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Towards Lean-Agile Portfolio Management – Case Kela

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The main objective of this thesis is to investigate biggest challenges in current enterprise level ICT system development processes in case organization and study improvement opportunities to those. The research questions in this study concern to improvement opportunities of lean and agile thinking in enterprise level portfolio management. This research aim to find out answer to the question of 'too many simultaneous projects ongoing' dilemma. Also the aim is in the question how lean and agile thinking could increase the productivity by eliminating the waste from resourcing process. The case organization in this research is Kela, The Social Insurance Institution of Finland.

The strategy for this research is case study and action research. The data collection method is triangulation. The data for this study is collected by open interviews of organizations key persons, collecting metrics data from finalized projects and current process descriptions. The collected data is analysed with pattern-matching technique where the data from the organization is compared with theoretical frameworks and best practises from literature relevant for this case. As a conclusion of analysis the improvement proposal is created and for future actions the roadmap proposal is introduced.

The results of this study recommend to increase the level of portfolio management to one or two levels higher. It requires to establish a new entity called Solution. The focus of portfolio management should be moved from small projects to the large requirements derived from strategic themes. This enables portfolio management steer the development work. Another big recommendation is to change the resourcing principles fundamentally. If lean and agile principles are taken into use the resourcing could be organized in a way that one person is working with one task at a time. Also the administrative work around resourcing could be decreased remarkably.

At its best portfolio management produces overall up to date visibility to the organization development needs and enables strategy based decision making regarding investments and development priorities.

Keywords
Portfolio Management, Lean, Agile, SAFe

Table of Contents

1 Introduction 1
1.1 Motivation and background 1
1.2 Case organization 2
1.3 Objectives of the research 4
1.4 Restrictions 5
2 Research methodology 5
3 Lean and agile portfolio management 10
3.1 Definition of portfolio management 10
3.2 Challenges in traditional portfolio management 11
3.3 Conceptual framework for Portfolio Management 13
3.4 Lean thinking 16
3.5 Scaled Agile framework 19
3.5.1 Team layer in SAFe 21
3.5.2 Program layer in SAFe 21
3.5.3 Portfolio layer in SAFe 22
3.5.4 Budgeting in SAFe 24
3.6 Portfolio prioritization methods – risk and reward 24
3.7 Portfolio prioritization methods - Lean canvas 27
3.8 Terms and concepts 28
4 Analysis of current portfolio management 30
4.1 Current project portfolio prioritization criterias 30
4.2 Key person interviews 31
4.3 Summary of the interviews 33
4.4 Key metrics from projects 37
5 Suggestions for guidelines 39
5.1 Portfolio Management framework for Kela 39
5.2 Proposal for Portfolio planning and Portfolio categorizing 40
5.2.1 Analysis and prioritization of portfolio epics 42
5.3 Proposal for resourcing process 43
5.4 Suggestion for pilot case - Statistic and reporting 44
5.5 Roadmap proposal towards Lean-Agile portfolio management and resourcing 45
5.6 Feedback to suggestions from Kela 48
6 Conclusions 50
7 Reflection 54
References 56
Appendices 59

Appendix 1. Interview Questions 59
Appendix 2. Notes of the interviews (confidential) 60
Appendix 3. The Management of Operational Development (confidential) 60
Appendix 4. Portfolio Management Process (confidential) 60
Appendix 5. Resource Allocation Example (confidential) 60
Appendix 6. Project metrics data (confidential) 60
Appendix 7. Project metrics data – older (confidential) 60
Appendix 8. Summary of the Thesis 60

Index of Figures

Figure 1 Kelas organization 1.1.2016.....3
Figure 2 Research onion diagram, (Saunders, 2007).....6
Figure 3 IT Value Streams and Service Models, (The Open Group, 2015, 29).....14
Figure 4 Strategy to Portfolio Activities, (The Open Group, 2015, 31).....14
Figure 5 Enterprise ICT lifecycle, (Bayney & Chakravarti, Chapter 1.2).....16
Figure 6 Waterfall vs. lean.....17
Figure 7 The Big Picture of Scaled Agile Framework, (SAFe, Big Picture, 2015).....20
Figure 8 The Scrum Framework, (Scrum Alliance, 2015).....21
Figure 9 Risk-Reward diagram, (Krebs, 2009, 115).....25
Figure 10 Risk-reward diagram with project bubbles.....26
Figure 11 Lean Project Canvas.....27
Figure 12 ICT standard – management streams and functions, (ICT Standard, 2015).....32
Figure 13 Solution creation model.....39
Figure 14 Risk and value diagram for Epics.....43
Figure 15 Lean-Agile transformation program release plan.....47

Index of Tables

Table 1 Project data.....38

1 Introduction

Motivation and background is described in this chapter. The case organization is presented as well as the objectives and research problem. The limitations of the work and the structure of the thesis are discussed in this chapter.

1.1 Motivation and background

The case organization has a long history of the usage of ICT technology. Mainframe based solutions has been used and developed since 1970's. Mainframe still exists and some applications from 80's are in use. Large process and ICT system renewal has been ongoing already for couple of years. The estimated work amount for renewal is still huge. The renewal program is planned to continue at least till 2021. Due to tight national economic situation organization is phasing up a challenges in terms of cost savings in operating costs. Current renewal program has challenges with development project lead times, resourcing and with the quality of products. For example first real reform of one large benefit system took more than four years and cost was tens of millions of euros.

So far the development has done in quite traditional way. The organization has a culture to create everything by itself, meaning that the organization is one of the biggest software development houses in Finland. Some parts of the solutions are bought or will be bought but all core functionalities are developed ourselves. The organizations own system development methodology, JAMES, is based on Rational Unified Process (RUP) methodology. RUP as well as JAMES is iterative and incremental methodology and it is sometimes calculated as agile methodology. For example very common agile methodology Scrum is developed on top of RUP. However the development projects in organization are very much waterfall oriented. There is a long and strong culture that requirements are defined in all details before implementation and testing is done for ready solution.

Two big challenges was rise up in the interviews of this thesis:

1. Portfolio has a lot of small projects and new projects can be established during the year without updating the portfolio -> too many projects ongoing at the same time
2. Resources are working in too many initiatives at the same time -> key resources are overloaded and their effort is used for task switching. On the other hand administrative work to maintain current resourcing process is enormous

Part of the current challenges in ICT development process may be due to mainframe development culture. A new iterative and incremental, RUP based system development methodology has been developed for new system development in Kela, but adopting it as part of the culture requires also to learning out from old habits.

Top management has asked alternatives for optimization of lead times as well as optimization of costs i.e. return of investment should be more effective. Developers, especially newcomers, are keen and they are used to do the development in agile way. The renewal program has initiatives for agile software development, but agile requirements of upper levels like release management and/or portfolio management are not studied in renewal program. This study concentrates to the program and/or portfolio management level in agile perspective.

1.2 Case organization

The case organization for this thesis is Kela, The Social Insurance Institution of Finland. Kela is a non-profit national institute in Finland. The mission is to secure the income and promote the health of the entire nation and support the capacity of individual citizens to care for themselves. Kela manages the basic social security of all persons who are covered by the Finnish social security system. Social security benefits of Kela include subsidies for families with children, health insurance, rehabilitation, unemployment security, financial aid for students, housing benefits and basic pensions. Kela provides disability benefits, conscripts' allowances and assistance for immigrant aid. Kela is also responsible for inform the public about benefits and services, carry out research in support of the development of social provision, prepare statistical service, estimates and projections, needed to anticipate and monitor trends in benefit provision and other operations and also submit proposals for the development of social security legislation.

In addition, Kela is also responsible for providing the National Archive of Health Information (Kanta) services. Kanta is a collective term used for a range of national health care information systems including Electronic prescription, Patient Data Repository, a national pharmaceutical database, and a portal for citizens to access their own health information online. (Kela, Mission, 2014).

Kela's operations are financed by statutory contributions from the insured and employers and with funding from the public sector. In 2015, the state's share of funding is about 69%, remaining 31% of the expenditures were financed by wage earners, companies and municipalities. (Kela, Funding, 2015).

In 2014, the expenditure on Finland's social benefits by Kela was EUR 13.2 Billion, which is more than 2 500 EUR per capita representing 6.9% of the Gross Domestic Product. The operational costs were 3.0 per cent of total expenditure. (Kela, Annual Reports, 2014).

Kela's services are available throughout the country in more than 300 service points. Kela has a substantial impact on society, and it serves each Finnish citizen. Kela is an institution under public law that operates under the oversight of the Finnish Parliament. Finnish Parliament controls Kela by appointed 12 Trustees. The Trustees choose ten members to the Board. Upon the proposal of the Board, the Trustees approve the accounting principles and accounts of the institution and release the Board from liability. The Trustees also submit a report on their operations to Parliament annually.

