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SAFe beyond budgeting - A reflective practitioner viewpoint

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Abstract: Scaled agile framework and beyond budgeting philosophies are widely used methods of scaling the software development and transforming organizations overall towards more flexible and dynamic leadership methods, environment, and way of working. This transformation is always a big leap for organization regardless of the size of it, which usually creates transformation issues like resistance for the change. This study is primarily focusing on bringing forward the right knowledge of why the transformation is for good, what are the possible pitfalls and how the organization can start the change from a software development perspective.

Keywords: safe, beyond budgeting, agile, scaling, large-scale, transformation, agility

Glossary

SAFe   SAFe is an abbreviation from the Scaled Agile Framework [21]. It states that it is a knowledge base of proven integrated principles, practices, and competencies for Lean, Agile, and DevOps.

Value streams   Development value streams are a series of steps to help the enterprise to implement the solution, which brings a continuous flow of value to a customer, internal or external, and support enterprise achieve its business strategy. [21].

Program Increment Program increment is a Scaled Agile INC [21] iteration of a fixed timebox for building and validating a set of features, demonstrating the value, and getting feedback.

CapEx and OpEx   These concepts are abbreviations from the Capital Expenses and Operational Expenses, where OpEx is an ongoing cost for running a product, business, or system. Its counterpart CapEx is the cost of developing the parts of the product or system.

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1 Introduction

1.1 Motivation

The motivation for this study springs from a professional need to investigate the research and professional literature from SAFe beyond budgeting applications and models to clarify the enablers for successful organization transformation. This investigation includes both highlighting the benefits of the change and exposing the possible pitfalls and issues organizations can face during the process.

The target audience for this study is the software development professionals, practitioners, and leadership, which generates the motivation and need to create a simplified leadership and budgeting model to start investigating the transformation options and methods. The models are also meant to clarify the foundations of SAFe and beyond budgeting for selling the philosophies through the organization, but especially to senior leadership.

1.2 Research questions

The goal of this study is to systematically review the grey and white literature to find theoretical and empirical information about how Scaled agile framework (SAFe) and beyond budgeting combined philosophies impact and could be implemented to the organization outside development teams. The primary research question focuses especially on how the organization can get started in this transformation. The question is phrased:

- How to get started in implementing SAFe and beyond budgeting philosophies in large-scale, global IT organization?

To complement the primary research question, to focus more on the leadership, budgeting, and human resources the philosophies are affecting significantly, the study will also consider the following three research questions as a secondary question. These questions will not change the search string itself. Still, because budgeting, leadership, and human resources are usually tightly related, the relevant studies typically consist of elements from all of these

three areas. Secondary questions are phrased:

- How does SAFe and beyond budgeting philosophies impact on leadership?
- How does SAFe and beyond budgeting philosophies impact on budgeting?
- How does SAFe and beyond budgeting philosophies impact on human resources?

1.3   Scope of work

The scope of work for this study is focused on investigating the SAFe and beyond budgeting implementations and philosophies to create a model on how to start the transformation process in a global organization, where the software development isn't necessarily the primary focus. However, the findings are applicable to any organization, not just for the organization type used as an example in the reflection.

The study is limited to investigate the frameworks, methods, and philosophies from SAFe and beyond budgeting. It does not take into account other large-scale agile frameworks or transformation models. From these philosophies, the study focuses on the investigation of the leadership and budgeting models, leaving the agile development itself outside of the scope.

1.4   Structure of study

This study is split into three different distinct segments. The first segment, chapter 1, includes the introduction to the study itself, research questions, and to the used research method. The second segment presents the findings of the multi-vocal literature review in chapter 2. The third segment is the reflective practitioner approach, in chapters 3 and 4, to the research questions and findings from the review including the discussion and conclusion in chapters 5 and 6.

1.5 Research method

This study is conducted using a research method called a multivocal literature review. The guidelines are introduced in Garousi, Felderer, and Mäntylä [5], and the following chapters summarize the critical aspects of it.

1.5.1 Multi-vocal literature review introduction

Garousi, Felderer, and Mäntylä [5] defines a Multivocal Literature Review (MLR) as a form of Systematic Literature Review(SLR). The main difference between these two review methods is MLR's inclusion of the grey literature in addition to the published formal literature. Grey literature itself includes the different professional literature like books, websites, blogs, and other similar documentation that software engineering (SE) professionals use in their everyday work. Grey literature has been earlier formally recognized in educational research, health sciences, and management. Garousi, Felderer, and Mäntylä [5] emphasis the need for this recognition in software engineering because it is a strong practitioner and application-oriented field of research.

Garousi, Felderer, and Mäntylä [5, Fig. 1] presents the shades of grey in grey literature. There are commonly four levels of literature used in MLR studies. The first level, or level zero, is the white literature where both expertise and outlet control is fully known. An example of this literature is other peer-reviewed studies and articles, which are the usual source of the SLR studies. The actual shades of grey are split into three different levels, which are presented in table 1.

Tier	Definition
1st: High outlet control and credibility	Professional books, magazines, government reports, white papers, professional sites like Scaled Agile INC [21]
2nd: Moderate outlet control and credibility	Annual reports, news articles, presentations, videos, Q/A sites like Stack overflow, Wiki articles
3rd: Low outlet control and credibility	Blogs, emails, tweets

Table 1. Shades of grey literature [5]

Garousi, Felderer, and Mäntylä [5, Fig. 7] illustrates the baseline MLR process, which is split in high level to three phases; Planning the MRL, Conduction the MLR, and Reporting the MLR. Each of these phases is divided into smaller process steps and guidelines. In the following chapters, I will present these steps and guidelines with some notes for a better understanding of how the MLR process flows.

1.5.2 Planning the MLR

MLR planning consists of two phases: Establishing the need for MLR and defining the goal and research questions (RQs) [5]. Raising the motivation and need for the MLR begins with identifying possible other existing reviews on the selected topic and from there to ensuring its usefulness for the intended audience. In this step, the reviewer should also assess the usage of the grey literature in this particular case. Garousi, Felderer, and Mäntylä [5, Table 4] provides a few questions to help with this assessment. One or more "yes" responses suggest that grey literature should be used.

- Is the subject "complex" and not solvable by considering only the formal literature?
- Is there a lack of volume or quality of evidence or a lack of consensus of outcome measurement in the formal literature?
- Is the contextual information important to the subject under study?
- Is it the goal to validate or corroborate scientific outcomes with practical experiences?
- Is it the goal to challenge assumptions or falsify results from practice using academic

research or vice versa?

- Would a synthesis of insights and evidence from the industrial and academic community be useful to one or even both communities?
- Is there a large volume of practitioner sources indicating high practitioner interest in a topic?

In defining the goal and research questions Garousi, Felderer, and Mäntylä [5] emphasis the point of making a connection between RQs, goals, and metrics. RQs should drive the entire review by affecting the reviewed studies, data extraction process, and data analysis process.

1.5.3 Conducting the MLR

Garousi, Felderer, and Mäntylä [5] structures conducting the MLR to five phases:

- Search process
- Source selection
- Study quality assessment
- Data extraction
- Data synthesis

The search process is usually an iterative process where usage of initially defined search strings reveals more relevant strings. Garousi, Felderer, and Mäntylä [5] also presents a technique called "snowballing" where the reviewer can follow citations either upstream or downstream. As important as the search strings is the knowledge and definition when to stop the search.

The source selection process typically consists of the definition of the selection criteria and performing the actual selection process. Garousi, Felderer, and Mäntylä [5] proposes the combination of inclusion and exclusion criteria with quality assessment criteria. The benefit, in this case, is that author can spend less effort in content analysis of the source. It is also possible only to provide inclusion criteria and then exclude all the sources which do not fulfill those criteria.

Grey literature is, by its nature, less controlled than formal literature. For that reason, qual-

ity assessment with grey literature takes more time and effort to perform. For this reason, Garousi, Felderer, and Mäntylä [5, Chapter 5.3] presents a synthesized approach that again takes advantage of the exclusion method using, for example, date of publication, or the number of backlinks. This approach also allows the author to define which method to use in data extraction, qualitative or quantitative, or both.

The last phase in MLR is reporting the review, which is similar to the SLR reporting guidelines. Garousi, Felderer, and Mäntylä [5] emphasis two significant differences in reporting MLR when compared to SLR because MLR needs to provide benefits for both researchers and practitioners. Firstly, the reporting style should be applied for the selected audience, and secondly, the usefulness for this audience should be ensured.

1.5.4 MLR guidelines

Garousi, Felderer, and Mäntylä [5] provides a set of guidelines on how to implement their MLR process. The following list presents these guidelines as a direct quotation to give the best possible grasp for the implementation.

1. The provided typical process of an MLR can be applied to structure a protocol on how the review will be conducted. Alternatively, the standard protocol structure of SLR in SE can be applied, and the provided guidelines can be considered as variation points.

2. Identify any existing reviews and plan/execute the MLR to explicitly provide usefulness for its intended audience (researchers and/or practitioners).

3. The decision whether to include the GL in a review study and to conduct an MLR study (instead of a conventional SLR) should be made systematically using a well-defined set of criteria/questions.

4. Based on your research goal and target audience, define the research (or "review") questions (RQs) in a way to (1) clearly relate to and systematically address the review goal, (2) match specific needs of the target audience, and (3) be as objective and measurable as possible.

5. Try adopting various RQ types but be aware that primary studies may not allow all question types to be answered.

6. Identify the relevant GL types and/or GL producers (data sources) for your review study early on.

7. General web search engines, specialized databases and websites, backlinks, and contacting individuals directly are ways to search for grey literature.

8. When searching for GL on SE topics, three possible stopping criteria for GL searches are: (1) Theoretical saturation, i.e., when no new concepts emerge from the search results; (2) Effort bounded, i.e., only include the top N search engine hits, and (3) Evidence exhaustion, i.e., extract all the evidence.

9. Combine inclusion and exclusion criteria for grey literature with quality assessment criteria

10. In the source selection process of an MLR, one should ensure a coordinated integration of the source selection processes for grey literature and formal literature.

11. Apply and adapt the criteria authority of the producer, methodology, objectivity, date, novelty, impact, as well as outlet control, for study quality assessment of grey literature.

   - Consider which criteria can already be applied for source selection.
   - There is no one-size-fits-all quality model for all types of GL. Thus, one should make suitable adjustments to the quality criteria checklist and consider reductions or extensions if focusing on particular studies such as survey, case study, or experiment.

12. During the data extraction, systematic procedures and logistics, e.g., explicit "traceability" links between the extracted data and primary sources, should be utilized. Also, researchers should extract and record as much quantitative/qualitative data as needed to sufficiently address each RQ, to be used in the synthesis phase.

13. A suitable data synthesis method should be selected. Many GL sources are suitable for qualitative coding and synthesis. Some GL sources allow a combination of survey results, but the lack of reporting rigor limits the meta-analysis. Quantitative analysis is possible on GL databases such as Stack overflow. Also, argumentation theory can be beneficial for data synthesis from grey literature. Finally, the limitations of GL sources w.r.t. their evidence depth of experiment prevent meta-analysis.

