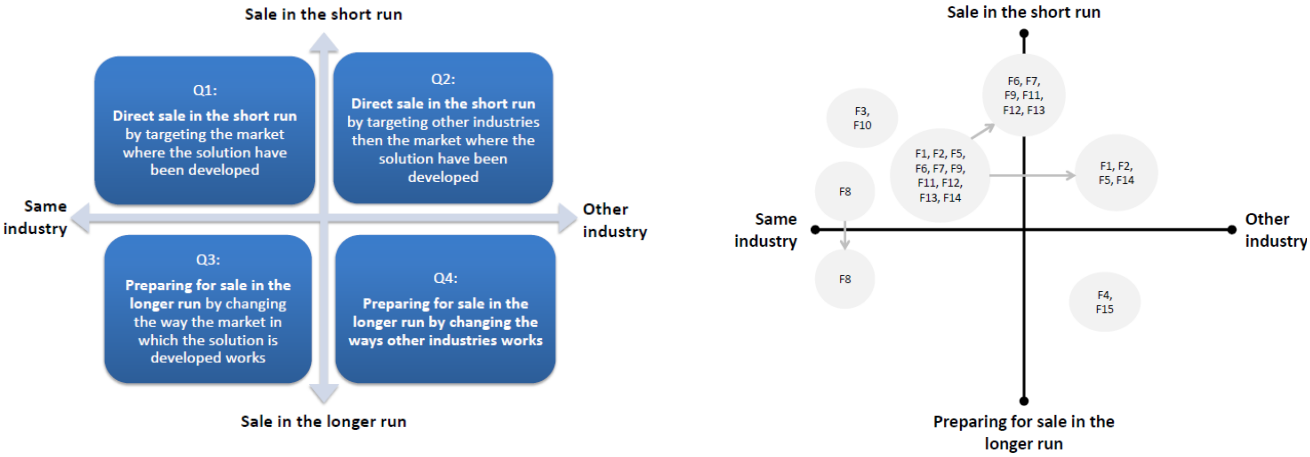
In situation where more systemic solutions are developed as telemedicine (F1, F3, F9, F11) solutions the firms use much time on analysis of workflow and systems in order to understand the context they have to develop and sell into. On one hand the firms need to understand the systems in order to develop an attractive solutions. But in order to sell the solution they all have to change and further develop the public workflows and systems therefore the sales are often limited and based on projects sales. Further firms providing system solutions often have to influence the political levels and in some situation the commercialisation are first possible after changes in legislation e.g. F1 had to lobby to have a law changed on when and how the hospital can be payed for consolations.

4.2. Second finding

The commercialisation journey the firms follow is far from a linear process. Rather the firms'

understanding of how to commercialize is typically interrupted and changed as the firms interacted with multiple public stakeholders along the innovation process. The path to commercialization finally applied often does not mirror the intended initial commercialisation plan. The firms' commercial understanding thus develops dynamically as the firms' interacts with many different stakeholders (Coombes & Nicholson, 2013). In the figure below four overall types of commercialization paths are captured.

Figure 1: Four paths to commercialisation



In the first category (quadrant 1) firms' develop their solutions with their direct innovation partners and after the project is closed down they sell to their direct partner. Many of the firms being a part of the case study intend initially to follow this commercialisation plan, but only very few of the cases end up here. Two firms follow this commercialisation path (F3 and F10). F3 initially targeted the market for Danish hospitals and eventually F3 also sold its solution to other hospitals belonging to other regions in Denmark besides their public partner in the PPI-project. But, the sales were delayed for seven years as the firm had to wait for a national tender to be organised. To finance its existence in the meantime the firm engaged in other public projects and kept on developing other solutions to the healthcare market. In the case of F10 the firm is forced to stay at the market for Danish hospitals and municipalities as the firm cannot provide sufficient documentation and tests that should otherwise have paved the way to also sell their solution at international markets. The firm experience a very slow sales scaling process, as the solution has only been diffused to single units in the hospital and municipality market over the years making it difficult, according to the firm, to accumulate enough critical mass for convincing tests and documentation.

