

A Framework for Smooth Adoption of Emerging Technologies for Rich Internet Application (RIA) Development Focusing on HTML5

Muhammad Ahmed, Dr. Syed Saif Ur Rahman

SZABIST, Karachi, Pakistan

ahmed928@yahoo.com, saif.rahman@szabist.edu.pk

Abstract-- The paper highlights the importance of the Rich Internet Application (RIA) domain. It emphasizes on the importance of adopting new RIA language; HTML5, as a technology to be focused on for all software development firms and individuals. To identify the factors involved in learning new technologies especially RIA and leaving old legacy platforms in software development firms, a survey is conducted which gives insight about the current strategies of software development firms and the software developers' perspective about RIA.

Keywords— RIA, HTML5, mobile application development, adoption, new technology

I. INTRODUCTION

The era of software development in terms of desktop applications and web2.0 has changed the world. They both ruled for many years. The web2.0 is quickly replacing desktop applications. We found in our survey that 95% of software people from different software houses said that desktop applications will be non-existent in the coming future. The RIA is the future and the purpose of the study is to show its importance especially for those who are unaware of its importance. The number of software developers is high. According to the survey, 40% don't know about RIA. Besides, there are many organizational issues which are involved as well and are causes for hindrance towards the adaptation of RIA or specifically any new technology. In this study, we tried to find out those issues along with the importance of the RIA paradigm and future technology HTML5. The major industry trends are also discussed to show the importance of RIA technologies and more specifically, HTML5. According to Survey, 95% of participants said that they haven't worked on HTML5. The important part of our study is the survey which is conducted in software development firms which are not moving towards RIA or are very slow in doing so. The survey also focuses on getting insight about organizational issues, individual software developers' perspective about new technologies, new and existing projects and issues in adoption as well.

A. Transition Phase from desktop to web to RIA

To shift towards present day desktop applications to web means shifting from static conventional platforms like C, C++ to the scripting dynamic languages like PHP, JavaScript and others. Most developers are aware of the desktop style programming and hence don't get scripting and dynamic languages in focus. There is a need to create awareness through education and technical trainings for it [1].

B. Conversion from traditional web to RIA

It is important to note that there are number of conversions of traditional web to RIA. For example, according to study conducted at Delft University of Technology, two applications from the insurance sector were converted into RIA using one of the RIA frameworks. In light of the usability feature, RIA was satisfactory. The report concluded that more and more application should be converted to RIA [2].

II. IMPACT

The adoption has impacts on current skills of the resources, re-identifying the project goals and may also redefine the software future and company vision.

A. Challenges of Software Firms

A software organization has two main assets, the projects (clients) and the team (skilled resource). On Some points both can have priorities over each other. Following are the challenges:

1. Clients and Projects
2. Skilled Resource
3. Dealing with Organizational Issues

B. Identifying the Issues

The issues could be from lack of skill and issues within the organization(s) as described below in Table 1.

TABLE III
REASONS FOR UNSKILLED STAFF

1	Lack Of Accurate Or Desired Educational Background
2	Lack Of Desired Experience

i. C. Behavioural and Political Issues

It is found in survey that 35% of employees say that their organization doesn't motivate them to learn new technology. Also 65% say that resources are not adaptable to new technologies. They try to oppose it due to some of the following reasons:

- a. Fear of losing control and stake in an organization due to New Technology.
- b. Do not like to giveaway the comfort zone due to the technology.
- c. Avoiding in investing personal efforts, time and energy to incorporate new technology.

D. Current Practices in dealing with Challenges

1) *Steps for Dealing with Challenge #1:* The following are some challenges to overcome.

- Improve their business processes and staff performance.
- Improve their customer satisfaction.
- Reduce their cost of operations.

The software firm may present their client the outcome of the new technology features by keeping in focus on above processes.

2) *Steps for Dealing with Challenge #2:* The following are ways on how to Improve Skill Sets;

- Conducting refreshing courses on premises
- Training at Technology Institute
- Self-Training through R&D Strategy

To save the money on expensive training, the most common approach these days is to make the employees do R&D on new technologies. 70% of participants in survey preferred this approach.

