

REVIEWING CROSS-FIELD PUBLIC PRIVATE INNOVATION LITERATURE: CURRENT RESEARCH THEMES AND FUTURE RESEARCH THEMES YET TO BE EXPLORED

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ABSTRACT

The aim of this paper is to provide a systematic overview of current and future research themes discussed in the literature of Public Private Innovation (PPI). The overview is much needed as different research areas currently investigating PPI seem unaware of each other's findings and, as such, produce knowledge that is unconnected. Bridging these unconnected knowledge resources makes it possible for researchers to position their PPI studies more effectively, and practitioners become aware of the many cross-research contributions existing in the area of PPI. The overview is provided through a systematic review and content analysis of PPI literature, bringing together PPI knowledge from different research areas. Our findings point out that current research into PPI mainly is process-oriented, focusing on the early activities taking place in PPI projects (development activities), and especially interested in how to manage relationships between public and private players. Also, current research mainly adopts a public sector perspective when investigating PPI. Further, our findings show that suggestions for future research keep this particular orientation. Only few researchers discuss PPI from the perspective of private firms, or consider those implementation and commercialization challenges that may exist after solutions have been developed.

Keywords - Commercialization, Development, Implementation, Innovation Process, Public Private Innovation, Systematic Literature Review

INTRODUCTION

In recent years, there has been increased focus on how private firms can be involved in solving public challenges by jointly developing new welfare solutions with public organizations through Public Private Innovation (PPI) (Weihe et al., 2011; Dittmer et al., 2009; Nissen et al., 2014). A general argument for the value of PPI is that to be able to

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develop new welfare solutions, there is a need to combine knowledge that cuts across the public and private sectors (Bland et al., 2010).

Also in academia PPI is being explored more and more (Nissen et al., 2014). PPI research is however characterized by being investigated from different research areas, seemingly with no connecting to each other. As a consequence, these research areas seem to be unaware of each other's research, resulting in lack of cross-references and resulting in use of diverse terminologies, not just across different research areas but even in some cases within the same research area. For many reasons, accumulation of PPI knowledge is thus hampered. It is, therefore, important to bring together research conducted into PPI, across and within different research areas, to provide a systematic overview of these unconnected knowledge resources to provide better insight into the current and future research conducted on the phenomenon of PPI.

In order to integrate and structure the extant knowledge on PPI, we answer the following research question: What PPI research themes are currently being investigated and proposed to be investigated in the future, in and across different research areas, and what PPI themes seem to be neglected by current researchers, but may be evident in getting a holistic picture of challenges faced by public and private players participating in PPI?

To be able to answer the research question, we structure the article as follows. First, the phenomenon of PPI is introduced by distinguishing it from related forms of public and private relationships. Second, the methodology is presented, clarifying the systematic cross-field literature review conducted and the content analysis developed by means of a computer-aided textual software program. Then we group PPI research, identified through the systematic cross-field literature review, into different research areas. Third, the findings are presented, starting by clarifying different terminologies used to cover the same phenomenon across and within the different research areas identified. Then, based on a content analysis developed by means of a computer-aided textual software program, we identify research themes being currently researched across different research areas and being studied the most. More, based on the systematic cross-field literature review, we identify themes which, in and across the different research areas, are argued to be of future interest to PPI researchers. Lastly, we discuss which future research themes seem neglected as they are only rarely touched upon in the literature: We identify neglected themes from a holistic process view, suggesting that an innovation process contains development activities, implementation activities, and commercialization activities (Rothwell, 1994). Thereby we provide a much needed overview and understanding of current research and future challenges in the fragmented research area of PPI. The paper ends with a conclusion summarizing our findings and discussing the limitations of the study.

DISTINGUISHING THE PHENOMENON OF PUBLIC PRIVATE INNOVATION

PPI is a rather new phenomenon being studied across different research areas, and as such it is valuable to know what typically characterizes PPI projects and what contrasts PPI to other related phenomena such as Public Private Partnerships and Triple Helix

Partnerships. This is done to be able to distinguish the phenomenon of PPI from other related phenomena.

Concerning what typically characterizes PPI projects, the term Public Private Innovation (PPI) often refers to a setting in which public and private players work together to develop innovative solutions targeted the public sector (Dittmer et al., 2009). The players are considered to be development partners and as such develop innovative solutions together through a continuous transfer of ideas and knowledge between the players involved (Weihe et al., 2010). Mostly, PPI projects have no tender included in the project, creating a situation where the private players often are uncertain whether a tender will be offered after the development process. In some cases, PPI projects can also follow the procurement procedure, as formulated in the EU directives, called competitive dialogue. In 2004, this procedure was made in order to stimulate more focus on public demand for innovative solutions. The procurement procedure opens for interaction between the public procurer and private developer through a dialogue process, where the contracting public authority and different tenders jointly define the means best suited for the authority's needs, before the developer finally submit their tenders.

When contrasting PPI to other related phenomena, it is valuable to mirror it in relation to Triple Helix Partnerships and Public Private Partnerships in general. Triple Helix Partnerships typically focus on university-industry-government relations (Etzkowitz & Leydesdorff 2000; Cantù 2010), and have for long been based on private firms and public research institutions in relation to technology and product development (Lundvall, 2002). PPI distinguishes itself from Triple Helix Partnerships since it does not necessarily include universities. Instead, PPI often includes public municipal and regional organizations as representing the public players.

As to Public Private Partnerships (PPPs), these can be characterized by being contractual partnerships between public and private players. PPPs are more common as governments have had partnerships with the private sector for a long time (Hodge & Greve, 2005, p. 3). PPPs typically extend over a few decades, and since the main incentive for establishing a partnership is risk-sharing (Hodge & Greve, 2005; Klijn & Teisman, 2003; Roehrich & Caldwell, 2012), PPPs do not typically have an explicit focus on innovation. As such, PPPs can be distinguished from PPIs as the partners in PPIs, as a starting point, are considered as development partners and not customers and suppliers.

