

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Honors Theses, University of Nebraska-Lincoln

Honors Program

Spring 4-7-2021

The Importance of Managerial Positions in the Agile Development Process

Adam Gray

University of Nebraska- Lincoln

Follow this and additional works at: <https://digitalcommons.unl.edu/honorsthesis>



Part of the [Gifted Education Commons](#), [Higher Education Commons](#), [Other Education Commons](#), and the [Other Engineering Commons](#)

Gray, Adam, "The Importance of Managerial Positions in the Agile Development Process" (2021). *Honors Theses, University of Nebraska-Lincoln*. 296.

<https://digitalcommons.unl.edu/honorsthesis/296>

This Thesis is brought to you for free and open access by the Honors Program at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Honors Theses, University of Nebraska-Lincoln by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

The Importance of Managerial Positions in the Agile Development Process

An Undergraduate Honors Thesis Submitted in
Partial fulfillment of University Honors Program
Requirements University of Nebraska-Lincoln

by Adam Gray, BS
Software Engineering
College of Engineering

March 15, 2021

Faculty Mentors:
Suzette Person, PhD, Computer Science and
Engineering
Chris Bohn, PhD, Computer Science and
Engineering

Table of Contents

- I. Abstract and Keywords- pg. 2**
- II. Introduction- pg. 3**
- III. Agile Development Background- pg. 5**
- IV. Importance of Managerial Positions- pg. 9**
- V. Personal Experience- pg. 12**
 - A. Internship Experience- pg. 12**
 - B. Senior Design Experience- pg. 13**
- VI. Discussion- pg. 14**
- VII. Conclusion- pg. 16**
 - A. Future Work- pg. 16**
 - B. Senior Design Suggestions- pg. 17**
- VIII. Bibliography- pg. 18**

Abstract

In software engineering, the Agile development process is becoming one of the most effective methods to handle the issues of continuous change and fast development. However, there are still some perceived issues that many Agile developers face, and a lot of these issues can seemingly stem from their managers. For example, it may seem like the manager is not always up-to-date on the various aspects of the project, or that they have closed off their mind to new ideas. In this paper, we include an in-depth analysis of the various managerial positions that can be found in the Agile development process and their importance. We will also examine some of the reasons why it seems as though those managerial positions can be a roadblock at times in the development process rather than helpful, both from personal experience and research. We conclude that managerial positions tend to get a bad reputation as the term “manager” can be somewhat misleading and thus causes a misunderstanding as to that team member’s role; a manager's job should be for a delegation of powers and assistance, not to be constantly controlling each aspect of the project.

Keywords

Agile, managerial positions, project management, software development

Introduction

The Agile development process has quickly established itself as one of the most popular ways for businesses to handle software development (*Mahanti 2020*). Agile is a development process that fosters innovation and continuous change in order to make a more complete product. It runs in cycles: planning, coding, testing, and repeat. A depiction of this cycle can be found in Figure A. This means that clients or other users can give input at any step in the development and allow the developers to quickly implement any feedback or suggestions into the software product. Agile is set apart from other development processes in that it is a continuous iterative cycle that incorporates client feedback, whereas something like the Waterfall development process has only one cycle of planning, coding, testing (*Thummadi 2011*). It is not an incremental process like Agile. There are many variations on the Agile process and they are usually unique to each business. Throughout these variations, one of the biggest sources of controversy is the subject of the managerial positions that can be found throughout the process (*Anderson et al. 2003*).

Agile teams on their own are generally considered self-managing; most Agile teams are capable of prioritizing work and making progress on their project without any need for a managerial position (*Gandomandi et al. 2020*). Even in larger businesses where there are multiple agile teams working on a single project, these teams meet together on their own and discuss what work needs to be accomplished by a certain deadline (*Hoda et al. 2016*). Others argue though that managerial

positions are necessary in order to help make a more clear understanding of what work needs to be done and also to help create easier cohesion between the multiple teams (*Anderson et al. 2003*). This is where the controversy comes in. Some argue that having managerial positions thrown into the agile development process only hurts the Agile teams as most team members are able to decide through their own experience of working on the project what needs to be worked on (*Anderson et al. 2003*). A manager telling a team what work needs to be done, despite not having as clear of an idea about the intricacies of the project, would only prove to be an obstacle for the team in the long run.

