Applying Scrum framework in the IT service support domain

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Abstract—This paper is presenting an idea of applying the Scrum framework in the IT service support domain. Scrum framework is mainly used with conjunction of other agile methods in software development domain, but almost, no reporting for its usage in the support of that software, except in few cases. Scrum framework can be applied at small, medium, and as well as large organizations, and companies. We expect that Scrum can change the IT service support from cost center into revenue and more value added center. We also expect that Scrum framework can change some companies’ profiles. The results achieved in a real-life example are prosperous and fruitful, as we will present in this paper.

I. INTRODUCTION

The IT service Support domain normally is fast changing, highly volatile, and timely pressured environment, and activity. Due to that nature of the domain, some inherited issues, like fast de-motivation of staff due to systematic work, high time consumption in the knowledge transfer activities, high Mean Time to Repair (MTTR), and under-utilized staff which leads to increasing backlog, are painful for the people managing the IT service support activities. We tackle those issues from a new perspective, and approach using Scrum framework. The Scrum framework is already used in the software development domain to cope with the fast changing requirements of the customers, increase team commitment, and build self-organized teams. For those aforementioned reasons we consider the Scrum framework as eligible for application in the IT Service Support domain, as well as any similar fast changing, and timely pressured environments. We expect some positive results from the framework application in the IT service Support domain that we’ll present.

The rest of the paper is organized as following: we will introduce what is IT service support in the next sub-section, and then we will give a brief introduction about Scrum. We will point references for more information about the benefits of the Scrum framework application in the domain of software development. The section after will answer the question “Why to use the Scrum framework in the IT service support domain”.

Previous experiences and experiments in the field of Scrum framework application in the IT service support domain will be demonstrated. After, our proposed solution will be explained, and elaborated. The expected results will be then presented in the section after.

Finally a conclusion and discussion of all the results along with the recommended future work in the last section.

A. IT service support

As stated in [8] “Service Support is the practice of those disciplines that enable IT Services to be provided. Without these disciplines, it would be almost impossible to provide these IT Services, and at best in a very unmanaged and haphazard way. The 6 Service Support disciplines are:

- Configuration Management
- Problem Management
- Incident Management
- Change Management
- Service / Help Desk
- Release Management”

That’s the IT Service support definition according to the itil-ism world website till 2003. The ITIL defined IT Service Management, where IT Service support is a homogeneous part of the whole IT Service Management entity.

B. Scrum

Scrum as a word is a Rugby team of eight individuals. They act together, and with each other to reach their goal, which is achieving a point during the match. They move the ball forward, backward, and on both sides till they reach the goal. The team has a vision, which is achieving a point, but does not have a definite final plan. The whole team plan according to the situation they are in. The Scrum framework used in the software development is mainly almost the same concept. The development team has a vision, which is delivering a final working product, and according to the changing requirements, and situations, they plan. Linda Rising, and Norman S.Janoff in [5] claims that “the Scrum development process facilitates this team focus”.

Keywords- Scrum; Scrum framework; IT service support; vertical Scrum; horizontal Scrum; dynamic Sprint planning
In [5] they mentioned that they learned that “Scrum is a process for incrementally building software in complex environments. Scrum provides empirical controls that allow the development to occur as close to the edge of chaos as the developing organization can tolerate”. They also said that “Scrum is a software development process for small teams”. They also claimed that “small teams that work independently are more effective”.

This section provides a brief about the Scrum framework, what is it from the various point of views, the main components of the framework, and the rules of the people in the framework. We urge anyone who wants to know and read more about the Scrum framework to read the complete references mentioned below in this section.

Scrum is defined in [3] as “an agile product development methodology”. They claim that although “the agile product management phenomenon may seem new”, but “Scrum has been around since 1986 and is used by world class organizations such as Microsoft, Google, IBM, Federal Reserve Bank, Yahoo!, Siemens, Sun and a host of smaller companies”. Also [4] mentions that “Scrum has been used to develop complex products since the early 1990s”.

Reference [3] Claims that Scrum focuses teams and product over individuals and code, which is different than other agile methodologies.

The Scrum team roles in software development are defined according to [3] as following: Scrum Master, Product Owner, Product Support and Release Management, and Executives. Scrum Team according to [3] is typically 5-10 people, the team builds the product. The team should function as one unit giving the estimates, working and sitting together. [3] Recommends that the team should typically consists of the skill sets: BA, Dev, QA, Other.

