The Strategies of Intermediaries in Collaborative Research: Evidence from the Netherlands

Abstract

The study examines how a research intermediary (RI) deals with the tensions inherent in the framework of shared research programs (SRPs). Specifically, it seeks to investigate how the RI can best facilitates ties among heterogeneous partners in order to improve the innovativeness of the SRP. For that purpose, the research builds on two apparently opposing strategies: tertius gaudens and tertius iungens. Using a qualitative in-depth case study, the paper identifies a number of determinants that influence enactment of the introduced strategies. The study gives evidence that both strategies are used by the research intermediary to reduce dependence within the network. However, the tertius gaudens strategy is enacted only when the situation does not jeopardize the relationship with a partner.

Introduction

The importance of networking is widely recognized by the academics. Scholars have given a lot of attention to positive effects of networks (Granovetter, 1973; Kale and Singh, 2009). Prior studies show evidence that firms with heterogeneous networks outperform firms with limited access to such connections (Baum, Calabrese & Silverman, 2000; Gulati, Nohria & Saheer, 2000). As the variety of actors in the innovation network increases, firms often use research intermediaries (RIs) as the third party actor to facilitate competing demands of the actors. A strong cooperation with a RI provides firms with access to a network with an extended knowledge base, new markets and diverse links to partner firms (Sofka and Grimpe, 2010; Laperche et al., 2013). However, the RI may also become a source of tension between the partners (Vernet, 2012; Lauritzen et al., 2013). Participation of RI's in the network allows companies to preserve autonomy, although, such partnerships might also increase dependence of the partner firms (Dalziel, 2010). In cooperation with multinationals, SMEs are widely considered to be in the subordinate position (Batterink et al., 2010; Gardet & Fraiha, 2012). Therefore, it is not surprising that prior research shows that SMEs are skeptical about networking and are less likely to participate in innovation networks compared to multinationals (Asheim et al., 2003). The lack of resources and weak bargaining position often evoke difficulties for SMEs to enjoy innovation results from collaborative projects with their larger counterparts (Byma, & Leiponen, 2006; Gulati & Sytch, 2007; Vanhaverbeke et al., 2012; James et al., 2014). Therefore, we pose the following research question that remains to be addressed:

Why do SMEs make use of the support of research intermediaries (RI) for the creation and facilitation of collaboration activities among them and other network partners?

By addressing the question above, the present study may provide important insights for understanding how the RI can deploy different strategies depending on the interaction required. In this study, the focus is on the industrial network of the RI consisting of small and middle sized enterprises (SMEs) and multinational companies (MNCs) as these left cases are rare in the framework of collaborative research. The collaboration with SMEs involves a different approach than collaboration with MNCs, and thus, the study investigates the difference in RI's behavior towards different partners.

Bridging organizations are gradually gaining more attention in the SME literature, but there is a clear need for more understanding regarding RIs operating within SME/MNC networking structures (Klerkx and Leeuwis, 2008). Recent literature indicates that engagement in open innovation framework raises particular challenges for SMEs (James et al., 2014). There are identified dilemmas relating to power, identity, and competence that must be balanced in order to encourage SMEs to benefit from the external networks (Alvarez & Barney, 2001; Gulati & Sytch, 2007; De Clercq and Voronov, 2009; Cosh & Zhang, 2011; Laperche et al., 2013). On the one hand, SMEs prefer intermediaries that have a diverse network, so that they can collaborate with partners across the whole value chain. On the other hand, they prefer network in which they have a high relative standing, so that they receive greater support from the intermediary. These criteria often cannot be simultaneously achieved (Piezunka, 2014). When describing the facilitating role of the RI, the literature often disregards the threat for the agent of being dependent on its network partners as well. Even though, RIs are expected to balance the different kind of demands of their members while preserving impartibility, they often need to take into account the request of more financially and strategically important partners (Stevenson and Greenberg, 2000; Williams, 2002).

This paper aims to clarify how RIs reconcile simultaneously the competing demands such as partner control and partner network dependence. This requires the RI to follow a strategy of active intervention in order to create or/and abandon network ties and shape network structure. The scholarly management literature identifies several mechanisms through which the agent is able to influence the relationship among SMEs and MNCs. The paper contributes to the theory by investigating the tertius gaudens and the tertius iungens profiles simultaneously. In fact, the previous literature has focused predominantly on solely tertius gaudens behavior (Simmel and Wolff, 1950; Burt, 1992) or solely tertius iungens behavior (Garriga, 2010; Obstfeld, 2005). It is still not clear to what degree and in what context these activities are reducing the resource dependence among network partners, and to what degree these activities enable value creation for SMEs rather than merely enable value capture for MNCs.

Building on the resource dependence and social capital theory, the study enriches theory by exploring how RIs deal with the tensions inherent in community collaborations in a more dynamic way. Specifically, this paper seeks to fill the identified research gap by explaining how a RI manages to facilitate collaborative ties among heterogeneous partners without losing its and SMEs' independence towards MNCs. The theoretical position has new implications on the role of RI as the network governor in the complex system of inter-organizational links.

The introduced study throws some light on the topic by providing empirical evidence of the cooperation processes among heterogeneous partners in the RI's network. Since there is no quantitative empirical research that explains the RI's strategy towards the issue investigated, the study employs an inductive in-depth case study. This study opts for qualitative research approach as it investigates the interaction between partners in context-specific set – up of RI. The data are obtained by carrying out in-depth, semi- structured interviews with key employees of RI, SMEs and MNCs, and using archival data.

The remainder of this paper is structured as follows. In the first section, the phenomenon of research intermediary and its organizational set-up to form partner interaction are described. A brief typology overview of the different roles and function that intermediaries play within innovation network is provided. Subsequently, the theoretical background is discussed. This section builds on the combination of two most prominent frameworks in the literature of management: resource dependence theory and social capital. This is followed by methodology section, in which the research process, using the qualitative approach is clarified. Finally, the paper ends with section 5 that contains findings, conclusions, research propositions and limitations of the research.

Theory and background

An idea that innovation constitutes interactive process is nowadays broadly accepted (Tödling et al., 2009). The interexchange of knowledge and technology is one of the most crucial elements in the increasingly competitive business environment today. Such activity becomes even more complex with

the emerging paradigm of "open innovation". The introduction and development of this phenomenon have initiated a fundamental change in the way companies nowadays undertake innovative activities (Chesbrough, 2003). Companies no longer tend to rely exclusively on their resources and expertise in order to come up with new innovations (Chesbrough, 2007; Malanowski and Zweck, 2007; Vrande et al., 2009). Contrary, they see themselves as deeply embedded entities in the social, technological and market networks, which results in opening up to new ways of working with external partners.

There are many parties with different objectives involved in the complex process of open innovation, causing a need for an entity who acts as a broker to help facilitate the flow of knowledge and technology between them. In the context of innovation literature, such an entity is known as RI.

Following the categorization of Dalziel (2010), RIs are defined as organizations which main aim is to foster innovation, either directly by enabling the innovativeness of one or more firms, or indirectly by promoting economic development within regions, nations, or sectors. The implicit definition of RI indicates that the entity facilitates bilateral or multilateral exchanges by playing a supporting role to their partners. However, occasionally, the entity needs to take on leadership roles to gain some control over the created network. The main goal of RI is to transfer knowledge from one partner to another in order to assure progress of this specific partnership. Accordingly, such entity as a non-profit organization is expected to be impartial to all network members regardless of their size, resources or power standing. The previous literature identifies several requirements that are necessary to maintain the role of innovation broker. Accessibility and trustworthiness of the RI belong to one of the most important premises (Kolodny et al., 2001). On the other hand, the adherence to certain preferred network partners or strategy developments invalidates the RI's neutral position (Winch et al., 2007). However, as the RI has own objectives to satisfy, the assumption of impartiality cannot be completely accepted (Klerkx & Leeuwis, 2008). Consequently, the study rejects the impartibility of RI in favor of more deterministic idea of architect builder, who as the agent, takes on a dual role to effectively broker the relationship between SMEs and multinationals.

