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Ensuring the success of change by introducing common tools

SAFe for development

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This thesis was written for YIT, which is a construction company with over 10,000 employees and operations in 11 countries. YIT develops and builds homes, business premises and infrastructure and provides services around these areas as well as paving.

The case company is developing new concepts and services to meet customer expectations of better living in sustainable cities. Development must be efficient yet explorative. A new agile way of development was taken into use by a small and innovative unit in order to gain experience with it and eventually spread the model to the whole company if the results were seen as promising.

The objective of the study was to develop a process around the Scaled Agile Framework, which was introduced to large enterprises as a development methodology for testing ideas more quickly and delivering results that bring value. Additionally, a toolkit, a set of tools, were developed together with the process to take the new way of working into the organization and to make it stick. Such tools were definitions, templates, checklists and establishing a calculation for defining the business value.

The study was carried out using the best practices of research strategy using participating methods and quick feedback. The toolkit evolved as tools were taken into practice, tested and modified, keeping in mind that the toolkit was supposed to serve the whole company in the future and could also be taken into use in support functions such as HR and Finance.

The outcome satisfied the case company as it introduced a custom-tailored way of conducting development using SAFe methodology as a base. The toolkit was taken into use and used as training material for “How do we develop in YIT and how do you get started”

Keywords	Agile, Change Management, Development, SAFe, Tools

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Työn tilaajana toimi YIT, joka on merkittävä suomalainen rakennusalan toimija jo 11 maassa 10000 ammattilaisen turvin. YIT kehittää ja rakentaa koteja, viihtyisiä ja toimivia toimitiloja sekä vaativia infrahankkeita ja päällystystöitä. Yritys myös tarjoaa palveluja tuotteidensa ympärille sekä panostaa vetovoimaisten ja kestävien elinympäristöjen kehittämiseen.

Tilaajayritys kehittää uusia konsepteja ja palveluja asiakkaiden muuttuviin tarpeisiin sekä entistä parempaan asiakaskokemuksen odotukseen. Kehityksen tulee olla tehokasta, mutta kokeellista. Uusi ketterä kehitysmalli otettiin käyttöön pienessä, mutta innovatiivisessa yksikössä, jossa kokeilukulttuuriin olla jo totuttu.

Opinnäytetyössä haetaan vahvistusta ajatukselle, jossa uuden toimintatavan esittely ja sen ottaminen päivittäisen työntekemisen menetelmäksi helpottuu, kun muutoksen läpiviemisen tueksi luodaan työkalupakki, joka sisältää prosessikuvauksen lisäksi määrityksiä, mallipohjia sekä tarkastuslistoja. Teoreettisen lähestymisen lisäksi prosessi sekä siihen liittyvät roolit ja tuotokset kuvataan ja istutetaan yrityksen toimintatapaan siten, että tuotos on otettavissa käyttöön koko yrityksen laajuisasti.

Työ eteni iteratiivisesti ja työkaluja päästiin kokeilemaan käytännössä heti niiden valmistuttua. Näin toimien palaute saatiin heti ja parannuksia voitiin tehdä lennossa.

Opinnäytetyön aluksi selvitettiin nykytilaa ja tavoitteita johtavilta henkilöiltä, jotka ovat olleet mukana muuttamassa osan yrityksen projektimaisesta kehityksestä ketterään kehitysmalliin ja todennut sen kehityskelpoiseksi tavaksi saavuttaa tuloksia: joko MVP-tyyppisesti, jossa pienimmällä mahdollisella toteutuksella validoidaan tuote tai palvelu tai haetaan ns. matalalla roikkuvia hedelmiä lunastaen johdon ja liiketoiminnan odotuksia nopeammalla syklillä kuin perinteisen vesiputousmallin mukaisella toteutuksella. Koska SAFe, kuten moni muukin metodologia on järjestelmäkehitykseen soveltuva menetelmä, yksi keskeinen työnosa oli liiketoiminnan kehityksen sovittaminen tähän tekemiseen.

Työ lunasti odotukset, jossa haasteena oli liiketoiminnan kehittämisen istuttaminen samaan malliin järjestelmäkehittämisen kanssa. Priorisointiin saatiin apuja laskentakaavalla, jolloin mielipiteet eivät enää vaikuta kehitysjärjestykseen. Työkalujen avulla prosessin omaksuminen helpottui ja mallia käytetäänkin jo uusien ketterien junien perustamiseen.

Avainsanat	Kehitys, Ketterä, Muutosjohtaminen, SAFe, Työkalut,

Contents

List of Abbreviations and Concepts

ART	Agile Release Train
CM	Change Management
DevOps	A mindset that fosters communication, collaboration and co-operations among professionals needed to develop, test and deploy a solution
DoD	Definition of Done. Implementation is ready and deployment is done.
DoR	Definition of Ready. Item is ready to be taken into development.
FO	Feature Owner
I & A	Inspect and Adapt
MVP	Minimum Viable Product
NFR	Nonfunctional requirement
PI	Program Increment
PM	Product Management
PO	Product Owner
RT	Release train
SAFe	Scaled agile Framefork
UAT	User acceptance testing
WIP	Work in Progress
WSJF	Weighted Shortest Job First (Prioritizing)

1 Introduction

Big Data, digitalization, performance leap, customer centric operations, more life in sustainable cities are words and phrases that are used in YIT's daily operations. In order to be able to take the performance lead and be a step ahead of competitors, YIT needs to put focus on employees' daily work and think how to make it more efficient and remove 'waste'. It is not enough to just be compatible for today; there is a need to think ahead: What does it require to be able to build homes where our customers feel at home in the future as well? What kind of services do we need to offer, in which channels do we need to be present, what is our competitive edge?

Customer Journey Management is key to YIT's competitive edge. Customers are spending increasing amounts of time online. This is raising customers' expectations for seamless experiences. Improving operational efficiency by improving processes, tools and activities in key touch-points will allow YIT to reach its goals.

Constructing houses, business premises, roads, bridges and tunnels will most probably be done in a traditional way: Make plans, do calculations and create schedules before any actual construction work. Agile and lean thinking cannot be implemented to this traditional field as such. What would our customers say if we would build the minimum viable product at first, such as a house without windows? In order to support the core functions, we need to improve processes and tools around it faster than before. Lean thinking was taken into software development trying to create applications and services faster than the waterfall way of developing. YIT is a very big company and there is ongoing development in many sectors, segments and operations that requires the same human resources, involves several applications and integrations and yet are owned and managed by different people.

To overcome these difficulties, YIT decided to pilot SAFe methodology in software development for one of the advanced functions. This could then be taken into use in the whole company, not only in IT-related development, but also in business development. How would such a big company full of engineers adopt lean ways of working? In my thesis, I will take process changes and change management under scrutiny as well as provide some actual tools to be of help. As we in YIT know, we love tools!

2 Description of the study

YIT is an expert in its core business projects while it has room for improvement in other development projects, such as business development and IT application projects. Scope creep, time and cost overruns and unsuccessful deployment are familiar issues in project steering groups.

2.1 Business Context

The case company for which this study is carried out is YIT.

> YIT is the biggest construction company in Finland and a major player in Northern Europe. We construct and develop apartments, business premises and entire residential areas. Furthermore, we are specialists in infrastructure construction and paving. Together with our customers, our 10,000 professionals create increasingly functional, appealing and sustainable cities and living environments. We have operations in 11 countries: Finland, Russia, Scandinavian and Baltic countries, the Czech Republic, Slovakia and Poland. The new YIT was created by the merger of YIT Corporation and Lemminkäinen Corporation, both over 100 years old, on February 1, 2018. In 2017, our combined annual revenue amounted to over EUR 3.8 billion. YIT Corporation's share is listed on Nasdaq. (www.yitgroup.com).

2.2 Business challenge, objective and outcome of the study

Development work in the case company was done in projects, which meant that the delivery of the results was slow because of the long definition and development phases. This often resulted in stakeholders not being entirely satisfied as their needs may have changed. Agile development was used to make development batches smaller. It brought challenges such as uncontrolled latencies because of dependencies. The list of need and requirements was always enormous and development was not smooth because of missing ownership, no means of prioritization and lacking expectations management.

The objective of the study was to overcome the challenges experienced previously and to ensure ownership, which would keep the scope within limits, make sure work is proceeding and that prioritization is done based on business value, not opinions. The target is a model that enables the participation of business stakeholders, and does changes based on early feedback if needed.

Main objectives of the YIT SAFe model were

1. to create a solid process for preparation and implementation keeping in mind the need to combine business and system development in an agile way
2. to define different size development initiatives in SAFe as well the definition of done and definition of ready criteria
3. to define decision cycle
4. to come up with means how to define business value for prioritization purposes
5. to define roles and responsibilities in different phases of the funnel
6. to define metrics
7. to ensure YIT SAFe model is taken into use in the existing agile release train and later successful launches of new trains.

The idea of the toolkit evolved constantly due to the huge amount of people, stakeholders included, taking part in its development. Learning is a slow process. Common models, processes, templates and checklists help people work towards a common goal – harmoniously. Processes help to predict and guide where repetition makes the change stick. Tools, definitions and templates are methods for deploying a new process to act as a new working model.

The outcome of the thesis should help with the adoption of SAFe and lead various value streams and agile release trains to operate in similar ways on the group level. I am trying to prove that a change is easier to adopt and even makes sense in a traditional engineer-oriented organization with the support of actual tools people can use during the change. Anchoring these changes into daily operations is more probable to succeed when there is a structured way of doing every day work with a new model.

SAFe and many other methodologies are concentrated in IT-related system development. IT is not only the implementation of a system or a functionality, but also very much about describing business processes, evaluating impact and business value, as well doing change management. This was recognized as one of the biggest challenges in taking the SAFe model in use and to be solved within this thesis work. As a result of this thesis, a set of tools will be introduced which work as a handbook for implementing SAFe methodology both in business- and IT-related development. In fact, in the end there is no separation between business and IT development. By the end of the thesis, one agile release train is acting as an innovator and has already changed the organization culture and showing the way for the early adopters and early majority.

2.3 Thesis outline

The case company had earlier identified that even the best led projects are likely to fail because of a lack of change management. A communication & training plan is prepared and stakeholders are informed and taken on as part of the development during the project. However, the latter part of change management is not planned as thoroughly and all aspects are not taken into consideration: How to implement and sustain a change that would stick?

The agile way of working creates new challenges to be solved in change management. Those responsible for development need to concentrate on many topics at the same while these development items are in different phases of development. Business people are not allocated as a resource, their participation is instead depending on the need and on their other duties. Employees who are affected by the change may have to adopt smaller changes but there is a numerous amount of changes in their daily processes.

