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Social networks in the R&D process: the case of the wireless communication industry around Aalborg, Denmark

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Abstract

Whether social networks diffuse knowledge across firm boundaries has been the topic of much debate. To inform these theories, this article considers two questions. First, who has contacts across firm boundaries? And second, when do these relations diffuse knowledge? Our empirical evidence comes from a survey of 346 engineers in the wireless communication industry around Aalborg in Northern Denmark. Our analysis finds that social contact between these engineers is frequent and is used to diffuse knowledge that receivers find useful. More experienced engineers are more likely to receive valuable knowledge from their networks. These findings show that the long-term relationships, which are more likely based on trust and reputation, are also more likely to be a channel valuable knowledge.

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1. Introduction

How do social networks among R&D engineers carry knowledge between firms? Is knowledge actually shared through interpersonal communication between engineers in

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separate organizations? Why do some engineers have many social contacts, while others have few? What is the relationship between the probability of acquiring knowledge and the individual characteristics of engineers? These are the central questions addressed in this article. And though they have been part of the research agenda for several years in the fields of sociology, economics, and business, as well as in economic geography, they continue to be issues of debate.

To address these questions, we examine social networks of informal contacts between employees in the wireless communication industry around Aalborg in North Denmark, analyzing the genesis of these informal contacts and their role in knowledge diffusion. The analysis takes place at the micro level, in this case treating the engineer as the unit of analysis. This provides a better picture of the social network of informal contacts than many of the previous studies that have, for example, been based on interviews with managers. Such studies cannot completely reveal the extent and importance of networks. Since the manager serves as the only source for information regarding internal firm dynamics and employees' social relations, the results are likely to be biased towards official firm policy and the manager's personal opinion.

The purpose of this article is to determine which factors influence the likelihood that an individual engineer will be an active participant in the social networks linking firms. We investigate the likelihood that an engineer receives knowledge, and more specifically, knowledge of high value. Our findings come from a questionnaire survey of personnel in the wireless communications industry around Aalborg (labelled as NorCOM). The survey includes more than 300 engineers employed in 19 different firms. We also investigate the antecedents of these informal social relations.

The remainder of this article is structured as follows. The next section reviews theories of the importance of social networks and knowledge diffusion through informal contacts and builds models from this theoretical framework. Section 3 describes the NorCOM questionnaire and presents descriptive data. Section 4 reports the results, which are then discussed in Section 5.

2. Social networks and knowledge diffusion

Knowledge flows have long been considered a part of social networks across firm boundaries. The diffusion of knowledge between firms can take place either through formalized collaborations or through informal social networks. The latter in particular have been a subject of much study. Allen and Cohen (1969) claim:

“No research and development laboratory can be completely self-sustaining. To keep abreast of scientific and technological developments, every laboratory must necessarily import information from outside”.

Allen and Cohen analyzed two different means of obtaining this information: published scientific and technical literature, and knowledgeable people outside the laboratory. They found that the so-called *sociometric stars* in the technical communication network in an organization, which served as an information resource for their colleagues, used outside sources more than others. These stars also had rather

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