Over the past decades, there has been a growing interest in the study of the roles of RI. In the earlier literature, the primary roles of RI were associated with more passive approach which involved

facilitating knowledge and technology transfer from one partner to another (Becker & Gassmann, 2006; Yildiz et al., in progress). It is interesting to acknowledge that the term of brokerage has evolved to cover multiple roles of the agent, including active involvement in constructing the network structure as well. In general, the role of intermediary has expanded to consist of a broad spectrum of activities which can be categorized into three groups: co-development of innovation, network facilitation and network governance (Yildiz et al., in progress).

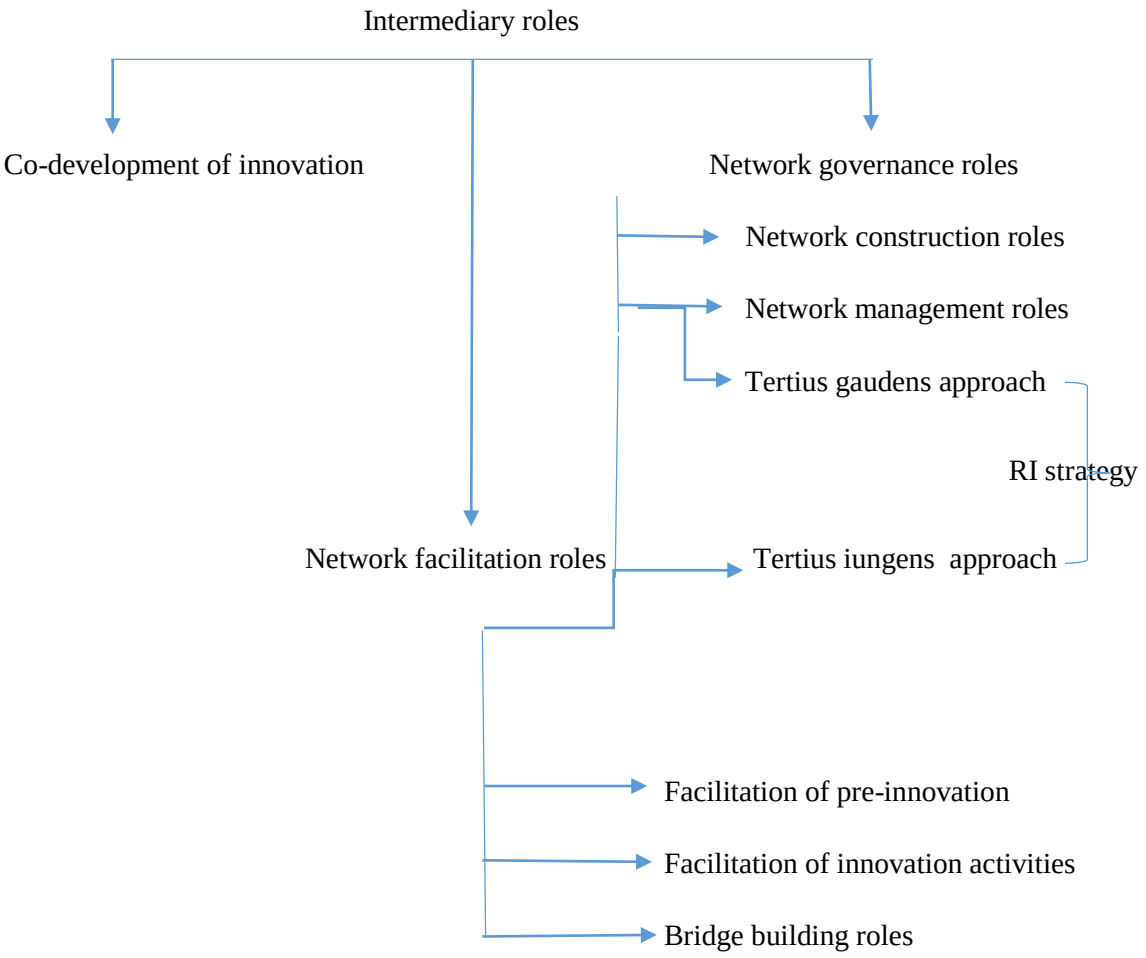

Figure 1: RI roles, adapted from based on the study of Yildiz et al., (in progress)

The co-development of innovation refers to an active engagement of an intermediary in the innovation process by combining disperse knowledge and exploiting it to serve the needs of all partners (Mina et al., 2009; Zeng et al., 2010). Subsequently, the intermediary's role as a network

facilitator involves creation of the necessary conditions for promoting knowledge and technology transfer among the diverse actors in the network. The last role, network governance, includes such activities as network construction and management of network ties. They involve, among others, accessing managerial know-how, contacts, troubleshooting and risk assessment skills to strengthen the network (Yildiz et al., in progress).

According to the study of Yildiz et al., in progress, the last two groups of intermediary roles are mostly passive, with only a few exceptions. Even though the study makes a significant step toward changing the 'outdated' perception of intermediary as a passive actor, the classification disregards the arising stream of literature devoted to intermediaries' deliberate efforts to act not only as bridge (tertius iungens approach), but also as a party that disconnects the partners (tertius gaudens approach). The presented research highlights that prior literature has given an oversimplified view of brokerage. As the role of RI becomes a much more complicated (Lingo and O"Mahony, 2010), the study acknowledges that research intermediaries might actively follow several strategies to shape the structure of their network. The roles of RIs that sometimes divide, sometimes reconcile, have implications for other partners (Vernet, 2012), and hence, should be addressed by the current literature. Figure 1 presents graphically the more extensive classification, including the additional component of RI's network strategy.

The role of RI has been extensively discussed by the previous literature. The studies draw on the following theoretical basis: role theory (Schein 1988), agency theory (Gallouj & Gallouj, 1996) and social network theory (Werr and Styhre, 2003). According to Chesbrough et al., 2013, the innovation literature has not paid enough attention to power relations and interdependence between partners. Mediating relationships can change social interaction between actors, and understanding these dynamics can be important for grasping the interdependent relationships between the involved parties. Hence, this study aims to explain how intermediary agents operate and use social capital to mitigate own and SMEs dependence on larger partners.

Differing from previous studies, this paper explores the role of RI not in relation to the innovation process, but in connection to the tensions deriving from collaborations between RI and its network

partners. The paper suggests the integration of the concept of resource dependence (Pfeffer & Salancik, 2003) into the theory of social capital to emphasis both power and social relations in the context of the innovation network.

Social capital theory plays a crucial role in understanding the functioning of RIs. Hereby, we define social capital as the web of social relationships between RI and its partners that facilitate action to create value by developing norms, values and obligations that yields potential opportunities for the members (Autio & Sapienza, 2001; Adler and Kwon, 2002).

Social capital, as described by leading advocates such as Robert Putnam (2000), refers as much to the negative consequences of networks as to the positive. Even though, there is an increasing recognition that frequently one person's benefit from social capital is at the opportunity cost of the exclusion of another, most research takes into account only positive aspects of network relationships. Nevertheless, it is evident that members of the network are often limited by the network boundaries. Some firms are unable to take advantage of some opportunities because the network does not provide access to the appropriate resources and does not allow them to gain through other network ties. In that sense, network relationships built over time become self-reinforcing. Firms may solely access and/or develop resources allowed by their network ties (Hitt et al., 2002). There is risk that firms lose their freedom of action as they are constrained by other actors (Pfeffer, 1987). Such constraints are explained, among others, by political behavior of the partners.