How to combine business- and IT-related development? How to use SAFe in the case company? How to ensure business value? The key question formed during the process was: “Can we ensure the success of change by introducing common tools?”. A set of tools was expected as the outcome of the work, later to be called “YIT SAFe toolkit”, containing definitions, process definitions, templates and descriptions of roles and responsibilities.

This thesis is divided into seven sections. In the first section a short introduction to the business environment of the case company is given. In the second chapter the business challenges and objectives of the study as well as the thesis outline are described. Research methodology is introduced in chapter three and chapter four analyses best practices to conduct a change. Chapter five and six is about SAFe, where SAFe methodology framework is briefly introduced and concentrating into SAFe toolkit prepared for the case company. Finally, chapter seven presents the summary and conclusions of the thesis.

3 Methodology and materials

In this chapter, the chosen research methodology is described, as well as an explanation of why it was chosen and to be used in the study is provided. “Methodology refers to the theory of how research should be undertaken.” (Saunders et al. 2009; 3).

In addition, some background materials are introduced under the “Materials” chapter to be able to understand the roles and responsibilities in the later chapters together with the toolkit.

3.1 Research Methodology

Denscombe (2010; 6) writes that the purpose of an action research strategy is to solve a particular problem and to produce guidelines for effective practices. A practical need to further develop the framework chosen by the case company into methods existed and therefore, an action research strategy for the study itself was selected.

Koshy also supports this approach. He describes a number of characteristics of an action research. (Koshy 2005; 10), The following characteristics were identified as relevant for the study:

- It aims to solve a practical problem
- It is about improving practices
- It is participatory
- It involves analysis, reflection and evaluation
- Theory and practice are combined

The challenge in the case company was well identified, but the key question to be answered was evolving. As McNiff and Whitehead (2000) point out, the research question may not emerge until the research process has started, and is therefore part of the process of ‘progressive illumination’. They note that this is particularly likely to be the case in practitioner action research.

Framework existed but implementation was lacking a common understanding and the way of doing. This type of study involved management, team members and other experts. In the beginning there was a short survey to management about the current situation and the need for the change. (Appendix 1). During the study, value stream owners,

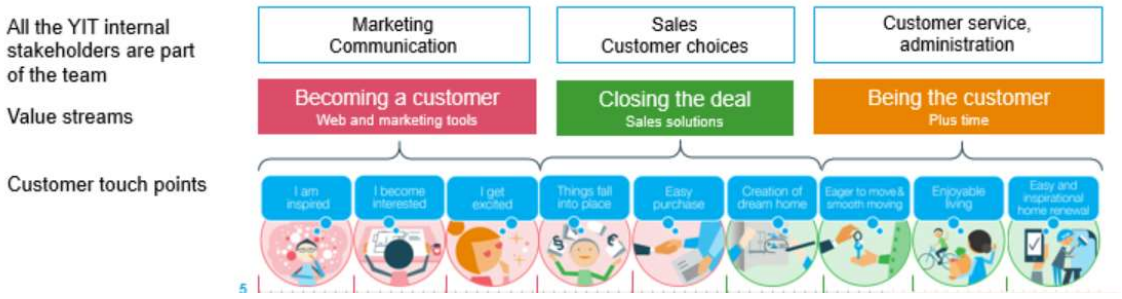
scrum masters, product owners and a release train engineer gave comments and improvement ideas as their teams were the ones who were supposed to work according to a common model at the end.

Short workshops around a topic were held and the outcome was taken into use immediately by the teams involved in the process. Retrospectives were done after each sprint by the teams evaluating the success and needed changes to the process as well a program level retro was held after a program increment to be able to improve the practises as a train.

Materials were prepared to be taken into use immediately, as SAFe methodology was already in use in one part of the case company. The method was participatory to a great extent. The outcome of each subset was taken into practice, evaluated and improved based on the feedback.

3.2 Materials

Some background material already existed. The Customer Journey and Customer experience processes were recently defined in the case company. These customer journey touchpoints were used to divide customer experience train into three different value streams. The first one concentrating on becoming the customer touchpoints, the second on closing the deal and third on being the customer.



Kuvio 1. Value streams in the case company

Prior to the study, organization roles were already defined within the customer journey. The situation was a bit unusual, as according to SAFe, one agile release train consists of one value stream. This particular case brought some twists and additional challenges

later on in the study. How these different three value streams have been organized, is seen below.

Kuvio 2. Roles in the Customer Journey train

The architect is responsible for the architecture in value streams. The tasks of an architect are: making plans, definitions and architecture, searching for best possible options, planning and defining the integration between other value streams and other parts of the technical solutions, discussing with other technical experts within YIT

The product owner owns the solutions, is responsible for one capability end-to-end and the quality of that capability. The tasks of a product owner are: managing the development and operations, bringing business needs to life, backlog prioritization, accepting the end results.

The business ambassador is the closest to various stakeholders in everyday work. He or she handles change management and process development, digs up the needs from the business and sells the ideas to the business units. The business ambassador's tasks are: Defining business processes and models and making them work, taking care of the Go-to-market activities and deployments, and handling the change management in the organization.

The value stream owner combines the company strategy for creating new business ideas and improvements for current services, brings value for YIT customers in the relevant

touch points and owns the concepts. The value stream owner's tasks are: Conceptualizing new initiatives, creating new business ideas, calculating business cases, testing the ideas, prioritizing the concepts, epics and features.

4 Best practices to conduct a change

Change is a Process, not an event. (Hall et al. 2001). Organizational changes happen all the time. Companies are downsized, re-engineered, re-strategized or merged, and facing cultural renewal after being merged. They might struggle with some quality issues of products or services or even be pushed to locate new opportunities for growth. Some of the changes are bigger and some of them are smaller and the impact on employees varies a lot.

4.1 Change Management

What has changed lately is the pace, amount and complexity of changes and the trend is increasing with no sign of letting up. John Kotter has travelled around the world interviewing leaders about changes they are making in their organizations and all of them are emphasizing the importance of change management. These leaders state that a successful change requires more of their time than they have been prepared for and that they spend over 40% of their time on the initiative. Emotions plays a vital role during change, especially with regards to making the change stick. Therefore, the emotional investment was valued highly among the leaders interviewed. Kotter was also told that his framework of Eight-Step-Change process has helped leaders in planning and designing their change programs. Many of those even suggested some tools, such as templates to help them structure their approach. (Kotter 1996; 1).

As found out later, Kotter did listen to the feedback from these leaders and published books that contained real-life examples, such as “Heart of Change” in 2002 and “Our Iceberg is melting” in 2005 together with Holger Rathgeber. The latter book was all about the story of a penguin colony and how Kotter’s eight steps produce the change needed in the group. He discovered that people were more willing to change when compelling experiences change their feelings instead of changing based on facts they were given. Management and Change Ambassadors all over the world realized that their message is affecting people’s minds better if examples are provided. A great deal of organizations was using the formula but still wanted more; Concrete hints, methods and tools would be useful to carry out a successful change. The heart of Change Field Guide was published to meet the demand for more specific advice with concrete examples on how-to-do it. (Cohen 2005).

Jurgen Appelo is invited to speak at conferences all over the world about changes and successful change management. Change is inevitable, according to Appelo. This is a fact that is widely known and agreed. Worth noticing is the fact that he also states that the way things were done in the 20th century are no longer working. This applies to change management as well. The eight-step-change programs that were conducted by the top management with great authority are no longer creating the sense of urgency as such. They are not able to paint a future people would want to be part of. Appelo is confident that with his methods, change becomes more sparking, and the engagement of people's minds and hearts grow. (Appelo 2012; foreword)

Kuula et al. (2012) are comparing new management paradigms to the development of a new product. Launch and lifespan of a new product is often presented using Bass diffusion model (Bass 1969) and according the study, the diffusion of management paradigms follows similar pattern and can be described using S-curve (Figure 6). As new theories are adopted unsatisfyingly at the beginning, the performance leap is not yet significant. Performance will speed up until the peak is reached and Late Majority follows Early Majority. New management methods are constantly being developed but it seems that the lifespan of S-curve is shortening by the time. Before one is fully adopted, a new practise is already being developed, often basing on previous ones. (Kuula et al. 2012)

Change in an organization involves social networks. Jurgen Appelo believes that when one wants to change behaviour in a social network, one needs to understand that there are four aspects of change management:

1 Dance with the system

2 Mind the people

3 Stimulate the network

4 Change the environment. (Appelo 2012; 7)

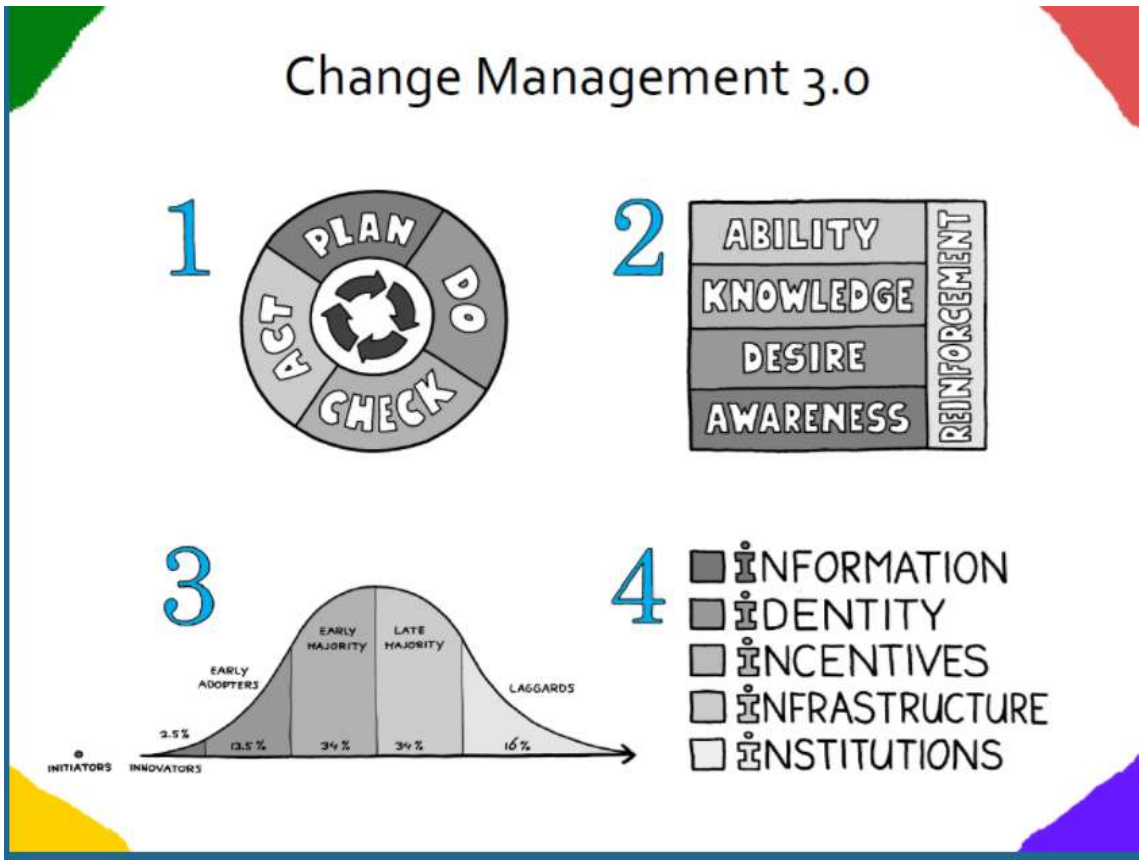
He is re-using some well-known change management models, one for each of the four aspects. He calls it "The change Management 3.0 Supermodel". An interesting part in his thinking is that he is taking the best and most convenient part of smaller models.

