



School of Social Sciences

Master in Business Administration (MBA)

Postgraduate Dissertation

Agile at scale as an innovative organizational method in
organizations: Literature review and application in a case study

Antonios Katsikadamos

Supervisor: Anastasia Constantelou

Patras, Greece, March 2023

Theses / Dissertations remain the intellectual property of students (“authors/creators”), but in the context of open access policy they grant to the HOU a non-exclusive license to use the right of reproduction, customisation, public lending, presentation to an audience and digital dissemination thereof internationally, in electronic form and by any means for teaching and research purposes, for no fee and throughout the duration of intellectual property rights. Free access to the full text for studying and reading does not in any way mean that the author/creator shall allocate his/her intellectual property rights, nor shall he/she allow the reproduction, republication, copy, storage, sale, commercial use, transmission, distribution, publication, execution, downloading, uploading, translating, modifying in any way, of any part or summary of the dissertation, without the explicit prior written consent of the author/creator. Creators retain all their moral and property rights.



The agile at scale as an innovative organizational method in
organizations: Literature review and application in a case study.

Antonios Katsikadamos

Supervising Committee

Supervisor:

Anastasia Constantelou

Hellenic Open University

Co-Supervisor:

Lyda Kyrgidou

Hellenic Open University

Patras, Greece, March 2023

“To my wife for her patience and Ms. Constantelou for her guidance”

Abstract

Today's modern companies face many challenges, such as enormous information, globalization, constant competition, constantly shifting customer needs, and a rapidly changing business environment. Companies must be flexible and easily adjustable to these internal and external factors to survive. Traditional hierarchical organizational structures pose an obstacle to the required business agility, with companies trying to shift towards modern agile-at-scale organizational structures. Having this in mind, this study examines and critically reviews the existing literature, the contemporary agile-at-scale organizational structures and focuses on a specific case study trying to answer the following questions:

1. How do non-digital companies apply their agile-at-scale transformations to all their operations?
2. What are the challenges and benefits that this transformation involves?
3. What mentality must modern leaders have for this transformation to succeed?

The method used for the case study is a closed, descriptive case study based on interviews. This study concluded that companies may apply their agile-at-scale transformation following the top-down or the bottom-up approach but must do so incrementally, in waves, examining and making the appropriate corrections through the process. The most common challenges companies face during this transformation are resistance to change, coordination issues between the agile teams, and wrong agile implementation. In contrast, the benefits achieved are the ability to respond immediately to customer requirements and the opportunity for continuous improvement. Leadership must be committed to change and invest in people's training, two of the most critical elements to help the agile-at-scale transformation succeed. Nevertheless, there is room for improvement. Further research is needed as the agile-at-scale transformation of non-software-related companies is premature, and the literature used for comparison is limited.

Keywords

agile, agile-at-scale, SAgile, Spotify, Scrum.

Η μέθοδος οργάνωσης agile σε μεγάλη κλίμακα (agile at scale) ως καινοτόμα μέθοδος οργάνωσης σε οργανισμούς: Επισκόπηση βιβλιογραφίας και εφαρμογή σε μελέτη περίπτωσης

Αντώνιος Κατσικαδάμος

Περίληψη

Οι σημερινές σύγχρονες εταιρείες αντιμετωπίζουν πολλές προκλήσεις, όπως η ο τεράστιος όγκος πληροφορίας, η παγκοσμιοποίηση, ο συνεχής ανταγωνισμός, οι συνεχώς μεταβαλλόμενες ανάγκες των πελατών και ένα ταχέως μεταβαλλόμενο επιχειρηματικό περιβάλλον. Οι εταιρείες πρέπει να είναι ευέλικτες και εύκολα προσαρμόσιμες σε αυτούς τους εσωτερικούς και εξωτερικούς παράγοντες για να επιβιώσουν. Οι παραδοσιακές ιεραρχικές οργανωτικές δομές αποτελούν εμπόδιο στην απαιτούμενη επιχειρηματική ευελιξία, με τις εταιρείες να προσπαθούν να στραφούν προς τις σύγχρονες οργανωτικές δομές agile-at-scale. Έχοντας αυτό υπόψη, η παρούσα μελέτη εξετάζει κριτικά την υπάρχουσα βιβλιογραφία, τις σύγχρονες οργανωτικές δομές agile-at-scale και εστιάζει σε μια συγκεκριμένη μελέτη περίπτωσης που προσπαθεί να απαντήσει στα ακόλουθα ερωτήματα:

1. Πώς εφαρμόζουν οι μη ψηφιακές εταιρείες τους μετασχηματισμούς τους στην ευέλικτη κλίμακα σε όλες τις δραστηριότητές τους;
2. Ποιες είναι οι προκλήσεις και τα οφέλη που συνεπάγεται αυτός ο μετασχηματισμός;
3. Τι νοοτροπία πρέπει να έχουν οι σύγχρονοι ηγέτες για να πετύχει αυτή η μεταμόρφωση;

Η μέθοδος που χρησιμοποιήθηκε για τη μελέτη περίπτωσης είναι μια κλειστή, περιγραφική μελέτη περίπτωσης που βασίζεται σε συνεντεύξεις. Αυτή η μελέτη κατέληξε στο συμπέρασμα ότι οι εταιρείες μπορούν να εφαρμόσουν τον μετασχηματισμό τους σε agile-at-scale ακολουθώντας την προσέγγιση από πάνω προς τα κάτω ή από κάτω προς τα πάνω, αλλά πρέπει να το κάνουν σταδιακά, σε διάφορες φάσεις, εξετάζοντας και κάνοντας τις

κατάλληλες διορθώσεις μέσω της διαδικασίας. Οι πιο συνηθισμένες προκλήσεις που αντιμετωπίζουν οι εταιρείες κατά τη διάρκεια αυτού του μετασχηματισμού είναι η αντίσταση στην αλλαγή, τα προβλήματα συντονισμού μεταξύ των ομάδων και η λανθασμένη εφαρμογή του Agile. Αντίθετα, τα οφέλη που επιτυγχάνονται είναι η δυνατότητα άμεσης ανταπόκρισης στις απαιτήσεις των πελατών και η ευκαιρία για συνεχή βελτίωση. Η ηγεσία πρέπει να δεσμευτεί στην αλλαγή καθώς και να επενδύσει στην εκπαίδευση των ανθρώπων, δύο από τα πιο κρίσιμα στοιχεία για να πετύχει η αλλαγή σε agile-at-scale. Ωστόσο, υπάρχουν περιθώρια βελτίωσης στην παρούσα μελέτη. Απαιτείται περαιτέρω έρευνα καθώς ο μετασχηματισμός σε agile-at-scale εταιρειών που δεν σχετίζονται με το λογισμικό είναι πρόωρος και η βιβλιογραφία που χρησιμοποιείται για σύγκριση είναι περιορισμένη.

Λέξεις – Κλειδιά

Agile, agile-at-scale, SAFe, Spotify, Scrum.

Table of Contents

Abstract	v
Περίληψη	vi
Table of Contents	viii
List of Figures	x
List of Tables.....	xi
List of Abbreviations & Acronyms	xii
1. Introduction	1
1.1. Problem statement	1
1.2. Research Objectives	1
1.3. Methodology and approach	2
1.4. Observations.....	2
1.5. Limitations	3
1.6. Brief chapters description	3
2. Literature review and related work.....	4
2.1. Literature review	4
2.1.1. What is enterprise agility and why is it needed?	4
2.1.2. What is Agile?	6
2.1.3. What is Agile at Scale?.....	7
2.1.4. Towards Agile at Scale.....	8
2.1.5. Leadership driving agile-at-scale	10
2.2. Main Agile at Scale organizational structures.....	10
2.2.1. The Scaled Agile Framework (SAFe).....	10
2.2.2. The SAFe meetings.....	14
2.2.3. The Spotify	15
2.2.4. The Spotify meetings.....	17
2.2.5. The Less (Large-Scale Scrum).....	17
2.2.6. The Less meetings	18
2.2.7. The Scrum of Scrums	19
2.2.8. The Scrum of Scrums meetings	20
2.3. Related work on the approaches of agile-at-scale transformations.....	20
2.3.1. Cross-Case Analysis	23
3. Case study and methodology	25
3.1. Case study	25
3.1.1. Data gathering	26
3.1.2. The large-scale transformation of Proximus	27
3.1.3. Transformation approach from SAFe to PEAK phase	35
3.1.4. Challenges during the transformation from SAFe to PEAK	37
3.1.5. Benefits from the transformation to PEAK.....	39
3.1.6. Leadership attitude towards the transformation to PEAK	39
4. Discussion and conclusions	40
4.1. Discussion	40
4.1.1. Proximus's transformation versus literature case studies	40
4.1.2. Proximus's challenges versus literature case studies.....	41

4.1.3. Proximus's leadership mentality versus literature case studies	42
4.2. Conclusions and limitations.....	42
4.2.1. Conclusions	42
4.2.2. Limitations.....	43
References	44

List of Figures

Figure 1: Scrum Framework (Next Technology Professionals, 2022)	6
Figure 2: SAFe Framework (Scaled Agile Framework, 2022)	11
Figure 3: ART Roles (Scaled Agile Framework, 2022).....	12
Figure 4: ART Teams (Scaled Agile Framework, 2022)	12
Figure 5: Team members (Scaled Agile Framework, 2022)	13
Figure 6: Solution roles (Scaled Agile Framework, 2022).....	13
Figure 7: Enterprise roles (Scaled Agile Framework, 2022).....	14
Figure 8: SAFe meetings (Scaled Agile Framework, 2022)	14
Figure 9: Spotify organizational structure (Kniberg & Ivarsson, 2012).....	16
Figure 10: Less organizational structure (The LeSS Company B.V, 2022)	18
Figure 11: Scrum of Scrums organizational structure (ScrumAtScale, 2022).....	19

List of Tables

Table 1: Agile-at-scale framework used	24
Table 2: Transformation approach.....	25
Table 3: Challenges	25
Table 4: Proximus's transformation steps	37
Table 5: Proximus's challenges and how they were delt	39

List of Abbreviations & Acronyms

APO	Area Product owner
ART	Agile Release Train
ATO	Agile Transformation Office
CoE	Center of Excellence
ICT	Information Communications Technology
IT	Information Technology
KPI	Key Performance Index
Less	Large-Scale Scrum Framework
PI	Program Increment
PO	Product owner
ROI	Return on Investment
RTE	Release Train Engineer
SAFe	Scaled Agile Framework
SM	Scrum Master
STE	Solution Train Engineer

1. Introduction

Agile means being flexible and adjustable to respond to change. The Agile way of working entered our lives in 2001 when the agile manifesto was released. The agile manifesto contains four core values and twelve principles that the teams must adhere to in order to be agile, customer-centric, responsive to change and provide incremental value to the customer. Agile as a philosophy soon became very popular, and many frameworks started implementing methodologies of applying the agile way of working. Initially, all these frameworks targeted small companies in the software industry, but after realizing the benefits, many companies in various business sectors started adopting these frameworks.

1.1. Problem statement

The modern, fast-paced environment affects large-scale organizations in multiple ways. It includes constantly changing laws and regulations, fierce competition, and rapid technological and information changes. Modern companies need to be able to adjust to these challenges and to do so, they must get rid of the legacy and the traditional organizational structures and adopt the agility needed at scale.

1.2. Research Objectives

The purpose of this study is to examine the contemporary agile-at-scale organizational structures, study the cases in which modern ICT and non-ICT companies have applied the agile-at-scale organizational structure to all of the aspects of their operations and try to answer the following questions:

1. How do non-digital companies apply their agile-at-scale transformations to all their operations?
2. What are the challenges and benefits that this transformation involves?
3. What mentality must modern leaders have for this transformation to succeed?

1.3. Methodology and approach

This research approaches the subject in the following ways: It critically reviews the literature and existing related studies trying to identify how these questions are answered. Furthermore, it focuses on a special case study of Proximus, one of the biggest telecom organizations in Belgium, that is one of the few cases that have applied the agile-at-scale transformation to all of its operations and compares it with the literature and the existing studies. The methodology followed is based on (Yin, 2014)'s guidelines: The survey is a closed, descriptive, single-case study based on interviews. The method will use the analytic generalization (Yin, 2014), under which the previously developed theory will be used as a guide to compare the empirical results of the case study.