In this regard, the literature on inter-organizational systems has identified two types of capabilities that brokers can develop to mediate inter-organizational processes: bonding (strong ties) and bridging ties (weak ties). The former concept refers to the existence of strong connections within homogeneous groups that often exclude interaction outside the group. In contrast, the agent with a high level of bridging social capital, tends to build and seek new contacts by entailing interaction between different social groups (Woolcock and Narayan, 2001; Putnam, 2000; Eklinder-Frick, 2011). According to the recent literature, combination of bonding and bridging ties facilitates collaboration among network members (Camisón & Forés, 2011). On the other hand, the adherence to bonding ties

involves the risk of ‘lock-in’ (Parra-Requena et al., 2009) while adherence to bridging ties can erode trust among the involved parties (Ahuja, 2000).

Cross theory research provides a more holistic view regarding brokerage at the individual level (Kirkels et al., 2010). Within the differentiated network of RI, both social theory and resource dependency theory (RDT) are required to understand the full range of partner relationships. Social capital perspective focuses on the patterns of relations in networks and their influence on opportunities, constraints, and behaviors. In contrast, RDT focuses primarily on economic factors that govern the willingness to form relationships (Rowely 1997; Wellman et al., 2001). The theories utilized in this study are complementary to each other and can give insights on different aspects of partners’ actions. In this regard, the resource exchanges result in relationship boundaries which are analyzed by the social capital theory. The willingness and intensity of interaction among partners is analyzed using RDT where more emphasis is put on economic factors.

RDT holds that firms are resource-insufficient and as a consequence, they need to acquire and depend on resources from the external environment (Pfeffer and Salancik, 2003). Among others, through external networks companies gain access to expertise (Katz & Martin, 1997; Melin, 2000), resources (Heinze & Kuhlmann, 2008; Vanrijnsoever, Hessels, & Vandeberg, 2008) and knowledge spillovers from the peers (Heinze & Kuhlmann, 2008). SMEs attracted by the mentioned benefits can ignore a fact that collaboration with RI involves facing other actors in its network. As the literature has already acknowledged, the network partners might begin competing for the limited resources of the RI which at the end will produce dysfunctional behaviors within the network (Hitt et al., 2002; Piezunka, 2014). RI as a non-profit firm aims to impartially facilitate collaborative ties among heterogeneous partners. However, without the active intervention, such entity can promptly become dependent on more powerful network actors and be forced to satisfy solely their interests, treating the needs of less influential parties as redundant.

The challenge for RI is to proactively and effectively manage incompatible and competing demands of the partners. RDT asserts that in such situation, the main focus of an organization is to minimize its dependence on other partners in the network. Several approaches are identified by the

previous literature. Following the study of Pfeffer and Salancik (2003), one scenario foresees that the RI could follow the strategy of prioritizing its responses to demands based on the importance of resources controlled by the network actors at a particular point in time. However, this approach is not free of limitations. SMEs as the resource constrained party have restricted access to the attention of key decision makers in the network and such reduction of dependence does not apply to the most powerful actors, who actually create the threat in the first place. Drawing on more dynamic view, another option involves the RI to be selective in disclosing information, censoring information transferred to different actors, and even, reducing input from the network actors (Pfeffer and Salancik 2003). The scenario could enable RI to manage the conflicting demands as long as such action does not jeopardize its relationship with the network actors. The last approach requires the RI to play one group against another (Oliver, 1991). By acquiring relevant information on challenges encountered by its external actors, the agent can use the situation to its advantage. Thereby, the RI can ward off pressure on certain issues by relying on the other actors who are outside the problem scope. The approach refers to the more dynamic view of RI which as the agent, takes on a dual role to effectively broker the relationship between SMEs and their larger counterparts. In this regard, the recent literature recognizes two strategies: tertius gaudens and tertius iungens (Obstfeld, 2005).

The agent who is tertius gaudens gains economic advantage because the other two agents in the network are unconnected or in conflict. Tertius gaudens has favored access to information and controls the game between the actors due to the asymmetry of information. By positioning itself between two unconnected/conflictive firms, it has access to two different flows of information. According to Burt (1992), tertius gaudens can enjoy several benefits from such network position. First of all, it can learn early on about activities in different groups which at the end will lead to the exposure to new ideas. Secondly, the more diverse tertius gaudens' range of contacts, the more it is attractive for other actors to join the network. Finally, such agent gains the opportunity to control the flow of communication between other actors and hence can use this power to its own advantage (Burt, 1992). The presented approach includes only the development of information and control benefits from an existing structural hole. The more dynamic approach sees RI as the architect builder, who fills the structural

holes to gain a strong position in the network. The strategy is applied when tertius gaudens intentionally reinforces its domination over existing ties by withdrawing or adding ties to its network. For instance, adding a competitor to the network creates unwillingness of cooperation among parties and need for mediation role. This way, the agent not only provides new opportunities for the members, but also generates new tensions for them. In fact, a structural hole involves tension (Burt 1992), implying *"no tension no tertius [gaudens]"* (Pathak et al., 2014).

On the other hand, Tertius iungens strategy is defined as: "a strategic, behavioral orientation toward connecting people in one´s social network by either introducing disconnected individuals or facilitating new coordination between connected individuals'' (Obstfeld, 2005, p. 102). Thus, Tertius iungens gains economic advantage from bringing other parties together. Following the argument of O'Mahony and Bechky's, those entities are advised to bridge the differences of the collaborating parties, without threatening the core values that make them distinct. What is equally important, tertius iungens approach facilitates building strong ties (Wagner, 2009). According to Granovetter (1973), a strong tie is built by frequent and direct interaction that is path-dependent. Namely, strong ties provide access to redundant information as over time the degree of connectedness increases and network members enjoy access to similar information (Henderson and Venkatraman, 1993; Wasserman and Faust, 1994). As a result, there are both advantages and disadvantages to promoting the development of strong ties among partners. On one hand, trust and mutual cooperation among the partners is enhanced, on the other, the diverse knowledge exchanges become highly limited (Granovetter, 1973).

Lingo and O"Mahony (2010) research shows that brokers need to switch between tertius orientations in order to accomplish their objectives. The presented research contribute to this idea by suggesting that depending on the specific context, the RI adjusts its strategy accordingly- an act that have received very little attention in the literature up to this point. The personal goals and the environment may influence the range of RI's strategic activities. It is still unclear what type of strategic activities RI enacts towards local systems (Howells, 2006). Kirkels et al., 2010 give evidence that none of RIs in their sample indicate a tertius gaudens orientation as they all report to have a tertius iungens orientation towards SMEs and MNCs. Nemeh et al., 2012 shows that the closer the R&D

program of RI is to the market stage, the less tendency of a firm to collaborate with a competitor, inferring the necessity of a tertius inguens approach of the RI . Similarly, the previous literature indicates that firms tend to collaborate less with rivals regarding the existing capabilities, particularly core competencies and collaborate more in relation to peripheral or non- existing activities (Prahalad & Hamel, 1990; Nemah, et ., 2012). As a consequence, RI is expected to adopt tertius gaudens orientation towards partners collaborating on non-existing and peripheral activities. Otherwise, tertius inguens approach is foreseen.

