SOFTWARE UPDATES MANAGEMENT IN PAKISTAN'S IT INDUSTRY – A SURVEY

This survey report is submitted to the Faculty of Computer Science as partial fulfillment of Master of Science degree in Computer Science

by

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Fall Semester 2020
Institute of Business Administration (IBA), Karachi, Pakistan

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Dedication

I dedicate this to the people who always go out of their way in supporting me; Being it emotionally or physically, thank you for believing in me which keeps me motivated and consistent.

Acknowledgment

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Abstract

Background: There are many defined processes for Project management, but very few focuses on release management. Generating a constant growth in the product requires proper management of releases, and the practices are a little different from what is followed when a project or a product is starting from scratch.

Aims: This research focused on understanding the software industry and the gap of release management and then understanding how Pakistan's IT industry manages updates of their software products.

Method: Studied the previous works and then from the learnings the research is divided into 2 phases. First a survey was conducted with selected audiences, and conclusions are driven by 60 responses, all by Pakistan's IT industry professionals. In second phase 6 participants amounts the 60 respondents were selected for interviews based on the conclusions from the survey.

Conclusion: Since frequent and small updates are reported in the research to keep the engagement of the user and manage internal targets, agile methodology is widely followed by multiple teams involved in each update, because agile helps in keeping up the pace. It is also noticed that the more frequent and small updates approach is more in practice with them being more client-centric which help in more decisive and facts-based innovation.

Keywords— Software updates, release management, processes

1.   Introduction

Pakistan has a huge IT industry for the development of all kinds of software, from games, ERPs to android and iOS applications. According to PSEB (Pakistan Software Export Board) (PSEB 2020), Pakistan has 4464 registered companies, and this number keeps on increasing as software usage and industry grow in the world. PSEB also reports (PSEB 2020) that in FY 2019 exports of software were about $902 million compared to FY 2013 where it was $330 million, showing the growth of about 63.5% in 6 years.

In an article from 2015, Bina Shah (Shah 2015) believes Pakistan is the next software hub, she says "the Pakistani programmers market ranks as the No. 3 country for supplying — freelance programmers — behind only the United States and India"[1] which shows how big this industry is considered in the world and also creates the trust for the market.

The reason for this huge export of software is being Pakistani currency cheaper in the market, thus giving a low development and maintenance cost. This creates opportunities in Pakistan also, for jobs and freelancing, and now has earned a reputation of good quality software with experience and growth in academia and the IT industry. The primary contributions of this paper are:

- Identify the methodologies used in software updates
- The teams involved in software updates
- How often are software releases made
- Defining priorities in updates
- The processes that are least or most time consuming
- Reasons these approaches followed, their benefits and improvements

The remainder of this paper is organized as follows. Section 2 explores the previous studies (literature review) which motivated this research. Section 3 explains the survey design. Section 4 describes the survey questions explored which is phase 1 in this study. Section 5 provides the detailed survey results. Section 6 has the phase 2 of this study which is interview design. Section 7 provides the results of the interviews conducted. And the last Section 7 concludes the result.

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[1] Bina Shah, 2016, Website

2. Literature Review

The software development industry does recognize the necessity to managing and defining the processes so as to realize productivity, efficiency and quality, and to define and plan processes that leads the resources to perform at its most efficient way (Watts S. Humphrey 1991).

In another study, with a survey they identified software release planning being few of the most critical identified activities of software product or project development (Franch and Ruhe 2016). This previous study motivates the study to look at release planning and understand the industry, to support and identify for future solutions to the problems related to release planning and the processes of development especially with bigger projects or products which involve many users, clients or consumers at once.

Researches, journals and survey have a good impact when making decisions on changes, especially theoretical changes in software, in a study (Guo and Seaman 2008) it showed 60% of the respondents agreed to following them when making a theoretical change decision, which is the 2nd most important criteria.

There is a previous study (Sukhoo, et al. 2004) which after surveys and results suggested that developing countries needs to understand and progress on the software management processes and other previous works have also suggested that software developers practice some sort of agile like processes, but they are unaware of the exact methodologies they are following (Carver, Heaton, et al. 2013) (Carver and D. Heaton 2015). The reason being for the use of agile has a lot to do with customer satisfaction which according to a study (Khomyakov, Mirgalimova and Sillitti 2020) suggests that 95% of the companies which uses agile have a good relationship with their customers.

In a related study to software updates and releases (Li and Paxson 2017), they realized almost 5% of the security patches impacts negatively, because not being managed properly or implemented properly, a patch doesn't have to have bugs to impact the customer but also if right processes are not followed it can have a big negative impact at some point in release management.

In another study about release decisions and planning (Sassenburg 2006), it is important to plan and manage properly and they discussed some points which may be followed when planning a release to make sure of quality and stakeholders proper input. Figure 1 shows the process that is recommended in this research.
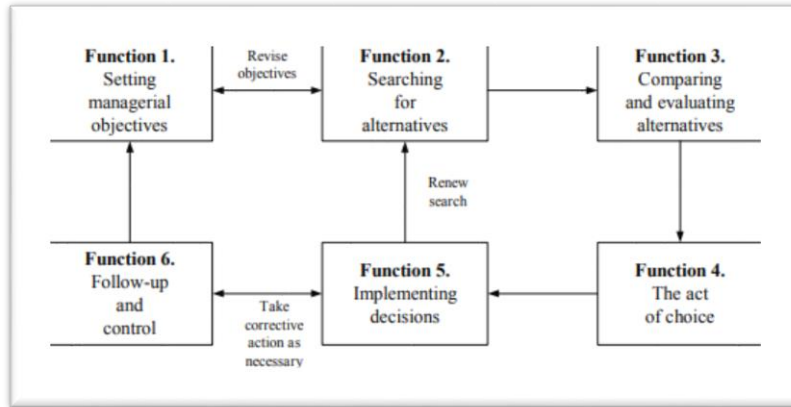
Figure 1: Functions *(Sassenburg 2006) page 46 Figure 1*

Also, in this study (Sassenburg 2006) they defined a process with identified 4 areas which are most important when managing a release, Figure 2 explains the process with the areas. This inspires many of the survey and interview questions in this research. These key area involves defining releases, their information such as making it as planned, the decisions that are taken it could be in terms of processes or priorities and then lastly the implementation which has to be smooth.
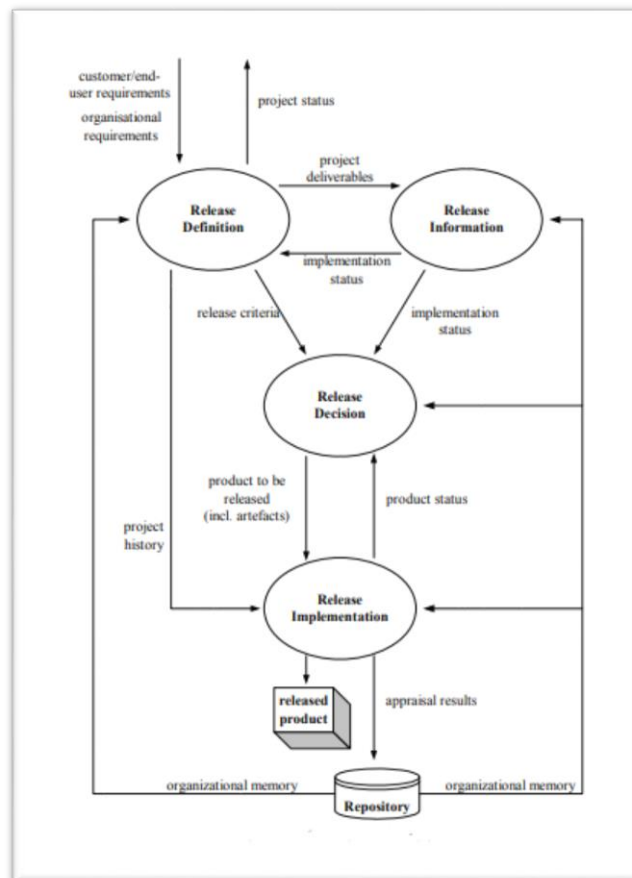