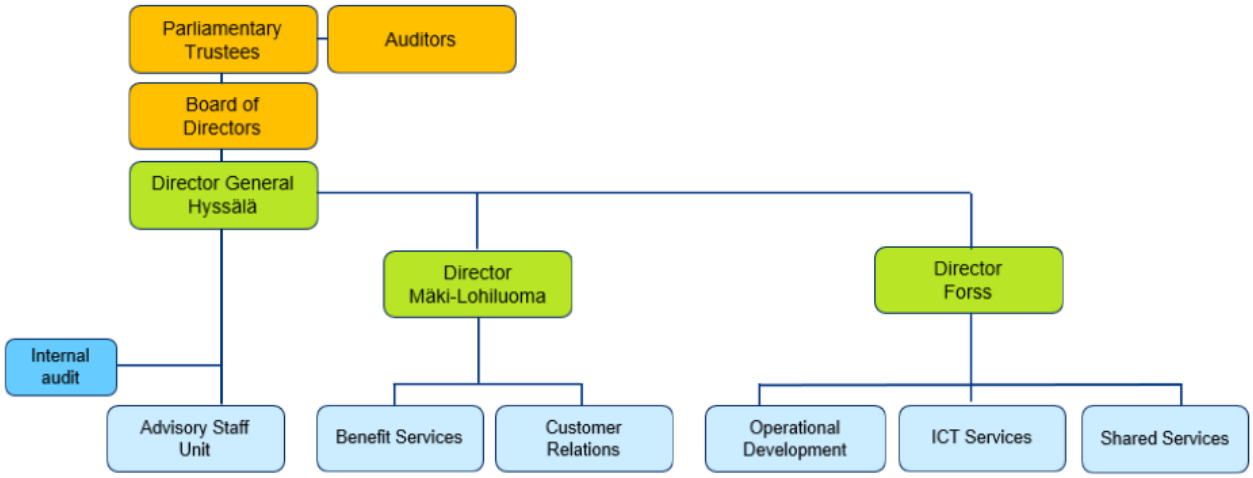

Figure 1 Kelas organization 1.1.2016

Kelas performance management model is based at Balanced Scorecard (BSC), which is designed at the enterprise level. Budget and personnel number are the most important key performance indicators which guide the decision making. The budget of whole enterprise is disaggregated to the profit and loss responsibility units. Performance management planning and implementation is monitored using Balanced Scorecards. Each unit has its individual BSC's where parts of the key performance indicators are a heritage from the enterprise BSC and some of the KPI's are unit specific.

Kela is under major change. The change extends in management approach, organization of the work and personnel as well as changes in the information processing systems. The governance model is changing to the two-tier model and the management approach will

be more process centric than earlier. New organization structure will be valid from 1.1.2016.

1.3 Objectives of the research

The first objective of this thesis is to investigate the current biggest challenges in ICT system development process. The throughput time of ICT development projects are relatively slow. This study will offer one viewpoint and change proposal for the management of Kela's operational development organization so that they have better possibilities to plan and manage the needed change better. Around 10 key persons from the organization will be interviewed and measurements of finished projects will be gathered. Interviews will concentrate to find out biggest challenges in current development process. Based on interview results the scope will be narrowed to one or two development areas.

The theories of the selected topic will be studied. A development proposal for the selected topic will be created as a result of this thesis. Roadmap for the proposed change will be also discussed. The operational development organization gets one alternative to improve their operations and decision-making. The benefit of this work will come though the one well thought alternative to optimize current way of working. With good alternatives the organization can achieve faster and bigger benefits of the change.

The aim for this thesis is to study pain points and possible bottle necks in the current ICT system development process and find out optimization possibilities based on selected theory studies. The objectives will be defined in more detail after first interview round with key persons from the organization. General objective in this point of time is to answer to the following research questions:

- How Lean-Agile portfolio management would improve productivity?
- How Lean-Agile portfolio management would solve current resourcing problem?
- How Lean-Agile agile portfolio management impacts to the current portfolio management?
- What kinds of changes are needed to be able to move to the Lean-Agile portfolio management (roadmap)?

The case organization has published a new organization structure and operating model what comes in to operation in the beginning of 2016. The client of this work has been nominated as Director of Operational Development for the new organization. His Operational Development Services division will be centrally responsible for development of business processes and information systems services. Continuous improvement in cus-

tomer-oriented and cost-effective way belongs also to the responsibilities. It is expected that the new organization will improve the effectiveness of business process and information system development.

1.4 Restrictions

The case organization has moved towards iterative and incremental development. It is still on the way and achievements can be recognized. The software development level frameworks are let out of the scope since agile software development is already under pilot work in the organization. On the other hand the markets have a lot of ready and proven agile development frameworks like Scrum, Kanban, RUP, Lean Software etc. Program management as well as release management will be touched only as an interface towards portfolio management. Budgeting and scorecard processes will be touched lightly but not comprehensively.

2 Research methodology

Used theoretical frameworks and research methodologies are discussed in this chapter.

The research onion was introduced by Mark Saunders in 2007. It describes the stages what needs to be thought and planned when new research is started. Different layers offer alternatives and descriptions of approaches.

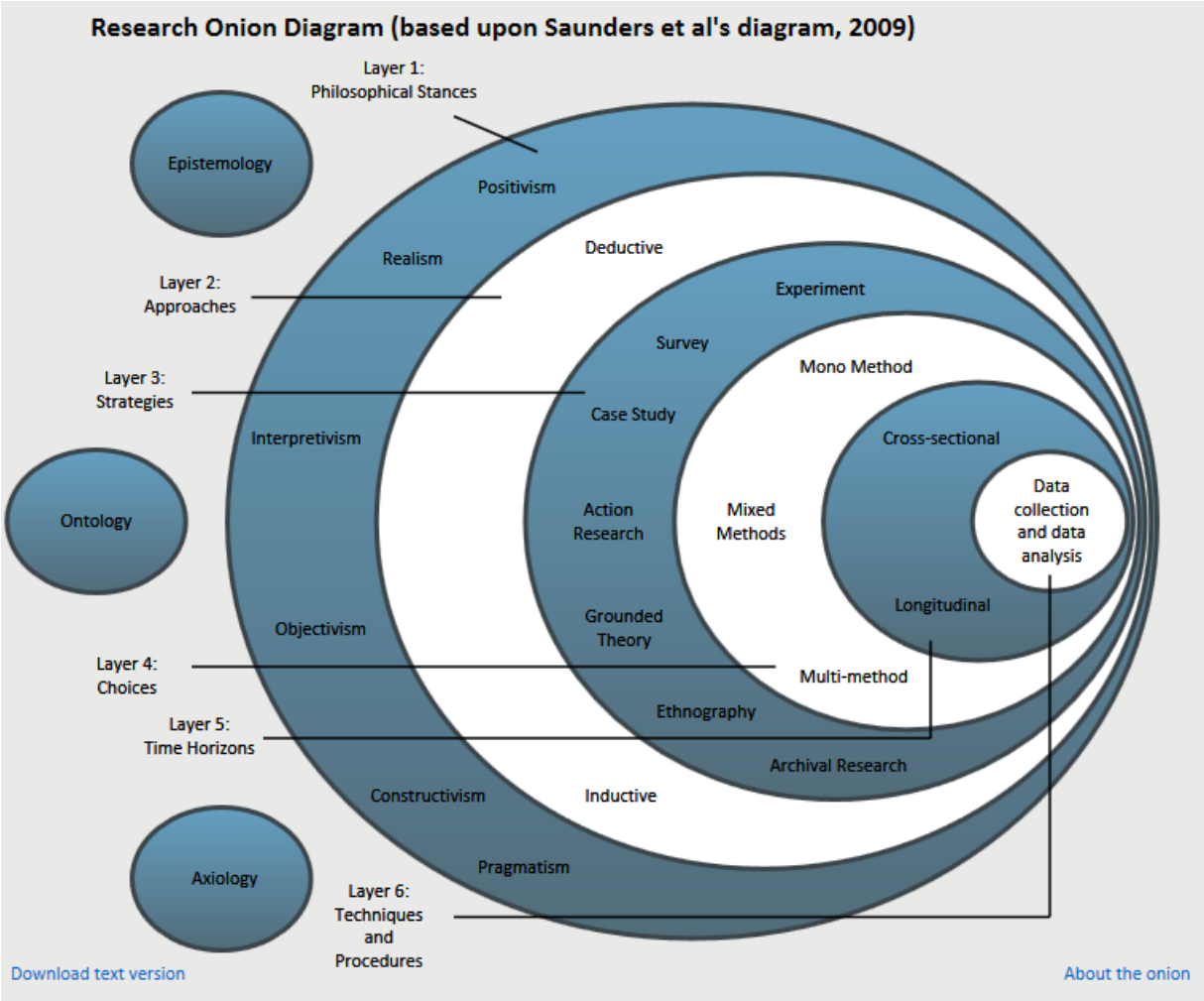

Figure 2 Research onion diagram, (Saunders, 2007).