1.4. Observations

This study reaches multiple conclusions. Companies that target an agile-at-scale transformation must carefully pick the agile-at-scale framework and make the necessary adaptations to suit their needs better and achieve optimal results. There are two ways to approach the agile-at-scale transformation: top-to-bottom beginning the transformation from the upper management towards the teams, and the bottom-to-top starting the transformation from single teams and moving upwards towards the upper management. The suggested methodology for either approach is launching the transformation in waves:

1. Launch the change for a part of the company.
2. Inspect the results.
3. Make the necessary corrections.
4. Launch the next wave.

The biggest challenges that companies may face during this transformation are resistance to change, misapplication of the agile-at-scale framework, misunderstanding of the agile concepts and methodologies, and difficulty in communication between the departments. To overcome these challenges, companies should invest in proper agile coaching, and the upper management should be committed to change despite the obstacles found during the transformation.

1.5. Limitations

Like every study, this does not come with limitations. The agile-at-scale transformation of non-IT companies is relatively new. Thus, the number of companies in the literature that had applied the agile-at-scale transformation in all aspects of their operations and which this study used as a base for the case study under examination is minimal. A more considerable number of similar studies in the future could provide more insight into the challenges that the companies may face during their transformation and how they can get over them and give more information on the skills that modern leaders should have to lead this transformation. Furthermore, Proximus's agile-at-scale transformation is only 6 months old so it is difficult to say if it has succeeded or not.

1.6. Brief chapters description

This study consists of 4 chapters:

- Chapter 1: Introduction. It covers the dissertation's summary. It introduces the problem under investigation, the study's objectives, the research method, and finally, the observations and limitations of the research.
- Chapter 2: Literature review and related work. It presents basic concepts of the research topic, the most common agile-at-scale frameworks and finally similar studies found in the literature taken under consideration for comparison with the case study.
- Chapter 3: Case study and methodology: It presents the case study, the approach and the methodology used.
- Chapter 4: Discussion and conclusions: It presents the case study's discussion and observations, a comparison against the literature and existing case studies, and the limitations and future work that may exist.

2. Literature review and related work

2.1. Literature review

To understand what Agile-at-Scale is, what are the challenges and the benefits and how it is achieved, an extensive literature review is essential. Understanding why large companies pursue the Agile-at-Scale organizational structure will allow an understanding of the importance of such transformation, the challenges, how it is achieved and what modern leaders need to drive such a change. Through an extensive literature review, this chapter investigates the reason behind the need for an agile-at-scale transformation, the challenges and how they are faced, and the procedure to undergo such a transformation. Furthermore, this chapter identifies the leadership skills to guide such a change and presents the most common agile-at-scale organizational structures.

2.1.1. What is enterprise agility and why is it needed?

Since the last decade, large companies have faced many challenges that impose them to become proactive, easily adjustable, and quickly responsive. Some of these challenges are the easily accessible and enormous amount of information, the constant shifting of customer needs and the markets (Brede Moe & Mikalsen, 2020), globalization (Birkinshaw & Ridderstråle, 2015), the fast pace changes in technology, competition (Salo, 2017), and the unexpected impact of external factors such as the environment, the laws, and the regulations (Salo, 2017), (Aghina, et al., 2018). The traditional hierarchical organizational structure prevents large companies from quickly adapting and adjusting to these changes. (Rigby, Sutherland, & Noble, Agile at Scale, 2018).

According to the literature, agile means being flexible and adjustable to respond to change. It is more of a mindset, an idea, and a way of thinking and acting, based on the Agile Manifesto's values and principles. Expanding the sense of corporate-level enterprise agility is how organizations are structured and organized to respond to change, whether it is economic parameters, competition, or other factors. (Alliance, 2022). The study tries to summarize the aspects of enterprise agility. There are four aspects of enterprise agility: economic, organizational, operational, and strategic. (Karvonen, Sharp, & Barroca, 2018). Economic agility addresses the way companies allocate their budget. Instead of allocating

and locking their budget per project, large companies should split their budget according to product streams. If product 'A' produces more value than other products, the company can halt the other product streams or transfer their funds to prioritize product 'A'. In this way, they are flexible deciding when and where they should invest their budget. Organizational agility covers the aspects of the structural organization of a company so that it can quickly adapt to competition, new opportunities, and customer requests. Companies must be organized around flexibility, innovation, and speed in this modern, fast-changing environment. Operational agility deals with how a company delivers products to the stakeholders. By using the agile way of working and delivering incremental working pieces of a product, companies can receive more frequent customer feedback and respond to changes in business requirements. Finally, strategic agility means that the leaders should be able to make bold and quick decisions regarding an opportunity or investment and to be able to anticipate and respond in the best possible way to impediments that may appear. There is a false impression that large enterprises must lose stability during their agile transformation. Agility and stability can be achieved if companies master the balance in all four aspects of enterprise agility. (Aghina, De Smet, & Weerda, 2015). This study will focus on organizational and operational enterprise agility.

Initially, only IT companies that produced software adopted agile frameworks. However, as companies outside the software industry gradually identified and recognized the benefits of the agile way of working (Aghina, Handscomb, Salo, & Thaker, 2021), they also turned agile. Several studies indicate that companies in the heavy industry (Handscomb, Heyning, & Woxholth, 2019), the insurance (McKinsey Quarterly, 2017) and the banking sector (Dib, Di Lodovico, Lamaa, Mahadevan, & Sengupta, 2022) have endorsed the agile way of working. The article (Rigby, Sutherland, & Takeuchi, Embracing Agile, 2016) also presents automotive, logistics, and mass media companies embracing agility. In another article, Harvard Business Review indicates that companies in all sectors, from pharmaceutical to banking, have already started transforming their Human Resource departments to work agile (Cappelli & Tavis, 2018). Furthermore, the 15th Annual State of Agile Report of 2021, an agile state report that provides information from a complete annual survey of Agile techniques (15th Annual State Of Agile Report, 2021), indicates that 94% of the surveyed companies have experience in practicing agile. Most of them have extended their agile way of working beyond their IT sectors (29% operations, 17% marketing, 17% security, 16% human resources, 11% finance, and 11% sales).

2.1.2. What is Agile?

Agile is all about mindset. The agile way of working initially targeted software development and was founded in 2001 when the agile manifesto was released. This agile manifesto includes four core values and twelve principles that the teams should follow to work agile. The Agile manifesto focuses on the customer, the quick response to change, the team collaboration, and the incremental delivery of the product. Since agile is a mindset and a set of values and principles, many frameworks have used this as a base for their implementations. One of the most common implementations of the agile mindset is the Scrum Framework. The Scrum Framework is an agile project management framework that helps teams and companies to manage their work through a set of values, principles, practices, and roles. Since the agile manifesto and the Scrum framework release, many software and non-software companies have adopted Scrum after realizing its benefits and simplicity. Organizations that transform towards agile-at-scale often use Scrum as the base framework upon which teams will work. The following picture summarizes the way Scrum works (see Figure 1):

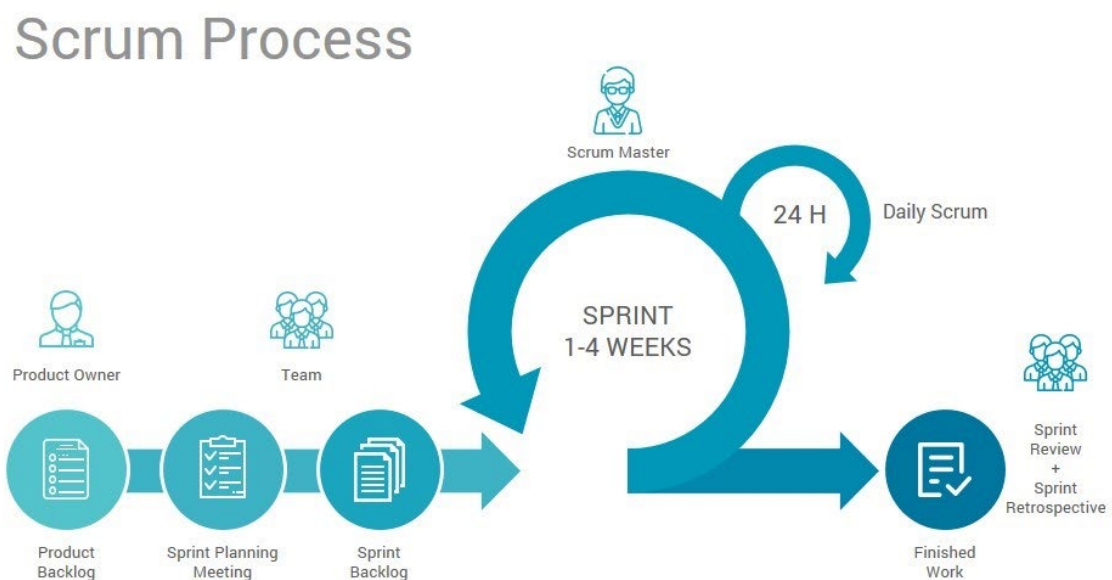


Figure 1: Scrum Framework (Next Technology Professionals, 2022)

In this framework, the Scrum team consists of the Product Owner, the Scrum Master and the team members. The Product Owner is responsible for contacting the customer. Then he creates a list of tasks called 'Product backlog', which are prioritized based on the customer needs. These tasks form the input of the team's 'Sprint Planning meeting', which occurs at the start of each iteration called 'Sprint'. In this meeting, the team decides what to take on for the next Sprint according to their capacity and the Product Owner's priorities. The outcome of this ceremony is the 'Sprint backlog' and is the list of the tasks that the team will try to deliver till the end of the Sprint. Each Sprint lasts one to four weeks, with the two-week interval being the norm. During the Sprint, the team runs the 'Daily scrum' to see the status, align and bring up impediments that might hinder their work. At the end of the Sprint, the team runs another two ceremonies the 'Sprint review', where they review their work and present it to the customer, and the 'Sprint retrospective', where the team reflects on what held the team back during the last Sprint, what they could improve as a team and what are their following actions towards this improvement. At the end of the 'Sprint,' the team delivers an increment of the product that adds value to the previous releases, and it is the Product Owner decides when it will be released after coordination with the client. An important entity of the Scrum is the Scrum Team. The Scrum Master is responsible for facilitating the team's ceremonies, removing the team's impediments during the execution of their tasks, and helping the Product Owner prioritize his tasks. He is responsible for making the teams and the organization as effective as possible by teaching the Scrum teams to be cross-functional and self-organized and ensuring that both the Scrum team and the organization apply the Scrum framework correctly. The Scrum team comprises self-managed, cross-functional, and autonomous professionals. There is no hierarchy within the team, and the team's members may come from different departments of the organizations.

2.1.3. What is Agile at Scale?

Initially, agile frameworks were designed for small teams or companies. As companies started growing (to even thousands of people) and expanding to different continents, new organizational frameworks were invented to address this growth and complexity. Several publications describe what is considered large for an enterprise. In their article, (Dingsøyr, Fægri, & Itkonen, 2014) conclude that a company is considered large if at least ten groups are working on the same project or product, whereas (Dikert, Paasivaara, & Lassenius,

2017) in their article have gathered multiple references and articles trying to identify the meaning of large. Based on their findings, a company is considered large when at least 50 people in 6 teams work on the same product. A company is organized under agile-at-scale architecture when all these teams work on the same product, or the whole company operates using agile methodologies.

2.1.4. Towards Agile at Scale

The path to agile at scale is a challenging one. The first significant step towards the agile transformation is choosing the proper process to go Agile. According to the literature, there are two traditional transformation methods (Trippensee & Remané, 2021): The top-to-bottom, which is used in traditional hierarchical organizational structures where the transformation starts from the business unit level towards the team level – and the bottom-to-top which is frequently used for small agile companies and where the transformation begins from the team level and goes hierarchically upwards. Both of these approaches seem not to be enough for agile-at-scale transformation. The study of (Rigby, Sutherland, & Noble, 2018) describes the exact steps a large company must follow: As a first step, organizations should create well-defined and structured teams with specific purposes and responsibilities. These teams should be able to work autonomously, interact closely with the customers, and be trained and focused on applying agile values and principles. Next, they should split the transition onto waves. That is, launch the first wave of teams, gather data, make adjustments and corrections, launch the second wave, and so on. According to (Dikert, Paasivaara, & Lassenius, 2017) who performed a detailed literature review, a company must focus on the following sectors in order to succeed:

1. Organizational structure: Companies must choose the correct agile-at-scale framework that suits their needs and implement incremental change.
2. People: Companies should invest in training personnel by employing agile coaches.
3. Management: High-level management should be supportive, well trained, and provide a clear vision about the transformation. It should support open and straight communication and embrace the commitment to change.
4. Invest in technology and agile management tools for coordination.
5. Take the transformation step by step.