There are many different approaches to the change management field. "All models are wrong; some models are useful." (Box et al. 2005; 440). Even though the scope of the

thesis was limited to produce a toolkit, it needs the same kind of change management as any other change. Different change management models were evaluated in order to choose the best one to be used in an organization where the corporate culture of its predominantly male community is mainly formed of engineers who believe in facts, figures and spreadsheets such as Excel. Since the case company's organizational culture supports conducting change via concrete tools, Appelo's change management toolkit was considered to suit the organization and its employees the best.

4.2 Four aspects of change management

According to studies, the success rate of leading a successful change through an organization is dependent on how it is planned and led. There are many change management models, with more frameworks being produced continuously. In this theoretical part, Jurgen Appelo's Change Management 3.0 is taken under scrutiny while, in parallel, the suitability of John Kotter's eight steps of change is kept in mind.

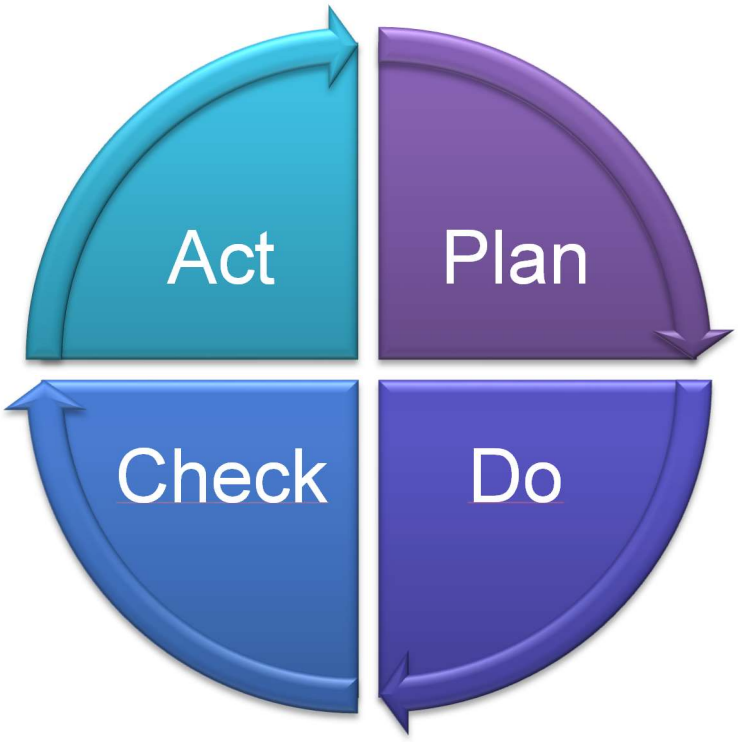


Kuvio 3. The four aspects of change management 3.0 Supermodel (Appelo 2012; 8)

4.2.1 PDCA

The first aspect of this supermodel is called the PDCA model. The letters PDCA stand for Plan, Do, Check, Act and it is an iterative improvement process. It was developed by Shwewart in the early 1920's and made popular by Deming in the 1950's. PDCA is a four-stage change management model that is used for continuous business improvement, incremental problem solving and iterative development.

The benefit of this model is its systematic yet agile approach to aiming at continuous improvement. The objective is to continually work according to the plan, check the results and do modifications if needed.



Kuvio 4. The PDCA model

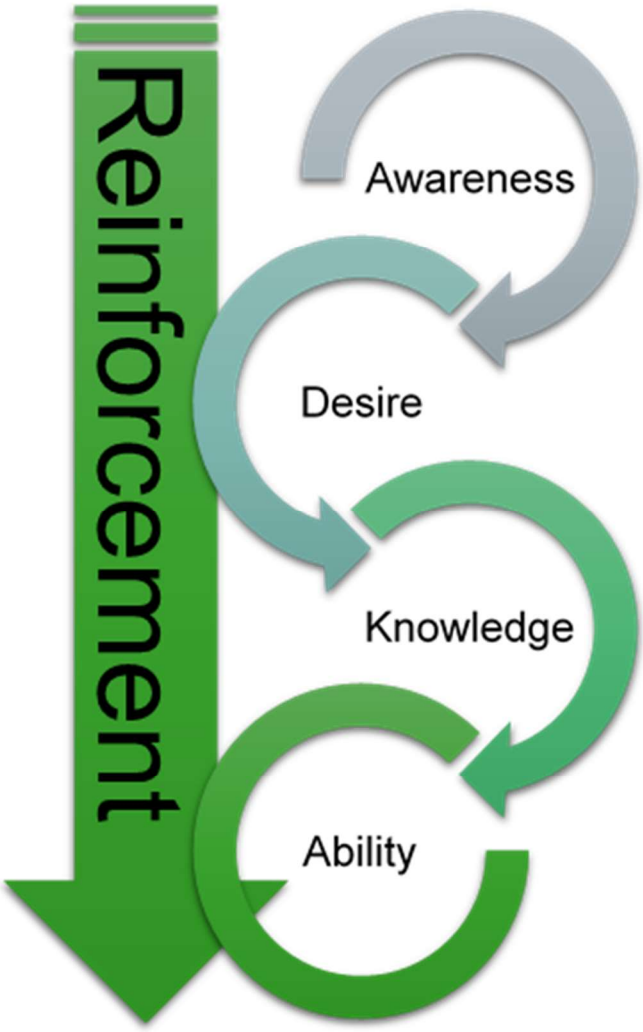
4.2.2 ADKAR

To be able to proceed with the desired change, people need a goal. To get people moving, they need a target they believe in and want to achieve. "When there is a genuine

vision, people excel and learn, not because they are told to, but because they want to." (Senge 2006)

Starting with small steps is needed to get people going. It is not enough to solely introduce a big picture, but to set clear and achievable short-term goals. The sooner feedback is asked for, the easier it is to react. Knowledge of what works and what does not, prevents from going into the wrong direction and investing into something that does not work.

The social system is formed of people, they are a crucial part of it. What makes things more difficult is that they are all different, they are individuals. "There is no one-approach-fit-all for social change. If you need an organization to improve, one has to work with people's individual needs, and the various barriers people put in their minds." (Appelo 2012; 22) When there is a need to affect individuals in an organization, one might try the ADKAR model developed by Jeff Hiatt [Hiatt 2006].



Kuvio 5. ADKAR model

Prosci's ADKAR model is a mainly result-oriented model that might be very typical for predominantly male and highly-educated lines of businesses.

The acronym ADKAR comes from five outcomes an individual must achieve for a successful change: Awareness, Desire, Knowledge, Ability, Reinforcement. This model concentrates on activities that will drive individual change. By affecting individuals, organizational results are achieved. (www.prosci.com)

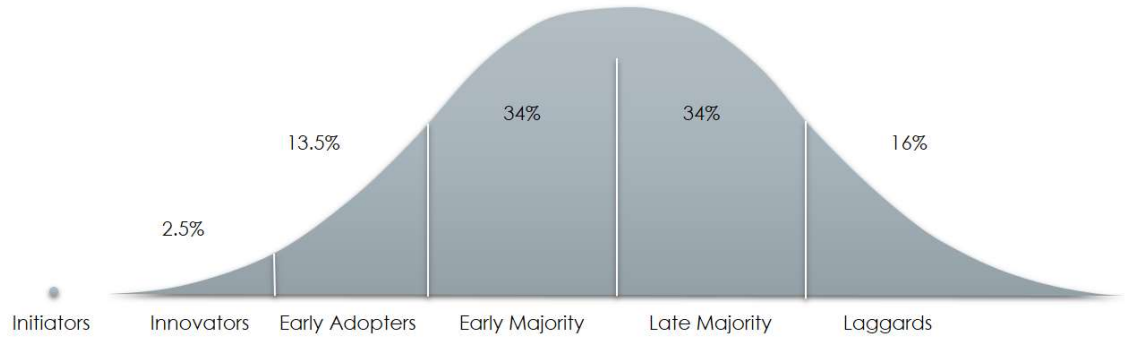
Awareness of need to change needs to be communicated. Kotter speaks about communicating the change vision and the importance of achieving the same understanding of the need, while Prosci uses the same principles on an individual level to stress the power of setting an example and repetition. Desire to participate goes hand in hand with

Kotter's Sense of Urgency, the first of eight steps. Knowledge, Ability and Reinforcement underpin Prosci's thinking about understanding how behaviour spreads.

4.2.3 Adoption curve

The third aspect Appelo uses to conduct successful change is the innovation adoption curve. It is important to understand that an organization is a social network and that it works as a sum of individuals and their interactions. (Appelo 2012;.24). Kotter has come to same conclusion and states that most cultural change happens in stage eight, not stage one. (Kotter 1996; 156). Innovators and early adopters tend to be opinion leaders and more socially forward, and thus, turn the organization towards change.

