

Agile approaches are a contemporary approach to software development that emphasizes rapid delivery of small, functional product components, customer involvement throughout the process, and flexibility to make adjustments as needed. Agile promotes open communication, teamwork, and rapid adjustments in response to input rather than producing extensive documentation and inflexible plans. Four fundamental principles form the basis of Agile: valuing people and their interactions over processes and tools; prioritizing functional software over extensive documentation; encouraging customer collaboration over rigorous contract negotiations; and accepting changes, even at the end of the development process, rather than rigorously adhering to a plan. These days, agile is increasingly popular because it enables businesses to adapt to consumer requests more quickly, enhance the quality of their products with each iteration, and maintain team motivation and involvement by granting them ownership of their work and short-term, clear goals.

Agile was initially created for small teams working together in a single place, thus there are a lot of obstacles when using it for large software development projects. Large firms sometimes have numerous teams dispersed over various time zones and regions, which causes delays, coordination issues, and communication concerns. It becomes extremely difficult to manage hundreds of developers, various departments, diverse work cultures, and regulatory compliance. The flexible, dynamic character of Agile is particularly difficult for traditional corporate organizations to embrace because they favor set, long-term goals. These difficulties make it difficult to scale Agile, so it's important to identify the precise barriers, or "de-motivators," that prevent Agile from succeeding in big businesses.

De-motivators are unfavorable elements that prevent management and teams from effectively implementing Agile practices. These include inadequate team communication, a lack of management backing, limited customer engagement, employee resistance to change, a lack of Agile experience, challenges in obtaining precise requirements, and challenges with continuous testing and integration. Frustrated teams, resource waste, and failure in Agile transformation can result from these de-motivators if they are not recognized and managed properly.

By identifying the main demotivators that prevent the use of Agile methodologies in large-scale projects from a management perspective, this study seeks to assist in resolving this issue. The goal is to identify these de-motivators by carefully examining the body of research and then ranking them using the Analytical Hierarchical Process (AHP), a technique that evaluates

problems according to their importance and seriousness. By doing this, the study gives businesses and project managers important information on which problems to start addressing in order to increase the likelihood that Agile will be implemented successfully. To put it simply, the objective is to identify the issues that are preventing Agile from being fully implemented in large organizations, identify the most significant issues, and provide helpful guidance to address them so that businesses can fully benefit from Agile in complicated and large-scale projects.

## II.

Originally Agile practices were for small teams working on small projects, though as it developed, many of its methodologies were applicable to large scale projects and teams. Large scale projects require more coordination and external contribution than smaller teams, such as project management, human resources, and marketing. The need for more coordination on large scale projects makes Agile practices challenging to apply. Another major challenge against agile is the transition in process and mindset that organizations will have to change in order to adopt agile practices. Agile practices can clash with pre established processes and client-company relationships causing many organizations to be wary of adopting it in their software development.

The definition of large scale projects is not definitive and is debated by several researchers. Some researchers define it by the number of developers of the project ranging from 40-50+ people, others define it through the amount of code needed to create the project, 5,000,000+, and still others use the cost of the project to determine the size, with projects exceeding roughly \$12,000. Though there is debate on how to determine the size of a project, the most common threshold for large scale projects are those with 50 or more personnel.

The study takes a deep look at potential de-motivators that hinder the adoption of agile practices in large scale projects. A Systematic Literature Review was performed to explore these de-motivators with emphasis on their effects on vendor organizations, a field that is overlooked in previous research. 15 total factors were identified through the Systematic Literature Review of a previous study performed by the authors, and an Analytical Hierarchy Process method was used to rank the different factors through a multiple criteria decision method. This study also presents 2 main research questions to be answered:

RQ 1: What are the practices / solutions De-motivators in agile large-scale software development from software project manager point of view through Systematic literature review?

RQ2: How could the identified De-motivators be prioritized for successful management of a Large-Scale Software Development Project using the AHP approach?

