

THE SOFTWARE PROCESS IMPROVEMENT PERCEPTION MODEL IN SMALL AND MEDIUM SOFTWARE ORGANIZATION IN MALAYSIA

Nur Razia Mohd Suradi¹, and Hema Subramaniam²

¹Faculty of Computer Science and Information Technology, Universiti Selangor, Malaysia
E-mail: razia@unisel.edu.my

²Faculty of Computer Science and Information Technology, Universiti Selangor, Malaysia
E-mail: hema@unisel.edu.my

Abstract

Software quality is vital to guarantee that developed software products meet user requirements, reliable and viable in the market. Past studies showed that the awareness and understanding of software process improvement was quite low. This paper presents the findings from practitioners' experiences in using SPI and challenges in implementing SPI initiatives. Qualitative study was conducted at the practitioner level to gauge their understanding of this SPI concept. Finally we present findings regarding SPI awareness and implementation among the practitioners in software organization.

Keywords: Software Process Improvement (SPI), Software quality model, practitioners, initiatives

1 INTRODUCTION

Software Process Improvement (SPI) is a set of activities that will lead to a better software process and high quality software or product. SPI has become a motivating force in the global software industry. Even though it sounds a global concept, SPI still differ according to countries based on the difference in culture and norm (Wong & Sazzad Hasan, 2008). In the current situation SPI even been exposed to small companies in an intention to improve their software process activities (Francisco J. Pino et al., 2009). This positive move had created a need to implementing SPI to all companies without looking at the company size.

Since the SPI closely relate with the software quality, it is essential to know the definition of software quality. The definition of software quality as suggested by IEEE is the degree to which a system, component, or process meets specified requirements (IEEE, 1991). Based on the given definition, it is known that requirements play a vital role improving the process of a company (Elhag et al., 2013). However, plenty of research studies have indicates that it is difficult to manage software process without proper standard or framework by the organization (Butler, 1995; Pitterman, 2000; Yamamura, 1999). Even though there are plenty of frameworks or standard available in order to manage the software process yet the implementation still at the low level (Ibrahim et al., 2011). One of the main reasons that lead to this situation is the lack of awareness of implementing SPI at small medium industry. In that case, this paper reports a study about the level of SME practitioner acceptance in implementing SPI at their organization.

2 LITERATURE REVIEW

SPI has turned into a popular approach to address improvements especially for software products (Humphrey, 1989). Various SPI frameworks have been introduced to assist organizations to deliver high quality software. Research shows that the strength put in SPI can promote in delivering quality product or software (N. Ashrafi, 2003).

Among them are Capability Maturity Model (CMM) (Paulk et al., 1993), Capable Maturity Model Integration (CMMI) (SEI, 2002), the Software Process Improvement and Capability determination (SPICE) (ISO/IEC-15504, 1998) and the ISO 9001 norms from the International Standardization Organization. Other methodologies or best practices is IT Infrastructure and Library (ITIL) which is a set of practices for IT service management (ITSM) which focusing on aligning IT services with the needs of business (Valerie Arraj, 2010).

3 RESEARCH METHODOLOGY

This research uses a qualitative approach in data acquisition in obtaining information on the perception of awareness among software practitioners. This qualitative technique was done at the respondents' organization. Semi structured-interviews were conducted with questions that focused on the awareness in implementing SPI in their organization. It can be divided into few categories as described below.

Basically, Open-ended questionnaires used in the study covered six topics covered, as follows:

- a. Drivers for using quality model/standard
- b. Effectiveness of SPI implementation
- c. Embarks of SPI
- d. Problems faced in implementing SPI
- e. Opinions on continuous improvement

4 RESULT AND DISCUSSION

This section reports the practitioners' perceptions model on the awareness of implementing SPI upon interviews conducted at their premises. A total of 6 companies participated in these interviews.

4.1 Drivers for using quality model/standard

Table 1 depicts the reasons why the respondents implemented quality model in their organizations. These reasons may be seen as drivers towards the implementations of quality standard in the organization.

Table 1. Drivers for using quality model/standard

Reason
Ensure product reliable and good quality
Reduce cost in terms of producing bugs product
Company reputation
Staff with certification from quality standard body
Company policy

4.2 Effectiveness of SPI implementation

Table 2 shows the usefulness of implementing SPI in the organization.

Table 2. Usefulness of SPI implementation

Reason
Encourages collaborative work among the global membership
Helps the company to improve their ability to serve customer

4.3 Embarks of applying SPI

Table 3 illustrate the benefits gained by the company who applying SPI. Most of the companies have used the standard more than 5 years.

