ABSTRACT

In the cyber world software has become a significant part of our everyday life and new application areas for software are continuously discovered. People entrust their lives to software in the form of various applications used around their environment. Software must be developed with enhanced and maintained capability. Rising demands for new software, software updates, and software maintenance require human work. So to reduce the human work, software companies develop quality software more efficiently, and in a more cost effective way with the reusability approach. In the field of software engineering, the usage of third-party software components is gaining substantial interest due to cost reduction and high quality that it brings. Component-Based Software Engineering (CBSE) denotes the practice of building software from pre-existing component or third party software component, in particular when this is done using standardized software component models. The main expected benefits of this practice over traditional software engineering approaches are used to increase quality, productivity and to reduce development time. CBSE seems to be the potent technology to achieve quality software with higher reusability. Empirical studies in industry answer questions about why and when certain approaches are chosen, how these are applied with impact on single instances and how to generalize over classes or systems to increase productivity of high quality software. This study helps in analysis, design and development of models and testing processes with CBSE approach to complete the demand of industry. To achieve benefits for organization, the current research work is divided in four main sections; first section spreads over first three chapters. First chapter presents the introduction of research with problem outline, research objectives and organization of thesis, second chapter presents the study and review of literature to acquire knowledge of past and current research and third chapter deals with the evolution of CBSE and background of concerned study. Second section from chapter four to six mainly emphasises on Component-Based Software Reuse (CBSR) with development of proposed component-based model and a modified development process of CBSE. Third section from chapter seven to eight mainly emphasises on Component-Based Software Testing (CBST) and proposes two component-based testing processes - modified component test process documentation and process to construct the testable component. Last section presents the conclusions of current research work and future directions.