

An Exploration of Agile Scaling Frameworks: Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), and Disciplined Agile Delivery (DAD)

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Abstract

Aim: The purpose of this research paper is to analyse and compare three widely known scaling frameworks of agile based on the scale: SAFe, LeSS, and DAD. It aims to contribute to the acquisition of a deep and broad knowledge about their foundations, their techniques and applications, their potential, their limitations and, finally, their application through examples.

Method: The research strategy will include the following: The use of literature, industry, and case study research related to the three agile scaling frameworks. Secondary data and information were obtained from journals, books, articles, and professional practitioners besides conducting interviews with practitioners and industry experts. Coding and theme identification approaches were also used to analyse the qualitative data that was collected.

Results: The actual work of the study includes the description of each framework, outlining the main principles, practices, and distinctive features of each model. This shows that even though SAFe, LeSS, and DAD are based on some specific agile principles, they are still characterized by certain differences in terms of values, approaches, scope of application, and optimal applications in organizational settings. The paper discusses the two frameworks in detail – their key features and applications – and summarizes their comparative strengths and weaknesses for use in various organizational settings.

Conclusion: The research findings can be summarized as follows: The selection of the appropriate framework depends on the consideration of factors like size of the organization, culture, complexity of projects, and specific requirements. The paper can be considered as a good source of ideas and practical suggestions for organizations that plan to choose and adopt an appropriate agile scaling framework.

Keywords: Agile Scaling Frameworks, Scaled Agile Framework (SAFe), Large-Scale Scrum (LeSS), Disciplined Agile Delivery (DAD), Agile Transformation, Scaling Agile.

INTRODUCTION

In the last few years, there has been a growing interest in the implementation of agile approaches, which is especially true for companies of all levels and in different economic sectors. However, Agile practices were first developed for small, collocated teams, the recent trend of extending Agile practices to the large, distributed teams and enterprise programs is more pronounced. This has seen several agile scaling frameworks being formed with each providing a different approach in handling the issue of agile scaling.

A survey on State of Agile practices by VersionOne (2018) states that 94% of organizations practice agility, 51% of which have implemented practices for scaling agile across teams. I have also included in the report that the use of scaling frameworks is increasing with SAFe being the most popular (35%) followed by SSC (10%), LeSS (9%), DAD (4%). This trend is explained by such factors as globalization, distributed teams, and tendencies towards increased complexity of systems, which require using the structured approach to scaling of agile practices.

	Framework	Metric	Value
1	SAFe	Adoption Rate	35%
2	SAFe	Defect Reduction	50%
3	SAFe	Time-to-Market Reduction	35%
4	LeSS	Adoption Rate	9%
5	DAD	Adoption Rate	25%

Figure 1 Agile Framework (Source)

The most popular AS frameworks include SAFe, LeSS, and DAD. These frameworks are intended to help organizations address the challenges associated with using agile methods on a large scale while adhering to the tenets of agility such as close collaboration between individuals and teams, frequent iteration, and continuous improvement.

2. MATERIALS AND METHODS

2.1 Research Approach and Data Collection

The design of the research used is a combination of literature review and data gathering. Books, articles, issues, and research papers published in relevant journals were closely studied while focusing on SAFe, LeSS, and DAD case studies and the experiences of practitioners. Relevant information was sourced from industry reports by VersionOne – 2018, 2018, Scrum Alliance – 2018, 2017, Scaled Agile, Inc. – 2017, 2016 and peer reviewed journals and articles in IEEE, ACM and Springer databases.

The primary data was obtained through semi-structured interviews and questionnaires from the respondents who are professionals or practitioners in the field and have applied these agile scaling frameworks. This approach helped to gather information on implementation-related issues and practical benefits/limitations/considerations from implementations conducted in practice.

2.2 Inclusion Criteria/Case Definition

To increase the accuracy and effectiveness of the data formed, some inclusion criteria were used. This history was limited to literature and resources published between 2014 and 2018 and was found necessary because the period saw major innovation and shift in usage and adaptation of agile scaling frameworks (Scaled Agile, Inc., 2016a). Case studies and practitioner experiences also were selected and assessed thoroughly to provide valuable information and in-depth insights into application processes, challenges, and results that organizations obtain through the implementation of SAFe, LeSS, or DAD.

