A Modern Study on Progressions & Issues of Web Applications Development in Small Firms

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ABSTRACT

In the modern digital era, Web based applications and internet is one of the most sources of statistics and have become as an essential part of each and every working field with daily life of its users. Since the age of internet due to ever growing business needs numerous applications have been transcribed from non-web to web based and related diligence has foresees recurring changes in the desires and application architecture throughout their lifecycle. The success of designed application highly determined by a model that has organizes and enables the identification of WBA quality perspectives. Model-driven approach for web application development is an important topic in software engineering. There are many existing tools to support model-driven engineering for web application development. However, most tools and techniques are complex and not very practical when it comes to real-life usage. This paper explores state of the art work on web applications development with its surviving methods. Additionally spring the current research issues of this field.

Keywords: Web Applications, Software Engineering, Agile Methodology, Web, Scrum

I. INTRODUCTION

In modern era with rapid growing demands and development of advanced mechanisms the Web-based applications have become so popular. Today, web applications are one of the most sources of information assortment and for any user it likes to be very hard or impossible to pass a single day without accessing of any digital devices or the functionality of internet based web application [1]. Over last decades one of the major trends for software development organizations was the move towards web application systems. Typically, application frameworks are a holistic set of guidelines and specifications that provide platforms, tools, and programming environments for addressing the design, integration, performance, security, and reliability of distributed and multi-tiered efforts. An application framework includes the presentation services, server-side processing, session management, business logic framework, application data caching, application logic, persistence, transactions, security, and logging services for applications. Recently, many companies have found success developing stronger business models that

helped make the World Wide Web a more compelling experience. Additionally many of accessible studies have given their focus on the quality of WBA and a lot of ongoing studies are dealing with number of quality factors towards specific WBA perspectives. Additionally, current studies accumulate different models to evaluate the quality of WBA [2]. This paper focus on conservative processes of software development and how can the phases of various methodologies be put together to facilitate small software industries develop a quality Web-based applications. The rest of the paper is structured as follows. Section 2 deals with the accessible model for web application development with their benefits and issues. Section 3 presents the related work which has done in direction to design effective web application method and finally paper is concluded in section 4.

II. WEB APPLICATION & PRACTICES FOR ITs GROWTHS

Web-based applications are not just web pages. Numerous researchers have endeavoured to define Web-

based applications. A group of investigators has defined the Web-based applications as "complex systems, based on a variety of hardware and software components, protocols, languages, interfaces, and standards" [3]. Conallen defined Web-based applications as "a Web system (Web server, network, HTTP, browser) in which the user input (navigation and data input) affects the state of the business [4]. Gellersen and Gaedke defined Web-based applications as any software application that depends on the Web for its correct execution [5]. Koch and Kraus defined Web-based applications as "Web information systems that tend to be used to integrate and streamline business processes across organisations (customers, agents, suppliers, others) and geographical borders" [6]. As the scope and complexity of current Web-based applications vary widely, it is difficult to come to a standard definition of Web-based applications.

However, since the age of internet huge methodologies has proposed by numerous researchers to address different software models which has develop for web applications [7-9]. Typically, software process model is a hypothetical picture of a process [10,11]. From a specific perspective each model offer a unique process sketch, Correct and formal descriptions of software lifecycle activities can be developed using such models. Software project utilizes a process to facilitate execution of the engineering tasks and develop a product that satisfies the user requirements. As conventional software systems become big and complex, a number of development lifecycle models have been created to manage the process [12].

One of the most popular model known as Waterfall model is the most influential and commonly used process model, in which the sequential execution of various phases of requirements specification, design, implementation, verification, and maintenance are performe. The Waterfall model has some well-known limitations as it assumes, the requirements are stable and well-known at the start of the project. Also, each phase relies on the preceding phase that needs to be completed before moving on. As requirements change are inevitable, with frequently changing requirements the approach results to inflexibility [13].

The limitation of waterfall modes has overcomes by Bohem"s model which has also known with another name spiral model [114]. Typically, this model consist four segments, Planning, Evaluation, Risk Analysis, and Engineering. These four phases are iteratively followed in sequence. However, the limitation of the spiral model is that, highly skilled people are required and process is more time-consuming and expensive. The spiral model is based on evolutionary development. At first features with highest priority are defined and implemented and then feedback from users is monitored. As the system evolves features with lower priorities are defined and implemented [15].

One of the other approaches named Agile has deals with changing requirements, which is difficult to manage in waterfall model. In Agile approach development activities are carried out in small phases, based on collaboration, adaptive planning, early delivery, continuous improvement, regular customer feedback, frequent redesign resulting in development of software increments being delivered in successive iterations in response to the ever-changing customer requirements [16]. Agile methodologies are increasingly being adopted by companies worldwide to meet increased software complexity and evolving user demands. The Agile software development embodies several methodologies including Extreme Programming, Scrum, Kanban, Lean, FDD (Feature-Driven Development), Crystal, DSDM (Dynamic Systems Development Method). However, agile is quite often used by small software developing teams, the required intensive customer involvement is difficult to achieve in practice for Web projects in small companies.

According to the act of Web-based applications it cans broadly categories in various sets and a given application could fall under more than one category.

1. Informational: information is provided to the end users through different and simple navigations and links.
2. Interactive: provide mutual interaction and communication among various users.
3. Transactional: users can request or place orders to obtain goods or services
4. Form-based: users can submit their data or queries to the organization and extract required information.
5. Web Services: it allows the user to create an interoperable distributed application.
6. Online marketplaces: user can view various goods, can compare and purchase accordingly.

7. Web Portals: provides facilities to the users to other content of the web or services which are not part of the application.