Methodology

This study opts for qualitative research approach, specifically case study approach. The decision to adopt this method is justified as follows. First of all, qualitative research seeks to understand phenomena in context-specific settings (Patton, 2002). This design matches perfectly the purpose of this study since the interaction between partners is strongly embedded in specific, organizational set-up of research intermediary. Secondly, Strauss and Corbin (1990) indicate that qualitative method is used to better understand phenomena which have not been fully investigated by other researchers. Taking into account that the phenomenon of research intermediary's governance role has received very little attention from the field, this approach is suitable. Thirdly, the case study is used often in investigating the decisions and behavior of groups and individuals within organizations and intercompany relations (Halinen & Törnroos, 2005). This approach is the most suitable for the study of business relationships since it enables the examination of the phenomenon which is hard to be detached from its context, but nevertheless, required to be studied this way in order to fully understand its dynamics (Halinen & Törnroos, 2005; Yin, 1989).

The study focuses on an in-depth single case study of RI, Holst Centre. The choice is justified by the following reasons. First of all, Holst Centre provides research activities for the firms of all sizes and therefore, constitutes an excellent setting for the study. Secondly, it is considered as a successful example of the RI's organization, providing a chance to investigate how the entity is able to achieve

the outstanding performance. Finally, the Centre is also an example of "triple threat", a term used by the recent literature to define a RI which can "do all" as it fulfills the previously mentioned roles: co-development of innovation, network facilitation and network governance (Zeng et al., 2010; Yildiz et al., in progress).

During the sampling process, the researcher needs to manage the trade-off between breadth and depth of the investigated subject. On the one hand, in-depth single case studies contribute to the rich understanding of a particular context. But on the other hand, it involves the risk of providing rather idiosyncratic situations, which can cause difficulties in reaching the final results. In contrast, multiple case studies give the possibility to obtain valuable insights through cross-case comparison. However, the analysis of the cases could result in superficial conclusions (Bizzi & Langley, 2012). In order to balance this trade-off, a single case study, including diverse type of informants is conducted. In this regard, the study opts for non- probability purposive sampling (heterogeneous), selecting a sample of information rich respondents '' (…) [from who] one can learn a great deal about issues of central importance to the purpose of the inquiry" (Patton, 2002, p. 230). The informants include executives and managers of firms that differ in size category, industry and status of membership. The heterogeneous sample provides the maximum variation possible in the collected data. The rationale for selecting this particular kind of sample is to enhance richness, validity and depth of information obtained (Eisenhardt, 1989). Further details and a list of case study organizations appear in Table 1.

The company	The interviewee	Location	Status	Descriptive data
Holst Centre	Programme Manager	Eindhoven, High-tech Campus	Research Intermediary	Turnover: non-profitable organization Employees: 170 Founding year: 2005/6 Industry: R&D
Roth & Rau	Development Manager	Eindhoven	Middle enterprise, participant	Turnover: 77 €M Employees: 100 Founding year: 1989 Industry: integrated system production
Smit Ovens	Engineering Manager	Son near Eindhoven.	Middle enterprise, participant	Turnover: 20€M Employees: 40-45fixed + 30-35 flexible Founding year: 1936 Industry: Solar panels
InnoPhysics	CTO and co-founder	Eindhoven	Micro enterprise, non- participant: European founded projects with Holst	Turnover: unknown Employees:5 Founding year: 2009 Industry: Ink equipment
Maastricht Instrument	Director Business Development	Maastricht.	Small enterprise, non-participant: license agreement with Holst	Turnover: 2.8€ M Employees: 15 Founding year: 1998 Industry: Medical commercialization
Qolpac	Chief Executive Officer	Amsterdam	Micro enterprise, non- participant: project based arrangement with Holst	Turnover: unknown Employees: 8 Founding year: 2011 Industry: Healthcare mobile
Philips	Principal Scientist	High-Tech Campus, Eindhoven	multinational, participant, initiator of Holst existence and participant	Turnover: 32, 22 $ B Employees: 115, 365 Founding year: 1891 Industry: several e.g., lighting

Table 1: Primary data sources

Even though interviews are considered as valuable source of information, they are generally based on subjective interactions, which are influenced by memory loss and the quality of the relationship between the interviewer and interviewee. These limitations suggest a need for using the data triangulation, a strategy that aims at improving the data credibility (Yin, 2003; Bizzi & Langley, 2012). As a result, the primary material collected by interviews is also supported by the collation and

synthesis of the secondary documents. The combination of interviews and written documents enable to capture the broader aspect of the examined issue.

Patton (2002) states that validity and reliability are two factors which should be taken into account by a researcher while designing and judging the quality of the study. The construct validity is strengthened since the occurrence of chance is eliminated by triangulation technique as much as possible. Overcoming this limitation is essential as only single case study is adopted in this research (Doorewaard & Verschuren, 2010; Gibbert et al., 2008). The reliability increases when the method of data collection is systematic (Sekaran, 2003). Consequently, the semi-structured form is chosen for the interviews because it is reasonably standardized and comprehensive approach (Eriksson & Kovalainen 2008, 82), while interviewees can still feel free to indicate their own point of view (Flick, 1998). The reliability of the data is also strengthened by sending the transcripts to the respondents, who receive opportunity of verifying the misinterpreted information. Additionally, the technical content of the study was verified by the scientist of Netherlands Organization for Applied Scientific Research (TNO).

In order to stimulate theoretical ingenuity and insert rigor in the research process, providing some degree of comparison into a study is recommended (Bizzi & Langley, 2012; Gibbert et al., 2008). Specifically, two forms of comparison are employed in this study: comparison across relationships and with theory. For that purpose, qualitative comparative analysis was conducted. The approach involves dichotomizing the interviewees' answers regarding their goals, activities and behaviors, taking into account the background knowledge (previous research and archival data). Finally, based on the recommendations of Miles and Huberman (1994), I aim also for the thematic content analysis where the predefined themes of the interviews are broken down into sub-themes. The analysis is the iterative process, which results in the renaming of some categories and the collapsing of others (Browning et al., 1995). Each piece of data is analyzed individually and then compared to identify common patterns. The data were coded using NVivo software.

Research context

Holst Centre is a joint research initiative set up by two founding organizations: imec (Belgium) and TNO (the Netherlands), with the financial assistance from the Ministry of Economic Affairs of the Netherlands. The company has been launched in December 2005 as an open innovation Centre that develops leading-edge technologies in the field of Wireless Autonomous Sensor Technologies and Flexible Electronics. Holst Centre conducts R&D activities not just for the sake of technological progress, but to meet the challenges faced by the society with regard to such areas as health, renewable energy or safety.

There are a few key characteristics of Holst's business arrangement. A key feature of the intermediary's partnership model is that powerful multinationals work closely with local SMEs, creating a competitive environment for the continuous innovation of consumer-driven technology. The first strategic partner to come on board was Philips Research, being followed by other multinationals such as ASML and Panasonic and several SMEs such as Roth & Rau and Smit Ovens. Since 2005, Holst Centre has grown into a success story, leading currently to more than 45 industrial partners and a research staff of 200 people from 28 countries.

The RI's collaboration with industry is built around shared roadmaps and SRPs. Due to the flexible arrangement, there is no accepted definition (Connell & Probert, 2010). According to TNO, the phenomenon is defined as a specific innovation eco-system, in which partners collaborate together, share the costs and technical risks of R&D as well as accelerate market acceptance. Holst Centre and its partners are engaged in two types:

• Technology Integration Programs – connect the application domains to the technology challenges and approve technology by means of prototypes and trials.

• Technology Programs – translate the technology challenges into research roadmaps (determine partners' long term strategy and content of the programs) and provide fundamental understanding of new development trends. In the present study, there is a focus on the Technology Program 2 which is

involved in the topic of Organic & Large Area Electronics, specifically organic light emitting devices (OLEDs) for lighting.

