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THE ROLE AND EFFECT OF CO-ORDINATION AMONG STAKEHOLDERS INVOLVED IN DEVELOPMENT PROCESS

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Abstract
Over the years, varieties of software development methodologies employed. Initially, traditional approaches used, but they had drawbacks and difficulties handling problems that arise during software development. The introduction of agile technologies, which prioritize customer needs by promptly implementing solutions and regularly providing clients with value products. Successful software project completion, prompt problem identification, and customer satisfaction, all made possible by efficient client-software development team coordination. Time zone, social, and cultural differences, along with linguistic and geographic ones, are examples of communication issues that cause initiatives to fail. To address these issues, a thorough literature assessment is required. Making use of SLR 43, pertinent articles created in 2018 to 2022 chosen. The importance of communication between the development team and the client has been the subject of numerous software development studies, although more research is still required. Through a thorough review of the literature, this study seeks to demonstrate the value of communication as well as the challenges that agile developers and clients face during the development process.

1. INTRODUCTION

Based on a number of variables, including the project's size, kind, and available resources, a variety of software development technologies employed for project development. Requirements collecting, planning, design, programming, testing, setup, and maintenance are the many stages of the software development process. At first, conventional methods such as the Waterfall Model, the Prototyping Model, and the Spiral Model employed. The previously listed methods have a number of shortcomings. Before going on to the next step, one must complete the previous one. Projects that have poor requirements gathering take too long and end up costing more than planned. Additionally, handling risks and mistakes is challenging, which makes it simple for people to get injured [1]. Agile technologies been designed to address the drawbacks of traditional methods and are the best means of meeting the demands of rapidly evolving clients. Agile divided into four phases, the first two of which are planning and communication. During this phase, needs are determined and all system shareholders are informed. After the proposal approved by the client, analysts review the documentation and system development begins. The third phase consists of design and development. Following approval of the prototype, development of the actual system begins. After that, assessing and implementing at this stage, test cases created. [2].

Identifying requirements is a crucial step in any software development process. Agile development gathers requirements perfectly, resulting in high-quality products in less time and expense. In opposed to conventional methods, the concept of agile software development initially emerged in the 1990s. Agile methods, also known as lightweight techniques created to meet customer expectations by producing high-quality products on schedule and within budget. The agile methodology encompasses a wide range of techniques and strategies. Scrum, Extreme Programming (XP), Adaptive Software Development, Dynamic Systems Development Method, and the Crystal family are examples of popular agile approaches [3].

Initiatives involving agile software processes may or may not successfully based on a number of success factors. Among such factors, one is the "people." At the core of the agile ideals are partnerships and connections, functional software, and flexibility. Because the level of customer engagement closely linked to the success of a software development project, projects that include more client interaction with the development team often have higher success rates [4].

When there is appropriate and efficient communication between the software development team and the client, agile-based development poses a significant challenge for software development, even if it is crucial to the successful collection of requirements. Geographical and physical distance, cultural difference, time zones, loss of trust, and poor communication skills are the main reasons why consumers and teams misunderstand one other [5].Strong customer service, cooperation, and efficient internal and external communication are critical to meeting customer requests and increasing success rates. Communication is highly valued and significant in all agile development methodologies [6].

To improve the success rate of projects developed using these approaches, agile values and principles developed. Agile software development emphasizes collaboration and self-organizing teams. Agile is heavily reliant on communication between development teams and other process stakeholders. Agile technique is a popular choice in software development and business circles due to its collaborative, empowering, and adaptable nature. There are several types of partnerships inside an organization, including

1.1. Customer Relationship: In reality, a team that takes part in the development process is a customer.

1.2. Relationship among Team Members: Throughout the development process, the team members' relationships are crucial.

1.3. Customer and Team Relationship: A successful and high-quality project or product is a result of the interaction between the customer and the development team [7].

The most notable component that is crucial to project development is the cooperation between the client and the software development team. This relationship can withstand the uncertainty and changing needs of the customer with good communication. Agile approaches need effective and efficient communication between stakeholders, such as consumers and the team, in order to complete projects of the highest caliber and satisfy customers. Effective and efficient communication is crucial. The receiver must receive a high-quality communication with the least amount of time, money, effort, and resources required to establish contact. It established that agile architecture offers benefits for better functionality and quality, on time and budget project completion, and active communication [8].