14. The writing style of an MLR paper should match its target audience, i.e., researchers

and/or practitioners.

- If targeting practitioners, a plain and to-the-point writing style with clear suggestions and without details about the research methodology should be chosen. Asking feedback from practitioners is highly recommended.
- If the MLR paper targets researchers, it should be transparent by covering the underlying research methodology as well as an online repository and highlight the research findings while providing directions to future work.

1.6 Selection of sources from the whitepapers and the grey literature

The first phase of the study is the source selectionc which is conducted using the MRL guidelines. This chapter introduces the steps performed in order:

- Search keywords and sources
- Inclusion and exclusion criteria implementation
- Finalizing the source pool

1.6.1 Search keywords and sources

The search engines and sources used in this study were selected by the commonly used sources. The selected sources were Google search, Google scholar, and JYKDOK international e-article search. These sources perform the searches to multiple articles and source databases and are considered to cover the majority of the materials available.

Based on the study's research questions, the search string was set to:

- "Scaled agile framework beyond budgeting"

The background on selecting this search string is based on budgeting principles introduced in Scaled Agile INC [21], which are extensively implementing the "beyond budgeting" ideology [1].

1.6.2 Inclusion and exclusion criteria

The inclusion and exclusion criteria were defined based on the research questions paying careful attention to include the relevant sources and exclude the out-of-scope sources. Primary criteria were that the source has to be relevant and considering the SAFe, not just, for example, agile, agility, or Scrum. If the source was deemed relevant, then the following questions ware investigated for each source:

- Does this source impact leadership?
- Does this source impact budgeting?
- Does this source impact human resources?

The sources which didn't meet the criteria above were excluded. A few examples were the sources considering agile budgeting or organization agility, which weren't relevant with SAFe itself, but still at first glance were relevant from a budgeting perspective. In addition to these, also the age of the publicization and paywall restriction was considered as exclusion criteria in the grey literature.

After the inclusion and exclusion, the "snowballing" was performed for the included sources as recommended by the guidelines. In this context, this refers to using the reference list of citations to the source to ensure that as many relevant sources as possible are included.

1.6.3 Final pool of sources

The search results were included in the result sources until the results were saturated and began irrelevant to the research questions. The point of irrelevance was reached in a very different amount of results in different sources. In the Google search engine, the point was reached after five pages of results, a total of 50 results. The JYKDOK surprisingly didn't provide any relevant sources, and the search was discontinued after 40 results. The majority of the relevant sources were provided by Google Scholar, where the irrelevance point was reached in 150 results. In total, 240 results were checked, and from these results, 25 sources were stated relevant and selected for the next iteration. After snowballing relevant sources and final review, 24 sources were included in this review. All the search results are

documented and can be found from Appendix 1 separated by the search engines to different sheets, and on the last sheet, the selected 24 sources are presented.

1.7   Reflective practitioner

The applied part of this review is performed following the reflective practitioner philosophy introduced by Schon [22]. The concepts behind these principles are, however much older, from the early 20th century. This method or philosophy targets to guide practitioners to gain a better understanding of practical uses and limits of research-based knowledge, and help scholars to take a new view of professional actions. Schon [22] emphasizes a need for ongoing learning at both individual and organizational levels. He introduces the term "reflection-in-action" which explains, in its simplicity, what the reflective practitioner is all about.

From a writing perspective, reflective writing differs from standard academic writing by its more personal nature. You can use the personal pronoun "I" and talk about your own experiences. However, you need to avoid being too casual or conversational. Reflective writing should include details, examples, and connect to the literature author has been reviewing [9]. Jasper [10] represents this more formally:

> In research, reflective writing acknowledges the subjective nature of the researcher's interaction and interpretation of the data, providing the decision-trail within the public domain and transparency of the processes leading to conclusions being presented.

1.8   Case description

The organization in the reflective practitioner case study is a multi-national and multi-billion corporation with multiple subsidiaries. The primary focus of this corporation is not software development itself; it is machine manufacturing on a global scale. However, considering the current market and customer demand, web-based services are a significant part of the new business expansions and enablers for better sales of the actual machines. Also, the focus for

web services is not only in the end customer, but it is also engineering and internal services to enable a better understanding of the manufactured machines, through that better services for customers and knowledge for new machine development. All this creates a highly competitive business environment requiring continuous development and improvement in all areas of the corporation, software development included, and fast reaction capability for new challenges and demands from the market.

2 Multi-vocal Literature Review

This chapter will introduce the findings of the multi-vocal literature review from the included sources. Before we dive into the actual results, I want to introduce you to the two foundations of the SAFe thinking. These two foundations are mentioned and emphasized in multiple included sources, and they are called the house of lean and lean-agile principles.

2.1 House of Lean

SAFe house of lean derives from lean manufacturing principles and practices and is placed on the context of software development by Scaled Agile INC [21], Knaster and Leffingwell [12] and other authors participating creating and improving the SAFe framework. This chapter just shortly describes the house of lean, you can read more detailed descriptions of it from Scaled Agile INC [21, Lean agile mindset].
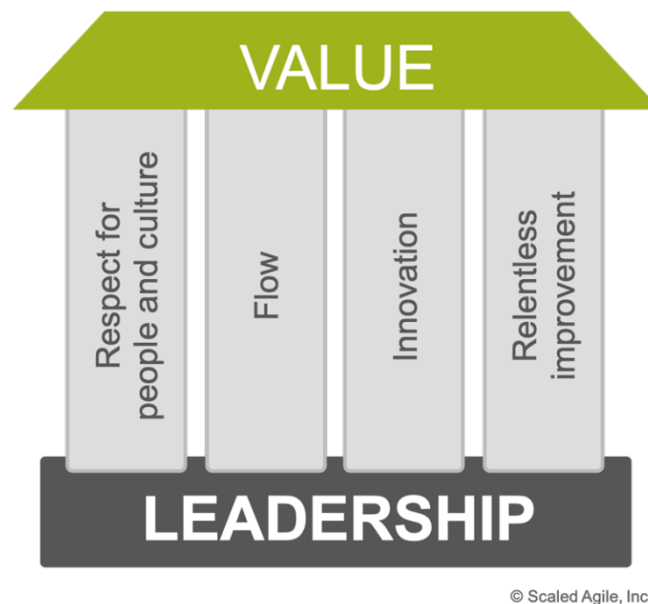
Figure 1. SAFe House of Lean [21]

The goal of the house of lean is to deliver maximum customer **value** in the shortest sustainable lead time and to unify the organization behind this single principle.

The supporting pillars for this are the following:

- Respect for people and culture - enable the right people to work in the right environment, people are the ones who create the culture and promotes the lean-agile thinking
- Flow - optimize the workflow and visualize the work in progress, deliver incremental value based on constant feedback and adjustment
- Innovation - continuously improve and innovate processes, workflows, and new solutions, without innovation they will decline
- Relentless Improvement - improve the operations and flow of value relentlessly wholly, encourage for problem-solving mindset

The foundation for the whole house of lean is the **leadership**, which has to support the transformation of the organization and thrive for operational excellence through individuals and teams. In the end, leaders are responsible for the successful adaptation of the lean-agile mindset and the values.

2.2 Lean-Agile Principles

SAFe introduces ten Lean-Agile principles that are meant to inspire and inform the roles and practices of SAFe [21, 12]. The principles are:

1. Take an economic view
2. Apply systems thinking
3. Assume variability; preserve options
4. Build incrementally with fast, integrated learning cycles
5. Base milestones on objective evaluation of working systems
6. Visualize and limit WIP, reduce batch sizes, and manage queue lengths
7. Apply cadence, synchronize with cross-domain planning
8. Unlock the intrinsic motivation of knowledge workers
9. Decentralize decision-making
10. Organize around value

I won't go on details from all these principles; you can again read more detailed descriptions

from Scaled Agile INC [21, Lean-agile principles]. That said, I want to emphasize one of these; Apply system thinking. Not only the software or the team developing the software are a system. The whole organization and enterprise should also be considered a system that enables and supports the development and solution. For this reason, only management can change this system for better, which makes it essential for management to understand and promote these principles and philosophies.

The philosophy of these principles can also be seen in the beyond budgeting ideology introduced by Bogsnes [1] around the year 2000, which interestingly is the same time agile methodology was born. The similarities of these two philosophies are also mentioned in many other sources of this study[24, 23, 29, 20, 16, 27, 28, 18, 8, 13, 17, 7, 25, 26].

2.3 Budgeting

Scaled Agile INC [21] uses the term "lean budgets" when introducing budgeting models. Lean budgets aim to provide a model for effective financial governance with less overheads through solution portfolio and budgeting value streams. These concepts will be introduced in the following chapters. As a first step to understand these concepts, we need to identify the problematics behind the SAFe and beyond budgeting.

2.3.1 The problem of traditional budgeting in software development

The conflict between traditional budgeting and lean-agile development emerges in the same sources that also brought up the similarities between SAFe principles and beyond budgeting philosophy in chapter 2.2. For most traditional enterprises, the budgets are organized in cost centers, which are not necessarily related to each other. This approach means building multiple, separate budgets and then combine the project budget from these. In addition, traditional cost center accounting usually expects a long horizon planning and estimation, which agile philosophy especially try to avoid. Scaled Agile INC [21] lists five major significant caused by this approach;

- Slow, complicated budgeting process
- Lower fidelity decisions

- Temporary teams lower overall performance
- Waiting on specialist causes delays to value delivery
- Full resource utilization is favored over a fast flow of value

These problems can be found in various formats from other sources, and in the worst-case scenario, they may lead to the failure of the agile and SAFe adaptation [16, 18, 17, 15, 25, 26]. Sirkiä and Laanti [24] and Sirkiä and Laanti [23] also emphasizes that even in a best-case scenario, the traditional system may only provide a false sense of cost control. As an example, from the scale of these problems, the Hackett Group companies spend on average 25 000 man-days on budgeting per billion USD in revenue [1].