Figure 2: Release Process *(Sassenburg 2006) page 48 Figure 3*

A similar result has been shown in a research (Usman, Mendes and Börstler 2015) according to which inaccurate estimation and planning has a big reason of mismanagement and issues in requirements, and to solve these issues more surveys and researches are required of this sort. Which shows that planning still being a critical areas for research and understanding the release management still seem like a pain area for the industry especially when it comes to multinational software projects which involves many departments and estimation planning in releases has a big impact on the development and timeline of releases. Also it helps in keeping the finances according to the plan because they have bigger budgets to deal with and can't afford the loss that can be caused by the mismanagement of releases and not proper estimations of time and money required. Also resources are a bigger part of cost estimation including the timelines and the finances which is highly impacted by the type of resources and the teams involved. This motivates us to include the resources in our study to understand what the industry is following and which teams and resources are usually involved in each release plan.

In the study (Simona Ibba 2018) on understanding the need of software processes they studied startups and concluded that quality of the developed software projects by software houses has a close link with the understanding of the methodologies of software development that the people learn in the academics in their studies or in the training course by professionals to professionals which is needed to progress in this fast paced industry to follow proper methodologies by all the teams involved. It also suggests that IT startup industry has increased the pace of development to a huge extent and we need to constantly research on the methodologies and update them according the time and pace of the industry. Also because of the tools that have been developed it has been become very quick to start off with the projects and deploy it to the customer.

The study (Sukhoo, et al. 2004) had the focus on developing countries in this survey and targeted the software professionals from the developing countries to understand the software management processes in these countries. Though this research was quite intensive and was mostly by IT professionals but this did not focus on the release management either management overall itself. This also suggests that there is a need to understand the release management. This study is very relevant to us because firstly Pakistan also being one of the developing countries and it mostly has an IT export industry. Here we have software hoses which focuses on developing projects mainly for offshore clients and deliver them, because having cheaper labor clients also prefers to go for developing countries for their projects, but now Products have gained a big market because Pakistan is maturing in terms of IT use and development both, so the bigger players in the industry focuses more on Products then projects and managing software products is different than managing projects, because in most cases projects only have change requests from the clients very few times but in Products you need constant releases to mostly a live software and make sure

of its security, testing and user satisfaction as well. Projects although has similar processes as well when it comes to agile mostly because clients prefers to have content updates and they are treated as users.

The next 2 surveys are from literature review from a literature review by (Rodríguez , et al. 2012) in which a survey (Ambler 2008) which had 642 responses. The response were from only North America and the respondents were professionals from software industry who knew agile methods. In which 69% of respondents showed that they had some working experience with agile. Their survey also showed that the projects they worked on with Agile had more success than the ones not using agile methods (among which 82% had success rate then compared to 71% rate of success in non-Agile projects). Moreover, the participants also indicated that they got more productivity (88% said that somewhat higher or much higher productivity), also quality (77% of them answered somewhat higher and/or much higher) and also business stakeholder satisfaction (to which 78% indicated somewhat higher and/or much higher). This research suggests that developing countries has a high number of understanding of software processes with Agile being the most common one. It also indicates that this helps in improving the quality of the projects and helps in communication internally and externally both as well.

A similar conducted survey (West, et al. 2010). The survey had 1298 responses from application professionals of application development or in software management. In the results of this survey, 35% of respondents said that agile is the closes to their development process. In which, 34% said they still use iterative or waterfall process for their software development as their main methodology. When agile practices are asked about, short iterations (which is 79%), continues feedback (which is 77%) and then the daily scrum meeting (which is 71%) are the most used by the software professionals in practice. Oppositely, test-driven development (which is 42%) and system metaphor (which is 15%) were the least implemented practices. This shows that understanding of the processes might not be clear to some professionals but they do use some sort of Agile in their development processes, and Agile mostly is not followed completely but is adopted piece by piece according to the usage in the project or product.

Another similar survey (Molokken-Ostvold and Furulund 2007) investigated the relationship between efforts and relationship with customers. This research is mainly focused on the interviews by the professionals in the software industry, they used only interviews and not the surveys as is usually practiced. The survey used 18 different projects. They concluded that a less effort overruns is experienced when there is improved customer collaboration using agile which is supports daily communication with the customer. They used a little different approach then most of the researches, they did not go for more professionals though survey approach but understanding them qualitatively more through interviews was more of their focus in it.

In a survey (Version One 2011) which was a 3 months long survey with multiple approaches to collect data received 6042 responses (approaches, design and rate was not provided). The responses were mainly from the people working in agile industry with 80% of them working on agile for more than 2 years. Scrum was voted as the most used methodology (53% using agile), second is the hybrid use of Scrum with Extreme Programming (in which 14% said this). And only 2% said to be using lean. About the practices in agile, the survey showed that daily stand-up (in which 78% of the respondents said they use it), iteration planning (in which 74% agreed to be using it) and unit testing (in which 70% responders use it) as the most followed practices. The top three reasons said to be for adopting agile were to increase the pace to get to market, it increases productivity and also helps in prioritizing better. Benefits they experienced from the responses of the survey was the ease to manage changing priorities (in which 84% agreed to this) and improved the visibility of the project (in which 77% agreed to this). And at last, the survey also showed agile also helps in changing the culture of the project or company (which is 52%), and secondly it helps in learning more and changing personal behavior is supported by agile (which is 40%). They received these many responses because Version One is an organization which also trains companies and individuals with agile learning and practicing.

Also in their largest Agile survey (VersionOne 2017) they concluded that 23% of the respondents use Scaling Agile Framework, 27% uses Scrums, and 3% uses other sorts of Scrum and then only 1% uses other forms of disciplinary Agile methodologies. But some sort of Agile is seen to have gained popularity. It is a great source for survey results because they have a huge response base, but they are more focused on the practices and type of practices, still they need to keep and track the release management as well keeping in mind the planning, designing and quality assurance.

In another recent and similar large survey (capterra 2020) they surveyed 300 project managers from around the world and through online forms they took a survey from them in which they identified Scrum bring the most used methodology (37% of the users said they use Scrum) with a very close Hybrid approach (35% said they use hybrid) which can be a mix of any 2 or more methodologies followed by Kanban and Lean sharing the same share (11% for both of the methods) and lastly is Scrumban (5% of responses) which is a mix of scrum and Kanban. This shows how the methodologies are evolving to cope up with the pace.

Also in this study, they identified Daily or weekly standups being used by most of the companies (57% of the users said they use standups) followed by the practice of sprints (54%). They also identified that users are not getting much mature using agile, because in this research 95% of the users are experienced with agile for at least 1 year. This shows that people are getting familiar with the processes and moving

more towards agile and getting familiar with agile software development more than other methodologies available.