Requirement elicitation (finding requirements), prioritizing (most important items first), negotiation (resolving issues and developing a common knowledge of needs), and feedback (customer reaction) are the four layers of communication that include each Agile cycle. Miscommunication can lead to a variety of communication problems, including misunderstandings and a failure to communicate. All phases of the project's development impacted by miscommunication. [9].

Agile development governed by a few core ideas. One of these principles emphasizes the importance of strong connections and communication between the development team and the client, which has a big impact on the project's outcome.

2. RESEARCH MOTIVATION AND OBJECTIVES

Business goals have altered significantly in the modern world. As a result, traditional approaches are going extinct, and agile development has replaced them. Agile is being used by many software businesses to build software because The successful completion of a project requires a number of factors, including a proper delivery strategy, the production of a valuable product or project, appropriate software engineering techniques, a skilled development team, a competent agile project management methodology, an agile-friendly team climate, and strong customer participation [10].

There is a significant correlation between these success factors and the relationship in agile software development. Communication greatly affected by the forums that agile approaches provide, including standup meetings and retrospectives. This is also true for transparency and knowledge sharing, both of which have completely good effects. [11].

2.1 Objectives Review

Examining how relationships between the client and the software development team affects the project's end outcome is the aim of this study. The agile method is important while working on software development in the present day. Though there are certain communication issues in this connection, we now recognize the significance of the relationships between the development process's stakeholders (customers and the development team) based on the literature review. Therefore, it was necessary to make an effort to determine the key challenges and rank them in order of importance. Determining how these difficulties varied by location and how they affected the connection was also essential.

Section 3: Background study and Section 4: Research Method comprise the remainder of the essay.

3. BACKGROUND OF STUDY

Relationships allow individuals to coordinate continuously, which is especially advantageous when exchanging information. Building relationships with the consumer and other team members is crucial. Relationships inside the team, which influenced by the size of the team. It suggests that smaller teams are more likely to succeed with agile efforts. Ineffective communication is one of the primary causes of project failure. Poor communication is a natural consequence of large teams. One issue is the development team's unclear communication with clients. Excellent and informal contact with clients to understand their changing demands is a "must have" if one wants to operate in an agile team [12].

Agile addresses issues in line with end-user and customer requirements. Customers informed of the product they will receive since they are participating in the whole product production process. Developers and customers often communicate. Developers may easily modify the project at any time to satisfy customer needs. Almost every customer is entirely happy with the agile methodology. When customers use the agile methodology, developers and feedback are able to communicate directly at every stage of the project. In every agile software development strategy, customer engagement is a crucial aspect of the development process [13].

Agile development places a strong emphasis on the client and quality referred to as customer satisfaction—is an essential part of the process. Quality is a broad and difficult term. Product quality, in its broadest definition, is the capacity of a product to meet or beyond the expectations of the customer and developed via appropriate communication between the customer and the development team, organization, or company. [14]. Project managers face the same challenges as the rest of the company: greater results, more productivity, requests to provide more value, and tighter budgets. The most often used approaches were PRINCE2 (60%) and PMBoK (48%) and ITIL (42%). The monitoring and feedback systems in their companies always enhanced, according to less than 20% of respondents. Determined timing (59%), shifting stakeholder demands and expectations (56%), failing to assess prior knowledge, including stakeholder understanding (48%), poor communication that detracts from results, and an incorrectly organized project team (50%), are the primary reasons for project failures. [15].

Agile has a strong communication strategy by integrating the client in the development process, even though its execution might be challenging. Agile is especially advantageous for the software development business. [16]. These days, many businesses quickly and affordably installed high-

quality solutions. Consequently, they are developing software using agile approaches. Quality concerns regularly addressed using agile approaches. The agile technique welcomes modifications at any level of development and places a strong emphasis on software quality through user participation. [17].

A series of user stories initialized, analyzed, designed, realized, and tested throughout each sprint, which is the foundation of the agile process. User stories are unofficial summaries of software features that written from the perspective of the user. It enhances the client, developer, and testers' comprehension and cooperation. [18].

Based on the agile manifesto, agile differs from previous methodologies. Agile processes prioritize feedback, teamwork, and people. [19]. Techniques for agile software development have become quite popular in a world where software development to be completed more efficiently and fast. Numerous software development methodologies have employed this strategy to generate high-quality software in a short amount of time. The customer is crucial, particularly in agile technique. Throughout the product development process, the customer should be actively available and knowledgeable about agile approaches. When there are no active customers, there are delays and subpar products. Agile software development techniques enable the rapid delivery of software products to clients with enhanced quality and client satisfaction. Agile procedures are therefore currently among the most popular approaches for software development. [20].