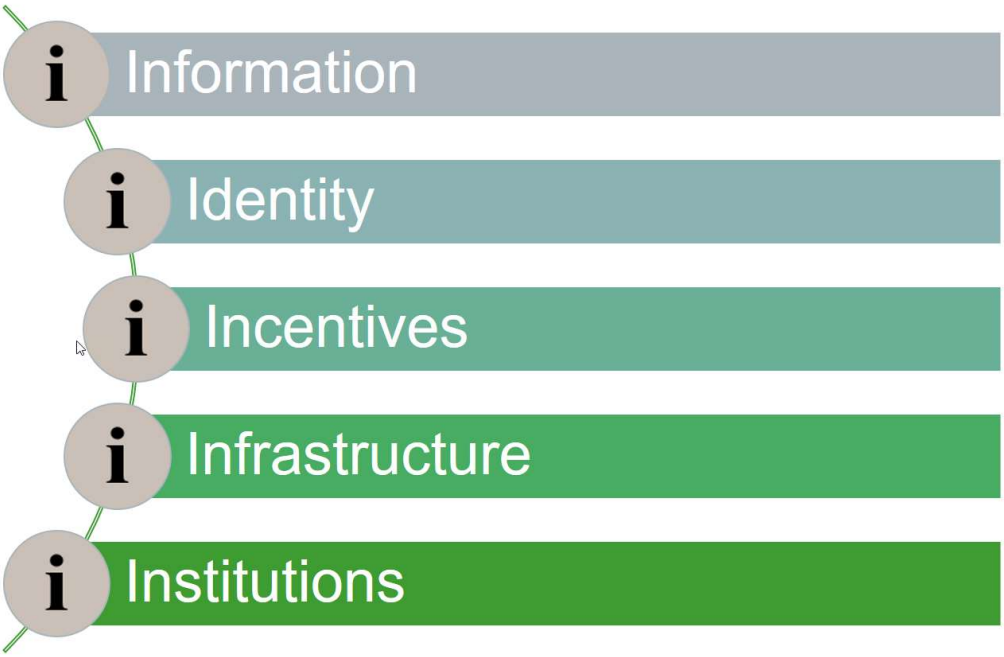
Laggards are the ones who can ruin the whole thing. They resist the change from the beginning and will do their best to get the organization back to its old behavior. Work is neither done, nor is the change adopted if the change is not stuck to this group.



Kuvio 6. The innovation adoption curve

4.2.4 Five I's

The fourth aspect of the change management 3.0 supermodel is The Five I's, also known as Four I's plus one. Basically, it is about changing the environment around people, which is easier to change than people's behavior. This approach is less likely to succeed in organizations that consist of well-educated people and is not to be considered in this case.



Kuvio 7. The Five I's

5 SAFe to manage operations

In this chapter SAFe framework is shortly introduced. It is a mindset, a set of principles and values that guide organizations to Lean and Agile development.

SAFe is a framework for scaling development across an organization. It is an abbreviation of Scaled Agile Framework for enterprise. Originally it helps large companies to achieve the benefits of Lean-Agile software and systems development at scale. It was introduced in the United States in 2011, after which more than a hundred large organizations have used it to gain benefits such as faster times to market, increases in productivity and more motivated teams.

SAFe brings together thought leadership from Agile development, systems thinking, and Lean product development into a framework that provides a set of principles, values and guidance for Lean-Agile development. The Scaled Agile Framework is a body of knowledge, graphically represented in the SAFe Big Picture.[1]

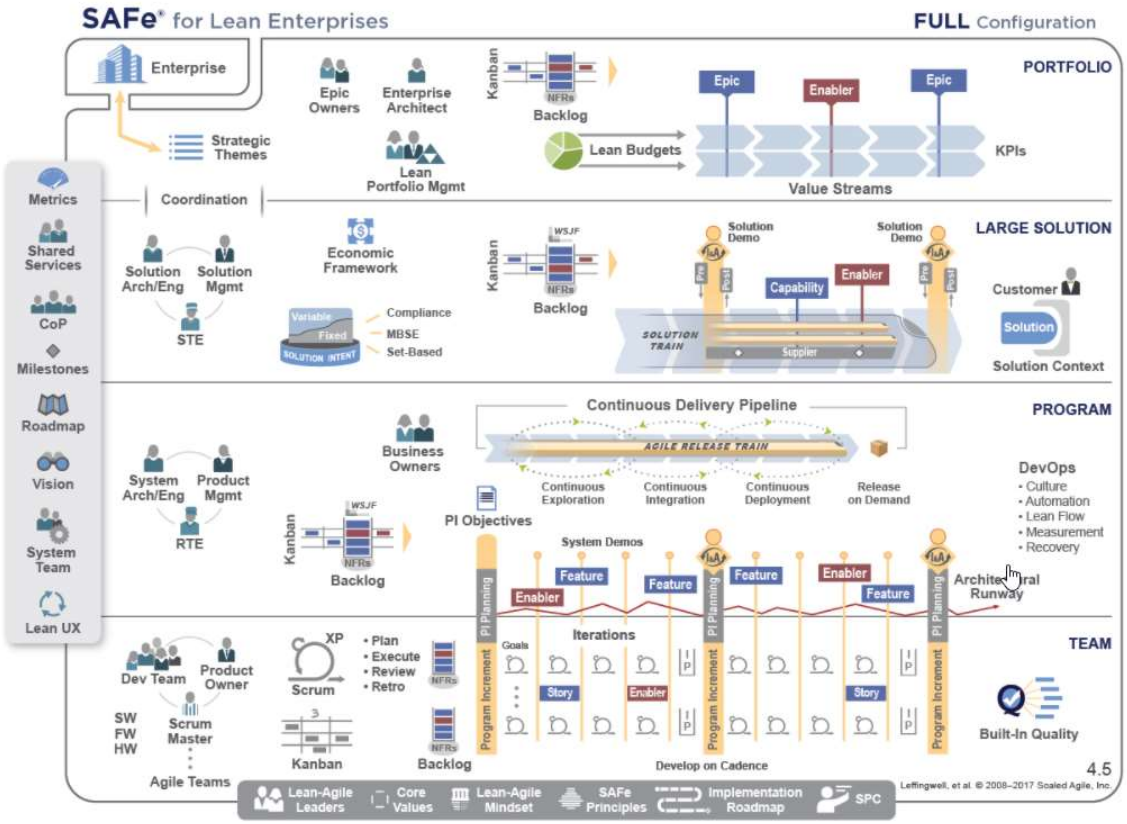


Figure 1. SAFe Big Picture

SAFe helps organizations test ideas more quickly and deliver results that bring value to the business much faster. It also improves portfolio management and simplifies governance.

5.1 Essential knowledge of SAFe

SAFe is, among other terms, about Value Streams, Agile Release Trains, Program Increments, Spanning Palettes and the SAFe foundation. Knowing what the concepts and abbreviations mean and learning how to take the methodology into practice takes time. Some help might also be needed even though the SAFe Journey is supported by an implementation roadmap which guides organizations every step of the way. (Figure 1)

Various teams and key stakeholders on a program level form an organizational structure called the agile release train (ART) which is dedicated to a common goal. Backlog is prioritized, progress is followed and development work is done during iterations aiming at continuous delivery pipeline and possibility to inspect and adapt fast.

Each organization is different. Though SAFe brings a good and solid framework, it needs to be taken into use in the organization. How to leverage Scaled Agile framework principles and practices and how to lead this transformation is taught in numerous courses worldwide, as well how to coach programs, launch Agile Release Trains, build a Continuous Delivery Pipeline and empower a Lean Portfolio. Third chapter describes how the agile release train is formed with a short description of key stakeholder roles.

6 SAFe Toolkit

As the Agile Release Trains on the company level and the individual teams in one train differ greatly from each other, it was obvious that guidelines on how to manage development should be defined. Equally important was the toolkit's role in describing how to broaden the use of the SAFe development model from technical development to business development. Common companywide cadence and process from preparation to development and deployment are essential parts of the toolkit and thus a great asset to portfolio management.

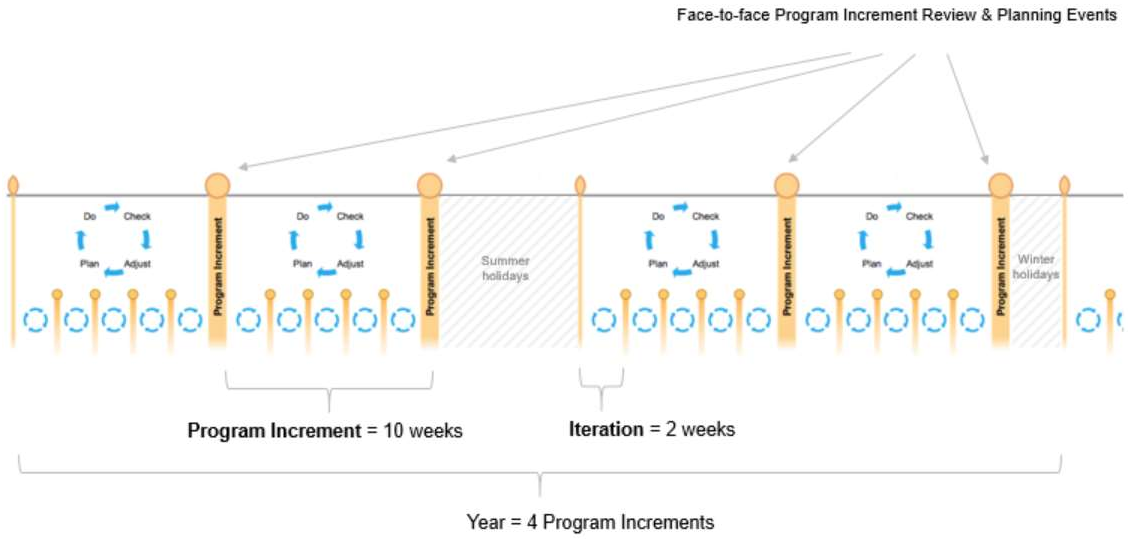
The technical tool used for storing the information and visualizing work in progress is VSTS (Microsoft Visual Studio). Some modifications were made to the application itself after the study was finished.

6.1 Targets and benefit

SAFe is, among other things, about bringing value, transparency and predictability to business. Correctly used, it matches the demand with capacity and minimizes work in progress, thereby enabling faster cycle time: No more major programs, but incrementally created solutions. It also provides better dependency management between teams. In a multi-vendor environment, it assembles one team with all the stakeholders and developers reaching for the same target.

6.2 Cadence

The development cadence is the same for all work and it lasts for ten weeks. This ten-week period is called a Program Increment. One increment consists of five two-week iterations. After each iteration, there is a sprint demo that enables the technical team and the stakeholders to test the expected business value in a working system, and receive fast feedback. At the end of a program increment, a face-to-face Program Increment Review & Planning Event is held, where all the key stakeholders participate.