The traditional budgeting project model can also reduce the flexibility and agility of the development when the organization cannot move the budget between projects and adapt to the continuous change. A common and frequent example of this is the project delays, which cause a lot of overhead when the delay or change of scope requires a management decision and replanning[21, 23]. To help with these problems and summarize the transition from traditional budgets and lean budgets, Scaled Agile INC [21] presents the figure 2.
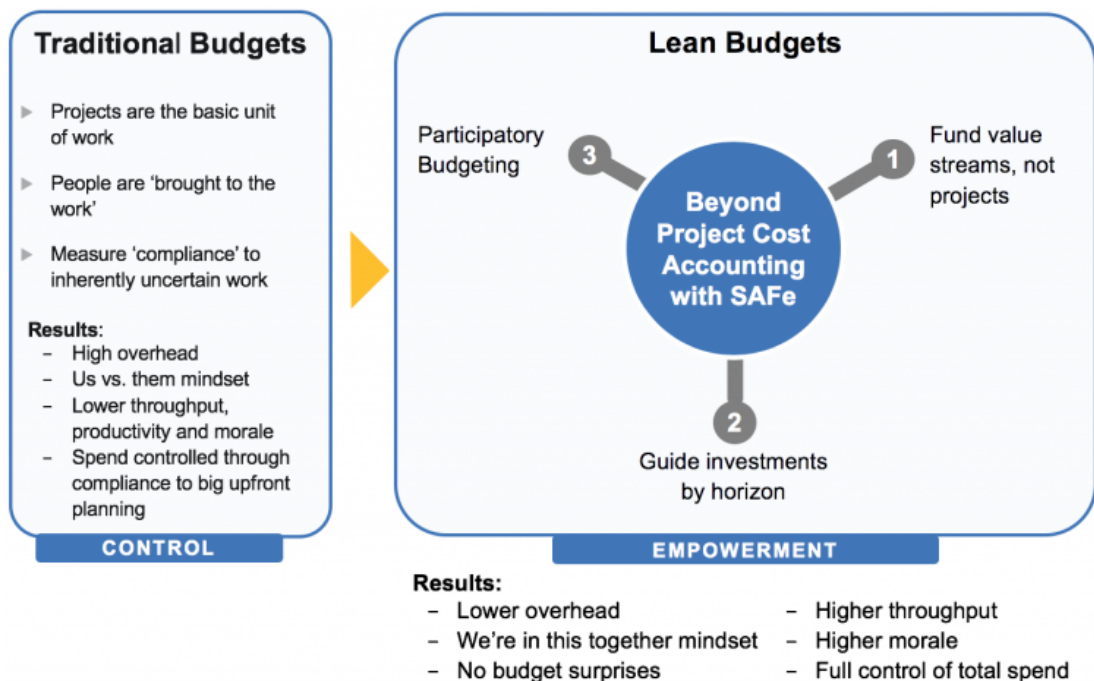

Figure 2. Moving from traditional to lean budgets [21]

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2.3.2 Lean budgets

SAFe lean budgets philosophy is based on the decentralized decision-making principle introduced in chapter 2.2. It is important to understand the difference in project management level, or in SAFe, portfolio level, where personnel won't plan work for others anymore or track costs against project budgets. For this transition Scaled Agile INC [21] introduces three steps:

1. Funding value streams, not projects
2. Guiding investments by horizon
3. Applying participatory budgeting

The first step, funding value streams instead of projects, aims to increase the autonomy of the development through defined spending policies and guidelines in the SAFe portfolio. This model brings better transparency in development initiatives like progress and status but also empowers developers through self-organized, long-lived teams with the right knowledge. Value streams are also easy to forecast because usually, the expenses per value stream are fixed across the program increment, and changes to initiatives don't change the budget, they change the priority of increment deliveries.

Sirkiä and Laanti [24] also emphasizes that creating visibility for deliverables is more important than planning cost centers. They also noticed in their study that cost center control or deliverable-based resourcing was not adding any value, it was more efficient and reasonable to move resources between projects (value streams) and extend the project a bit. Like this, the total cost is mostly based on the headcount, and thus it is quite stable and transparent to forecast. Sirkiä and Laanti [23] also adds to this philosophy the matter of trust; remove the control and rely on trust, because agile teams cannot see where they are going in mid/long term future. Trust the teams to deliver the maximum value with given resources and don't try to micromanage them with detailed cost center control.

The second step, guiding investments by the horizon, is a model to identify enterprises' most important value streams and in which investment horizon they are. It is also imperative to make investments at the right time [29]. In the changing market, the prediction of the future is shady at best, so the adaptation and flexibility are fundamental requirements for investments

and budgeting[29, 14].

The following figure 3 gives a simple but good explanation for the horizons mentioned.
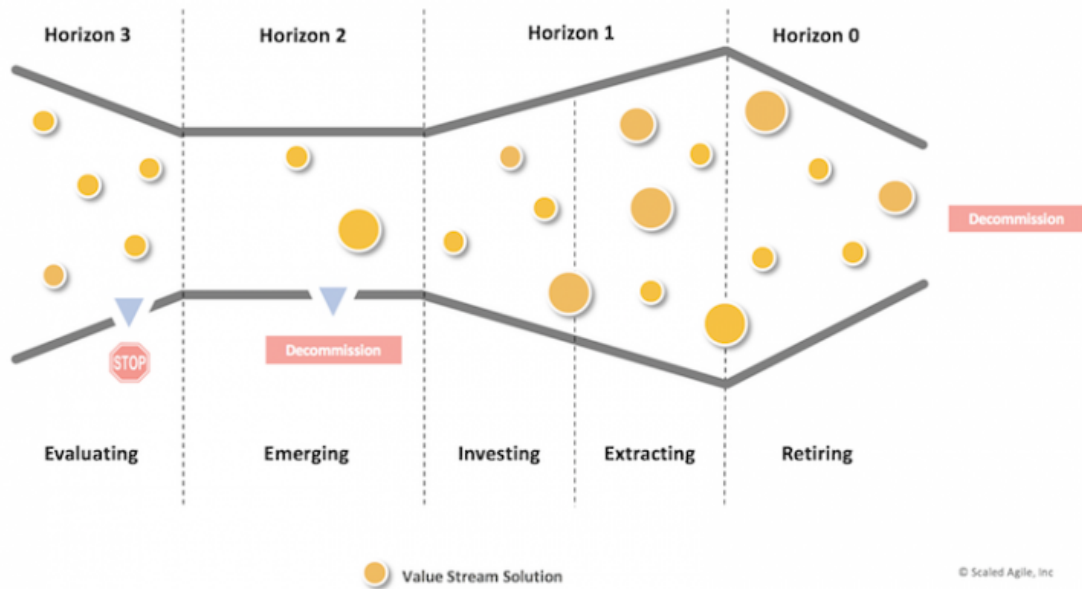
Figure 3. SAFe investment horizon model [21]

In short, the horizons in the figure above, are:

- Horizon 3: Investments are dedicated to prototyping and investigating new options and solutions.

- Horizon 2: Investments are dedicated to emerging solutions which need more investment for market penetration, but have already made its way to business ecosystems and decommissioning requires also investment.

- Horizon 1: In this horizon, solutions deliver more value than the cost of investment and the solutions can be in two groups; requires significant ongoing investment or deliver a great value with relatively lower investment requirement.

- Horizon 0: These solutions are close to their end-of-life and the investment is needed to decomission these solutions.

The third step is participatory budgeting. The idea of this technique is to bring together architects, business owners, and other relevant stakeholders to plan and identify the best investments in the right value streams. The usual case is that not everything can be funded;

it's more about collaboratively pooling the budgets to support the initiatives delivering the most value across the value streams.

2.3.3 OpEx and CapEx

CapEx and OpEx are standard accounting practices in product development regardless of the industry. In lean-agile accounting, it is part of the value stream budgeting [21, 12]. As stated before, in SAFe, the enterprise funds the portfolio through lean budgets, which can include elements from both CapEx and OpEx. Although these practices are well known and established in the industry, they are typically used more in waterfall-based development [21, 19].

The common issue in capitalizing the agile work is the absence of the "phase gates", which are common in the waterfall approach. Scaled Agile INC [21] reveals the issues where finance is unable to handle this change, and they can easily continue to apply the old waterfall-based rules or even decide to expense all the costs. Neither of these is ideal from an agile development perspective.

Scaled Agile INC [21] introduces some guidelines on how to handle the capitalization in agile development. However, at the same time, they give a disclaimer that they don't have formal training in accounting and the capitalization rules vary between countries, industries and companies.

As stated before, the portfolio may include both CapEx and OpEx costs. OpEx cost is ongoing costs which can consist of the following cost elements [21]:

- Salaries
- The burden for operating personnel, sales and marketing
- General and administrative costs
- Training
- Supplies and maintenance
- Rent
- Other expenses related to operating a business or an asset of the business

Then again, CapEx is more often incorporated with a purchase, physical asset, and other property, and sometimes patents and software can have a similar treatment. Usually, the purchase is put in the balance sheet as an asset and then expensed on the income statement during the useful life of the asset. Or, like Greening [6] defines it, spreading the costs over a long-term asset's life of returning value. CapEx can include cost elements like [21]:

- Salaries
- Contract labor
- Materials and supplies
- Other items related directly to the solution development activities

It is critical for portfolio stakeholders to understand the limitations and potentiality of capitalization for the best possible financial result. For example, unsuccessful capitalization can be seen as decreased or limited headcount and higher taxation [6]. Scaled Agile INC [21] uses US FASB 86 guidelines as an example and basis for their own guidelines. For clarity, I decided to use a direct quotation from Scaled Agile INC [21] to describe the FASB 86 statement.

> FASB 86 states that costs incurred internally in creating a computer software product must be expensed when incurred as research and development until technological feasibility has been established. Thereafter, software production costs may be capitalized and subsequently reported at the lower of either the unamortized cost or the net realizable value. Capitalized costs are amortized based on current and future revenue for each product, with an annual minimum equal to the straight-line amortization over the remaining estimated economic life of the product.

In short FASB 86 requires the fulfillment of the following criteria to start capitalizing the development [21]:

- The product has achieved technical feasibility
- Management has provided written approval to fund the development effort
- Management has committed the people and resources to development

- Management is confident that the product will be successfully developed and delivered

Figure 4. Categories of expensed and potentially capitalized costs [21]

Scaled Agile INC [21] also gives a few guidelines about what labor can be considered as a subject for capitalization. The following list is a summary of these guidelines.

- The salaries of the whole agile team including developers, testers, architects, user experience designers, and other relevant experts
- Product owners and scrum masters are also contributing directly to definition and development, which is associated with new value delivery and thus can be capitalized.
- Also, other experts outside agile teams, like IT and other value providing roles, can contribute to the implementation and design. Their work from the relevant part is subject to capitalization.

Reed and Wyckoff [19] gives more detail to the capitalization of labor cost rules by dividing cost elements into three different stages of development, which supports the SAFe model very well.

1. The preliminary project stage, including among other things formulation, evaluation, prototyping, and feasibility analysis. All costs are expensed during this stage.
2. The development stage, including among other things design, implementation, and testing. This stage is a subject for capitalization.
3. The post-implementation including among other things training, bug-fixing, and routine maintenance. The costs of this stage are expensed.

Various sources can state that the impact of the correct capitalization in software development can give significant enterprise benefits like the health of the company competitiveness, consistent reporting, investor confidence, compliance, and, more importantly, the focus on the customer value creation [21, 12, 19, 6]. Also, primarily because agile teams focus strongly on customer value, they also create more financial value, which enables more efficient capitalization and, through it, greater business value [6, 2].

On the other side of the coin, it is essential to involve at least one person that has a good understanding of all three fields; finance, engineering, and processes. Because if finance doesn't really understand or like the agile way of thinking, they could [6, 2]:

- Force engineers to track hours which decrease the creativity and productivity
- Undercapitalize software development
- Reclassify past expenses causing uncertainties for example in the eyes of investors and other externals
- Obstructs the agile adaptation

Regarding capitalization gone wrong, Connor [2] transforms the old motto very well to this concept.