Also [3] Mentions that Scrum framework is mainly a methodology that can be used as a framework. Although Scrum is identified as a framework rather than a methodology, as in [4], and other resources, as it was seen during the early ages of its application, for managing the fast changing, and highly volatile projects and work environment.

Ken Schwaber in [4] mentions that “Scrum, which is grounded in empirical process control theory, employs an iterative, incremental approach to optimize predictability and control risk”. He mentions that this process has to have 3 legs to uphold: transparency, inspection, and adaptation. For more information about the Scrum framework, the roles, and the processes in the software development domain, references [4], and [6] are good place to start. Gabrielle Benefield in [9] provides more details about the Scrum framework application results in software development domain within the Yahoo! Organization, which is a good example for the framework results in that domain.

II. Scrum in the IT Service Support Domain

Reference [2] Mentions that “Scrum was not conceived as an independent method, but a complement of other agile methods. Scrum stresses management values and practices, and it does not include practices for the technical parts. For that reason, Scrum can be used in conjunction with other agile methods. Scrum is a management and control process that implements process control techniques”. This is one of the reasons that makes Scrum suitable framework to apply within many various domains rather than the software development domain only.

There are some similarities between small software projects and IT service support. In [2] it mentioned that the small and medium size software projects involve time pressured activities and clients reactions at the very last moment. That is why such projects have a high rate of changing requirements. The IT service support domain also involves very high time pressured activities, and involves the same high rate of volatile requirements, even higher than the small software projects.

In [2] there are some critical issues to the small software projects, like: Deadlines Determined by need of the clients, non-synchronized and Distributed Work. The inadequate management of such issues produces most problems appearing in these types of projects. Similarly the IT service support domain faces the same critical issues, which makes it eligible to a new trend of agile method, or framework application, and from which is the Scrum framework.

The agile methods best fits the IT service support domain for the aforementioned reasons. The Scrum among the whole agile methods/frameworks is the one that is considering the process control techniques and process management. Scrum can be applied with conjunction of other agile methods, so it can be applied with many domains rather than the software development one. The Scrum framework is very rich with communication channels, staring from the daily scrum (Daily Stand Up meetings), the Sprint meetings, to the various tools used (e.g. Burn Down charts, team velocity charts, Sprint backlog board, Product backlog board .... etc, the list is not exclusive, nor ending). The communication is a vital core for a successful IT service support, for sharing knowledge, solving new, or urgent issues, and gaining new experiences. The sprint planning concept is very suitable for the domain of IT service support, because in the IT service support domain there’re always some targets need to be met at predefined intervals (like the releases concept of the software development domain).

Also a very important reason, as mentioned in [7] Scrum team is a “real team”, not only a team with a direct manager as usual. There’s a vast difference between both. In a fast changing, volatile environment like the IT service support, it is a vital key point to keep people together towards a unified target via commitment, as in Scrum where each individual from the team, or couple of team members, or the whole team picks up the suitable task they feel comfortable with, and not via pushing like the case in the normal situations, where the manager pushes the tasks to the team members according to their knowledge he knows about them, which he may not know it all. The whole team is accountable for the deliverables at the end of each sprint. There is no “I finished my tasks, so I am good.” as it may exist in normal situations; rather the sprint is not a success unless every promised feature/goal is delivered by the team.
III. PREVIOUS EXPERIENCE: APPLICATION OF SCRUM FRAMEWORK IN THE IT SERVICE SUPPORT DOMAIN

“Agile is generally thought of as an application development framework, and rarely, if ever, linked to the support of the same applications”. Said Bhaven Sheth in [1]

Bhaven Sheth in [1] was applying a 3 tier application support model like in the figure 1

Bhaven Sheth claims in [1] that the third level support was costing $ 9+ million, and the incidents volume was 2000 incidents per month, the available resources were 15 onsite, and 65 offshore, types of activities done by this level were Problem identification, Root cause analysis, and ad hoc reporting.

He continues that this support model was spending a lot, was receiving a lot of complaints, was missing many SLAs, had unknown cost drivers, had unknown root causes, had lack of visibility, which at the end of the day led to unhappy users.