Table 3. Benefits of applying SPI

Reason
Support various of interoperable products or services
Protect customer of the safety product
Help to improve product and service

4.4 Problems during implementing SPI

Table 4 displays various problems arose during the implementation of the SPI.

Table 4. Problems during implementing SPI

Reason
Supplier don't follow the guidelines
Insufficient time since they are implementing quality standard
High cost

4.5 Continues improvement

Table 5 shows the suggested continuous improvement needed by the organization.

Table 5. Continues improvement

Reason
Implementing role of Software Quality Assurance(SQA) especially in software organization
Applying best practices based on other company with similar business

This research has found the following result:

- Adequate budget in implementing SPI in organization
- Organization strong policy
- Reliability of the product to the customer
- Advantages in implementing SPI – increase profit margin, achieve industrial wide recognition, reduce cost of operation, improved product performance

5 CONCLUSION AND FUTURE WORK

The study investigates the level of awareness of implementing SPI in organizations' business process and the needs for applying SPI among the small and medium software companies.

This work is a preliminary study where only few software companies were observed. The research will be extended to include more practitioners in various software companies. Strategic Plans on the initiatives and programs are necessary to encourage software companies to implement SPI in their business. Such action would boost a strong confidence from customer perspective regarding their product.

In Malaysia, various quality model or standard are implemented by small or large organizations where sufficient budget have been allocated for the initiatives. For the organization not applying any SPI, an awareness should be initiated at top management level as they are the group which provide budget, policy making and project

ACKNOWLEDGMENTS

The work reported in this paper is part of a project on software process improvement. We are honorably grateful to the software companies and practitioners for their participation in this study.

REFERENCES

- Butler, K. (1995). The Economic Benefits of Software Process Improvement. *CrossTalk* (July), 14-17.
- Crosby, P. B. (1979). *Quality is Free*. New York: McGraw-Hill.
- Elhag, A.A.M.; Elshaikh, M.A., Mohamed, R., Babar, M.I. (2013). Problems and future trends of software process improvement in some Sudanese software organizations. *Computing, Electrical and Electronics Engineering (ICCEEE)*, 2013 International Conference on, vol., no., pp.263,268, 26-28 Aug. 2013.
- Francisco, J.P., Garcia, F., & Piattini, M. (2009). Key processes to start software process improvement in small companies. *Proceedings of the 2009 ACM symposium on Applied Computing (SAC '09)*. ACM, New York, NY, USA, 509-516.
DOI=10.1145/1529282.1529389
<http://doi.acm.org/10.1145/1529282.1529389>
- Humphrey, W.S. (1989). *Managing The Software Process*. Addison Wesley.
- Ibrahim, S., Ali, R.Z.R.M.. (2011). Study on acceptance of customised Software Process Improvement (SPI) model for Malaysia's SME. *Software Engineering (MySEC)*, 2011 5th Malaysian Conference in , vol., no., pp.25,30, 13-14 Dec. 2011
- IEEE Standard Glossary of Software Engineering Terminology. February (1991). IEEE Std 610.12-1990. The Institute of Electrical and Electronics Engineers, New York.
- N. Ashrafi. (2003). The impact of software process improvement on quality: in theory and practice. *Information & Management*, 40(7). 677-690.
- Paulk, M., Curtis, B., Chrissis, M., Weber, C. (1993). *Capability Model for software Version 1.1*. CMU/SEI-93-TR-24, Software Engineering Institute, USA.
- Pitterman, B. (2000). Telcordia Technologies: The Journey to High Maturity. *IEEE Software* (July–August), pp.89–96.
- SEI. (2002). *Capability Maturity Model Integration (CMMISM), Version 1.1*. SEI, CMU/SEI-2002-TR-029. Retrieved from <http://www.sei.cmu.edu/reports/02tr029.pdf>.
- Valerie Arraj. (2010). *ITIL®: The Basics*, Official Accreditor of the OGC.
- Yamamura, G., Wagle, G. (1997). SEI CMM level 5: For the right reasons. *CrossTalk* 10(8).
- Wong and Sazzad Hasan. (2008). Cultural influences and differences in software process improvement programs. *Proceedings of the 6th international workshop on Software quality (WoSQ '08)*. ACM, New York, NY, USA, 3-10.
DOI=10.1145/1370099.1370101
<http://doi.acm.org/10.1145/1370099.1370101>