A study on security releases (Li and Paxson 2017) with surveys found that non-security patches has a higher footprint in code that security updates; one third of all issues related to security were initially produced more than 3 years before actually understanding an solving them. Attackers who continuously check open-source repositories can get a start of weeks or months before actually having the solution to the security issue.

Security patches or security related software updates are a big part of software releases and they are always very high risk, and with they need to be prioritized as well. This can happen that the Quality assurance teams usually have testing environments setup, and live deployments are done on other servers, if not managed properly, there can be incidents mostly related to security releases that it works fine when deployed on testing servers and the Quality Assurance approves the release, but then when deployed on live servers it might cause some issues specially with connectivity and in most cases on urgent bases these releases will need to be rolled over. Not only these impact the user trust and satisfaction level but it has a high chance of a breach and you code is at high risk at that point. So it is important to have better quality assurance practices with its management and resource allocation so that the security releases can be deployed sooner as well. For this test automation approaches are also used to speed up the processes but that is a separate debate and research all together. There are many researches and surveys only focused on the test automation.

Previously a similar study was done on understanding Brazil's IT industry (Claudia de O. Melo 2013) in which they surveyed Software professions through forms to analyze the industry in order to find gaps and solve them in future studies. It makes sense to learn about one industry because it can give different aspects of understanding one type of industry because software are developed in different ways and each industry has a role of its own, some are research based, some are startup based and some are export based with software houses majorly.

Pakistan's IT industry has grown mature from projects to products; thus, it is a good market to study. Maintaining software is similar yet different than starting and building software, and the research is to survey, analyze, and understand processes followed to update software, or in some terms, it is called patch releases. Pakistan is also a very startup based industry and according a research the startups following proper research methodologies like agile tend to be more successful (Simona Ibba 2018).

In a similar investigation (Rainer and Hall 2003) about the external influences that affects the Software Processes. They summarized and identified the factors through a survey. They then compared these

factors from interviews that were identified. They used two research strategies to make sure the identification of the identified factors were very relevant and precise specially the ones which were given lower value from the respondents. In this research as they used two different research ways and identified and valued the results of even low frequency answers, which made the results more valid and also more reliable because it gave more idea and more understanding not just from the survey but also from the interviews. Also having a good sample also makes a difference because interviews are conducted from much selected audience and this gives more prove and validity to the research and conclusions that it is from the professionals.

Although a previous work has shown that people do not always understand why do they need to update the software (Fagan, Khan and Buck 2015) which leads them to not update or ignore the updates even when they are needed (Vaniea, Rader and Wash, Betrayed by Updates: How Negative Experience Affect Future Security 2014). This leads to dead weight loss in which users might have ignore to update to the newer version, and developers might go for fewer updates, and there are chances in which user might not update because of assuming to have risks that it might involve and unclear benefits. This not only happens with the less technical people but with most of the people, and this is not only for the public applications but also the applications which are used inside the industry for development purposes or for support purposes. Developers and support people are more concerned about updating the software on which the project is made on, or some plugins they have used inside their code, because it can impact the whole workflow of the software and can cause major delays in the timeline, which only effects the users but also the internal teams with management to development and Quality assurance, because then everyone have to update their schedules with tasks.

In another related study by them (Vaniea and Rashidi, Tales of Software Updates: The process of updating software 2016) suggests that users actually wants to know what they are adding when they are updating the software and importantly if they will enjoy it. They observed that users spends time and effort in researching on the updates, asking friends and family or searching about them online. Their most important concerns are time that is required to install the update; resource and space required while installation after; improvements it's making to the software; and does it impacts the features that are close to them. Thus it's also important to communicate to the user clearly about the updates either it is the client or the end user. There can be many approaches to do this, also mentioned in this research is the example of Google play store which has an option of "What's new" in which the publisher or the company lists downs all the updates that are in the latest release. Also Google play store is very open with a very fair policy of letting user know every time there is an update, the details are a must to be provided with an option to not update the apps. Similarly many other platforms are there to manage the

release updates for users to make them aware of the changes are being made so they know what they should be expecting from the release and they are aware of all the details, which is not only fair but gets satisfaction as well.

We website (Broadcom 2020) discussed in great deal about the release planning, one thing that was interesting is the concept of release backlog they mentioned in, where they identified that it is important to reduce the backlog of the project in a release and incorporate them in the release as well, because if that is not practiced, the project or product backlog is going to keep increasing. It is a good practice to have a defined percentage that would be shared at least for the previous backlogs, and they are to be prioritized as well with the other priorities. They also mentioned product owner to be more responsible for the overall product or project backlog, because they are to manage the backlog not just for the releases but also for the product. Although the backlog is whole different concept to be researched upon but it being part of a release has importance itself in planning and decision making of not just the release but also for the whole project. Backlog has a lot of security issues because they keep on getting delayed, this also has an effect on technical innovations because they keep getting pushed into backlog and innovation and technical improvements are discouraged with it, product owners are responsible to understand this and manage accordingly.

When it comes to release planning, if most teams are not involved in terms of roles and responsibilities the most harm in the release process comes to release requirements, because either the decisions would not be according to the requirements by the client or though right analysis of the user. Also could have wrong timelines because resource and work estimation should be responsibility of the relevant teams and people with the roles. Focusing on the people is also important when planning a release, which means stakeholder management especially in the initial phases of releases should be considered with high importance.

In another recent study (Jarzębowicz and Sitko 2020) they studied about release planning in which 69 responders participated discussing about prioritization practices in requirements in industrial agile projects. They took Polish IT companies and asked professionals to fill survey forms, to understand the practices in this industry. They summarized that business value has the highest priority when prioritizing tasks in release planning but despite that being given the most value, other criteria such as complexity and stability also has value when planning a release. They also concluded that planning a release should include multiple teams from different perspectives to have the most of the planning and should most miss out any part in each release plan. They also studied that customer point of view or client's opinion is given high importance but that is also because they have high background knowledge and understands

he business processes quite well, which helps the requirements better and makes the product more relevant to the end user.

They also mentioned that this study is based on surveys but other research formats such as case studies, interviews and focus groups can help understand the software management more in depth and help improve future processes. This also helps improve the validity of the research. Interviews gives a good understanding of the reasons of the survey results, as we then do not make assumptions but know the exact reason of the results that we get from out surveys. Case studies are also a good source of research and understanding because can answer many whys that we get during these researches. Literature reviews are also mentioned to be a good source of understanding and researching when it comes to Agile methodologies and software development, because there is no wrong or right processes but there is always better practices that could be followed in software development. And these we can see that good methodologies help improve not just the software quality but also saves time and reduces cost with more client satisfaction.

These early research highlights the importance of release management and understanding the processes followed in the industry to help improve them. The gap identified from these early researches is proper understanding and management in the industry and focusing more on the processes that should be followed. Also that mostly researches are done based on first development of the projects and a lot is to be done on release planning and management specially when it comes to software products, because products are designed to have constant updates and to last longer with better technologies that projects. Thus software product releases involves more teams and resources in general than that of projects.

To understand release as discussed in previous works (Palumbo 2015) Release management also is a part of systems management which is done remotely. This process includes building the release, testing it and ensuring that it works for the client, and also installation of it if requires. A big part of this process is vulnerability detection, in which system is to be scanned of bugs and security issues. The results of these well managed releases are different than the ones who are not done with proper processes. Releases are mostly part of live on going projects, because of that one can never be too careful, must always have contingency and roll back plan with each release.