Then Bhaven Sheth in [1] decided to create a team focusing on support improvements, and called that team Support 2.0. He also collected data to determine the root causes, and the cost drivers. The goals of this new focused support team were: determine 100% of the root causes of the incidents at the 3rd level support, make support fun and an exciting area that people want to work in, maintain a reasonable mean time to repair (MTTR).

A. Before applying Scrum

After one month of applying the Support 2.0, Bhaven Sheth in [1] stated that monthly backlog was growing out of control as shown in figure 2

A lot of critical issues were raised, and many complaints from the users. So they figured out that the goals are widely unrealistic. Team challenged the feasibility of achieving the goals and considered rethinking the goals. But instead of all that, the team considered utilizing Agile practices to organize their work.

B. After applying Scrum

Support 2.0 team in [1] started to apply Scrum; Smaller, self-organized sub-teams, Cross functional team, increased team collaboration and transparency. The Scrum structure they adopted was as following:

- 2 week sprints
- Daily stand ups to discuss what the team is working on
- Sprint reviews to display progress
- Sprint retrospectives to inspect and adapt

They started to determine patterns of issues to improve application quality, and provide transparency and updates for open issues in order to focus on the customer satisfaction. The results were as the following:

- Increased motivation of the sub-teams
- Improved team focus, collaboration, and communication
- Joint problem solving between the sub-teams (It is everyone’s problem, and the whole teams are accountable)
- Provided a forum to discuss progress and impediments
- Reduced customer noise throughout Phase 1 updates
- Ability to adapt due to new findings which leads to change Root cause analysis goal from 100% to 75%

The monthly incidents backlog started to decrease as shown in figure 3
IV. OUR PROPOSED SOLUTION

As shown earlier in the previous work section 4, the applied method of the Scrum framework was more or less looks like the Problem Management team defined in the ITIL framework. In other words they applied the concept of problem management team with a scrum framework. The application of the framework that way concentrates mainly on the number of incidents, while it does not mention the effect of the framework application on the MTTR, or the effect on the knowledge transfer time. Also the number of workaround solutions is not identified, so that’s why we proposed below a new application of the Scrum framework with a new way in the IT service support domain.

We will propose in this section another structure for the Scrum team collection, and some variations for the normal sprint planning. In the previous demonstrated example the team was of the same level of knowledge and experience (what we called horizontal scrum team). We will propose a new way of applying the Scrum framework with a team working across the various levels of support for the same application/system (what we called vertical scrum team) to stress and achieve the Scrum “Team” concept, which is that the Team is cross-functional. Another target for this proposal is also the reduction of knowledge transfer time between various levels of support for the same application/system, among other targets to achieve from this proposal as well.

Sprint planning should differ in the IT service support domain, as the domain nature is highly volatile and fast changing, almost on a daily basis, which leads to a different sprint planning. We will propose a new way for the sprint planning in such environments (which we called Dynamic Sprint Planning).

A. Vertical vs. Horizontal Scrum team formation

As shown previously in section III, the formed team members were all of the same experience and knowledge level (they formed Scrum team of high knowledge and experience), in other words a “horizontal Scrum team”, by which we means team formed from the same support level as shown in figure 4.

We propose in our solution to have the Scrum team members from various support levels (from level1 support, level2 support, and level3 support … till the nth level support), which is aligned with the Scrum team concept, which is that the Scrum team is a cross functional team, so it has to combine different levels and areas of knowledge. Also forming the scrum team that way will add a new dimension of transversality to the team besides the cross functionality. We call this Scrum team formation “vertical Scrum team” as shown in figure 5. We propose that the Scrum team is focused on the support of one system/software/domain to increase the pace of the team’s velocity. The Scrum team formation from different levels of support will allow high pace of knowledge sharing during the normal daily work (daily stand up meetings), not required to have separate knowledge transfer sessions for the team members anymore, which will save the knowledge transfer sessions time. The cross functionality, and transversality of the team members is highly enforced by having the team members with different knowledge backgrounds and levels. The daily stand up for the Scrum team which is consisting of people working in different teams, will allow more coherence within the company/organization, and between people. As shown below in figure 4, and figure 5, the arrows between the various levels show the incidents flow, both the two Scrum teams’ formations are elaborated.

