



LUND UNIVERSITY

Openness in the Interplay between Technical and Business aspects - a system of systems

Runeson, Per

Published in:
SICS Technical Report

2015

[Link to publication](#)

Citation for published version (APA):

Runeson, P. (2015). Openness in the Interplay between Technical and Business aspects - a system of systems. *SICS Technical Report, T2015(04)*, 7-8.

Total number of authors:

1

General rights

Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Openness in the Interplay between Technical and Business aspects – a system of systems

Per Runeson

Lund University

per.runeson@cs.lth.se

Technical systems never exist in isolation, but interplay with users as well as other technical systems, and exist in a specific business context. With the arrival of various variants of open innovation, i.e. “a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology” (Chesbrough, 2003), the interplay between different technical and business systems becomes apparent. This interplay is not a hierarchical relation, but rather of network type, where some nodes may be more powerful than others (technically or business-wise), but there is a mutual dependency between the nodes. Further, the technical and business aspects are intertwined, composing a system of systems.

Software is a specifically well suited enabler for open innovation, since the mechanisms of open source software may foster an instance of open innovation, and that the intangible characteristic of software opens up for novel methods for product and service design and delivery (Regnell et al. 2015, Munir et al. 2015). Business models for software based services and products also vary a lot, from the traditional paid license model – Microsoft being the role model – via other companies distributing free software at a cost for related services – for example RedHat– to yet other companies getting paid by advertising as a return for the information users provide for free – read Google. Depending on the business model, the technical architecture and working practices vary.

We have studied some aspects of the interplay between the technical and business systems through surveys and in observational case studies, where companies open up their business and technical systems, and we clearly show dependencies between the systems as well as the lack of knowledge and guidance for strategic and operational decisions. We also identify interdependencies between different types of innovation, product, process, business and organizational innovation (Linåker et al, 2015).

Axis is a supplier of networked surveillance cameras. They collaborate with integrators to supply complete, tailored systems for the end users. Earlier, the integration was hierarchical, plugging cameras together into a complete system. Now, as they gradually move their features into software, the cameras must open up for execution of third party applications in the cameras. In order to boost open innovation, Axis has invited partners to a semi-open ecosystem, which we have studied (Wnuk et al, 2014). Our observations suggest that internal and external standardization can play a dual role, not only ease the development but also enable additional sales channels and new opportunities for the ecosystem participants. At the same time, the business model selected by the ecosystem leaders and technical execution performance, are identified as the main barriers to ecosystem participation.

Gerrit and Jenkins are open source tools that are used in Java system development. Gerrit is an OSS code review tool created by Google in connection with Android in 2007. It is tightly integrated with the software configuration management tool GIT, working as a gatekeeper. Jenkins is an open source build server that conducts the build of executable software from source files. The tools are integrated into a tool chain, constituting a technical system of systems, but there is also an interplay between technical and business systems. Both tools are developed and evolved through investments from companies. Consequently, companies have to take into consideration what to share openly, and what to maintain

internally, i.e. the interplay between technical and business systems, at the technical design level. We observe that these trade-offs are made, but also that strategic support for management in making these decisions are lacking.

In summary, with open innovation, several challenges appear, both when integrating technical system from other systems, and with respect to the interplay between the technical and business aspects of products and services, based on software.

References

H. W. Chesbrough. *Open innovation: the new imperative for creating and profiting from technology*. Harvard Business School Press, Boston, Mass., 2003.

J. Linåker, H. Munir, P. Runeson, B. Regnell, and C. Schrewelius. A survey on the perception of innovation in a large software organization. In K. Wnuk and R. J. Machado, editors, *International Conference on Software Business*, 2015.

H. Munir, K. Wnuk, and P. Runeson. Open innovation in software engineering: A systematic mapping study. *Empirical Software Engineering*, online <http://dx.doi.org/10.1007/s10664-015-9380-x>, 2015.

B. Regnell, P. Runeson, M. Höst, and J. Linåker. Innovation med öppen källkod ger konkurrensfördelar. *Management of Innovation and Technology*, volume 2, May 2015.

K. Wnuk, P. Runeson, M. Lantz, and O. Weijden. Bridges and barriers to software ecosystem participation - a case study. *Information and Software Technology*, 56(11):1493–1507, 2014.