During their journey to agile-at-scale companies face many challenges (Dikert, Paasivaara, & Lassenius, 2017), (Fuchs & Hess, 2018):

1. Resistance to change: People resist change and usually adapt slowly to new organizational structures and responsibilities. Upper management fears losing power and control over self-organized and independent teams.
2. Lack of communication between the teams: The agile at scale frameworks does not provide guidance on how the multiple teams will communicate between each other. So when a company adopts an agile-at-scale framework it is up to the leaders to establish a successful communication and collaboration between the teams.
3. Misunderstanding of the agile-at-scale framework: It is common that in many large companies, upper management does not invest in the agile training of the employees. This results in the misunderstanding of the agile values and principles and the new way of working. Often the new roles and responsibilities are quite unclear.
4. The difficulty in the collaboration between the agile and the non-agile departments. Not all the departments follow the agile way of working. This causes synchronization and communication issues because some departments follow the agile way of working and some other departments the traditional hierarchical organization.
5. Lack of coaching and training. There are many cases where companies try to transform towards agile-at-scale without providing their employees with proper training to acquire the agile mindset.
6. Not investing in agile collaboration and synchronization tools. Large companies are reluctant to invest a decent amount of money in acquiring the much-needed agile collaboration and synchronization software.

Literature (Aghina, Handscomb, Salo, & Thaker, 2021), (Putta, Paasivaara, & Lassenius, 2018) indicates quite a few benefits for companies that decide to transform towards agile at scale:

1. Transparency and alignment between the teams.
2. Improved quality as teams deliver products incrementally, taking continuous feedback from the stakeholders.
3. Increased productivity and operational performance that is achieved through synchronization meetings.

4. Opportunities for innovation.
5. Customer centricity as the teams and companies operate towards customer satisfaction.

2.1.5. Leadership driving agile-at-scale

One of the main principles of the agile way of working is the 'inspect and adapt'. Modern agile leaders should be willing to constantly retrospect, learn from their mistakes and improve. Furthermore, they should change their mindset from autocracy to partnership and collaboration, learn to 'cheer their teams' and dismiss the blame game mindset. They are 'servant leaders' that try to remove the impediments, as well as empowering their teams by providing freedom, autonomy and motivation. (Mako, 2019). Agile leaders are expected to think and behave according to the agile principles and values, understand their meaning, pass these on to their teams and try to align them with the corporate culture (De Smet, Lurie, & St. George, 2018).

2.2. Main Agile at Scale organizational structures

As mentioned in the previous section, Agile has first targeted small companies with up to 5 teams. As technology and demands have grown, large companies must also achieve business and organizational agility. The real challenge is to expand the Agile way of working across large organizations that sometimes operate on different continents. There are quite a few agile-at-scale organizational structures in the literature. The most important are: the SAFe, the Spotify model, the Less model, and the Scrum at scale.

2.2.1. The Scaled Agile Framework (SAFe)

The Scaled Agile Framework (SAFe) provides various organizational and workflow structures depending on an organization's size. The SAFe is a set of values, principles, and

organizational structure for achieving business agility and is described in the Figure 2:
SAFe Framework:

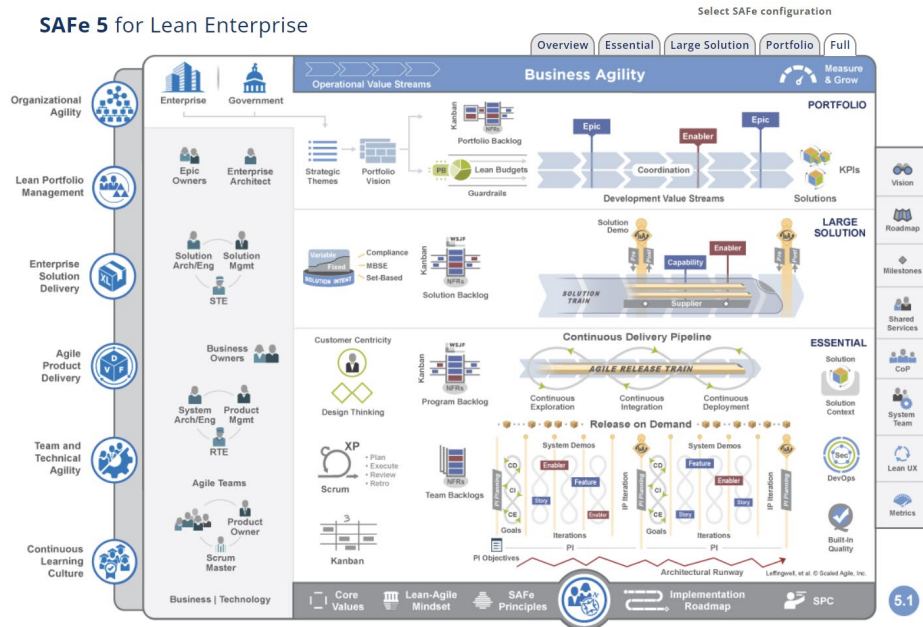


Figure 2: SAFe Framework (Scaled Agile Framework, 2022)

The SAFe framework has four configurations:

1. **Essential SAFe:** This is for large companies working on a single large solution. This is the base of the other configurations and includes one Agile Release Train. The Agile Release Train includes a group of agile teams working for the same part of the product
2. **Large Solution SAFe:** It is an extension of the Essential SAFe, including multiple Release Trains.
3. **Portfolio SAFe:** This expands to the whole Enterprise.
4. **Full SAFe:** This includes all of the configurations.

In SAFe large companies are organized in separate value streams called Agile Release Trains. Each ART consists of (see Figure 2: ART Roles):

1. The Release Train Engineer (RTE) responsible for coordinating the teams within the train, removing impediments, and handling the risk and dependencies.
2. The Product Manager who coordinates the train's product owners ensures that the delivered product aligns with the company's vision and roadmap.

3. The System Architect responsible for the architectural decision of the solution.
4. The Agile Teams that work on different parts of the same large solution.



Figure 3: ART Roles (Scaled Agile Framework, 2022)

All the teams within the agile train work, plan, implement, demonstrate and release the solution together, fully aligned in predefined timeslots. Each team is self-organizing, autonomous, and cross-functional and contains people from different departments of the organization so it can define, build, demonstrate and deploy working product increments (see Figure 3: ART Teams).

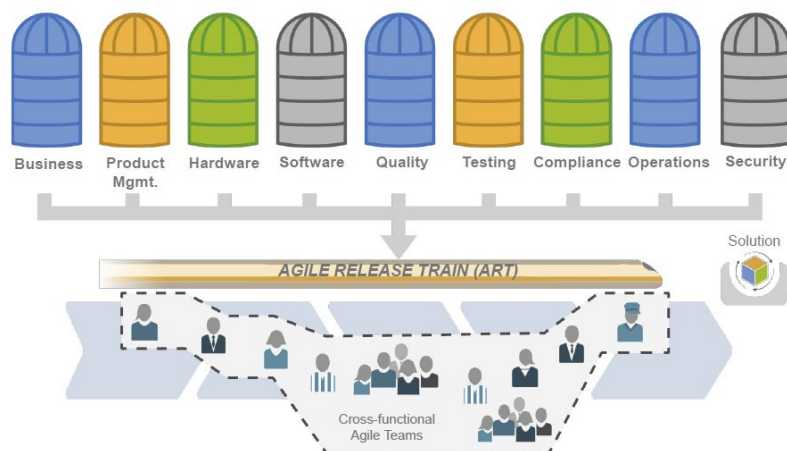


Figure 4: ART Teams (Scaled Agile Framework, 2022)

At the team level, each team consists of 5 up to 11 persons, and there are the following roles (see Figure 4: Team members):

1. The Scrum Master responsible for coaching the team, removing the impediments and helps in the team organization.

2. The Product Owner that represents the customer needs and is responsible for prioritizing the work.
3. The Core Team responsible for creating a specific part of the product.



Figure 5: Team members (Scaled Agile Framework, 2022)

Large companies may operate multiple Agile Release Trains, each working for a different part of a larger solution. In this case, all these trains must be coordinated, so an extra layer of roles is added. These are (see Figure 5: Solution roles):

1. The Solution Train Engineer (STE) responsible for coordinating the solution trains within the organization and facilitating cooperation between them.
2. The Solution Manager who coordinates the Product Managers from the different trains and is responsible for delivering the large solution.
3. The Solution Architect responsible for the architectural decision of the larger solution.



Figure 6: Solution roles (Scaled Agile Framework, 2022)

At the top is the Lean Portfolio Management Team responsible for the budgeting, the portfolio vision (multiple large-scale solutions), and the enterprise strategy. These roles are (see Figure 6: Enterprise roles):

1. The enterprise executives are responsible for the budget, the vision, and the strategy of the company.
2. The Business owners, i.e., the stakeholders responsible for the Return on Investment (ROI) and specifying the solution expectations and requirements.
3. The Enterprise Architect responsible for the enterprise's technological strategy and organizational structure.



Figure 7: Enterprise roles (Scaled Agile Framework, 2022)

2.2.2. The SAFe meetings

During the solution implementation, teams and trains host specific meetings for aligning purposes as depicted in Figure 7: SAFe meetings:

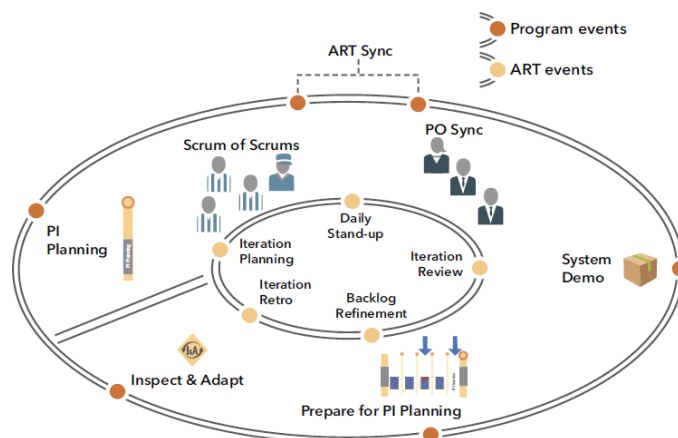


Figure 8: SAFe meetings (Scaled Agile Framework, 2022)

At the team level, each team delivers its part in a specific timeslot of 2 weeks called iteration. Every day the team performs the stand-up to align and specify the impediments. Before the beginning of the iteration, the team hosts the planning meeting in which the members plan what they can deliver within the iteration. At the end of the 2-week iteration, the team performs the retrospective meeting – in which the members discuss what went wrong and where they can improve, and the iteration review – where the team demonstrates to the Product Owner what they achieved. The Backlog Refinement is a meeting occasionally occurring within the 2-week iteration and allows the Product Owner to analyze and clarify the requirements to the team.

At the train level, there are also meetings for alignment and coordination. At the train level there is the predefined release duration called Product Increment. This PI has length for 8 – 12 weeks. At the start of every PI, similar to the team level, all the train teams perform the PI planning, a two-day meeting that allows them to discuss what can be delivered during the next quarter and specify the risks and the dependencies between them. At the end of the quarter, the train teams perform the System Demo – a meeting in which the Product Manager of the train presents the implemented solution to the stakeholders and the Inspect and adapt meeting in which the members of the train discuss what held them back and where they can improve. There are also two weekly synchronization meetings. The first is called Scrum of Scrums and is a meeting between the train's scum masters, and the second is called PO sync and is a meeting between the train's Product Owners where they synchronize to discuss whether the requirements are still valid or not.

2.2.3. The Spotify

The Spotify organizational model is one of the most recent and modern large-scale agile organizational structures. Introduced in 2012 by Spotify – hence the name, one of the world's largest and most popular audio streaming companies, it became pretty popular among companies that would like to scale agile operations (Kniberg & Ivarsson, 2012) (see Figure 8: Spotify orgizational structure).