Figure 3. Monthly incidents backlog after applying Scrum

Figure 4. Horizontal Scrum team formation

Figure 5. Vertical Scrum team formation
Dynamic sprint planning

Reference [5] Mentions that, the key idea behind the sprint is to deliver valuable working functionality. The sprint period is identified as one to four weeks long.

In the normal sprint planning, after the candidate product backlog item is split into smaller tasks, the Scrum team starts to evaluate the level of effort of each task individually to fill in the sprint backlog with the tasks till they feel comfortable with the sprint load, that’s if the Scrum team does not know its velocity. If the Scrum team knows its velocity, then after estimating the level of effort of the various tasks, they fill the sprint backlog with tasks until they reach their known velocity.

The Scrum team is accountable for, and comfortable with the sprint backlog. The Scrum Master does not accept any changes in the Sprint activities like changing the requirements of the in-progress tasks, nor accepting new very high urgent requirements until the end of the Sprint (which may be 1-4 weeks), except in few cases. One of such cases is to cancel the ongoing sprint and restart a new one (of course with the approval of all stakeholders), or to wait till the end of the sprint and then take the new changes into account in the next sprint.

In the IT service support domain, the situation is completely different especially with production environments. Urgent outages which require instant intervention, always occurs. Very high severity incidents need to be solved as fast as possible, which was not taken into account during the sprint planning, also may occur. A problem that needs a root cause analysis (RCA), that arises out of the blue. All these are just some examples of what can interrupt the planned Sprint, and it is not an exhaustive list of all Urgent issues. If we decided to continue the sprint, and take those kinds of changes into the next sprint, then we might gain a very high customer dissatisfaction, lose very valuable time, and may lead as well to a loss in the market share due to loss of customers’ satisfaction, and time. If we consider cancelling the Sprint, then it’ll be almost the case with all the sprints, as such mentioned things happen on a daily basis, or even twice a day in the IT services support domain (we may call such issues, urgent dynamic issues).

For such reasons we propose the dynamic sprint planning (the dynamic sprint planning can be very helpful in any very fast changing environment that uses Scrum framework for managing its projects), where we plan the sprint not with the full velocity capacity of the team, but instead we estimate according to historical data from the domain, and according to the experience of the team members, the level of effort of the various daily urgent dynamic issues. We keep a slot of time reserved in the sprint planning ahead for the urgent dynamic issues before the normal sprint planning takes place, then we continue to fill in the sprint with the rest of the Scrum team’s velocity.

The dynamic sprint planning that way is not complete yet, as it has couple of anomalies, which are represented in figure 6 as:

Case 1: “what will the Scrum team do if the estimated urgent dynamic issues level of effort was overestimated for one of the sprints?”. Apparently so far in our planning the Scrum team will have a very valuable business time wasted, and the team will be doing nothing during it. So the second proposal for the dynamic sprint planning is to plan the current sprint, and roughly plan the next upcoming sprint (e.g. extend one item of the product backlog into the equivalent tasks, and no
need to fill the whole sprint, so that if the team finishes the sprint backlog tasks, and there was an over estimation of the level of effort of the urgent dynamic issues, then they can feed in tasks from the upcoming drafted sprint tasks into the current sprint sequentially (this determines that the upcoming drafted sprint backlog be ordered from the least level of effort ascending), and so on.

That way with the application of those two steps in the sprint planning, the dynamic sprint planning is done, and ready to be used in the actual environment.

But, there’s still the other anomaly:

Case 2: which is “What if the case was not an overestimation, but rather an underestimation? What the Scrum team will do to meet the Sprint targets?” Normally the answer of this anomaly’s question is within the normal sprint planning. As the Scrum team is in the starting phase, sometimes they tend to underestimate, so the proposed Scrum solution is either to find new solutions, new ways of solutions for known issues. Ask for help from other teams if possible, and if they have time to help. Ask the experts of some domains, if not available within the Scrum team. If all such ways did not work well, then the Sprint will not deliver the committed deliverables, and it’ll be the goal of the sprint retrospective to identify the weak areas, how to overcome such situations in the future, and also as the Scrum team works with several sprints, they will tend to know their ideal velocity, and the ideal average time of the urgent dynamic issues as well, and then they’ll plan accordingly afterwards. The whole dynamic sprint planning idea is illustrated in figure 6.