That is the primary reason why manager roles have seemingly started disappearing from Agile teams. For example, the project manager role used to be seen as the primary leader role that manages all the teams for a project. Over the years, the percentage of agile teams that still have the project manager role has dropped to 67% (*Shastri et al. 2016*). Instead, they have replaced it with other roles such as product owner or scrum master (*Shastri et al. 2016*). If the project manager role does exist, research has suggested that this role's duties may have changed over the years (*Shastri et al. 2016*). Several questions arise from all of this. Do manager roles in Agile development only serve as an obstacle for Agile teams? Do they hold any significant importance for teams? What are all the advantages and disadvantages of the various manager roles found in Agile development?

Through my personal experiences in Senior Design at the University of Nebraska- Lincoln as a portfolio manager and combining this with research and analysis, I address these questions and do analysis on them. This paper also

includes a comprehensive background on some of the major managerial positions found in the various Agile methodologies. I will offer some of the previous research found in the field on Agile managerial positions, and also a section describing my personal experiences and observations as a portfolio manager. I will then do an analysis on the possible advantages and disadvantages on the various major managerial positions, and discuss the importance of managerial positions. Finally, I suggest possible future research involving managerial positions.

Agile Development Background

The Agile Manifesto was created in 2001 and outlines some of the most important aspects of the Agile development process (*Beck et al. 2001*). It also sets the foundation for many of the Agile methodologies one can find today. Some of these aspects are prioritizing individuals and interactions over processes and tools and responding to change over following the plan (*Beck et al. 2001*). Despite all of the groundwork that it lays out, the Agile Manifesto itself is quite open-ended. For example, the Agile Manifesto never defines any of the roles that should be found on a team or the type of management that a team should have (*Beck et al. 2001*). It does, however, lay out some rules that a manager must follow for a more smooth process. A manager should never tell people what to do, rather they should place trust that their employees know more than the manager about the certain parts of the project they are working on. Managers should encourage a proper working

environment and give support to employees when they need it and trust the employees to properly get the job done (*Beck et al. 2001*).

This open-ended description of managerial roles means that each Agile methodology can define the types of managers it has (*Dybå & Dingsøy 2015*). Though, over the years, standards have been established for the types of managerial positions that are common throughout these Agile methodologies. The main difference is how the methodology assigns duties to each of the managerial roles (*Dybå & Dingsøy 2015*). The project manager of one methodology may have more duties and roles, while another methodology may want them to take more of a backseat in the project.

The project manager is one of the prime examples of managerial positions found in the Agile process. Generally, project managers are given several duties of organizing teams and assisting them in finding the next direction that the project should take. Project managers are especially helpful in larger teams or a project that has multiple Agile teams that need to coordinate together (*Gandomandi et al. 2020*). Observations of agile teams that have a project manager have shown that those teams generally have higher efficacy and quality (*Gandomandi et al. 2020*). It is theorized that this is because project managers help to organize sessions that investigate and discuss team obstacles, which can be extremely helpful for program development (*Gandomandi et al. 2020*).

Despite some of the benefits that the project manager can provide, Agile teams have started to remove the role from their methodology. This is because of several disadvantages that the project manager can possibly bring up. A project

manager can be useful to a project, but only if they respect the Agile Manifesto and allow their Agile teams to have a large degree of autonomy (*Boehm & Turner 2005*). It can be a major obstacle if a project manager is constantly trying to grab the reins of a project and command others on what to do. Thus, many teams are removing the project manager role and dividing the duties among other roles found in the Agile development process.

Another managerial role that is commonly found in Agile processes is the Scrum Master role. In comparison to the project manager, the Scrum Master, or a similar role, is usually seen as a necessary role for most Agile teams. The Scrum Master's duty is to lead the team discussion during meetings and sometimes to write a summary of the meeting. They are usually seen as very important because Agile teams generally can have multiple meetings in one day, so it is important that things stay on track in terms of discussion. Most of the time, one person has the job of Scrum Master, though some methodologies have the Scrum Master switch between people (which only normally happens for smaller Agile teams).

The portfolio manager is only a role you generally find in methodologies designed for large businesses. The portfolio manager has the duty of choosing a lot of the long-term goals, called epics, for the project. More specifically, they organize and manage a lot of the Agile aspects of the project. While this can sound similar to the project manager, there are some key differences. The portfolio manager works very closely with the backlog, which is a board that shows the progression of the tasks and goals of the project. Some teams also just have the portfolio manager ensure that all Agile requirements for a project are being met and upheld. The

portfolio manager does not usually decide what next in the project to work on, but rather how best to maintain proper Agile work ethics. This is also the primary reason why portfolio managers are rarely found in small business Agile teams, as usually these teams are fully capable of determining by themselves if all Agile requirements are being met for a project.