Table 1 summarizes the contrasts between PPI, Triple Helix Partnerships and Public Private Partnerships.

Table 1: Core characteristics of PPI, PPP and Triple Helix

PPI	PPP	Triple Helix
Development relationships between public and private players with a particular focus on innovation targeting the public sector (Dittmer et al., 2009; Weihe et al., 2010)	Durable buyer-supplier relationships between public and private players based on risk-sharing and development or delivery of products or services targeting the public sector (Roehrich & Caldwell, 2012; Hodge & Greve, 2005; Klijn & Teisman, 2003)	Institutional university-industry-government relationships supporting technology and product development (Cantù, 2010; Leydesdorff, 2009; Etzkowitz & Leydesdorff, 2000)

METHODOLOGY

The findings of this paper are based on a systematic literature review and a systematic content analysis. The first investigation is based on cross-field literature, identified through traditional literature sources, and is performed by three researchers, while the latter is based on the number of PPI papers provided from the cross-field literature review, laying the foundation for the computer-aided analysis conducted through the textual software program called Leximancer. The purpose in general with both investigations is to get an overview of existing PPI knowledge, and Leximancer is used as a verification of the researchers' interpretations based on the systematic cross-field literature review.

The systematic cross-field literature review

The systematic cross-field literature review is conducted in accordance with Tranfield et al. (2003) and follows three steps by planning, conducting and reporting the review (Tranfield et al., 2003). In the methodology section, the first two stages are discussed. The third stage is covered in the findings.

During the process of the planning stage, the objective of the systematic cross-field literature review is set: 1) Identify different research areas currently conducting PPI research to provide an overview of terminologies used across and within the different research areas, covering a similar phenomenon. 2) Identify what future research themes are proposed in and across different research areas, and what PPI themes seem neglected by current researchers, but may be evident in getting a holistic picture of challenges faced by public and private actors participating in PPI.

In order to provide knowledge about the above, we develop three criteria to the literature we review (Petticrew & Roberts, 2006), based on the core characteristics of PPI as presented in table 1. We only include literature that fulfills the following inclusion criteria (Tranfield et al., 2003):

- the phenomenon in focus has to consist of public and private players
- the public and private players are engaged in some sort of development relationship

- the purpose of the relationship is concerned with innovation or developing something new.

Beside the inclusion criteria, we also use a number of exclusion criteria when the inclusion criteria are too broad and fail in excluding non-relevant literature. The exclusion criteria concern papers that deal with:

- relationships exclusively based on Triple Helix
- traditional contractual buyer-supplier relationships, such as PPP.

During the process of the conducting stage, the EBSCO Host database (Academic Search Premier and Business Source Complete) is used. Table 2 shows an overview of search words, search results and number of papers selected for review. The conduction stage is iterated several times to make sure that all relevant literature is included. As such, the three inclusion criteria is only used as a starting point, followed by a snowballing approach, as we pay attention to the terminologies used in the first papers we identified as relevant and include these as search words in the following search. Only those papers meeting the above criteria are included in the final research.

Table 2: Overview of search words and number of papers

	Search words and total number of papers	Number of papers selected for re-view*
First search*	Public private (AND) network (AND) innovation Number of papers: 298	28
	Public private (AND) inter-organizational network Number of papers: 30	9
	Public private cooperation (AND) innovation Number of papers: 312	29
	Public private collaboration (AND) innovation Number of papers: 40	3
	Public private innovation (AND) partnership Number of papers: 102	17
	Public private relationship (AND) innovation Number of papers: 22	1
	Public private (AND) commercialization (AND) innovation Number of papers: 57	0
	Public private innovation Number of papers: 509	4
	Public private AND inter-organizational partnership (AND) innovation Number of papers: 1	0
	Public private AND inter-organizational arrangement (AND) innovation	1

	Number of papers: 1	
	Public private AND collaborative arrangement (AND) innovation	0
	Number of papers: 2	
	Public private AND commercialization partnerships (AND) innovation	0
	Number of papers: 8	
	Public private AND academic partnerships (AND) innovation	0
	Number of papers: 8	
	Public private AND cross-sector partnerships (AND) innovation	2
	Number of papers: 6	
	Public private AND consortia (AND) innovation	1
	Number of papers: 29	
	Public private AND policy networks (AND) innovation	0
	Number of papers: 15	
	Number of papers	95
Second search	Additional papers found by going through the references of the 91 papers from the first search	11
	Number of papers	106

* Keywords and abstracts were read, and the potentially relevant papers were chosen for further review.

During the search process, we discard duplicates already found in previous searches, making it possible to end up with articles presumably dealing with PPI. However, to make sure this is the case, the 106 papers go through a content screening process, securing that they fulfill the inclusion criteria, by screening the abstract, introduction and conclusion of each paper. This content screening process is conducted by three researchers. This process results in discarding further 43 papers, leaving us with 63 papers, which are then read again systematically from top to bottom by three researchers independently. Eventually, further 5 papers are discarded, leaving us with 58 papers dealing with PPI relevant issues.

Table 3: Interpretation of the papers

Partial content screening	Abstract, introduction and conclusion were read in all the selected 106 papers	
	Those papers which did not fall under the key selection criteria were deselected, discarding 43 papers	
	Number of papers	63
Total content screening	The 63 papers are read from top to bottom by 3 researchers, discarding further 5 papers	
	Number of papers	58
	Total number of papers selected for review	58

As the papers identified are published in different academic journals, we find it suitable to get an overview of PPI knowledge by clustering the journals into broad research areas. Journals concerned with PPI vary from journals like the Innovation Journal, Public Management Review, Journal of Management, Research Technology Management, and Journal of Business Research. Although several journals are in play, we find an overweight of journals concerned with the public sector, management and innovation.