V. EXPECTED RESULTS

Some of the expected results for applying the Scrum framework in the IT service support domain as proposed earlier are:

1. Decreased MTTR
2. Increased customer satisfaction
3. Decreased Knowledge Transfer time
4. Increased staff motivation & satisfaction
5. Increased number of incidents solved at the first levels of support
6. Increased number of incidents solved per month
7. More innovative solutions & workarounds
8. More collaboration & self managed teams

The verification of the previously mentioned expected results require the application of the framework in real world teams to measure the exact figures and percentages of either the decrease or the increase of each point. The third, fourth, seventh, and eighth expected results are also supported in [5] by mentioning that the Scrum meetings serve as a team building purpose, and bring in the remote contributors to make them feel as a part of the group, and also making their contributions visible to the rest of the team.

In [5] they enumerate the goals of the Scrum meetings as:

- focusing the effort of developers on the backlog items
- communicating the priorities of backlog items to team members
- keeping everyone informed of team progress and obstacles
- resolving obstacles as quickly as possible
- tracking progress in delivering the backlog functionality
- addressing and minimizing project risk

As shown in those points, there are a lot of matching between them, and our expected results according to the proposed solution. The second and the third points here match the expectation of decreased knowledge transfer time. The fourth point matches the decreased MTTR expectation. The last two points, match with the expectation of increased number of incidents solved.

Also as mentioned and stressed upon in [10], and [11], the human being centricity in the technological domains shall be focused on, and shall increase. It’s not less important to stress on the human element in any process implementation, as it’s one of the corner stones in the success or failure of the processes.

VI. DISCUSSION

The results and achievements according to Bhaven Sheth in [1] after applying the Scrum methodology in the 3rd level support were:

- Better understanding of cost drivers, thus able to reduce support costs
- Identified root cause of incidents which led to the identification of major issues’ patterns and areas of improvement
- Improved service levels which increases customer satisfaction
- Improved team collaboration and culture, and thought processing
- Removed barriers between application development and support teams
- The Support turned from “Operational cost center” to “Value-added thought partner”
- Support were thought as “Black hole”, but turned to “Open transparency”
- Work environment was forcing “Lack of motivation”, but turned to “Fun in support”

As overall, Support 2.0 achieved a better customer satisfaction. Support 2.0 also helped to improve the quality of application development through the improved feedback loop with development teams. This led to better understanding of
In our proposed solution, all of the expected results have to be validated via applying the solution in a real world organization. To reach a solid conclusions about that proposal, and the whole idea of applying the Scrum framework in the IT service support domain we will need more experimentation, and documentation about that subject to get a rigid ground of results, which will allow us to reach a decision about that subject, if it is successful or not.

In the future work, we urge the application of the proposed solution framework mentioned in section 5, and reach a conclusion about it. By applying the proposed framework in a real-world experiment we will be able to identify, and have clear view of how well experienced are the people that applying Scrum should be. Does Scrum fits for all people with various kind of experiences. Is it better to make the Scrum team with the same level of experience, or mixed. We also propose that there should be qualitative measures as well as quantitative measures, like the MTTR figures, root causes statistics, Problems per category before the Scrum, and after. The effect of using the Scrum various tools like burn-down charts, sprint backlog, release backlog, product backlog, and if we need more tools, modify, or twist the existing tools. We shall know if the current Scrum roles are suitable for the application of the framework in the IT Service Support domain, or do we need to eliminate some roles, do we need to introduce new roles. Where in the various IT services frameworks does the Scrum framework best fit? As mentioned earlier this is a fresh new Scrum idea and proposal, and obviously a lot of future works need to be done in order to make a full picture and view of the Scrum application in the filed IT service support.

VII. CONCLUSION

In Conclusion we believe that applying the Scrum framework within the IT service support domain will be a gain both for the IT service support domain in order to give better results, and for Scrum as it is a proof that it is a generic framework, and not specifically for applications development only. From the results we had in Section 4, we believe that the Scrum framework is somehow applicable in the field of IT Service support in general, and not only applications support. The more general proposal of the framework we did in section 5, we believe that it will enhance the IT service support domain within any organization in several ways, and directions. Future work advised in Section 6 can validate such hypothesizes.

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Translation: (And say (unto them): Act! Allah will behold your actions, and (so will) His messenger and the believers, and ye will be brought back to the Knower of the Invisible and the Visible, and He will tell you what ye used to do) - Surah Al-Tawba, Verse 105

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