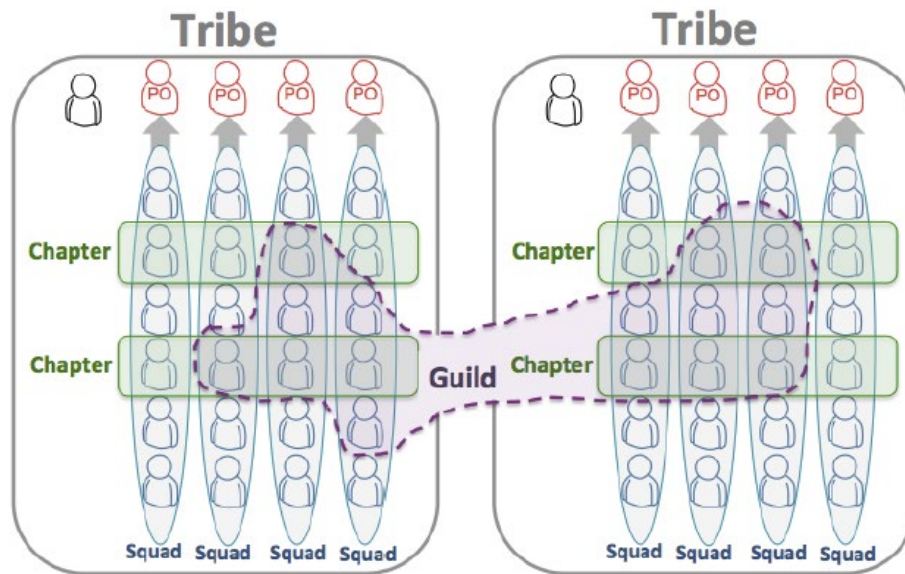


Figure 9: Spotify organizational structure (Kniberg & Ivarsson, 2012)

In this framework, teams working on the same large solution or feature are organized in groups called Tribes. Each tribe consists of 5 to 12 teams – called squads, a person called tribe lead, the leader of the tribe. Tribes are designed to include around 100 people. Every squad in the tribe includes from 5 to 12 people, is as much autonomous as possible and contains the following roles:

1. The Product Owner responsible for the creation of the requirements after consulting the customer or the business owners.
2. The Agile Coach responsible for helping the team to be autonomous, self-organizing, independent, and adhere to the Agile principles.
3. The team members with the skills capable of producing a fully working product increment.

For aligning purposes, Spotify introduced the Chapter structure. A chapter is a group of people with the same skills, such as analysts, quality assurance, product owners, etc. There is a unique role called “chapter owner” responsible for regularly organizing the so-called chapter homecoming meetings for knowledge sharing and synchronization purposes. Each Chapter belongs solely to one Tribe. For example, each Tribe will include a different chapter on quality assurance personnel or analysts.

Finally, Spotify introduced the Guild. A Guild has a broader sense than a Chapter and is considered a group of people with similar interests or knowledge. Some examples are the

agile Guild, the quality assurance guild, or a guild for a specific technology where people can share knowledge and best practices.

2.2.4. The Spotify meetings

As each Squad and Tribe is independent, there are no cross-tribe or cross-squad preplanned meetings. At squad level, each squad follows the usual scrum meeting pattern. Each squad delivers its part in a specific timeslot of two to four weeks called sprint. Every day the team performs the stand-up to align and specify the impediments. Before the beginning of the sprint, the team hosts the planning meeting in which the members plan what they can deliver within the sprint. At the end of the sprint, the team performs the retrospective meeting – in which the members discuss what went wrong and where they can improve, and the iteration review – where the team demonstrates to the Product Owner what they achieved. The Backlog Refinement is a meeting occasionally occurring within sprint and allows the Product Owner to analyze and clarify the requirements to the team.

2.2.5. The Less (Large-Scale Scrum)

The Less framework is based on the basic scrum principles, rules and team structures but at scale (The LeSS Company B.V, 2022). There are two versions of the Less framework: the Basic Less for teams with up to 50 people in total and Huge Less for teams with over 50 people (see Figure 9: Less organizational structure).

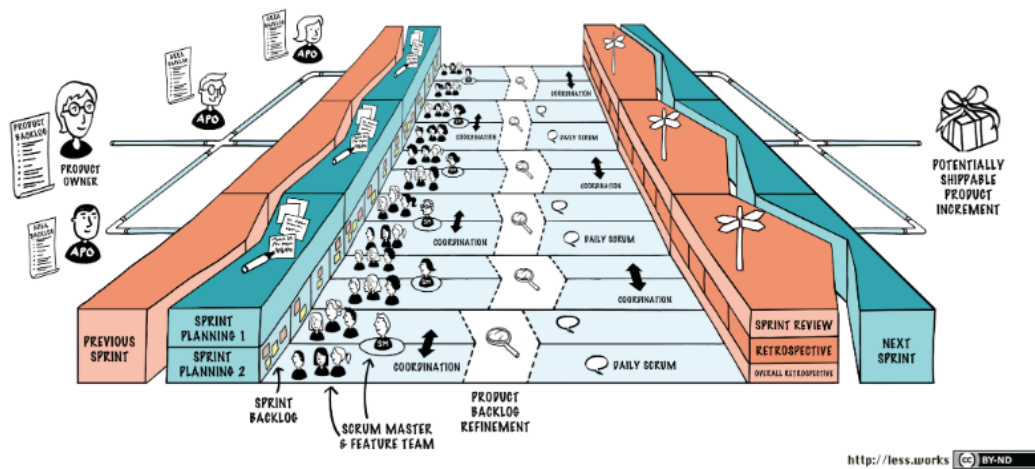


Figure 10: Less organizational structure (The LeSS Company B.V, 2022)

Large companies following Less are organized based on product. At the top of this organizational structure is the Product Owner (PO) responsible for communicating with the client, prioritizing the work for the teams, and keeping track of the progress and the budget. Whether or not a company follows the basic or the Huge Less depends if there are the Area Product Owners (APOs) under the Product owner. The Area Product Owner is responsible for making decisions for a specific product area while the Product Owner has the final decision. The PO and the APOs form the Product Owner Team.

In Less organizational structure, teams are cross-functional, autonomous, and self-organizing. The teams follow the traditional scrum way of working with some alterations. Each team does not own its Product Owner, but the PO or the APO participates in each team ceremony. Similarly, there is the role of the scrum master that owns two or more teams, being the meeting facilitator and the impediment removal. Coaching and support teams may exist, and their operation spans across all the product-based teams.

2.2.6. The Less meetings

In Less, teams work in sprints from two to four weeks. Like the traditional Scrum, teams host the daily stand-up meetings, the sprint planning at the beginning of each sprint, and the sprint review and retrospective at the end. Bi-weekly meetings may occur between the members of the Product Owner Team for aligning purposes.

2.2.7. The Scrum of Scrums

The Scrum of Scrums organizational structure is the oldest and simplest large-at-scale organizational structure and is very close to the traditional scrum (ScrumAtScale, 2022) (see Figure 10: Scrum of Scrums organizational structure).

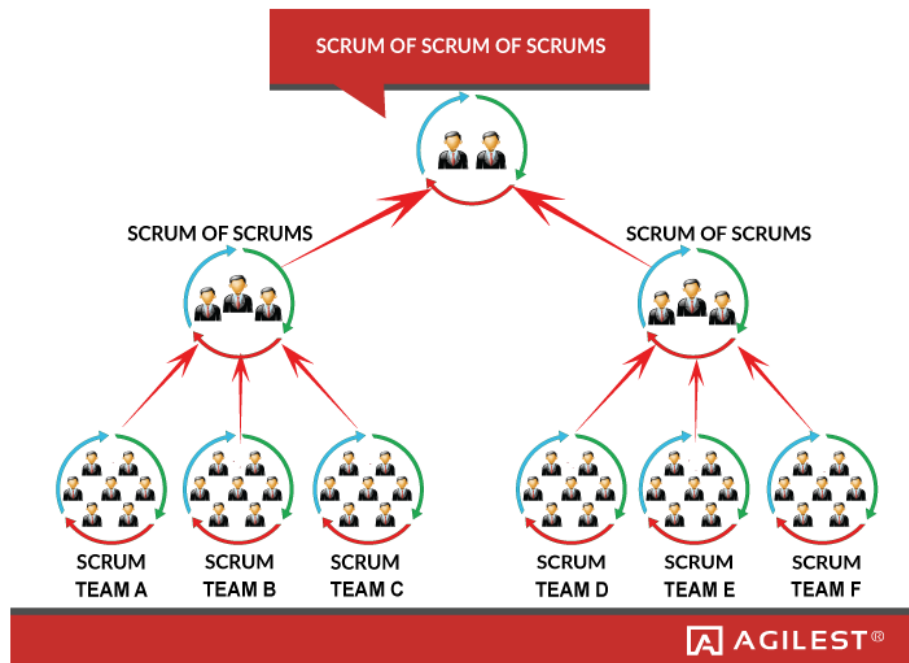


Figure 11: Scrum of Scrums organizational structure (ScrumAtScale, 2022)

At the team level, each team consists of 5 up to 9 persons, and there are the following roles:

1. The Scrum Master responsible for coaching the team, removing the impediments and helps in the team organization.
2. The Product Owner that represents the customer needs and is responsible for prioritizing the work.
3. The Core Team responsible for creating a specific part of the product.

At the corporate level, there is the Scrum of Scrums board, and depending on the number of teams working, there are multiple Scrum of Scrums boards. In this case, the hierarchy goes upwards, creating Scrum of Scrum of Scrums boards etc.

2.2.8. The Scrum of Scrums meetings

Scrum of Scrums board's purpose should be the impediment removal and the aligning of the teams rather than reporting to the upper management. The Scrum of Scrums board meets every second week, and the Scrum of Scrum of Scrums meets monthly. Teams also follow the Scrum ceremonies in this structure, i.e., the daily stand-ups, the sprint retrospective, and the sprint review meetings.

2.3. Related work on the approaches of agile-at-scale transformations

Quite a few studies try to cover the topic of Agile-at-Scale organizational structures from different points of view. These studies use systematic literature reviews and single or multiple case studies to approach specific parts of the agile-at-scale organizational structures. Some focus on the challenges and benefits of some transformation while others study the transformation of a large company towards the agility-at-scale.

In their study, (Putta, Paasivaara, & Lassenius, 2018) use a multivocal literature review to identify the challenges and benefits of adopting the SAgE framework. Another systematic literature review (Dikert, Paasivaara, & Lassenius, 2017), studied the challenges and the success factors of companies trying to transform towards agile-at-scale. Similarly, (Conboy & Carroll, 2019), in their article – which included 13 case studies of agile-at-scale transformations for a duration of 15 years –, identified nine challenges that companies may face during their journey towards agile-at-scale organizational transformation.

Some researches tackle the methodologies towards agile-at-scale transformation. In their research (Trippensee & Remané, 2021), identify two transformation approaches: the top-to-bottom and the bottom-to-top. In the first case, the transformation starts from the enterprise level and goes downwards, whereas in the second case, the transformation starts from the team level and goes upwards. In their study, (Rigby, Sutherland, & Noble, 2018) describe that both these methods need to be revised and that companies need to take extra steps to succeed in their agile transformation. Four studies focus on agile-at-scale organizational structures. The first research focuses on the agile-at-scale transformation of two companies, InsureTech and EventCom (Fuchs & Hess, 2018). InsureTech – which by 2017 had over 29.000 employees – is part of a large, multi-national insurance and finance group that underwent the large-scale agile transformation during its digital transformation. The firm

was initially organized on a matrix structure and a separate organization for coordinating the projects. This company used the waterfall method¹ for implementing the desired products, that is, five phases: Analysis, Design, Implementation, Testing, and Release. InsureTech underwent the agile-at-scale transformation into three stages. Unfortunately, all these three phases failed. The first phase – started in 2007 and ended in 2013 – failed because the company followed the bottom-up approach starting from their IT department, scaling their agile way of working in over 60 teams. As the company tried to scale the agility to the upper management, they found the transformation too sophisticated, time-consuming, and unnecessary significant change. During the second phase in 2015, the company followed the top-to-bottom approach trying to apply agility at scale, starting from the suitability of the projects. This transformation caused the sense of a two-tier society within the firm while hindering communication between agile teams and those that continued to work in the old format. The final phase – in 2017 – failed because even if the company tried to expand the agile-at-scale organizational structures, the middle management resisted change because they lost part of their staff and thus their control and power.

