

# Communication Channels impact in Agile

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**Abstract**—Today software development society, we cannot omit the agile software development methodology as we are now living in the changing world, means technology change, economy change, market change, etc. Among them, the new competitive threats without warning are the customer and end-user's changing requirements. To be able to cope these changing requirements, we must adopt the agile methodology for software development. Agile methodology promotes the traditional, informal strategies to more changeable, informal, iterative strategies that mainly focus on incremental software product that meet changing user requirements. They involve customer representative's interaction that directly impact in the development process. Therefore, customer involvement is critical process in Agile. Communication serves as a valuable mechanism in building these connections and engagement between people. The bigger the team size, the more communication channels become challenges and complex. In this paper, we will discuss the communication channels in agile methodology and proposed communication channels reduction framework to gain the most efficient and effective work done.

**Keywords**— Agile, software development, communication channels,

## I. INTRODUCTION

Modern computer software still facing with continue changing requirements, tight timeline and budget. The customer-user satisfaction is the main goal of software project. Moreover, time to market is also important factor for managing requirements and getting competitive advantages. If we miss the market window, the software project itself may be meaningless. Therefore, software developers are accepted the philosophy and a set of development guidelines of Agile software development. The original of agile come from the latin term *agilis* which means 'nimble or quick' and from the term *agere* which means 'to set or keep in movement'.

Communication channels are the ways through which people in an organization communicate. Using the given channels, we have tried to get the necessary activities, important requirements, functions, features and also do planning, modeling, quality assurance management, setting project milestones etc. We can get negative consequences for a given task or interaction due to the inappropriate communication channels. This consideration is based on communication channels only and not consideration on the budget and technology complexity.

Agile teams communication types may be internal and external communication. The internal communication process involves the developers and the project leaders and

communication takes place between the development team and the customers is called external communication.[4]. There is no doubt that face-to-face communication is most frequently employed and increase trust among the team members and consequently, the quality of software product [3]. There is no study regarding to the communication channels reduction process based on the communication strategies. Therefore, we designed a reduction framework for communication channels in Agile.

In this paper, we will discuss the related work in Section 2. The development of agile methodology will explain in Section 3. Section 4 will present the communication challenges in Agile. We will propose the effective communication channels reduction framework in Section 5. The conclusion will draw in final section.

## II. RELATED WORK

Requirement engineering review for software development was discussed in [1]. In this paper looked at numerous aspects of requirements engineering and argued about the suitability for agile approaches and list major importance in any requirements engineering process that appear to be ignored in the agile movement. A systematics Mapping Study (SMS) that aggregates, summarizes, and discusses the results concerning the impact of communication channels and practices in Agile Software Development was presented in [11]. D. E. H. Damian, et al. [2] investigated the media-effects theories and face to face communication which are the richest medium in requirement negotiation. Two issues were communication between system analysts and the need for sound negotiation techniques in reconciling conflict requirements. M. Hummel et al. [9] provided an integrated view of the role of communication in Agile software development by conducting a systematic literature review. They aggregated existing knowledge on and insights into the role of communication within Agile projects.

D.Tabi, et al. [3] designed an empirical study using four development teams to develop the same application with requirements from external entrepreneur, applying the three Agile development processes, namely Scrum, Scrum with Kanban, XP and one for an unstructured process, named banana development process. They compared communication overheads between these methodologies. The analyzed results found that the four processes can be applied in software industry but the three agile processes need the lower communication time rather than non-agile development process. S. Bhalerao [15] proposed agile software development methodology (ASDLC) that intended to provide the guideline for average developers about usability, suitability, applicability of agile methods.

The agile methodology has three levels of communication named the primary, mid and end iteration. Stakeholders are involving in primary level communication and intend to gather requirements. A mid iteration intends to remove unambiguity requirements and gather clear requirements. An end iteration means to get feedback information and to adjust update new requirements among team members.

S.Alsaqqa et al. [14] explained different types of agile methodologies with its own advantages and disadvantages. They suggested the best way to select suitable agile methodology is depends on variables such as projects' specification, characteristics, requirements and budget etc. The traditional software development methodologies are suitable for some cases, such as complex project, huge number of team number and critical budget.