When examining the types of journals, we concretely look at which research areas and scopes each journal covers. The research areas can typically be identified via the online platforms where the journals are accessible. Based on this information, it is possible to cluster the different articles into broad research areas. We do this as many journals share the same interest in similar research areas.

Table 4: Journals and authors grouped according to different research areas

Journals	Authors	Research areas
International Journal of Public Sector Management	• Arlbjørn & Freytag (2012)	Public Management
International Journal of Public Sector Management	• Erakovich & Anderson (2013)	
European Public Private Partnership Law Review	• Dittmer et al. (2009)	
Public Management Review	• Singh & Prakash (2010)	
Public Management Review	• Saz-Carranza & Longo (2012)	
Administration & Society	• Edelenbos & Klijn (2007)	
The Innovation Journal: The Public Sector Innovation Journal	• Bland et al. (2010)	
Public Money & Management	• Schoeman (2012)	
Public Organization Review	• Anderson et al. (2012)	
International Journal of Public Sector Management	• Schmidt (2008)	
Museum Management and Curatorship	• Søndergaard & Veirum (2012)	
Public Management Review	• Conteh (2012)	
Public Performance & Management Review	• Getha-Taylor (2012)	
Nonprofit and Voluntary Sector Quarterly	• Babiak & Thibault (2009)	
Public Administration	• Peters (1998)	
International Public Management Review	• Bommert (2010)	
Natural Resource Forum	• Forsyth (2005)	
European Procurement & Public Private Partnership Law Review	• Indén & Olesen (2012)	
Public Administration Review	• Mcguire (2003)	
Journal of Health and Human Services Administration	• van Sullivan (2012)	
International Review of Administrative	• Brewer & Hayllar (2005)	

Sciences

European Journal of Housing Policy	• Munk (2002)	
Construction Management and Economics	• Bossink (2002)	
European Public Private Partnership Law Review	• Burnett (2010)	
European Public Private Partnership Law Review	• Olesen (2013)	
Government Information Quarterly	• Raus et al. (2010)	
American Behavioral Scientist	• Stiglitz & Wallsten (1999)	
Policy Studies Journal	• Dudley & Rood, (1989)	
Journal of Business Ethics	• Murphy & Arenas (2010)	Business and firms
Journal of Business Ethics	• Le Ber & Branzei (2010)	
Journal of Business Research	• Gallego et al. (2012)	
The Journal of Applied Business Research	• Cancar & Petkovšek (2013)	
Journal of Small Business and Entrepreneurship	• Hansen & Klewitz (2012)	
Journal of Business Ethics	• Clarke & Fuller (2010)	
Journal of Knowledge Management, Economics and Information Technology	• Coto-millán et al. (2011)	
Academy of Management Journal	• Stevens et al. (1986)	
Academy of Management Journal	• Dowling & Schaefer (1982)	
Journal of Management	• Selsky & Parker (2005)	
Academy of Management Journal	• Huxham & Hibbert (2005)	
Journal of Service Science and Management	• Jalonen & Pekka (2011)	
Contemporary Management Quarterly	• Bogacz-Wojtanowska (2011)	
Journal of Management	• Provan et al. (2007)	
The Service Industries Journal	• Koschatzky & Stahlecker (2010)	
Innovation Journal	• Grudinschi et al. (2013)	
Industrial Marketing Management	• Nissen et al. (2014)	
European Planning Studies	• Visser & Atzema (2008)	Innovation systems
Papers in Regional Science	• Frenken et al. (2010)	
Science and Public Policy	• Fogelberg & Thorpenberg (2012)	
Journal of Urban Regeneration and Renewal	• Johnston & Diamond (2011)	
Our Economy	• Znanstveni, članek (2010)	
Journal of Economic Geography	• Siemiatycki (2011)	
Nature Biotechnology	• Harvey & McMeekin (2004)	
Agribusiness	• Hartwich & Negro (2010)	
Journal of Innovation and Entrepreneurship	• Nordin & Svensson (2007)	
Journal of Organisational Transformation and Social Change	• Peón-Escalante et al. (2008)	
Construction Innovation	• Eaton et al. (2005)	Technology inno-

Technovation	• Drejer & Jørgensen (2005)	novation
Research-Technology Management	• Micheli et al. (2012)	

Content analysis developed by means of Leximancer

In order to identify current research themes and most studied research themes across and within different research areas, a computer-aided textual software program called Leximancer was used. The Leximancer content analysis provides an overview of research themes dealt with across all research areas interested in PPI. The program has previously been used by researchers conducting a literature review (Erichsen & Christensen, 2013), and it is valuable to use as it, in a non-biased way, produces an overview of a large amount of literature. Furthermore, it provides a stronger ground for qualitative interpretation.

Concretely, Leximancer is used to identify frequencies of the research themes (e.g. main concepts) used the most in all the reviewed literature, and also used to identify their co-occurrence. Once all the literature is registered in the program, it automatically conducts a content analysis by identifying the most frequently appearing concepts. Concepts are to be understood as collections of words that generally travel and occur together throughout all the literature (Leximancer, 2011). As such, a table can be produced that shows a ranked overview of dominant **concepts** based on all 58 papers (see table 5 below).

