DOI:10.1145/2556940

Marco Ceccagnoli, Chris Forman, Peng Huang, and D.J. Wu

Economic and Business Dimensions

Digital Platforms: When Is Participation Valuable?

Assessing the benefits and challenges of knowledge spillovers.

Smart owners of information technology (IT) platforms develop ecosystems and encourage third-party producers to develop complements—products that run on the platform. Independent software vendors develop complements for the platforms of major vendors (for example, SAP, Apple). In addition, such platform companies sometimes create Internet-based knowledge-sharing communities in which users exchange ideas. The benefits and costs of such participation are tied to what economists call "knowledge spillovers."

This column reports on four studies of complements to SAP's flagship enterprise resource planning software.[1–4] Users can participate in the SAP Developer Network (SDN), a knowledge-sharing community that encourages voluntary knowledge exchange regarding the implementation, use, and customization of SAP software. A study of 275 firms participating in SDN between 2004 and 2008 showed firms using the platform's online question-and-answer forum had significantly higher productivity. Knowledge spillovers were at work. Valuable knowledge gained from investments in SAP by user firms was transferred to others through the online forum, helping the diffusion of best practices related to the platform. Preliminary estimates suggest a 1% increase in such inward knowledge spillovers will increase production output by many thousands of dollars.

While knowledge spillovers benefit software users, they present challenges for producers. SAP bolsters development of third-party software products and complements by encouraging start-ups to ensure their products are compatible with the platform and to advertise this fact through formal certification. Small start-ups receiving SAP certification had higher sales and a greater likelihood of issuing an initial public offering. Complements and platforms in enterprise software are tightly coupled, and applications developed and used without formal endorsement from the platform owner might not work well. Platform certification signals compatibility and higher quality. The study, using data from 1996–2004, looked at small start-up firms before and after they joined SAP's certification program.

While start-ups benefited significantly from certification, some start-

ILLUSTRATION BY SEBASTIAN KAULITZKI

ups benefited more than others. Firms with the greatest gains also had strong intellectual property protection from patents, copyrights, and trademarks, the latter being a common indicator of brand strength. Again, knowledge spillovers were at work. Certification requires start-ups to go through a process of documentation and testing. Signaling compatibility with the SAP platform has benefits for the start-up, but poses risks of unintended knowledge spillovers leading to possible competition from SAP itself. SAP's early website portal stated, "Part of being an open ecosystem is open and fair competition among partners, and between SAP and partners. SAP cannot guarantee exclusivity of partner solutions, nor can we guarantee that we won't offer competing solutions."

Large platform companies like SAP realize their possible entry into complementary markets can dissuade complementors from joining the platform. However, the intellectual property asset holdings by start-ups help mitigate this problem. Protected start-ups are more likely to join the platform and tend to do so earlier, and large companies can face higher costs in competing with start-ups that hold intellectual property assets.[a]

Intellectual property rights thus play a dual role in shaping platform growth. On the one hand, strong intellectual property rights can help protect small companies, reducing the threat of imitation and entry by a platform owner, and increasing the value of the platform and benefit the platform owner. On the other hand, intellectual property rights in the form of "patent thickets" (dense, overlapping webs of intellectual property rights held by incumbents) can slow platform growth by raising complementors' costs of potential patent infringement. Patent thickets make it easier to inadvertently infringe on intellectual property rights of other firms in the marketplace, a recent example being the "smartphone war" between Apple, Samsung, and other firms. Patent thickets might be a more serious problem for small, entrepreneurial firms that have few intellectual assets of their own and that are unable to navigate patent thickets by negotiating patent cross-licensing deals with other firms.

While start-ups benefited significantly from certification, some start-ups benefited more than others.

Managers of technology platforms can bet that potential complementors might refuse to join a platform because of the risks of platform owner entry. Those platforms can alleviate complementor risks by giving up control of the platform or "opening" it up to encourage participation. Such approaches are less essential when strong IP rights protect complementors from the consequences of unwanted spillovers to potential competitors. C

a SAP. Powered by SAP Netweaver Partner Program FAQs; http://bit.ly/J7UYgc.

References

1. Benbya, H. and Van Alstyne, M. How to find answers within your company. *Sloan Management Review 52*, 2 (Feb. 2011), 65–75; http://sloanreview.mit.edu/article/how-to-find-answers-within-your-company/
2. Ceccagnoli, M., Forman, C., Huang, P., and Wu, D.J. Cocreation of value in a platform ecosystem: The case of enterprise software. *MIS Quarterly 36*, 1 (Jan. 2012), 263–290.
3. Huang, P., Ceccagnoli, M., Forman, C., and Wu, D.J. Appropriability mechanisms and the platform partnership decision: Evidence from enterprise software. *Management Science 59*, 1 (Jan. 2013), 102–121.
4. Huang, P., Ceccagnoli, M., Forman, C., and Wu, D.J. IT knowledge spillovers and productivity: Evidence from enterprise software. Working Paper. University of Maryland and Georgia Institute of Technology, 2013; http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2243886

Marco Ceccagnoli (marco.ceccagnoli@scheller.gatech.edu) is an associate professor of strategic management in the Scheller College of Business at the Georgia Institute of Technology in Atlanta.

Chris Forman (Chris.Forman@scheller.gatech.edu) is the Brady Family Term Professor in the Scheller College of Business at the Georgia Institute of Technology in Atlanta.

Peng Huang (huang@umd.edu) is an assistant professor in the Decisions, Operations and Information Technologies Department at the Robert H. Smith School of Business at the University of Maryland.

D.J. Wu (dj.wu@scheller.gatech.edu) is an associate professor in Information Technology Management in the Scheller College of Business at the Georgia Institute of Technology in Atlanta.