### III. DEVELOPMNET OF AGILE METHODOLOGY

In modern economy, it is often impossible to predict the changing of software systems will evolve as time passes. Change is inevitable in all large software projects. Market condition is changing rapidly, end-user needs evolution, and new competitive threats emerge without warning. The system requirements are also change to external pressures, competitive advantages and management priorities. As new technologies become available, new approaches to design and implementation become possible.

#### A. Agile Manifesto

Agile Manifesto is a brief document that identifies four key values and twelve principles for agile software development. Agile manifesto does not point out any specific processes, procedures, rigid framework or methodology for agile. This manifesto is intentional. The main motivation of creators created a philosophical mindset for software development. They are:

- Individuals and interactions over processes and tools.
- Working software over comprehensive documentation.
- Customers are collaboration over contract negotiation.
- Responding to change over following a plan. [5]

Fig 1 represents the four key values of Agile Manifesto, which formulates common values and principles of Agile software development, highlights the fundamental role of informal communication for Agile software development. Customers and developers should work together and project information is to be shared by means of informal communication such as face-to-face conversation [7].

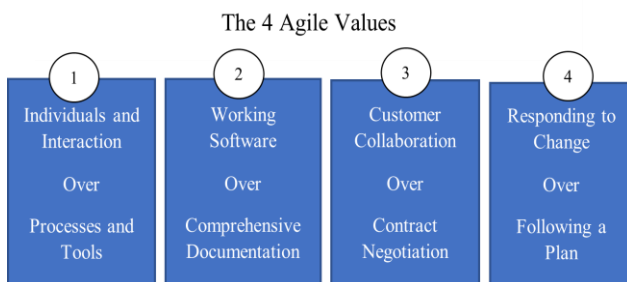


Fig 1 Four Key Values of Agile Manifesto

#### B. Agile Principles for Communication

The intention of Agile is to align development with business needs, and the success of Agile is apparent. Agile projects are customer focused and encourage customer guidance and participation.[13]. Agile has grown to be an overarching view of software development throughout the software industry and an industry all by itself.

All agile development methods accept the Agile Manifesto and twelve principles which represents a set of values for guiding how to behave people in the organization. The following twelve principles [12] are based on the Agile Manifesto. These principles are:

**Principle 1:** Our Highest Priority is to satisfy the Customer through Early and Continuous Delivery of Valuable Software.

**Principle 2:** Welcome Changing Requirements, even late in Development. Without delaying project, it can expertise to accept changing requirements.

**Principle 3:** Deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter time scale.

**Principle 4:** Businesspeople and developers have the skills to work together daily throughout the project. Better decisions are made when the business and technical team are aligned.

**Principle 5:** Trust and motivated team members can deliver the best work done than unhappy team members. This gives the best way to be successful projects.

**Principle 6:** The effective channel of conveying precise information within the development team is face-to-face communication. Direct conversation to each other can solve misunderstanding problems than other communication techniques.

**Principle 7:** Working Software is the Primary Measure of Progress. The main objective is to deliver workable and functional software product to the customers that help more effectiveness of their work done.

**Principle 8:** Agile processes promote sustainable development. The sponsors, developers and users should be able to maintain a constant pace indefinitely.

**Principle 9:** Continuous Attention to Technical Excellence and Good Design enhances Agility.

**Principle 10:** Simplicity – the art of maximizing the amount of work not done – is essential. The deliverable of software product is simple, ease of use, easily amendable for changing requirements and finally to get customer satisfaction.

**Principle 11:** The Best Architectures, Requirements, and Designs emerge from Self-Organizing Teams. Self-Organizing teams gives the best ways to promote decision making and problem-solving skills, sharing knowledge between team members that deliver quality products.

**Principle 12:** Regular reflection on work makes the more effective process improvement and the more advancing skills that help team members' work effectively.

Among these principles, the five principles (4,6,7,10,12) are related to the communication [7]. From these principles, we can clearly see how the communication channels and the challenges of communication are important in agile.