Table 5: Leximancer results

Concept	Count	Relative count
public	2053	100%
innovation	1593	78%
collaboration	1263	62%
network	1528	55%
organizations	1096	53%
government	1095	53%

In order to examine the concepts in more detail, the concepts' thesaurus is surveyed. The components of each concept are placed in a thesaurus that contains the words' relative importance in the concept generation. The **thesaurus** shows a ranked list of relevant words that lie behind a concept, and thereby is associated to and describes a concept. Together with the most frequently occurring concepts and their thesaurus, the most relevant words that **co-occur** with each concept are also displayed in the list. The concepts included contain all concepts with a relative count higher than 50 %, which includes relevant concepts. In appendix 1, a full overview of the research themes is included, also including concepts which appear the least in the papers.

FINDINGS

In the following section, a logical sequence of findings is offered and discussed to be able to answer the research question.

Different PPI terminologies

As a consequence of numerous authors publishing research in the young research field of PPI in diverse academic journals, various PPI terminologies also exist. Thus, the first objective of this paper is to provide an overview of the various terminologies used to cover PPI. These terminologies describe relationships between public and private players, where the aim is to develop new solutions. The table below provides an overview of the different terminologies found across different research areas. As the table shows, different and similar terminologies are used both within and across research areas.

Table 6: Overview of different terminologies related to PPI

Terminologies	Authors	Research areas
• Public Private Innovation/PPI	• Arlbjørn & Freytag (2012)	Public Management
• Cross-sector collaboration	• Erakovich & Anderson (2013)	
• Public Private Partnership for Innovation	• Dittmer et al. (2009)	
• Inter-organizational networks	• Singh & Prakash (2010)	
• Inter-organizational partnerships/cooperation	• Saz-Carranza & Longo (2012)	
• Inter-organizational networks	• Edelenbos & Klijn (2007)	
• Collaborative arrangements	• Bland et al. (2010)	
• Commercialization partnerships	• Schoeman (2012)	
• Public-private academic partnerships	• Anderson et al. (2012)	
• Public-private cooperation	• Schmidt (2008)	
• Public-private consortia	• Søndergaard & Veirum (2012)	
• Inter-organizational collaboration	• Conteh (2012)	
• Cross-sector partnerships	• Getha-Taylor (2012)	
• Cross-sector partnerships	• Babiak & Thibault (2009)	
• Networks between government and non-government organizations	• Peters (1998)	
• Collaborative innovation	• Bommert (2010)	
• Public-private cooperation	• Forsyth (2005)	
• Public Private Innovation/PPI projects	• Indén & Olesen (2012)	
• Collaborative public management	• McGuire (2003)	
• Inter-organizational relationships	• van Sullivan (2012)	
• Public private partnerships/cooperative partnerships	• Brewer & Hayllar (2005)	

• Social partnership	• Munk (2002)	
• Public private arrangement	• Bossink (2002)	
• Partnerships in Competitive Dialogue	• Burnett (2010)	
• Public Private Innovation Partnership	• Olesen (2013)	
• Business-to-government	• Raus et al. (2010)	
• Public-Private Technology Partnerships	• Stiglitz & Wallsten (1999)	
• Multi-organizational partnerships	• Dudley & Rood, (1989)	
• Cross-sector and multi-sector partnerships	• Murphy & Arenas (2010)	Business and firms
• Cross-sector partnerships	• Le Ber & Branzei (2010)	
• Public-private cooperation arrangements.	• Gallego et al. (2012)	
• Public private technology partnerships	• Cancar & Petkovšek (2013)	
• Inter-organizational networks	• Hansen & Klewitz (2012)	
• Multi-organizational cross-sector social partnerships	• Clarke & Fuller (2010)	
• Collaborative relationships	• Coto-millán et al. (2011)	
• Business-Government Relations	• Stevens et al. (1986)	
• Business-government relationship	• Dowling & Schaefer (1982)	
• Cross-sector partnerships	• Selsky & Parker (2005)	
• Inter-organizational arrangements	• Huxham & Hibbert (2005)	
• Cooperation between the public and private sectors	• Jalonen & Pekka (2011)	
• Cooperation between non-government and public organizations	• Bogacz-Wojtanowska (2011)	
• Inter-organizational networks	• Provan et al. (2007)	
• Strategic partnership	• Koschatzky & Stahlecker (2010)	
• Cross-sector collaboration	• Grudinschi et al. (2013)	
• Public Private Innovation/PPI	• Nissen et al. (2014)	
• Combined network approach	• Visser & Atzema (2008)	Innovation systems
• Institutional affiliations	• Frenken et al. (2010)	
• Public private partnerships engaging in development processes	• Fogelberg & Thorpenberg (2012)	
• Policy networks	• Johnston & Diamond (2011)	
• Public private innovation networks	• Znanstveni, članek (2010)	
• Private Finance Initiative/PFI	• Siemiatycki (2011)	
• Public private collaborations	• Harvey & McMeekin (2004)	
• Collaborative partnerships	• Hartwich & Negro (2010)	
• Public-private relationships	• Nordin & Svensson (2007)	

• Inter-institutional network	• Peón-Escalante et al. (2008)	
• Private Finance Initiative/PFI	• Eaton et al. (2005)	Technology innovation
• Public private collaborations	• Drejer & Jørgensen (2005)	
• Commercialization partnerships	• Micheli et al. (2012)	

Overall, terms such as ‘inter-organizational’, ‘cross-sector’ and, not surprisingly, ‘public private’ are frequently used in the literature – both within the same research area and across research areas. These terms capture the composition of PPI, which consists of players from different sectors and organizations. That may also be the reason why the term ‘partnerships’ seems to be the most common term used, as PPI often is associated with collaboration/cooperation between different players. In fact, the term ‘partnerships’ appears to be used across all different research areas, but is typically combined with different terms.