> Just because you can overengineer capitalization policies by, for instance, computing cost per story point, doesn't mean this is the right thing to do.

She introduces ten pitfalls you should avoid when capitalizing. I highly recommend getting familiar to those pitfalls, for this study they are too complex and need a lot of background information to really give them the credit they need.

2.4 Leadership

Adapting or transforming towards lean budgets also requires the a new type of management philosophy that understands the underlying agile and lean principles [21, 12, 1, 24, 29, 20, 16, 14, 8, 13, 17, 11, 25, 26]. Leffingwell [15] presents these problematics in a way of transformation "roadmap" from legacy to lean-agile philosophy which is part of the lean portfolio management in SAFe.

From legacy mindset	To lean-agile pattern
Too many projects	Limiting work in program
Detailed project plans	Lightweight business cases
Annual funding	Incremental funding
Centralized annual planning	Decentralized rolling-wave planning
Work breakdown structure	Agile estimating and planning
Projects	Agile release trains
Traditional project management (PM-BOK)	Agile project management
Waterfall milestones	Fact-based governance

Table 2. Transformation roadmap from legacy mindset to lean-agile leadership[15]

2.4.1 Lean portfolio management

Sirkiä and Laanti [24] presents the theory of constraints, which tells us that any system is capable of delivering at a rate of its weakest link. Based on this theory, we should focus on understanding our limitations and execute our resource allocation based on this information, hence optimize the bottleneck resource usage. The lean portfolio management Scaled Agile INC [21, Lean portfolio management] introduces, is exactly the forum to identify and execute these limitations. Best way to describe this forum is a quotation from Scaled Agile INC [21]:

> The Lean Portfolio Management competency aligns strategy and execution by applying Lean and systems thinking approaches to strategy and investment funding, Agile portfolio operations, and governance.

Figure 5. SAFe lean portfolio management [21]

Strategy and investment funding are responsible for the alignment and funding of the portfolio so that it can meet the business targets. This forum is founded by executives, business owners, portfolio stakeholders, technologists, and architects. Scaled Agile INC [21] states four primary responsibilities for this forum:

- Connect the portfolio to the enterprise strategy
- Maintain a portfolio vision and roadmap
- Establish lean budgets
- Establish portfolio flow

Agile portfolio operations drive for operational excellence through decentralized decision making. Úlfarsson [27] emphasis this matter by arguing that decentralized, empowering leadership thinking is a fundamental requirement for adaptive management thinking, and through this, beyond budgeting philosophy. Agile portfolio operations require co-operation from program management for scrum masters and release train engineers. In short Scaled Agile INC [21] states three responsibilities for this forum:

- Coordinate value streams
- Support program execution

- Foster operational excellence

Lean governance consists of architects, business owners, and program management. This forum's main tasks are [21]:

- Forecast and budget dynamically
- Measure portfolio performance
- Coordinate continuous compliance

Based on the Scaled Agile INC [21] lean portfolio management described above, Laanti, Sirkiä, and Kangas [14, Table 1.] have created a set of practices and rationale for them. This set presents really well the key roles, groups, and practices enterprises should focus on as the first step in lean portfolio management transformation.

2.4.2 Beyond budgeting

As discussed in chapter 2.2, there is a lot of similarities between SAFe and beyond budgeting philosophies. Bogsnes [1], Sahota et al. [20], Lohan [16], Lohan, Lang, and Conboy [18], and Stettina, Christoph Johann and Hörz [26] especially emphasis the coherence between leadership, its values, and management processes. To clarify this, the beyond budgeting presents a set of rules for creating an agile-friendly environment and changes needed in management to move from traditional thinking and processes towards agile and beyond budgeting principles.

Leadership principles	Management Processes
Values - Govern through a few clear values, goals, and boundaries, not detailed rules and budgets	Goals - Set relative goals for continuous improvement, don't negotiate fixed performance contracts
Performance - Create a high performance climate based on relative success, not on meeting fixed targets	Rewards - Reward shared success based on relative performance, not on meeting fixed targets

Transparency - Promote open information for self-management, don't restrict it hierarchically	Planning - Make planning a continuous and inclusive process, not a top-down annual event
Organization - Organize as a network of lean, accountable teams, not around centralized functions	Coordination - Coordinate interactions dynamically, not through annual planning cycles
Autonomy - Give teams the freedom and capability to act, don't micromanage them	Resources - Make resources available as needed, not through annual budget allocations
Customers - Focus everyone on improving customer outcomes, not on hierarchical relationships	Controls - Base controls on relative indicators and trends, not on variances against plan

Table 3: Leadership and process changes from beyound budgeting[1]

To discuss further on beyond budgeting topic, it is also good to understand the difference between beyond budgeting philosophy, methodology, and methods. It might be relatively easy, for example, to implement only some methods without really understanding the philosophy, or really implementing the whole methodology to ensure the coherence between leadership principles and management processes. This brings us back to the SAFe lean-agile principles introduced in chapter 2.2, especially to the principle of "apply system thinking". Úlfarsson [27, Table 6.] abbreviates the differences in these three major components in his study:

Component	Explanation
Philosophy (a belief, paradigm, mindset or thinking that guides behavior)	Highly adaptive organizations outperform traditional command and control organizations and decentralized management models are a prerequisite.
Methodology (a system of methods)	A management model consisting of adaptive management processes which work in coherence with decentralized leadership principles.
Methods (a way of doing something)	Methods that support the specific system design. Examples: Rolling forecasts, dynamic resource allocation, transparency, focus on customers and purpose etc.

Table 4. Three main components of the beyond budgeting concept [27]

van Manen and van Vliet [28], Karvonen, Sharp, and Barroca [11], and Horlach, Schirmer, and Drews [7] also strongly links organization agility and beyond budgeting principles. van Manen and van Vliet [28] presents three main elements for agile an mindset in their article, which should carry over the whole organization, not just the development teams.

Trust	All employees should take responsibility for changes and issues, as they are empowered and trusted by the management to make their own decisions, while the organizational structure and processes reflect this trust
Continuous improvement	Everyone in the organization strives for continuous improvement of all processes, people, and products, by maintaining an open attitude towards each others feedback
Collaboration	All results and improvements are achieved trough intensive collaboration of everyone in the organization

Table 5. Three main elements of the organization's agile mindset and agility[28]

Interestingly, this review didn't bring up too much research related to IT management, but this matter is still worth mentioning, even if it is not in the scope of the review. Horlach et al. [8] focuses on this perspective in their article and presents a comparison between scaling agile frameworks, SAFe included, in IT perspective. Figure 6 gives an interesting perspective on the differences, especially when Scaled Agile INC [21] defines IT strategy through strategic themes and business objectives, which may result in the absence of common strategy[8]. As Horlach et al. [8] states in their conclusion, none of the frameworks solve the matter entirely. It would be interesting to get more, especially empirical research, from this topic how enterprises have solved this. Horlach, Schirmer, and Drews [7] processes this topic further by creating a set of agile portfolio design principles.

	Scaled Agile Framework (SAFe)	Disciplined Agile (DA)	Enterprise Unified Process (EUP)	Enterprise Agility	IaCoCa Model	Scrum @Scale	Recipes f. A. Governance (RAGE)	XScale
IT Principles	4, t	4, t	4, t		3, t	4, t		
IT Architecture	1, m	4, m	1, m	1, b	3, m			
IT Infrastructure Strategies	1, b	1, m		1, b	3, b			1, m
Business Application Needs	4, t	4, t	4, t	4, t	3, t	4, t	5, t	4, t
IT Investment and Prioritization	4, m	4, t		4, m			5, t	4, t
Legend								
Coverage *Why?-Principle* *What?-Process* *Who?-Role(s)* *How?-Practice(s)*								
Responsible 1- *IT* 2-*Business* 3-*Convergence* 4-*Alignment* 5-*Not specified*								
Control t – *top down (Authority-led)* b-*bottom up (Autonomy-led)* m-*mixed*								

Figure 6. Comparison of scaling agile frameworks in IT [8]

2.5 Human resources

The transformation towards lean leadership and budgets brings with it a transformation also for HR requirements, tasks, and mindset [1]. HR needs to be more focused on managing the competence issues in teams and creating a transparent, agile environment to work. Eyholzer and Leffingwell [4] abbreviates this transformation as a "shifting from a process-oriented HR management to an empowering lean-agile people operations". They also describe six underlying themes on how to address aspects of lean-agile people solutions.

- Embrace the new talent contract
- Foster continuous engagement
- Hire for attitude and cultural fit
- Move to iterative performance flow
- Take the issue of money off the table
- Support impactful learning and growth

Also, when regarding more contemporary HR practices, recent research shows that working environments and spaces are vital to productive, agile teams. Scaled Agile INC [21] lists the following considerations for working environments:

- Providing focused individual areas that enhance the state of mental flow
- Supporting the need for constant informal team collaboration
- Supporting the need for occasional privacy
- Providing room for daily stand-ups, whiteboards, and walls to post objectives
- Dedicating communication channels to support remote team members and other teams

3 SAFe beyond budgeting research model

The research model for this study is built on a reflective practitioner approach introduced in chapter 1.7. This reflection includes the creation of the models based on the review and the author's experience from the topic. The picture 7 and the following chapters outline the components used in the created models, the models itself are introduced in chapter 4.
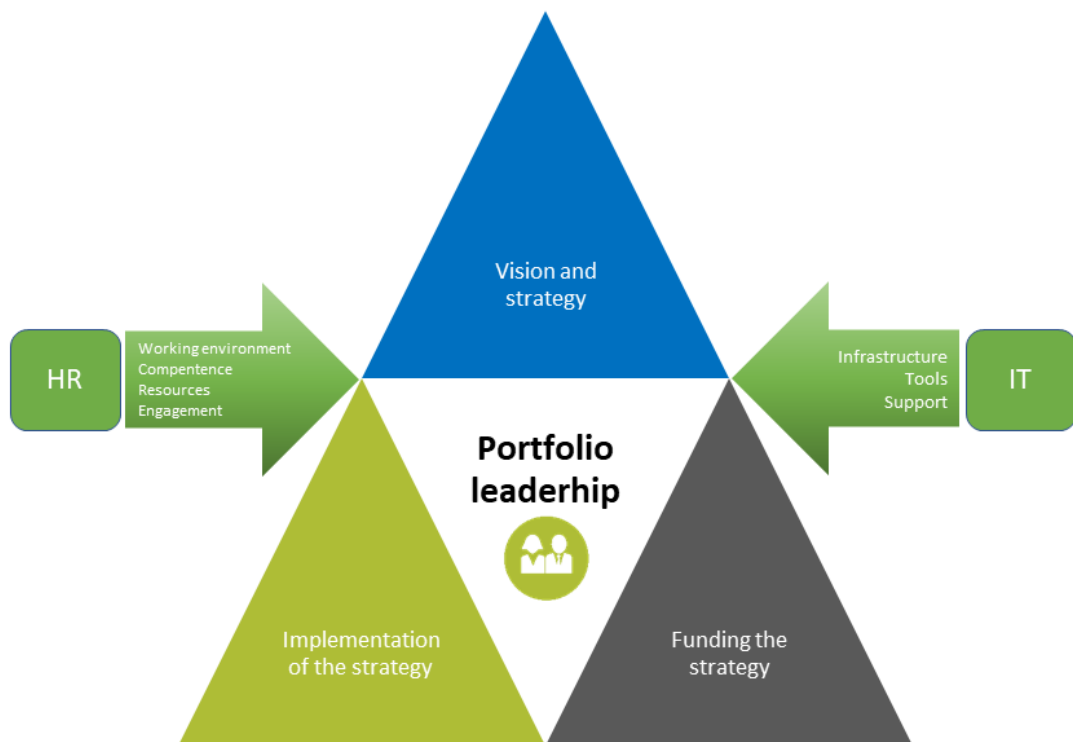
Figure 7. Relationship of the research model components

3.1 Portfolio leadership group

The portfolio leadership group model is structured with the different models and notes from the sources introduced in chapter 2.4. The main components for the created model are the leadership models introduced by Scaled Agile INC [21] and Bogsnes [1]. These components have then been enriched by notes and findings for other various sources like Laanti, Sirkiä, and Kangas [14] and Greening [6]. Finally, the model has been reflected against the author's

leadership environment in chapter 4.1.

