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## Benefits to Organizations after migrating to Scrum

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### Abstract:

Since technology is moving at a fast pace globally; companies all over the world are changing their work environment for a faster, smarter and better production. However, companies cannot ignore the factor of quality under any circumstance. Ensuring quality of deliverables will make global competition easier for a company to sustain. For this purpose, many companies are adopting new and more apt Software Quality Assurance (SQA) model. Over the past one decade there is a shift from the traditional waterfall model to Agile Scrum in the Pakistan based software houses and other companies of various fields. This paper investigates the evident differences and changes a company faces after successful implementation of Agile Scrum as a SQA model. The purpose is to do comparative analysis of Scrum organization with non-Scrum organizations.

**Key Words:** Agile Methodology, Scrum, Agility, Process Models

## 1.INTRODUCTION

Software Quality Assurance (SQA) is an activity to ensure that the process or product of an organization is according to the universally acclaimed standards of quality assurance. It is an ongoing activity throughout the software development process so the quality is checked and maintained at every step and not just at the end.

There are several models in SQA to maintain and improve quality; however, a company has to face some critical decisions and factors while deciding the most suitable SQA model according to the structure of the organization and nature of the deliverables. Some popular SQA models are:

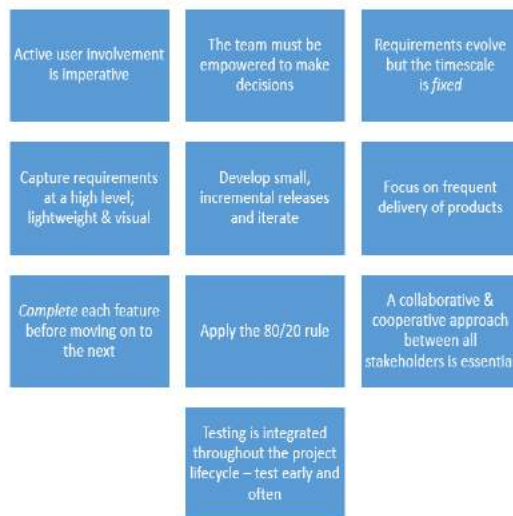
- Waterfall Model
- Spiral Model
- Agile Scrum

- Extreme Programming
- Rapid Application Development (RAD)
- Total Quality management (TQM)

Scrum is a type of agile methodology. Agile software development refers to a gathering of software improvement techniques in view of iterative improvement, where prerequisites and arrangements advance through joint effort between individuals belonging to different teams in the organization. Scrum focuses on how to handle assignments of the project in a team oriented environment. Since Scrum is fairly easy to implement; it is popular among SQA teams globally and hence is the most implemented agile approach.

Prominent characteristics of Agile include: team work, timely decision making, testing of small units of project, applying of 80/20 rule i.e. focusing on purpose of the project and working on the most essential areas of the project, fixed time bar, testing at each cycle etc.

10 Key Principles of Agile Scrum



**Fig.1 10 Key Principles Of Agile Scrum**

### 1.1 BRIEF DESCRIPTION ON AGILITY

Agile is a software engineering methodology which is a mixture of many other methodologies. [7] It has an iterative approach where requirement is gathered in teams belonging to different backgrounds and having different expertise. Agile methodology encourages team work where employees work together on projects and are well connected with other members of teams [8]. This methodology also creates a sense of accountability among the team members. Unlike waterfall model; agile welcomes change at almost every stage of the project and performs rigorous testing after every development cycle [9]. Many other methodologies fall under the umbrella of Agile. Some are listed below.

- Adaptive software development (ASD)
- Agile modeling
- Agile Unified Process (AUP)
- Crystal Clear methods

- Disciplined agile delivery
- Rapid Action Development (RAD)
- Dynamic systems development method (DSDM)
- Extreme programming (XP)
- Feature-driven development (FDD)
- Lean software development
- Kanban
- Scrum

Agile also focuses on making tasks easy and manageable. Involving the client side through every phase is also an integral feature of Agile methodology. [10]

Scrum is a type of Agile methodology. The key factor which differentiates Scrum from other Agile methodology is that Scrum consists of three components (i)Roles (ii)Artifacts (iii)Time boxes. Scrum is the easiest agile methodology to implement hence it is the most popular among organizations. [11]. Scrum helps to gain control over the pace and scope of project and also helps in raising the quality bar of deliverables of the company.

### *1.2 IMPORTANCE OF USING SCRUM*

Scrum is a branch of Agile which is used for incremental and iterative approach for processes. Agile proves to be a lot more helpful than traditional waterfall model because it increases productivity of the processes and helps in reducing the time consumed for completion.