In the second category (quadrant 2) firms primarily end up focusing on sales to other customers than the original intended customer. Typically other potential markets than the original market is introduced during the PPI-project through stakeholder interaction. Other target markets are often other public markets, domestic private markets or international markets. This is the case for the main part of the firms (F1, F2, F5, F6, F7, F9, F11, F12, F13 and F14). F1, F2, F5, F6, F9, F11 and F14 have initially developed a solution for the Danish healthcare market (hospitals and/or municipalities), but end up by selling their solutions to international markets. For some of these, F6, F9 and F11 the solution is both sold at the Danish hospital market and international markets. As to F7, F12 and F13 the solution is being sold to other public markets besides the initial intended public market.

The third and fourth category concerns more long-term strategic aspects of commercialization planning as the firms in both categories come to realize or from the beginning knows based on prior experience that they have to prepare the public market for their future solutions. In case of F8, belonging to quadrant 3, the firm do not in the end of the PPI-project expect selling their product as long as the system divides their finances into day-to-day activities and development activities. As long as public organisations may not invest large sums of money into the day-to-day operations the solution will not be saleable – the solution is not cost-effective on the short run; rather it is cost-effective on the longer run as it creates a better work-environment for employees and creates a more ethic way of handling patients creating more self-supporting patients. The firm is active trough a trade organisation to influence the way the system works.

Concerning quadrant 4, applicable to F4 and F15, the firms from initiation knows that the public market is cumbersome to enter and therefore do not have high expectations as to sell their solutions immediately after the PPI-projects ends. Rather they enter the PPI-projects with the purpose of accumulating knowledge from their public stakeholders, which they can use in other industries. More, the firms use the PPI-projects to brand themselves in relation to other industries as developing activities with public organisations creates legitimacy and acceptance when new solutions have to be launched in other industries. Both firms thus make use of PPI-project to prepare other markets and influence existing standards.

Table 4: Four main types of interaction influencing firms' commercialisation development

Four distinct commercialisation paths	**Impact of stakeholder interaction (direct/indirect, short term/long term)**	**Target market (same/other)**	***Firms: F1-15***
Direct sale in the short run by targeting public markets Firms ends their commercialisation journey by selling directly to one or more hospitals	The firms primarily interact with project members. Through these interactions the firms gain knowledge and insight, which contribute directly to how firms develop their commercialisation plans. The firms come to realize that developing a solution to their project members will open the doors to other hospitals	Develop a new solution to the local project partner to eventually gain access to other hospitals in the same industry. However not all firms gain access to other hospitals.	F3 (serial), F10 (side-stepper),
Direct sale in the short run by targeting other industries then the public market Firms ends their commercialization journey by gaining knowledge, which makes them able to sell to other industries	The firms interact with project members and other public stakeholder. Through these interactions the firms gain knowledge and insight, which contribute directly to how firms develop their commercialisation plans for other target markets. Typically the firms expect initially to sell to Danish hospitals, but during the innovation projects the firms realize that their target market belongs to other industries.	Develop a new solution with hospitals to sell to other public markets afterwards, such as municipalities. Develop a new solution with hospitals to sell to other private industries Develop a new solution to sell to international markets	F1 (side-stepper) F2 (serial), F5 (side-stepper) F6 (side-stepper) F7 (serial), F9 (serial) F11 (side-stepper) F12 (side-stepper) F13 (side-stepper), F14 (side-stepper)
Indirect sale in the longer run by targeting the public market Firms collaborate with	The firms interact with project members and other public stakeholders. Through these interactions the firms improve their understanding of various stakeholders' preferences, and improve their relations to key stakeholders in the public sector or	Collaborate with public sector to implement solutions in all hospitals in the future	F8 (serial)

the purpose of changing the way hospitals work in the future	improve the understanding among their public partners of the necessity to adopt a new solution. The firms do not expect direct sale in the short run, rather they collaborate to acquire knowledge about the needs within the public health care market that may lead to sale on a longer term basis. Typically the firms are engaged in lobbyism trying to actively change the system		
Indirect sale in the longer run by targeting other industries Firms collaborate with the purpose of changing standards and influence other industries to create a new market for its own solutions	The firms interact with project members and other public stakeholders. Through these interactions the firms accumulate knowledge from their public stakeholders, which can be used in other industries. Interactions are used to influence medical standards in the industry and to influence existing products. The firms use their interactions to brand themselves in relation to other industries and pave the way for new markets based on their solutions. The firms do not expect direct sale in the short run, rather they collaborate to acquire knowledge about needs within the public health care market that are similar to needs in other industries – this knowledge may lead to sale on a longer term basis. Various stakeholder interactions contribute to the firms' long-run strategic commercialization plans:	Collaborate with public **sector to implement solutions in other industries**	F4 (serial) F15 (serial)