3.2 Budgeting model

The created budgeting model is following the principles and philosophy introduced by Scaled Agile INC [21], but simplifying it for faster adaptation based on the author's experience other sources in the review chapter 2.3 [24, 23, 29]. The created model also takes into account the possible capitalization issue at a high level and how finance should contribute to the agile budgeting process.

3.3 Supporting departments

Supporting departments in this reflection include human resources and IT but exclude finance. This separation is based on the created leadership model where the finance department is part of that group, although the separation is not complete. This will be explained with more details in chapter 2.4. The role of the human resources and IT departments in this reflective model is based on the findings from the various review sources [8, 21, 7, 1].

4 Results of the reflective practitioner approach for research model

In this chapter, I take the reflective practitioner point of view to bring the results of this MLR to the context of a real organization and use cases. This approach creates a starting point for the transformation process towards SAFe and beyond budgeting philosophies. However, I won't try to create a ready model because every organization is different and needs a lot more background research before creating the actual model. Keeping this in mind, I will first introduce the current state of the organization introduced in chapter 1.8 from the transformation perspective, and after that, I will create the first iteration models for leadership, budgeting, and supporting departments. The following chapters in the reflection will also include primary and secondary empirical conclusions to summarize the models and the key statements from them with prefixes PEC and EC.

Also, to change our way of thinking immediately, I'll use the concept of value streams instead of projects and products in this reflection. This concept is introduced in review chapter 2.3.2, and I will return to it with more details in chapter 4.2.

4.1 Portfolio leadership group

To understand the portfolio leadership model I will introduce later in this chapter and the motivation for its creation, we need to dive deeper into the existing organization model, how it is structured and what actions the organization has taken already towards SAFe and beyond budgeting philosophies.

4.1.1 Current organization structure and status of transformation

The organization or corporation in question is structured in a traditional hierarchical way where all functions are distributed in departments, and every department is governing itself and working as a separate entity. From a software development point of view, multiple sites and departments are working with software, from machine "onboard" to "offboard" web ser-

vices. In this particular case, I will focus on this "offboard" side of the organization, because it is naturally agile and not tied too much to actual manufacturing processes and principles. The manufacturing processes are more waterfall and "gate" based processes mentioned in multiple sources in the review. For this reason, the "onboard" software development and the overall company "way of working" is more tightly tied to these "phase gates". Traditionally, and also, in this case, separate project management and product management departments are working with software development and manufacturing, which have their own separate responsibilities and complexities.

The majority of the mentioned departments are working under the corporate umbrella, but there are also equivalent departments under subsidiaries. For clarity, let's assume that the subsidiaries are working with different machine types globally, so from a manufacturing perspective, this makes sense. Against this background, the software development department I'm part of is under the category of "offboard" and under corporation umbrella. We are also globally distributed in different countries and continents.

Customers for my department are corporation's subsidiaries, through them the end customers and finally the corporation itself. Personally, my role is a software development manager, and I'm responsible for software development related to telemetry, location, real-time, and other web services. I'm also part of the "offboard" leadership group and have a crucial role in process development and SAFe-agile transformation design. The following picture 8 presents the current organization structure and hierarchy at a high level to understand how the different departments are separated. The organization structure is based on the traditional matrix organization model.
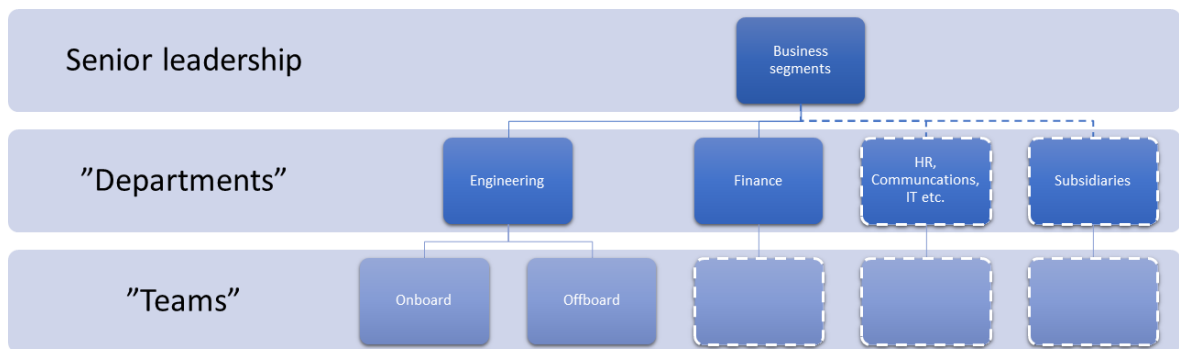
Figure 8. The current high level organization hierarchy

The detail that makes this particular organization a fascinating case for transformation study is it has already taken actions of transformation towards SAFe and beyond budgeting principles. Besides for these actions, almost all enablers for the transformation, Bogsnes [1] presented, can be recognized in this organization. For example, the dissatisfaction for the current situation and way of working can be seen in multiple departments in addition to the high level "need for the change". All the previous creates a fertile environment to study, design, and adapt a new way of leadership and development philosophies.

As an example of the actions mentioned before, the corporation has taken leaps to improve the "onboard" software development process towards agile principles. Although the created model itself is in between waterfall and agile, which brings its problems and is not applicable for pure software development, it leads the way in the right direction in transformation perspective. Similar changes can also be seen in leadership, budgeting, IT, and HR functions. They have taken steps towards the beyond budgeting principles, but the issue lies in none of those functions have been fully and completely transformed, and, in many places, this has led to the pitfalls, Bogsnes [1] and Connor [2] warns us about. Another example is my department, which is in the middle of SAFe transformation and has been in this state for a while. The reason for this is mainly because other supporting departments have not performed a complete transformation, or have not begun, which induces the usage of traditional leadership and budgeting models. This creates a high risk that our transformation won't ever be completed, or even worse, completely reversed. It also causes problems in information and "requirement" flow the following picture 9 introduces. In "software development", we

don't truly have the ability to iterate the decisions and requirements set to us, mainly because we lack "empowerment'. However, this matter is work in progress, and there has been and will be improvements taking place in the near future.
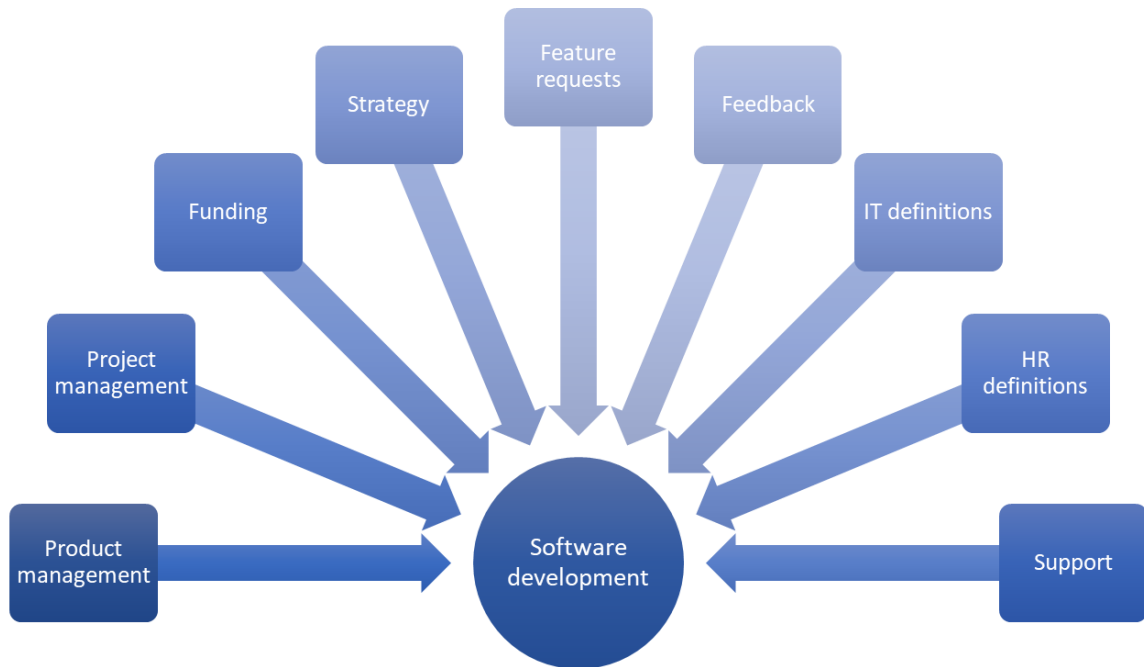
Figure 9. The flow of demands in current organization related to software development

To address the risk of transformation failure and the probability of success mentioned before, Bogsnes [1] presents the "formula of change". He highlights the critical elements for change to take place with the equation of

Dissatisfaction x Vision x First steps > Resistance

If any of the three first are low or zero, the resistance usually wins, and the change won't happen. Still, even considering all mentioned actions taken, the organization lacks the clear, shared vision, what needs to be done, and it doesn't have the first actions defined well enough. This brings me to my first empirical conclusion:

EC1: When designing and implementing the transformation, avoid the beyond budgeting pitfalls and improve the outcome of the formula of change.

4.1.2 Leadership model

I have structured the portfolio leadership model in this chapter in a similar way as it has been presented in Scaled Agile INC [21] lean portfolio management. Reflecting that model, I won't bring it closer to the actual portfolio planning, management, and implementation using my own experience from the topic and enriching it with findings from review sources. The model is also reflecting the current status and structure of the case organization introduced in chapter 4.1.1.

When investigating the SAFe models, I concluded that the exact SAFe model is targeted for wider organizational implementation. However, in many organizations, it is impossible to implement the model on such a wide scale from the beginning. It should be first adapted for a smaller scale in a spirit of proof of concept, to get feedback and information for creating a suitable transformation model. This process also improves the "formula of change" outcome drastically when the organization can see the results of the transformation in their environment and removes the risk of partial implementations and pitfalls the current case organization is facing. This approach was also endorsed in the review sources; hence here is my first primary empirical conclusion.