III. APPLICATIONS DEVELOPMENT ISSUES WITH SMALL SOFTWARE FIRMS

Different Web application development procedure has work according to altered methodologies and requires changed resources with multi-disciplinary development teams. Typically, small software firms face the following issues:

1- Problems with customers.
2- Changing project goals and requirements.
3- Incomplete specifications.
4- Project management problems.
5- Staffing problems.
6- Lack of project control.
7- Lack of tools.
8- Lack of training.
9- Lack of a unique process.
10- Lack of methods.
11- Lower communication of team members.

Basically small firms need a lightweight development method to design web application. However, a number of investigators have proposed dissimilar approaches to overcome above issues.

IV. RELATED WORK

D. T. T. Vijaya Kumar & Ms. M. Sowmyavani, 2012,[17] have investigate number of web applications to get an answer of bulk of requirements like Legal issues, Medical issues, Educational issues. According to authors they have not get a single application which can serve for all the needs. To fill this gap they have proposed a new application to satisfy all the requirements by using the Agile Methods. Typically, Agile methodology is an approach used for the development of a project. However, this methodology is used to deal with the situations where waterfall model fails. The biggest drawback of waterfall model is that it assumes that every requirement of the project can be identified before any design or coding occurs.

Soundararajan and Arthur [18] proposed a soft-structured methodology for the developing of a larger system. This framework consists of two parts: (1) the Agile Requirements Generation Model i.e. a soft structured requirements collection model that reflects the agile philosophy and (2) a tailored development process that applicable for both small and larger scale systems. The objective of this approach is to overcome the changes during the development of large scale systems. Pritha Guha et. al. [19] presented a new approach for developing an online polling system. Initially the author has analysed merits and demerits of Model Driven Architecture (MDA) and Extreme programming and introduced a new method for developing the software in both small and large scale application. Huang et al. [20] propose a UML profile for modeling web applications at the PSM level and have Servlets, JSP, and Java code templates generated. Hsu [21] presents a UML profile for web 2.0 mashups which is used in the model-driven development of a web mashup that uses map and web feed services. Kaewkao and Senivongse [22] base the generation of their Google App Engine applications on the proposed UML profile. Other researchers such as Mubin and Jantan [23] only present a UML profile for modeling conceptual, navigational, and user interface features of web applications, while Kataria et. al. [24] present a component-centric UML profile for modelling web applications that use ASP, JSP, PHP, Servlets, and JavaBeans technologies. Similar to these researches, we drive the development of web applications by UML profile-based modeling but target the AngularJS platform.

Ridi Ferdiana [25] has given concern for the beginner developer teams who want to develop or evaluate mobile applications in more nimble. The authors have introduced a software engineering approach called MASEF ("Mobile Application Software Engineering Framework"). According to the authors designed approach guides the novice developers to develop and evaluate a mobile application development in agile way. Additionally the designed approach has recounts the successes and challenges in adopting MASEF at four kinds of mobile applications projects.

Martin Tomanek et. al. [26] has discussed the advantages and disadvantages of using the two frameworks. Different groups of readers can benefit from the results of this paper. It will help corporate management to decide how a company should set up its own specific framework for managing agile product development projects. Project managers will have a better understanding of agile development principles and

how it fits in the classic project management framework. Last but not least, it will help product developers to work in more agile ways and survive in he controlled and complex project environment.

Erdogan Dogdu et. al. [27] presents a simple data model-driven approach for web application development that is based on RDF data model, the basic semantic Web data model, and its reasoning capabilities. The authors has presents a prototype implementation of the data model-driven Web application development framework that utilizes semantic Web technologies in the backend for the data model. With the designed framework, the authors have given focused on the RDF data model and its reasoning logic (partially). Developers define the data model online using a Web application front-end and the framework generates different views of the data elements automatically. This enables the developers to change the data model easily whenever it is needed. M. Wasim Raja & Dr. K. Nirmala [28] have develop the agile project management model (ELAM) for E-Learning using Agile methodologies. The proposed model prove to be very interesting instructional strategies in Electronics and Engineering education, because the authors have provide practical learning skills that help students understand basis of electronics. Nitin Uikey and Ugrasen Suman [29] have identifies and analyzes various aspects of conventional and Web-based development and proposes a lifecycle model, which incorporates the aspects of agile and plan-driven development to develop a Web-based application successfully.

Wutthichai Chansuwath and Twittie Senivongse [30] have propose a UML profile for AngularJS for building a model of an AngularJS web application, and a set of transformations that transform the model into a code template. The developer can then fill in the template to make a complete workable web application. Also, a transformation tool is developed to assist in constructing the code template. Using a case study application, the evaluation in terms of transformation rate shows that the automatically generated code covers 87% of the complete code of the case study, which means it could greatly help reduce development time. Kamran Rasheed et. al. [31] has discussed Traditional and Evolutionary Software Development Models. According to authors there is no single model that has its replacement but adaptive model has taken or move to the IT industry to themselves because of the great variety avilable in all

part of projects, from team building to documentation, from scalability to testing, from user requirements to user satisfaction. Adaptive methodologies or model has provided an ample facility to user so that adaptive methodologies has become most powerful methodologies in the development of the software or systems. Predictive model has its own presence and influence due to which these methodologies can also be used in different criteria.

V. CONCLUSION & FUTURE WORK

In the last couple of years, one of the major trends for software development organizations was the move towards web application systems. These years also saw a large number of small firms emerging in this area. Unlike older software organizations, these small firms do not have established development practices. This paper has discussed a number of accessible models related to development of web application in small firms. Additionally a focus has also given on current research in this area. A brief on development issues with small software firms has included for better explaining the difficulties of this field. Future work can be done in direction to trim down some issues with the altered version of model like waterfall or agile model.

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