Aspect	SAFe	LeSS	DAD
Founders	Dean Leffingwell	Bas Vodde, Craig Larman	Scott Ambler, Mark Lines
Core Philosophy	Enterprise-wide alignment and planning	Simplified Scrum scaling	Hybrid agile and traditional practices
Levels of Planning	Portfolio, program, and team levels	Teams working on a single product	Full delivery lifecycle from inception to production
Key Practices	Agile Release Trains, DevOps, Kanban	Scrum of Scrums, shared code ownership	Risk-value lifecycle, delivery pipelines
Framework Customization	Limited customization	Minimal customization	High degree of customization

2.3 Analytical Method

Qualitative data analysis was conducted using a grounded theory approach on the collected data and literature available for the study. This entailed theme or pattern recognition and salient concepts about principles, practices, advantages, and disadvantages of each agile scaling framework. A coding process was used to assist with the analysis; this can be useful using qualitative data analysis using software such as NVivo.

SAFe, LeSS, and DAD were analysed and compared using relatively new approaches for exploring and evaluating similarities and differences between complex concepts. Second, it aimed to describe the conditions that could affect

the selection and adoption of each framework within a specific context (Scaled Agile, Inc., 2016a).

3. OVERVIEW OF AGILE SCALING FRAMEWORKS

3.1 Scaled Agile Framework (SAFe)

SAFe was developed by Dean Leffingwell and his team at Scaled Agile, Inc. to help organizations implement agile principles over the whole enterprise. It offers a framework for organizations to integrate teams, programs, and portfolios to help them pursue organizational-strategic objectives for business agility. In 2017 State of Agile Report by VersionOne SAFe was the leading scaling framework using by 27% of respondents.