Besides variation in terminology across different research areas, variation inside single research areas also exists. For instance, in the literature concerned with public management, terms such as ‘inter-organizational networks’, ‘inter-organizational partnerships’, ‘inter-organizational collaborations’, ‘inter-organizational arrangements’ are used. The inconsistent use of terminology in the same research areas may be due to the fact that the research subject PPI is still in its formative years.

The use of different terminologies across different research areas may at first glance make the research into PPI seem fragmented. However, in spite of different terminologies in and across different research areas, many authors link PPI to similar core characteristics. In particular, PPI is often linked to the purpose of developing new solutions, targeted the public sector, to solve societal problems through close collaboration between public and private players (Arlbjørn & Freytag, 2012; Saz-Carranza & Longo, 2012; Jalonen & Pekka, 2011; Nordin & Svensson, 2007). Also, PPI is recognized as a particular partnership mode that supports the development of innovations in a broader context, such as to foster the development of clusters and new technological innovations in national, regional or sectorial innovation systems (Coto-millán et al., 2011; Harvey & Stahlecker, 2010; Hartwich & Negro, 2010; Drejer & Jørgensen, 2005).

Thus, across and within different research areas, there seems to be agreement about what characterizes PPI. Fortunately, the use of different terminologies seems to be relatively superficial, as the disagreement only is related to what to call the phenomenon of PPI. The opportunity of comparing and linking research findings across different research areas thus is promising, as getting insight into other PPI research may bridge the otherwise fragmented PPI research, and support accumulation of PPI knowledge.

Current themes in cross-field PPI research

The current research themes, found through the Leximancer content analysis, support the interpretations established through the systematic literature review. The Leximancer analysis serves as a verification of the screening process conducted by the 3 researchers (see table 3 for an overview). Thereby we have examined the consistency between the results from Leximancer and our own interpretation of the themes gained from the papers. In the following section, an overall detailed analysis of dominant research themes

appearing across all the 58 papers is provided. Next, an overview of dominant research themes within each research area is also identified.

Those research themes being the most investigated in PPI research across different research areas are, in the following, presented as dominant concepts, which are high-frequency words appearing in all 58 papers.

Table 7: Research themes (concepts) appearing in PPI research

Concept	Thesaurus	Co-occurrence (Related word like)
public	ideal type, purchasing, academia, budget driven, cooperators	private, sector, services, cooperation, government
innovation	dairy, innovate, countries, knowledge-based, innovativeness, socio-political	regional, external, knowledge, context, industry
collaboration	collaborators, activation, socio-political, cross-sector, cross-cultural	stakeholders, relationships, research, community, industry
network	dyadic, nodes, intra, sub-networks, constellations, project-oriented	structure, relationship, members, analysis, organizations
organizations	organized, organic, organization-level, bounding, community-based	individual, health, network, organizational, members
government	governance, governing, business-government, basic law, control	agencies, local, business, policy, national

Looking more closely at the data extracted from Leximancer, our findings reveal that current PPI research is mainly focused on the public sector, e.g. on public services, public procurement and stimulation of innovation from a societal point of view. Second, current PPI research is predominantly process-oriented, e.g. on how to manage joint processes in projects or relationships/networks where public and private players participate. Especially, there seems to be focus on how differences between the public and private sector are coped with when collaboration across the two sectors takes place.

Current themes being researched the most across research areas are related to the public sector. This may be historically conditioned as public governance through partnerships or networks became a novel phenomenon to research along with the New Public Management (NPM) reforms in many Western countries during the 1970's and 1980's (Petersen, 2011). Until then partnerships or networks mostly was considered to take place in the private sector (Rhodes, 1997). More, it may not be surprising, since one of the search words in the EBSCO Host searches was the word 'public'. However, the word 'private' was also part of the search words, but focus on the private sector seems to be neglected since it does not appear until the twelfth concept (see appendix 1). Areas such as 'innovation', 'network', 'collaboration', 'organizations' and 'government' are dominating in the 58 papers to a much higher degree than a direct focus on private players. The concept 'government' (ranked as the sixth concept) is, together with the first concept 'public', related to a public sector perspective, and their high rank in the concept list manifests them as dominating throughout all the reviewed papers, to a much higher degree than a private sector perspective. Also, the concepts mainly refer to the collabo-

ration process taking place among public and private players rather than to the outcome of the collaboration, such as successful implementation and commercialization. The word 'process' additionally appears as a concept itself (ninth concept, see appendix 1).

Examining the thesaurus of the most dominating concept 'public' more closely, we find that it is related to research themes concerned with public services, procurement and dealing with the differences between the public and private sector. The concept contains a focus on the public sector as an ideal type, focusing on the description of the public sector as a whole in relation to state bureaucracy. Purchasing is furthermore a relevant topic that lies behind the concept in the thesaurus, which indicates that public procurement also seems to be mentioned often in the papers. This also reveals a focus on the attainment of specific products or services which the public sector can gain from participating in relationships with private players. Looking at the most relevant words that co-occur with the concept 'public', one can see it is related to the private sector. However, in the reviewed papers, the focus on the private sector is basically related to the differences that exist between the public and private sector: Researchers pay much attention to the sectorial cultural differences between the two sectors. Furthermore, the word 'services', which is also associated with the word 'public', indicates that creation of public services, through collaboration between public and private players, tends to be in focus.

As for the second most dominating concept, 'innovation', the words 'dairy', 'innovate', 'countries' and 'socio-political' appear in the thesaurus, which indicates the existence of a societal focus, looked at from a macro level in relation to generate innovation through collaboration. This societal focus is especially related to countries and specific sectors such as the dairy sector. The most dominant word that co-occurs with the concept is related to 'regional'. This indicates that the theme regarding innovation is much related to innovation in regions. As such, the thesaurus and co-occurrence of words reveal that focus areas in the papers are much related to overall innovation systems including the national level, regional level and the sector level.