Another key feature of the model is the multi-partner programs, where several industrial partners pay together a fee to get access to research results developed during the program(s). There are two kinds of fee, entrance fee and yearly fee. Only those companies, which enter the program in the latter stage, are required to pay the former fee. This ensures the equal input from all partners as the distinction between earlier and later entrants is made. By paying the entrance fee, a new partner receives access to background knowledge developed within a program prior to its involvement. However, this arrangement is limited to the background knowledge required to exploit the foreground which consists of a knowledge being the outcome of the program participation.

The principle behind SRPs is not only to share costs, but also new knowledge generated through information-exchanges, joint work and cross-fertilization of experience. Through SRPs partners can collaborate together directly, but also indirectly. The direct way involves knowledge transfer between program partners while indirect approach involves knowledge transfer through intermediary. What is 'transferred' from one partner to another changes together with the knowledge status of the industry, the objectives of collaboration, barriers, incentives and contractual agreements.

Typically, the findings obtained from their SRPs aim for products that can be launched on the market within three to ten years. Holst is engaged up to demonstrator level while bringing the product to the market is an individual responsibility of partners. Accordingly, the cooperation with the intermediary is concentrated on early phases where potential commercial value starts to emerge out of basic research. Organizationally, the provision of knowledge rests on flexible staffing arrangements by which Holst's highly- educated employees work alongside researchers from resident companies. In this regard, the Centre introduces the so called resident model, meaning that its employees are the core of the research project, while industrial members can station employees (residents) within a project team. For that purpose, residents are allowed to use Holst's facilities (MiPlaza). Located in building 31 of High- Tech Campus, Holst possesses over 200 office spaces, including high-tech infrastructure such as clean rooms, sophisticated research equipment and labs, as well as all accompanied know-how. The

mutual collaboration ends when the project is getting closer to market. At this point, partners take the project out, conducting the final development themselves. It includes, for instance, gaining new partners and intellectual property (IP).

Holst Centre supports close interaction among partners after the pre-competitive stage is over as well. All players enter into a constructive interaction, in which they discuss the obtained results and possible applications. Open networking is enhanced during sessions on which invited companies can demonstrate their technological possibilities. During those gatherings, the intermediary and industrial partners have the possibility to explain what kind of work has already been done. The audience needs to identify if those results can be linked to its activities. That is, SMEs are supposed to identify if they can, for instance, use and improve further partners' technology, develop new technology based on what is already available, or provide services for partners in the future. When such opportunity occurs, the collaboration between partners who can contribute to the project is initiated. The model is summarized in Table 2.

Resident model	
Residents:	Work in Holst Centre teams on topics relevant to partner Participate in team meetings Transfer of know-how to partner
Semi-annual partner meetings:	Review of technical progress Discuss activities next period
One-to-one meetings:	Sessions at Holst Centre and at partner premises
On-line information	Sharing on Holst Centre Share point Quarterly progress reports Technical notes News and background information

Table 2: resident model

Another important feature is the IP research model is the co-ownership of patents and non-exclusive rights to use the results generated by the program(s). While access to foreground IP is ensured upon joining, access to background IP developed at the Holst by the research intermediary and/or other partners needs to be further agreed upon. Non-exclusive IP agreements are the standard,

but exceptions can be made for some residents to conduct exclusive R&D and hence, become the sole owner of the developed IP.

Subsequently, Holst Centre is involved in active partner portfolio management as different competences are required at different stages of SRPs. It might require some partners to phase in or phase out. Simultaneously, the intermediary opts for effective partner portfolio management, meaning that all key competences are in-house at the right time, by defining clear technology roadmaps, mapping the existing knowledge and implementing partner selection strategies. The main aim is to bring different parties to jointly undertake SRPs. Holst Centre works together with partners across the value chain ranging from materials and equipment to end users (see Table 3). It enables to bring together otherwise disperse knowledge from different stages of the chain.

Case study Partners from the entire value chain	
R&D	TNO, imec, Holst Centre, TU/e
Materials	NeoDec, Rolic Technologies
Equipment	Smit Ovens, ASML, nTact, Spgprints, Roth & Rau,
End User	Philips, Panasonic, Maastricht Instrument, Samsung, Qolpac

Table 3: Case study partners in SRPs and sub- programs

Diversity is recognized as an essential asset to the management active within the Centre. This does not only include diversity in partners' knowledge competences, but also diversity in partners' firm size and nationality. The participating companies consist of regional large multinational companies (e.g., Philips and ASML), foreign multinationals (e.g., Panasonic and Samsung) and several of regional SMEs (e.g., Smit Ovens, NeoDec, Rolic Technologies and Roth & Rau[1]). It is necessary to acknowledge that small companies, such as Maastricht Instrument and Qolpac do not take part in SRPs, but collaborate with Holst Centre through sub-programs. Due to the financial constraints, short time- to- market, and focus on niche market, small entities are less suitable for SRPs than middle-sized enterprises. However, they are open to new arrangements that can partially overcome their

[1] The companies do not draw on the resources of mother companies, therefore, are regarded as stand-alone entities.

disadvantages. Consequently, they are engaged in sub-programs, enjoying and paying for only certain outcomes of the programs.

Findings

Holst Centre as a non-profit organization aims at accomplishing the mission of enhancing the innovative power of all of its industrial partners. Its mission is stated as follows:

''To be a world-leading open-innovation R&D centre, creating generic technologies in the fields of Wireless Sensor Technologies and Flexible Electronics, enhancing the innovative power of our local and international industrial partners by bringing together their researchers with our own talent and researchers from our academic partners to jointly execute shared research programs.''

However, the impartibility in building the innovative position of each partner is not always possible as the Program Manager of Holst Centre states:

"*we started it seven years ago and every day we learn how to deal with it, because it is not simple to have a big players and SMEs together in one box (...) We would like to team- up with everybody, but knowing that you have already some big partners on the board, some partners will be hesitant to do it. (...)Some companies [SMEs] like to join because there are some big players on the board. This gives them an idea in which direction these big companies are going. However, some [SMEs] might feel it as a threat that these big ones will be too dominant.''*

The RI is required to balance different kind of demands addressed by its partners who have a direct influence on its present and future position. On one hand, MNCs provide significantly higher financial contribution to SRPs than financially constrained SMEs. On the other hand, European Parliament and the Dutch Government enact various policies that stimulate their R&D activities and collaborative research among SMEs (TTR-ELAt, 2013). Besides the contribution of partners, a significant part of the RI's budget is provided by EU and the Dutch government. The science system of the Netherlands is organized in such a way that there is direct link between the providers of

European funds and RIs. According to OECD, the total amount of public funding necessary to enable the further growth of the Centre in the next years is estimated at EUR 72 million. This budget was provided in 2012 by mutual effort of several public organizations (TTR-ELAt, 2013). In return, Holst Centre is responsible for promoting competitiveness of Dutch companies, in particular SMEs, which will create employment and will stimulate the economy in the Netherlands.

Taking into account that electronics industry in the Netherlands is dominated by single powerful corporations such as Philips and there is increasing significance of SMEs in the industry, the RI is required to address its limited resources to both parties. However, as it is stated in Holst Centre's Annual Report of 2009: *"it is clear that collaboration with SMEs requires a different approach and dedicated agreements to fit in the open-innovation model."*

Holst Centre is required to facilitate the bilateral exchanges, playing a supporting role for SMEs which are disadvantaged by "liability of smallness" (Strotmann, 2007; Chesbrough, 2010). Nevertheless, the participation of SMEs depends also on MNC partners, who in this arrangement possess resource control. SMEs have to compete with MNCs for access to the RI's resources. Consequently, they need to face up to the dominant position of MNCs in the network, where these lead firms tend to impose their strategies and decisions on the RI's activities. The statement is confirmed by Principal Scientist of Philips, who claims that successful participation in SRPs is also a result of financial power:

''They [MNCs] are capable of paying so much more money. So, if you are paying 10 and SME is paying 1and you ask management of Holst what you are doing: request from the partner who is paying 10 or from partner who is paying1?"