EventCom is a company that operates in retail and entertainment events with over 550 employees. As EventCom grew, the need for a new way of organization became visible. EventCom also tried to apply the agility-at-scale in three phases. During the first phase, they followed the top-to-bottom approach from the upper management towards the teams following the Scrum of Scrums organizational structure. This effort failed because the company did not follow a pilot phase, there was no agile coaching, and EventCom's customers had the mindset 'get as much as you can at once,' so increasing customer demands and team frustration led this effort to fail. During the second phase, EventCom tried to address these issues by providing external coaching support, launching a pilot project for a specific department, and introducing agile-specific tools to facilitate team coordination. The lack of transparency from the pilot project team led to further frustration and problems. The third phase was the one that improved stability and coordination. EventCom spread the Scrum of Scrums framework beyond the pilot team to the rest of the companies while improving knowledge transfer by establishing a common coordination structure. According to the case study, EventCom is still facing issues that try to overcome.

¹ The waterfall approach entails a clearly defined sequence of execution with phases that only advance once a phase is finished and receives final approval.

Only some departments are mature enough or equally suitable to undergo the agile transformation. This still causes the sense of a two-tier company and makes coordination between the agile and the non-agile teams difficult.

The second study describes the agile-at-scale transformation in Ericsson one of the largest multi-national telecom organizations in Europe (Paasivaara, Behm, Lassenius, & Hallikainen, 2018). Ericsson implemented the agile at-scale transformation in two phases using an approach similar to the SAFe organizational structure. At the end of the transformation Ericsson applied the agile at scale in five sites located in three different countries. In the first stage, Ericsson focused on knowledge transfer from past experiences. As Ericsson scheduled the agile transformation in multiple teams, they hired external agile coaches to facilitate the process and launched two agile teams. During the second phase, after experimentation on how to organize the teams, Ericsson concluded to create teams specialized in specific business flows (similar to the Agile Release Trains). Within flow, teams are organized based on a specific component of the business flow (like the agile teams in the Safe). The size of the business flows varied depending on the size of the features. The third study also focuses on the agile transformation at Scale at Nokia. Along with Ericsson, Nokia is also considered one of the largest telecom companies in Europe. (Paasivaara & Lassenius, 2016). According to this research, Nokia follows the Huge Less organizational structure. As a first step, Nokia launched two teams of fifteen people who learned to work in the Agile way. One of the two teams focused on the R&D sector, while the other focused on designing future products based on customer needs. As a second step, Nokia launched six teams of 40 people worldwide working on multiple sectors, from software to research and customer support, along with the guidance of a Less agile coach. After 2.5 years, Nokia's Less organization comprises 20 teams in four countries. The agile teams of six to ten persons operate using Scrum. The Huge Less organizational structure includes one Product Owner and ten Area Product Owners (APOs). Nokia also launched two cross-functional teams, one containing line managers responsible for monitoring and overseeing the teams and the other a maintenance team that provided technical support.

The fourth study (Uludag, Kleehaus, Dreyman, Kabelin, & Matthes, 2019) concentrates on how one of the biggest German automotive manufacturers – employing more than 120.000 people – implemented the Less framework. In this case, the IT department was organized first in the Less framework, followed by the production lines. The Less implementation took at least 3 years to implement following a series of adaptations. The

German manufacturer adopted a combination of Less and Huge Less. Smaller departments followed the most straightforward Less adoption while others, like the chassis production department, followed the Huge Less because the part of the chassis was manufactured in different countries.

2.3.1. Cross-Case Analysis

Comparing the case studies that explore the journey towards agile-at-scale of five big international organizations, all operating in a different business, there are quite a few similarities and differences in how they implemented the agile-at-scale transformation. As far as the journey towards agile-at-scale is concerned, the companies followed either the top-to-bottom or the bottom-to-top approach – as described in the study (Trippensee & Remané, 2021). Meanwhile, they include elements of the approach analyzed in (Rigby, Sutherland, & Noble, 2018)’s article: Pick the more suitable model, invest in the training of their employees, in the technology and the agile tools for coordination, as well as rolling the transformation in waves.

All of the companies chose a different agile-at-scale model according to their needs. InsureTech and EventCom tried a modification of Scrum of Scums. Ericsson opted for a SAFe-like organizational structure, while Nokia and the German car manufacturer went for Less. InsureTech and EventCom began their transformations using bottom-to-top, and top-to-bottom approaches, respectively, with InsureTech creating a few agile teams, offering training, and then expanding to up to 60 teams. At the same time, EventCom started from the upper management trying to create an agile product management way of thinking and then expanding the mentality towards a small number of teams as a first step and then expanding it to a more significant number of teams. Ericsson, Nokia, and the German manufacturer followed the bottom-to-top approach, initially applying the agile way of working with a limited number of teams and then expanding their agile way of working across teams expanded in different continents.

The five companies faced significant challenges during their agile-at-scale transformation journey similar to the ones found in the studies of (Putta, Paasivaara, & Lassenius, 2018), (Dikert, Paasivaara, & Lassenius, 2017), and (Conboy & Carroll, 2019). In some cases, these challenges should have been appropriately tackled, and the companies did not do it. For example, InsureTech should have invested in the proper training and coaching of the upper

management and the employees. Failing to do so resulted in the non-fulfillment of all three agile-at-scale transformation waves. Upper management resisted change, stating that the change was “too dogmatic and too sophisticated, resulting in too big of a change”. Bad leadership generated agile teams with no agile mindset, a mentality of fearing the consequences, and a lack of efficient collaboration. EventCom was also a victim of the absence of proper agile coaching and training, lack of integrating new collaboration tools, absence of top management engagement, and failure to select a suitable agile-at-scale framework at the beginning. To a lesser extent, Ericsson, Nokia and the German car manufacturer also faced the absence of the agile mindset, the need for a common view of agile implementation, and the resistance to change. However, they overcame these problems by hiring experienced agile coaches, giving their employees proper training, and showing determination in their plan despite the difficulties. Table 1 summarizes the agile-at-scale frameworks that each company adopted.

	InsureTech	EventCom	Ericsson	Nokia	German car manufacturer
Framework	Scrum of Scrums	Scrum of Scrums	SAFe	Less	Less

Table 1: Agile-at-scale framework used

Table 2 indicates the approach that the companies used during their transformation journey. InsureTech and EventCom began with bottom-to-top and top-to-bottom, respectively, but as soon as their transformation failed in the first wave, they tried the opposite direction. The rest three companies followed the bottom-to-top approach. All five companies tried to transform by creating waves, learning from experience and mistakes, and then expanding the transformation or retrying with a new approach.

Transformation approach	InsureTech	EventCom	Ericsson	Nokia	German car manufacturer
Top-to-bottom	☑	☑	☒	☒	☒
Bottom-to-top	☑	☑	☑	☑	☑
Waves	☑	☑	☑	☑	☑

Table 2: Transformation approach

Table 3 enumerates the challenges the companies faced during their transformation and whether these were common.

Challenges	InsureTech	EventCom	Ericsson	Nokia	German car manufacturer
Resistance to change	☑	☑	☑	☑	☑
Lack of communication between the teams	☑	☑	☒	☒	☒
Misunderstanding of the agile-at-scale framework	☑	☑	☑	☑	☑
Lack of coaching and training	☑	☑	☒	☒	☒
Lack of investing in agile tools	☑	☑	☒	☒	☒

Table 3: Challenges

3. Case study and methodology

3.1. Case study

A case study is a suitable research methodology as this dissertation aims to study a complex contemporary phenomenon in a real-life context: the implementation of the agile-at-scale transformation of one of the largest European telecom organizations, Proximus. Proximus is a Belgian telecom company offering digital and communication services in the

Belgian and other international markets, employing approximately 11.500 employees and 5.5 million in revenue. The survey is a closed, descriptive, single-case study based on interviews and will use the analytic generalization (Yin, 2014), under which the previously developed theory will be used as a guide to compare the empirical results of the case study. This case study is unique because Proximus is one of the few cases where an organization uses the Spotify framework on such a scale for an agile transformation. The 15th Annual State of Agile Report of 2021 states that Spotify is used only by 5% of global organizations, with SAFe being the most popular, with 37% coverage (15th Annual State Of Agile Report, 2021). Furthermore, Proximus extends its agile transformation beyond its operations, covering many aspects of its operations. The case study focuses on the following questions:

1. How did Proximus approach the agile-at-scale transformation?
2. What are the expected benefits and the challenges of this transformation, and how were they tackled?
3. What are the essential leadership skills required for this transformation?

3.1.1. Data gathering

The information is collected through interviews conducted according to (Yin, 2014)'s guidelines. All interviews lasted around 30 minutes and were recorded so that to be able to analyze, categorize and compare the data. The interviews were conducted with the following:

1. 2 Proximus's Agile Coaches from two different units (called Tribes according to Spotify) who are actively helping overcome the challenges and help with the transformation refinement.
2. A Proximus agile leader who organized and supervised the agile at scale transformation and can provide the benefits and the reason for this transformation.
3. A Tribe leader, i.e., a team leader of a unit of 200 people, can provide a view of the challenges and leadership skills required to lead such a big group of teams.

3.1.2. The large-scale transformation of Proximus

After conducting the interviews and making notes trying to categorize the events in the chronological order, it is clear that Proximus's agile-at-scale transformation took place in two phases:

1st Agile Phase: Before 2019, Proximus operated using the traditional hierarchical organizational structure in all of its operations. As telecom products are pretty complex, customer and business needs are constantly changing, and technology is evolving, it became apparent that Proximus's departments could not continue working using the waterfall model. Management constantly had to perform budget exercises and allocation, and the departments had to redesign and reimplement the products. Finally, customers, business users, and stakeholders received their required products with extreme delay. For the following reasons, in 2019, Proximus decided to go agile by following the bottom-to-top approach. Proximus decided to follow the SAFe agile-at-scale organizational structure. Initially, they launched the transformation from the Digital Solution Team launching a Large Solution Train (see Figure 11), the DIFA Train.

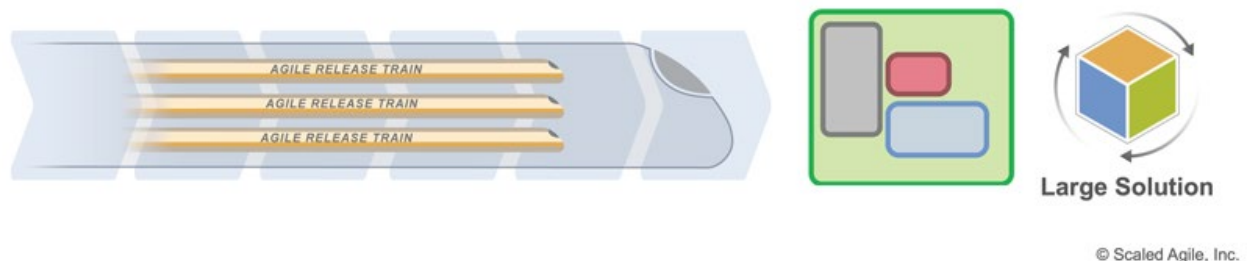


Figure 11: SAFe Solution Train (Scaled Agile Framework, 2022)

The DIFA train contained five specialized Agile Release Trains – ARTs (ATIN, DIEB, MECC, EMOB2, DISE, and DIOR) which were launched gradually. Each ART contained five to seven agile teams working under scrum. Three entities were the leaders of the DIFA Train (see Figure 12):

1. The Solution Train Engineer (STE), who coordinated the five ARTs, ensuring they all delivered the desired outcomes.
2. The Solution Manager, who defined the solution roadmap and assured the desirability and viability of the solution.

3. The Solution Architects and Engineering team were responsible for designing the solutions.



Figure 12: Solution Train Leadership (Scaled Agile Framework, 2022)

Each Agile Release Train had its own leadership entities:

1. The Release Train Engineer (RTE), who coordinated the teams within the Agile Release Train, ensuring they all delivered the desired outcomes and they were all up to speed.
2. The Release Train Architect, who was responsible for designing the solutions and provide architectural decisions.
3. The Product Manager, who coordinated with the Solution Manager and the Business user, responsible for defining and prioritizing the work each train had to deliver. The Product manager had the following responsibilities (See Figure 13):
 1. He coordinated with the RTE and the RTA for the status and the feasibility of the solution,
 2. He aligned with the Solution Manager and the Business Owners to identify the priorities
 3. Evolved the solution and split the work between the teams.