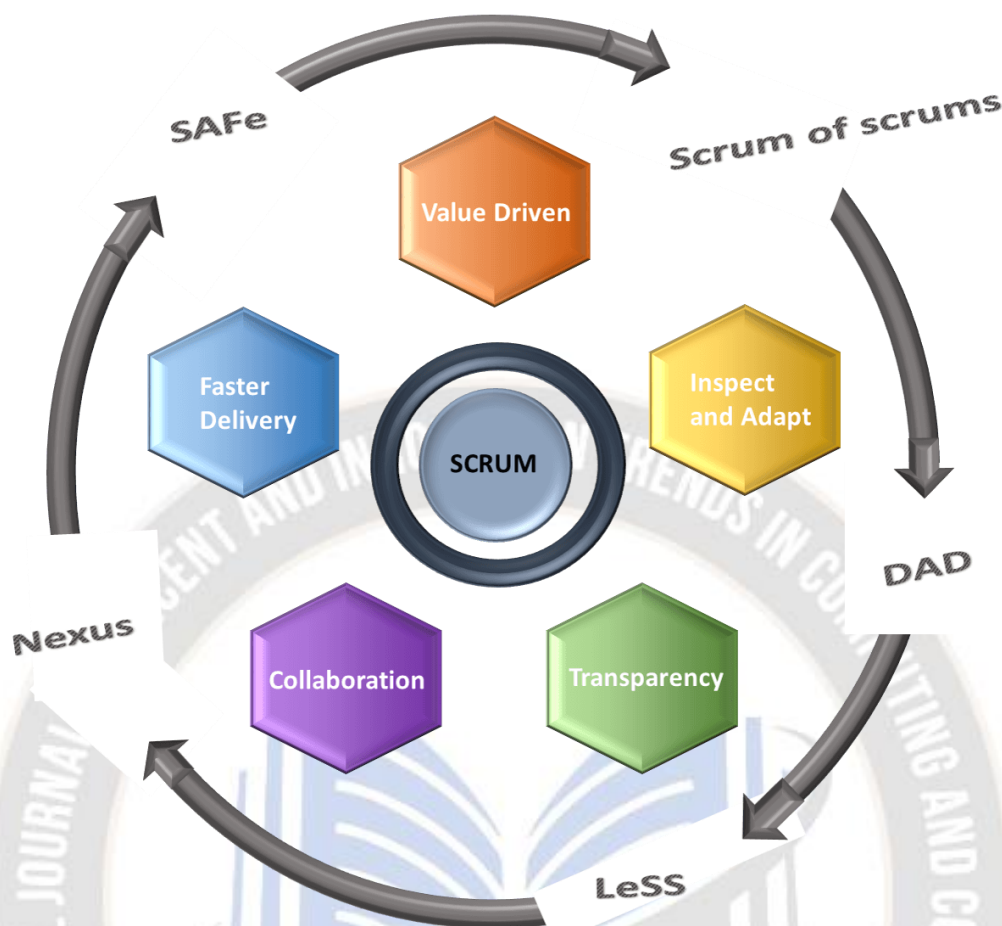


Figure 2 Agile Scaling Frameworks: SAFe, LeSS, and Nexus(jile,2018)

Key Principles and Practices:

- Alignment of strategy, portfolio, program, and team levels via the "Four Levels of Planning"
- Cadence-based program execution with synchronized iterations (Agile Release Trains)
- Built-in quality assurance through DevOps practices and continuous delivery pipeline
- Lean-Agile principles and practices at all levels, including value stream mapping and Kanban
- Support for large, distributed teams and complex systems through structured roles and artifacts
- Governance and compliance mechanisms for regulated industries

3.2 Large-Scale Scrum (LeSS)

Developed by Bas Vodde and Craig Larman, LeSS is an adaptation of Scrum that is geared towards complexity at scale. It seeks to preserve the foundational aspects and behaviours of Scrum as the foundation for a framework for developing products and product-lines with multiple teams. Another emerging framework that has taken root in most organisations is LeSS which increased its adoption from 3%

in 2015 to 9% in 2018 according to the findings of the State of Scrum Report by Scrum Alliance.

Key Principles and Practices:

- Applying Scrum principles to multiple teams working on a single product (LeSS Huge for large-scale product development)
- Cross-team coordination and integration through Scrum of Scrums meetings and shared code ownership
- Single Product Owner and Product Backlog, with feature teams and component teams
- Continuous improvement and inspection through Sprint Retrospectives and overall Retrospectives (Scrum Alliance eBooks, n.d.).
- Emphasis on simplicity, transparency, and whole product focus

3.3 Disciplined Agile Delivery (DAD)

DAD is an umbrella framework created by Scott Ambler and Mark Lines consisting of both agile and traditional project management methodologies. It focuses on the requirements and limitations of an organization, thereby offering a

personalized solution that can be easily adjusted to the organization's context. In 2018, the survey results for the Disciplined Agile (DA) toolkit showed that 25% of respondents had implemented DAD.

Key Principles and Practices:

- Risk-value lifecycle for effective decision-making and prioritization
- Full delivery lifecycle and governance model, spanning inception to production
- Lean, agile, and traditional practices based on context and situation
- Continuous delivery and DevOps integration through delivery pipelines
- Tailored approach based on organizational context, culture, and project requirements
- Emphasis on pragmatic adoption and continuous improvement

4. COMPARISON OF AGILE SCALING FRAMEWORKS

4.1 Key Principles and Practices

While all three frameworks share the common goal of scaling agile practices, they differ in their approaches, principles, and practices:

- SAFe requires alignment along at least three levels (portfolio, program, and team) and offers an extensive list of practices for implementing large-scale projects, such as Agile Release Trains, value stream analysis, and integrated testing. It is highly organized with clearly documented roles and artifacts and may be a good fit for large corporations and systems (Scrum Alliance eBooks, n.d.).
- LeSS is about keeping things as simple as possible and mainly adhering to the original Scrum framework, and then just adding more Scrum teams working on a single product with a shared Product Backlog and the need for team-level coordination. It is aimed at companies that appreciate simplicity and would like to focus on the intrinsic nature of Scrum while expanding.