The final managerial role that will be addressed in this paper is the product owner role. This role is responsible for ensuring that all requirements given by the client are being met. This usually means they have constant communication with the client and that they act as an intermediary between the client and the rest of the Agile team. In contrast to the rest of the managerial roles, this one does not usually require that the product owner has experience in software. Although, this position requires at least some knowledge of the Agile process, as the person will be highly involved in things like looking over the backlog and attending regular standup meetings. The product owner is seen as a required role for Agile teams, even if it's just someone temporarily taking the mantle of product owner for means of communicating with the client.

Despite the descriptions given here, the roles and responsibilities of all of these managerial positions are not concrete. Each Agile methodology has a different way of defining and assigning these roles in an Agile team. Some will have different names for these roles, and some may not include any of these roles. This does not invalidate any methodologies just because, per se, they do not include a portfolio manager role. A newly formed Agile team should do research into what methodology will work best for their team based on a variety of factors such as team size, product

release dates, their client, etc. It is important that the duties of the managerial positions are defined as soon as possible in the development cycle. Otherwise, confusion relating to what duties the manager should and should not be doing can act as a roadblock for the team (*Abernathy 2009*).

Importance of Managerial Positions

The process of adopting the Agile development process can be difficult for a new business. One of these reasons that is most commonly stated is that it seems difficult for a team to remain autonomous when there are various managerial positions getting in the way (*Boehm & Turner 2005*). The system seems to be contradictory in a way, so it would seem much better to keep with the more traditional ways that the employees are familiar with (*Boehm & Turner 2005*). While this may seem the case, it shows a fundamental misunderstanding of what these managerial positions are and what they do.

The title of “manager” is what brings the negative connotations- when someone thinks of a manager, they think of someone who will take the reins of a project and allow for no autonomy for the team under the manager’s command. The name is misleading in itself, which is why roles like project manager have been renamed over the years (*Shastri et al. 2016*). Figure A, below, shows all of the various titles that the project manager role has been renamed to over the years (as referenced from a sample size of various studies). Of course, there may still be

teams that have it where the managerial roles have more power, but that is not what the Agile manifesto intends. It states that the teams should retain their autonomy and that managers should nurture this environment and aid in overcoming obstacles (Beck *et al.* 2001). This is the primary difference that sets Agile managers apart from other industry counterparts.

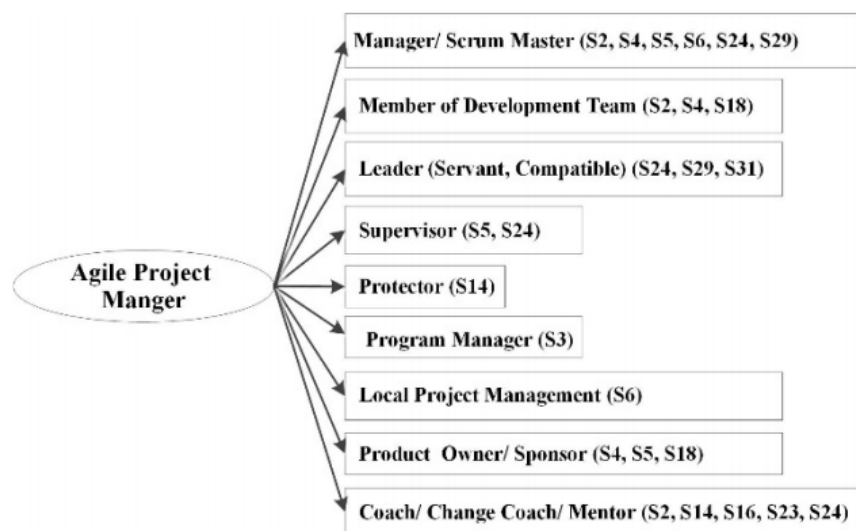


Figure A. This diagram shows how the agile project manager has been renamed, as seen when looking through a sample of various studies (Gandomandi *et al.* 2020).

In a sense, an Agile manager is just supposed to be another member of the team, with no more power than the rest of the team members. Their purpose is for a delegation of powers in that they worry about certain aspects of the project so the rest of the team does not have to (Anderson *et al.* 2003). One of the duties of a project manager is to help connect the various Agile teams in a project together. A Scrum Master worries about organizing a meeting so that it goes more smoothly. In this fashion, the Agile team can focus on what they need to get done and the

managerial positions are aiding them in accomplishing their goals (*Anderson et al. 2003*).