## I. Research Methodology

This section explains the step-by-step procedure adopted by the researchers to investigate the practice of de-motivators when there is adoption of Agile Software Development Methods (ASDM) by big organizations, from a managerial point of view. The key goal was two-fold: one, to identify specific actions or solutions (termed "practices") that align with identified issues (termed "de-motivators") in large-scale agile implementation, and two, to prioritize the underlying de-motivator factors themselves to ascertain which of them pose the biggest challenges for management. To achieve this, the study employed a two-pronged approach consisting of a Systematic Literature Review (SLR) coupled with the Analytic Hierarchy Process (AHP).

### A. Systematic Literature Review (SLR): Identifying the Practices

The first major ingredient of the methodology was an SLR. An SLR is a very structured and therefore quite rigorous way to review existing research. In contrast with a casual literature survey, an SLR actively seeks, assesses, and synthesizes all relevant studies published on a specific topic or research question in an unbiased and repeatable manner.

- **Purpose in this Study:** This SLR was not aimed at finding out the de-motivators themselves (which were researched in some Azmar et al. 2020 study), but rather at discovering the actual practices or solutions discussed in the literature corresponding to those 15 known de-motivators. Specific practices from the perspective of project managers or the management team were considered within the context of large-scale teams, which were defined loosely as 50+ people or 6+ teams, with respect to adopting agile. Researchers recognized a gap in this regard, since prior SLRs never focused on practices regarding these de-motivators in large-scale contexts from management viewpoint.
- **The SLR Process:** The SLR Process is a protocol that the researchers have followed from beginning to a detailed multi-step process which is probably established by the software engineering SLR guidelines:
  1. **Defining Research Goal & Scope:** The statement of the subject clearly serves as an objective for founding practices for de-motivators in large-scale agile adoption.

2. **Search Strategy:** They planned to search some major academic digital libraries that include: IEEE Xplore, ACM Digital Library, SpringerLink, ScienceDirect, and Google Scholar.

3. **Developing Search Strings:** This was an iterative process. The beginning was with keywords that are related to the research questions (e.g., "Agile Method", "Large Scale Development Team", "de-motivators", "barriers", "challenges"). Next, they found synonyms and alternative terms (e.g., "Agile Software Development", "Risk Factor", "Disincentives"). Here, they constructed long search strings to be comprehensive using Boolean operators 'AND' and 'OR' - creating smaller substrings based on the main slice when some databases restrict a length. This careful construction would capture all the possible relevant literature but still take database limitations into account.

4. **Inclusion and Exclusion Criteria:** They delineated clear rules for what papers to include or exclude (see Table 1 ). Papers need to discuss de-motivators/risks/challenges in adopting ASDM in large-scale teams from a management standpoint, in English, full-text available. Excluded were those not clearly presenting these points or not meeting some of the inclusion criteria.

5. **Study Selection (Tollgate Approach):** A systematic filtering method represented in Figure 2 has been used to select the most relevant papers from the initial search results. This was a part of several phases:

- Phase 1: The number of articles collected was initially 3606.
- Phase 2: By title and abstract filtering, 812 of the articles remained.
- Phase 3: Reading introduction and conclusion further narrowed the number to 313 articles.
- Phase 4: Reading the full texts of these 313 articles led to the identification of 83 relevant studies.
- Phase 5: Removing duplicates results in a set of 74 primary studies.

6. **Snowballing:** This technique was applied so as not to miss any essential papers that were either referenced by (backward snowballing) or were citing (forward snowballing) the initial set of selected studies. With this procedure, 36

more papers were found, all of which were filtered through the same Tollgate approach, bringing in another 10 studies.

7. **Final Study Set:** The total 84 primary studies selected were finally included in the analysis: a cumulative outcome from database searching and snowballing.