Research approach of this thesis is deductive, meaning that the research starts with the theory and research question and finds out the answer to those. Questions can be statements or speculation of the topic. The deductive process goes forward from theory to the research questions, to data collection and finally to answers to research questions. It may lead to the new revision of the theory and a new cycle of research.

The strategy for this research is case study and action research. In English written literature method is often bundled together with data collection and research methods. Also case study method is often named as method. Case study may include multiple research methods. It is therefore reasonable to say that the case study is a research method or research strategy, which consists of a variety of materials and methods. (Laine, Bamberk & Jokinen 2007, 9). A case study is a representation of the object under examination, which may be e.g. organization. The starting point is to collect a versatile material from the target organization and describe it carefully. (Laine et al. 2007.10.).

The case study is done by interviewing the key persons from the case organization. Key persons are selected to represent different aspects and viewpoints of a topic. There are all levels of organizaation and all relevant parties represented. The amount of interviewees were set to 11 person together with the client of this study. After 7-8 interviews the answers started to repeat themselves. The interviews were done as an open interview. High level questions and themes for interview were sent beforhand for the interviewees. (Appendix 1). Notes were done during the interview. The summary of each interview were written right after the interview and sent for checking to the interviewees. The notes of the individual interviews are as attached in this thesis. (Appendix 2). One summary of all interviews are written as anonymoys mode and added as part of this thesis where findings from interviews are highlighted. The research questions are specified based on the results of the interviews.

The research strategy has an action research features since I am acitvely working in case organization and I am facing the same problems that were risen up in interviews. I am also actively participating to find out solution to the problems. I am discussig with key employees in organization and iteratively developing the new working model to the problems.

The primary data is collected from interviews. Data about projects, like the duration and costs of projects are also collected. Project data is used as secondary data to support and verify the interview results.

Triangulation method can be used to deepen the empirical and conceptual understanding of the various parts of the case. Any findings or conclusions complement each other, if evidence or witness can be found. (Laine et al 2007, 24). Four triangulation types can be distinguished: data collection triangulation, methodological triangulation, theory triangulation and researcher triangulation. (Laine et al 2007, 24). In data collection triangulation the data is collected from different sources and with different ways.

In this research empirical data is collected by open interviews of organizations key persons, collecting metrics data from past development projects and organizations current process descriptions. Furthermore, the aim is to bring the research of external references as a reference point. A triangulation method is used when the collected data is analyzed. (Laine ym. 2007, 25).

The starting point of the study is a phenomenon, which is in my personal interest. In this investigation the phenomenon is the question what is the root cause for the slow through-

put time of the system development projects. I've experience of a successful large change from strong waterfall / project based operating model to agile way of working. There the big amount of waste was eliminated from system development process as well as the business value realization time was shortened remarkably. Starting point here is comparable to my earlier experience.

The target for the interviews is to find out the organizations understanding of the root cause for the problem. Project measurement is used to analyze if those complement the findings from interviews.

External advisory board for this thesis was set up from experienced ICT mangement and devlopment professionals. Advisory board members were:

Kirsi Ilkka, Indipendent
Mika Mäkinen, Factory IT Director from Microsoft Mobile
Lassi Salo, Chief Consultant, Operational Development Business, QPR
Laura Keränen, Senior Consultant, Affecto
Sanna Rantonen, Business Architect, Kela

Advisory board was discussing about enterprise level portfolio and solution management. Board members had valuable experiences of agile transformation. For example the importance of high level non functional requirements in portfolio planning was raised up in discussion.

As subject domain theories the IT4IT refernece architecture and Scaled Agile Frameworks (SAFe) are used to position the portfolio management to the whole enterprise development context. Following literature together with earlier mentitoned framworks were used to develop the solution porosal for Kela: Mary and Tom Poppendiecks Lean Software Development, Dean Leffingwells Scaling Software Agility, Jochen Krebs' Agile Portfolio Management and Niklas Modigs and Pär Åhlströms This is Lean. Other literature or articles plays smaller role and are referred in text as well as in reference list of this thesis. Main frameworks and theories are presented in next chapter.

The collected data and selected theoretical frameworks and best practices are analyzed with pattern-matching technique where the data from interviews and from organizations documentation are compared with theoretical frameworks and best practices from literature relevant for this case. The improvement proposals as answers to the research questions are created based on analysis. The improvement proposals are discussed with external advisory group and with internal feedback group. The feedback is collected and the

improvement proposal is modified based on relevant feedback. For the future actions the roadmap proposal is created.

3 Lean and agile portfolio management

Pre-requisite for effective portfolio management is high quality strategy and knowledge of it. Portfolio managers should have a good understanding where their organization is heading. The strategy and financial targets of the organization should be able to articulate for an unknown person with a short sales pitch. This level of clarity should exist in portfolio management. When the target of the organization is known, portfolio management has the possibility to drive the organization to its goal. Strategic planning is a necessary prerequisite to successful project portfolio management (Bayney & Chakravarti preface).

Three different definitions of portfolio management are presented in chapter 3.1. All three definitions are concluded as a one definition in the end of the chapter. The common challenges of traditional portfolio management based on literature studies as well as light reflection to the case organizations corresponding challenges are discussed in chapter 3.2. Positioning the portfolio management to the whole enterprise development context is done based IT4IT refernece architecture and Bayneys and Chakravartis Enterprise Project Portfolio Mangement model. Those are presented in chapter 3.3. As the lean thinking and agile methodologies are the basic theories of researching the renewal for the portfolio management lean thinking is discussed in chapter 3.4. and Scaled Agile Framework (SAFe) in chapter 3.5. Portfolio optimization and prioritization are key elements in portflolio management. Two methods for portfolio prioritizaion are presented in chapters 3.6 and 3.7. Chapter 3.8 is concluding the terminology used in different theories and making a syntesis of terms for this research.

3.1 Definition of portfolio management

Below is three different definition of portfolio management:

*"*Project portfolio management (PPM) is the active management of a collection of projects or investments (or programs), whose consolidated purpose is to aid in the attainment of an enterprise's ongoing strategic and financial goals under constrained resource conditions. In many organizations, this is referred to as enterprise project portfolio management (EPPM)" (Bayney & Chakravarti, Chapter 1).

Project Management Institute (PMI) defines portfolio management: "Portfolio management is the coordinated management of one or more portfolios to achieve organizational strate-

gies and objectives. It includes interrelated organizational processes by which an organization evaluates, selects prioritizes, and allocates its limited internal resources to best accomplish organizational strategies consistent with its vision, mission and values." (PMI, 2013, 5)

Leffingwell describes the Program Portfolio Management in SAFe model: Portfolio management represents the executives and business management who has the responsibility of strategy and investment funding, program management and governance. There have to be a good understanding of business strategies, technology and financial constraints. It implements and defines the portfolio and solution strategy. Portfolio Management is typically assisted by Project Management Office (PMO). (SAFe, PPM, 2015).

All above definitions emphasize the mission of portfolio management to support the organization to achieve its strategic and financial targets. In addition architecture and technology related opportunities/constraints need to pay respect to in order to verify portfolio's implementability.

At its best portfolio management produces overall up to date visibility to the organization development needs and enables strategy based decision making regarding investments and development priorities.

3.2 Challenges in traditional portfolio management

Similar challenges what was found out though the interviews in Kela are commonly identified in other organizations as well. For example Jochen Krebs, an experienced agile mentor and instructor, is describing following challenges in his book Agile Portfolio Management. Krebs says that the deepest roots of traditional waterfall type of development are in mainframe based system development. Mainframe programming was heavily procedural, top-down. When changes were required the entire program or system needed to recompile and reassemble. Also complete re-testing was required to be in complete side. This created a culture where requirements were defined very well before implementation and valuable time and resources were wasted to try to get scope enough stable for sign off before implementation. Changing well established culture requires much more energy than adapting to a new programming language. (Krebs, 2009, 5.)

Kela has a long and strong history in mainframe software development. Part of the current challenges in ICT development process may be due to mainframe development culture.

Iterative and incremental, RUP based system development methodology has been developed for new system development in Kela. Adopting it as part of culture is long journey and requires also learning out from old habits.

Lean-Agile portfolio management has developed to solve the typical governance problems in software development. The strategy of portfolio management is targeting to achieve three common goals: maximizing value of the entire organization, achieving a balance between costs and benefits, managing and synchronizing the content of portfolio with the goals of the organization. In practice, target to achieve all of the goals at the same time is highly challenging. Krebs says that when organizations are targeting to maximize its value by linking portfolio strategy to the goals of the organization following symptoms is usually shown:

- Too many projects are under way at the same time.
- Projects rarely get terminated, even when they should be.
- Not enough resources are available for the project.
- Portfolio is unbalanced; there is incorrect mix of risk and reward projects.
- There is a lack of metrics for the project.
- There is no vision for the project and there is lack of visionary projects.
- Focus goes to the small projects.