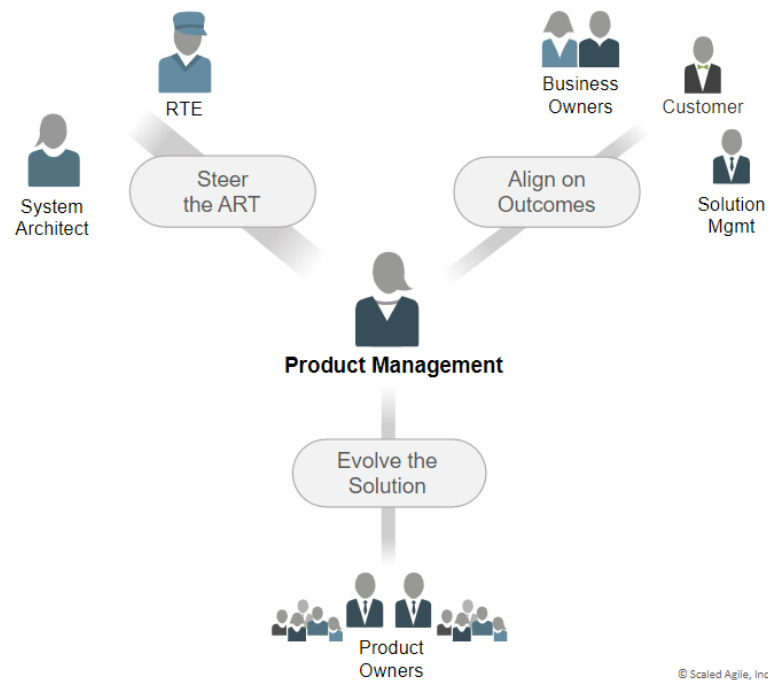


Figure 13: A Product Manager's interaction (Scaled Agile Framework, 2022)

Each team within the agile train followed the Scrum configuration containing (see Figure 14):

1. A Scrum Master, who coordinated the team members and removed the impediments
2. A Product Owner, who in coordination with the Product Manager prioritized the work for the team
3. The team members who produced the products.



Figure 14: SAFe Team structure (Scaled Agile Framework, 2022)

All the DIFA Agile Release Trains (ART) followed the same schedule and ceremonies described in the SAFe framework. The work was divided into four quarters (Q1 – Q4), each consisting of a Program Increment (PI) – a duration for which an ART delivers an incremental value to the customer – of twelve weeks. All teams within the same Agile Release Train followed the same iteration cadence and duration to synchronize their work. Their timebox was two weeks.

As far as the ceremonies are concerned, all the agile teams and Agile Release Trains followed the same ceremonies (see Figure 15): At the Agile Release Train level, all the teams participated in a system demo and hosted an inspection and adaptation meeting where they addressed all the issues once a month. Just before the end of the Program Increment (PI) – towards the end of the quarter – all the teams within a train prepared for the next quarter's planning, resulting in a two-day event of organizing and synchronizing between the teams. At the team level, all teams followed the Scrum ceremonies. They hosted the daily standup for synchronization. At the end of the two-week sprint, they participated in the sprint review meeting to present their work to the stakeholders, the retrospective meeting to review what went wrong and how to improve, and the sprint planning, an event in which the Squads plan their work for the next sprint.

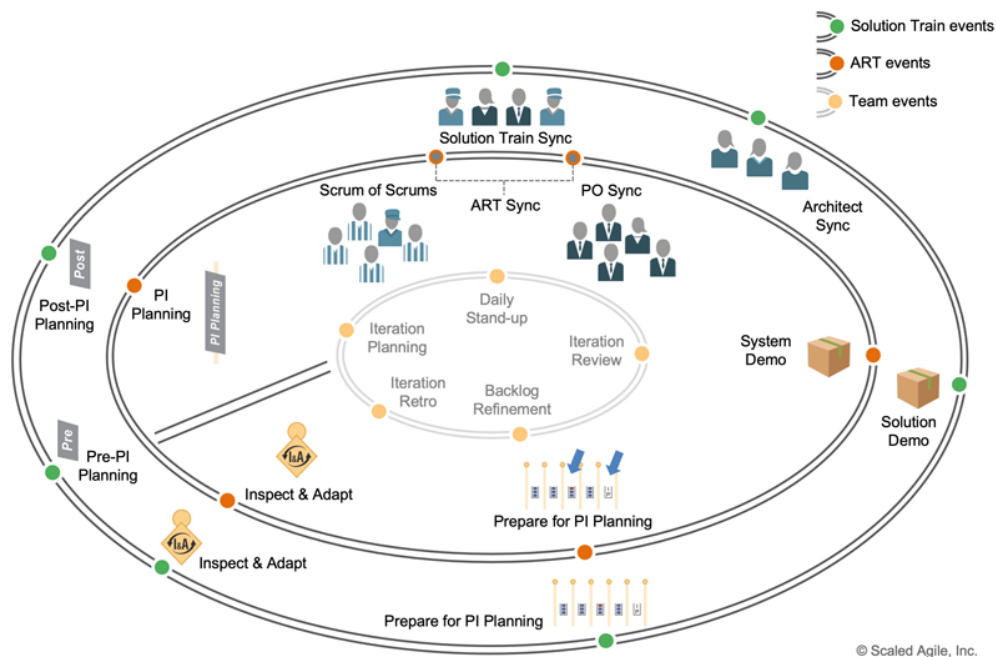


Figure 15: Proximus SAFe ceremonies (Scaled Agile Framework, 2022)

2nd Agile Phase: In 2021, after Proximus saw the benefits of turning agile-at-scale, they decided to expand their agile transformation at the whole company, even the non-digital departments. As stated by one of the agile transformation managers: “The purpose was to go from a company with some agile teams to a customer-centered agile company”. The target was to create an agile company with smooth operations and functions that directly and faster impact the customers. It was when PEAK was born. PEAK is a custom organizational structure that aims to extend the agile way of working at scale. According to Agile Transformation Office: “Peak applies to all agile workflows of Proximus from products and services to commercial activities and B2B sales”. For PEAK to be suitable and adjustable for every department of the company, Proximus defined four different agile types:

1. Agile Tribes – An adaptation of the Spotify agile at scale framework.
2. The Agile Circles.
3. The Agile for Teams.

The first type is the Agile Tribes. This model follows the Spotify organizational structure with some customizations: (see Figure 16).

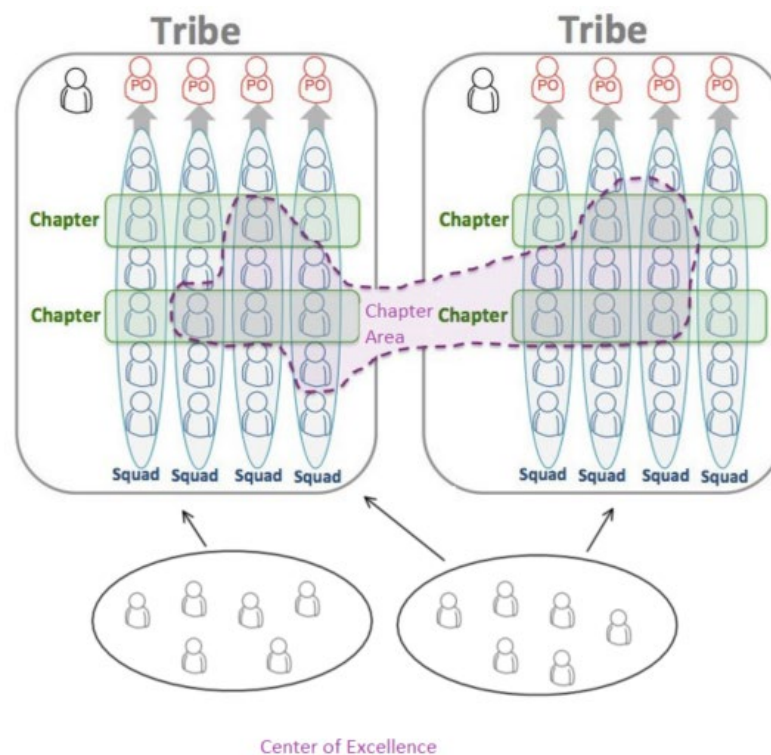


Figure 16: Proximus's Agile Tribe model (Kniberg & Ivarsson, 2012)

There are three types of Tribes:

1. **The Segment Tribes** which are customer oriented. Their mission is to attract new customers, ensure a high level of customer care and make customer-oriented propositions.
2. **The Product Tribes** which are assigned to deliver innovative products at the right cost.
3. **The Enabling Tribes** which have more specific roles, such as providing common infrastructure and components to the entire organization and acting as a third-party service provider.

Proximus's Agile Tribes model are organized into the following groups:

1. The Tribes. Each Tribe is a team of around 150 members. The Tribes contain teams that develop product and services for internal and external customers. It contains a Tribe Lead – “a mini-CEO with specific boundaries” as described by an agile lead – and multiple Squads. According to an Agile Coach: “A tribe has a clear mission and boundaries, minimizes the overlap with other tribes to have the best possible autonomy”. Tribes belong to one Business Unit/Department according to their business operations
2. The Squads which are considered self-organizing and autonomous and consist of a Product Owner who is responsible for the team's work prioritization, a Scrum Master who is responsible for coordinating the team members, facilitating the squad's operations, ensuring the team's plan and deliverables are on target and reporting the weekly status, and the team members. All the squads within a Tribe work following the Scrum Framework. Usually, all the members of a Squad (the Scrum Master, the product owner and the team members) belong to a Chapter or a CoE.
3. The Chapters. These are groups of people belonging to only one Tribe and consist of people with particularly valuable knowledge for the Tribe. The lead is the Chapter owner. Each Chapter belongs to a specific Chapter Area, and can be assigned to one Tribe
4. Chapter Areas and Center of Excellence (CoE) groups: These are Spotify's Guild groups renamed. These groups of five to thirty people share common knowledge among them. The leader is the Chapter Area Owner and CoE Lead equivalently. Each Tribe's squad is staffed by people from different Chapter Areas, ensuring they

have adequate resources to fulfill the mission. For example, all the Scrum Masters of all the tribes and teams belong to the "Agile Enablement" Chapter Area. The main difference between Chapter Areas and CoE groups is that CoE units contain people with functional expertise not needed full-time in a squad or Tribe in the long run. In contrast, Chapter Areas include people allocated to Agile Tribes and Squads, enforcing standards, consistency, and best practices around a specific competency or skill. Each Chapter Area or CoE can belong to one Business Unit/Department but support multiple tribes in another department. An example of CoE groups is the department of media and creative campaigns or the digital architecture, providing architectural decisions. On the other hand solution analysts, scrum masters, and project managers are part of different Chapter Areas. Up to now, Proximus has created twenty-one Chapter Areas and nine CoE groups.

At the Agile Tribe level, Proximus introduced custom meetings not described by the Spotify model and kept some from the SAFe era. Like in the past with Safe, the work is divided into four quarters (Q1 – Q4) – now called Rolling Waves – each with twelve weeks. At the end of each quarter, each Agile Tribe hosts two meetings: the Tribe Retrospective with a duration from two to four hours, facilitated by the Tribe's Agile Coach, in which all the Squads evaluate what has been delivered, find impediments and ways to improve, and the Tribe Rolling Wave Planning, a two-day event, where based on the available resources and the priorities, the Agile Tribe decides what it is committed to achieving in the next quarter. There is also a weekly meeting called Intra-Tribe sync – like the ART sync in SAFe – with a duration of one to two hours, which can be either one ceremony or divided into two depending on the size of the Squads: Product Owner Sync and the Scrum Master Sync. In these meetings, all the Products Owners or/and the Scrum Masters of an Agile Tribe respectively gather to align. Depending on the dependencies of an Agile Tribe, there may be an ad-hoc meeting of the Cross-Tribe sync where the POs and the SMs of two or more tribes gather to align with the deliveries. At the squad level, the teams host the regular Scrum meetings: They host the daily standup for synchronization. At the end of the two-week sprint, they participate in the sprint review meeting to present their work to the stakeholders, the retrospective meeting to review what went wrong and how to improve, and the sprint planning, an event in which the Squads plan their work for the next sprint.