> PEC1: The lean portfolio management model should be first adapted for organizational proof of concept scale to enable and improve the outcome of wider scale implementation later.

The leadership model has three primary segments, each responsible for one key area of portfolio management and implementation. In the following picture 10, I introduce these segments in a format of a leadership model and explain its components in the following paragraphs.
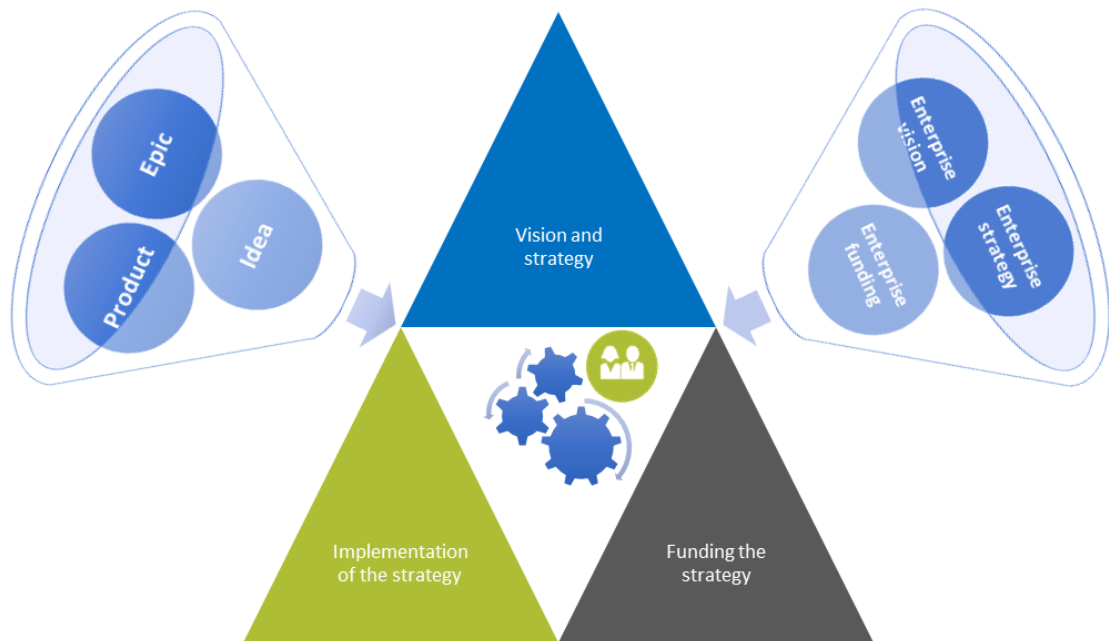
Figure 10. Portfolio leadership model

Before diving more in-depth on these segments, I want to introduce an empirical conclusion which is emphasizing the philosophies of SAFe and beyond budgeting. The conclusion is critical for successful portfolio management, communication, and it should be considered as a foundation principle in the adaptation of the leadership model.

EC2: Make sure that the whole leadership group understands and applies the principles of decentralized and empowering decision making.

The first segment, portfolio vision, and strategy should consist of people from different business departments, including value stream stakeholders. This segment takes account and combines traditional project management, product management, and stakeholders under one guidance and leadership. The purpose is not to dissolve the current organization structure. It is to create a group of specialists and giving them the focus and right tools to achieve the set goals in an agile way, which brings us to my next empirical conclusion.

EC3: When creating leadership groups, make sure that they consist of the right specialist, give them focus and proper tools to achieve their tasks.

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In this context, if enterprise strategy steers which kind of services, products, and vision organization should actualize, this group steers the portfolio in the right direction through value stream requirements and vision. It is imperative that this group has defined stakeholders, or at least indirectly included, from all different user groups, for example, internal, external, and customer. These stakeholders drive the priorities for value stream development and give valuable feedback to the value stream business owners from the 'field'. This group is also responsible for arranging the co-operation of supporting marketing, sales, customer care, and communication departments. The coordination of these functions is value stream business owners' responsibility alongside the role of a primary contact point and spokesperson for the group. This gives us my next empirical conclusion.

EC4: Value stream business owners should have the final decision authority over their value stream priorities, strategy, and vision.

The second segment, funding the strategy, the primary responsibility is to help discover, manage, and categorize the aspects of funding for the value streams. In a way, this is a supporting segment in the portfolio leadership group, but still, a significant part of it, when the actual funding comes "outside" of the leadership group from the enterprise executives and finance department. The difference to the current model is that these representatives should be responsible for "making the budget work" and working with the portfolio leadership group to achieve the common goals, not just setting rules for them. They should be part of the team in its fundamental meaning.

I would phrase the purpose of this segment to answer the question of how funding can be acquired and used most efficiently from the perspective of both the enterprise strategy and the value stream. To achieve this purpose, it is critical for this segment to have the right knowledge from the different areas of agile portfolio management and implementation. This brings me to my next conclusions.

> PEC2: The leadership group should include at least one representative from finance who has the understanding from finance, engineering, and agile processes.

EC5: Financial complexity should be owned, and responsibility of finance and not complicate the implementation of the portfolio value streams.

The third segment in the portfolio leadership group is the implementation of the strategy. This includes the value stream product owners, enterprise architects, and release train engineers from the actual software development department who are responsible for the implementation and delivering the value streams steered by business owners in the given financial framework. Compared to the current status of this group in the case organization, the needed changes are minor ones. The principles and foundations are there; it is more of a matter of finalizing the transformation, which gives us the following empirical conclusion.

EC6: Don't blindly implement new processes, first investigate the existing ones and modify them to fit bigger picture before the wider transformation.

This group has a crucial role in managing and synchronizing the development of different value streams so that the set priorities can be achieved or raising the flags in the portfolio management group if something does not match or needs reprioritization. It is always a negotiation between value stream priority, requirement priorities, and technical implementation, which then circulates back to the initial funding and prioritization decisions. This leads to my next empirical conclusion.

EC7: The software development group should feel empowered and have the authority to make technical decisions on how the value streams should be implemented even if the decisions have a significant impact on budget and priorities.

The work in the portfolio leadership group is coordinated by the portfolio manager, who is also the first point of contact for all external communication and inquiries. In addition to the coordination and leadership role, the portfolio manager has a major role and responsibility of applying the lean-agile leadership principles and measuring how they have been followed alongside the overall performance of the group. This measurement should be considered and applied to be more of a tool to steer and educate, not to evaluate or control. With this, I warn to be careful, of course, the line between the control and steering can be thin. To guarantee the success of this role, I introduce the next empirical conclusion.

EC8: Portfolio manager should feel empowered to protect, steer, and educate the portfolio leadership group towards the commonly agreed portfolio goals.

4.2 Budgeting model

Budgeting is a critical part of the portfolio leadership and influences the decision made in all levels of the model. There are three parts in the budgeting model I have created as a part of my reflection. The first concerns the planning and tracking of the portfolio value streams and their budgets, second is the identifying and investment to horizons; how can we invest in the right time and maintain the dynamic portfolio. The third is the capitalization of the value streams.

4.2.1 Portfolio valuestream budgets

The first step in the process of more dynamic, value stream-based budgeting, is to define the value streams. I won't describe what precisely the definition of the value stream is, it can be found from Scaled Agile INC [21, Value streams], which also gives us tools to identify the value streams you have in your portfolio.

EC9: Identify portfolio value streams for better traceability and predictability to create more efficient and comparable budgets.

From a budgeting perspective, value streams will bring an easier trackability and clear capitalization targets. This comes from the incremental design and development process, which also creates a roadmap for the value stream itself. The following picture 11 adapts the model Sirkiä and Laanti [24] created in their article. It is following the classic resources-schedule-content triangle from agile development philosophy, where typically the content changes, not resource or budget.
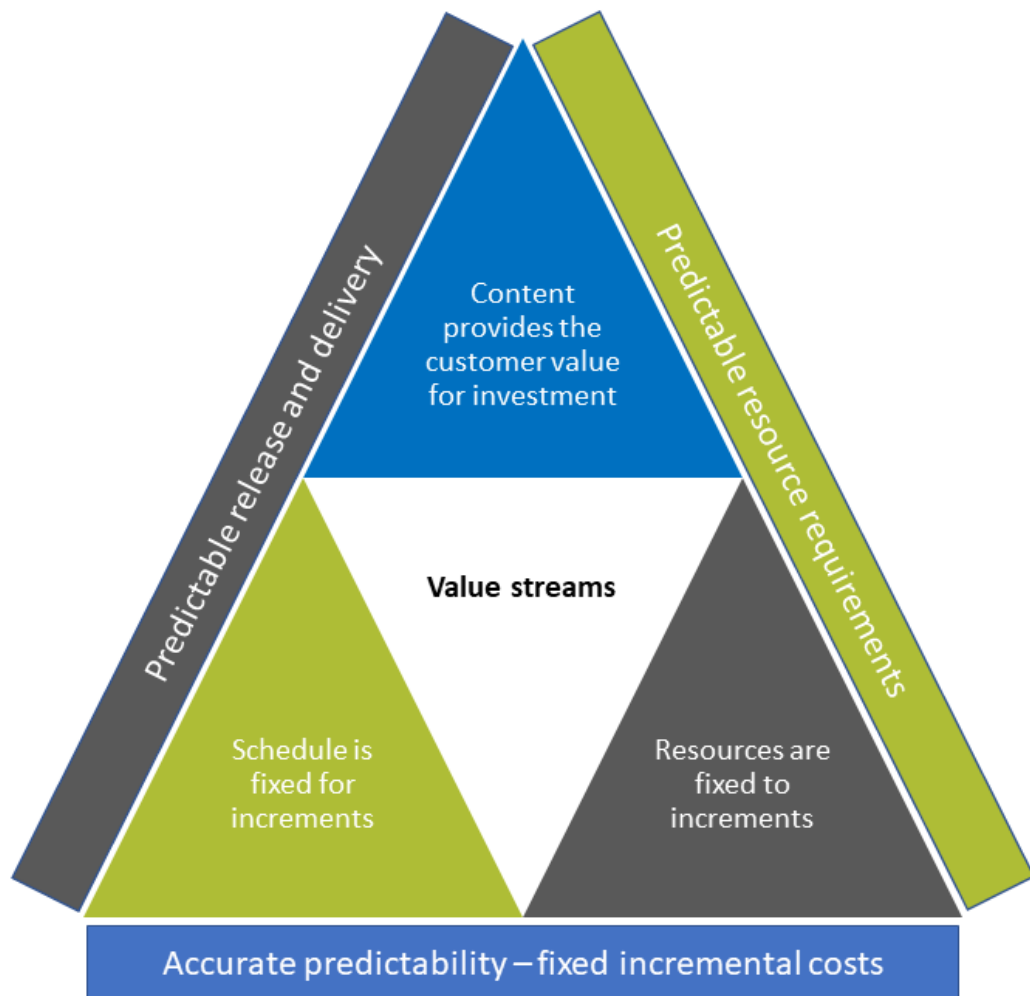
Figure 11. Valuestream budget predictability

For every increment, portfolio leadership needs to decide which value streams have the priority and what are the deliverables for those, which then links to the actual team allocation. The keyword in successful portfolio budgeting is the participatory budgeting explained in chapter 2.3.2. All the previous adds to the predictability of the portfolio budgeting that can be summarized to the following picture 12 of increment budget planning adapted from the model presented by Vierlboeck et al. [29].

