



Establishment and embedding of innovation brokers at different innovation system levels: Insights from the Dutch agricultural sector

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ABSTRACT

In the systems perspective on innovation, co-operation between several different types of actors is seen as key to successful innovation. Due to the existence of several gaps that hinder such effective co-operation, the scientific and policy literature persistently points at the need for intermediary organizations to fulfill bridging and brokerage roles. This paper aims to provide an overview of the insights from the literature on such 'innovation brokers', and to contribute to the literature by distilling lines of enquiry and providing insights on one of the lines identified. Taking as an empirical basis experiences with different types of innovation brokers that have emerged in the Dutch agricultural sector, it identifies a number of tensions with regard to the establishment and embedding of such organizations. The paper indicates that, despite being perceived to have a catalyzing effect on innovation, innovation brokers have difficulty in becoming embedded as their clients and/or financiers find it difficult to grasp the nature and value of their activities.

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1. Introduction

1.1. Systemic intermediaries in innovation networks and innovation systems

Systems thinking in innovation studies has become widespread, inspired by approaches such as national, sectoral, and technical systems of innovation [1–3]. As Smits [4] states, innovation calls for an effective combination of hardware, software, and orgware. Hardware relates to the material equipment required, and software concerns the knowledge in terms of manuals, software, digital content, tacit knowledge involved in the innovation. Orgware refers to the organizational and institutional conditions that influence the development of an invention into an innovation and the actual functioning of an innovation. Hence, production and exchange of (technical) knowledge are not the only prerequisites for innovation; several additional factors play a key role, such as policy, legislation, infrastructure, funding, and market developments [5]. With the growing importance of user orientation and user involvement in innovation processes [6] and the trend of 'open innovation' [7], an important question is how to adequately perform networking for innovation [8,9]. Such networking is about establishing connections between the demand side (intermediate and end-users of innovations, such as firms) and the supply side (Knowledge Intensive Business Services [KIBS] and R&D providers) of the knowledge infrastructure,¹ as well as establishing other relevant connections (e.g. firms with other firms, firms with hardware suppliers, researchers from different disciplinary backgrounds).

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¹ Smith [10] refers to a knowledge infrastructure as a complex of public and private organizations and institutions whose role is the production, maintenance, distribution, management and protection of knowledge. These institutions possess technical and economic characteristics that are not dissimilar to those of physical infrastructure. Whereas this definition appears to focus principally on the supply side of the knowledge infrastructure, current innovation systems thinking emphasizes the role of the user in the co-creation of knowledge [4].

The formation and functioning of innovation networks and systems that provide for an effective combination of hard-, soft-, and orgware can be problematic however, because of the existence of several gaps. With regard to the nature of these gaps, one can identify cognitive gaps (actors from different institutional backgrounds have too much cognitive distance to adequately learn together [11], or have different norms, values and incentive systems which hinder effective communication [12,13]), information gaps (actors are imperfectly informed about possible cooperation partners and what these can offer, i.e. there exists information asymmetry [14]), and managerial gaps (actors are unable to acquire and successfully implement new knowledge and technology [15]). Furthermore, there may exist a 'system gap', which is about the fit of the innovation within the broader system and is related to issues like path-dependency, dominant designs, and system lock-in [5,16,17].