Another primary duty of the managerial positions is to foster and support the environment for their employees (*Beck et al. 2001*). While it is extremely important to take into consideration your employee's mental health and wellbeing, the "environment" mentioned here is referring to ensuring that employees have all necessary tools for their job. Most of the time, the Agile team together will be able to identify the tools required for the project, and from there it is the duty of the manager to verify that all the team members are able to get that tool without much trouble. This can include writing walkthroughs and guides for setting up the tool. Sometimes, research by the manager can be required for selecting between several different tools.

The managerial positions in Agile can also become a roadblock for Agile teams if done improperly. As the Agile Manifesto defines it, the manager should always trust the employees to make the best decisions and do what needs to be done. This is because they will have the most familiarity with the project since they are constantly working and developing parts of the system. When a manager tries to change the definition of their role by taking charge and commanding people what to do, this counteracts the Agile process. The managers in this case are placing their knowledge above their employees, despite the fact that they probably don't know as much as the employees do.

Proper Agile training is required to ensure that managers know their role on a team and their duties to ensure the Agile cycle goes as smoothly as possible

(*Abernathy 2009*). Training is also useful for helping rid any misconceptions about the manager's roles and duties on a team. Specifically, training is seen as one of the main methods for helping a company transition to Agile. This is because one of the main roadblocks of transitioning is the fear that the managers will hold too much power and ruin the Agile process (*Mahanti & Aniket 2020*). In general, the act of finding and identifying a good Agile training course can be one of the biggest steps in converting your company's work process to the Agile development process (*Boehm & Turner 2005*).

Personal Experience

I have talked about the technical aspects of the various managerial roles found in the Agile development process, but I also want to address some of my personal experiences and observations I encountered with these roles. I will be talking about both my internship experiences and also my experiences with the Senior Design program at the University of Nebraska- Lincoln.

A. Internship Experience

During my internship at T.D.Ameritrade, I was offered the chance to take a course in Scaled SAFe Agile. SAFe is an Agile methodology that was created to help coordinate a large number of Agile teams that all work together for a corporation, and a lot of its managerial positions reflect this (*Leffingwell 2016*). For instance, while there is a Scrum Master role for each team, all of these Scrum

Masters have an overall Senior Scrum Master they report to which helps to coordinate between the multiple Scrum Masters. One of the most interesting things that caught my attention about SAFe was the portfolio manager role that it introduced, which I had never heard of during my college education.

The portfolio managerial role, as defined by SAFe, is a role that helps to prioritize specific features identified during special meetings called Program Increment Planning, or PI Planning. Once these features were identified, portfolio managers would meet together to create portfolios for these features. Portfolios in this case are a description of the long-term goal involving that feature that Agile teams should strive for. Once the portfolios were created, they would eventually be accepted and epics would be created out of these portfolios and assigned to teams. All of this was a completely new concept for me, but I was extremely interested by the concept of how this managerial position was created to cater towards larger corporations.

B. Senior Design Experience

This is the primary reason why, when the portfolio manager protege role was announced to us for Senior Design, I was excited to sign up for the role and I wanted to experience being a portfolio manager for myself. Once I had actually gotten the role, however, I was a little surprised to see how the role was defined differently for Senior Design. In this case, a portfolio manager was more of the master of the Agile process. They helped teams manage their backlogs, answer questions about the Agile process, and check progress to see how teams were doing. I was not

disappointed in the slightest, just caught off guard by the contrast with how I previously learned the portfolio management role was defined.

During my time as a portfolio manager protege, I worked with multiple teams and one of my jobs was to get a little insight into the opinions of the students about how they thought things were going. One of the most common sentiments that I heard repeated a lot by the students was that a lot of their responsibilities weren't well-defined for the work they were doing, so it felt like the coaches and managers of the teams seemed to be nagging them on every little mistake they made. For example, a team might not have had issues in their backlog marked correctly, so we would correct them on these mistakes. Of course, we did not expect them to always do everything perfectly. However, they thought that because we were correcting them on this that they had failed in some manner and we were judging them in some manner.

I think that this problem that a lot of students had was due to miscommunication. When they heard the title of manager or coach in any context, they assumed automatically that we would start to grade them on every single little mistake that they had. The miscommunication occurred when we failed to explain to these students what exactly our roles in the Agile process was. We didn't expect them to be able to remember and do every single little thing perfectly. Rather, our roles as managers were to remember those little things so that the teams wouldn't have to, thus making their lives a little easier. We didn't properly communicate this delegation of powers to them, and so it just ended up stressing them out even further.