#### IV. COMMUNICATION CHALLENGES IN AGILE

We use communication every day in our environment. Communication is necessary when building relationships, sharing knowledge, managing teams, dividing duty, delegating responsibilities. Therefore, we need to highlight the communication challenges in our development society. This is especially true for Agile environments where customer cooperation is needed to be succeed. We can find the best solution to a specific problem and overcome obstacles if we tackled the communication challenges [9].

Fig 2 describes the various communication types that people may choose to apply in their workspace. The left-most curve listing communications options for when you are documenting and the other communication options for when you are modeling. In the figure, we can obviously see that face-to-face communication is the “hottest” style while email is placed at the “colder” state. Therefore, we can say that face-to-face communication is the most effective way between participants in an Agile team. Both theoretically and practically point of view indicates that face-to-face conversation is the highest communication channel in project team as well as most frequently employed in Agile team [10]. However, the communication channels exist, we are still facing the challenges like miscommunication of requirements, communication cost, lack of documentation, misuse of communication methods etc.

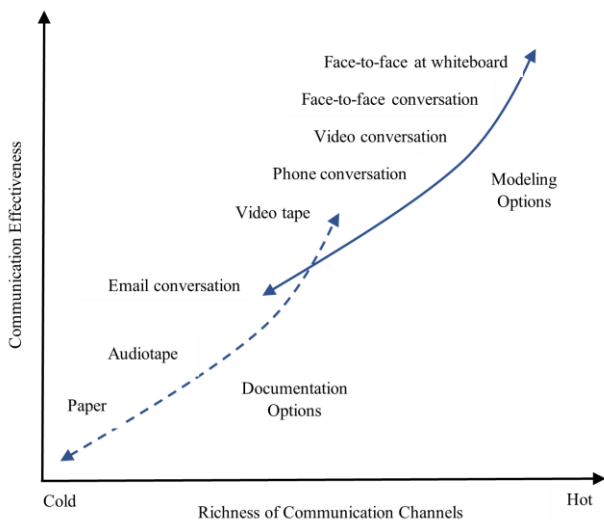


Fig 2 Communication Channels Types

##### A. Communication Channels

We need to recognize the importance of customer involvement in the development process. The effectiveness of communication between customers is directly impact on the software product to be successful. Communication channels are the methods used for the information exchange. Generally, a channel represents an information conveyer between two persons, teams, or organization, ion media etc. Communication channels are like the way which can be used peoples in the organization. Nowadays, there are many communication channels that we can be used

easily in our daily work routines. But the most important one is how we choose the best communication channels which is more effective and complete various tasks. If we chose and used inappropriate communication channel for a task in our organization then this can lead to negative consequences.

Communication in Agile teams can be formal and informal communication includes specification documents and review meeting, while informal communication takes place via conversation among the teams within a company.[6]. The communication channels can be either active or passive. Active communication is the physical and synchronous kind of communication and passive communication is asynchronous communication. Taking into account asynchronous communication, online chart is rarely used between the stakeholders. There are number of different types of communication channels. They are:

- Face-to-face conversation
- Video Conferencing
- Audio Conferencing
- Emails
- Chat and messaging
- Documents Letter
- Spreadsheet etc.

The above communication channels can be further classified as formal, informal and unofficial as shown in the following Fig 3.

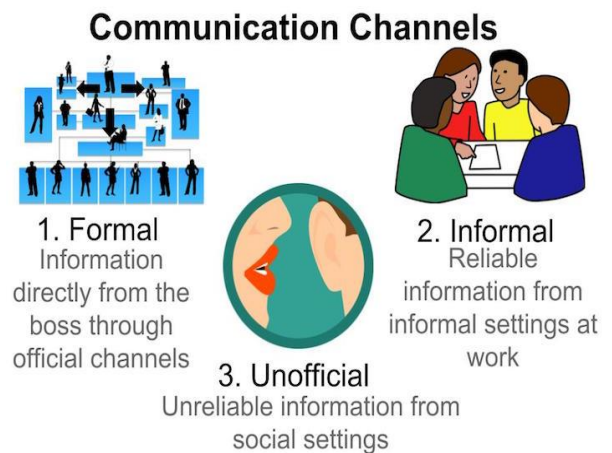


Fig 3 Types of Communication Channels

1) *Formal channel of communication* means the normal communication that is controlled by the authorized people in an organization.

