Chapter XII

Contributions and Future Directions of Software Review

Abstract

This chapter presents theoretical and methodological contributions. It also addresses the limitations of the empirical studies (i.e., industry survey and case study). Discussions of future research are presented in the final section of this chapter.

Contributions

This book makes several key theoretical and methodological contributions to the software review literature.

Theoretical Contributions

The book adapted the input-process-output (IPO) approach to develop the Explicit and Implicit Input-process-Output (EIIO) Model. Thus, a richer and more comprehensive model of software review was developed by integrating...
key conceptual frameworks across multiple disciplines. Advances in software engineering and information systems science are characterised by constructs being conceptualised progressively from simple, one-dimensional phenomena measured with single or multiple items, to complex multidimensional phenomena, with each dimension measured with multiple indicators (items) (Bagozzi, 1994).

In the EIIO model, the concepts of the explicit and implicit inputs, process, and outputs in the proposed model are represented with multiple constructs, with each construct further represented with multiple indicators to encompass the rich and broad domain of the model constructs. Thus, the model proposed and tested here is both theoretically meaningful and managerially useful. This model overcomes specific problems of current models (e.g., Laitenberger & Debaud’s model (2000), Sauer’s behavioural approach to technical review model (2000)) in the software review literature. The model also expands the concepts of the implicit inputs, meeting process factors, and review performance to increase the importance and value of software reviews in the system development life cycle.

This book developed a systematic model to analyse software review performance (i.e., number of defects found). Due to its comprehensiveness, the revised EIIO model has a significant R-square of 0.392 for the number of defects found. Additionally, the model has reasonable explanatory power for the teamwork, experience, use of reports and previously reviewed software documents constructs, with R-squares of 0.321, 0.192, 0.023, and 0.042 respectively. By identifying the factors that influence software review performance, the findings will help managers to effectively leverage their resources (both explicit and implicit inputs) and improve their software review performance. First, a theoretical EIIO model is used to understand the important relationships between input, process and outputs to analyse software review performance. Second, from the results of the survey study and in-depth interviews with experts, the key software review inputs that influence review performance were identified and validated. Third, the in-depth interview results also identified the issues in organizing and conducting software reviews. Fourth, the research programs (a set of hypotheses), was developed to formulate the underlying theory so that the research program can be empirically tested and validated.

In summary, the theoretical contributions from this work are twofold. Firstly, this work furthers understanding of how to improve the review process by looking at the important relationships between inputs, process, and outcomes. Secondly, from the EIIO model, this work generated practical guidelines for organizing and conducting software review in terms of the use of software review inputs.
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