In order to reduce these gaps, which may lead to innovation system failures in the form of network and institutional failures [18], and effectuate adequate combinations of hardware, software, and orgware, there is a growing attention for 'systemic intermediaries' who connect the different components of international, national, sectoral and/or regional innovation systems [16,19–22]. At the micro level, there is also attention for such intermediaries in the context of innovation network formation [23,24]. Often, such systemic intermediaries are at least partially supported with public funds (see e.g. [22,25,26]), as system failures provide a rationale for government intervention [27]. This implies that the role of government becomes one of a coordinator, as Hearn and Rooney [28] argue, which these authors specify as mediator, organizer, and transformer. Nooteboom [29] sees a role for government in the facilitation of cluster formation and innovation network formation. Braun [30] states in the context of science policy that the focus of government activities in general and of science policy in particular becomes not the manipulation of the behaviour of scientists but the creation of interaction spaces, the reduction of transaction costs for inter-systemic and interdisciplinary co-operation and the maintenance of vigorous, self-organizing systems. Edler and Georghiou [31] discuss both demand and supply side measures of government in respect of innovation policy tools. With regard to the formation of adequate innovation networks, supply side measures include what they call information and brokerage support and networking measures, and demand side measures include systemic policies (cluster/supply chain policies) and support of private demand (including articulation of demand, awareness, and training) as key innovation policy tools. As the subsequent review will show, systemic intermediaries appear to combine both supply and demand side measures.

1.2. Objectives and scope

The goal of this paper is to explore experiences with such systemic intermediaries that act as brokers in the formation and maintenance of innovation networks and systems, with a focus on their establishment and embedding. We focus on innovation intermediaries that have brokerage as their main task and, like Winch and Courtney [26], we call them 'innovation brokers'. This paper continues with a review of the literature in which such systemic intermediaries are described in the context of an innovation systems perspective, from different thematic angles. This review highlights the emergence of a type of systemic intermediary that is fully dedicated to the facilitation of the formation and maintenance of innovation networks and innovation systems from an independent third-party position. From this review, two lines of further empirical attention are identified: one which deals with the organization level effect of innovation brokers on the innovation process, and one which deals with the embedding of an innovation broker in the knowledge infrastructure and the innovation system. The paper aims to contribute to the second line of enquiry by providing a description of the emergence of different types of innovation brokers in the Dutch agricultural sector, and an analysis of their embedding. Although the literature has touched on this topic, it has often not been the central focus of analysis, whereas it is important from an innovation policy point of view as the number of innovation brokers appears to be steadily growing [32,33]. By mirroring it to experiences elsewhere, several problems and dilemmas are identified with regard to establishing innovation brokers sustainably as an innovation policy instrument.

2. Theoretical background

In view of an innovation systems and networking perspective on innovation, with an emphasis on the importance for innovation of connectivity of a heterogeneous group of actors and the importance of exploring and exploiting 'weak ties' [34], 'structural holes' [23] or 'interstices' [24], systemic intermediaries have been studied in a range of disciplines. These analyses have been made in relation to topics such as inter-firm networking and clustering [35,36], organizing regional innovation systems [19], the interaction between science establishments and industry [37–42], the transition to context sensitive, transdisciplinary 'mode 2' science [43], and large-scale societal transition processes [22].

Names often coined for such systemic intermediaries include third parties, brokers, bridging organizations, technology transfer intermediaries, -infrastructures or -organizations, and boundary organizations, but many other names are used. It is beyond the scope of this paper to attempt to describe all the different names attached to such systemic intermediaries (see [32]). Although there is a wealth of literature, this literature has been characterized as *theoretically fragmented and fairly practical* [33], and according to Howells [32] it is a *burgeoning, yet surprisingly disparate, field*. Recently, there have been several attempts to synthesize the broad but dispersed knowledge (e.g. [16,20,21,26,32]). By way of synthesizing the many existing definitions, Howells [32] employs the broad term 'innovation intermediary', which is defined as *An organization or body that acts as an agent or broker in any aspect of the innovation process between two or more parties. Such intermediary activities include: helping to provide information about potential collaborators; brokering a transaction between two or more parties; acting as a mediator, or go-between, bodies or organizations that are already collaborating; and helping find advice, funding and support for the innovation outcomes of such collaborations.*

In the literature, intermediaries that fulfill brokerage roles in innovation have been studied from different angles. These deal with their functions, the degree to which innovation intermediation or brokerage constitutes their organizational identity, their relation to the institutional environment, and their influence on the innovation process.

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