As far as the roles of the Agile Tribes are concerned, these are:

1. The Tribe Lead: Who acts as a "mini-CEO" and makes decisions within the Tribe's boundaries.
2. The Tech Lead: It is an optional role, depending on the size of the Agile Tribe, who is the Tribe Lead's right hand, acting on his behalf when he is away. It is also assisting in the Tribe Lead into the Tribe coordination.
3. The Epic Owner: The Epic Owner follows the priorities set by the Tribe Lead and ensures that the product/solution is delivered within the time and budget following Agile practices. Depending on the solution/product, her role may expand in different Agile Tribes.
4. The Agile Coach: The Agile coach advises the squads with the best practices of the agile way of working and facilitates the squads in their ceremonies.
5. The Solution Architect: This role's purpose is to analyze the requirements and specify an implementation/production roadmap for the solution/product. His role can also expand to multiple Tribes.
6. The Chapter Area Owner: This role acts as a Lead for a specific Chapter Area managing the teams of the group.
7. The Center of Excellence Lead: This role is the leader of a CoE group.
8. The Scrum Master: This role is responsible for coordinating the team members, facilitating the squad's operations, ensuring the team's plan and deliverables are on target, and reporting the weekly status and the team members. A Tribe has multiple Scrum Masters, each managing one or more squads.
9. Product Owner who is responsible for the team's work prioritization, A Tribe has multiple Product Owners, each one managing the work for a different squad.

The Proximus's second agile organizational structure is the Agile Circles. The teams organized under this structure are in direct contact with the customer and help him with their administrative and technical questions. An Agile Circle consists of five to six multidisciplinary teams of eight to twelve people and is responsible for providing services to a specific group of customers. The teams are grouped based on the type and content of the Agile Circle's clients. Each Agile Circle has its support team for managing the team's data, helping in the planning and the agile coaching. Before this change, multiple teams handled customer requests, including lots of back-and-forths between different levels of

support. With agile circles, the customer requests are controlled by a single team, specialized on a specific customer group, limiting the interactions within the team only.

As of now, Proximus has created 10 Agile Circles. The Roles of the Agile Circles are:

1. Circle lead: The leader of the Agile Circle responsible for coaching and managing an Agile Circle team.
2. Team Facilitator: He acts as a liaison between the Agile Circle team members removing their impediments and helping them to work towards success.
3. Workforce Planner: This role is responsible for organizing the appropriate capacity within the Circles within the given boundaries by generating the timetables and planning the activities within the Circle.
4. Business Data Specialist: This role is a critical figure in monitoring and interpreting the operational performance of the Circles and the impact on the customer. He provides valuable data to the Circle Leads, the Operational Domain Leads, the Team Facilitators, the Workforce Planners, and the team members to track progress.
5. Learning Facilitator: This role helps the Agile Circle team members develop their skills to reach their full potential by collecting content from Operational domain leads, Circle leads, Team facilitators, and Team members.
6. Expert Engineer: He provides specific support to customers and Circle team members with knowledge in a specific field.
7. M&P content coach: This role aims to coach employees in technical expertise and/or write work instructions and procedures.

Proximus's third and more straightforward agile structure is the Agile for teams. This structure applies to all teams that do not belong in rest models such as the Tribes & Chapters or the Circles model. This structure is meant mainly for field operations, sales, and supporting teams like Finance, Corporate Affairs, and the Human Resources department.

3.1.3. Transformation approach from SAFe to PEAK phase

Proximus was organized into eleven Agile Business Units/Departments, even before the SAFe era. During the SAFe transformation, it was only the Digital Unit that changed following the SAFe framework. Proximus chose to start the agile-at-scale transformation from its digital department by selecting the SAFe framework because SAFe had many

success stories on digital departments' agile transformation (i.e., IT departments). After the second phase Proximus's organization structure was like this: Each business unit is composed of smaller structures based on one of the three organizational structures: Agile Tribes, Agile Circles, and Agile Teams. Proximus started the transformation journey following the top-to-bottom approach and organized in waves. During the first wave, Proximus selected few specific business units to perform the Agile transformation. They chose three Business Units to perform the Agile Tribe, The Agile Circle, and the Agile Team transformations. During the second wave, all the other Business units and departments followed. The transformation of the departments and the teams was led and coached by the Agile Transformation Office (ATO) in coordination with the Human Resources department and Experienced Agile Transformation Coaches. The teams' responsibilities were the roadmap implementation, the impediment removals, the progress tracking and the coaching. After the waves had finished, the 11 Business Units included: Agile Tribes, Agile Circles, Agile Teams (see Figure 17):

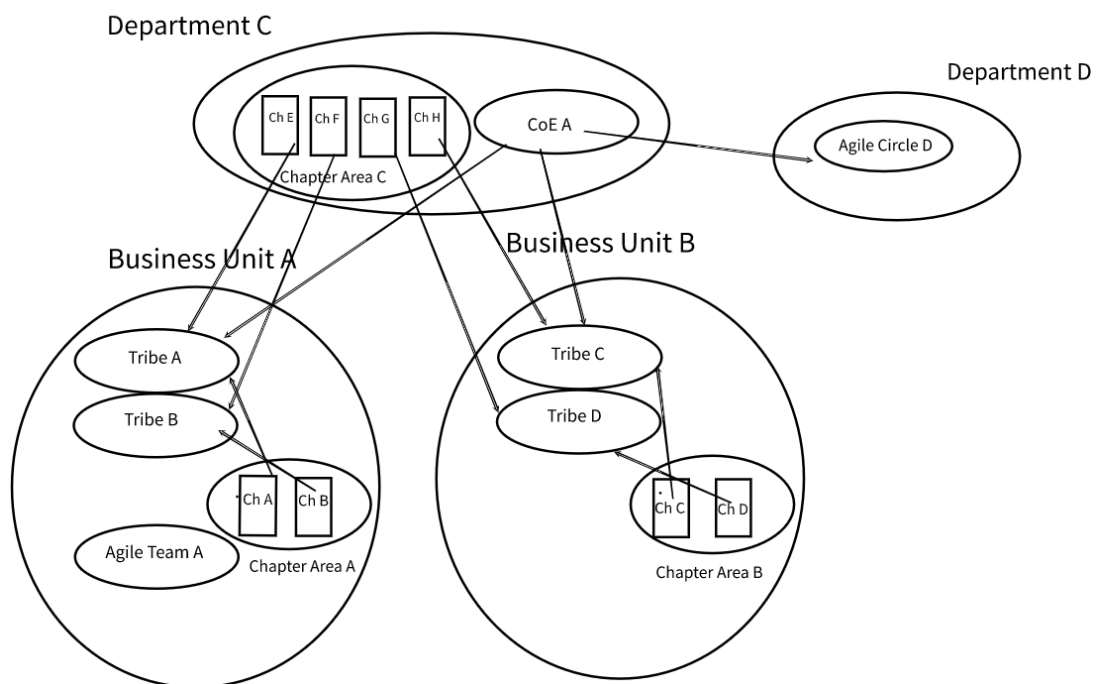


Figure 17: Part of Proximus's PEAK structure

The Business Unit Leaders also follow this agile-at-scale framework. Together they form the so called leadership Squad, working under the Agile framework. Table 4 summarizes the changes during the transformation:

	Before SAFe ➡	SAFe ➡	PEAK
Organizational structure	Teams organized in departments and departments under business units	5 Agile Release Trains launched gradually under a bigger Solution Train only for the Digital Domain	Proximus organized into Agile Tribes, Agile Circles, Agile Teams.
Business Delivery	Waterfall coordinated by the project managers after receiving the specifications from business	• Agile delivery for the Digital department. • Waterfall coordinated by the project managers after receiving the specifications from business	• Agile delivery for all the company.
Roles and Responsibilities	• Project managers managed projects across teams. • Teams had a Tech Lead / Team Leader, Architect and Analysts	• SAFe and Scrum specific roles for the Digital Department. • Matrix roles for the rest of the company.	• Custom roles fit for the Agile Tribes and Agile Circles. • Scrum roles for the Squads and the Agile Teams

Table 4: Proximus's transformation steps

3.1.4. Challenges during the transformation from SAFe to PEAK

During the agile transformation, Proximus faced many challenges. One of the biggest problems was that not all Proximus's employees were familiar with the agile methodology and principles, the agile terminology, and the scrum framework. To tackle this, Proximus made several steps. First, they hired experienced Agile Coaches and assigned them to Tribes and Agile Teams. These Agile Coaches participated in the Tribe / Squads meetings and ceremonies, guiding the teams towards the agile way of working. Furthermore, Proximus invested in employee training in two ways: They created a community of Agile practices where different people could post agile-related questions. They also provided different trainings about the PEAK, its organization, and roles. In some cases, this training led to certifications which made the training more appealing. Another major problem was the coordination between the Tribes and the lack of sharing of important information. The Spotify model suggests that the Tribes and the Squads in them are as much independent as possible and does not specify specific meetings like the SAFe framework. In Proximus there is an interdependency between either between the Squads within the Tribe or even between Squads among different Tribes. This initially created coordination, communication and information sharing gaps among the Squads and the Tribes. This was dealt with ad-hoc

meetings when necessary and with on-line tools where people can store the information in a formatted way. The ad-hock meetings could be either weekly or daily and their occurrence expanded from few weeks to months. Other problems that Agile Coaches had to face were the resistance for change and the hesitation towards the new organization diagram. The resistance for change came from teams that were not working agile. The hesitation came mostly from teams already working under the SAFe model and their main question was “why to change since SAFe is working”. Furthermore, the reorganization led to people relocate to different teams than the ones initially working. This led initially to either a poor agile adoption from newly formed teams, managers higher up in the hierarchy still comparing the performance of the teams using legacy metrics, and people trying to adjust to the new reality while business continuity had to carry on. During the agile transformation the KPIs (Key Performance Incidators) of the teams change. The performance of an agile team is not measured by how much work they can deliver in a sprint (i.e., the more, the better), but the KPIs that are measured are:

- The business value added to the customer.
- The quality of the product.
- The on-time delivery of what has been committed ahead of the sprint.

Once more, the Agile Coaches lifted the burden, trying to coach the new teams, emphasize the benefits of working agile, and coach the new way of tracking the progress and the business value towards the customer. A smaller problem was the software tools used for monitoring the progress of the products. During the transformation, Proximus introduced new software tools that were new to the majority of the employees. An additional problem to that is that all the data existed in the old software should be migrated to the new ones. In order to tackle this Proximus, launched trainings for the new tools, and hired professionals in order to create automated procedures for the data migration. Until now, though there are quite a few teams that are still using the old software or trying to migrate the data manually because the automation procedures do not cover all the cases. Table 5 summarizes the challenges and Proxumus’s actions.

Challenges	Response
• Not all people where familiar with the Agile way of working.	• Proximus hired Agile Coached assigned to Agile Tribes, Agile Circles and Agile Teams to Coach with the Agile way of working, facilitate the PEAK ceremonies and help through this journey. • Proximus invested in trainings and certifications.

• Coordination between different Tribes and Squads. • Lack of sharing important information	• Ad-hock meetings either weekly or daily. • Use of on-line tool for storing the information in formatted way.
• Resistance to change • Hesitation of the new scheme	• Proximus invested in trainings with the Agile Coaches. • Commitment to change. • Communication and transparency.
• New tools, and migration of existing data, while business continuity.	• Proximus invested in trainings, and Q&A's sessions for the new tools. • Proximus invested with.

Table 5: Proximus's challenges and how they were delt

3.1.5. Benefits from the transformation to PEAK

Although the PEAK journey is relatively new, Proximus anticipates benefits. The first is the quicker and incremental delivery of the products. With Agile delivery, Proximus can deliver small pieces of the required outcomes incrementally. The incremental delivery also brings the advantage of continuous improvement. Every time a team delivers a piece of the product, there is an opportunity to fix irregularities and respond quickly to customer requests for change. Another advantage of incremental delivery is predictability. With teams delivering their output regularly, management is more efficient in high-level planning.

3.1.6. Leadership attitude towards the transformation to PEAK

The core pillar behind Proximus's PEAK transformation is the "Think possible" culture embraced by the leadership. This culture has four pillars:

1. Care for the customer.
2. Make a difference by going the extra mile.
3. Simplification.
4. "See the feature", that is, anticipate the changes and be flexible.

During the PEAK transformation, Proximus's leadership demonstrated a solid commitment to the change, showed a can-do attitude and invested in the training of Proximus employees, and adopted an inspect and adapt and learning from mistakes attitude.

