SUCCESS OF EFFORT ESTIMATION STRATEGIES AND PRACTICES OF DEVOPS BASED SOFTWARE DEVELOPMENT IN SRI LANKA

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DECLARATION

I declare that this is my work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Effort estimation of software development is one of the most crucial things in Software Engineering. The effort estimations are conducted in the initial stages of the project management. These estimations help the customers, investors, managers, and software developers to recognize the total investment, financial plan, project schedule, and resources necessities. The process used to estimate the efforts differs from organization to organization. Several aspects need to be thought by the software developers when estimating the efforts. Although there were many studies related to this area, this study explores factors that help to succeed in effort estimation in DevOps-based software development in the Sri Lankan context.

According to the literature, the software development process would be easy in the DevOps context. Hence, the effort estimation would be easy when works on DevOps-based software development also. This study has chosen nineteen factors, by thoroughly reviewing the past literature and studies. The preliminary interview was done for identifying the most important factors. Poor communication, measurements, monitoring, technology stack, skills & experience, knowledge sharing, and deployment process were identified as the most important factors. The followed research methodology was the quantitative approach for this research study. Hence the online survey was conveyed among the 450+ software experts who have work experience in DevOps-based software development in the Sri Lanka IT industry. There were 41 questions with one open-ended question on the questioner. The reliability analysis was led to check the stability and validity of the questions before distributing the questionnaire. Descriptive analysis was used to elaborate on the elementary characteristic of the research data. The Pearson coefficient correlation was used for statistical data analysis and hypothesis testing. Moreover, the regression analysis was done to test the robustness of the connection between the predictor (independent) and predicted (dependent) variables in this research study.

As the results of the exploration, communication, and technology stack are highly impacted to the success of effort estimation in DevOps-based software development while knowledge sharing, skills & experience, and deployment process moderately impact the dependent variable. Measurement and monitoring were low impacts on the success of effort estimation in DevOps-based software development. Additionally, the set of practices and guidelines was suggested to follow when doing the effort estimation in the DevOps context. By following those practices and guidelines, software professionals can easily estimate the efforts and those efforts may be more confidently. It would be highly advantageous when achieving project deadlines and customer requirements easily.

Keywords: Effort Estimation practices, DevOps

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LIST OF ABBREVIATIONS

SVR - Support Vector Regression

ANOVA - Analysis of Variance

ANCOVA - Analysis of Covariance,

GLM - General Linear Model

CAMS - Culture, Automation, Measurements, and Sharing

CALMS - Culture, Automation, Measurements, Sharing and Lean

CAMM - Culture, Automation, Measurement, Monitoring

SCM - Software Configuration Management

RS - Requirement Specification

DOKS – DevOps Knowledge Sharing

SPSS – Statistical Package for Social Science

EE - Effort Estimation