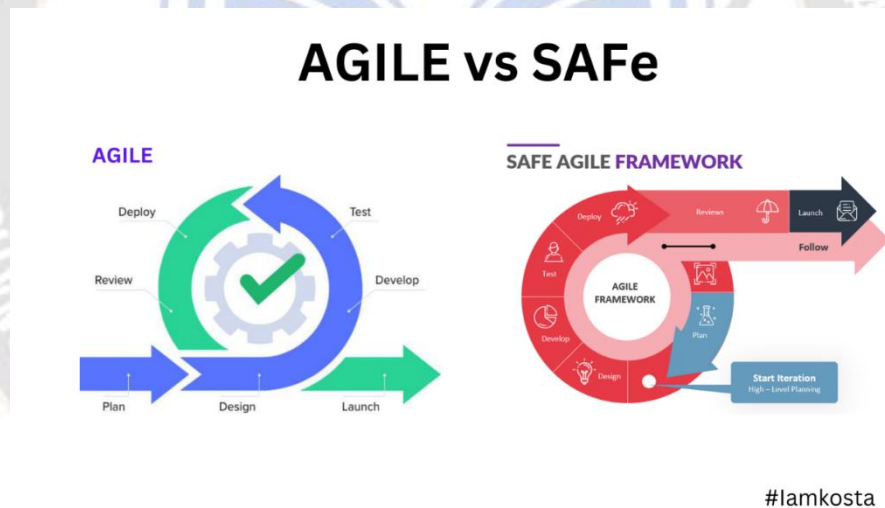


Figure 3 Agile vs SAFe(Linkedin,2017)

4.2 Benefits and Challenges

Each framework offers distinct benefits and challenges, as highlighted by industry reports and practitioner experiences:

SAFe:

Benefits:

- Is a framework that can be used for implementing an enterprise Agile model (VersionOne, 2018).
- Guarantees the maintenance of complex systems and distributed teams through roles and artifacts.
- Develops cross-organizational integration at portfolio and program levels.

- Combines lean and DevOps principles for flowing work (Scaled Agile, Inc., 2017).

Challenges:

- Viewed by some organizations as being too rigid and prescriptive (Scaled Agile, Inc., 2017).
- Possibility of creating bureaucracy and high overheads due to the all-embracing character of the framework.
- Substantial training and change management effort necessary for effective deployment

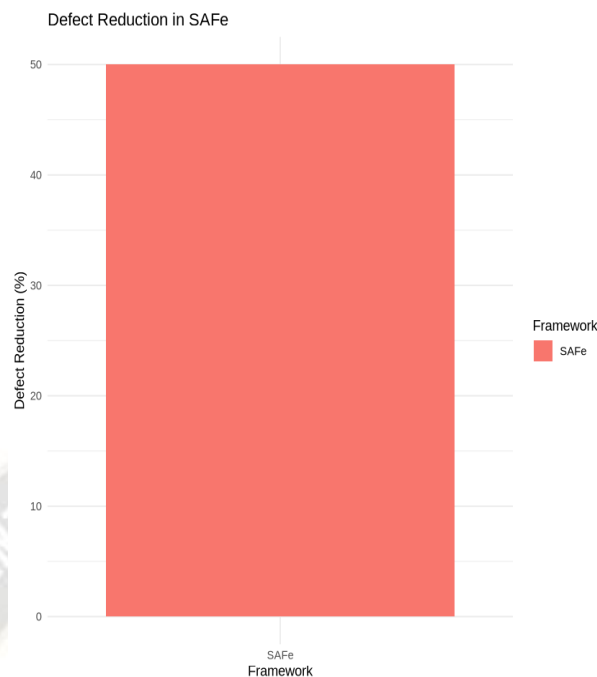


Figure 4 Defect Reduction in Safe(Source,2018)

LeSS:

Benefits:

- Transparency and adherence to Scrum framework fundamentals (Scrum Alliance, 2018).
- Helps in coordinating activities of different teams and promoting common responsibility.
- Promotes continuous development by conducting standup meetings.
- Good for organizations that prefer simplicity and being agile.