When it comes to the third concept 'collaboration', the thesaurus specifically reveals the words 'collaborators' and 'activated', which indicate a focus on a process where collaborators are activated to collaborate. Also, the words 'cross-sector' and 'cross-cultural' indicate a focus on the sectorial and cultural differences that exist between public and private players when they collaborate. The words that co-occur with the concept are also much related to the different players that are in a relationship, as is indicated by the words 'stakeholders' and 'relationship'. The focus on differences between public and private players who collaborate includes emphasis on how to manage these sectorial differences during an innovation process in order to support interaction between the players. This suggests to a great deal that the papers tend to focus on mechanisms within relationships and between its stakeholders/members.

As for the fourth most dominating concept 'network', the arrangement of the network is highlighted in the thesaurus, which is indicated by the words that appear, such as 'dyadic', 'sub-networks' and 'constellations'. The words that co-occur with this concept are also related to the arrangement of a network, which the words 'structure' and 'relationship' seem to suggest. Further, the fifth concept 'organizations' seems to share similar

characteristics with the concepts ‘collaboration’ and ‘network’ as its thesaurus and co-occurrence of words contain words characterizing the arrangement of relationships, which is indicated by the word ‘organized’, appearing first in the thesaurus. Thus, the focus seems to be on framing the overall setting of a relationship between public and private players.

Finally, the sixth concept ‘government’ is related to the concept ‘public’ including words related to the public sector, such as ‘governance’, ‘governing’ and ‘policy’. The first two of these mentioned words appearing in the thesaurus and co-occurrence column are especially related to how the public sector is managed or governed. As such, the word ‘governance’ seems to capture that the public sector governs through relationships or networks with e.g. businesses.

In order to support the findings, a Leximancer analysis was additionally made by conducting a separate analysis for the papers within each research area. The reason for this is to make sure that the overall impression of the previous analysis is interpreted correctly when the single papers are clustered into the identified research areas. The data extracted from Leximancer, within each of the research areas, shows that the main concepts are similar to the ones appearing when all the 58 papers were analyzed as a whole (see appendix 2 for an illustration of the most dominating research themes within each research area), providing evidence for the validation of the above findings.

Suggestions for future research in the cross-field PPI literature

A distinctive dominating research trend found in the papers is that the literature mainly takes a public sector and a societal perspective on PPI, and also mainly focuses on development activities conducted by the collaborating parties from the public and private sector. This is confirmed by the results extracted from the computer-aided textual analysis in Leximancer, where the most dominating concept within all the reviewed papers was the word ‘public’. Furthermore, when investigating the types of journals where the 58 papers have been published, a majority of them are published in journals concerned with the public sector, e.g. public management.

Table 8 shows the identified themes and suggestions for further research divided between the different research areas. The suggestions for further research have been identified by the team of 3 researchers while screening all the papers identified (see table 3 for an overview). A dominating research theme for future research found in the papers is how to manage joint processes or projects where public and private players participate, seen from the perspective of the public sector. Not all the reviewed papers suggested themes for future research.

Table 8: Suggestions for future PPI research across different research areas

Research areas	Suggested themes for future PPI research
Public Management	<p>More understanding of cooperation limits between public and the private sectors (Arlbjørn & Freytag, 2012).</p> <p>Development of trust as an important mechanism in managing processes (Dittmer et al., 2009; Singh & Prakash, 2010).</p> <p>Focus on the skills to facilitate and manage the entire innovation process, within networks (Bland et al., 2010).</p> <p>Focus on development of trust as an important mechanism in managing processes (Edelenbos & Klijn, 2007).</p> <p>Focus on how to create a synergistic environment in the innovation process in which the individual weaknesses of each partner are compensated by creating mutual dependency and accountability to one another (Anderson et al., 2012).</p> <p>Focus on competing institutional logics in collaborations in public private joint ventures with other objectives than economic development/policy objectives (Saz-Carranza & Longo, 2012).</p> <p>Focus on features of management of cooperation processes across countries (Søndergaard & Veirum, 2012).</p> <p>Focus on collaborative innovation compared with bureaucratic innovation as a way for the public sector to tackle complex social and economic challenges (Bommert, 2010).</p> <p>Focus on collaborative public management (Mchguire, 2003).</p> <p>Focus on value assessment for both private and public stakeholders (Raus et al., 2010).</p> <p>Focus on public-sector organizations' capacity and willingness to engage in a process with private partners and on private-sector partners' ability to engage in a process with a variety of stakeholders, and be open to sharing skills and expertise (Schoeman et al., 2012).</p>
Businesses and firms	<p>Focus on issues around third-party facilitators processes in cross-sector collaborations (Murphy & Arenas, 2010).</p> <p>Focus on differences between public and private external sources of knowledge when they engage in a joint process (Gallego et al., 2012).</p> <p>Focus on understanding the functioning of networks as a unique form of governance (Provan et al., 2007).</p>
Innovation systems	<p>Focus on the complex form in which innovations are generated within innovation systems when bringing different players together (Hartwich & Negro, 2010).</p>
Technology innovation	<p>Further evaluation of completed projects to investigate potential stimulants and impediments to creative behavior in construction to improve innovation processes (Eaton et al., 2005).</p>

