Research Policy 42 (2013) 167–179

Contents lists available at SciVerse ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Knowledge-sourcing of R&D workers in different job positions: Contextualising external personal knowledge networks

Franz Huber*

University of Southampton, Management School, Highfield, Southampton SO17 1BJ, United Kingdom

ARTICLE INFO

Article history:
Received 29 June 2011
Received in revised form 5 May 2012
Accepted 17 May 2012
Available online 9 June 2012

Keywords:
Knowledge sourcing
Personal networks
Knowledge networks
Inter-organisational networks
Clusters
R&D

ABSTRACT

This paper systematically examines the role of external personal knowledge networks vis-à-vis alternative sources of work-related knowledge. Specific hypotheses on whether the importance of external personal networks varies for job positions, knowledge functions and sources of competitiveness are examined. The study is based on a survey and interviews with 105 R&D workers in 46 information technology (IT) firms in the Greater Cambridge Region (UK).

The results show that alternative sources of knowledge are considerably more important than external personal networks. Specifically, the results confirm the hypothesis that the lower the job position, the less important are external personal networks. The most frequent type of knowledge that is uniquely available through personal networks concerns business knowledge of senior managers rather than technological knowledge. Furthermore, the analysis supports the view that external personal networks are most important for exploratory keeping up-to-date than for problem solving. Finally, the paper shows that external personal networks are more important for firms whose competitiveness is primarily driven by being cutting-edge in technology.

Overall, the results suggest that academic theorising and R&D management/policy on external personal networks needs to be more context-sensitive and would benefit from differentiating between job positions, knowledge functions and types of firm competitiveness.

1. Introduction

The acquisition of knowledge as a key resource has been identified as a key topic for innovative firms and R&D policies. Importantly, since technological fields have become increasingly dynamic and complex, individual R&D workers face challenges in terms of sourcing relevant knowledge, which is often distributed across organisations and individuals (e.g. Galunic and Rodan, 1998; Kogut and Zander, 1992). It has often been argued that progressively, the distributed nature of networked R&D makes external sourcing of knowledge outside of one's own organisation important (Chesbrough, 2003; Howells, 2008; Howells et al., 2003; Huggins, 2010; Leonard-Barton, 1995; Macpherson and Holt, 2007; Nooteboom, 2004). Absorptive capacity, the ability to recognise, absorb and utilise outside sources of knowledge, has been identified as critical for organisations (Cohen and Levinthal, 1990). For instance, internal R&D activities enable knowledge networks with external scientists, which provide search benefits for innovation (Fabrizio, 2009), and it has often been pointed out that personal networks are critical.

However, the literature has often uncritically accepted, or even celebrated, the importance of external (inter-organisational) personal knowledge networks without empirically examining their exact role (Sunley, 2008). Although a few studies, particularly on small business and entrepreneurship, have already shed light on the functioning as well as the limitations of external personal networks (e.g. Edelman et al., 2004; Lechner and Dowling, 2003; Zhang, 2010), more critical empirical research is needed (i) to understand the contexts in which external personal knowledge networks are important/unimportant and (ii) to contextualise them vis-à-vis alternative sources of knowledge. Specifically, the question whether the importance of personal knowledge networks varies according to certain contexts such as job positions, certain knowledge functions and types of firms has been underexplored. Yet, an understanding of these contexts would help targeting networking initiatives in R&D management and policy.

This paper aims to address these issues by systematically examining the relative significance of external personal knowledge networks for R&D workers in the Cambridge IT (information technology) Cluster. The results are based on a survey and interviews with 105 R&D workers—including technology managers

* Corresponding author. Tel.: +44 2380592545.
E-mail address: f.huber@gatesscholar.org

0048-7333/$ – see front matter © 2012 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.respol.2012.05.010

and managing directors in micro businesses if they are actively involved in R&D—in 46 hardware and software companies in the Greater Cambridge Region.[1] The paper examines the importance of external personal networks vis-à-vis alternative sources of knowledge including the kinds of knowledge that are uniquely available through personal networks. Importantly, the paper tests whether the role of personal knowledge networks varies for different job positions, knowledge functions and the sources of competitiveness.

The results contribute to a more sophisticated understanding of the contexts in which external personal knowledge networks are significant or unimportant. This contributes to a more nuanced contingency-theoretic perspective on inter-organisational personal knowledge networks for R&D workers, which can facilitate more targeted networking initiatives in R&D management and policy.

The remainder of the paper is structured as follows. First, the existing literature is critically discussed, gaps are highlighted and hypotheses are developed in Section 2. Section 3 outlines the material and methodology of the study. Afterwards, Section 4 presents and discusses the results. Finally, Section 5 concludes and reflects on the implications and limitations.

2. Sourcing knowledge: personal networks and alternative sources

Section 2.1 outlines that much of the diverse literature on innovative, R&D intensive firms highlights the importance of external personal knowledge networks and key concepts are introduced. Afterwards, Section 2.2 identifies gaps in the literature and develops research hypotheses.