Scrum is stable and mature for software or product development. If compared with waterfall or traditional models it has a lot more to offer in terms of efficiency, accuracy and ease. In a traditional waterfall model planning is always done before testing and once a phase is complete there can be no changes made in the previous phase. However, in Scrum at any stage changes can be incorporated to make the outcome better. With waterfall model the testing phase is always a hassle because there a number of bugs and errors are found after development phase whereas in Scrum testing is a lot easier because it is done side by side in every phase so bugs are corrected as soon as they occur. Lastly Agile scrum provides great flexibility which allows customization for the end product according to customer's needs and satisfaction which is a major reason for many companies who have or want to adopt Scrum.

### *1.3 ISSUES THAT LEAD TO THE USE OF SCRUM*

Scrum is the methodology which can be quickly adopted by teams to plan and manage their work. Each Scrum step has necessary detail to plan, design, develop and test code, managing the team progress as well. Straight forward use of scrum is its major strength. In our current environment of software industry, major problem is the request of changing requirements during the development lifecycle to meet the shifting demands in business. A proper change management process is required. When client provides long lists of requirements, it creates a chaos. Scrum provides an easy adaptive way to structure such chaos. Moreover, for a quality product to be delivered and having complete client's confidence, feedback from customer during iterative development is necessary. Implementing scrum allows the customers see on-time delivery of product in chunks and get regular feedback on how the product is working. To chase an emerging market, delivery time of product has reduced from years to months and in some cases weeks. Managing such quick delivery of a quality product could be done implementing scrum. It provides a way where progress could be made even with the changing unstable initial requirements. Problem of communication within team is also a major barrier. Scrum methodology of agile can be implemented to address these concerns. It has the power to transform project management across every industry. In a

nutshell Scrum is a team-based approach which controls the chaos of contradictory needs and interest by iterative and incremental development of products with rapidly changing requirements. Daily stand-ups reduce the miscommunications among team and maximize cooperation. In addition, it is scalable from small single projects to entire organizations.

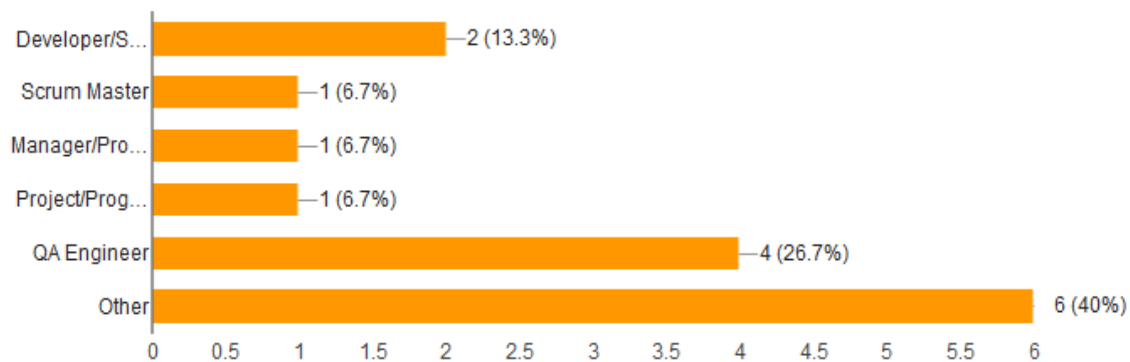
## 2. METHODOLOGY

A survey was designed on Google for SQA professionals and employees working for various companies in Pakistan to be conducted online. The survey included questions on a variety of SQA models, experience of companies with different SQA models, reason for shifting to Agile Scrum and changes after the successful implementation of Scrum in the organizations. The aim of conducting a survey through an online questionnaire was to gather facts and figures about companies implementing Scrum in Pakistan based companies and also to gain an insight the changes and circumstances faced by companies after Scrum. Questionnaire is attached in Appendix A for further reference.

### 2.1 RESULTS OF THE QUESTIONNAIRE

According to the online survey conducted for this research paper; approximately 30% of the respondents were QA engineers while rest of the respondent included developers, project managers, software engineers etc.

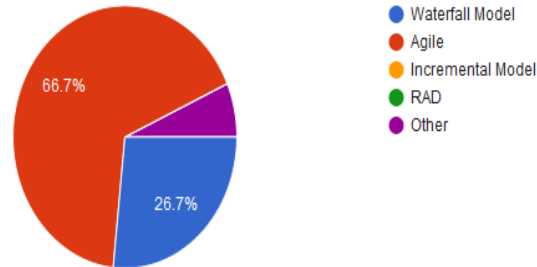
#### What is your role in your company? (15 responses)



*Fig. 2 What is your Role in Your Company*

The popularity of the Agile methodology is evident as 90% of the respondents in the online survey are following agile methodology currently in Pakistan.