The development team is able to keep positive relationships and harmony with customers through efficient communication. Since customers are a valuable asset to the business, it is crucial to maintain positive relationships and communicate with them as often as possible. [21]. For small and medium-sized projects with a co-located team, agile approaches previously suggested. Face-to-face contact between team members made possible via co-location, which promotes quick releases and high-quality output. As a result, the majority of projects employ agile. Collaboration necessitates a high level of collaboration, wherein parties cooperate and develop meaningful relationships. [22]

Drawing from an extensive analysis and investigation of several research articles on agile development I focused on three main aspects to perform this study: customer connection, customer satisfaction, and customer engagement. I believed that the success of initiatives, particularly agile software development, depended heavily on these three areas.

4. RESEARCH METHOD

A systematic literature review (SLR) conducted in order to achieve the goals. While a standard literature review entails an ad hoc search of publications, systematic literature reviews (SLRs) are more deliberate and methodical. By locating, evaluating, and concentrating on all of the easily accessible information on study topics, SLR increases the validity of the available data. Other writers used the same strategy to accomplish their objectives. We followed the guidelines provided by [5], [3], [11], [22], [23], [24], [25], and [26].

4.1 Research Questions

To conduct the SLR and to analyze the challenges, the following questions formulated based on above mention studies in section 4.

RQ1: What is the impact of relationship between the customer and the development team on the software project?

RQ2: What are relationship issues between customer and development team?

RQ3: How to explore issues with customer?

RQ4: How to explore issues with development team?

To respond to the query, search criteria for each research question is used.

Determined the significance of the relationship between the development team and the client for RQ1, and SLR determined the difficulties and problems in that relationship for RQ2.

In RQ3 and RQ4, respectively, challenges for the client and those inside the development team listed.

4.2. Plan of Research

Prior to data extraction and analysis, a search strategy established, relevant articles for the study was searched; inclusion and exclusion criteria was established as depicted in Fig. 1.

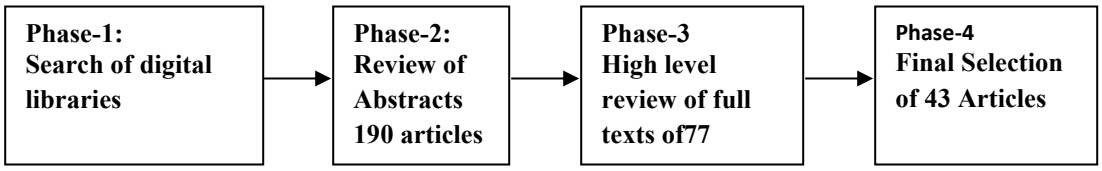


Fig1: Inclusion and Exclusion process

The digital libraries we have utilized to Conduct SLR are Science Direct, IEEE Explore, spring link and Google Scholar.

4.3. Search Strategy

Finding appropriate publications for our study constitutes the initial phase of performing SLR. Next, provide the SLR search strategy technique. Papers sourced from a variety of places, including digital libraries, and then examined. Search strings utilized to look up the pertinent documents. The articles that were closest to the issue and most pertinent ultimately chosen. Synonyms and other pertinent terms employed to search the research articles according to a set search criterion for performing SLR. When using synonyms or other spellings, use "OR," and when combining two key phrases, use "AND."

Keywords: Relationship in Agile Development, Active Communication, Agile Methodologies, Traditional Approaches, Communication Problem.
Different words used for searching given as follows:

- Old software development models OR conventional software development techniques OR conventional software development approaches OR hard development processes OR Traditional software development methodologies.
- Soft approaches for software development OR new software development techniques OR agile methodologies.
- Effective coordination OR successful communication OR useful communication that is useful OR communication that is powerful OR strong communication.
- *A communication problem is a situation in which there are difficulties in communicating between conventional software development methodologies (such as Traditional models or old models) and agile methodologies (or new soft methodologies for software development), affecting active and effective coordination, and leading to communication challenges.*

The aforementioned search terms created for various libraries. Sometimes the same results discovered for two distinct strings, and other times too long strings were not correctly recognized, thus we altered the following words:

(Conventional software development Methodologies OR Traditional software development Methodologies OR Old Software development models OR Traditional software development approaches OR Hard development methodologies) and (Agile methodologies OR New software development methodologies OR Soft methodologies for development of software) AND (success factors for project development) "OR "critical factors effecting software development.