We have seen studies related to software development and release planning which has focused on a selected country or type of countries like developing countries to study, which is a better approach because then literature reviews can be done on them only to understand different perspectives that they bring and also it makes the researches more relevant because they are more focused and precise. Similarly Pakistan is a country which even being a huge software export industry has not been researched enough

as the potential of the industry is. This can lead to a future literature reviews by taking these surveys from different industries and different types of industry to understand the global software development and can lead to better practices.

It is also identified that surveys and other researches have a big impact on improving the software industry. Thus much research is required like surveys, interviews, focus groups and experiments. Most of the researches are based on surveys but other ways can be further explored as well, mostly experiments would have good impact on learning but would be time consuming and might get risky if done on live projects, on the other hand interviews and focus groups with the professionals can give more insight of the industry and help in future improving the processes. Since the software industry is gaining pace exponentially we need to adopt many research methodologies to identify further gaps and design better approaches to solve them. Although the IT in general is huge and cannot just be summarized with researching on the software industry but this only has a bug part to play in overall IT of the world. In contribution to that this paper has conducted a survey and a series of interviews from professionals in Software industry of Pakistan to understand the industry for future studies.

3.   Survey Design

This research is based on understanding the software industry and to know the practices followed for software updates. Thus, the research is designed in 2 phases:

1. Survey
2. Interviews based on survey conclusion

To keep and get the relevant responses only, the survey design has been inspired by a previous study (Thiruvathukal, Eisty and Carver 2019) for software engineers in the research industry, they designed a survey to filter and identify the correct responses. Questions about demographics not only helps in getting correct responses but also understanding the business or the industry that is involved in the study.

The interviews then are conducted to understand the conclusion of the surveys, that why the approaches are being followed and what could be the reasons.

To identify the responses are individual and no duplicate responses are submitted, these three Demographic Questions (DQ) are asked:

- DQ1: Email
- DQ2: Name
- DQ3: Country

To make the research not biased towards one organization, a question is asked to keep the validity of the data:

- DQ4: Company

Making sure that all responders are unique and to know what kind of projects are made and what kind of professionals this study has, some demographic questions are designed to understand the projects and people involved:

- DQ5: Company Size
    - o   Less than 50
    - o   50 – 100
    - o   100 – 500
    - o   500+
- DQ6: Your department
    - o   Director

- o   Product / Business
- o   Project Management
- o   Design / UI
- o   Development
- o   QA
- o   Other
- DQ7: Project Size
  - o   Small Scale
  - o   Medium Scale
  - o   Enterprise
  - o   Other
- DQ8: Type of project currently working on
  - o   ERP
  - o   Game
  - o   E-commerce
  - o   Big Data
  - o   AI
  - o   BlockChain
  - o   Other

To reach a broad audience, the survey was made online using google form and shared through multiple channels, but to specific IT professionals in Pakistan.

- Facebook: Some groups for IT professionals were selected and the survey was shared there.
- Emails: Sent out an email to multiple companies from an online list (TechGrasp 2017), and requested them to get it filled from their managers, in which multiple companies took part.
- Whatsapp: The form link was shared with some professionals are known directly through personal contact to fill the survey.

These tools helped in reaching a very relevant and wide audience, Facebook groups was the most effective one among the three.

For interviews, 10% among the respondents, 6 versatile candidates were selected from different department and different sized companies. They were reached out through emails or phone calls for an interview session in person or call on which 4 agreed to be on call and 2 in person.

Validity and threats

The survey is based on Pakistan's IT industry and the results might differ from industry to industry. Keeping in mind every industry has a different level of following software practices, it may impact the responses.

It is always possible that the respondent misunderstands a question (Thiruvathukal, Eisty and Carver 2019). However, in this survey, all questions are kept very simple and with choices mostly to give clear direction, and the responders were all professionals which reduce the chances of misunderstandings.

4.   Survey Questions

In a previous study they worked on maintainability or updates of software (Wieringa and Hordijk 2005), they highlighted some important points to consider when making updates in software or releasing a patch. The mentioned some points such as:

- Teams or resources involved
- Frequency of updates
- The complexity of the updates or tasks
- Testing

Another study used a basic questions approach (Fhang and Swamy 2018), which developed the study based on those basic questions, thus it makes it more detailed and understandable. Also, because basic questions get the information more detailed and we will not miss the important things that should be studied. The questions they used are such as:

- What?
- When?
- How?
- Who?

This paper has mixed and used both approaches to prepare a survey that is relevant to IT industry and is focused on software updates. These observations led to the following Survey Questions (SQ)

- SQ1: On average, how often do you release a new update?
    - Every week
    - Once a month
    - Twice a month
    - Once or Twice in 3 months
    - Once or Twice in 6 months
    - Other
- SQ2: On average, How many update points per release?
    - 1
    - 2-5
    - 6-10
    - 10+

- SQ3: Departments in your company involved in the project updates
  - Business Analysis
  - Design
  - Product Management
  - User Interface
  - Project Management Office
  - Development
  - Quality Assurance
  - Dev Ops
  - Others
- SQ4: Which methodology is used for updates?
  - Agile Kanban
  - Agile Scrum
  - Waterfall
  - CPM or CCPM
  - Rapid Development
  - Prototyping
  - Hybrid
  - None
  - Other
- SQ5: While planning a release, what factors are considered most or least important when prioritizing tasks to first go in the releases (1 most important - 5 least important)
  - Complexity
  - Time required
  - Client Push
  - Security/ Risk
  - New initiative/ design

All the questions are given with choices, to save time for the participants, and to make the questionnaire more quantitative and measurable.

5.   Survey Results

The survey received 60 responses from IT professionals of 45 different companies in Pakistan. Since all the questions were mandatory to complete the survey, we can mark all responses as fulfilled and can use them in the analysis and result. In this section, firstly results of the demographics will be given, and then the results of research questions.

1.   *Demographics*

Demographics play an important role in understanding the survey as from where the survey is coming from and the relevance of it to the study and for future works.

Company Size: As we can see in figure 3, 75% of the responses are from people working in companies having more than 50 employees.
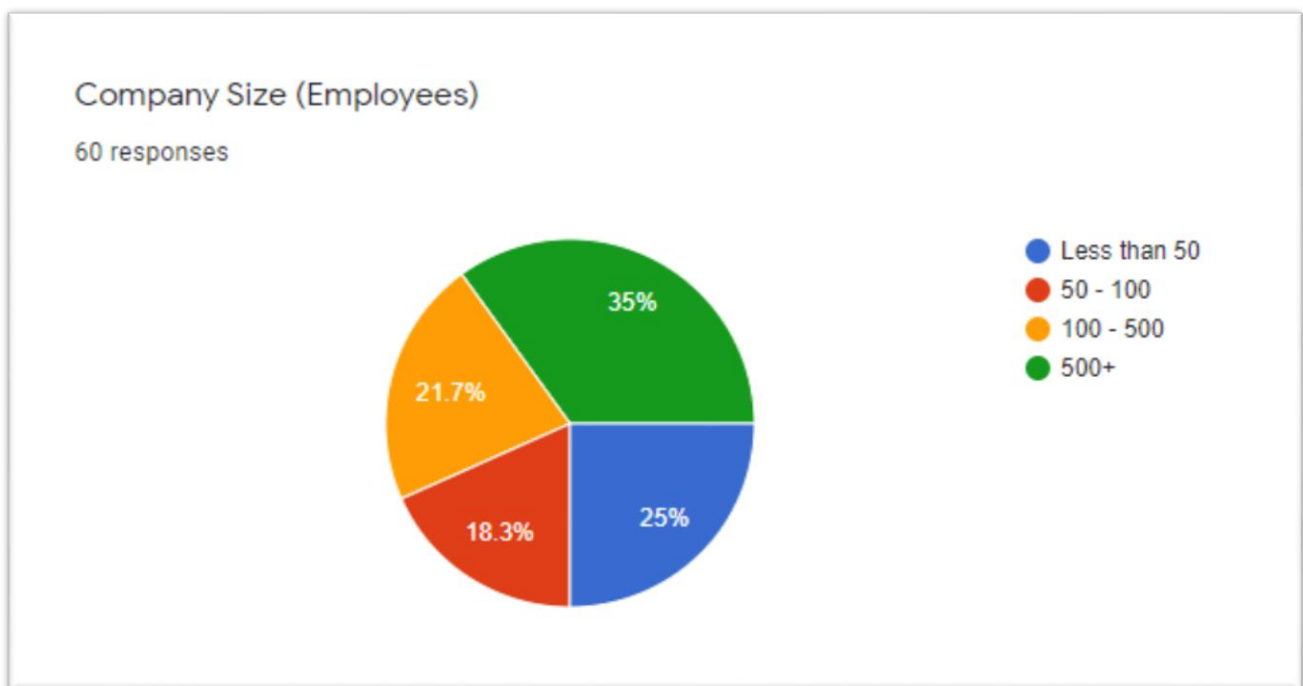