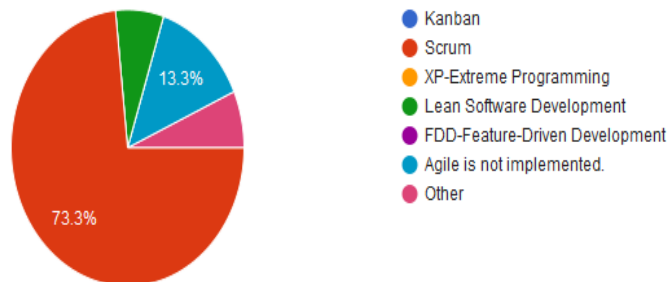
Which software development model is followed in your organization?  
(15 responses)



**Fig.3 Software Development Model Followed in Your Firm**

Since Scrum is fairly easy to implement; it is popular among SQA teams globally and hence is the most implemented agile approach. In Pakistan 90% companies are using SCRUM methodology for agile development and testing.

If your company follows Agile methodology which method is implemented?  
(15 responses)

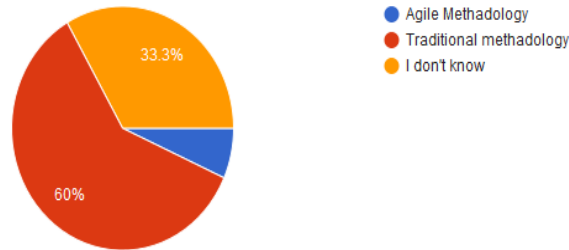


**Fig.4 Agile Methodology Implemented**

Waterfall model tends to be more popular before companies shifted to SCRUM. The basic difference in waterfall and SCRUM is that in waterfall, any development phase cannot be started before its prerequisite is not completed however in SCRUM, multiple phases are initiated simultaneously. SCRUM is open to change, team work and quick decisions.

Before implementing scrum which software development process was used in your organization?

(15 responses)

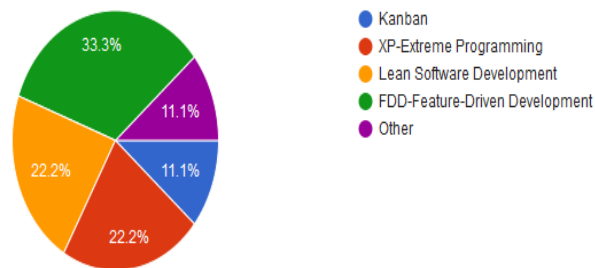


**Fig.5 Software Development Process Used Before Implementing Scrum**

However, it is observed from the results of the questionnaire that before SCRUM the Agile methodology was not very popular in Pakistan's SQA environment.

Before implementing scrum which alternative agile method was used in your organization?

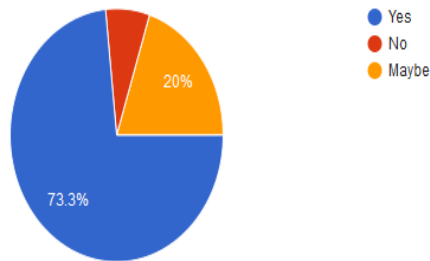
(9 responses)



**Fig.6 Alternative Agile Method Used Before Implementing Scrum**

Companies in Pakistan claim to observe that SCRUM changes the work environment and product quality. 90% of the respondents claim that the success rate of projects has increased after implementation of SCRUM. This is because of numerous reasons but some major reasons are increased collaboration, quick decision making and daily communication among developers and end users.

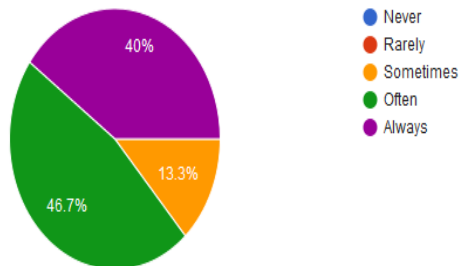
After implementing scrum is there a visible change in success rate of your projects?  
(15 responses)



**Fig.7 Success Rate After Implementing Scrum**

Only 30% of the respondents are sure about the quality of their end product, usually it is due to changing requirements on every sprint. Such changes may damage the team confidence and end product

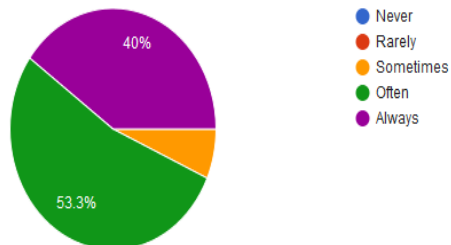
Does your team manages to deliver quality software frequently? (15 responses)



**Fig.8 Delivery of Quality Software**

Only 40% of the developers' meet all of the client's requirements, this is because many requirements are technically or functionally not feasible, many requirements are unnecessary after product walk through. Requirement engineering is not done properly at the initial stage of the project which leads to miscommunication among the client and the company.

