International Journal of Industrial Organization 48 (2016) 270–290

Contents lists available at ScienceDirect

International Journal of Industrial Organization

www.elsevier.com/locate/INDOR

Network dynamics and knowledge transfer in virtual organisations☆

Neil Gandal[a,*], Uriel Stettner[b]

[a] *Berglas School of Economics, Tel Aviv University, Israel*
[b] *Coller School of Management, Tel Aviv University, Israel*

ARTICLE INFO

Article history:
Received 23 October 2015
Revised 28 June 2016
Accepted 30 June 2016
Available online 14 July 2016

Keywords:
Network dynamics
Knowledge spillovers
Modification of code
Social network
Open source

ABSTRACT

Employing a model of knowledge spillovers, we find empirical evidence consistent with both direct and indirect spillovers among open source software projects. We further find that programmers who work on many other projects have a positive effect on the success of a project beyond the effect they have on connectivity of the network. We also find that, both "modifications" and "additions" are positively associated with project success.

© 2016 Elsevier B.V. All rights reserved.

1. Introduction

This study examines whether the success of open source software (OSS) products depends on knowledge spillovers across distinct OSS development projects. It also evaluates

☆ We appreciate the invaluable research assistance of Yaniv Friedensohn and Peter Naftaliev. We gratefully acknowledge the financial support of the Israel Science Foundation (Grant nos. 1287/12 and 1069/15) and the support of a grant by the Research Program for the Economics of Knowledge Contribution and Distribution. We are especially grateful to the editor, Pierre Dubois, and two anonymous referees for comments and suggestions that significantly improved the paper. We also thank Sarit Weisburd and seminar participants at UT-Austin, Tel Aviv University and the Economics of Knowledge Contribution and Distribution conference at Georgia Institute of Technology for helpful comments. Any opinions expressed are those of the authors.

* Corresponding author. Fax: +972 3 640 9908.
E-mail addresses: gandal@post.tau.ac.il, neil.gandal@gmail.com (N. Gandal), urielste@tau.ac.il (U. Stettner).

http://dx.doi.org/10.1016/j.ijindorg.2016.06.010
0167-7187/© 2016 Elsevier B.V. All rights reserved.

the relative contribution of product *modifications* and functional *additions* by programmers of software code to product success. We do so by taking under consideration that programmers may work on multiple projects simultaneously.

Product development in community-based organisations is becoming an increasingly important setting in which individuals create and disseminate knowledge in joint efforts to develop products. In such work environments, knowledge spillovers enable fellow software programmers, researchers and firms to benefit from innovations of others. Software programming is a vocation in which knowledge spillovers are likely to be important for product development given the rapid advancements in technologies, development methodologies, changing product-market preferences, and increasing competitive pressures.

In particular, OSS can facilitate spillovers in R&D because the underlying software code is freely available in human readable form to the broad public. In its traditional practice, OSS development is a collaborative effort of loosely coordinated and geographically dispersed programmers who contribute their time and knowledge to establishing and improving software. Members create innovations as a collaborative effort in which they reveal and share knowledge not only with their project peers but often with potential competitors (Harhoff, Henkel & Von Hippel, 2003; Hippel, 2005). Indeed, OSS innovations are typically developed by consumers and end users, rather than manufacturers, but are freely revealed with manufacturers in hopes of having them produce the product (Von Hippel and Von Krogh, 2003). These "lead users" require specialised solutions to existing product limitations and thus develop their own modifications to existing products, or entirely new products (Von Hippel, 1986).

OSS projects, like virtual teams, are semi-structured groups of skilled programmers working on interdependent tasks using informal, non-hierarchical, and decentralised communication with the common goal of creating a valuable product (Lipnack and Stamps, 1997).

Virtual development teams, as opposed to traditional work teams that enjoy the benefits of face-to-face communication may also encounter challenges to form personal relationships (Beyerlein et al., 2001), to communicate (Pinto and Pinto, 1990), and perform (Jehn and Shah, 1997). Consequently, the resulting lack of strong connections and social support may have negative effects on productivity through reduced commitment, trust and leadership as well as willingness to share knowledge (Cascio, 2000; Townsend et al., 1998; Whiting and Reardon, 1998; Wong and Burton, 2000). Accordingly, by the nature of its organisational design and structure, members of dispersed virtual development teams are restricted in their exposure to knowledge and know-how.

On the other hand, there are numerous advantages to the open source "team" model of innovation. In the case of OSS, the contribution of each individual programmer is known and measurable, since each addition or modification to the software is associated with a particular programmer. Hence, moral hazard problems that arise from joint output produced by teams (Holmstrom, 1982) are less likely to arise in OSS settings than in proprietary "cooperative" research settings like research joint ventures. Additionally, OSS development teams make the underlying project knowledge accessible to the general

Download English Version:

https://daneshyari.com/en/article/5077813

Download Persian Version:

https://daneshyari.com/article/5077813

Daneshyari.com