(Krebs, 2009, 62 & 111.)

Surprisingly similar symptoms and root causes was risen in interviews. Development work challenges are realized and known in Kela. Portfolio management process exists and the targets for the process are good. Anyway, there are points where the entire organization works differently than the process supposes. Current portfolio management process supports the best Kelas annual budgeting and performance agreement cycle.

Krebs describes the same problem in his book: ‘Tracking and collecting metrics, initiating and selecting projects, prioritizing, and closing out projects take energy out of the portfolio management team. The effort of administering an abundance of small projects distracts from the more important challenge for portfolio managers, linking the portfolio to a strategy. Deciding which of the many small projects are the important ones, and figuring out their dependencies, is a task that is very time consuming.’ (Krebs, 2009, 113.)

Resolving this challenge Krebs recommends grouping small related projects together under one umbrella. One project team would handle the relationships and dependencies of several small initiatives. Combining many small, separate projects decreases the number of active projects in portfolio and makes it easier to fit it to the overall strategy. Also the

bigger planning items makes the portfolio planning more reasonable and gives more flexibility and decision making possibilities for the project team. (Krebs, 2009, 113.)

The aim for this thesis is to create a proposal to solve above described problem in portfolio management. Root cause of resourcing problem leads to the portfolio and program management, to the amount of projects, size of the projects and the prioritization of the projects. Lean-Agile approach towards portfolio and release/program management is developed to solve this kind of challenges and they are offering solutions to the problems.

3.3 Conceptual framework for Portfolio Management

The Open Group is the global consortium with members from more than 450 companies and organizations. It enables the achievement of business objectives through IT standards. Open Group has published an IT4IT reference architecture version 2.0 in October 2015.

The Open Group has find out that one common challenge with IT in organizations is the weakness or lack of IT operating model. Portfolio management is one essential part of IT operating model. IT4IT reference architecture set up an IT operating model standard what is flexible enough to support different industries and adopt changing IT trends like multisourcing, agile development, mobile technology etc. It describes the capabilities required to manage the requirements of the business of IT. IT4IT reference architecture includes the whole IT value chain from end to end, from planning to build and operate.

The portfolio management settles down in the beginning part of the IT value chain. The IT value chain consists of IT value streams. Below is the picture of IT value streams in IT value chain as described in IT4IT reference architecture.

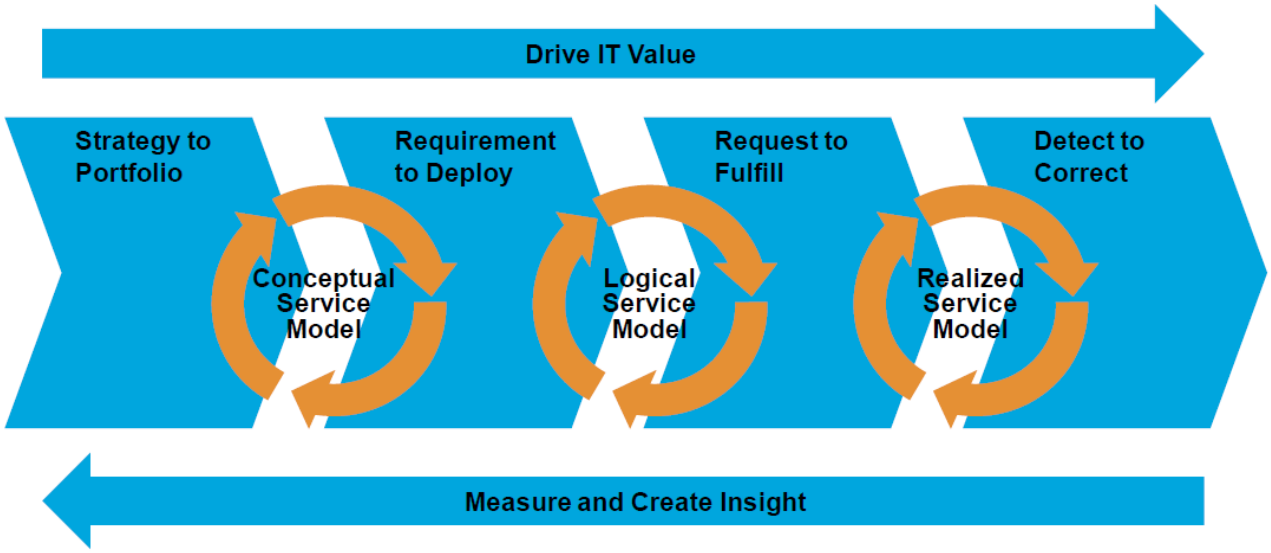

Figure 3 IT Value Streams and Service Models, (The Open Group, 2015, 29).

IT value chain is a set of performed IT value streams what adds value to the business or IT services. Value streams include the capabilities needed to manage the corresponding phase of the whole IT value chain. Strategy to Portfolio value stream is the first part of the whole IT value chain. It provides a framework for interconnecting the different functions involved to manage the portfolio of services what are delivered to the whole enterprise (The Open Group, 2015, 9). Following picture describes the activities included in Strategy to Portfolio value stream.

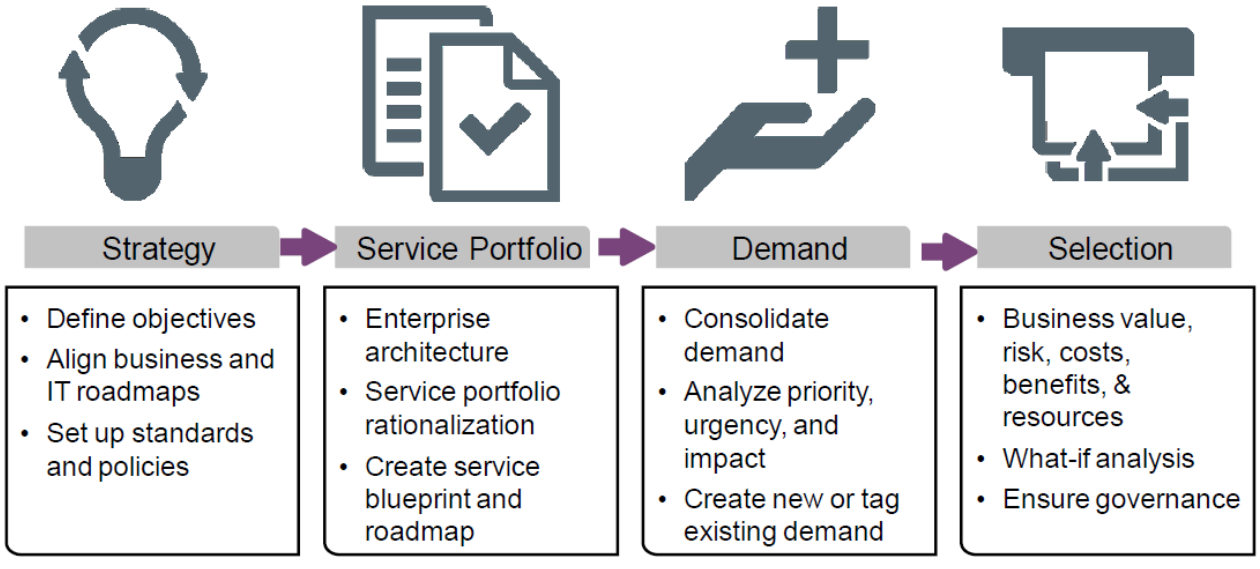

Figure 4 Strategy to Portfolio Activities, (The Open Group, 2015, 31).

The alignment of business strategy and portfolio requires transparency and data consistency between the activities. Traditional portfolio management and portfolio planning concentrates to follow the collection of projects. The projects represent the orders from business. In IT4IT reference architecture Strategy to Portfolio value stream concentrates to the services what have target to produce value for the business. It has holistic view to the whole IT portfolio to drive business investment decisions so that portfolio delivers business value.

The Strategy to Portfolio value stream collects new business requirements and enhancements to the services. It provides end to end IT portfolio view consisting of conceptual service blueprint, high level architecture and business cases so that the portfolio prioritization can be done and expected business outcomes achieved (The Open Group, 2105, 11)

Bayney and Chakravarti have defined the framework for IT services as ICT services lifecycle. In this model IT services are the essential parts of organizations business services and plays a big role in the development work of organization. Below is described the overall picture of whole lifecycle of IT services by Bayney and Chakravarti. Enterprise ICT lifecycle includes three phases of activities: the discovery phase (or innovation), development (project) phase and production (asset) phase. Following picture describes the ICT lifecycle and positions the strategic planning, business requirements, architecture and portfolio planning into it.

