Challenges in adopting ISO/IEC 29110 standardized processes in agile VSEs

Luis T. Portela-Peñúñuri[1], Gilberto Borrego[1], Ramón R. Palacio[2]

[1]Department of Computing and Design - Sonora Institute of Technology. Ciudad Obregón, Sonora, México.

[2]Sonora Institute of Technology - Unidad Navojoa, Sonora, México.

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tadeo.portela@potros.itson.edu.mx,
{gborrego,ramon.palacio}@itson.edu.mx
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Abstract. *Very small software entities (VSEs) face challenges when attempting to incorporate structured quality practices into their agile environment. The ISO/IEC 29110 standard aims to address these challenges; however, its adoption still faces some issues. This study identifies adoption barriers through an ongoing systematic mapping aiming to prioritize those with the highest impact on standard adoption. Preliminary results highlight organizational barriers, technical challenges, and psychosocial factors. These findings lay the groundwork for future research to compare factors with case studies, aiming to develop an adaptive framework that closes the gap between agility and standardization, enabling VSEs to adopt critical disciplines of the standard.*

Keywords: ISO/IEC 29110, Agile Methods, VSEs, Systematic Mapping

1. Introduction

Very small entities (VSEs) are vital to the global economy, particularly in the software industry. There's a growing need for these organizations to adopt engineering practices that ensure reliable, efficient, and secure software that meets user requirements [Muñoz et al., 2021][Stojanov, 2022]. However, VSEs often struggle to implement standardized processes, such as those in the ISO/IEC 29110 standard [ISO, 2015][Muñoz et al., 2021], due to perceived rigidity and misalignment with agile principles [Muñoz et al., 2018]. While VSEs prioritize agility to adapt quickly to changes in software development [Beck et al., 2001], the challenge remains: How can they adopt standardized processes without losing their agility? The objective of this study is to identify and analyze the key factors that hinder the adoption of standardized practices within VSEs. Additionally, the study aims to explore these barriers in practice through interviews and focus groups with experts seeking a deeper understanding of the challenges VSEs encounter when implementing standards.

2. Methods

The study uses a systematic mapping review (SMR) following Kitchenham and Charters (2007) guidelines, focusing on VSEs and their challenges in adopting the ISO/IEC 29110 standard. The search string utilized boolean operations AND(&), OR(|) and produced: ("iso/iec 29110"|"iso 29110" | "29110 standard" | iso/iec29110) & (implementation | adoption | deployment) & (challenges | obstacles | issues) in ACM, IEEExplore, Wiley, SpringerLink, and ScienceDirect databases.

The inclusion criteria focus on studies published in English from 2011 to 2024 that explicitly mention the standard and present empirical data—such as case studies, surveys, or interviews—related to its implementation. Acceptable sources include academic journals, international conferences, and book chapters. Exclusion criteria include duplicate publications, abstracts, opinion articles, editorials, and PowerPoint presentations. We identified 339 studies, narrowing it down to 280 after removing duplicates. From these, 51 articles were selected for preliminary analysis based on title, abstract, or introduction criteria. A quality assessment is pending, along with qualitative research involving expert interviews and focus groups. The insights from this research will be analyzed to compare them with the findings from the SMR.

3. Preliminary results and conclusions

51 articles were analyzed and the data was extracted[i] to report preliminary results:

Fig. 1 results for each source by year and % of mentions for each factor
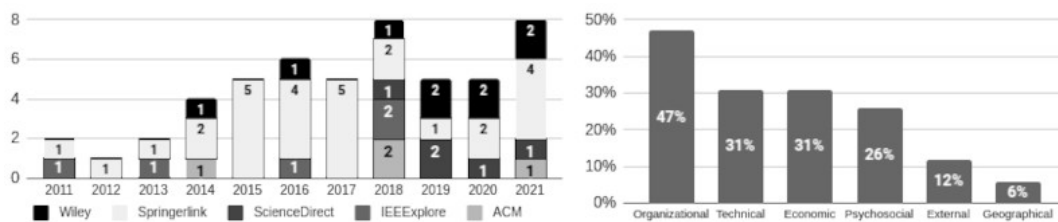
Preliminary results show that VSEs face significant challenges in implementing standards, such as resource constraints, knowledge gaps and resistance to change. Technical issues, skill shortages and financial limitations also hinder adoption. Additionally, motivation and perceived value are key psychosocial factors. Understanding all factors is essential for bridging the gap between agility and standards.

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[i] The artifacts associated with this submission are publicly available on Zenodo under DOI: https://doi.org/10.5281/zenodo.15062258