4. Discussion and conclusions

4.1. Discussion

Agile-at-scale transformations have become increasingly frequent in modern organizations, affecting all aspects of their operations. In the contemporary, fast-pasted economical environment, where the competition is relentless, companies compete to respond to customer needs as fast as possible while trying to acquire a more significant market share. The motivation of this study was to analyze and present companies that adopted the agile-at-scale framework beyond their IT operations to the extent that affected the whole organizational structure and compare it with a modern and large organization, which based the most considerable part on the Spotify model, a framework that is not widely used in such transformations. During the literature review, this study identified three crucial questions that need further investigation:

1. How do non-digital companies apply agile-at-scale transformation to all their operations?
2. What are the challenges and benefits that this transformation involves?
3. What mentality must modern leaders have for this transformation to succeed?

4.1.1. Proximus's transformation versus literature case studies

The literature identifies two major approaches for starting migration. Either follow a top-to-bottom approach, where the transformation starts from the upper management and is applied to the teams, or the bottom-to-top approach, where the transformation begins from a department or a business unit and goes all the way up to the upper management. For these two approaches to succeed, companies must take further steps:

1. Choose carefully the agile-at-scale framework to apply.
2. Follow a step-by-step process: Do not apply the transformation at once.
3. Companies must invest in technology and training.
4. Upper management must be committed to change, be supportive and lead the way.

The literature review of similar case studies identified that all the big organizations chose to adopt different agile-at-scale frameworks. All the organizations, including Proximus, had

something in common. They did not follow the agile-at-scale frameworks by the book but instead opted to adapt them according to their needs. In the current state Proximus followed the Spotify model where possible. Still, they kept some of the meetings from the SAFe era (for example, weekly meetings for monitoring the progress, weekly alignment between the Scrum Masters and the Product Owners, etc.). For the teams and departments that could not organize in the Spotify model, Proximus kept the simple Scrum model for the teams or introduced the Agile Circles structure. All these organizations have another thing in common. They applied their agile-at-scale transformations in phases, and these phases included waves. Proximus began its transformation in the first phase using the SAFe framework and, in the second, the Peak implementation. Both these phases included waves. In the first phase, Proximus launched the Agile Release Trains consecutively. Similarly, during the second phase, Proximus opted to launch the agile transformation from a few Business Units and teams and then apply the changes to the rest of the organization. In both transformation phases, Proximus chose the bottom-to-top transformation like the other large telecom organizations, Ericsson and Nokia, while InsureTech and EventCom tried both approaches.

4.1.2. Proximus's challenges versus literature case studies

Proximus faced two of the most common challenges in the literature and the rest case studies: Skepticism in change and false application of the agile way of working. Many teams already working under SAFe found this transformation meaningless or felt that nothing changed in their day-to-day work after the PEAK transformation. Other teams, primarily the non-IT related, needed help to adapt to the new way of working. Furthermore, after the PEAK transformation, some Agile Tribes depended on other Agile Tribes, either in the same Business unit or in different ones. This initially created coordination issues between various Agile Tribes but was soon resolved by establishing cross-Tribe synchronization meetings and identifying the stakeholders among the Agile Tribes. On the other hand, Proximus invested a lot in training its employees for the PEAK transformation and the Agile way of working. They hired Agile Coaches assigned to Tribes and Teams and introduced new software for coordination and monitoring. These steps made a difference and helped Proximus overcome most of the challenges of agile-at-scale transformation.

4.1.3. Proximus's leadership mentality versus literature case studies

As seen in the literature, one of the most common reasons for failure during the agile-at-scale transformation is the misconception of the agile way of working and the resistance to change. What distinguishes Proximus from the rest of the case studies under consideration is the 'Think Possible' attitude and the leadership's commitment to change. Although Proximus's shift to PEAK is new and under evaluation, the leadership seems to have taken the correct steps. They organized and invested in training sessions and proper agile management tools, hired competent agile coaches to guide the teams, and are open to adjustments to the model.

4.2. Conclusions and limitations

4.2.1. Conclusions

This study presented the application of the agile transformation at scale in one of the most prominent telecom organizations in Europe. It also included a comparison between similar case studies and the literature.

Several conclusions can be extracted. Companies that want to apply agile to all aspects of their organizations must carefully pick the agile-at-scale framework that best suits their needs. In most cases, companies must customize the agile-at-scale frameworks to achieve optimal results. Companies can choose between top-to-bottom or bottom-to-top approaches during the agile-at-scale transformation. Still, they should also pay attention to launching the transformation in waves:

1. Launch the change for a part of the company.
2. Inspect the results.
3. Make the necessary corrections.
4. Launch the next wave.

Almost all companies that applied the agile-at-scale transformation in all or part of their departments faced the challenges such as resistance to change, misapplying the agile-at-scale framework due to lack of agile training and coaching, and communication and synchronization difficulties between the teams in the same or different departments. Leadership plays an essential role in the success of the agile-at-scale transformation. Companies should invest in training and technology, and the administration must be committed to change despite the difficulties, challenges, and impediments they may face.

These are the critical factors for success so that companies benefit from the realization of agile-at-scale transformations.

4.2.2. Limitations

This study comes with limitations. Although Proximus has completed its agile-at-scale transformation towards PEAK, this transformation is only six months old, and revisions are already undergoing reorganizing on how some teams were split into Agile Tribes, Agile Circles, and Agile Teams. So, this study cannot conclude that the transformation is successful or not. Furthermore, this study is based on a small number of interviews, not including stuff from all the Agile Tribes, Circles, and Agile Teams. In addition, the number of non-IT companies that have performed agile-at-scale transformation to all their operations and departments is still small. Hence, future research on a more considerable number of non-IT companies may provide more insight into the challenges they may face during their agile-at-scale transformation and how to overcome them. A similar study can focus more profoundly on the skills that modern agile leaders must have to lead such a transformation.

References

- 15th Annual State Of Agile Report, . (2021). 15th Annual State Of Agile Report. Retrieved from Digital.ai: <https://digital.ai/resource-center/analyst-reports/state-of-agile-report/>
- Aghina, W., Ahlback, K., Lackey, G., De Smet, A., Lurie, M., Murarka, M., & Handscomb, C. (2018, January 22). The five trademarks of agile organizations. Retrieved from Mckinsey&Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-five-trademarks-of-agile-organizations>
- Aghina, W., De Smet, A., & Weerda, K. (2015, December 1). Agility: It rhymes with stability. Retrieved from McKinsey & Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/agility-it-rhymes-with-stability>
- Aghina, W., Handscomb, C., Salo, O., & Thaker, S. (2021, May 25). The impact of agility: How to shape your organization to compete. Retrieved from Mckinsey&Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/the-impact-of-agility-how-to-shape-your-organization-to-compete>
- Alliance, A. (2022, January). Agile 101. Retrieved from Agile Alliance: <https://www.agilealliance.org/agile101/>
- Birkinshaw, J., & Ridderstråle, J. (2015, 12 1). Adhocracy for an agile age. Retrieved from Mckinsey&Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/adhocracy-for-an-agile-age>
- Brede Moe, N., & Mikalsen, M. (2020). Large-Scale Agile Transformation: A Case of Transforming Business, Development and Operations. XP 2020, 115.
- Camara, R., Marinho, M., & Moura, H. (2021). Agile tailoring with scaling agile frameworks in distributed. 3-4.
- Cappelli, P., & Tavis, A. (2018). HR goes Agile. Harvard Business Review, 46–53.
- Conboy, K., & Carroll, N. (2019, March). Implementing Large-Scale Agile Frameworks.
- De Smet, A., Lurie, M., & St. George, A. (2018, October 01). Leading agile transformation: The new capabilities leaders need to build 21st-century organizations. Retrieved from Mckinsey&Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/leading-agile-transformation-the-new-capabilities-leaders-need-to-build-21st-century-organizations>
- Dib, H., Di Lodovico, A., Lamaa, A., Mahadevan, D., & Sengupta, J. (2022, April 14). Better and faster: Organizational agility for the public sector. Retrieved from Mckinsey&Company: <https://www.mckinsey.com/industries/public-and-social-sector/our-insights/better-and-faster-organizational-agility-for-the-public-sector>
- Dikert, K., Paasivaara, M., & Lassenius, C. (2017). Challenges and success factors for large-scale agile transformations: A systematic literature review. K. Dikert et al. / The Journal of Systems and Software 119 (2016) 87–108, 88.

- Dikert, K., Paasivaara, M., & Lassenius, C. (2017). Challenges and success factors for large-scale agile transformations: A systematic literature review. *The Journal of Systems and Software*, 101.
- Dingsøyr, T., Fægri, T., & Itkonen, J. (2014). What Is Large in Large-Scale? 3-5.
- Fuchs, C., & Hess, T. (2018, December). Becoming Agile in the Digital Transformation: The Process of a Large-Scale Agile Transformation. pp. 7-12.
- Handscorn, C., Heyning, C., & Woxholth, J. (2019, May 2). Giants can dance: Agile organizations in asset-heavy industries. Retrieved from McKinsey&Company: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/giants-can-dance-agile-organizations-in-asset-heavy-industries>
- Karvonen, T., Sharp, H., & Barroca, L. (2018, May 16). Enterprise agility: Why is transformation so hard? pp. 3-5.
- Kniberg, H., & Ivarsson, A. (2012). Scaling agile @ spotify with tribes, squads, chapters & guilds.
- Mako, T. (2019). Leadership challenges of large-scale agile transformations.
- McKinsey Quarterly. (2017, January 10). ING's agile transformation. Retrieved from McKinsey&Company: <https://www.mckinsey.com/industries/financial-services/our-insights/ings-agile-transformation>
- Next Technology Professionals. (2022, August 18). The Most Popular Agile Framework. What Exactly is Scrum? Retrieved from <https://nexttechnology.io/>: <https://nexttechnology.io/the-most-popular-agile-framework-what-exactly-is-scrum/>
- Paasivaara, M., & Lassenius, C. (2016). Scaling Scrum in a Large Globally Distributed Organization: A Case Study.
- Paasivaara, M., Behm, B., Lassenius, C., & Hallikainen, M. (2018, January 11). Large-scale agile transformation at Ericsson: a case study.
- Paasivaara, M., Behm, B., Lassenius, C., & Hallikainen, M. (2018, January 11). Large-scale agile transformation at Ericsson: a case study.
- Putta, A., Paasivaara, M., & Lassenius, C. (2018). Benefits and Challenges of Adopting the Scaled Agile Framework (SAFe): Preliminary Results from a Multivocal Literature Review. 7-8.
- Rigby, D., Sutherland, J., & Noble, A. (2018, May 01). Agile at Scale. Retrieved from Harvard Business Review: <https://hbr.org/2018/05/agile-at-scale>
- Rigby, D., Sutherland, J., & Takeuchi, H. (2016). Embracing Agile. Harvard Business Review.
- Salo, O. (2017, October 2). How to create an agile organization. Retrieved from McKinsey&Company: <https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/how-to-create-an-agile-organization>
- Scaled Agile Framework. (2022). SAFe 5 for Lean Enterprise. Retrieved from Scaled Agile Framework: <https://www.scaledagileframework.com/>
- scrum.org. (2021). www.scrum.org. Retrieved from Online Nexus Guide: <https://www.scrum.org/resources/online-nexus-guide>
- ScrumAtScale. (2022). Scrum@Scale. Retrieved from Scrum@Scale™ Framework: <https://www.scrumatscale.com/>
- The 14th Annual State of Agile Report, . (2019). The 14th Annual State of Agile Report of 2019. 2.
- The LeSS Company B.V. (2022). Less. Retrieved from Less: <https://less.works/>
- Trippensee, L., & Remané, G. (2021, August). Practices for Large-Scale Agile Transformations: A Systematic Literature Review. pp. 1-10.

- Uludag, O., Kleeaus, M., Dreyman, N., Kabelin, C., & Matthes, F. (2019). Investigating the Adoption and Application of Large-Scale Scrum at a German Automobile Manufacturer.
- Yin, R. K. (2014). Case Study Research Design and Methods. Sage publications.

Author's Statement:

I hereby expressly declare that, according to the article 8 of Law 1559/1986, this dissertation is solely the product of my personal work, does not infringe any intellectual property, personality and personal data rights of third parties, does not contain works/contributions from third parties for which the permission of the authors/beneficiaries is required, is not the product of partial or total plagiarism, and that the sources used are limited to the literature references alone and meet the rules of scientific citations.