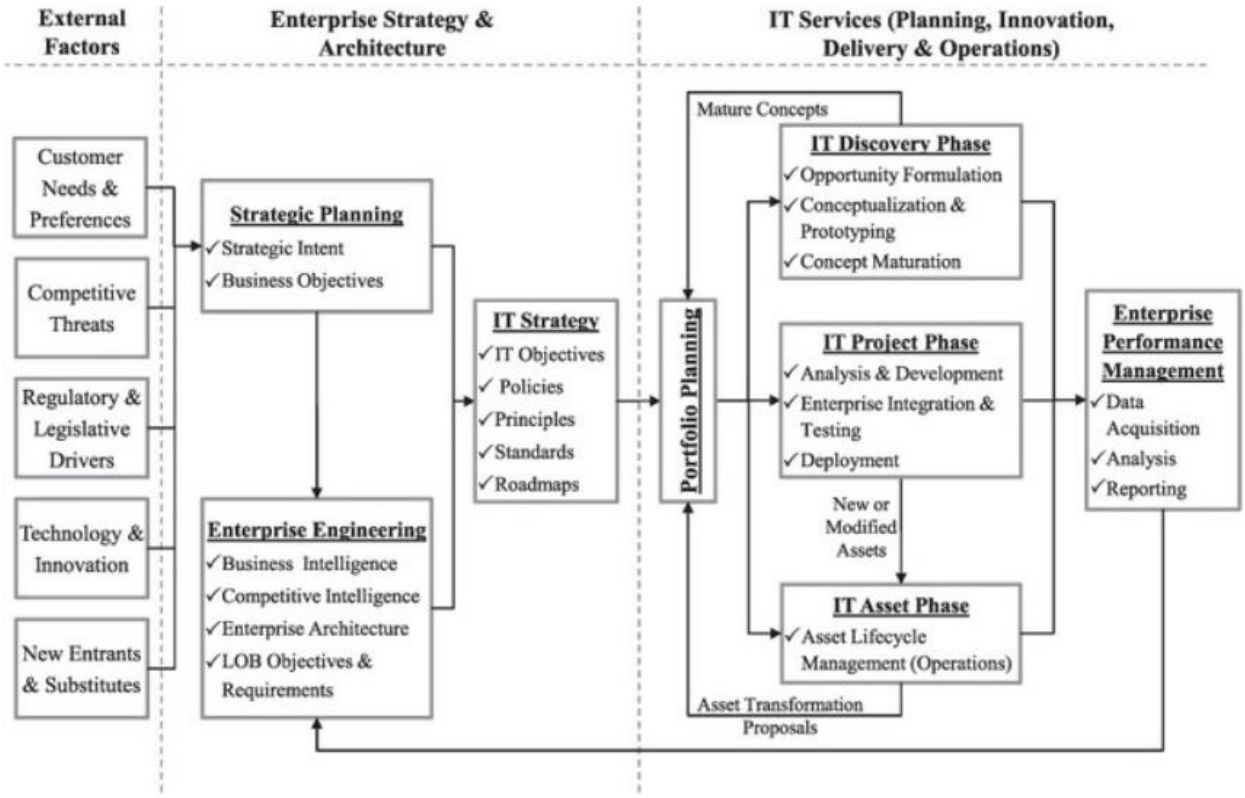

Figure 1-3 Enterprise IT lifecycle

Figure 5 Enterprise ICT lifecycle, (Bayney & Chakravarti, Chapter 1.2).

This picture is drawn from IT services point of view. I would rather talk about Business Services where IT services are included as part of it. It is hard or even impossible to develop IT services without tight linkage to the corresponding business services, and vice versa most of the business services include IT services. There are external drivers, enterprise architecture targets and organizations strategic goals what are driving first the business services and thru those the IT services can be developed to deliver real value for the organization. Sometimes organizations are talking about IT services including business services to those. Above enterprise ICT lifecycle picture describes the content framework of IT services.

3.4 Lean thinking

Agile methods have become mainstream over the past years in the software industry. The roots of agile software development go to the mid-1990s. The driver behind all different agile methods has been the same: create reliable software more quickly by eliminating unnecessary waste and unproductive overhead. (Leffingwell, 2008, 2). The agile software methodologies have got principles from Lean thinking. Lean thinking has evolved in the

automotive-industry, especially in Toyota. Toyotas historical success is also the strongest proof of lean thinking. (Lean Enterprise Institute, History, 2015).

All agile methods are based on lean thinking. The seven core ideas in lean is to maximize customer value while minimizing waste, amplify learning, decide as late as possible, deliver as fast as possible, empower the team, build integrity in, and see the whole. Simply, lean means creating more value for customers with fewer resources. Lean thinking requires a change in culture and organizational habit. (Poppendieck 2006, Introduction).

Eliminating waste from all phases of value streams, instead of at individual points, creates processes that need less work effort, less space, less capital, and less time to make products and services at far less costs and with much fewer defects, compared with traditional ways of doing. Organizations are able to respond to changing customer needs with high variety, high quality, low cost, and with very fast throughput times. Also, information management becomes much simpler and more accurate. (Lean Enterprise Institute, What is Lean, 2015).

Following picture illustrates how lean and agile way of operating is reducing the work under development i.e. releasing the capital to produce more, compared to traditional waterfall type of operating. It also illustrates how more value is produced when the solutions are quicker in use.

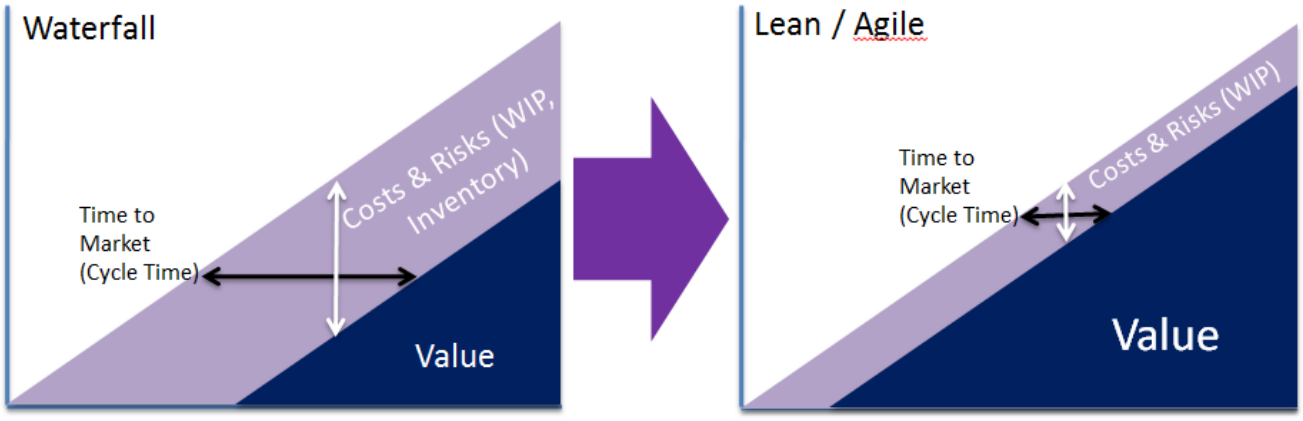

Figure 6 Waterfall vs. lean

Lean encourages reducing Work In Progress. Lean development process provides continuous flow of value to stakeholders. The less we have work in progress; the faster we are and get more value. Purpose in lean is to decrease cycle time, deliver as fast as possible and deliver in small batches. Work under development (work in progress, WIP) is not adding value but is considered as inventory, causing higher costs and risks. Iterative and

incremental approach iterations (projects) are kept small in terms of content and short in terms of duration. Such projects generate faster cash flow and return on investment by reducing costs and risks. This is done by delivering value to customers as early as possible, supported by early feedback loops. Portfolio management is in an essential role to enable organization to keep the amount of work in progress in optimal level. Portfolio management should keep the requirement backlog as an optimal size and an optimal content so that the implementation flow rate is good and the implemented content is adding value for the client.

Lean thinking is based on deep understanding of what creates value, why fast flow is important, and how to release the brainpower of the people doing the work from unessential. In opposite of lean thinking the CMM (Capability Maturity Model) is standardizing the processes, but at the same time it leaves out the possibilities of discovery and innovation. CMM has an emphasis on process definition and detailed front-end planning. It has been also studied that ISO9000 is good in documenting the processes but not supporting the creation of success. In traditional waterfall based development detailed front-end definitions are justified by the target that ‘anyone can code’. In lean the target is to build skills in frontline. Waterfall has also the target to get things right at the first time. In lean this is strange. It has been proved that working software requires enormous amount of testing and fixing, i.e. iterations. Lean changes the focus from traditional project management tasks like; control, work breakdowns, requirement and time tracking to the value, flow and people. By focusing those you get better quality, lower cost and faster delivery. (Poppendieck, 2006, preface).