5. Discussing and concluding on theoretical contributions and managerial implications

Our study show how interactions with stakeholders can contribute to commercialization planning as stakeholders can provide feedback and trigger learning on, for example, value-generating customer benefits, accessing, overcoming adoption barriers, and development of sales, and thus enable a firm to develop and focus on commercialization activities that fit the characteristics of the innovation, the markets, and the resources of the innovator firm. Our stakeholder approach to commercialization planning development brings the key contribution as both academic research and firms tend to neglect the ability of customers and other stakeholders to contribute to commercialization development (Aarikka-Stenroos & Sandberg, 2012; Aarikka-Stenroos & Lehtimäki, 2014, Costa et al., 2004; Coviello & Joseph, 2012; Partanen et al., 2011; Talke & Hultink 2010). Our findings on how stakeholder interactions refine commercialization plans, i.e. commercialization strategy, overcoming adoption barriers and inducing/increasing sales, generated contributions of three types:

Firstly, by adopting a dynamic process, learning approach to commercialization and by conducting a detailed analysis on how commercialization plans are developed and realized we showed that stakeholders contributions develop innovator firms' commercialization planning particularly through four patterns: stakeholder interactions advice innovator firms 1) to redefine the target markets or expand the markets to other industries 2) to facilitate adoption (after understanding what factors shape the adoption and the procurement logics at the market) by educating customers and changing their preferences, 3) to "manipulate" adoption and diffusion by putting efforts to activities that encourage market actors to change standards and regulations more favourable for new offerings, 4) to ensure and fortify direct sales. These contributions expand the current understanding of commercialization development (Aarikka-Stenroos & Lehtimäki 2014; Costa et al. 2004).

Secondly, our results on divergent inputs by divergent stakeholders underline that the stakeholders are able to improve planning throughout the innovation process, not only to the product/service development but also to commercialization. Thus we contribute also to literature discussing divergent stakeholders' contributing role in making the innovation (Partanen et al. 2011; Coviello & Joseph 2012; Perks & Moxley, 2012), which again points at a more refined understanding of how commercialisation planning takes form.

Thirdly, our results also point at stakeholders position to support the firms' in realizing their commercialisation plans, not just on the short run but also on the longer run as stakeholders may take the role as brokers securing diffusion of an innovation. Thus we contribute to both stakeholder and commercialisation literature by expanding the current understanding of how commercialization develop (Aarikka-Stenroos & Lehtimäki 2014; Costa et al. 2004).

In regard to managerial implications, managers of innovator firms can employ our findings to monitor the refinements that might be relevant in their commercialization planning. The customer need for the innovation might still be indistinct, or special efforts might be required to create/prepare the market by improving the adoption among customers and stakeholders or to learn how to induce sales with the particular, chosen target customer. Key should be identified at an early stage of commercialization planning and interaction engaged to develop understanding and information for commercialization. Early stakeholder perceptions and user experiences through reference customers and lead users should be pursued, not only for product development purposes but also for commercialization plan development and to learn the key benefits from the user and stakeholder perspectives, and what optimal tasks are needed for market preparation.

Our findings stem from analysing the commercialization development of a set of purposefully chosen public-private innovation projects in Europe. Consequently, our cases do not represent all industries or firms, and studies on other industries may yield different answers but because the set of case firms display a variety of firms in size and experience, we believe that our findings are likely to be applicable to divergent firms and innovations.

Future research could analyse how different types of stakeholders providing the perspectives of distributors, experts, regulators and complementors can contribute to development of commercialization planning. We also call for longitudinal research designs to study the commercialization process in future, to increase our understanding the learning and evolvement that is related to this critical activity of innovating.

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