The final list of sources, search terms and the number of articles found for each resource shown in table1.

4.4. Articles selection

We specify inclusion and exclusion criteria for the selection of desired articles.

4.4.1. Inclusion Criteria

This criterion specifies which research papers, Books, research reports etc. used for data extraction. Only those articles considered that have much concern with direct relationships and communication in agile software development.

The articles that are related to factors Relationship and Communication in agile Software development.

The Articles are included based on following criteria;

- The studies related to Customer and Development team in agile development.
- Each Article within the range of a period 2018 to 2021 cited.

- Only those articles considered in this study, which written in English Language.

4.4.2. Exclusion Criteria

The purpose of exclusion criteria is to exclude material that is irrelevant to our study, our research subject, and our research questions. Studies, which not reported in any workshop/conference/journal.

4.4.3. Title and Abstract

Inclusion/exclusion criteria applied to both titles and abstracts of all 190 articles to highlight their significance. Those articles not included which are not clearly relevant to our topic. For example, as the term, "Relationship" used in the search string to extract articles about "Relationship" and outside the scope of this systematic literature review are excluded. In Some articles author used such comical title that makes it hard to guess the actual contents of an article. In such cases, the abstract reviewed only to make it clear whether the article was out of scope or not. All those studies excluded whose focus was not Relationship. After titles and abstracts screening, "43" papers selected. Some abstracts were missing or misleading. Similarly, a few abstracts gave little sign of what was in the full article. All those articles included some type of involvement with Relationship.

4.4.4. Full-text level screening

In this Phase77, articles were carefully studied in which 43 articles are ranked for inclusion and the contents of these articles are applied in SLR.

4.5. Choosing Primary Sources

Various portfolios like IEEE Explorer, Science Direct, Springer link and Google Scholar, utilized to look up relevant articles to conduct SLR.

4.6. Level of Selection Process

There are two levels of selection process

- **Initial selection level:** It performed by reviewing the title, keywords and abstract.
- **Final Selection level:** It performed by reviewing through full text of the papers.

We have identified 190 papers from different sources such as IEEE explore, Science Direct, Springer, Google Scholar and other sources. Duplicate papers and non-English language papers excluded and only most relevant 43 papers selected.

Table-1: Research Articles utilized from different Sources / Portfolios

Resources	Total Articles	Primary selection	Final selection
IEEE explore	22	12	3
Science Direct	30	9	6
Springer Link	36	18	3
Academia	40	10	5
others	62	28	26
Total	**190**	**77**	**43**

4.7. Study search selection

By applying search strategy, 190 articles extracted from various digital libraries. In first round, we studied the abstract and conclusion portion of the articles by applying inclusion criteria. The articles which are relevant to Relationship and Communication in Agile development are incorporated after primary selection and as a result we achieved77articles. Then, we applied further exclusion criteria by reviewing all articles and total of 43articles were included in end in SLR.

4.8. Data extraction and synthesis

Using the guidelines, we were able to find relevant material from the final list of articles [5], [3], [11], and [22]. The following data extracted from each publication: (i) publication date (ii) Title (iii) Source (iv) Methodology (inter-view, case study, report, and survey).

Following the application of inclusion and exclusion criteria, 43 pieces ultimately selected as winners. Papers by different authors reviewed based on the aforementioned research questions.

5. RESULTS

After applying Inclusion and exclusion criteria finally, 43 articles chosen after being subjected to inclusion and exclusion criteria. Based on the research issues mentioned above, papers by various writers examined. The graphical presentation of various studies performed for SLR are depicted in below Fig. 2

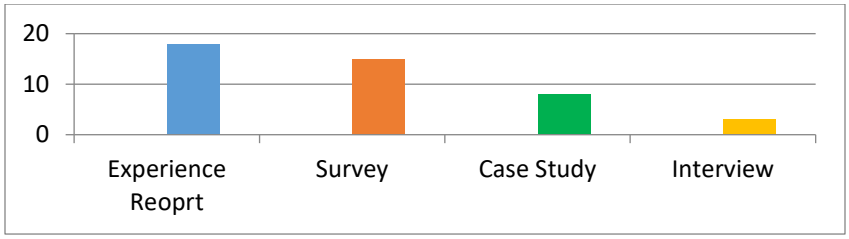


Fig. 2.Different stdies performed for SLR Preparation

5.1. Analysis on different research methods

Experimental reports accounted for 17 (39%) and surveys for 15 (35%), case studies for 8 (19%), and interviews for 3 (7%). The researcher concluded that strong and efficient communication is essential to agile software development (ASD) after conducting a number of case studies and experiments.