Leaders are setting directions, aligning people and motivating the team (Kotter). A good leader has a passion towards the developed product, they have a clear vision of the end products and they are mainly selected the development team. They understand that giving room and responsibility for the talents is much more effective than trying to control the work. (Poppendieck, 2006, 112).

Software development requires master developers. They are the persons who have a great experience of the technology and a domain. There is no excuse for the experience. In addition to the technology and domain skills master developers has also abstraction and communication skills. They are the persons who will do the basic design work for a new product. It can be a one person or group of wisest person in an area. Organization responds to the management expectation. Software development leaders are not growing in an environment what values process, documentation and respect to the plans over all else. They grow in an environment where the value is moved from processes to people,

from documentation to code, from contracts to collaboration and from plans to action, as Agile Manifesto has defined. Organization will get what it values. Lean development changes the role of project manager to be more as a leader. Traditional software development project manager may not be the technical expert like master developer should be, either tasks are not assigned or monitored by project manager. The product manager or better to say product leader will concentrate to the identifying waste, sketching the value stream map, tackle the biggest bottlenecks, create a release plans etc. (Poppendieck, 2006, 115).

3.5 Scaled Agile framework

Dean Leffingwells Scaled Agile framework (SAFe) offers one proved agile framework to scale agility to the portfolio and program management levels. The basics of SAFe model are introduced in this chapter.

SAFe model offers a framework of how lean principles and agile way of working can be scaled to the portfolio and program management level. The first public version of SAFe was published 2011. It has been developed based on experiences of over than 50 large software enterprise Lean-agile transformations. Main creator and methodologists of SAFe model is Dean Leffingwell, who has done a long career in software business. He has for example been a vice president as Rational Software, responsible of commercialization of Rational Unified Process (RUP). Kelas own system development methodology JAMES is based on RUP methodology. Even RUP leaders haven't been contributing to the original Agile Manifesto, the basics of RUP, like iterative and incremental approaches are common to certain aspects of the agile methods. Leffingwell is using the basic framework of iterative and incremental practices for applying agile methods at scale. (Leffingwell, 2008, 2).

Version 3.0 is newest published version of SAFe model. Version 4.0 is under development. Version 4.0 is interesting since for example the connection between program portfolio and its connection to the enterprise strategy is strengthened. (SAFe, Overview, 2015). This study concentrates to the officially published version 3.0. The usage of SAFe model has been shown to bring improvements in employee engagement, time-to-market, solution quality and team productivity. The enterprises and organizations are different and it is likely that SAFe model, like any other models, is not fitting to all specialties of the organization. The organization may need to customize some parts of the model to fulfill the specific needs better. The SAFe model is developed based on many static Lean and Agile principles. Lean principles are discussed in previous chapter. These principles are the

basement that makes SAFe effective. When organization needs to customize the model the principles are guiding them to the move towards shortest sustainable lead-time, with best quality and value to people and society. (SAFe, Lean Principles, 2015).

The big picture of Scaled Agile Framework is described in following picture:

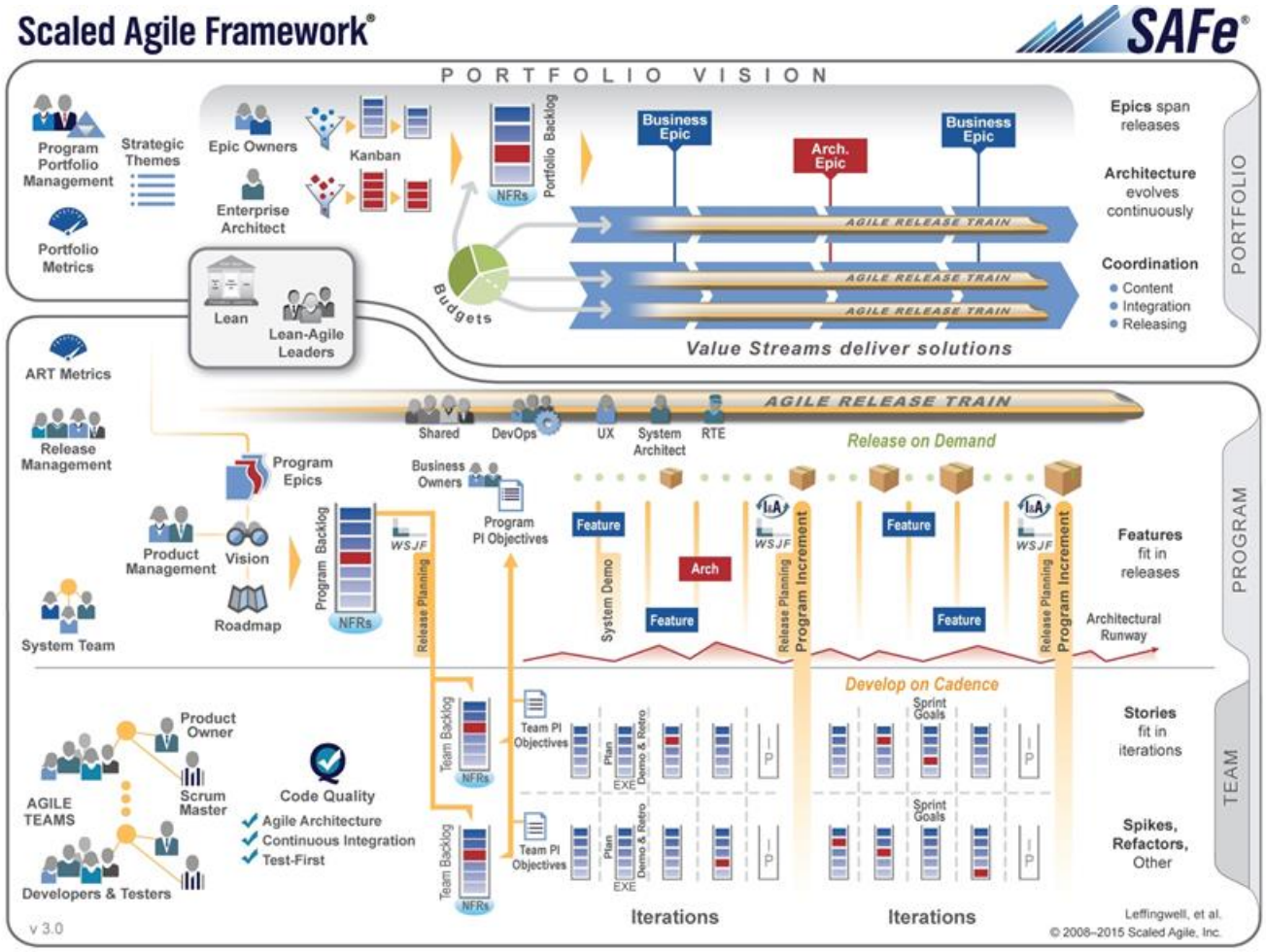

Figure 7 The Big Picture of Scaled Agile Framework, (SAFe, Big Picture, 2015).

The big picture is describing the agile mode of operation model for the whole enterprise in one picture. For first time it might seem quite busy picture, but when the model starts to be familiar the picture is excellent picture of the wholeness of organizations development model. The picture is meant to be read from its origin; scaledagileframework.com where it is interactive. Each element in the picture opens up a description page. The basics of the model are presented in this study.

3.5.1 Team layer in SAFe

In the lowest level in SAFe model is the team level. Agile development team is cross-functional team, which consists of all need professionals to be able to define, build and test a working piece of software in short sprints. The agile team has authority to decide the prioritization of requirements and design the solution elements. In SAFe model the team level use often the Scrum framework to run the agile development work. Scrum framework is one of the most widely used agile development frameworks. Other agile methodologies can be used as well in the lowest level of the SAFe model. (SAFe, Team Layer, 2015).

The basic idea of scrum is to provide small pieces of value add software in relatively short time periods (2-4 weeks) called sprints. The requirements, called user stories, are prioritized in product backlogs where the team selects the feasible number of user stories to be implemented in coming sprint. Following picture illustrates very basic idea of the Scrum process:

Figure 8 The Scrum Framework, (Scrum Alliance, 2015).