2.1. External personal knowledge networks

Inspired by the work of Lundvall (1992) on *innovation* systems, much of the literature on innovative firms has highlighted the vital role of interactive learning between organisations (Pittaway et al., 2004). For instance, in the software industry, it has been widely argued that knowledge networks, alliances and partnerships are essential (Grabher, 2004; Jordan and Segelod, 2006; Segelod and Jordan, 2004; Trippl et al., 2009). In the light of these thoughts, 'open innovation' has been proposed as a strategy of deliberately allowing inflows and outflows of knowledge across company boundaries to enhance innovation capability (Asakawa et al., 2010; Chesbrough, 2003). In general, it has been often argued that firms without external knowledge linkages face severe disadvantages in terms of innovativeness and commercial success (Enkel et al., 2009).

Such knowledge networks can represent *formal* arrangements such as official alliances, subcontracting, co-operative agreements, joint ventures, R&D collaboration or licensing (see e.g. Krätke, 2010; Lane and Probert, 2007; Powell et al., 1996). Yet, importantly for this article, much of the literature on learning and innovation has also stressed the importance of *informal* inter-organisational networks beyond officially planned collaborations and formal role structures. Individuals often know each other and interact beyond official business duties, which can lead to informal personal networks being an often invisible, but powerful, intangible infrastructure (e.g. Allen, 1977; Cross and Parker, 2004; Krackhardt and Hanson, 1993; Kratzer et al., 2008; Kreiner and Schultz, 1993; Rost, 2011). For instance, Weck and Blomqvist (2008) suggest that informal inter-organisational relationships are the main source of external knowledge for patent inventors rather than formal contractual arrangements.

The importance of external knowledge networks has been highlighted by different strands of the literature.

In the *open innovation* literature, according to the clarifying conceptual typology by Dahlander and Gann (2010), accessing external knowledge through personal knowledge networks—the topic of this paper—concerns non-pecuniary inbound open innovation.

In the literature on *innovative regions*, nearly all recent territorial innovation models have highlighted that networks between firms and organisations are critical for innovation and regional economic development (Boggs and Rantisi, 2003; Grabher, 2006). Knowledge relationships with (local or non-local) external partners are considered to be essential for innovative geographical clusters (Belussi et al., 2010; Cooke et al., 1997; Eisingerich et al., 2010; Huber, 2009). It has been argued that informal contacts across companies, often driven by inter-firm labour mobility, can lead to important inter-organisational knowledge linkages (e.g. Keeble, 2000; Mason et al., 2004; Saxenian, 1996). Moreover, the collective, and often informal, aspect of knowledge production in regional economies has been emphasised with reference to the notions of communities of practice and epistemic communities (Amin and Cohendet, 2004; Benner, 2003; Brown and Duguid, 2000; Håkanson, 2005). As one of the most sophisticated empirical studies, Dahl and Pedersen (2004, 2005) reveal that engineers in the wireless communication cluster around Aalborg have frequent contacts with each other (usually as former colleagues or classmates), which often leads to the receipt of useful work-related knowledge.

Also the *small business and entrepreneurship* literature has highlighted the importance of internal and external personal networks (Anderson et al., 2007; Bowey and Easton, 2007; Casson and Della Giusta, 2007; Chen and Wang, 2008; Collinson and Gregson, 2003; Greve and Salaff, 2003; Johannisson, 1998; Lechner and Dowling, 2003). External relationships can help entrepreneurs to source complementary knowledge as illustrated, for instance, by Macpherson et al. (2004).

Moreover, in terms of *network policies*, Huggins (2001) argued that policy initiatives which focus on informal networks work better in creating inter-organisational relationships than formal networks initiatives. Similarly, Nishimura and Okamuro (2011) argue that for cluster policies, indirect networking/coordination support has a stronger impact on firm performance than direct R&D support.

To clarify the terminology, in this paper the term *external personal knowledge relationships* refers to knowledge interactions between individuals in different organisations, who know each other personally and interact beyond official work duties. Such relationships can be informal, but they can also be embedded in formal relationships as long as they involve personal acquaintance and knowledge interactions beyond formally prescribed roles. Chatting with strangers (e.g. in trade fairs) and interactions in online discussion forums do not count as personal acquaintance in this article and are therefore not categorised as personal knowledge networks. *Personal knowledge networks* refers to a set of individuals and their knowledge relationships, whereas personal knowledge contact refers to the person which whom somebody has a knowledge relationships with. The qualitative strength of personal relationships can have implications for knowledge sourcing, and there can be a trade-off between maintaining a high number of weak ties versus few strong ties (e.g. Eisingerich et al., 2009; Granovetter, 1973; Hansen, 1999; Krackhardt, 1992). However, this is not the focus of this article. The issue of tie strength (sometimes also called social proximity) and interactions with other types of proximity are discussed in Huber (forthcoming).

[1] The diverse empirical material of this study has been used for other publications but on different topic areas. Whereas Huber (2012a) focuses on the advantages of being located in the Cluster, Huber (forthcoming) discusses the role of different types of proximity for personal knowledge networks. Furthermore, Huber (2012b) elaborates on the dynamic mechanisms of formation, maintenance and knowledge interactions.