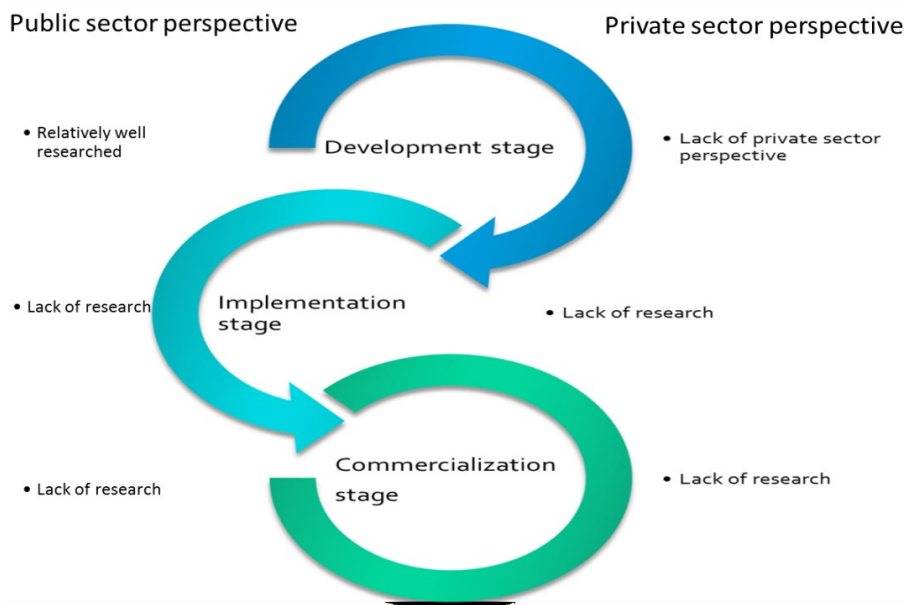
Future challenges neglected in the cross-field PPI literature

The current literature on PPI seems to have an overweight of research themes related to relationships where public and private players interact with each other during a joint innovation process. However, focus is mainly on the early stages of the innovation process, focusing almost only on development activities. Also, current PPI literature tends to have an overweight of themes related to a broader context regarding innovation systems and public policy-related themes for the purpose of fostering economic development at regional and national level. The systematic identification of these themes, through the Leximancer content analysis, supports the finding of potential gaps still to

be investigated in the current literature on PPI to get a more holistic picture of PPI. More knowledge is needed for establishing a better understanding of how firms from the private sector cope with PPI, and how the implementation and commercialization activities that private players also have to conduct, when participating in innovation processes with public players, are handled. More knowledge about these aspects of PPI is necessary as innovation processes involve both development activities, implementation activities, and commercialization activities (Rothwell, 1994).

Based on the systematic cross-field literature review and the systematic content analysis, we can identify that a discussion of the value which private firms gain by participating in PPI seems to be neglected in the current PPI research, as only very few researchers consider those implementation and commercialization challenges that may exist in relation to PPI when new solutions are being developed. This may be a perspective that is valuable to research further as private firms experience challenges when the solutions are to be implemented into public sector organizations. Also, they may experience challenges when commercializing new solutions which they have developed together with public players in PPI. These challenges are connected to inhibited implementation and commercialization in the public market of innovative solutions developed during PPI processes. To sum up our findings, the below figure can be used to illustrate gaps of PPI knowledge which still need to be researched.

Figure 1: Overview of current PPI research and lack of PPI research



The idea behind the figure is based on traditional innovation literature suggesting that any innovation process, and as such also PPI processes, consists of a variety of activities involving development activities, implementation activities and commercialization activities: All these different activities can be looked at as constituting different stages or central activities of an innovation process (Rothwell, 1994).

CONCLUSIONS

Our findings point out that current research on PPI is very much directed by a public sector perspective, and that the themes most often researched are rarely examined from a private sector perspective. As for themes being currently researched, different research areas are mostly process-oriented, as most PPI research tends to focus on how public and private players collaborate in a joint process. This is of course due to the papers mainly being published in journals with a public sector view: Highlighting development of services in the public sector and stimulation of clusters in innovation systems (e.g. regional) to gain growth. As such, a dominating research trend is how to manage processes and PPI projects for the benefit of the public sector.

Suggestions for future research seem rather affected by current research, as an overall suggestion for future research themes is that most researchers find it necessary to increase focus on public and private players' engagement in and management of PPI processes. Only few authors deal with the outcome or value that private firms can gain by participating in PPI processes with public organizations. This is notable as PPI consists of players from public and private organizations that work closely together in a joint process, and as such should be treated as equal partners, but apparently there is an overweight of literature that examines such processes from a public sector perspective.

More, what seem to be lacking, in general, are considerations of implementation and commercialization of new solutions, after development activities have ended, and the public and private players no longer interact with each other through a single PPI project. This focus is important to research if private firms also in the future should be able to see the value in being involved in solving public challenges by jointly developing new solutions with public organizations through Public Private Innovation.

We therefore suggest that there is a need to pursue research on how solutions for the public sector are being implemented and commercialized by private players after a joint development process has ended between public and private players. Also, policy makers should consider targeting funding programs on commercialization and implementation. Pursuing research with this focus will contribute to achieve a more holistic picture of PPI, by going beyond the examination of joint processes between public and private players and by increasing the current scant focus on the private sector.

Our study has its recognized limitations. The focus on relationships, where the public and private players are considered to be development partners and not just customers or

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suppliers, may have left out some research within the literature field of public procurement.

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APPENDIX 1:

The table displays an extended overview of the findings deduced from Leximancer.