2) *Informal channel of communication* means the relax form of communication although it can be categorized within the official framework.

3) *Unofficial channel of communication* means unofficial mode of communication. We also keep in mind that this channel will give the important information than other channels.

To calculate the number of communication channels in agile community depends on the number of people who are

communicating with each other. In agile development team, developers work on self-directed teams and are empowered to create their own process models. We can calculate the number of channels using the following equation.

$$\text{Channels} = N(N-1)/2 \quad (1)$$

where N is the number of stakeholders

Consider in the agile team,

2 stakeholders, Channels=2(2-1)/2= 1 channel

3 stakeholders, Channels=3(3-1)/2= 3 channels

4 stakeholders, Channels=4(4-1)/2= 6 channels

5 stakeholders, Channels=5(5-1)/2=10 channels

6 stakeholders, Channels=6(6-1)/2=15 channels

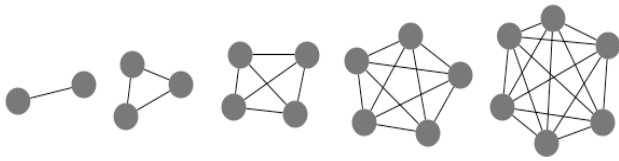


Fig 4 Ways of Communication Channels

Fig 4 shows the way of communication channels in an agile community. It shows the number of members on the project is the heart that makes communication as a challenge. If the project team contains 5 members including project manager, there is no doubt that the project manager has to communicate the other 4 members to inform about urgently changing situation as well as team members have to communicate each other constantly. Loss of communication makes a big problem for finishing the project on time and may become over budget. The project manager has the skills to understand the complexity of communication channels and how to control them, then this skills would help the project in the following ways [8]:

- Tasks are completed correctly when due
- Changes are handled promptly and with less conflict
- Decisions will get made in a timely manner

- Problems and issues are addressed properly and promptly
- Stakeholders understand the changes and impact

## V. PROPOSES COMMUNICATION CHANNELS REDUCTION FRAMEWORK

Communication among developers play important role regardless of the development processes. Several studies propose comparing communication effort in Agile development process and try to identify the most beneficial communication strategy and which process is needed more communication effort than other processes. No studies have conducted to consider how to reduce the communication channels within the project group. The following Fig 5 represents the proposed communication channels reduction framework for agile software development. In this framework, we need to classify the input variables such as the number of team distribution, team size, project domain and what agile methodology is used. These are the important influence factors to get the best communication channels in agile software development. The output of the process framework is the effective communication channels for the agile to get customer satisfaction and successful projects.

This study highlighted the communication channels reduction framework. Any project contains many stakeholders and there may exists a large number of channels to meet the project time and constraints. The more channels can cause knowledge sharing problems and requirement misunderstanding. These are the carriers for project failing. No matter the existence of communication channel types, many channels become defects on Agile software development teams. We need to choose the most appropriate channels that is effective and efficient in our domain areas. The more we used effective communication channels, the less we reduced the communication cost.