Discussion

From my experiences in Senior Design, I think one of the most important things for managers to do is to establish with the teams their exact roles and duties. I think it is important to immediately set the boundaries of what the manager is supposed to help with and how they won't interfere with the autonomy of the teams. Their purpose is to worry about things like the backlog, and establish that they should be one who worries about the little details so that the Agile team doesn't have to. This way, the teams do not have to constantly worry that they are doing every little thing needed for the perfect grade. This mimics how management should happen in an Agile work environment- each managerial position worrying about their own roles and duties so that the main Agile team can focus on delivering a complete product to their clients.

Above all, I think one of the important things that an Agile manager can be is friendly to their fellow team members. It may seem like it can go without saying, but I think a good attitude and trust can really go a long way. I theorize that this is the reason why so many Senior Design students were willing to confide certain perceptions they had about Senior Design management with me. While it wasn't that the Senior Design coaches and managers were unfriendly in any way, there was that constant thought that any sort of suggestions or pieces of advice were instead slashes to that team's grade. I think this mindset can also be applied to a work environment. The fear of getting fired can quickly morph any sort of suggestions made by the manager into horrifying critiques. This is why it is so important for

people in management positions to be as friendly as possible in giving advice to others.

I would even argue that things go much more smoothly when the team members are able to elect their own members to management positions. For instance, they were allowed to choose their own development manager and product owner. In this way, they not only had complete trust in these positions since they would personally know the manager is just a student like them. I think the opposite reigns true also: the manager would know that they are just a student like everyone else and thus would not try to overstep their power in any way. The only time I ever heard complaints about these self-elected managerial positions was when that manager was doing absolutely nothing for the project. I think, however, that's just a problem with any sort of role on an Agile team, regardless if it's a managerial position or not. Generally, when this sort of thing happened, the team members would just designate an impromptu member of the team as development manager or product owner instead.

Conclusion

Managerial positions in Agile have been slowly disappearing throughout various Agile teams, due to the misconception of what their duties are. Agile managerial positions are mistaken to take command and lead, when in reality they are supposed to support and encourage. Throughout the many types of managerial roles that can be found in the Agile process, a manager should prioritize helping the

Agile team and trust that that the team knows the best route to take for a finished product.

A. Future Work

For future work, I would recommend that a survey be done in order to more accurately measure the opinions of software engineers concerning Agile management. This would give a more accurate insight into what additional reasons there may be for the negative connotation concerning Agile managerial positions. Additionally, it would provide insight into the difference of managerial positions across the many Agile teams that exist. There could exist a correlation between the differentiating managerial position duties and the attitude of software engineers towards those managerial positions. A study like this could shed more light and answer these inquiries.

Another suggestion for future work is another survey on the various managerial roles that can still be found on different Agile teams. While there has been some studies that concern checking for specific roles like project manager, there has not been a comprehensive study of all the roles. This would give a good indication as to the popularity of certain roles across various Agile teams. It would also give indication as to if certain managerial positions are disappearing at all, or perhaps being renamed into something different. A survey like this would be able to provide critical information to the formation of Agile teams and processes and their level of autonomy.

B. Suggestions for Senior Design

The idea for students to act in managerial positions assisting multiple teams is an excellent one, and should be continued. The act of allowing a student manager assists in getting rid of the notion that any suggestions given by the managerial position are reducing that team's grades. In fact, I would recommend adding more managerial positions to students. Currently, there are only two protege managers and four technical reviewers, and the other cross-team managerial positions are taken by faculty and staff. I think having more students acting in these managerial positions would allow for more positive feedback and suggestions that won't stress the teams.

Another suggestion I would give to improve Senior Design would be to establish what each of the managerial positions do for the teams. In my personal experience, it felt like a lot of the managerial positions and what they did for the teams in last year's senior designs were confusing. Because of this confusion, it felt like all of the managerial positions there were just there to grade us in different ways, and that made things more stressful. I think giving a short explanation at the beginning of the semester to all of the students would be very useful in how they can offer help and assistance to the teams, and instead alleviate stress instead of causing it.