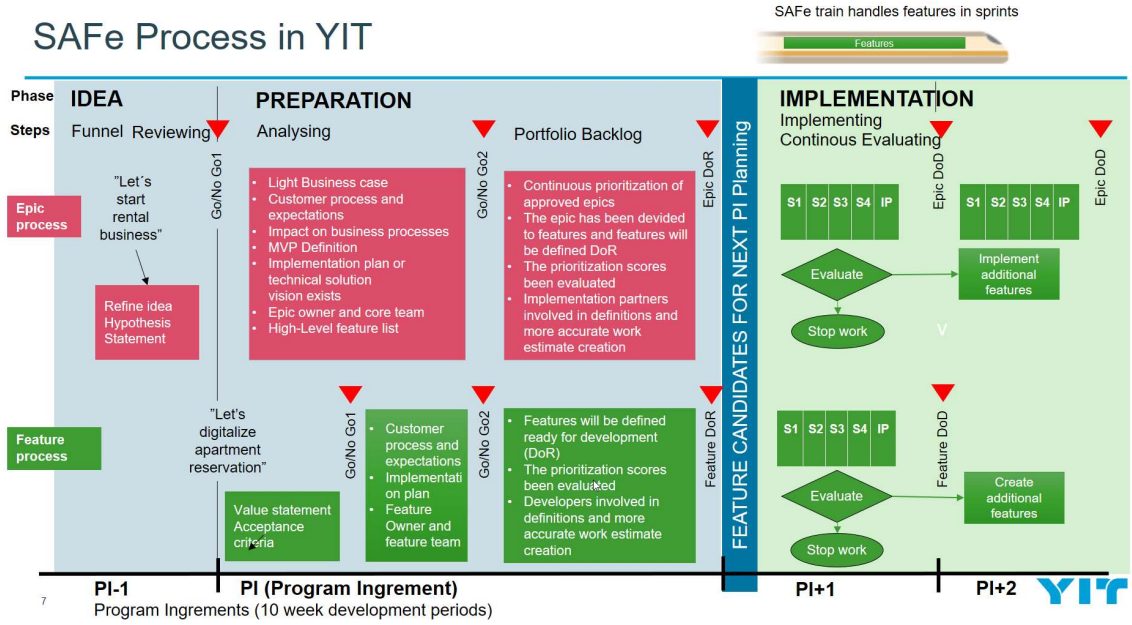


Kuvio 8. SAFe cadence

6.3 Process

The process was defined to serve small, medium and large-scale development work as well as the preparation, implementation and deployment work for both business and system development. In fact, different development types are handled similarly as the process remains the same.

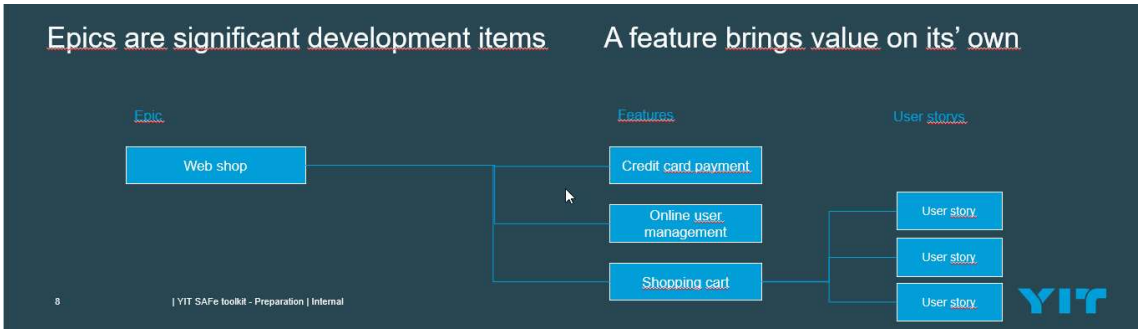
The process demonstrates how an Epic or a Feature moves to next phase. It describes the level of preparations and definitions that should be done before the gate is accepted and can be moved to the next phase. All development ideas go through a reviewing and analysing phase before they are moved to the next candidates for the next Program Increment. When a feature is ready to be taken into development, it means that it meets the criteria set but is not automatically taken into development. Features are prioritized and the backlog is formed according their prioritized value. In addition, the Business Owner paints the big picture by giving some priorities so that the team can plan their future work accordingly. This process will be explained more thoroughly in chapter 6.5.



Kuvio 9. SAFe process in YIT

Agile Release Trains contain features. This means that Epics are split into Features and that development work is planned on a feature level. Teams are responsible for splitting the Feature into smaller entities called User Stories, which help an individual team's planning.

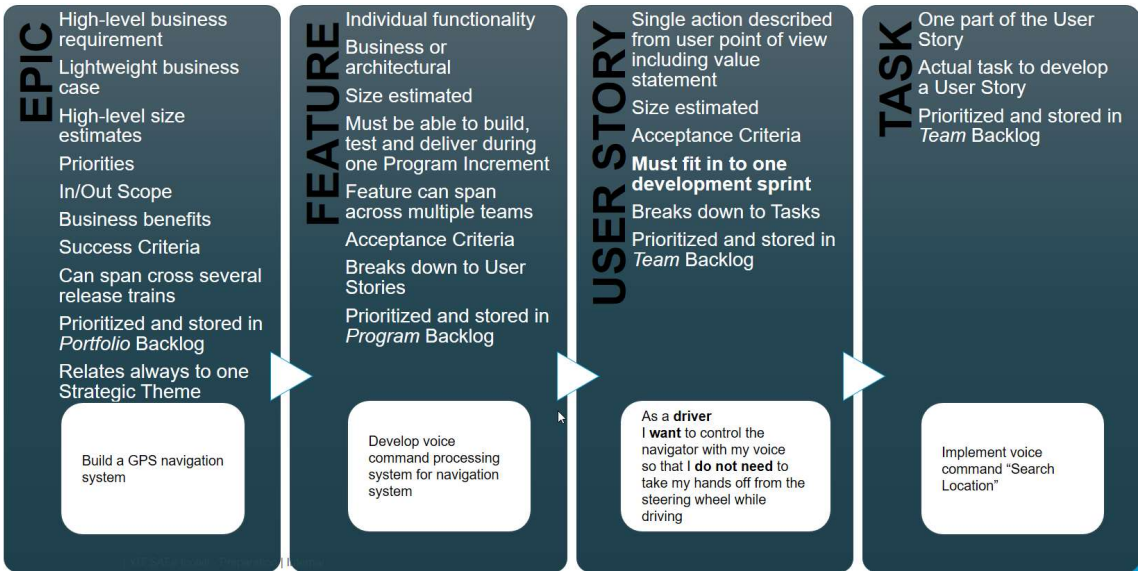
When to create an Epic with Features and when is just a Feature enough? An epic is a development initiative large enough to require analysis, a definition of a Minimum Viable Product (MVP), and financial approval prior to implementation. The implementation of an epic will take several Program Increments. Each feature has a value statement and its own acceptance criteria. They are parents to User Stories, which may belong to different teams, whose implementation fits into one PI.



Kuvio 10. Differentiation between epics and features

6.4 Definitions for epics, features and user stories

SAFe also covers the portfolio-level Epics whose development spans over multiple trains. This level was not relevant in the case company, so it has neither been defined nor described in a detailed level.



Kuvio 11. Epics, Features, User Stories and Tasks

6.4.1 Epic definition

Epics are fairly large development initiatives. There are two types of Epics:

1. Business Epics are customer-facing initiatives that encapsulate the new development necessary to realize certain business benefits and are often derived from the company's strategy.
2. Architecture Epics (Enablers) are initiatives in technical development, that are necessary to evolve portfolio solutions to support current and future business needs.

In the preparation phase the Epic size is estimated in T-shirt sizes.

Taulukko 1. Epic size conversion table

T-Shirt size	Man days work needed for all the parties	Job size estimation
XS	< 40	1
S	< 100	3
M	< 200	5
L	< 300	8
XL	< 500	13
XXL	< 800	20

Epics focus on fulfilling the needs in one program and in one release train. The implementation of an Epic is preferably spread across 1 to 2 program increments and its preparation normally takes one increment at most. Portfolio level Epics, if there were to be any, can be spread over several release trains as their nature is more of a companywide initiative.

An important part of the Epic definition is describing the business processes associated with it, as well as planning how to put these into practice. Change management and trainings should be part of an epic as features. It means that Epic preparation cannot proceed if there are no plans on how to deploy the functionality or the changes in processes. Epics are divided into features to be implemented on a train level just as implementation is done on the Feature level.

6.4.2 Feature definition

Each feature should bring value on its own. It delivers a package of functionality or a service that end users would generally expect to get all at once. Together with its size, the previously mentioned definition is used to define whether a development item is a Feature or a User Story. A feature is a group of stories that are related but can include stories for various teams. Features are not necessarily connected to any epic, since it is reasonable to not create epics just for the sake of it. The feature team and key responsible testers are defined early enough, as the feature owner is the one who drives the item forward before it goes to implementation and is the main contact person during development. Acceptance criteria need to be defined in enough detail as they also serve as a test script for the users doing user acceptance testing. These criteria can also be

clarified during the Program Backlog refinement. Features will be estimated, business value given, and time criticality and risk/opportunity aspects are evaluated. Work estimates are given in man days without decimals. With the help of these criteria, a Weighted Shortest Job First (WSJF) value is calculated. Chapter 6.6.

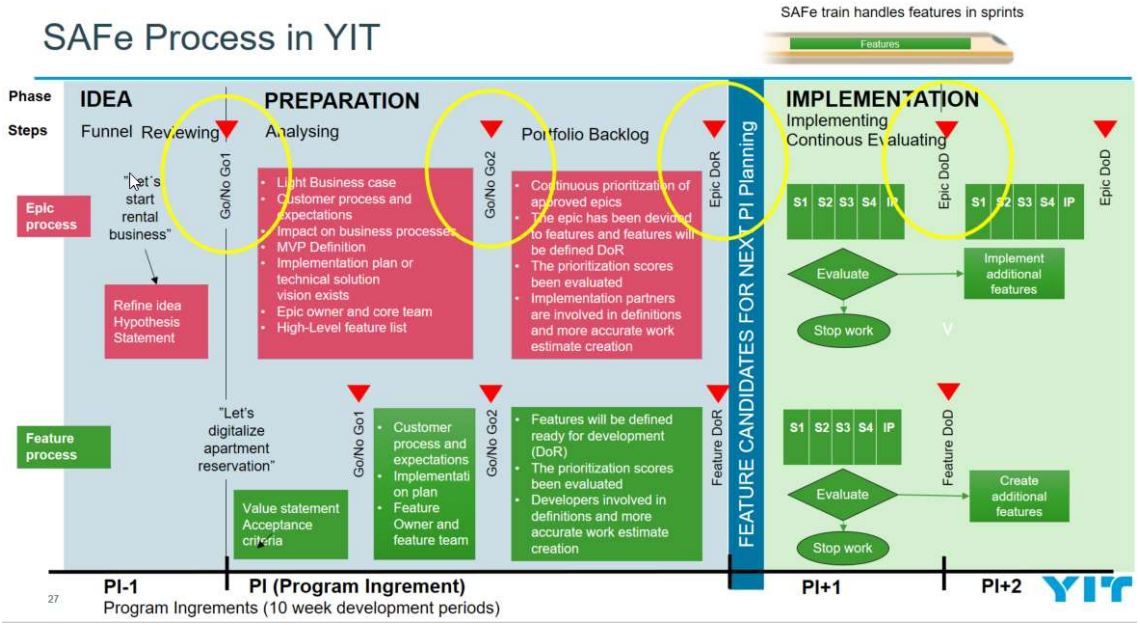
6.4.3 User Story definition

User stories are written in the format of the User's Voice: As a <role>, I want <feature> so that <reason>. User stories can be implemented within one sprint by one team and they are estimated in man days. It means that the ideal size of a user story is less than 10 days. Acceptance criteria are also set for user stories.