Figure 12. Increment budget planning model

The presented long-term budget can be considered to be a combined burn rate estimate for the value streams burn rate. The budget restrictions can change during this long-term period for both directions, so the budget should be evaluated and planned incrementally with the value stream prioritization and increment planning. This brings me to my next primary empirical conclusion:

PEC3: Budgeting should be based on incremental reporting and value stream prioritization, not milestones, features or projects.

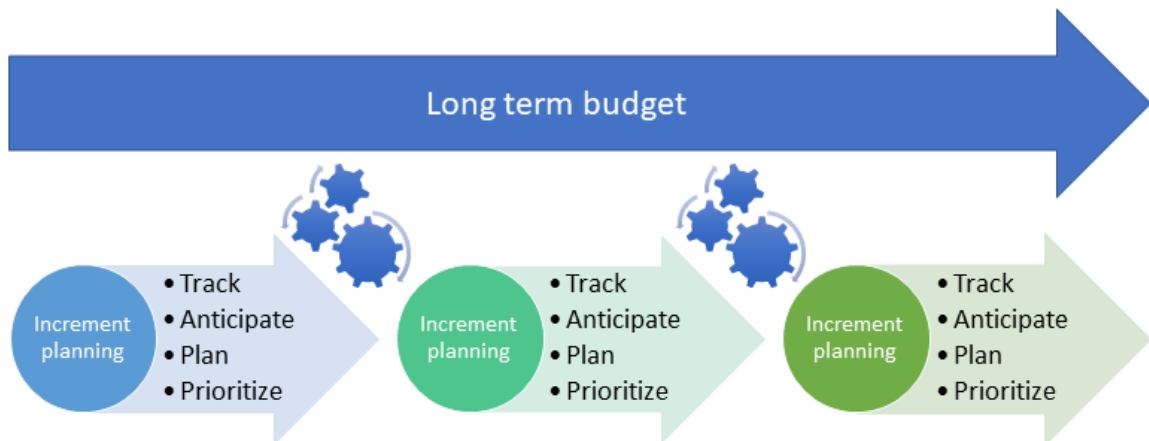### 4.2.2 Investment horizons

The second part of budgeting model is related to the investment horizons. After or simultaneously, when identifying the value streams, they should also be evaluated from the investment horizon perspective. I have introduced this concept in chapter 2.3.2 already as a part of the multi-vocal literature review, so there is no need to repeat it in this chapter. Instead of representing the already created horizon model, I would like to present my next empirical conclusion from this model:

EC10: Identify the investment horizon for each value stream to invest them on the right time and to gain more flexibility and ability to adapt to continuously changing market demands.

4.2.3 Capitalization

Capitalization of software development assets varies quite a lot between countries and companies. I have presented my findings concerning this in chapter 2.3.3, which includes a set of high-level capitalization rules which can be applied quite commonly. What I want to emphasize in this reflection is the role of agile development as a part of efficient capitalization. Agile teams can enable more efficient capitalization and business value gain because they focus strongly on customer value. An example from the agile teams' capitalization, when the initial feasibility phase is completed, all development can be traced to the features at a reasonable level and, therefore, can be capitalized. This also includes, for example, the Scrum Master effort and agile ceremonies. This brings me to my next empirical conclusions.

> PEC4: It is imperative for the leadership group to understand and agree with finance when what and how to capitalize the software development as a part of efficient budgeting model.

EC11: The same agreed capitalization rules should be applied to all identified value streams and not change arbitrarily inside the portfolio.

4.3 Supporting departments

From the supporting departments' perspective, the SAFe transformation will bring a need to change the traditionally applied processes and ways of working. These departments weren't the primary focus of this study, but they are still a critical part of the SAFe and beyond budgeting themselves. That's why I have introduced the IT and HR at a high level as a part of the SAFe transformation in chapters 2.4.3 and 2.5.

From the IT perspective, the transformation is more of a change from maintaining, steering, and accepting the developed software to enabler role to maintain and develop the infrastructure, including tools for the software development teams. This also brings the need for a more aligned approach for IT management, because when the toolset itself doesn't change, but the way how tools are used can vary between teams. Also, the requirements for different software platforms affect the used toolset. An example from is the mobile and web

development, even when the service itself is the same, the platform requirements are entirely different. Also, one huge change from the traditional IT process to agile methodology is that teams are responsible for the architecture, quality assurance, and maintenance of the developed software, not IT.

The same enabler role applies to the HR functions, too; they should focus more on competence issues and working environment where teams are productive and happy. This can be phrased as a shift from a process-oriented HR management to an empowering lean-agile people operations[4]. There are a lot of details in chapter 2.5 and the related articles on how HR can support and enable the transformation of others and where to focus in their transformation. From these details, I want to emphasize the points of genuine engagement and collaboration with portfolio management and especially teams.

My last primary empirical conclusion merges the transformation philosophy for supporting departments to the following:

> PEC5: Supporting departments should transform towards enabler functions with strong engagement and collaboration approach and methodology.

4.4   Summary of reflection

The reflective approach for SAFe beyond budgeting implementation models in this chapter presented four primary empirical conclusions, which all contributed towards the creation of the leadership model in their respective segments. These primary conclusions were enriched with the empirical conclusion, which reveals the logic behind the creation of the model itself and also the steps of how the model can be implemented in the respective scale. The empirical conclusions are presented in table 6.

Identifier	Empirical conclusion
EC1	When designing and implementing the transformation, avoid the beyond budgeting pitfalls and improve the outcome of the formula of change.
EC2	Make sure that the whole leadership group understands and applies the principles of decentralized and empowering decision making.
EC3	When creating leadership groups, make sure that they consist of the right specialist, give them focus and proper tools to achieve their tasks.
EC4	Value stream business owners should have the final decision authority over their value stream priorities, strategy, and vision.
EC5	Financial complexity should be owned, and responsibility of finance and not complicate the implementation of the portfolio value streams.
EC6	Don't blindly implement new processes, first investigate the existing ones and modify them to fit bigger picture before the wider transformation.
EC7	The software development group should feel empowered and have the authority to make technical decisions on how the value streams should be implemented even if the decisions have a significant impact on budget and priorities.
EC8	Portfolio manager should feel empowered to protect, steer, and educate the portfolio leadership group towards the commonly agreed portfolio goals.
EC9	Identify portfolio value streams for better traceability and predictability to create more efficient and comparable budgets.
EC10	Identify the investment horizon for each value stream to invest them on the right time and to gain more flexibility and ability to adapt to continuously changing market demands.
EC11	The same agreed capitalization rules should be applied to all identified value streams and not change arbitrarily inside the portfolio.

Table 6. Empirical conclusions formed on the reflection

The primary empirical conclusions are presented in table 7, and they lay the foundation for the discussion in chapter 5.

Identifier	Primary empirical conclusion
PEC1	The lean portfolio management model should be first adapted for organizational proof of concept scale to enable and improve the outcome of wider scale implementation later.
PEC2	The leadership group should include at least one representative from finance who has the understanding from finance, engineering, and agile processes.
PEC3	Budgeting should be based on incremental reporting and value stream prioritization, not milestones, features or projects.
PEC4	It is imperative for the leadership group to understand and agree with finance when what and how to capitalize the software development as a part of efficient budgeting model.
PEC5	Supporting departments should transform towards enabler functions with strong engagement and collaboration approach and methodology.

Table 7. Primary empirical conclusions formed on the reflection

All conclusions together summarize the philosophy of the SAFe and beyond budgeting in the context of the reflected organization. However, I also want to emphasize the point that it is not required or even recommendable to break the old reporting structure just yet. Instead, the focus should be on creating a leadership team, which is self-managed and empowered to achieve the tasks they are set to do. Start with an environment that can be isolated mostly to prototype and get feedback on these philosophies and methods. It is also worth of mentioning that this created model does not fit everyone's needs, like SCRUM, for example, doesn't work in every software development related environment. This model is meant to be a starting point, the first step to get people to think and consider what the future could hold.

5 Discussion

This chapter considers the implications for five primary empirical conclusions from a practical and research point of view.

5.1 Implications for practice

SAFe and beyond budgeting philosophies are fundamentally changing the professional way of thinking towards more dynamic, human-oriented leadership and processes. This transformation will always require a commitment from leadership to a single person working for the organization. To improve and make a successful outcome more likely, an organization should acquire more knowledge and support from itself and its employees. The reflective leadership model with the empirical conclusions was created to guide organizations through the first steps, or even leaps, towards the new way of working and thinking. The following table 8 introduces the practical implications in the organization for primary empirical conclusions.

Identifier	Implications for practice
PEC1	The leadership model creates a new concept of the self-governing entity which is enjoying the trust of enterprise leadership, working within the given financial and strategic framework, but also stating its own rules and restriction.
PEC2	Enterprise finance should be represented and supporting the software development functions inside the function to help to achieve the best possible outcome within the given financial frame.
PEC3	Value stream-based incremental budgeting creates a more dynamic and flexible working environment which is predictable and can be planned and tracked more efficiently.
PEC4	Higher capitalization rate for software development increases profitability and efficiency. Clear, robust capitalization rules also increase the trust in the organization.

PEC5	Supporting departments should be considered as an enabler function in organization for the benefit of all functions and especially they should focus on the good working environment from their respective responsibility area.

Table 8: Practical implications of the study

5.2 Implications for research

The goal of this study was to create a transformation model on how to get started in SAFe and beyond budgeting implementation in the context of case organization, which generates the interest could this model be beneficial for other organizations too, especially in light of organization-wide implementation as a next step. The table 9 introduces the implications for research for primary empirical conclusions.

Identifier	Implications for research
PEC1	The next step would be the creation of the models for the next phases of leadership transformation and its wider organizational implementation after successful prototyping phase.
PEC2	The exact processes, practices, and effects to include finance representative to portfolio leadership group should be investigated and prototyped.
PEC3	The exact process and practices of value stream based incremental financial reporting should be created and prototyped to study this model more.
PEC4	The level of financial knowledge in portfolio leadership required for a portfolio to function correctly should be investigated. This would provide valuable information on how exactly the leadership group could be structured from a finance point of view.
PEC5	The transformation model for a function focusing on enabler role should be investigated and created. Similar prototyping phase could be used for empirical study from this topic.

Table 9. Research implications of the study

6 Conclusions

The SAFe and beyond budgeting transformation can, regardless of the organization type, be considered as a significant change in the leadership, budgeting, and overall management philosophies and methodology. It requires learning and commitment from all levels, from senior leadership to the junior employee. From the findings of this review and reflection, the need for solid, clear strategy and vision towards everyone can commit, rises over everything else. An excellent way to assess the state of these facts and the organization's readiness for the transformation is the formula of change. The leadership and transformation model created in this study is especially answering this formula by increasing the transparency and knowledge of the goal, vision, and practical implementation possibilities.