More of Scrum framework can be found: https://www.scrumalliance.org/

3.5.2 Program layer in SAFe

The middle layer in SAFe model is the program layer. The main delivery mechanism in program level is Agile Release Train (ART). It is formed of agile development teams who are implementing the same agile release value stream in and typically it consists of 50-120 individuals. Defining the suitable value streams and agile release trains are one cornerstone in SAFe model. Value stream is the entity what creates the greatest economic

value in terms of products, systems, solutions or services. The ART carries common mission for the teams. It implements a continuous product development flow enabled by routine 8-12 weeks planning with pre-defined schedule for releases. Each train has the dedicated resources and it is independent in terms of competences. The 'train' metaphor works well when thinking the role of ART: The train departs from station and arrives to destination in pre-defined schedule. The train has a standard speed, predictable planning, and all cargo in a train (documents, code etc.) Professionals needed on the train are dedicated to it, no matter what is the line organization or position. Schedule and resources/budget are defined, scope is variable. (SAFe, ART, 2015). ART can be compared to program. ART is continuous mechanism to deliver value when program has pre-defined targets and schedule.

ART is getting inputs from program backlog. The program backlog is the repository of all accepted upcoming work expected to ART to implement. The backlog consists of user needs, features, to deliver business benefits and architectural features required to build consistent solution for value stream. Prioritization and sequencing the program backlog is the key success factor for the program layer. The prioritization is done again in each program increment. The backlog has to be managed actively and it needs to be kept short to keep the ART reliable and fast. (SAFe, Program Backlog, 2015).

Program level roadmap is created typically for 3 to 6 months. Roadmap is used to clarify and communicate business objectives of deliverables to the program team. The roadmap offers rather detailed level visibility to the features of next program increment, medium level visibility to the increment after that and low level visibility to the longer term. Note, that the longer term visibility in feature level means around half year for the future no longer. It is unrealistic to plan longer than half year in today's changing world. If organization want to stay competitive it's better to be agile and it has been proved that all longer term commitments decreases the agility of the organization. (SAFe, Roadmap, 2015).

3.5.3 Portfolio layer in SAFe

Portfolio is the highest level in SAFe model. Portfolio vision represents the organizations business strategy for the programs/solutions. Business objectives are lead from business strategy and the business objectives steers the creation of strategic themes. The strategic themes provide the business context to the decision making in portfolio level. The critical decisions are needed for investments of value streams and release trains, as well as in portfolio and program backlog creation and prioritization. The essence of strategic themes is to provide differentiations from organizations current state to the future state. Lean can-

vas or many other methods can be used in business strategy creation as well as in the creation of strategic themes. (SAFe, Strategic Themes, 2015).

Value streams are input for the portfolio vision. Portfolio vision is realized in value streams. Value streams are implemented in release trains. Portfolio level backlog includes typically business and architecture needs whose scope is wider than one release train and those needs to be implemented in more than one release train. A value stream provides clear value to a customer or organization. A good tool for defining value stream is 'Value Stream Mapping'. It is a tool where the flow of information needed to produce product or service to the customer is defined, documented, analyzed and improved. (SAFe, Value Streams, 2015).

Enterprise level initiatives are described in epics. The epic is a large need. It is significant enough in scope and cost to understand the potential return of investment. Light weighted business case is created for epics. The business case drafts business and technology impact as well as implementation strategies. Approved epics are put into the portfolio backlog. The scope of epic can be wider than one ART. Epics may arise also locally in program level. Even epic is in program level it requires business case analysis and some discussion with program portfolio management before the implementation. (SAFe Program Epics, 2015).

A portfolio backlog holds coming business and architecture epics what are approved for implementation. Those epics provide the competitive edge and/or operational efficiency for the organization. Business requirements are first collected as free-formed needs. All needs are collected to the one funnel. Basically whoever is able to create a need. The needs are formulated as epics, rather large initiatives. Several needs can form one epic or one very large need may be divided to several epics. The epics are reviewed, analyzed and prioritized before approval to the backlog. SAFe recommends using Kanban system for processing epics. Portfolio backlog consist only epics for approved to the implementation. Program or product management creates a vision for the solution to be developed. Product management is well aware or organizations strategic themes, they take inputs from portfolio backlog, from program epics, from architecture, from customer feedback and from development team. Based on all input the ART backlog is created. The capacity in a release train is carefully taken into account in ART backlog creation. ART backlog has a well-planned and monitored work in process (WIP) limit. The WIP limit is not exceeded; otherwise the train will be sucked and starts to delay. ART backlogs are implemented in agile release trains. (SAFe, Vision, 2015).

Business management and executives has the primary responsibilities of enterprise business strategy, program management and governance as well as the definition of solution strategy. In many organizations portfolio management represent executives and they are assisted by Program management office (PMO) especially in the guidance of program execution and governance. Portfolio management establishes and communicate the strategic themes what gives guidance for investments and strategy. Portfolio management has a deep understanding of portfolio vision and they are helping in value stream definitions and budget allocations for agile release trains as well as defining portfolio level epics. They report on investment spent and program progress to the business. If the organization has both lean-agile and traditional waterfall programs the portfolio management may have responsibility to manage both of them. (SAFe, Portfolio Management, 2015).

3.5.4 Budgeting in SAFe

Traditional budgeting in organizations and Lean-Agile development are often conflicting. SAFe offers one concept for budgeting supporting Lean-Agile development. Portfolio Management has main responsibility of budgeting of strategic investments. Firstly the budgeting is done in a level of agile release trains. Resources are allocated also in agile release train level. Release trains hold the resource pools. When flexibility is needed the release train can be flexible and it has the authority to do the needed decisions by themselves. The decision making related to budget and resources are empowered to the ART level. The economical focus is put to the portfolio management. It is assured that there are good economic reasoning for the content and order of features in ART level backlog. Epics, both program and portfolio level, are well analyzed, prioritized and approved for implementation before they are added to the portfolio. This ensures that the ART level budget is used to implement program and portfolio level vision. The budget assigned to the release trains is good to revisit twice a year. If there are changes in priorities between release trains the budget can be re-allocated. By doing this the organization keeps the capability to react fast for changing needs. For portfolio level large epics the SAFe recommends to allocate the whole budget for agile release trains (program) or allocate part of the budget for the specific epics in portfolio level. In first case program need to understand that there will come portfolio level epic(s) outside of their own backlog. In second case experienced SAFe professionals has proved that giving more money the resources in release train are able to provide more value. (SAFe, Budgeting, 2015).

3.6 Portfolio prioritization methods – risk and reward

Risk and reward portfolio prioritization method presented in this chapter is based on the theory by Jochen Krebs. To be able to manage and prioritize portfolio, the projects and

project proposals those need to be categorized in some way. Below is a diagram what categorizes projects based on risk and reward.

Figure 9 Risk-Reward diagram, (Krebs, 2009, 115).

It compresses the information of project vision, risk and potential benefits. This kind of categorization makes project prioritization meaningful. There is a good reasoning what projects are selected to the portfolio and what not.

The portfolio should be also balanced with different type of projects so that there are e.g. enough visionary projects. Visionary projects are easily thrown out from portfolio because of their high risk level. But the truth is that those are often the projects what are creating a real competitive value for organization. Lack of key and comparable information is often a reason for unbalanced portfolio. The actual meaning and thresholds of the quadrant in above diagram can be defined by the organization to fulfill their specialties. For example SWOT (Strength, Weakness, Opportunity, and Thread) analysis, market research or competitive analysis can be used. The axis can be also labeled differently. Regardless of selected parameters a risk and reward diagram is an extremely powerful tool in portfolio management. (Krebs, 2009, 115.)

A bubble diagram, one way to use risk-reward tool, is one of the most popular diagrams for facilitating the project selection process. The power of using a bubble diagram is that it can reflect more than two project parameters in the same picture. In addition to giving meaning to the risks and rewards by using quadrants, the portfolio management can express the amount of resources needed in each project by using bubbles. Larger bubbles

mean that a project requires a bigger amount of resources. Readability can be increased by adding colors or shadows to the bubbles, e.g. by line of business or technology or dotted line for coming projects, solid line for ongoing projects. (Krebs, 2009, 116.)

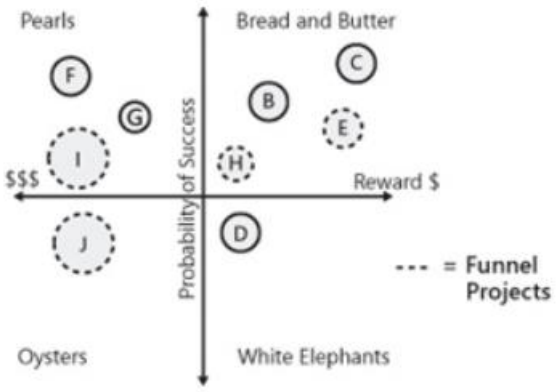

Figure 10 Risk-reward diagram with project bubbles

It is important to balance portfolio with visionary projects. Quite many IT organizations try to catch up with the latest business drivers and technologies rather than incorporate new ideas and technologies into their portfolio. Usually business organization order and IT deliver – one way street. Agile development practices keeps the business segment constantly involved, this creates more dialogue between IT and business and it is proved to be successful. Business vision should be visionary also from the perspective of technical innovation – it should tackle the issues of tomorrow, not todays. Assumptions between today and date the system will be released makes business case visionary. (Krebs, 2009, 121).