Figure 3: Company Size

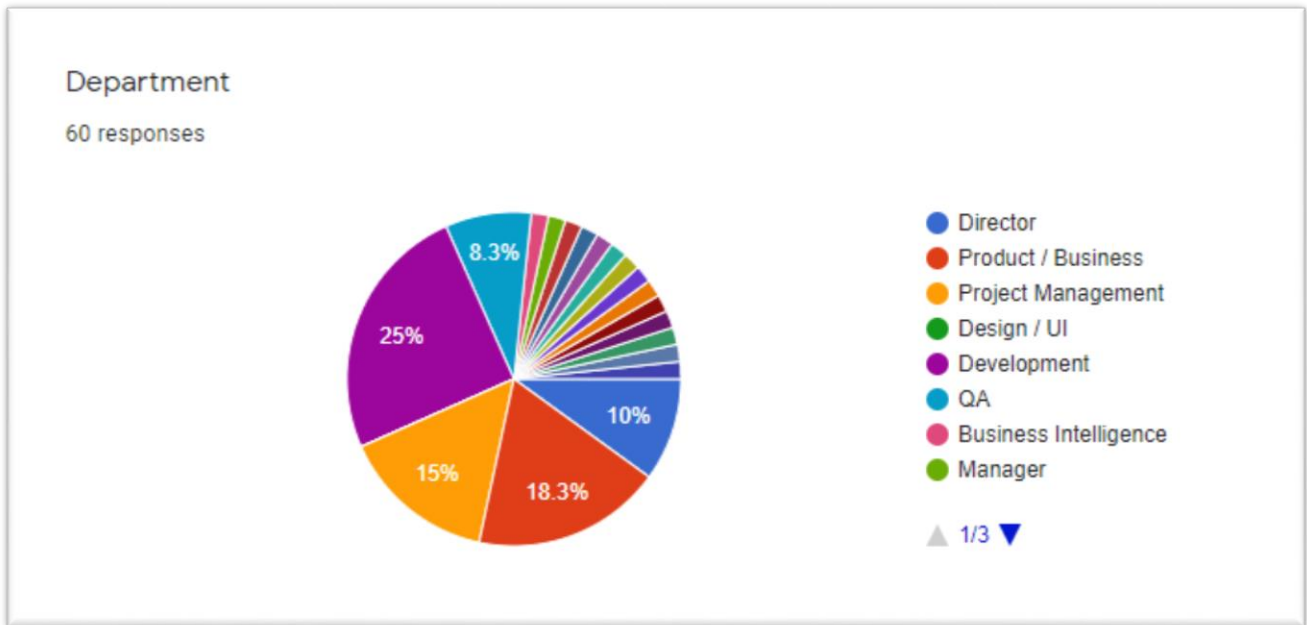*Department*: According to figure 4, we have a good mix of people from different departments.

Figure 4: Departments

Project Size: Figure 5 shows us from the people we got responses by, 91.6% of them are working on the above medium scale project and among them, more than 58% are working on enterprise-level projects.
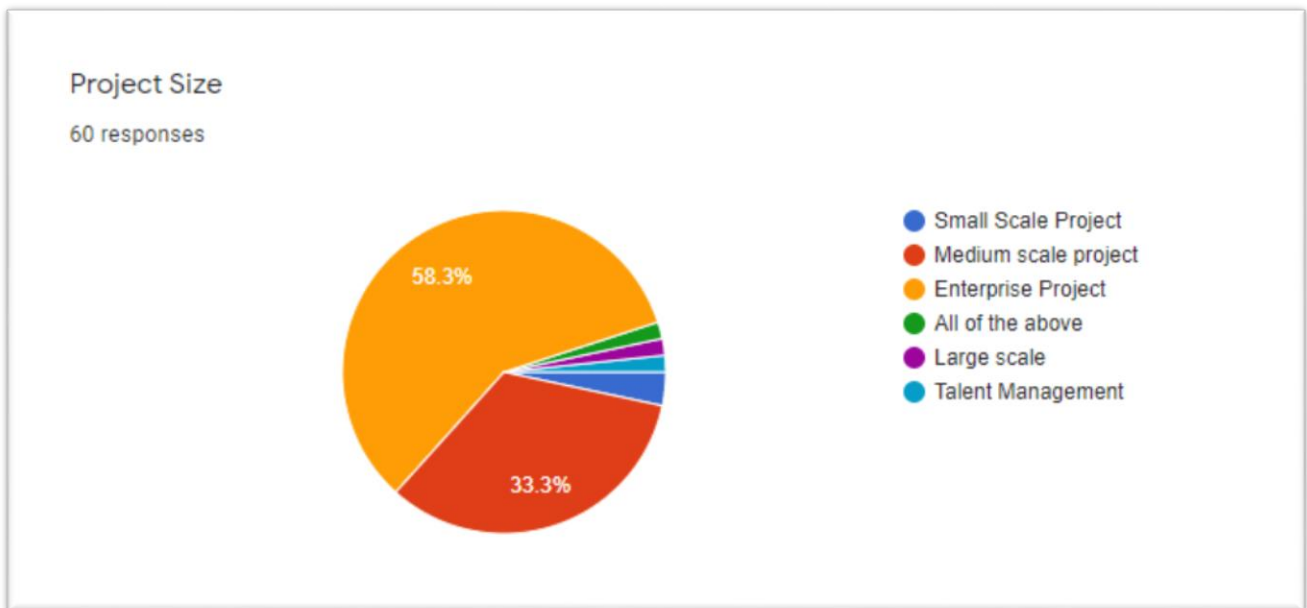

