

GUIDE FOR SEMI-STRUCTURED INTERVIEWS ON THE USE OF OPEN INNOVATION PRACTICES IN THE MANAGEMENT OF REQUIREMENTS IN SOFTWARE ECOSYSTEMS

This study investigates the use of open innovation practices in requirements management activities in software ecosystems. The main research question in this field study is: **How do open innovation practices influence requirements management in software ecosystems?**

PROCEDURES FOR PREPARING INTERVIEWS

DEFINITION OF THE TARGET PUBLIC FOR THE INTERVIEWS:

- Professionals who carry out activities related to requirements management in software ecosystems (i.e., platform manager, product manager, product owner, project manager, developer, requirements manager, requirements engineer).

DEFINITION OF THE DURATION OF THE INTERVIEWS:

- 40 minutes.

DEFINITION OF INTERVIEW FORMAT:

- Online por meio da ferramenta Google Meet.

SENDING INVITATION AND INTERVIEW SCHEDULE:

- We will search for potential participants in our contact networks and academic networks on digital platforms. In addition, we will ask for nominations of new participants for the professionals interviewed.
- We will invite potential participants by email and inform them that, if they accept the invitation, they must inform us of the day and time availability. We will send a link with the days and times available for the interviews in the invitation email.

DEFINITION PROFILE OF PARTICIPANTS:

- After scheduling the interview, we will send you a new email with: (i) a link to the Google Meet room for the interview; (ii) a link with a consent term for the acceptance of the participant; and (iii) a link to a form with five questions for the characterization of participants. We will send the following characterization questions to participants:

1. Have you ever been (or are you) involved with a software platform/marketplace* in collaboration with other actors (companies, third-party developers, open source software communities, software vendors, etc.)?

- Closed question (Yes, No, or I don't know)

***NOTE:** *The software platform/marketplace and all the actors collaborating around it (your company and/or you) will be called the software ecosystem. A software*

ecosystem is “a set of actors functioning as a unit and interacting with a shared market of software and services, along with the relationships between them” (JANSEN et al., 2009).

2. Have you ever participated in any project that used open innovation* to support requirements management activities?

- Closed question (Yes, No, or I don't know)

***NOTE:** *Open innovation involves “the participation of external actors, through the iterative exchange of knowledge, technology and resources” (CHESBROUGH, 2003)—for example, open source communities, hackathons, bilateral partnerships, among others.*

3. What is your major educational background?

- Closed question (PhD, Master's degree, Specialization, Bachelor's degree, Technical course/High school degree)

4. What are the main activities related to requirements management* that you have already performed?

- Open question

***NOTE:** *Requirements management encompasses “the set of procedures that support requirements development, including planning, traceability, impact analysis, change management, and other related activities” (HOOD et al., 2007). For example, activities related to (i) requirements changes identification; (ii) version control or requirements traceability; (iii) requirements prioritization, negotiation, or communication.*

5. How many years of experience do you have working with activities related to requirements management?

- Open question (in years)

PROCEDURES FOR CARRYING OUT INTERVIEWS

PART 1 – CHARACTERIZATION OF THE PARTICIPANTS

COMPLETION OF THE CONSENT FORM AND CHARACTERIZATION OF THE PARTICIPANTS VIA A FORM.

PART 2 – PRESENTATION OF THE CONCEPTS OF REQUIREMENT MANAGEMENT, SOFTWARE ECOSYSTEMS, AND OPEN INNOVATION

DEFINITION OF REQUIREMENTS MANAGEMENT

- Requirements management encompasses procedures supporting requirements development, including planning, traceability, impact analysis, change management, and other related activities. In addition, it represents the integration between

requirements development and all other systems engineering disciplines, such as configuration management and project management (HOOD et al., 2007). Requirements management is an organized process of identifying, documenting, maintaining, communicating, tracking, and tracing requirements throughout the life cycle of a system, product, or service. Requirements management evolves from elicitation to requirements change management (ISO-IEC-IEEE-29148/2018).

DEFINITION OF SOFTWARE ECOSYSTEM

- A software ecosystem is a set of actors functioning as a unit and interacting with a shared software and services marketplace and the relationships between them. (JANSEN et al., 2009). In addition, a software ecosystem can also be analyzed from the perspective of projects as groups of projects that are developed and co-evolved in the same environment (LUNGU et al. 2010).

DEFINITION OF OPEN INNOVATION

- Use intentional inputs and outputs of knowledge to accelerate internal innovation and expand markets for external use of innovation, respectively (CHESBROUGH, 2006). The fundamental principle of open innovation is that the involvement of external actors, through the iterative exchange of knowledge, technology, and resources beyond its borders, can stimulate an organization's innovation process and results (CHESBROUGH, 2003). Open innovation is a paradigm that assumes that companies can and should use external ideas (CHESBROUGH, 2003).

PART 3 – INVESTIGATING THE USE OF OPEN INNOVATION IN REQUIREMENTS MANAGEMENT IN SOFTWARE ECOSYSTEMS

1. Considering the concept presented previously, on a scale of 1 to 5, where 1 is least familiar and 5 is most familiar, how familiar are you with open innovation?
2. Do you usually receive/provide ideas/requirements/change requests from external actors (companies, third-party developers, open source communities, software vendors, etc.) to the projects you have been involved in? If yes, how did it happen?
3. *[unguided impressions]* What open innovation practices have you used to support requirements management activities in software ecosystems? *[guided impressions]* What of the following open innovation practices have you used to support requirements management activities in software ecosystems?

OPEN INNOVATION PRACTICES	DESCRIPTION
Co-creation	The involvement of consumers or customers in generating, evaluating, and testing new ideas for products, services, processes, or business models.
Open source software	Open source software aims to reveal internal technologies without immediate financial rewards for indirect benefits to the company.
Hackathons	Several participants (individuals, teams, or organizations) are invited to offer solutions in a competitive process. Participants compete rather than collaborate. The winners are compensated financially and/or otherwise.
Coopetition	Coopetition combines competition with cooperation. Coopetition occurs when two professionals or companies come together to achieve something more significant.
Crowdsourcing	Crowdsourcing consists of outsourcing processes, traditionally carried out internally, to an indefinite, generally large group of people
Collaboration	A collaborative relationship in which two or more parties jointly develop a solution to a joint innovation problem through the mutual exchange of knowledge.

REFERENCES

Chesbrough, H. W. (2003). Open Innovation: The new imperative for creating and profiting from technology. Harvard Business Press.

Chesbrough, H. W. (2006). The era of open innovation. Managing innovation and change, 127(3), 34-41.

Hood, C., Wiedemann, S., Fichtinger, S., & Pautz, U. (2007). Requirements management: The interface between requirements development and all other systems engineering processes. Springer Science & Business Media.

ISO/IEC/IEEE29148: ISO/IEC/IEEE International Standard - Systems and Software Engineering – Life Cycle Processes – Requirements Engineering. ISO/IEC/IEEE 29148:2018(E) pp. 1–104 (2018). <https://doi.org/10.1109/IEEESTD.2018.8559686>

Jansen, S., Finkelstein, A., & Brinkkemper, S. (2009). A sense of community: A research agenda for software ecosystems. In 2009 31st International Conference on Software Engineering-Companion Volume pp. 187-190.

Lungu, M., Lanza, M., Gîrba, T., & Robbes, R. (2010). The small project observatory: Visualizing software ecosystems. Science of Computer Programming, 75(4), 264-275.