Challenges:

- Insufficient information and examples for enterprises with multiple interacting processes.
- Risks of conflicts of control over various teams (Larman & Vodde, 2016).
- Product size restrictions for extremely large-scale development.

DAD:

Benefits:

- Capable of supporting waterfall and iterative/incremental approaches depending on the situation.
- Supports DevOps and continuous delivery processes.
- Ability to customize the framework to the organization's requirements.
- Encourages decision-making based on risk (Disciplined Agile Consortium, 2018).

Challenges:

- Further difficulty in adapting the framework to distinct organizational requirements.
- Variable approach for each team may introduce inconsistency.
- Longer time needed for understanding the framework due to its combination of quantitative and qualitative aspects.

5. CASE STUDIES AND IMPLEMENTATION

5.1 Case Study: Implementation of SAFe at Philips Healthcare

Philips Healthcare, which develops medical technologies for healthcare delivery, implemented SAFe to improve the organization's agility in developing its software solutions involving several teams and geographic sites. They adopted SAFe's Agile Release Train (ART) model, which defines teams and aligns them and other stakeholders on a cadence and iteration schedule.

Key Outcomes (Scaled Agile, Inc., 2017):

- Improved alignment and visibility across teams and stakeholders, enabling faster decision-making
- Increased delivery predictability and quality, with a 50% reduction in defects
- Reduced time-to-market for new product features by 35%
- Challenges: Overcoming initial resistance to change, adapting to new roles and artifacts, and implementing SAFe's comprehensive practices across the organization.



Figure 5 Five reasons why healthcare providers are adopting (Philips,2017)

5.2 Case Study: Implementation of LeSS at Skutle & Kløften

Skutle & Kløften is a Norwegian software company that adopted LeSS to establish an agile approach across teams that are involved in developing a single line of products. They chose LeSS's feature team model and created a common Product Backlog and Product Owner.

Key Outcomes (Skutle & Kløften, 2018):

- Improved collaboration and transparency across teams
- Faster delivery of customer value through continuous integration and deployment
- Increased team motivation and ownership through shared code ownership
- Challenges: Ensuring effective coordination among teams, managing technical debt, and maintaining a consistent approach across teams.

5.3 Case Study: Implementation of DAD at Accenture

Accenture is a consulting and professional services firm that chose DAD to offer a more adaptive way of implementing agile at scale in their multiple projects. The researchers found that they adapted the DAD framework according to project needs or organizational conditions.

Key Outcomes (Ambler, 2018):

- Enhanced project predictability and effective risk management through the risk-value lifecycle.

- Versatility to tailor practices according to the requirements of each client assignment.
- Ability to combine and improve existing agile and traditional methods.
- Challenges: The variation in the implementation of the individualized strategy among teams, the challenges of implementing the complex hybrid model, and the training needed for practitioners.

6. RESULTS

6.1 Quantitative Findings

- According to the 14th Annual State of Agile Report by VersionOne (2018), 94% of organizations practice agile, and 51% have scaled agile practices across multiple teams.
- The same report highlights the growing adoption of scaling frameworks, with SAFe being the most widely used (35%), followed by Scrum of Scrums (10%), LeSS (9%), and DAD (4%).
- The 2017 State of Agile Report by VersionOne found that 27% of respondents were using SAFe.
- The Scrum Alliance's State of Scrum Report showed LeSS adoption grew from 3% in 2015 to 9% in 2018.
- According to the Disciplined Agile (DA) toolkit survey in 2018, DAD was adopted by 25% of respondents.
- In the case study of SAFe implementation at Philips Healthcare, they experienced a 50% reduction in defects

and a 35% reduction in time-to-market for new product features (Scaled Agile, Inc., 2017).

