Supporting Product Development with Software from the Bazaar

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Introduction
Open Source Software (OSS) is increasingly adopted in industry in various ways, two of which are:

- Adoption of OSS components in product development
- Adoption of OSS development practices for product development (Inner Source)

In both scenarios, software is developed in a “Bazaar-style,” in the first case an external bazaar, and the second case an internal bazaar. In both scenarios, the developed software is integrated into a final product.

Product development with software “from the bazaar” has been a topic of little study.

Objectives and Research Questions
The research had two research objectives. For the external bazaar (Open Source):

Objective 1: To document challenges and to provide guidance in product development with OSS components.

This objective led to the following research questions:

RQ1: What are the challenges associated with integration of OSS products?
RQ2: What is the state of the art of OSS evaluation and selection methods?
RQ3: What is the importance of architectural knowledge for OSS integrators?
RQ4: How can architectural patterns in OSS products be identified?

The second research objective relates to the internal bazaar, or Inner Source:

Objective 2: To identify challenges in Inner Source and to provide insights into when and how Inner Source can thrive.

This led to the following research questions:

RQ5: What are challenges and approaches to mitigate them in Inner Source?
RQ6: What are the key factors to consider in adopting Inner Source?

Research Methodology
To answer RQ1: A Systematic Mapping Study to identify, aggregate and categorise challenges that may arise in product development with OSS products.

To answer RQ2: A literature study to identify and compare OSS evaluation methods that have been proposed so far in the literature. This study includes the development of a comparison framework (grounded in literature) that is used to compare a number of the OSS evaluation methods.

To answer RQ3: An exploratory survey to empirically investigate the importance of architectural knowledge of OSS products.

To answer RQ4: An empirical study based on the Improvement Paradigm to develop and assess a process to guide practitioners to identify architectural patterns in OSS products.

To answer RQ5: An industrial case study to identify, document and categorise challenges in an Inner Source organisation. The identified challenges are also compared to the challenges related to the use of OSS products.

To answer RQ6: A literature review to develop a framework to guide the assessment of an organisation’s fit with Inner Source. The framework-based assessment is demonstrated with data drawn from an in-depth industrial case study at an organisation that had indicated an interest in adopting Inner Source.

Contributions and Future Work
This research led to six contributions. Figure 1 shows them organized by contribution type and bazaar type (Open Source v. Inner Source).

The contributions related to the Open Source literature are:

- A synthesis and categorization of challenges in product development with OSS [1][8]
- FOCOSEM: A framework for comparing OSS evaluation methods, including the results of the application of the framework [2][8].
- An empirical investigation of the need for architectural knowledge in OSS products, including the classification of architectural knowledge needed [3][8].
- IDAPO: A process for identifying architectural patterns in OSS product [4][5][8].

The contributions related to the Inner Source literature are:

- An empirical study of challenges in Inner Source and a comparison of those challenges to an Open Source context (see contribution 1) [6][8].
- A framework for assessing an organisation’s suitability for adopting Inner Source [7][8].

Future work will focus on Inner Source. In particular, open questions are:

- What are the essential steps for organizations to adopt Inner Source?
- What are the key success factors of a successful Inner Source program?
- How to build a thriving developers’ community within an organisation’s boundaries?

Publications


