

A Tale of Community Smell Mitigation Strategies

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I. ABSTRACT

Effective communication and organization within a software development team might influence the quality of both the software development process, and the software created [1]. It is estimated that the consequences of poor communication in terms of cost reached \$37 billion for companies¹. For this reason, the research community drop on “social debt” [4], meant as the presence of non-cohesive development communities whose members have communication or coordination issues as well as community smells, *i.e.*, socio-technical characteristics and patterns, which may lead to the emergence of social and technical debt [5].

While community smells are increasingly being studied, little is known about how team composition and, in particular, gender diversity influences their presence. In previous studies not strictly related to software engineering, women were reported as a fundamental component to increasing team efficiency and mediating organizational quality [6], [7].

For this reason, in our study [3] we conjectured that gender diversity and, in particular, the presence of women within a team improves communication, thus reducing the number of community smells. In particular, we analyzed 25 open-source systems and built a statistical model, with the aim of investigating the existence of the relationship between the presence of women and four community smells *i.e.*, *Organizational Silo*, *Black Cloud*, *Lone Wolf*, and *Radio Silence*. The results of our study show that the expected relations between gender balance and participation of women as mediators against the proliferation of community smells are valid in the cases of *Black Cloud* and *Radio Silence*, while we found only partial relations between the variables of interest and *Organizational Silo* and *Lone Wolf*. For example, as expected the role of women as mediators for increased organizational quality is not equal across all community smells. In particular, the role of women is increasingly important for those smells which affect the quantities and qualities of communication across the organizational structure (*e.g.*, the *Radio Silence* effect) as opposed to the organizational arrangement of the structure (*e.g.*, the *Organizational Silo* effect). These results indicate that the presence of women plays a beneficial role in mitigating strains faced by complex organizations. Based on the results described above, our next step was to analyze whether the perception of developers or managers was aligned to the results of statistical modeling.

So, we triangulated the results previously obtained in [3] by conducting a survey that involved 60 software practitioners [2]— the majority of them belongs to project managers’ associations *e.g.*, Project Management Institute - Southern Italy Chapter) — with the aim of understanding the extent and presumed importance of gender diversity over the presence and prominence of community smells, but also whether there are additional factors to consider to reduce community smells. As a result, we found that practitioners do not to perceive the phenomenon of gender diversity as an important factor to mitigate the presence of community smells. Nevertheless, practitioners who consider this as an important factor tried to strongly motivate their considerations. Finally, as main takeaway message from the survey, participants highlighted that good communication skills are fundamental for developers within a software team, besides technical expertise.

Based on the results of our works, we invite the research community to go deeper and analyze the role of cultural and social aspects within team composition.

Index Terms—Community Smell; Team Composition; Empirical Software Engineering.

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¹ <https://tinyurl.com/ydfjf4p6>