3) Dealing with Challenge #3

- a. *Dealing with Unskilled Staff:* 70% of the participants in the survey said that it is very difficult to find proper skilled resources. We suggest that it is better to train the existing ones instead of searching for new employees. Conduct motivational and inspirational sessions with them as 100% of our survey participants liked to have trainings.

b. Dealing with Behavioral and Organizational Issues:
Below could be the strategy steps;

- 1) Identify the employees which could make issues.
- 2) Classify them according to the level of issue.
- 3) Top Management should clarify the vision about the technology and its benefits.
- 4) Conduct sessions with them individually or in groups about the new adoption of technology. This should be done in Top down approach i.e. from senior resource to junior resource.
- 5) Identify their roles and explain to them the benefits the employee can have along with the firm.
- 6) Take their feedbacks and change the alter plans if it is required.
- 7) Conduct Training sessions for them as discussed above in Dealing with Challenge #1.

III. RIA

The Current web Applications which are also termed as web2.0 has changed the web. On the other hand, increasing Bandwidth and computing powers has fueled the web instead of Desktop applications. The Term RIA was first used by Adobe in 2002. The hurdles it has been facing are now being addressed by new technologies. The RIA is basically the web application which processes the data both at client and server side efficiently. The Smart RIA utilizes the bandwidth and communication effectively. The favourable communication should be Asynchronous. On the client side the look and feel should be like Desktop [3].

A. Importance of RIA

By 2010, at least 60 percent of new application development projects were in some nature incorporated with RIA technology.

B. Mobile Applications development Trend

In 2011, the mobile application development business was estimated to touch \$9 billion [4]. Mobile application development is one of the hottest trends of the development world. According to survey, as it is shown in Figure 1, 24% of participants said they like to do mobile application development in the near future.

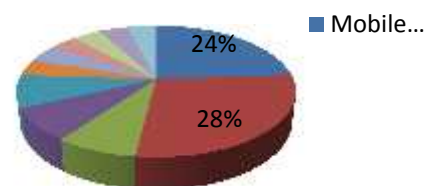


Fig 1: Mobile Application Development Trend

C. RIA Technologies

There are two main ways to develop and build RIA. The first is through Plug-Ins like the ones built in Flash, Java or Silverlight and the second is through JavaScript.

IV. HTML5

HTML5 is an answer to Adobe Flash and Silverlight like technologies. The W3C and WHATWG devised few important rules which also address main industry related issues as well.

A. Features of HTML5

Some of the core features of HTML5 are provided in table 2;

TABLE II
CORE FEATURES OF HTML5

Basic Validation at Client Side
Audio & Video Support
Canvas
Data Storage
Offline Operation
Drag and Drop
Geo location
Messaging and Workers
Web Sockets

B. Industry Trends

Apple supports HTML5 on its devices. Google introduced a tool called Swiffy.to to convert the flash files to HTML5. Microsoft is pushing HTML5 in place of Silverlight and has introduced its support in its new windows 8 platform. Last year Amazon introduced the support of HTML5 in its e-book reader Kindle. IBM announced Maqetta, an HTML5 authoring tool for building desktop and mobile user interfaces.

1) *HTML5 is Replacing Flash on Mobile Phone:* In 2011, Adobe announced that there will be no more flash software for mobile devices. Flash will only be for PC. According to adobe, they said that HTML5 is the ultimate choice by organizations like Google, Microsoft, Apple and RIM.

2) *HTML5 Enabled Mobile Phones:* According to strategy analytics [6][7], a data and analysis business solutions customer research firm forecasted that there will be 1 Billion HTML5 enabled mobile phones by 2013. Also, ABI research forecasted that there will be 2.1 Billion phones with HTML5 capability by 2016. Also, it is predicted that HTML5 phones will have 100% increase in it sales in 2012 [8].

3) *HTML5 Cross Browser Platform Support:* The mobile applications developer has to develop an

application in different platforms to be executed on different mobile devices [2]. The HTML5 is a cross browser development platform and can run equally well in Apple Safari, Google Chrome, IE9, Opera mini and Firefox versions.

4) *Mobile Devices Usages:* The mobile devices' usage will also require a single development platform as its growth and usage is expected to increase. According to IDC research, the Smartphone Market Growth was 55% in 2011 and is expected to touch 1 Billion in 2015. Also, the average Smartphone will generate 2.6 GB of traffic per month in 2016 [5] which is a clear sign of mobile device penetration.

V. SURVEY

The objective was to get the current status of different software development firms in context of the application development strategies, employees' technical trainings, intentions towards rich internet application development and future strategies regarding up-gradation of different projects towards rich internet client applications.