Figure 5: Project Size

Project Type: If we look at figure 6, it shows the Pakistani IT industry is very vast and the responders are working on 23 different kinds of projects.
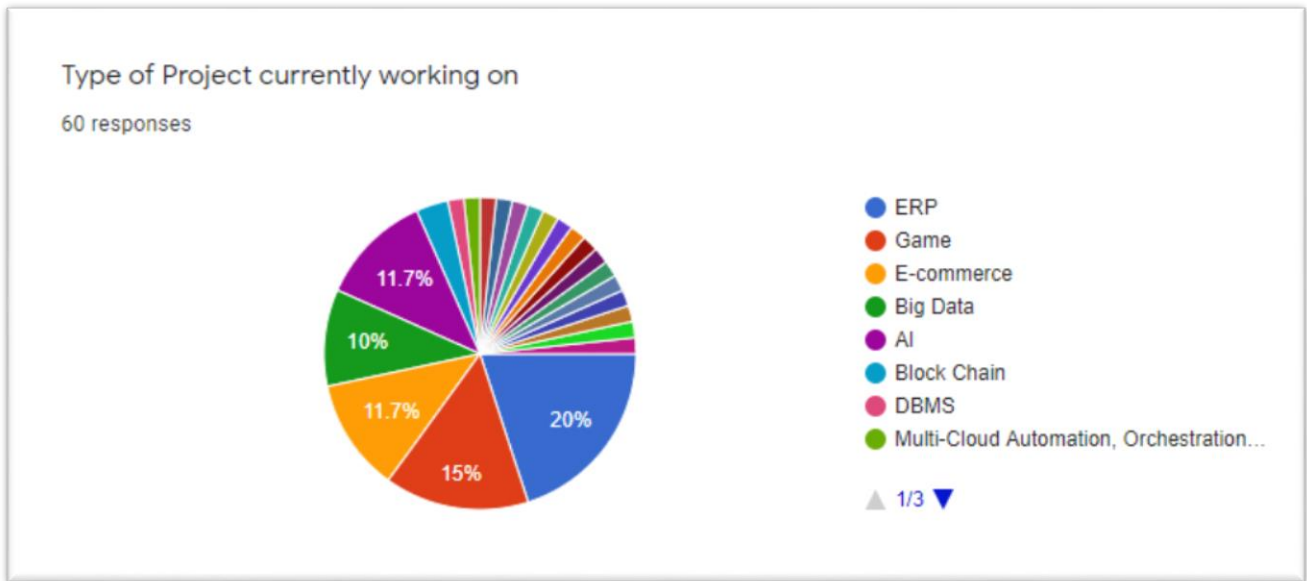
Figure 6: Project Type

2.   Survey Questions

Senator John McCain once asked Apple CEO Tim Cook "why the hell [do] I have to keep updating the apps on my iPhone all the time and why you don't fix that?"[2] (Vaniea and Rashidi, Tales of Software Updates: The process of updating software 2016). It is important to plan the updates in all aspects as we discussed earlier, it is also important to have updates quick (Vaniea and Rashidi, Tales of Software Updates: The process of updating software 2016) but also to make sure they are not very frequent to irritate the user.

SQ1 - On average, how often do you release a new update: Figure 7 shows the frequency of the updates, in which we can see that 55% of the respondents say they have released or update at least once or more than once a month.

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[2] Time Cook, 2016, Tales of Software Updates: The process of updating software, page 3215
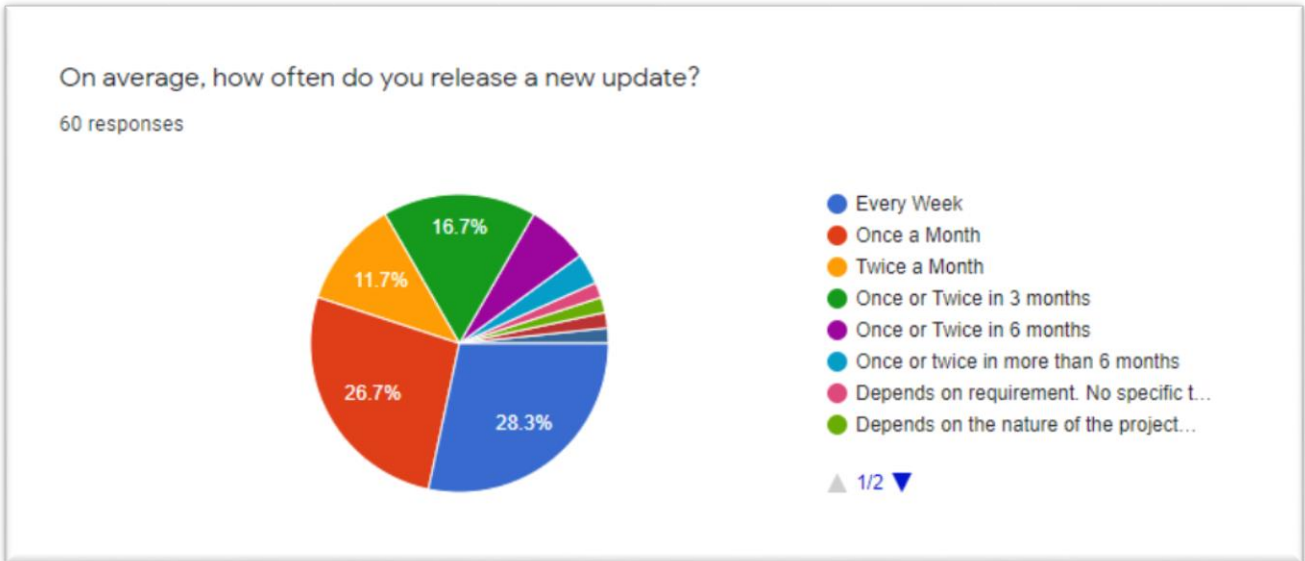
Figure 7: Update frequency

SQ2 - On average, How many update points per release: From SQ1 we saw that frequency of updates is high, and the reason we can see in figure 8 that 75% of the responses say they update the application with less than 5 release points.
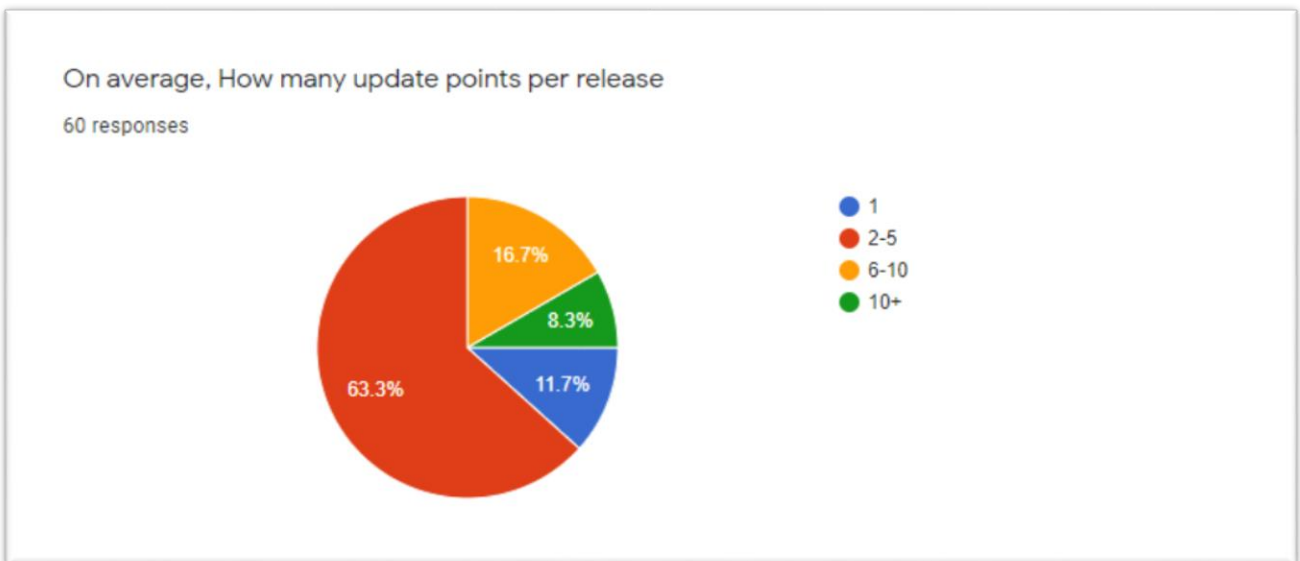