8. **Quality Assessment:** Before beginning data extraction, the quality of the 84 papers was assessed by the researchers. A checklist of questions related to whether objective research was clearly stated, adequate methods to identify practice were described, adequate data supported the results, clarity of the ASDM context, and bias in reporting said results was devised. A score of at least 50% in this assessment was a prerequisite for any paper being included in order to guarantee a minimum threshold of research quality. All 84 assessed papers passed this evaluation.

- **Outcome of the SLR:** The main outcome from this complete SLR process was the identification and categorization of 76 separate practices, or solutions to overcoming de-motivators from a management perspective regarding large-scale agile adoption. These practices were abstracted from the final set of 84 studies identified as high quality.

## **B. Analytic Hierarchy Process (AHP): Prioritizing the De-motivators**

While the SLR focused on identifying *practices*, the second part of the methodology employed AHP to tackle another question in the research- that is, to prioritise the underlying de-motivators factors for itself. AHP is formulated technique for handling multiple criteria complex decisions. It hierarchic-structuring the problem of decision and pairwise comparing to measure the relative importance of different elements.

- **Purpose in this Study:** AHP has been applied to 15 such de-motivator factors by researchers in their earlier study (Abrar et al., 2020). The intention of using such ranking was to rank these 15 factors according to their criticality from a project manager's perspective. He would be able to know the challenges that needed attention while implementing agile methods in large teams.

**The AHP Process:** This study used the standard methodology for the AHP which is shown in pictures 5 and 6:

1. **Decompose the Problem (Hierarchy):** The problem was presented within three levels as shown in figure 7:

- Overall goal: Prioritization of de-motivators for large-scale agile adoption.
- Organizational Management; Team; Customer; and Process were four logical categories into which the 15 de-motivators were grouped within category Level 2: Categories .
- Attributes - The 15 specific de-motivator factors listed in Table 20.

2. **Construct Pairwise Comparison Matrices:** This is the core of AHP. Using the online questionnaire, the researchers got judgments from the 54 experts (respondents). These experts compared in category four de-motivators as well as compared the four categories against each other. They employed Saaty's 9-point standard scale as shown in Table 18 to measure much one better than other (e.g., 1 = equally important, 9 = extremely more important). After which, all 54 respondents' responses for each comparison were aggregated through geometric mean and presented as comparison matrices (examples in Tables 21, 23, 25, 27, 29).

3. **Calculate Priority Weights (Local Weights):** Mathematical calculations were made using the pairwise comparison matrices in order to derive the relative weights (priorities) of each de-motivator within its category and the weights of the categories themselves. Thus essentially turned into a score of importance at its level in the hierarchy through numeric scoring of pairwise judgments.

4. **Check Consistency:** A very significant point in AHP is checking whether pairwise judgments were fairly consistent. If someone claims that A is much more important than B, but B is much more important than C, and then states C is much more important than A, their judgments are not consistent. The Consistency Index (CI) and Consistency Ratio (CR) were calculated for every matrix based on Equations 1 and 2 with Random Index values from Table

19. A CR value less than 0.1 (or 10 percent) is considered generally acceptable.

5. **Calculate Global Weights and Final Ranking:** The local weight of each de-motivator was multiplied with that of its category to yield the overall (or global) weight. The overall weights were then used to rank all 15 de-motivators from most to least critical in the entire decision structure.

- **Outcome of AHP:** The AHP Analysis finally resulted into a list arranged in some priorities of the 15 de-motivator factors which appears in tables 31 and 32 such as "Exhaustive Pair Programming" as the most significant de-motivator and lack of team orientation as the least, as defined from the management point of view according to the expert panel.

### C. Data Extraction and Analysis (Frequency Analysis)

This section specifically treats how the information collected through the SLR interloc UT with that of the 76 practices was processed.