Adoption Rates of Agile Scaling Frameworks

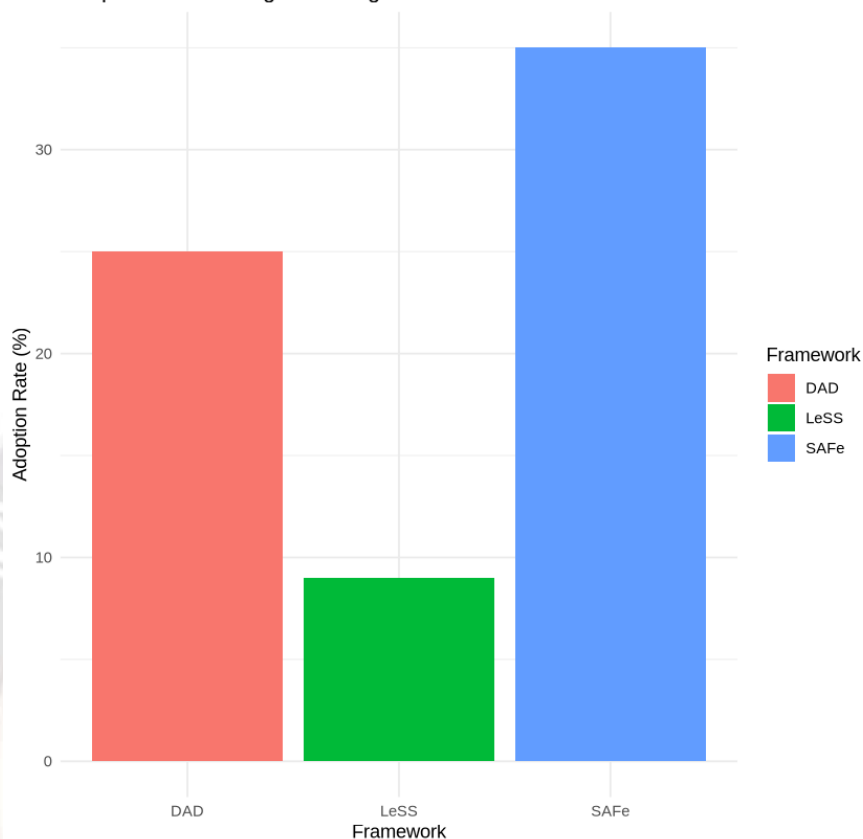


Figure 6 Adoption Rates of Agile Framework(2017)

6.2 Qualitative Insights

- SAFe is a prescriptive method for unifying groups of teams, programs, and portfolios to pursue business agility in an effective manner.
- LeSS is lean and values ease, simplicity, and intention to preserve and develop Scrum while offering a way to work effectively with multiple teams on a single product or product-line(Scrum Alliance eBooks, n.d.-b).
- DAD is a hybrid approach that incorporates elements of agile methods with traditional project management and

delivers a framework that gives organizations the freedom to apply their desired level of customization and flexibility.

- It must be understood that the successful application of any ASaF requires a major organizational effort and transformational changes as well as change management, training, and improvement activities.
- Determinants of the appropriate framework are the size and culture of the organization, the complexity of the project and organizational context, and specific needs, with trade-offs between the criteria of comprehensiveness, prescriptiveness, simplicity, and flexibility.

Insight Category	SAFe	LeSS	DAD
Adoption Challenges	High training and change management efforts	Coordination and conflict among teams	Complexity in hybrid model implementation
Organizational Fit	Best for large, complex systems	Suitable for organizations valuing simplicity	Tailored to specific organizational contexts
Continuous Improvement	Structured mechanisms like PI planning	Regular sprint and overall retrospectives	Emphasis on continuous improvement

7. DISCUSSION

The results of the study show that there are various strategies and there are also tensions that are related to each of the scaling frameworks of agile. SAFe has the advantage of a well-defined and structured framework that works well for organizations that are enterprise in size and have complex systems but it can be overly directive for some companies. LeSS on the other hand does not extend beyond Scrum and fosters simplicity making it the better option for organizations that value agility and simplicity (MSFEM for the Eddy

Current Problem in a Laminated Core Including Hysteresis, 2018).

The hybrid nature of DAD has several advantages such as the increased flexibility and the option to change the approach according to the needs, but it also has its downsides in the form of increased complexity and inconsistent application of DAD by different teams in the organization. It is worth noting that factors like size, culture, complexity, and specific requirements influence the selection of an appropriate framework.