Figure 8: Update points

SQ3: Departments in your company involved in the project updates: Departments suggest the resources involved in a release. According to figure 9, Development makes sense to be involved in most of the releases since it is the IT industry, and all changes are done through development, 80% of the respondents say that the development team is involved. The project management office is involved in 45% of

responses which shows that there are companies that do not follow management practices enough to need a separate manager. Though Business Analysis now has seemed to have grown and 65% of the responses have said they are involved in the releases, which justifies because previously in SQ1 we have seen clients are given the most value when prioritizing a release.
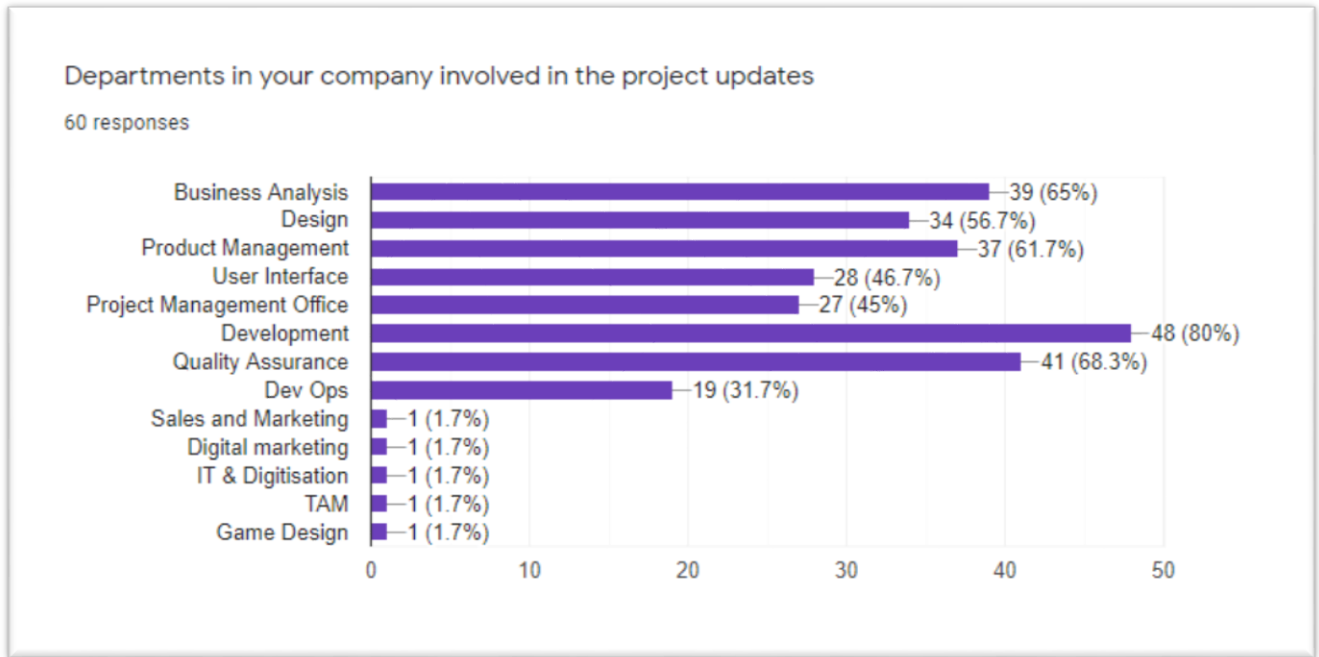

Figure 9: Departments Involved

SQ4: Which methodology is used for updates: In this research, as shown in Figure 10 60% of the responders said they use Agile for software updates, either be it Kanban or Scrum. But 8.3% also said they do not follow any methodology for managing updates.
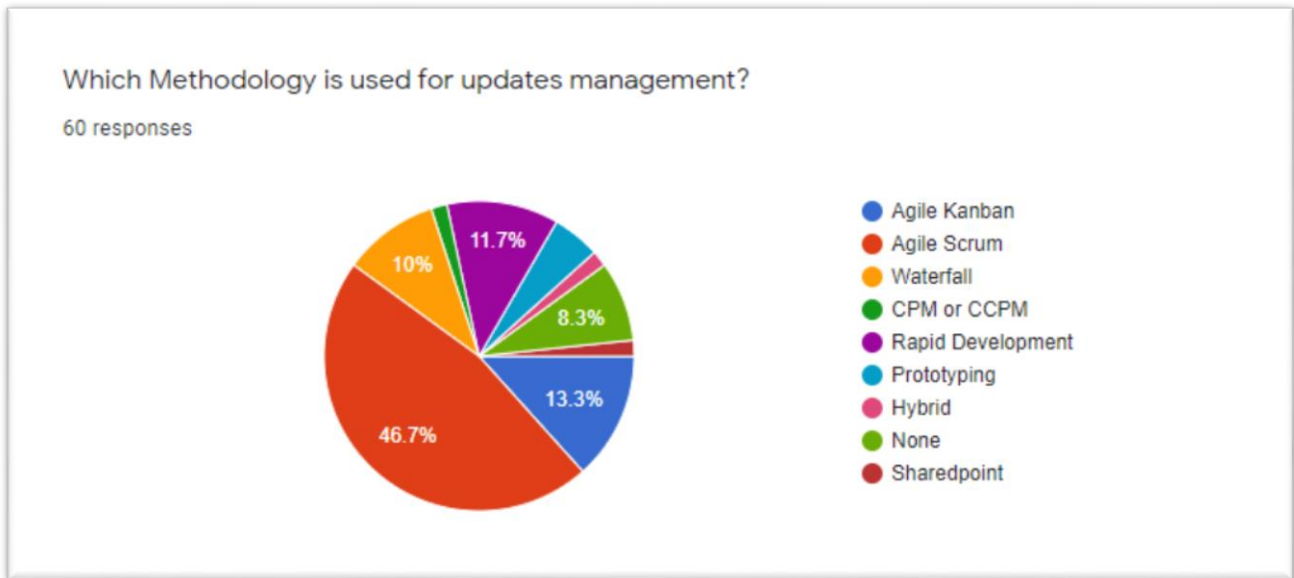
Which Methodology is used for updates management?