How often are you able to meet clients' requirements fully? (15 responses)

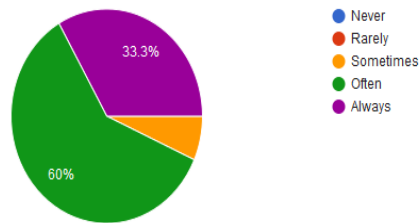




**Fig.9 How Often Client's Requirements Are Met**

The changes during or end of any sprint may affect the overall project timelines, project structure and end product, 40% of the respondents accommodate the changes suggested by the product owner; however, a large number of developers may not be able to accurately accommodate the changes.

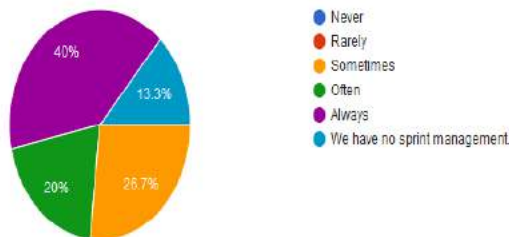
Does your team manages to cope up with the changes suggested by the product owner?  
(15 responses)



**Fig.10 Team Manages to Cope with Changes Suggested by Product Owner**

Usually the team knows their next sprint goals, but the varied responses suggest that there are no definite boundaries/goals and teams usually know high-level requirement

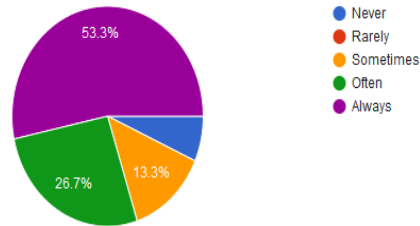
How often your team knows that what they will be doing in the next three sprints?  
(15 responses)



**Fig.11 How Often Team Knows What They Will Be Doing in Upcoming Sprints**

Success of Agile methodology depends on the collaborative efforts all teams are putting, without cooperation and collaboration, sprints cannot deliver successful and working product

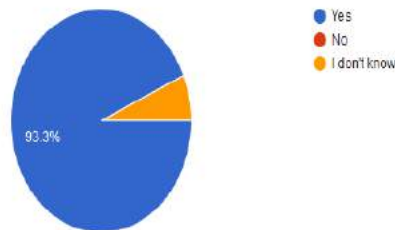
Does your team collaborate daily? (Example: Daily stand-up, status update meeting)  
(15 responses)



**Fig.12 Frequency of Team Collaboration**

All respondents had a consensus on the daily communication and collaboration for any successful projects

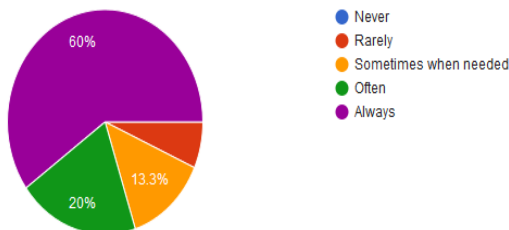
Do you think these daily collaborations result in fruitful product/solution?  
(15 responses)



**Fig.13 Result of Daily Collaboration**

Agile methodology requires constant, back and forth and clear communication, 80% of our respondents communicate among their teams on daily basis

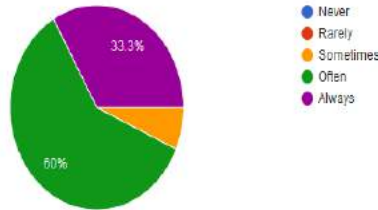
How much does your team communicate face to face with each other?  
(15 responses)



**Fig.14 Frequency of Face to Face Communication**

According to 70% of the respondents, their team often delivers well tested and working software at each sprint end, these promising figure shows the success of Agile methodology.