Drawing on the existing theories, RDT and social capital, the study investigates how Holst Centre is able to reconcile competing demands that result from its mediation role between the heterogeneous parties, being at the same time independent from the influence of multinationals.

In accordance with the research of Lingo and O"Mahony (2010), the study gives evidence that the successful RI needs to deploy both the "tertius gaudens" and the "tertius iungens" approaches to

brokerage. It acts as “tertius gaudens” towards MNCs by intentionally creating the structural holes in their network. Such policy includes conscious separation of partners instead of connecting them in order to avoid the threat of lock –in. Philips has started collaborating with Holst Centre at the beginning of its existence being the largest financial contributor to the undertaking. Initially, Philips did not have to face any competitor in SRPs which has led to building a single strong value chain consisted of 8 suppliers of the material and machine makers, including such companies as Roth & Rau and Rolic Technologies. It seemed to be an ideal set up for Philips since all decisions regarding the content of the programs were made for its benefit. However, in 2008, the RI decided to introduce another company to the network- an equally strong competitor in terms of knowledge and resources, in this way creating a second “competing” value chain within the boundary of the program. In the name of open innovation, participating organizations in SRPs do not have the blocking vote to prevent the admission of a new partner. Consequently, Philips was required to accept the new partner losing its exclusivity in influencing the content of the program.

“We did not like it. We tried to avoid that, but there was no go, because at this moment Panasonic is paying more to Holst than Philips”(...) We were the largest contributor to Holst. And whatever we asked, they did it more or less. And now no, no, no.”

As the content of SRPs changes according to the needs of partners, Philips often need to be part of projects within programs which are general and even not in their immediate interest. This is also a reason why the employees of Philips visit often the premises of Holst with the aim of networking:

“that is very good that I am on a daily basis in Holst. Every morning I am there, not only for the official meetings, but coffee talk etc. So I do networking and maybe I get more attention that maybe you are allowed to have on a basis of financial contribution. That's a play”.

In fact, Holst Centre relies more on control than on trust. The intermediary’s control emerges from the tension created for the other players. Following the theory of social capital, one could argue that such tension would lead to a reduction of knowledge sharing for the RI. However, social capital theory argue also that the control and advantages of brokerage (having access to unique sources of

information or resources) are lost if the broker proved untrustworthy. For that purpose, each research program is managed by a program manager who is responsible for preventing any imbalances. Research contribution of the participating parties and transfer of research results to them are closely monitored. Parties are confronted in case there is imbalance between knowledge acquisition and knowledge contribution. Consequently, as the between- party, the broker becomes the solely recipient of knowledge flows from potential global players, who are eager to collaborate with the intermediary in order to benefit from possible knowledge spillovers:

" a lot of knowledge is falling into the competitor; not only to Holst and to non-competitive partners but also to competitive partners. Whatever I am telling on Wednesday, on Thursday there is a phone call from Holst to Japan [Panasonic] telling what I have told them [Holst]. So, I have to be careful what I tell them [Holst]. It is a little bit difficult also for me. "

Knowledge spillovers going to rivals affect the actor's profitability negatively as it benefits direct the competitor (Czarnitzki and Kraft, 2007). However, firms tend eagerly to protect their core businesses and are more willing to form collaboration linkages involving peripheral activities which offer opportunity for learning and less vulnerability from sharing core information (Hamel et al., 1989; Lorange and Roos, 1993). For many multinationals, the technologies developed within Holst Centre do not yet belong to their core –businesses, but they are expected to become important for their activities within a number of years. By participating in SRPs, these companies get insight into the latest technological trends and developments. Organic & Large Area Electronics [OLAE] is seen as a new class of electronics with an enormous market potential covered by five major application areas, i.e. displays, lighting, photovoltaics, organic electronics and integrated smart systems. New OLAE products such as OLED (organic light emitting devices) displays are already on the market while other organic applications such as OLEDs for lighting are close to market entry. In this regard, materials development allows the demonstrations of applications but manufacturing processes are still revised.

The case study reflects on the " learning race" between Philips and Panasonic on the manufacturing activities in the area of OLEDs for general lighting applications. The technology represents an enormous economic and technical opportunity for lighting manufacturers and their

supply chains. As such it is seen as an another source for many new technologies. According to recent market research studies, sustainable products based on the materials such as organic semiconductors will have an annual value of hundred billion Euros in the next decades (See Figure 2). Therefore, the technology is becoming a top priority research effort for many companies worldwide, including industrial partners of Holst Centre.

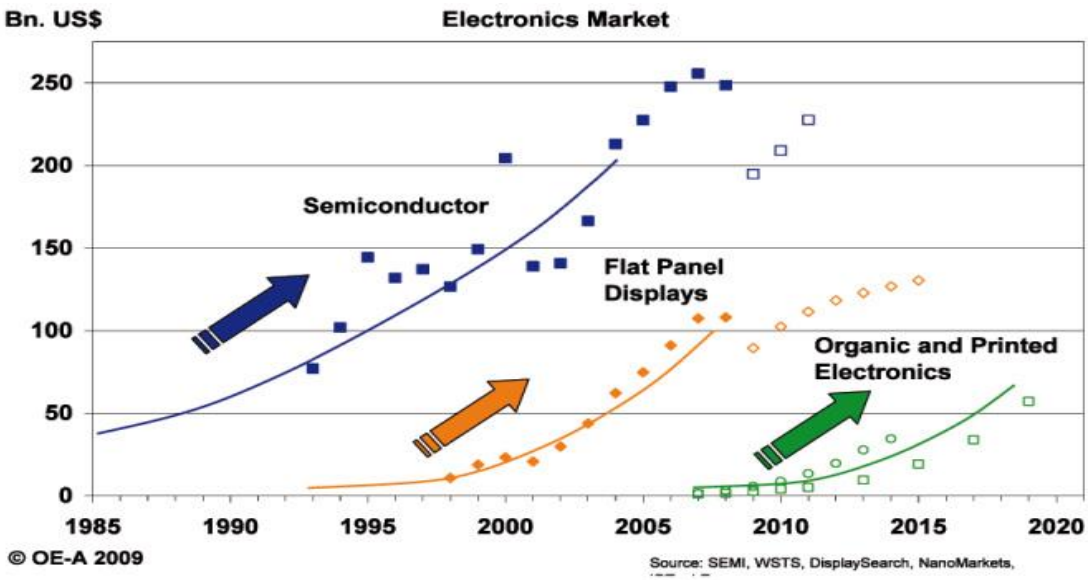

Figure 2: Expected Market growth of OLAE products

By creating the tension between the main players, the intermediary has not only gained the controlling position in the relationship, but also has led to reduction of SMEs' resource dependence on larger partners. This is further explained as follows.

There are several reasons why SMEs are willing to be engaged in SRPs. One of them include attractive network base where potential clients are identified. Indeed, by participation in SRPs, SMEs gain large client by satisfying their specific technological needs and consequently, enhancing future demand for the product: *"they do not make a material because they like the properties, they make materials with properties which are just suitable for simple encapsulation of Philips products."* Co-specialization is an enabling factor in building strong relationship with multinational partner, but it

also limits the number of options for SME to diversify and change collaboration ties, creating the threat of lock- in if a company is too dependent on its client (Hassink 2005).