A. Analysis on Survey Results

1) *Training on New Technology and Mode of Training:* More than 85% of participants said that they learn new technologies on their own. It is also to be noted that around 30% of participants said that it takes 6 months at least for them to get well versed on new technology. For mode of training majority was in favor of training through R&D followed by the option of training through professional institutes.

2) *Organization's Role:* Majority of the participants said that their organizations motivated them to learn new technologies. On the other hand, 35% of participants' answer was no.

3) *RIA Awareness:* On asking whether they heard about RIA, it is alarming that around 40% of the participants had never even heard about the term RIA. This has to be taken seriously as we presented in our report that RIA comprises of the majority of software development of the near future.

4) *HTML5:* Around 1/3rd of the participants said that they haven't worked on HTML5. It is also to be noted that the rest 25% who worked on HTML5 did not make business applications, only prototype type small applications.

5) *Mobile Application Development as a Hottest Trend:* 1/4th of the participants have shown their interest towards mobile application development.

6) *Desktop to Web and Project Up gradation:* For the future of desktop applications, 95% was sure that they will be no more and web will replace it eventually. For project up-gradation towards new technologies, all participants said that they want to convert their existing projects to new technologies. 75% agreed that organizations that don't switch to new technologies would eventually lose the business.

7) *Project Conversion on New Technology: Factors and Possibilities:* 70% said that once the product is shifted to new technology it means old technology is gone, it is also supported by participants that 85% of them don't like to work on old technology, and 55% said that the resource only provides support to old technology as a part of their job role.

8) *Fear of Adopting New Technology: Factors:* 35% said that resources are not willing to adopt new technologies. This seems to be in contradiction to the reply that all participants are willing to learn new technology. This further needs to be clarified, In our opinion there might be strong chance that the participants are talking about those resources which are in most senior positions and don't want to lose their comfort zone by leaving their current skills and expertise on existing old technology.

Around 78% of the participants estimated that nearly 40-80% projects didn't opt to adopt new technology. One of the most important factors which affect any organization to adopt new technology is finding a skilled resource on that. 70% of the participants said that it is very difficult to find the desired skill set resource.

VI. CONCLUSION

The web2.0 is coming towards an end. The shifting towards RIA domain is the key to the future development of web and smart client applications. HTML5 is the focusing technology of the RIA domain in the coming next years. The reason is that all major vendors and other industry trends are signalling towards it. Our survey showed that there is a strong need for software development firms and entrepreneurs to revise their strategies and focus on RIA especially and mobile application development. The survey shows that there exist a large number of technology people who don't know about HTML5 and RIA in general. The reasons are many which include organizational issues and somewhat personal motivations as well. Participants are sure of few points that despite the organizational issues like motivation, the individuals like to learn new technologies on their own; they want to learn through R&D which is a good sign. There are also likely to convert their existing products to new technologies and they believe that if the organization doesn't adapt to

new technology then they might lose business opportunities.

ACKNOWLEDGMENT

All praises be to the Almighty Allah, the most beneficent and merciful. I would like to acknowledge the guidance provided by our respected teacher and advisor, Dr. Syed Saif Ur Rahman, Assistant Professor at SZABIST for his excessive support and for being the source of motivation to perform.

REFERENCES

- [1] Transforming the Web Into A Real Application Platform: New Technologies, Emerging Trends And Missing Pieces, Matti Anttonen, Arto Salminen and Tommi Mikkonen Tampere University Of Technology, SAC '11 Proceedings ACM Symposium On Applied Computing, 2011
- [2] Usability Of Rich Internet Applications, Noureddine Ou-aissa
- [3] Rich Internet Applications State Of The Art, Marianne Busch, Nora Koch, Programming and Software Engineering Unit (PST), Institute for Informatics, Ludwig-Maximilians University Germany, December 2009
- [4] Mobile Application Market: A Developer's Perspective Adrian Holzer a,*, Jan Ondrus b
- [5] Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011-2016
- [6] Global HTML5 Handset Sales Forecast, Strategy Analytics Report, 2011
- [7] HTML5 For Mobile Devices and Tablets, ABI Research Report, 2011
- [8] HTML5 Phones Sales To Grow 100% in 2012, Strategy Analytics Report, 2011
- [9] Event Driven Architecture using HTML5 Web Sockets for Wireless Sensor Networks, by R. Narayana Swamy, Dr. G. Mahadevan, July 2011
- [10] New Riders Introducing HTML5 2nd Edition, Bruce Lawson Remy Sharp, October 2011