- **Data Extraction:** Data were collected on the 84 papers selected in the SLR, with the researchers extracting the information systematically in a data extraction form. These comprise bibliographic details (title, authors, reference, library source) on all research specifics (location, country, methodology used like survey, case study, etc), and most importantly, the specific demotivator practices or solutions described in the paper.
- **Data Analysis (Frequency Analysis):** The prime mechanism employed in analyzing the practices extracted was frequency analysis. This involved:
  - **Counting:** Manually counting how many of the 84 selected studies mentioned each specific practice identified.
  - **Calculating Percentages:** The frequency count for each practice was indeed normalized into percentages, with respect to the total number of studies (74 or 84, paper seems to use 74 in Table 2's header but finalized on 84 studies overall). This percentage indicates how often the specific practice was given in the relevant literature. For example, Table 2 shows "Lack of effective communication" was mentioned in 42 papers giving it a frequency percentage of 57% ( $42/74 \approx 57\%$ ). The detailed tables (Tables 3-17) list the specific practices for every de-motivator found along with their computed frequency percentages.

- **Identifying Critical Practices:** Through this frequency analysis, the researchers concentrated on the most "critical" or significant practices. They applied different thresholds (e.g., practices mentioned in >10%, >15%, or >20% of studies) as a filter to focus attention on the literature's most frequently cited solutions, assuming that higher frequency correlates with higher perceived importance or relevance

This was a way of providing frequency-wise measurements for assessing the significance of each practice from the 76 identified through qualitative synthesis of the literature in the SLR. Coupled with overall de-motivator factor ranking using AHP, it would also project which specific solutions were given most priority in research discussions.

Specifically, a methodology that combines results from methodological literature with knowledge gleaned from the field would allow the researchers to (1) scan systematically for a comprehensive list of practices described in literature, (2) analyze how frequently these practices were mentioned based on existing field information with frequency analyses, and finally (3) use their expert judgment to prioritize the high-order challenges these practices aim to mitigate through AHP.

#### IV.

The systematic literature review (SLR) identified 76 individual practices to tackle 15 main de-motivator factors of large-scale Agile adoption, all covered under SLR Results. These practices are grouped into four high-level categories, Organization Management (creating centralized decision-making bodies, securing top-management commitment), Team (cross-training, knowledge-sharing through facilitated session), Customer (placing real customers within iteration reviews, making rapid feedback loops ), and Process (automating continuous integration and testing, employing information radiators), with each category's interventions explicated in Tables 3–17. Table 2 provides a complete mapping of de-motivator factors to practice frequencies, enabling managers to see which interventions are most common in the literature and to prioritize those most strongly supported.

In order to address the issue of scaling Agile practices, the 76 de-motivator practices that were found were systematically grouped into four major categories: Organization Management, Team,



Customer, and Process. In this way, the researchers were able to group similar issues and solutions under one category so that the management could easily identify areas where they had to step in. Within each category, practices were further sub-divided based on their respective de-motivator factor and ranked in order of the frequency with which they were used in the 74 studies selected. Frequency cutoff points (e.g., 10%, 15%, 20%) were utilized to report only those highly critical and widely supported practices where project managers need to concentrate on high-impact areas with significant literature support.

The Analytical Hierarchy Process (AHP) technique was employed to prioritize the 15 de-motivator factors based on expert opinion from 54 experts. The method yielded global and local weight rankings, which identified which factors were most influential from a managerial perspective. The analysis identified Exhaustive Pair Programming as the most important de-motivator because rigid pairing plans have a tendency to suppress flexibility and productivity for bigger teams. At the opposite side of the range, Lack of Team Orientation ranked lowest, suggesting that while harmony between the team is worthwhile, it is less of an immediate impediment than communications or skills deficiencies in scaling Agile. This ranking enables managers to focus their time and energies on eliminating the most obstructive barriers first.