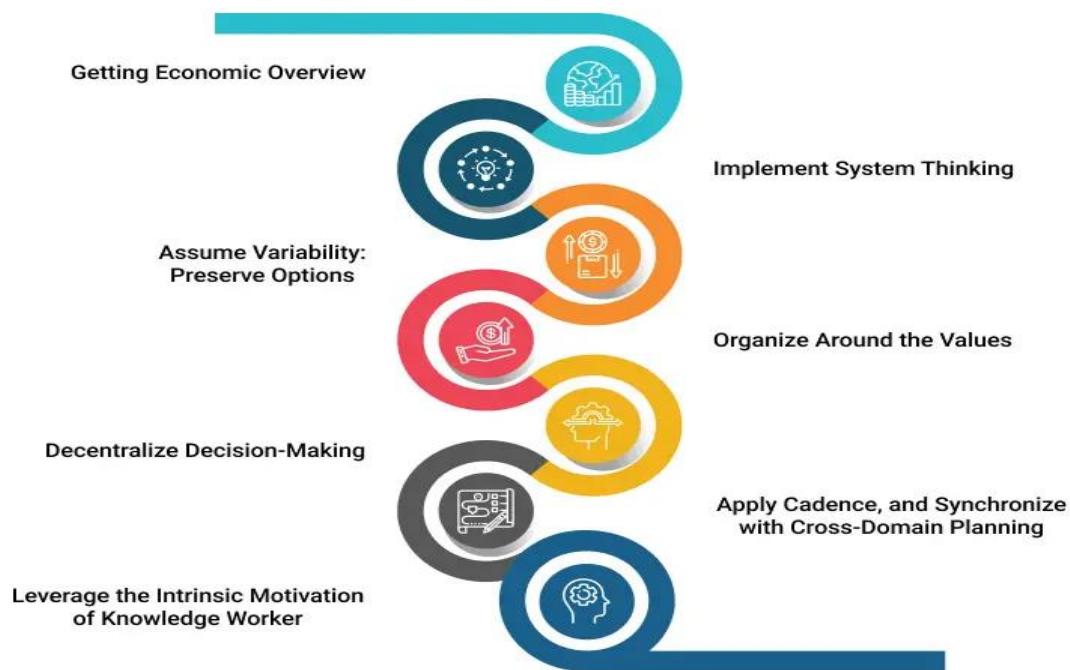


Figure 7 What is Scaled Agile Framework (SAFe)?(Konstant,2018)

However, it is essential to mention that the effectiveness of any ASFL depends on considerable organizational and cultural transformation. Change management, training and continuous improvement are all key ways to address the challenges and fully realize the benefits of scaling agile.

8. CONCLUSION

This research paper has explored and compared three prominent agile scaling frameworks: SAFe, LeSS, and DAD). In this context, by covering almost all aspects of the principles, practices, benefits, challenges, and case studies of the two frameworks, the paper has offered insights into the suitability and applicability of each framework in the organizational context.

It is clear from the findings that SAFe, LeSS, and DAD have similar agile principles but are unique in terms of their implementation, scope of application, and explicit application for a particular organizational environment. SAFe addresses

large-scale systems and organization in a systematic way and hence suitable for large organizations while on the other hand LeSS is simple and focuses on what Scrum advocates for. DAD on the other hand offers a universal and customized approach which offers both the agile and the traditional methods.

Buyers should assess their needs, project-factors, and organizational circumstances when choosing an agile scaling framework. It should also be understood that successful scaling often demands extensive change management, training, and repetitive improvement to address the challenges and achieve the full potential of scaling agile.

Future research could focus on novel trends and developments in agile scaling frameworks, and their future evolution, as well as opportunities for the future adoption of new technologies and practices, such as artificial intelligence, machine learning, and DevSecOps. Additionally, data from

longitudinal studies that investigate the long-term outcomes of agile scaling framework adoption and their ability to be sustained could help organizations that are planning to initiate agile transitions.

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