The beneficial characteristics of a backlog item is can be measured using the "INVEST" model, where "I" stands for independent. User stories should not have dependencies on another backlog item. N stands for negotiable as in the agile way of doing it is not carved into stone. "V" stands for delivering value to its stakeholders. "E" stresses the estimation where as "S" is for small and "T" for testable.

6.5 Preparation & implementation process

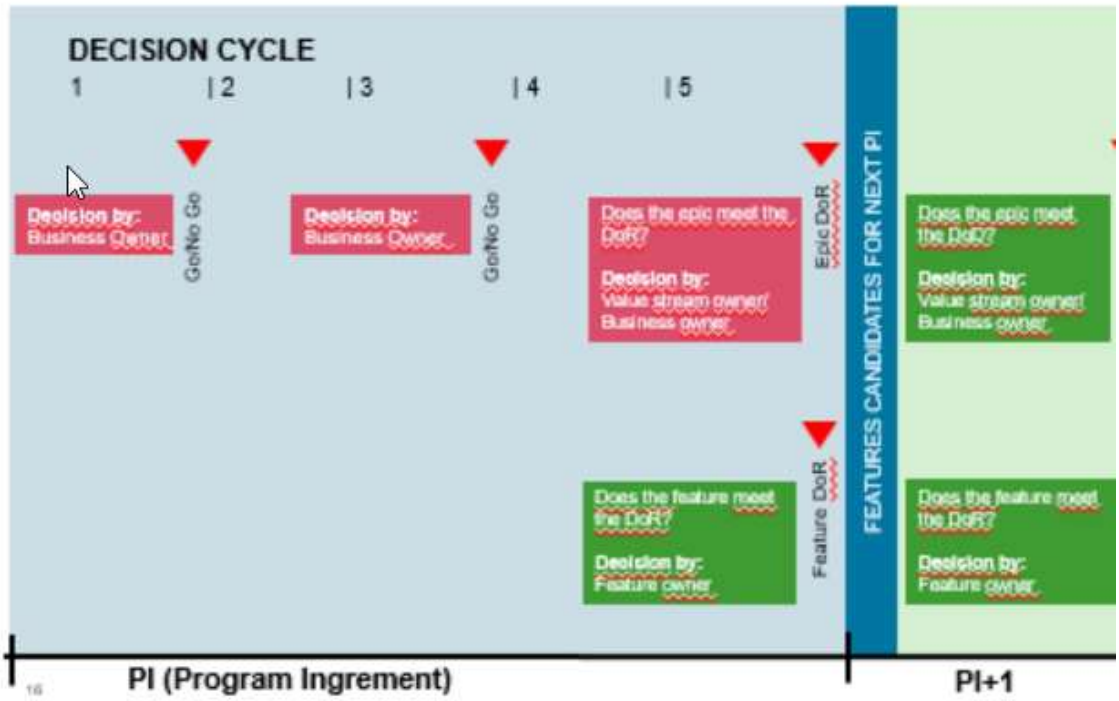
Process definition clarifies how an epic or a feature is born. What are the acceptance criteria for different items, by whom are they evaluated and when? What kind of actions need to be done before an item can be moved to the next stage? Who does the preparation and does it differ between epics and features? What happens before PI planning and who is responsible for implementation and evaluation? All these questions are answered in the process definition figure below.



Kuvio 12. Safe process & decision gates

Ten weeks is a short period of time when development and deployment are ongoing, and at the same time, the same people are responsible for preparing features from epics or standalone features for the next program increment planning session.

The decision cycle was created to bring predictability and transparency to the model. The product Management team led by the Business owner meets twice during a Program Increment: Once at the end of sprint 1 and after sprint 3. There can be epics and features waiting for Go/NoGo1 or Go/NoGo2 meetings. Starting the preparation of features (Go/NoGo1 decision) can be delegated to a team of specialists or to the person in charge of change management.



Kuvio 13. Decision gates

6.6 Defining the Business value and priorities

Defining the business value for a development item is extremely hard when there is more than one person defining it. This becomes more complex when various value streams and development teams' development items become involved. How to make the evaluation process rational and comparable? The most important factor is the business value; how can it be measured? A formula was created to guide people through the evaluation process. The formula was tested with some case examples and improved based on the experience gathered and comments received. Every feature is prioritized based on scores given in the backlog. Prioritization is done according to a sequence of steps to produce maximum economic benefit.

A common way of calculating the Business value will essentially help setting the priorities for the development work

1. Business value (See table 1 below)
    - maximum value: 40
2. Risk reduction value
    - Risk reduction OR opportunity enablement

- No impact: 0 points
- Risk reduction impact: 3 points

3. Time criticality value
    - What happens if it is done e.g. 10 weeks later? Will there be sanctions? Will some service be down?
    - No impact: 0 points
    - Deadline/impact exists: 3 points
4. Work estimates
    - In man days

Taulukko 2. Business value calculation logic

Impact on end customer experience		
Not at all 0 / Low 2 points / Medium 4 / High 6 / Significant 8 8 = decision to buy, 6 = WOW effect, 4 = positive feeling, 2 = CX is neutral, 0 = Not noticeable		
Impact: How many external or internal users totally (per month)		
0-10	2 points	
11-50	4 points	
51-300	6 points	
301-1000	8 points	
1001->	10 points	
Efficiency increase	**OR**	**Cost saving**
Time save		Cost save
Per user * per usage * users in a month		% of certain cost base
< 59 min	2 points	< 5%
1 hour – 24 hours	4 points	5-10%
> 1 day	6 points	> 10%
Turnover increase (per month)		
No increase in turnover		0 points
Turnover increase	< 2%	4 points
Turnover increase	2 - 5%	8 points
Turnover increase	> 5%	12 points
Launch of a new business, concept		16 points

Weighted Shortest Job First (WSJF) is calculated from the following: business value, risk reduction value, time criticality and work estimates.

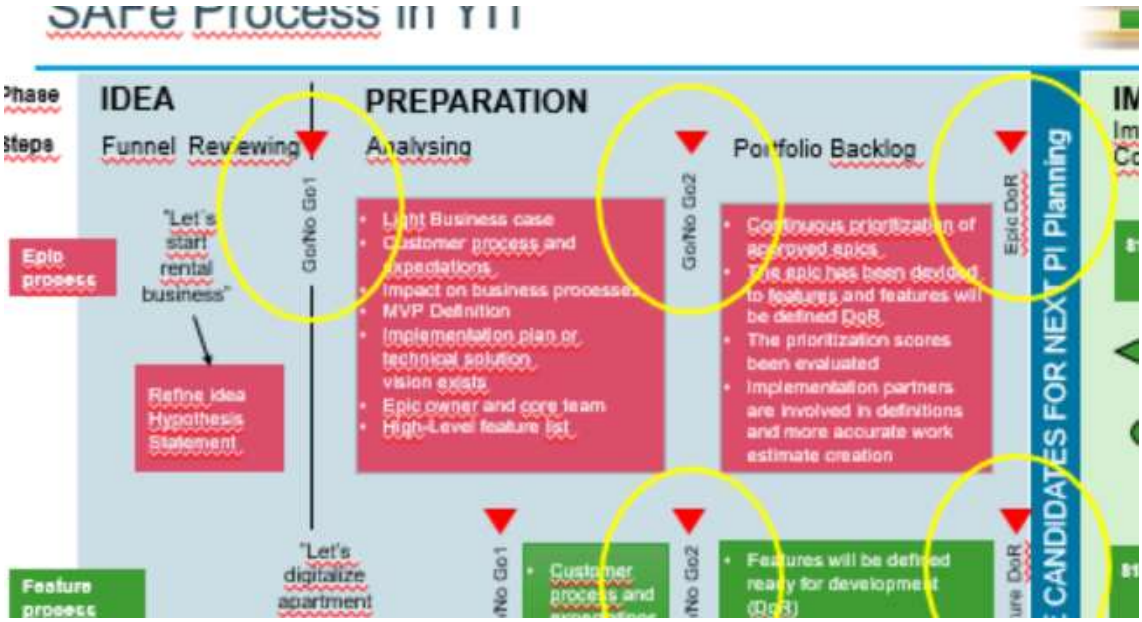
$$\frac{\text{Business value} + \text{Risk reduction} + \text{Time criticality}}{\text{Work estimates}} = \text{Weighted Shortest Job First (WSJF)}$$

Kuvio 14. WSJF calculation

Calculation examples for Customer Journey train can be found on appendix 3.

6.7 Tools for passing Epic, Features and User stories through the process

In this chapter, all levels of backlog items are defined with the aim of fulfilling the criteria before Go/NoGo gate decision one or two. Definition of done and definition of ready criteria were also created and will be presented as checklists.



Kuvio 15. Go/No go gates

A new epic is created into VSTS (visualstudio.com) and is ready for its first Go/NoGo meeting when the Epic is defined and it includes an epic description and a Hypothesis statement that contains the success criteria & how the outcome is measured. The epic description follows the SAFe model entirely. (Scaled Agile, Inc. 2016; 7.17)

For *<target user/market segment>*
who *<statement of need>*
the *<product or capability name>*
is a *<product type or theme>*
that *<key benefit, compelling reason to buy or use>*
unlike *<primary competitive alternative>*
our product *<statement of primary differentiation>*

The definition must include high level information on the elements that are needed for the MVP (Minimum Viable Product) and the elements that are out of scope. If there are non-functional requirements, they must also be stated.

The epic is then planned further for Go/NoGo2 with the following topics:

- Light Business case (Appendix 1)
- Customer process and expectations
- Impact on business processes
- MVP Definition
- Implementation plan or technical solution vision exists
- Epic owner and core team
- High-Level feature list.

Preparation continues after Go/NoGo decision and the epic is ready to be taken into development when

- epic is analyzed and prioritized between other epics
- epic is defined using the standard format and updated to visualstudio.com
- epic size is defined using T-shirt sizes
- light business case is created
- approval of an MVP estimate
- technical solution vision exists

- customer process and expectations are described and verified
- user experience vision based on verified user needs
- impact on business processes is evaluated and expected changes are described
- initial risks and dependencies have been identified
- epic has been initially split into Features and at least one feature fulfills the feature DoR (definition of ready)
- epic owner/coordinator and initial core team is defined and allocation communicated.