Topics	References
Importance of Relationship	125
Issues in Relationship	87
Issues with customer	80
Issues with Development Team	85

Table 2: topic appeared in articles with following number of times during the study

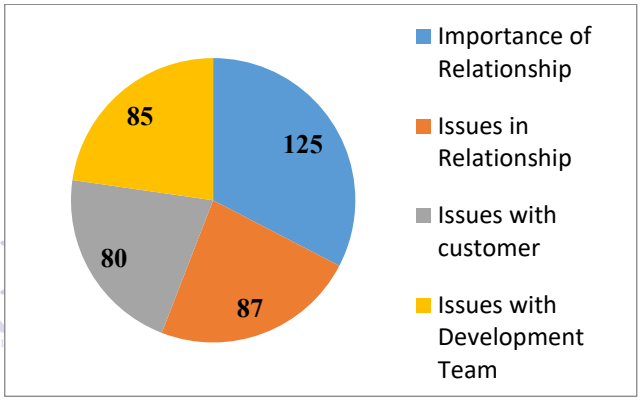


Fig. 3: Graphical representation for various Articles utilized in SLR

5.2. Analysis of Research Question

In order to address the formulated research questions *RQ1, RQ2, RQ3*and *RQ4*for SLR various research articles reviewed. The outcomes after thorough analysis, four research questions given as under.

5.2.1. Findings Related to RQ1

The main goal of the first research question is to determine relationships' significance, how they affect software projects, particularly in agile software development. According to a survey of the Systematic Literature, the significance of relationships is the subject of 35 out of 43 pertinent research publications. After extracting the articles that addressed the first SLR research question, we found that 35 publications, or 79.54%, expressed significant concern about the significance of relationships and effective communication amongst stakeholders in agile development. Project failure results from poor communication, interaction, and coordination.

5.2.2. Findings Related to RQ2

Relationship problems between the development team and the client are the subject of this research question. According to an assessment of the Systematic Literature, relationship concerns covered in 14 of the 43 most pertinent research publications, accounting for 31.81% of the citations. Disparities in language, culture, and geography can cause problems in relationships. Challenges include direct contact, communication channels, consumer availability on a

daily basis, and people's willingness to build relationships.

5.2.3. Findings Related to RQ3

The problems with customers were the focus of this research question. These topics covered in 20 research publications, or 45.45%. The implementation of agile in organizations, frequent meetings at all levels can be annoying, erratic customer specifications can impact project time and budget, stakeholder politics, transparency of processes among all stakeholders, and customer data stored on numerous computers that can cause system blockages are the most important issues.

5.2.4. Findings Related to RQ4

30-research papers from the final selection of articles were determined to be 68.18% concerning the challenges with the development team, which is the subject of RQ4. Individuals have differing opinions. Team members may lack of cooperation, time zone, language. Cultural and geographic differences. Task prioritization, lack of team experience, the need for specialized training to write user stories, the difficulty of producing less documentation, the size of the team and the project, monitoring problems, the lack of trust among team members, pressure from upper management, risk management, interpersonal problems within the team. Problems with teamwork and collaboration, Knowledge sharing, working overtime can make team members stressed, managing resources requires different skills, integration problems, reusing components when using new technology, and rapid release presents challenges for the development team because it sets deadlines for testing activities and prevents testing time to identify problems.

6. CONCLUSION

Agile software development has gained appeal because it involves people, has a working program, has cooperative clients, and accepts changes. The interactions between the different stakeholders are a major focus of the agile technique. Out of the 190 research articles that examined, 43 of the most pertinent ones examined. Exclusion criteria applied in order to reduce the number of applicants. Numerous studies contrasting agile and conventional methods in the context of stakeholder interactions examined; nevertheless, communication and relationship issues might arise because of time zones, language barriers, and other factors. The author's suggestions about the interactions between the development team and the client are required for further research. Relationship problems with stakeholders will arise if proper and effective communication strategies are not well defined. A strong structure is necessary for the communication system in agile technologies. Effective customer communication throughout the agile development process has an impact on time management, cost savings, and customer satisfaction.

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