It is also good to identify the similarities between these two philosophies, SAFe and beyond budgeting. Regardless they are different approaches for different industries and different departments of organizations, they overlap in many places, and the foundation principles are quite close to each other. It can almost be considered that when implementing SAFe, the beyond budgeting philosophy is also being implemented, or at least it should be to make the transformation to succeed over expectations.

6.1 Answer to research questions

The created primary empirical conclusions are answering the research questions set for this study, and empirical conclusions are enriching the primary conclusions and provide more details for the transformation model implementation process. The primary research question was phrased:

> How to get started in implementing SAFe and beyond budgeting philosophies in
> large-scale, global IT organization?

To answer this question, all five primary empirical conclusions are relevant and should be considered. Together, they form a high-level principle of how an organization can start designing and prototyping its model for transformation. They also favor the leadership and

process principles from SAFe and beyond budgeting, especially emphasizing the matter of trust in all functions and actions.

The primary research question was divided into three secondary research questions to study the impact of the philosophies on the three major segments of organization and software development leadership. The first secondary question focuses on the impact on leadership, and it is phrased:

How does SAFe and beyond budgeting philosophies impact on leadership?

To answer this question, the primary empirical conclusions PEC1, PEC2, and PEC4 are relevant. They form the foundation principles for the portfolio leadership group, how it should be structured, what kind of expertise is required, and how to start. To perform and deliver maximum value, this group should feel empowered to make the right decisions and create its own way of working.

From leadership, it is logical to move to budgeting and what are the impacts of introduced philosophies. The second secondary research question is phrased:

How does SAFe and beyond budgeting philosophies impact on budgeting?

From primary empirical conclusions, the PEC3 and PEC4 are focusing on the impact on budgeting. These conclusions can be summarized to the understanding of what can be done and what should be done from a perspective of value stream planning and tracking. Capitalization also plays a significant role in budgeting. It can increase or decrease significantly the amount of value that can be delivered with the "same" amount of investment.

The third secondary research questions focus on the supporting departments, especially the impact on human resources. This question is phrased:

How does SAFe and beyond budgeting philosophies impact on human resources?

The primary principle in supporting departments, like human resources, transformation is summarized in PEC5. The focus on collaboration and engagement instead of working in the own corner of the organization and transformation to enabler role, are the key factors in

successful transformation towards beyond budgeting.

6.2 Limitations of work

This study is limited to the selected SAFe and beyond budgeting frameworks and philosophies because these are linked to the case organization. However, there are other similar frameworks meant for similar use cases, or focusing more, for example, on leadership transformation. Most of them are fundamentally based on the same philosophies and even including these two. One example to mention is BOSSA nova, Eckstein and Buck [3], which combines, among other things, the philosophies for agile and beyond budgeting. Large scale scrum (LeSS) and disciplined agile delivery (DAD) are good examples from more software development focused frameworks, but they miss the overall leadership and focus on the development and delivery more.

This study was also limited to investigate only one organization that has started the transformation process towards the SAFe. This creates an excellent opportunity to study the current state and implementation already done, even analyze what can be done in the future. To research and create a model for this particular organization, the reflective practitioner research method was selected. This method gives the author an excellent opportunity to study and analyze the organization, it's state of transformation, and present the created model as an answer for the question of how to start the SAFe and beyond budgeting transformation.

However, this also sets the limitations and questions for the study's results; can the results be used in different organizations and how other organizations have done the similar transformations, or are planning to execute it. The selected reflection approach also limits the view from the organization; it is a single software development professional's point of view in the organization, and it doesn't reflect, for example, the finance professional's point of view. But, all this said, this creates an opportunity to do more empirical research. Like the created model is an answer to the question of how to start, this study also is the first step towards a more in-depth empirical study to create the full implementation model and roadmap. This matter will be discussed in the following chapter 6.3.

6.3   Future work

This study creates a lot of opportunities for future work. Taking account of the limitations of this study discussed in the previous chapter 6.2, this study establishes a foundation to implement the findings and, at the same time, enrich the model with empirical observations. This approach produces the topic for future work, which can lead to a wider organizational transformation.

> How the created leadership model improves the outcome of the portfolio from different aspects and how can that information be used for wider transformation?

This question leads to a more practical and empirical research question of:

> How to create a practical, organization-wide, SAFe and beyond budgeting transformation model for any organization?

Another possibility for future works surfaces from the framework limitation. By studying other different relevant leadership models like Eckstein and Buck [3] have created, can enable the creation of separate, possibly more complete, transformation, and leadership model. This model can take account better the different departments without losing the synergy with, for example, software development, which is executing SAFe. This approach gives us a more MLR related topic, which can also be tied to the empirical case study.

> What other leadership models there are and how they apply the agile and beyond budgeting models and philosophies?

This question can be enriched again with a more empirical topic:

> How other leadership models can be implemented with SAFe and beyond budgeting models or how they can be implemented separately?

Bibliography

[1] Bjarte Bogsnes. *Implementing Beyond Budgeting: Unlocking the Performance Potential*. 2nd ed. Wiley, 2016.

[2] Catherine Connor. *The top 10 pitfalls of agile capitalization*. 2016. URL: https://agilityhealthradar.com/wp-content/uploads/2017/05/The-top-10-pitfalls-of-agile-capitalization-Highlight.pdf/.

[3] Jutta Eckstein and John Buck. *Company-wide Agility with Beyond Budgeting, Open Space & Sociocracy: Survive & Thrive on Disruption*. 2020.

[4] Fabiola Eyholzer and Leffingwell. *Agile HR with SAFe*. 2018. URL: https://www.scaledagileframework.com/agile-hr/.

[5] Vahid Garousi, Michael Felderer, and Mika V. Mäntylä. "Guidelines for including grey literature and conducting multivocal literature reviews in software engineering". In: *Information and Software Technology* 106 (2019), pp. 101–121. DOI: 10.1016/j.infsof.2018.09.006.

[6] Dan Greening. *Why Should Agilists Care About Capitalization?* 2013. URL: https://www.infoq.com/articles/agile-capitalization/.

[7] Bettina Horlach, Ingrid Schirmer, and Paul Drews. *Agile portfolio management: Design goals and principles*. 2019.

[8] Bettina Horlach et al. *IT Governance in Scaling Agile Frameworks*. 2018.

[9] Lioba Howatson-Jones. *Reflective practice in nursing*. Learning Matters, 2016.

[10] Melanie Jasper. "Using reflective writing within research". In: *Journal of Research in Nursing* 10.3 (2005), pp. 247–260. DOI: 10.1177/174498710501000303.

[11] Teemu Karvonen, Helen Sharp, and Leonor Barroca. "Enterprise Agility: Why Is Transformation so Hard?" In: *Agile Processes in Software Engineering and Extreme Programming*. Springer International Publishing, 2018, pp. 131–145. DOI: 10.1007/978-3-319-91602-6_9.

[12]   Richard Knaster and Dean Leffingwell. *SAFe 4.5 Distilled: Applying the Scaled Agile Framework for Lean Enterprises*. 2nd ed. Addison-Wesley, 2018.

[13]   Janne Korhonen and Konsta Luhtala. *Upping the Ante: Agile Product Development at RAY*. 2015.

[14]   Maarit Laanti, Rami Sirkiä, and Mirette Kangas. "Agile Portfolio Management at Finnish Broadcasting Company Yle". In: *Scientific Workshop Proceedings of the XP2015*. Association for Computing Machinery, 2015. DOI: 10.1145/2764979.276498 0.

[15]   Dean Leffingwell. *Agile portfolio and program management in the scaled agile framework*. https://pdfs.semanticscholar.org/914b/5fdd0cdcd3cbc1c37015418c5fa43fe707e0.pdf. 2011.

[16]   Garry Lohan. "A Brief History of Budgeting: Reflections on Beyond Budgeting, Its Link to Performance Management and Its Appropriateness for Software Development". In: *Lean Enterprise Software and Systems*. Springer Berlin Heidelberg, 2013, pp. 81–105. DOI: 10.1007/978-3-642-44930-7_6.

[17]   Garry Lohan, Kieran Conboy, and Michael Lang. *Beyond budgeting and agile software development: A conceptual framework for the performance management of agile software development teams*. 2010.

[18]   Garry Lohan, Michael Lang, and Kieran Conboy. "A Performance Management Model for Agile Information Systems Development Teams". In: *Building Sustainable Information Systems*. Springer US, 2013, pp. 297–308. DOI: 10.1007/978-1-4614-7540-8_23.

[19]   Pat Reed and Walt Wyckoff. *Accounting for capitalization of agile labor costs*. 2016. URL: https://www.agilealliance.org/wp-content/uploads/2016/02/ACCOUNTING-FOR-CAPITALIZATION-OF-AGILE-LABOR-COSTS.pdf/.

[20]   Michael Sahota et al. *Beyond Budgeting: a Proven Governance System Compatible with Agile Culture*. 2016. URL: https://www.agilealliance.org/wp-content/uploads/2016/02/BeyondBudgetingAgileWhitePaper_2014.pdf.

[21]   Scaled Agile INC. *Scaled Agile Framework*. https://www.scaledagileframework.com/. 2020.

[22]   Donald Schon. *The Reflective Practitioner: How Professionals Think in Action*. Basic Books, 1983.

[23]   Rami Sirkiä and Maarit Laanti. *Adaptive Finance and Control: Combining Lean, Agile and Beyond Budgeting for Financial and Organizational Flexibility*. 2014.

[24]   Rami Sirkiä and Maarit Laanti. *Lean and agile financial planning*. 2013. URL: `http s://www.scaledagileframework.com/original-whitepaper-lea n-agile-financial-planning-with-safe/`.

[25]   Isabelle Smeekes, Hans Borgman, and Hauke Heier. *A Wheelbarrow Full of Frogs: Understanding Portfolio Management for Agile Projects*. 2018. DOI: `10.24251/HI CSS.2018.682`.

[26]   Stettina, Christoph Johann and Jeannette Hörz. "Agile portfolio management: An empirical perspective on the practice in use". In: *International Journal of Project Management* 33.1 (2015), pp. 140–152. DOI: `10.1016/j.ijproman.2014.03.00 8`.

[27]   Axel Úlfarsson. "Beyond budgeting: Critical factors for successful implementations". 2018.

[28]   Hidde van Manen and Hans van Vliet. "Organization-Wide Agile Expansion Requires an Organization-Wide Agile Mindset". In: *Product-Focused Software Process Improvement*. Springer International Publishing, 2014, pp. 48–62. DOI: `10.1007/9 78-3-319-13835-0_4`.

[29]   Maximilian Vierlboeck et al. "Budgeting for Agile Product Development". In: *Proceedings of the Design Society: International Conference on Engineering Design* 1 (2019), pp. 2169–2178. DOI: `10.1017/dsi.2019.223`.