Taulukko 3. T-shirt sizes

T-Shirt size	Man days of work needed for all the parties	Job size estimation
XS	< 40	1
S	< 100	3
M	< 200	5
L	< 300	8
XL	< 500	13
XXL	< 800	20

The epic is ready to be closed when it meets DoD (Definition of Done):

- Epic has met its Outcomes hypothesis
- Scope is being evaluated
- Features are closed
- Change management is done
- Epic state updated to “closed” in the VSTS.

A feature is created into VSTS and the following information is given

- value statement
- acceptance criteria
- feature owner
- feature team
- E2E responsible tester, if needed
- nice to have, if any

- out of scope, if any
- set the target date only if it exists (e.g. legislation issues)
- feature is accepted to backlog by giving Business value, time criticality and work estimate.

The feature is ready to be taken into development when

- value statement exists
- business value, time criticality and effort are evaluated
- feature owner and team are defined
- feature acceptance criteria are defined
- VSTS is updated to visualstudio.com.

The feature is considered done and can be closed when

- acceptance criteria are met
- E2E & UAT tests are done and story exists if testing is needed
- all user stories are closed
- all the requirements are met
- documentation updated (process descriptions, user manual, technical description, etc.)
- chance management is done
- feature state has been updated in the VSTS.

As we go on to lower levels with smaller item sizes, there are less common criteria to be fulfilled but the team might instead add their own specific criteria, such as firewalls are opened, user rights are defined or usability tests are conducted etc.

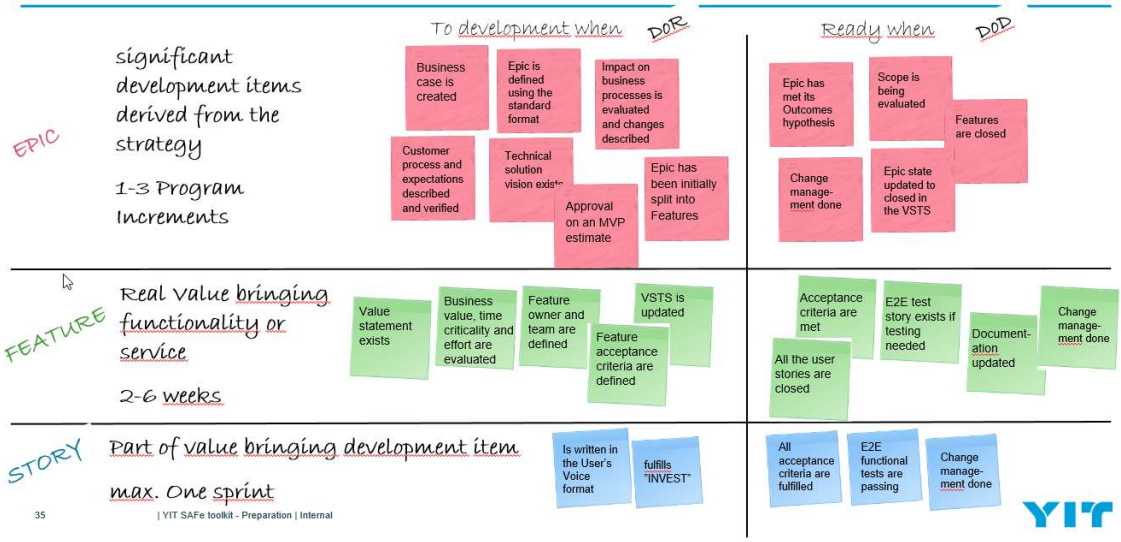
A user story is ready to be taken into development when

- business value is written in the User's Voice format
- the user story's work load is estimated in man days and can be completed in one sprint
- initial acceptance criteria are defined
- dependencies are identified and no external dependencies prevent the story from being completed.

The user story is ready to be closed when

- all acceptance criteria are fulfilled.
- in technical development stories
    - code builds without errors.
    - code is deployed to PREPROD environment.
    - E2E functional tests are written and passing.
    - regression testing is performed without errors.
- the needed documentation, diagrams and descriptions are produced and/or updated. Includes user manuals for business users
- change management is done.

Change management and trainings of an item that is being developed, should be thought of from the beginning. To make sure they are included a feature or a user story should be created about these topics with a responsible person assigned and a schedule. By doing this, we make sure that they will be conducted as features, preventing epics from being closed before all items below them are closed.



Kuvio 16. Preparation summary

6.8 Roles and responsibilities

In this chapter roles and responsibilities are described chronically meaning that they are described in the order of the development process.

Ownership is essential on every level when organizing development work done with SAFe. The business owner ensures the whole SAFe development team fulfills the strategy where epic and feature owners are in key positions. Competent Product Owners run the development work and teams are empowered and goal-directed. All the parties in one release train are part of the same team in their mindset and decisions are made in teams where the necessary expertise must be available.

When roles are clear, work can proceed steadily. The whole organization needs a common task management system (in YIT, VSTS)

6.8.1 Epic preparation on Funnel stage

The funnel is used to capture all new big ideas, which are described using a short phrase in VSTS to keep the investment in funnel epics minimal, until they are discussed by the Management team. Epics should be customer-facing initiatives that encapsulate the new development necessary to realize certain business benefits and are often derived from the strategy. Epics that meet the decision criteria are then moved to 'Review'.

Roles and responsibilities

- Management team consisting of a Business Owner, Value Stream Owners and Business Ambassadors, will regularly review the funnel for ideas that support the strategy as well as select the potential ones to be pulled into Review
- Management team will appoint an Epic Owner for the epic at the point it is moved to Review

6.8.2 Epic preparation on Review stage

In the Review phase, the epic idea that has been approved for further processing is defined more clearly, and a hypothesis statement is created for the epic. In the review phase, only a limited number can be processed to avoid excessive work in progress ,, which is currently set to 6 at maximum.

Roles and responsibilities

- Management team has appointed an epic owner, who is responsible for creating the hypothesis statement during the funnel phase
- Epic owner will create the epic hypothesis statement with the help of appropriate experts and reviews.
- After the review is done, the epic owner will present the epic to Management for approval, which will make the decision on whether the epic is moved to Analysis for detailed definition

6.8.3 Epic preparation on Analysis stage

The analysis phase is where the proper evaluation and epic clarification is made to ensure that it can be implemented by the Customer Journey train. At this stage, a lightweight business case is created, customer expectations are clarified as well as their impact on business processes, the MVP is defined and high-level features are created to facilitate estimation and the building of the core team. In Analysis, only a limited number of epics can be processed in parallel, preferably no more than 3-4.

Roles and responsibilities

- Epic owner will lead the core team
- The epic owner estimates the epic as well as defines the impact on business processes.
  Deliverables: Business case, MVP definition, Stakeholder brief and Blueprint for splitting the epic into implementation features and Change Management purposes
- After the epic has been analysed, the epic owner presents the epic to the Management team who makes the Go/NoGo decision. In case the epic warrants further study, the management team can return the epic to analysis.
- The core team, comprising of subject matter experts and other key stakeholders needed to define the epic, will support the epic owner. The management team will appoint the core team.

- Business Owner will approve the epics for portfolio analysis, where features will be defined for the PI planning

6.8.4 Epic preparation on Portfolio Backlog stage

After the epic has been approved by management, it will be prepared further for the upcoming PI as features. Features need to be prepared to meet feature DoR and the features of an epic are prioritized

Roles and responsibilities

- Business Owner approves the epic to Portfolio Backlog
- Epic owner makes sure that features that have been initially identified in the Analysis phase are prepared to meet DoR
- Epic owner is responsible for moving the features of an epic into the right column in the VSTS tool
- Epic owner prioritizes features in backlog according to WJSF

6.8.5 Role Summary of an epic Preparation

- Business Owner leads the PM team and approves the epics
- Management team consists of Business Owner, Value Stream Owners and Business Ambassadors. PM team led by the Business owner will meet on a regular basis (Decision cycle) to review and decide on whether to accept epics and standalone features to the next phase or not. The team consists of the Business owner, Value stream owners and Business Ambassadors.
- Epic Owner is responsible for coordinating Epics through the Portfolio Kanban system. If an epic is accepted, the Epic Owner works with the Feature Owner(s) and other Release Train stakeholders to define the Features that bring the value. They may also have some responsibility for supporting the initiative and doing business development and process tasks.
- Core team is a group of Subject matter experts that will support the Epic Owner in epic analysis

6.8.6 Feature preparation during analysis stage

During the feature analysis, new features are further explored. The refinement of these features includes the collaboration to particularize their descriptions, value statements and acceptance criteria.
Business values, time criticalities and effort are evaluated according to the formula. The WIP (Work In Progress) limit for this state must account for the availability of key resources, the capacity of teams and other subject matter experts.

Roles and responsibilities

- The feature owner is responsible for preparing the feature for the PI planning
- The feature owner will form a feature team that will analyze the feature, create the required specifications and in general ensure that it meets the DoR criteria by the PI planning. Business Ambassadors often assume the role of the Feature Owner. Deliverables: Value statement, acceptance criteria.
- The change Management team, together with Business ambassadors are responsible for business value, time criticality and Opportunity enablement / Risk reduction.
- The change Management team prioritizes the features according to WSJF
- The business Owner approves the features that will be finalized for the Program backlog

6.8.7 Epic preparation on Portfolio Backlog stage

The highest-priority features that were analysed and meet the DoR (Definition of Ready) advance to this state, where they are prioritized relative to the rest of the backlog using uniform criteria, after which they wait for the next PIP to be implemented. Size estimates in MD (man days) are used to limit the amount of work to be taken into the train at the PI planning.

Roles and responsibilities

- Value stream owners ensure that the business value and time criticality assigned to the features are aligned between features

- Feature owners make sure that features are defined appropriately and meet their DoR and will return the features back to further analysis if needed.
- Feature Owner also ensures that features spanning several teams are reviewed appropriately.
- Product Owner will, together with the team and within the prioritization limits set by the value stream owner, analyse the features and split them into high-level stories for the upcoming PI
- Feature owners will support the teams

6.8.8 Role summary for feature preparation

Business Owner

- Approves epics and features and makes Go/NoGo decisions.

Feature owner

- Feature owner will prepare the features for the implementation.
- Will make sure that features are defined as agreed and meet their DoR during the Preparation phase
- FO makes sure E2E and UAT will be conducted and has the E2E responsibility of the feature and DoD.