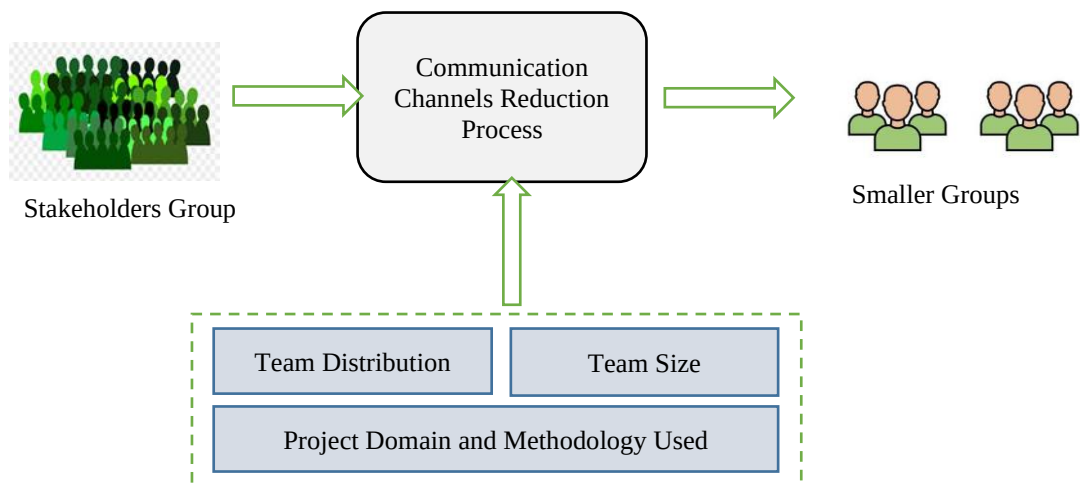


Fig 5 Proposed Communication Channels Reduction Framework

## VI. CONCLUSION

The most attractive agile approach has the ability to reduce cost of the software development process changes as well as the rapid delivery of software that satisfies to the customer. Effective communication is the foundation of successful projects. Good communication makes the team to become unique and able to understand project's strategy, objectives, time, budget. Ineffective communication makes to project can incur more risks and obsoletely fail. Today world, we are using many communication channels for our daily software development tasks. Communication keeps a whole organization moving towards. The team members have to apply right communication strategies that leads lower communication cost. We need to choose the best channels in our team and consider inappropriate channels that are hesitate of our project timeline. The least channels will give the better to meet project goals. In this framework we propose communication channels reduction framework in Agile development process. This framework is not only one for the channels reduction but also lower the communication cost. We can also identify the best communication strategies for the different phases of agile software development project.

## REFERENCES

- [1] A. Eberlein, J.P.Leite,"Agile Requirements Definition: A View from Requirement Engineering", IEEE Software,Vol. 17(3), pp. 28-35, 2000.
- [2] D. E. H. Damian,A Eberlein, M. L.G.Shaw, B.R. Gaines," Using Different Communication Media in Requirements Negotiation", IEEE, June, 2000.
- [3] D.Taibi, K.Liukkunen, M.O.Ahmad," Comparing Communication Effort within the Scrum, Scrum with Kanban, XP and Banana Development Process", International Conference on Evaluation and Assessment in Software Engineering, June, 2017.
- [4] H.K.Flora, S.V.Chande," A Systematic Study on Agile Software Development Methodologies and Practices", International Journal of Computer Science and Information Technologies, Vol.5(3), pp.3626-3637, 2014.
- [5] I.Sommerville,"Software Enginnering", Addison-Wesly, 2016.
- [6] J.D. Herbsleb and A. Mockus," An empirical study of speed and communication in globally distributed software development", IEEE trans on Software Engineering, Vol. 9(6), pp.1-14, 2003.
- [7] K.Beck et al," Agile manifesto",2001.
- [8] M.Fahmi bin Ismail, Z. Mansor, " Agile Project Management: Review, Challenges and Open Issues", Journal of Computational and Theoretical Nanoscience,Vol.7(24), 2018.
- [9] M.Hummel, C. Rosenkranz, R. Holten,"The role of Communication in Agile Systems Development : An Analysis of the State-of-the-Art", October, 2013.
- [10] M. Korkala, P. Abrahamsson, P. Kyllonen," A Case Study on the impact of Customer Communication on Defects in Agile Software Development", Proceeding of AGILE 2006 Conference, 2006.
- [11] M. O. Ahmad, M. Oivo,V. Lenarduzzi, D. Taibi, "Lessons Learned on Communication Channels and Practices in Agile Software Development", September, 2018.
- [12] N. Carmen, R.S. Ciochina," Challenges of Applying Agile Principles and Vlaues to IT Project Management", Journal of Entrepreneurship, Management and Innovation, Vol.14(4), pp.43-62,2018.
- [13] R. Pressman," Software Engineering: A Practitioner Approach", McGraw Hill Education,2019.
- [14] S. Alsaqqa, H.A. Nabi et al. "Agile Software Development: Methodologies and Trends", International Journal of Interactive Mobile Technologies, pp.246-270, July,2020.
- [15] S. Bhalerao et al," Generalized agile software development life cycle", International journal of Computer Science and Engineering, Vol. 1(3), 2009.