Abstract

This article investigates software process diversity, defined as the project condition arising out of the simultaneous use of multiple software development process frameworks within a single project. Software process diversity is conceptualized as the response of a project team to such contingencies as requirements volatility, design and technological novelty, customer involvement, and the level of organizational process compliance enforced on the project. Moreover, we conceptualize that the degree of fit (or match) between a project’s software process diversity and the level of process compliance enforced on the project impacts overall project performance. This conceptualization was empirically tested by utilizing data collected from 410 large commercial software projects of a multinational firm. The results show that higher levels of requirements volatility, design and technological novelty, and customer involvement increased software process diversity within a project. However, software process diversity decreased relative to increases in the level of process compliance enforced on the project. A higher degree of fit between a project’s process diversity and process compliance, rather than the effects of those variables independently, was found to be significantly associated with a higher level of project performance, as measured in terms of project productivity and software quality. These results indicate that increasing software process diversity in response to project-level contingencies improves project performance only when there is a concomitant increase in organizational process compliance efforts. The implications of these results for research are discussed and prescriptive guidelines derived to manage the fit between process diversity and process compliance for improving software project performance.

Keywords: Software process diversity, process compliance, plan-based processes, agile processes, software engineering, productivity, quality, fit as matching