The study identified the three top de-motivators that significantly limit the application of Agile methodologies by large-scale development teams. Lack of effective communication was the biggest obstacle, titled in 57% of studies consulted. Because Agile relies so intensely on casual, ad-hoc communication in real time, it becomes difficult to sustain it when dealing with large distributed teams. To address this, practices such as dividing teams into small groups, employing tools such as video conferencing, and centralization of decisions were recommended. The second most critical factor was reduced productivity due to delay (50%), which is primarily brought about by poor infrastructure, poor team coordination, and poor stakeholder involvement. Solutions recommended included improving task management, developing cross-functional working, and undertaking professional training. The third major de-motivator was traditional organizational culture (34%), which reflects the difficulty most businesses face in shifting from rigid, top-down hierarchies to Agile's iterative and adaptive mindset. This was addressed through cultural transformation, leadership acceptance, and a willingness to implement short-term planning cycles. All three de-motivators combined highlight the importance of communication, flexibility, and organizational readiness in successfully scaling Agile practices.

V.

The findings emphasize that large Agile adoption is not just a technical transition, it's an organizational and cultural one. Communication breakdowns, resistance to new processes, and delayed productivity resulting from ill-aligned processes or unclear requirements are most critical issues of concern to the management. Agile relies on collaboration, transparency, and rapid feedback mechanisms,

which are difficult to achieve in large, distributed, or hierarchical environments. These findings indicate that managers will need to do more than simply implement frameworks; they will need to actively sponsor cultural change, invest in communications plans, and apply Agile philosophy to their own context. Without management support and appropriate support infrastructure, Agile techniques can rapidly slope into a process-checklist instead of tools for creativity.

The conclusions of the research agree with current research in that Agile is severely tested when used at scales greater than small teams. As with past articles, this research supports that lack of stakeholder involvement and traditional organizational culture remain persistent issues. This work is different, however, in that it employs both frequency analysis and AHP prioritization, offering a more subtle view of what problems have the most effect. While earlier studies emphasized a general failure to communicate or lack of buy-in, this study provides greater specificity, namely, specific practices (e.g., extreme pair programming) not often mentioned in the earlier literature but rated as highly disruptive by practitioners. This dual-method approach argues for more tailored interventions than a blanket, one-size-fits-all Agile rollout.

AHP-prioritization of de-motivators offers PMs with evidence-based rules to abide by for the roll-out of effective Agile. Rather than dealing with all of it at the same time, PMs can work on the most challenging impediments, such as communication gaps and poor pair programming design, that are having the maximum amount of impact on the team performance and morale. Also, understanding what de-motivators are seen as being less critical (lack of team orientation) allows PMs to prioritize and allocate time and resources more effectively. Prioritization with knowledge allows PMs to lead with empathy, align strategies with team needs, and build Agile environments that scale. It, ultimately, turns the project manager role to adaptive leaders of organizational change.

#### Recommendations for Practice: Practical Strategies for Managers

Managers overseeing agile adoption in large-scale teams face various obstacles. Here's how they can proactively address the most significant demotivators identified in the study:

##### 1. Improve Communication Channels

a. Why it matters: Agile thrives on quick, informal, and clear communication. In large or distributed teams, poor communication becomes a major blocker.

##### b. Actionable steps:

- i. Schedule regular stand-up and sprint planning meetings with all stakeholders.
- ii. Implement tools like Slack, Microsoft Teams, or Zoom for instant and face-to-face communication.
- iii. Create centralized decision-making structures (e.g., agile leads or cross-

functional councils) to reduce communication silos.

iv. Use digital boards like Jira or Trello to ensure shared understanding of tasks.

## 2. Management and Commitment Support

a. Why it matters: Lack of support from top leadership undermines agile adoption.

b. Actionable steps:

i. Secure executive sponsorship for agile initiatives.

ii. Allocate budgets for agile coaching, training, and team-building.

iii. Celebrate short-term wins to showcase agile's impact and gain team buy-in.

iv. Define clear agile KPIs and integrate them into management evaluations.