For that purpose, research intermediary acts as the tertius iungens towards regional SMEs by either introducing disconnected SMEs to international parties or facilitating new coordination between connected parties. This way, Holst Centre creates opportunities for SMEs to access the various markets and knowledge sources needed to build lasting competitive advantage. It is important since SMEs are expected to have unique and relevant value for multinationals' supply chains. Otherwise, program partners could decide to buy their offer externally instead of accepting another partner with much lower financial contribution. As a result, the RI with proper mechanisms brings them into the centre of the partners' development processes. Indeed, the unique character of the knowledge that SMEs are able to provide for different industrial partners puts them at the heart of innovation networks.

It is achieved through flexible co-specialization where SMEs cooperate with several customers through the ties of the intermediary. The introduced term refers to the production of small series of specially designed goods of a specific quality, usually for niche markets, but in this context the goods are provided for the frontier technology manufacturers at the early stage of market growth. Flexible production systems typically have the following five characteristics: reliance upon multi-purpose equipment to rapidly change the product specifications to the customer needs, continual innovation, clustering, networking and spillover effects.

The model has proven to be a particularly successful strategy in enhancing the competitiveness of innovative SMEs in SRPs. The participating parties make sophisticated and ever changing demands, which push SMEs to provide a continuous stream of innovations. It refers to the close relations between SMEs and their customers, the latter providing immediate feedback on technical specifications to the RI. Through continuous innovation achieved in cooperation with the research intermediary, SMEs can keep their position of leading players in their fields. Rolic Technology is the leading company in the world that is able to produce a specific kind of material- the product which is in the interest of Philips as well as of companies from other programs such as Samsung. Similarly,

Roth & Rau was “selected” to join SRPs since there is no other equipment company in the Netherlands which could fit in its specific position in the value chain. Currently, the Company is a leading provider of innovative inkjet and thin film equipment for high tech electronic applications. By keeping its competitive edge, Roth & Rau is able to provide service through the ties of the RI to such companies as Philips and Panasonic. This way, contrary to large parties, SMEs are provided with equally high quality alternatives, which in turn increases their bargaining power in this arrangement. Emerson (1962) in his research argues that power derives not simply from one’s having a large number of relationships, but specifically from having relationships with few key players who ought to be dependent to some extent on the cooperation. Enhancing resource concentration potential (centrality) requires new connections to well-connected places, while enhancing control potential requires new connections to poorly connected parties. In other words, actors may enjoy many opportunities to exchange resources, but they might have relatively little opportunity to exercise power over those exchanges. In this context, SMEs enjoy limited number of alternatives, however, these ties are strategically implemented to assure some control in this arrangement. Namely, Philips has option to purchase goods from different suppliers, but due to continuous innovation of Roth & Rau and Rolic Technology, such goods will be not of the highest quality on the market, reducing its bargaining power in the relationship with the SMEs and the intermediary. In general, four power structures can be distinguished: independence, buyer dominance, supplier dominance, and interdependence (Cox, 2001). In this arrangement, both parties aim for interdependence, where each party has some degree of influence.

In the business world, it very rarely occurs that SMEs are able to closely collaborate with several partners who are equally influential competitors to each other. Without bargaining power, firms are unable to take advantage of such opportunities because the network creates the boundaries distinguishing the inner groups – a phenomenon which is explained by the existence of bonding ties. In the presented case study, it is evident that SMEs are part of value chains where inner- members value “loyalty” as the respondent from Philips states:

"Roth & Rau is not interested where their machines will be applied. They do not care. They want to sell machines if it for the niche market of general lightening market. They do not care as long as they can sell. Rolic is trying to sell material. They are not interested if it is in niche market or lighting market. That is crucial which market is for the producer of the light source. That is, Philips or Panasonic."

Taking into account that the market leader has not emerged yet, the creation of collaborative ties with potential candidates has significant meaning. Due to mediating role of RI and organizational set – up of SRPs, SMEs are able to collaborate with key members who are recognized as competitors. The innovation broker assists SMEs in interacting with all partners and accessing their knowledge base that otherwise would be difficult or impossible to tap into due to inner boundaries of groups. Namely, the direct cooperation with the RI challenges the internal distinction between a member and a non-member solving the often occurred problem of inclusion to and exclusion from the internal group. As a result, SMEs can become a customer of any company:

"Roth& Rau is supposed to support the machine to make a barrier, but of course they can deliver to any company. If they only sell a few machines to Philips they cannot survive. They need the whole market. (...) basically you don't like it but that was the official original agreement that they are allowed to do so."

What is equally important, none of the SMEs' competitors can be introduced to the existing network without any consequences for the partnership as the Development Manager of Roth & Rau states:

'' We are now the partner in the program. For example, if our competitor would be asked to join, and we definitely would go to Holst and say: no, they would not join or we are out. And this all is covered by the agreement, which we have with them.''

According to the CEO of Qolpac the decision is justified as follows:

''if you have in the case of us something which is unique, we have more to lose then to gain in working with a competitor''

MNCs tend to impose their decisions regarding the direction in which the program should head. As the participating SMEs are highly specialized and technology developed in the programs belongs to their core businesses, the RI reduces SMEs' dependence on multinational players by assuring that the program content reflects their needs. For that purpose, SMEs take part in sub- programs, enjoying and paying for only specific content of SRPs. Accordingly, Maastricht Instrument only pays for using a specified technology developed within SRPs by the RI and its partners. On the other hand, the Engineering Manager of Smit Ovens claims that the SME has more influence on the content of SRP than its multinational resemblance:

''Our CEO is advising in Solliance Advisory Board[2]*. So, he is kind of important in Solliance Program. He has a lot of influence in defining the programs and pushing the programs in certain direction (...). He is not the only one, but I also know from other members of Holst programs, for example, from nTact [multinational SMEs], they do not have much influence on the program that we have.''*

Conclusion and research propositions

The study investigates the phenomenon of RI that consciously positions itself between heterogeneous actors who differ in size, nationality, backgrounds and competences. Although increasing attention has been paid to the brokerage activities, there is a clear lack of understanding regarding the RI's role of network governance. The previous literature has strongly emphasized the bridging role of brokers, dismissing the fact that the agents are required to follow different kind of strategies in order to satisfy their own objectives. Consequently, the study rejects the "outdated" perception of the intermediary as the passive agent and attempts to address the following question: how does a RI manage to facilitate social ties among heterogeneous partners without sacrificing its controlling position and partner autonomy?

[2] Solliance is the recent alliance between, among others, Holst Centre and Eindhoven University of Technology to provide SRPs in the area of solar energy.

In order to obtain a better understanding of the issue investigated, a qualitative case study approach is adopted, including semi-structured interviews and archival records. Theory-guided design gives opportunity to compare and complement the primary data collected across firms with secondary data, including literature review and conceptual framework. However, this approach also has several limitation that should be taken into account when interpreting the results. The study limitations are inherent to the drawbacks of qualitative research. First, the study is based on the evidence gathered from few individuals and few situations. The smaller sample size was inevitable given the study context requires rich and complex information about particular events. Such specific information resides with few principal individuals that are often hard to access (Baker & Edwards, 2012). Additionally, the study is conducted at relatively young RI, which is still exhibiting a significant growth in the terms of accepting new partners to SRPs. Accordingly, this raises the question if the results are also applicable to more matured and established RIs. Further research could address this question. Finally, the results presented in this study are regarded as tentative as they are derived from sample of Dutch R&D-based companies. But whether the results also hold for R&D-based companies in other European Union countries is a subject for future research

Given these limitation this study provides relevant insights on how a RI may deploy both the tertius gaudens and the tertius iungens approaches to brokerage. Obstfeld (2005: 120) argues that the language of structural holes is full "of competition, control, relative advantage, and manipulation." While the previous literature perceives tertius gaudens behavior in negative terms, this study emphasizes how the agent can use its unique position to impose indirect cooperation, accelerate customer-oriented innovation and contribute to the society as a whole. Consequently, the study shows that the tertius gaudens behavior of the intermediary does not benefit only the individual, but the collective.