Concept	Count	Relative count	Thesaurus	Co-occurrence (Related word like)
public	2053	100%	ideal type, purchasing, academia, budget driven, cooperators	private, sector, services, co-operation, government
innovation	1593	78%	dairy, innovate, countries, knowledge-based, innovativeness, socio-political	regional, external, knowledge, context, industry
collaboration	1263	62%	collaborators, activation, socio-political, cross-sector, cross-cultural	stakeholders, relationships, research, community, industry
network	1528	55%	dyadic, nodes, intra, sub-networks, constellations, project-oriented	structure, relationship, members, analysis, organizations
organizations	1096	53%	organized, organic, organization-level, bounding, community-based	individual, health, network, organizational, members
government	1095	53%	governance, governing, business-government, basic law, control	agencies, local, business, policy, national
sector	1091	53%	cross, deficiencies, organization-specific, relationally, buyer	private, creation, public, value, services
partnerships	1086	53%	public-private, clashing, multi-sector, political, unfolded, asymmetrical, decoupled, formalize, interchangeably, modernization, neo-liberal, co-development	creation, partners, sector, private, community, health, relationships, trust, organizational, role, terms, costs, development, social, collaboration, local
process	995	48%	processing, eco-efficiency, iterative, linear, adaptive	systems, capacity, creation, learning, strategy
partners	983	48%	fusion, dyad, elasticity, sector-specific, levels, conversations, cross, incidents, journey	creation, partnerships, value, social, understanding, common, sector, work, organizational, relationships, joint, organizations, terms, project
research	989	48%	professors, non-university, organization-level, accuracy, application-oriented	institutional, industry, analysis, collaboration, technology
private	907	44%	sectors, privatization, technology-push, adjustments, market pull	public, sector, companies, market, cooperation, actors
management	840	41%	managers, manage, institutionalization, style, re-think, activate, ideal-type, readiness	joint, stakeholders, policy, context, structure, activities, role, collaboration, understanding, strategy, members, institutional, control, public,

				research, relationships, government
development	780	38%	summit, attached, delayed, inter-institutional, neo-liberal, reconstruction, originate, agenda setting, demonstrators	economic, local, industry, actors, regional, community, joint, support, technology, national, groups, process, companies, systems, policy, environmental, change, research
services	762	37%	non-government, admissions, charging, constructing, diversified, piloted	health, public, sector, activities, key, private, costs, innovation, business, cooperation, agencies, social, resources, role, large, market
project	747	36%	design-build, sheet, project-delivery, sponsors, co-funded, successive, sector-led, timeframe	agencies, involved, key, support, costs, large, market, industry, companies, national, partners, private, development, partnerships, joint, collaboration, work
knowledge	659	32%	assimilation, tacit, absorb, mediators, unstructured, assimilated, inter-organizational, attainment	capacity, external, learning, strategy, creation, information, technology, role, local, activities, innovation, industry, cooperation, process, context, market
value	626	30%	re-design, business to government, beliefs, communal, stakeholder-specific, clashing, trade-offs, quantify	creation, stakeholders, social, context, sector, partners, understanding, economic, costs, private, terms, business, partnerships, political, public, relations

APPENDIX 2:

Concept	Count	Relative count	Thesaurus	Co-occurrence (Related word like)
Public Management				
Public	1240	100%	Sector, ideal type, allocating, budget-driven	Procurement, sector, private, services
Sector	1089	88%	Persistent, innovating, combining, relationships	Private, public, procurement, services
Government	638	51%	Governance, accountable, top-down, governed	Agencies, policy, economic, strategic
Business and firms				
Public	387	100%	Non-government, suppliers, innovations, organizations	Organizations, private, services, cooperation
Innovation	383	99%	Countries, novelty, bureaucratic, competitors	Approach, external, private, cooperation
Network	305	79%	Egocentric, nodes, bounding, accomplish	Level, organization, studies, individual
Partners	278	72%	Complementarities, clashing, transitions, align	Frame, value, partnership, sector
Sector	275	71%	Cross, drivers, healthcare, bureaucracy	Private, value, public, frame
Organizations	266	69%	Non-government, diversified, districts, synergy	Individual, network, relationships, partner
Innovation systems				
Innovation	392	100%	Stimulating, cluster-based, high-tech, settings	Learning, clusters, policy, innovative, system
Public	261	67%	Provision, start-up, sectors, boundary	Private, sector, services, partners
Private	211	54%	Boundary, secured, unemployed, complementarities	Public, sector, companies, government
Collaboration	210	54%	University-industry, spatial-institutional, communications, hierarchical	International, collaborations, organizations, national
Knowledge	198	51%	Tacit, exploit, marketplace, knowhow	Global, learning, management, innovative
Development	197	50%	Efficient, inter-institutional, agenda-setting, communications	Growth, developed, actors, organizational
Technology innovation				
Innovation	201	100%	Incorporation, evaluating, improving, practitioners	Construction, impediments, innovative, organizations
Public	130	65%	Agencies, types, private, high-tech	Private, institutions, sector, government
Project	100	50%	Co-funded, stakeholders, teambuilding, contracts	Team, level, developing, risk

Note: The table illustrates the most dominating research themes within each research area. The word ‘public’ appears to a very high degree within each of the research areas, while some of the other themes appear in a different order. Besides the public sector and innovation, the main focus seems to be related to collaboration in networks or projects. The word ‘private’ appears as a dominating concept within the research area concerned with innovation systems. The focus on the private sector within this research area seems to be related to stimulating clusters of firms. This is revealed when examining the first concept within this research area where the words ‘cluster-based’ and ‘clusters’ appear in the thesaurus and co-occurrence column. Also, the cluster-based view seems to be related to processes of collaboration and knowledge sharing because clusters serve as a frame to gather different organizations together so the proximity is heightened and interaction and learning may occur more easily.

About IPMR

IPMR The International Public Management Review (IPMR) is the electronic journal of the International Public Management Network (IPMN). All work published in IPMR is double blind reviewed according to standard academic journal procedures.

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