Bibliography

1. B. Boehm and R. Turner, "Management challenges to implementing agile processes in traditional development organizations," in *IEEE Software*, vol. 22, no. 5, pp. 30-39, Sept.-Oct. 2005, doi: 10.1109/MS.2005.129.
2. Mahanti, Aniket. "Challenges in Enterprise Adoption of Agile Methods - A Survey." *Journal of computing and information technology*, vol. 14, br. 3, 2006, str. 197-206. <https://doi.org/10.2498/cit.2006.03.03>. Citirano 17.12.2020.
3. K. Sutling, Z. Mansor, S. Widyarto, S. Letchmunan and N. H. Arshad, "Agile project manager behavior: The taxonomy," *2014 8th. Malaysian Software Engineering Conference (MySEC)*, Langkawi, 2014, pp. 234-239, doi: 10.1109/MySec.2014.6986020.
4. T. J. Gandomani, Z. Tavakoli, H. Zulzalil and H. K. Farsani, "The Role of Project Manager in Agile Software Teams: A Systematic Literature Review," in *IEEE Access*, vol. 8, pp. 117109-117121, 2020, doi: 10.1109/ACCESS.2020.3004450.
5. Y. Shastri, R. Hoda and R. Amor, "Does the "Project Manager" Still Exist in Agile Software Development Projects?," *2016 23rd Asia-Pacific Software Engineering Conference (APSEC)*, Hamilton, 2016, pp. 57-64, doi: 10.1109/APSEC.2016.019.
6. O. McHugh, K. Conboy and M. Lang, "Agile Practices: The Impact on Trust in Software Project Teams," in *IEEE Software*, vol. 29, no. 3, pp. 71-76, May-June 2012, doi: 10.1109/MS.2011.118.
7. Beck, K., Beedle, M., van Bennekum, A., Cockburn, A., Cunningham, W., Fowler, M., Grenning, J., Highsmith, J., Hunt, A., Jeffries, R., Kern, J., Marick, B., Martin, R. C., Mellor, S., Schwaber, K., Sutherland, J. & Thomas, D. (2001). *Manifesto for Agile Software Development* *Manifesto for Agile Software Development*.
8. P. Abernathy, "Hook, Line and Sinker: The Role of Line Management in Relation to Agile Teams," *2009 Agile Conference*, Chicago, IL, 2009, pp. 314-319, doi: 10.1109/AGILE.2009.43.

9. C. Vriens and R. Barto, "7 Years of Agile Management," *Agile 2008 Conference*, Toronto, ON, 2008, pp. 390-394, doi: 10.1109/Agile.2008.97.
10. M. Laanti and M. Kangas, "Is Agile Portfolio Management Following the Principles of Large-Scale Agile? Case Study in Finnish Broadcasting Company Yle," *2015 Agile Conference*, Washington, DC, 2015, pp. 92-96, doi: 10.1109/Agile.2015.9.
11. T. Dybå and T. Dingsøy, "Agile Project Management: From Self-Managing Teams to Large-Scale Development," *2015 IEEE/ACM 37th IEEE International Conference on Software Engineering*, Florence, 2015, pp. 945-946, doi: 10.1109/ICSE.2015.299.
12. Z. Hu, Q. Yuan and X. Zhang, "Research on Agile Project Management with Scrum Method," *2009 IITA International Conference on Services Science, Management and Engineering*, Zhangjiajie, China, 2009, pp. 26-29, doi: 10.1109/SSME.2009.136.
13. Robert G. Cooper & Anita Friis Sommer (2020) New-Product Portfolio Management with Agile, *Research-Technology Management*, 63:1, 29-38, DOI: 10.1080/08956308.2020.1686291
14. Lougie Anderson, Glen B. Alleman, Kent Beck, Joe Blotner, Ward Cunningham, Mary Poppendieck, and Rebecca Wirfs-Brock. 2003. Agile management - an oxymoron? who needs managers anyway? In Companion of the 18th annual ACM SIGPLAN conference on Object-oriented programming, systems, languages, and applications (OOPSLA '03). Association for Computing Machinery, New York, NY, USA, 275–277. DOI:<https://doi.org/10.1145/949344.949410>
15. Hoda, Rashina & Murugesan, Latha. (2016). Multi-Level Agile Project Management Challenges: A Self-Organizing Team Perspective. *Journal of Systems and Software*. 117. 10.1016/j.jss.2016.02.049.
16. Dean Leffingwell. 2016. SAFe 4.0 Reference Guide: Scaled Agile Framework for Lean Software and Systems Engineering (1st. ed.). Addison-Wesley Professional.
17. B. V. Thummadi, O. Shiv and K. Lyytinen, "Enacted Routines in Agile and Waterfall Processes," *2011 Agile Conference*, Salt Lake City, UT, USA, 2011, pp. 67-76, doi: 10.1109/AGILE.2011.29.