Feature team

- Feature team supports FO in preparing the feature for implementation

Management team

- PM team lead by the Business owner will meet on a regular basis (Decision cycle) to review and decide on accepting epics and features to next phase. The team consists of the Business owner, Value stream owners and Business Ambassadors.

Change Management Team members

- Participate in feature preparation and assign business value, time criticality and opportunity enablement / risk reduction scores
- Before next PI planning, they go through the remaining list of PI candidates, and whether they are still valid. Features will be closed, remain as such or have their WSJF score redefined.

Product Owner

- The product owner owns the element/service (VIP, Plus, Marketing 1 systems) backlog. The PO is responsible for defining Stories and prioritizing the Backlog to streamline the execution of program priorities, while maintaining the conceptual and technical integrity of the Features or components for the team.
- During preparation, the PO will create high-level user stories with the FO.
- During implementation, the PO will support the team in implementing the stories and accept stories when they are done.

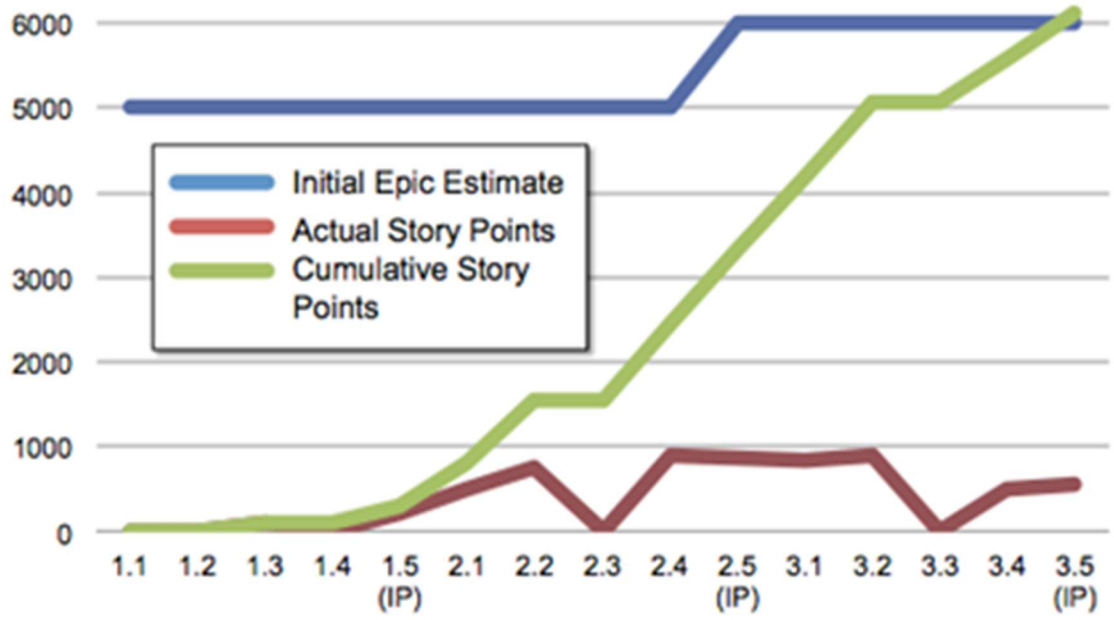
6.9 Train metrics

Train, value streams and teams have metrics to measure the performance. Teams are conducting their self-assessment evaluation on the health of the team at the end of a program increment. This is an important tool for the team to see what to improve and which areas are on a good level. On a train level self-assessment is not done yet, but instead there are certain metrics to be followed.

Metrics on a train level for showing success:

1. Program Increment (PI) velocity (development capacity and velocity man days)
2. Features planned vs Product Owner (PO) accepted per PI (Successfully implemented features on train level)
3. Successfully demoed features (Approved features on Release Train level)
4. Work estimation accuracy % (Accuracy of work estimates)

5. UAT accepted features (The number of features that have passed UAT after E2E testing)
6. Number of defects per PI (Number of production bugs/defects reported during PI)
7. Regression (=Amount of regression bugs/defects)
8. Number of PIs per Epic (Time-to-market for Epic)
9. Defects per Epic (Defects/bugs found per Epic)
10. Size in man days
    i. Initial epic estimate (=Estimated man days in lightweight business case)
    ii. Actual Story Points / man days (Amount of work completed during one sprint)
    iii. Cumulative Story Points / man days (Completed Story Points / man days per sprint)



Kuvio 17. Example graph of metrics

7 Summary and Evaluation

This section presents a summary and evaluation of the thesis project. Objectives are presented once more with an evaluation whether the case company can fully take advantage of the thesis.

Large companies tend to be more stiff than smaller ones. This is often due to lacking portfolio management, project management, slow decision making and unclear priorities. Agile way of doing improves productiveness and end customer satisfaction even though there are some problems that need to be solved such as dependency management between projects, resource allocation and ownership. SAFe is a framework to Lean-Agile development especially for large companies. It brings guidance for development and yet, organizations need to deploy it in a way that best serves the company and its resources.

The aim of this thesis project was to support the case company with the implementation of SAFe by creating a common process by developing a toolkit which guides people involved in development towards harmonious way of working.

The objective of this thesis was to develop a way how SAFe methodology could be followed in the entire company. One of the biggest challenges was to define a process also for non-IT related development as originally SAFe helps large companies to achieve the benefits of Lean-Agile software and systems development at scale. The process developed for this purpose was highly appreciated as common cadence, process steps, unified material and documentation brought needed structure to development preparation. Gates and criteria for decision making made sure that preparation was done properly in time, and if not, it was understood that the item is not accepted and cannot proceed to next phase.

Objective of bringing business real value in relatively short period also succeeded due to development items of same size (Epics, Features and User Stories) making estimation easier and the outcome transparent. Even more significant outcome was the business value calculation logic which makes decision making easier. Prioritization is done based on the facts, not basing on opinions or who discusses the loudest.

Very important objective was to create and train ambassadors – Early Adopters, to help the change management. New way of doing was first adopted in relatively small group

which was also taking part in the toolkit development. By defining roles and responsibilities, the change was easier to communicate and to make to stick. One significant detail of the role definition was that it followed the process and there was no need for making own interpretations.

Finally, the last objective was to define how to measure the success: What are the metrics followed on different levels of the train. Metrics, that were agreed on, are being used mostly at the end of a program increment (development cycle) evaluation. Self-assessment is crucial for inspect and adapt. This is done both on a team and on a train level.

In conclusion, this thesis could reach its objectives and provide the toolkit that was defined in the beginning of the project. The outcome has been revised by the Lean-Agile Center of Excellence of YIT and accepted as a toolkit for running trains as well as for the new ones to be established.

After the study, an interview was carried out with Minna Hämäläinen, the Senior Manager at YIT and instructor of the thesis.

According to Minna Hämäläinen, SAFe grows from lean and agile principles and is a fascinating tool for managing all kinds of development work. It improves predictability and dependency management, and additionally, it helps in focusing and capacity planning as the tasks are divided into reasonably sized portions. The prioritization model in SAFe promotes the items that bring the best value. In our experience, it requires strong ownership and forces everyone to work together.

In a big company like YIT, one needs to have tools that unify the way of working for all staff members. The only way to consistently communicate and reassure~~,~~ that everyone is working in the same way, is to provide them with common tools. The tools are the way of making the methods live.

As Minna Hämäläinen summarizes the outcome of the study: “YIT is keen in standardized and systematic ways of working and managing it with tools. We have always started with setting tools for every area. We are having toolkits e.g. for building project calculations, to personnel management and to contracts. SAFe toolkit is natural continuation in the process. With SAFe toolkit YIT is controlling the work and safeguarding the needed end results.”

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Survey on current challenges and objectives of the study

"Ensuring the success of change by introducing common tools to support the framework."

1) YIT:n kehityksen lähtötilanne, johon ketterillä menetelmillä, kuten SAFe ja Lean haettiin parannusta?

0/4000

2) Kuvaile joitakin haasteita, johon ketterillä menetelmillä pyritään tuomaan parannusta.

0/4000

3) Minkälainen rooli mallipohjilla, prosessi- ja roolikuvauksilla sekä yhteisillä määritelmillä on muutoksen läpiviennille ja juurruttamiselle?

0/4000

4) Minkälaisia tavoitteita on asetettu ja miten onnistumista mitataan?

0/4000

Lean business case

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Lean Business Case

Epic Name: (Short name for the Epic)	**Funnel Entry Date:** (Date the Epic entered the funnel)	**Epic Owner:** (The name of the Epic Owner)
Epic Description: (Consider using the Epic Hypothesis Statement in the Epic article as a starting point for a description of the epic.)		
Outcomes Hypothesis: (Describe how the success of the Epic will be measured: for example, 50% increase in shoppers under 25; Availability increases from 97% to 99.7%, etc.)	**Leading Indicators:** (Establish innovation accounting metrics to provide leading indicators of the outcomes hypothesis: for example, a measurable change in purchaser demographics within 30 days of feature release)	
In Scope: • ... • ... • ...	**Out of Scope:** • ... • ... • ...	**Nonfunctional Requirements:** • ... • ... • ...
Minimum Viable Product (MVP) Features • (Feature or Capability) • ... • ...	**Additional Potential Features** • (Feature or Capability) • ... • ...	
Sponsors: (List key business sponsors who will be supporting the initiative)		
Users and Markets Affected: (Describe the user community and any markets affected)		

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Lean Business Case

Impact on Products, Programs and Services: (Identify products, programs, services, teams, departments, etc. that will be impacted by this Epic)		
Impact on Sales, Distribution, Deployment: (Describe any impact on how the product is sold, distributed, or deployed)		
Analysis Summary: (Brief summary of the analysis that has been formed to create the business case.		**Go / No-Go:** (Go, or No-Go recommendation)
Estimated Story Points (MVP): (Estimated story points for the MVP of the epic)	**Estimated Monetary Cost (MVP):** (Example: Estimated story points * cost per story point for MVP features)	
Type of Return: (Market share, increased revenue, improved productivity, new markets served, etc.)	**Anticipated Business impact**: (Revenue, ROI, or other applicable financial metrics)	
In-house or Outsourced Development: (Provide recommendations for where the Epic should be developed)		
Estimated Development Timeline	**Start Date:** (Estimated start date)	**Completion date:** (Estimated MVP evaluation date or estimated number of PIs)
Incremental Implementation Strategy: (Epics are defined as a single whole, but each epic undergoes incremental implementation. Click here for details on potential strategies. Many parts of this guidance can also be applied to enabler epics)		
Sequencing and Dependencies: (Describe any constraints for sequencing the epic and identify any potential dependencies with other Epics)		
Milestones or Checkpoints: (Identify potential milestones or checkpoints for reevaluation of the Epic)		
Attachments:		

Calculation examples

This appendix is only for the case company