Ibarra, Kilduff, and Tsai (2005) in their research claim that dominance of tertius gaudens approach in brokerage could hinder the creation of collective outcomes. The presented study claims that indeed, the intermediary needs to balance both approaches, but different network contexts represent different approaches that intermediary adopts to benefit the collective.

The case study intermediary belongs to organizationally complex RIs that are responsible for bridging the gap between industry and academia, and enhancing the competitiveness of all industry residents. For that purpose, the RI has developed a unique partnership model that fosters the accomplishment of this goal. A key hallmark of the RI's strategy involves creation of interdependence between SMEs and MNCs, forcing them to obey the autonomy of partners and make continuing contributions to the partnership. Mutual interdependency reflects the positions that the actors take in the network and the 'ties' that connect them. SMEs derive their power not simply from having a large number of relationships, but specifically from having relationships with a few key players who are dependent to some extent on the cooperation. The broker strengthens innovation capabilities of SMEs and connects them with strong multinational players to create for SMEs equally important alternatives. Although the previous literature has acknowledged that tertius iungens approach supports the creation of strong ties among partners, the set – up of the intermediary is designed to blur the inner- group boundaries. As the multinationals do not enjoy a similar advantage, they are eager to acknowledge the unique position of SMEs in the network despite their lower financial contribution to the programs. On the other hand, the RI gains control in the network as it positions itself between leading multinationals by intentionally creating the structural holes in the network. In this relationship, the agent is the controlling party as it becomes the only source of diverse knowledge which is of a high value to the partners. Accordingly, the presented research shows that RI gains controlling position in the network and reduces own as well as SMEs` dependence on larger partners through tertius gaudens orientation towards multinational partners and tertius iungens orientation towards SMEs.

Proposition 1 a*: Enactment of the tertius iungens strategy towards SMEs by RI reduces the SMEs' resource dependence on MNCs.*

Proposition 1 b: *Enactment of the tertius gaudens strategy towards MNCs by RI reduces RI's resource dependence on the MNCs.*

The enactment of tertius gaudens behavior by the RI does not jeopardize its relationship with the network actors even though the partners have a tendency to reflect this approach as well. By controlling the resource allocation and the distribution of benefits among the partners, the RI provides

a neutral platform for all partners to support the idea of open innovation as the model of direct and indirect collaboration. The RI imposes indirect cooperation between competitors who due to the benefit of knowledge spillovers are "eager" to be part of the network. Previous research shows that the actor could end the relationship with RI if it would have involved simultaneous cooperation with a competitor (Nemeh, et al., 2012). However, within SRPs, two types of programs can be distinguished. On the one hand, the programs draw on a firm existing capabilities constituting firms' core competencies. On the other hand, the programs attempts to build new capabilities or to open new business opportunities based on peripheral competencies of a partners. MNCs indicate a high interest in latter programs while local SMEs in the former.

As the firms tend to protect eagerly its core business and are more willing to collaborate on peripheral activities, the intermediary acts differently depending on the situation. When a firm's core business is threatened the RI assists this partner by facilitating information flows and research cooperation among partners instead of creating tensions for them. The situation is reverse when peripheral competences are involved. The more a program is exploration-oriented (March, 1991), the more companies are willing to collaborate indirectly with a competitor (Santamaria & Surroca, 2011) and, hence accept the tertius gaudens strategy of a broker. The statement leads to the following research proposition:

Proposition 2a: *Low core business integration of research partners acts as an incentive for the intermediary to enact the tertius gaudens strategy*.

Proposition 2b: *High core business integration of research partners acts as an incentive for the intermediary to enact the tertius iungens strategy*.

RIs play an crucial function in innovation as they have capacity to draw upon diverse sources of information. Innovation tends to emerge in environments where a high openness and diversity (heterophily) are present. Both determinants are difficult to manage, and heterophily is particularly hard to be achieved within network that is rather homogeneous (Rogers 2003; Koppenjan & Klijn 2004; Mulgan 2009; Bason 2010). Hence, spurring innovation might require the RI to position itself

between disconnected competitors. It creates tension for the actors, but it provides the agent with the possibility to draw on various knowledge sources that otherwise would not have been possible to be combined. The presented case study distinguishes between pre-competitive research which is close to the market (manufacturing processes) and which is already on the market (materials), but involves further innovation. As the innovation spurring achieved by the knowledge diversity is beneficial for the products which are still under investigation and do not reach the market stage yet, tertius gaudens approach is enacted by the RI for this type of goods. In this case, market leaders are still not identified, and hence, parties are not discouraged by tertius gaudens brokerage approach as they want to win the "learning race" that requires several competences (Hamel, 1991). RIs can easily tap into diverse knowledge of several competitors. Direct cooperation between competitors is hard to be managed and not always preferred (Gnyawali et al., 2008; Bengtsson et al., 2010; Nuojua et al., 2012). Partners are willing to sacrifice the knowledge leakages as the first partner who absorbs generated knowledge from the direct collaboration with RI and indirect collaboration with rivals will gain a competitive advantage. The situation is reverse for the products which has already been on the market. Firms aim to improve the innovativeness of their products and strengthen their positions on the market. There is no incentive for firms to accept a competitor to the network, but to gain the feedback from the value chain partners. Consequently, in this case, RI facilitates the collaboration by connecting partners along the value chain.

Proposition 3a: *Medium market readiness of a product acts as an incentive for the RI to enact the tertius gaudens strategy.*

Proposition 3b: *High market readiness of a product acts as an incentive for the RI to enact the tertius iungens strategy.*

The main contribution of the study is that it enhances the understanding of brokerage strategy by integrating social capital and resource dependence theories. As the previous literature has not directly investigated the determinants of tertius approaches, the study provides some important managerial implications. The tertius gaudens strategy is used by RI only when the situation does not jeopardize the relationship with a partner. SMEs are characterized by high specialization, exploitation of existing

core competences and short time to market and hence, do not experience this type of strategy as it would significantly undermine their business activities. On the other hand, MNCs experience the co-opetitive tensions, but they are willing to accept them due to extensive knowledge spillovers that increase their chance to win “the learning race” and explore new core competences. By comparing the findings with previous literature, some discrepancies can be identified. Contrary to the work of Kirkels et al., 2010, a RI draws on both approaches tertius gaudens and tertius iungens depending on a partner and its characteristics. Nemeh et al., 2012 shows that the closer the R&D program is to the market stage, the less tendency of partners to collaborate with a competitor, inferring tertius inguens approach of RI. The presented study contradicts the results as in this case, RI attempts to spur innovation by enacting tertius gaudens strategy while partners attempts to win the “learning race” by accepting this strategy. The discussion is summarized in the Table 3.

		Brokerage approach
Firm Scope	SMEs	Tertius iungens
	Multinational	Tertius gaudens
Core business	High core business integration	Tertius iungens
	Low core business integration	Tertius gaudens
Market readiness	High (on the market)	Tertius iungens
	Medium (close to the market)	Tertius gaudens

Table 3: Summary

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