60 responses

- Agile Kanban
- Agile Scrum
- Waterfall
- CPM or CCPM
- Rapid Development
- Prototyping
- Hybrid
- None
- Sharedpoint

11.7%

10%

8.3%

13.3%

46.7%

Figure 10: Update Methodologies

SQ5: While planning a release, what factors are considered most or least important when prioritizing tasks to first go in the releases: In this question, responders were asked to give 1 as most important and 5 as least important. To make the graph more understandable and relevant in Figure 11, it is not made using the average directly, but a formula for each option is used as:

Score = 5 (max score) - average

This shows most of the releases are customer-centric and it is the highest priority for them to get out what clients are requesting. Security seems to be the second-highest priority when releasing an update, which makes sense because the software is mostly high risk because of private data of customers. UI design and new initiatives seem to get the least priority, UI updates should also be rare because customers do no like bigger changes in design when they are familiar with one, but they also should be made because it keeps the customer engaged and new initiatives are important to keep the software secure and attractive.
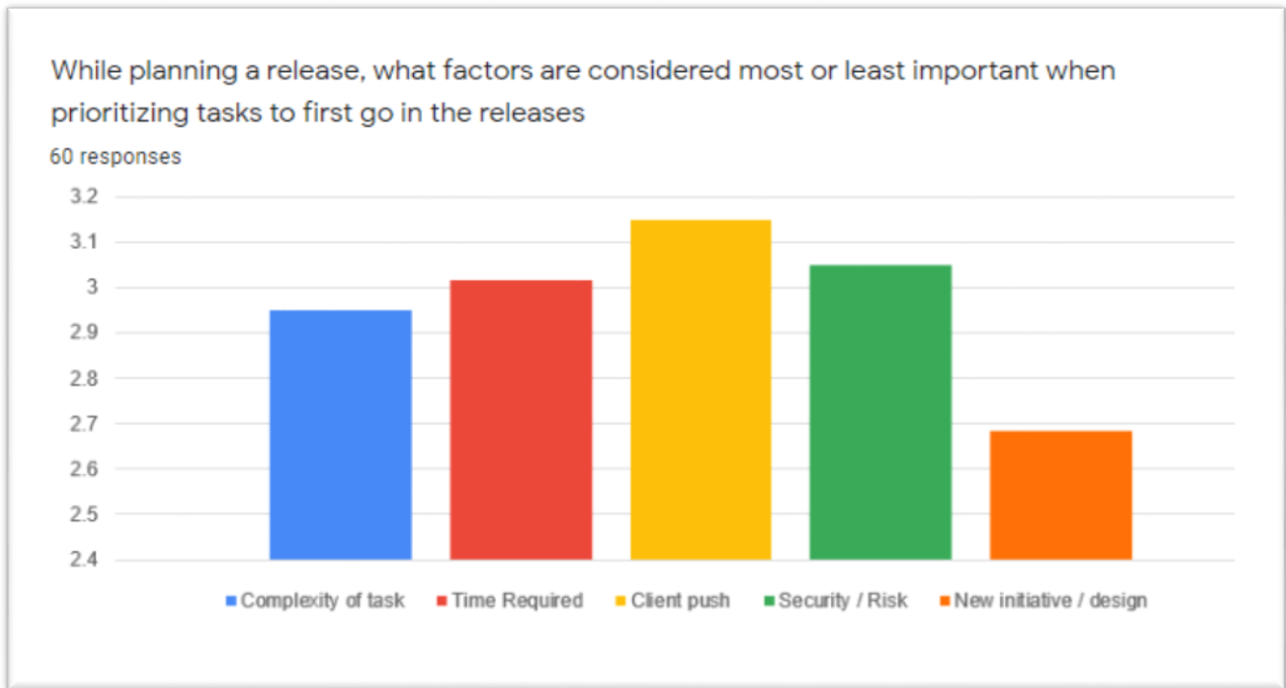
Figure 11: Priority

Survey Conclusion

From this survey we concluded these 3 main statements:

- It is a practice to have small and more frequent releases, more than 65% says at least once a month with maximum 5 release points.
- 60% of the industry uses Agile, and they have multiple teams involved in each release like, dev, business analysis, QA and PMO.
- When planning a release, most priority tasks are client requirements and least are internal innovations or design changes

6.   Interview Questions

The interview questions were designed based on the survey conclusion points. Firstly a fact is presented and then 2 opinionated questions to understand the reason from the professionals themselves. These interview questions are referenced as IQ (Interview Questions)

- IQ1: According to our survey, it is a practice to have small and more frequent releases, more than 65% says at least once a month with maximum 5 release points.
    a) Do you think it is a good approach? and Why do you think this approach is widely followed?
    b) What could down sides in your opinion of this approach?
- IQ2: From the survey conducted in this research, 60% of the industry uses Agile, and they have multiple teams involved in each release like, dev, business analysis, QA and PMO.
    a) Why do you think the industry have chosen Agile over others?
    b) What do you think can be improved in this methodology?
- IQ3: Looking at the survey results, when planning a release, most priority tasks are client requirements and least are internal innovations or design changes.
    a) Do you think management processes has an impact on this?
    b) Do you think more formal processes help increase innovation?

7. Interview Results

The interviews were conducted from 6 participants of the survey that makes 10% of the total population. They have been selected from different companies, company size, role, and project size. Among the 6 selected participants, 4 of them were interviewed over call and 2 in person, and all the answers that were common in at least 3 participants, are summarized below.

IQ1: According to our survey, it is a practice to have small and more frequent releases, more than 65% says at least once a month with maximum 5 release points.

 a) Answer to: Do you think it is a good approach? and Why do you think this approach is widely followed?

  To which most of the people said Yes! It is a good approach and seems like the right statement and approach to follow. To this they added:

- Quick feedback from clients or users
- Keeps the user or client engaged
- Employee targets
- Employee performance management
- Continues growth or improvement

 b) Answer to: What could down sides in your opinion of this approach?

  Though everyone agreed that the approach is right to follow, but they all also agreed that there are some down sides also. To this they added:

- Quality sometimes gets compromised, specially QA
- Pressure on employees
- Code merging issue
- Miss or misunderstand requirements
- Can have a process bypass
- Complex things keep getting delayed

IQ2: From the survey conducted in this research, 60% of the industry uses Agile, and they have multiple teams involved in each release like, dev, business analysis, QA and PMO.

 a) Answer to: Why do you think the industry have chosen Agile over others?

All of them agreed to Agile being followed, because it is a quick and fast industry which is feedback oriented, and it important to be agile about software and development processes. To this they added:

- Standups gives frequent updates
- Changes can be made in initial stages
- Agile helps improve communication
- Gives more visibility
- Backlog is very helpful
- Teams can focus on the tasks in hand

b) Answer to: What do you think can be improved in this methodology?

Mostly were convinced with using, but obviously there can always be room for improvements. To this they added:

- Standups sometimes can take a lot of time or sometimes can get messy if not managed properly, they should be more formalized.
- More documentation should be done. Less documentation makes it difficult to track back, for which one of participants mentioned and example, if a formula is updated in a report, tickets are created but tracking back to them is difficult due to less documentation.

IQ3: Looking at the survey results, when planning a release, most priority tasks are client requirements and least are internal innovations or design changes.

a) Answer to: Do you think management processes has an impact on this?

All of them denied this, according to it is general acceptance and processes are needed to ensure the standards, but some also added an impact on technical innovation. To this they added:

- Technical innovations sometimes get sidelined, for example:
  - Code improvements
  - Server changes and upgrades
  - Moving to new platform even for a single module

b) Answer to: Do you think more formal processes help increase innovation?

It was in majority that said yes it does. To this they added:

- Customers feedback or client requirements gives rise to innovation as well, which would be more relevant because it is based on facts
- Formal processes improve decision making

8.   Conclusion

This research is based on 60 IT professionals of Pakistan, from 45 different companies; to assess the practices used in software updates management.

When it comes to management methodologies for software updates, most of the professionals use some sort of agile practices with multiple teams being involved in each update because of the fast pace of industry, agile matches the speed and helps with quick feedback and changes. It is also reported that short and more frequent updates are more in practice, to keep the engagement going and manage the teams/employees more efficiently with better targets. Customer centricity is noticed when planning a release which according to this research gives rise to innovation as well.

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