## 3. Cultural Shift and Team Orientation

a. Why it matters: Agile isn't just a process shift — it requires a mindset change.

b. Actionable steps:

i. Promote transparency, feedback culture, and shared ownership.

ii. Break down large teams into smaller, autonomous agile units.

iii. Foster psychological safety so teams feel empowered to make decisions and fail safely.

## 4. Continuous Training and Expertise Building

a. Why it matters: Many teams struggle due to a lack of understanding of agile principles.

b. Actionable steps:

i. Provide onboarding programs for new hires on agile basics.

ii. Host regular agile bootcamps, peer training, and knowledge-sharing sessions.

iii. Pair less experienced team members with agile mentors.

## 5. Feedback and Customer Collaboration

a. Why it matters: Agile depends on frequent feedback loops and customer involvement.

b. Actionable steps:

i. Involve customers during sprint reviews and backlog grooming.

ii. Create roles like customer proxy or product owner to bridge the customer-team

gap.

iii. Encourage retrospective meetings to identify improvement areas continuously.

## Implications for the Software Industry: Agile in Large Organizations

This study contributes meaningfully to the adoption and scaling of agile in complex Environments:

### 1. Blueprint for Large-Scale Agile Transformation

a. Provides a prioritized list of 15 de-motivators (e.g., lack of agile experts, poor feedback loops, traditional culture) with mapped solutions — a ready-made checklist for transformation teams.

### 2. Bridging Agile Theory and Practice

a. Many agile implementations fail due to lack of guidance on scaling. This study helps bridge that gap by offering empirically validated practices, especially for complex and distributed teams.

### 3. Influencing Framework Choices

a. By understanding specific barriers, organizations can better choose and tailor frameworks like SAFe, LeSS, or Spotify model based on their culture, size, and goals.

### 4. Elevating the Role of Management

a. Positions leadership not just as supporters but as active agents of agile change, emphasizing their role in strategy alignment, cultural adaptation, and resource mobilization.

## Future Research Directions

### 1. Limitations of the Current Study

- Database Limitation: Only five digital libraries were used; some relevant literature might be missing.
- Geographical Focus: The context and challenges are predominantly drawn from certain regions — broader international comparisons are needed.
- Subjectivity in Prioritization: AHP rankings were based on expert judgments — a broader sample size could improve generalizability.

## 2. Opportunities for Future Research

- Empirical Validation: Test these recommendations in live projects across industries and geographies to verify their effectiveness.
- Agile vs. Hybrid Models: Explore how hybrid models (agile + traditional) perform in regulated or high-risk environments.
- Role-Specific Studies: Deep dives into how roles like scrum masters, product owners, or agile coaches navigate and mitigate de-motivators.
- Tech-Specific Agile Challenges: How do modern technologies (AI, cloud-native apps, microservices) affect agile scalability?

## VII. Conclusion:

In summary, this study has demonstrated that, although Agile approaches are highly effective in producing high-quality software rapidly and maintaining customer satisfaction, large-scale Agile implementation in large organizations is considerably more difficult due to management concerns, cultural resistance, communication gaps, and intricate project structures. This study found 76 crucial practices through a thorough Systematic Literature Review (SLR) that can assist project managers in identifying and resolving the issues known as de-motivators, which frequently result in the failure of Agile adoption in major projects. The Analytical Hierarchical Process (AHP), a scientific technique for prioritizing issues according to their seriousness, was used to thoroughly examine and assess these demotivators. According to the report, some of the main causes of Agile's difficulties in large-scale environments include things like intensive pair programming, poor communication, inadequate management support, strained client relationships, and a lack of team training. Project managers can now more effectively plan their Agile transformations, concentrate on resolving the most important issues first, and develop methods that suit the particular environment of their firm by knowing which issues are most important. This study's primary objective was to provide a workable framework that businesses may utilize to successfully implement Agile, even on the most complex and large-scale projects. These results can be used in future research to improve Agile methods and develop even more effective solutions to these problems, which will facilitate, accelerate, and increase the success of Agile adoption in the software sector.