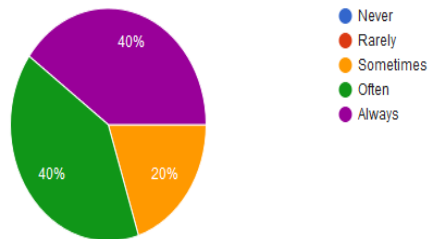
Does your team manages to deliver properly tested,working software at the sprint end?  
(15 responses)



**Fig.15 Delivery of Quality Software at Sprint End**

Majority of IT projects are not delivered on time or on the planned budget, there are many reasons behind such overrun, usually requirements are not clear in the initial phase, hence multiple development iterations are required to complete the project

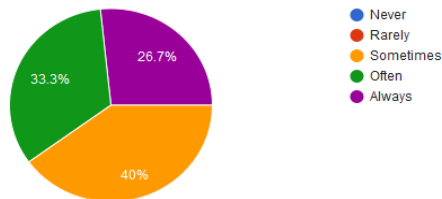
Does your team manages to deliver at an acceptable pace? (15 responses)



**Fig.16 Team Manages to Deliver Product at an Acceptable Pace**

Majority of the team members are engaged in multiple projects/roles hence there is a light boundary. Such scenario can be disastrous at the time of incident as one cannot specifically determine the responsibility

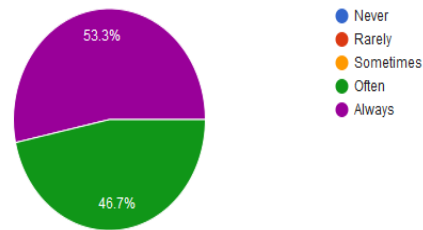
Are team members bound to their definite job roles? (15 responses)



**Fig.17 Team Members Bounded to Their Definite Job Roles**

At the time of incident, company environment plays a vital role in the preparation of response of what has happened, 50% of the respondents are able to always express the incident while 50% often expresses the incident

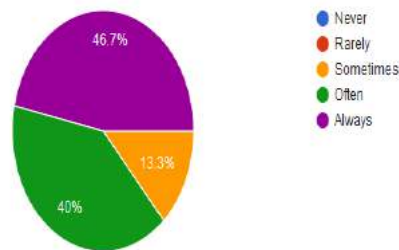
How frequently is your team capable to express on what has happened?  
(15 responses)



**Fig.18 Team Expressiveness**

Usually IT professionals are focusing on improving their current processes but varied responses can be reliable due to high pressure of new responsibilities/development

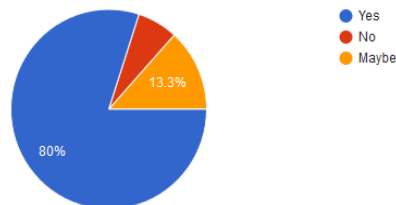
How much does your team focus on improving their processes? (15 responses)



**Fig.19 Focus On Process Improvement**

Result shows that 90 percent of the companies in Pakistan use performance metrics to increase performance of the team in order to ensure quality of the final deliverable or process

Does your team use performance metrics to increase performance of their team?  
(15 responses)



**Fig.20 Use of Performance Metrics**

### **3. ANALYSIS AND DISCUSSION:**

After analyzing the result of the survey which we conducted, people with different job descriptions participated in filling this questionnaire. It is very clear that agile methodology's variant Scrum is gaining a wide acceptance in software development community of Pakistan. There are numerous reasons why people in professional organizations in our society prefer the implementation of this process- Scrum. We found that 90 percent of the study respondents uses agile methodologies to different degrees, and a good number sight it positively due to better communication between team members which is an important aspect in our Pakistani society, frequent release and the increased flexibility provided by the agile design, that in terms of expressing their opinion to daily communication. Success rate of scrum is also high as following this process testing of product is integrated throughout the lifecycle which enables the continuous inspection of the product as it gets developed. Agile also believes in increased and active participation from each member of the product team so people are not specifically bound to their job description. When new changes come so team discuss what's the right thing for the project and product. Moreover, team is empowered to make decisions and most of them have a clear and visible idea regarding what they will be doing in their upcoming next sprints. Agile provides flexibility to change in requirements when change is required; this creates better business relationship and customer satisfaction.

### **4. FUTURE WORK AND CONCLUSION**

Agile software development methodology's variant scrum has resulted in a major departure from plan-based, traditional approaches. It is quite clear that implementing agile has resulted in great benefits. Its iterative nature, flexibility and change acceptance makes it a fluid successful process. As said by Heraclitus said, "Change is the only constant in life". Whether change is a result of the market around you or user's feedback, it is going to occur throughout the process. There are pros and cons of everything. Most of the companies do extremely well with agile but still there are some which virtually see no improvement. We can work on what are key points which stop people from adopting agile. How we can improve it to increase efficiency. Moreover, how we can overcome the disadvantages of this process.

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