If organization has too many small projects ongoing or queueing into portfolio, it can't see forest for the trees. Portfolio management should keep focus in the overall situation and strategy. Coordination and administration of small projects requires large amount of effort. Bundling small efforts together provides many benefits – e.g. team communication -> Emphasis of small projects in a portfolio is directly linked to a lack of vision in the project portfolio and to an organization having too many projects. Agile model encourage testing new ideas with couple of sprints before future bigger commitments. (Krebs, 2009, 122).

Business case captures knowledge about the market information, financial justification, and few high-level requirements for an idea. DO NOT do too detailed view of business requirements – time and money spent to build a business case for an idea might be dropped anyway. In agile model: provide enough information and justification to get 1-3 iterations funded. After that organization gets better understanding of the case and project

will get additional funding for the rest of the application. Instead of funding business case creation the organization gets already small part of working software. Innovations are difficult to plan on paper and more ideas surface after the initial iterations. Business case might be as unstable as requirements. Business cases are often too positive –> agile development use couple of development sprints to prove the business case. (Krebs, 2009, 125.)

3.7 Portfolio prioritization methods - Lean canvas

Portfolio prioritization and balancing is challenging task. Organization may be successfully lean and agile in development team level, but the inefficient waste start to appear in program management and portfolio management levels. It is usual and quite human that stakeholders are keen in their own targets what might be competing with enterprise level targets. Enterprise level portfolio management should be enough strong to avoid HiPPO (Highest Paid Persons Opinion) method based prioritization.

Lean canvas is one tool to be used to guide the portfolio prioritization. It is useful and simple tool for weighing different business plans to choose the most promising options. There are several versions of lean canvas in the markets. Below is one example what is derived from Alex Osterwalder's business model canvas by Brad Swanson.

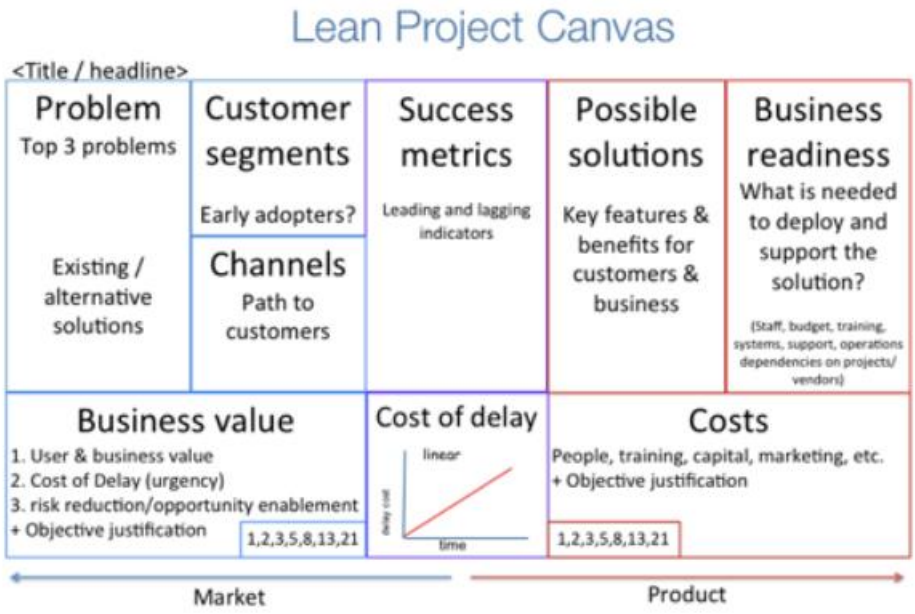

Figure 11 Lean Project Canvas

The lean project canvas is meant to be filled from left to right and from up to bottom. By analyzing each topic the portfolio management gets quite wide understanding of the pro-

posed requirements / project. Lean canvas is close to light weighted business case in SAFe model. (Swanson, Lean Canvas, 2013).

3.8 Terms and concepts

Agile Release Train (ART) - Long living team of agile-teams, typically 50-125 individuals are working in one train. It serves as program level. It is a value delivery mechanism in SAFe. Each train has dedicated resources needed to define, built, test and deliver value to the one value stream. ART has regular increments and it publish releases based on market needs. The budget (resources) and schedule are fixed – scope varies.

Backlog

- **Portfolio backlog** – Portfolio backlog is the highest level of the backlog in SAFe model. It serves as a staging area for the epics what are approved for implementation in epic prioritization process. Portfolio backlog consists of business or architectural epics what are essential to achieve operational efficiency, competitive solutions or market differentiation.
- **Solution backlog –** Solution backlog is a value stream level backlog in SAFe. It serves as a staging area for the coming capabilities or enabler capabilities required to create or enhance the solution. Solution backlog is prioritized in solution backlog prioritization. The capabilities in backlog are approved for implementation.
- **ART backlog –** ART backlog is a staging area for upcoming work what is estimated in advance for Agile Release Train to implement as its part of the solution. The ART backlog consists of the features and enabler features representing the user and architecture needs. Features deliver business benefits and build an architectural runway. Product management is responsible to prioritize ART backlog. The prioritization is key success of the ART.
- **Team backlog** – The team backlog is the collection of the things the team needs to do. It can contain user stories, technical stories, features for future, defects, infrastructure work, spikes, refactors, and anything else a team need to do.

Budget - Traditional budgeting and cost accounting are in conflict with Lean-Agile budgeting. Lean-Agile budgeting fund trains or solutions instead of projects. Empower trains to their own budget – rapid decision making and flexible value delivery. Portfolio management team has a control of total spending.

Capability – Capability is an ability of a solution to achieve some part of solution intent. Capability may be functional or non-functional.

Enabler – Enabler can be architectural or infrastructure development activity necessary to support the future solution capability. Enabler can support each level of SAFe model like enabler epic, enabler capability, enabler feature and enabler stories.

Epic - a large enterprise level need, initiative. Typically cross-cutting multiple solutions, release trains and program increments. Epics require a business case. Portfolio Epics affect multiple release trains. Program Epics are contained in single train.

Feature - A functional component is the smallest unit of technology that can stand on its own and be useful as a whole to an IT practitioner (or IT service provider). It must have defined input(s) and output(s) that are data objects and must have an impact on a key data object; for example, create, update, delete. Typically, a functional component controls and/or manages a single type of data object but this is not dictated by the architecture.

Portfolio Management – Definition in chapter 3.1.

Program – Program has often one for one relationship to Agile Release Train. Programs are delivered by long-living Agile Release Trains.

Solution - Represents the product or service that is produced by value stream. May be goods, products, services, systems, applications, or collection of any above.

Strategic themes – Strategic themes are specific business objectives what connect SAFe portfolio to the business strategy. Strategic themes provide a business context for decision making within the portfolio. It serves as inputs to the portfolio, solution and ART backlogs.

Value stream - Value stream provides clear and realized value to a customer, organization or end user. It is a long-term initiative that drives programs that differentiate an enterprise from its competitors – like umbrella program. Value streams are implemented in agile release trains.

4 Analysis of current portfolio management

Kela has a vision to provide the best service, social welfare, and life force to Finnish Society. The main processes are defined to support the organization to achieve the vision statement. Main processes are:

- benefits and services to the customers
- internal services
- operations management

The management of operational development processes, where portfolio management belongs to, is one of the sub-processes of operations management. The aim for the development process management is to steer the strategic programs and projects based on the government policies. The operational development process and its sub processes are described in more detail in Finnish language in Appendix 3. (Appendix 3).

The development work (operational, process, ICT…) is done in project mode in Kela. Development projects are collected to the project portfolios, each project belongs to some project portfolio. Business Units have their own project portfolios. The project portfolio planning period is one year and it is bounded to the budgeting. Portfolio managers in Business Units are managing their project portfolios.

Since Kela is under big structural organization chage, year 2016 project portfolio is deeper than business unit level. Project portfolio planning is based on the frame given in performance agreement (tulossopimus). The target of project portfolio monitoring is to support the planning of development work, project success, cost management and effective usage of resources. The project portfolio plans and actuals consists of the planned and recoreded work and costs in the projects. Kela-level portfolio is reported quarterly for the management of Business Unit as well as Kelas management team. Business Unit level portfolios are reported monthly for the Busines Units. Current portfolio management is described in appendix 4. (Appendix 4).

4.1 Current project portfolio prioritization criterias

The priority of the project is dependent on its strategical and operative impact, its benefits, risks and architectural compatibility. Project proposals and busienss cases should

describe the priorization viewpoints. Project level priorization viewpoints are saved in centralized project- and portfolio management tool, Clarity.

The strategic importance of projects are analyzed towards strategic focus areas of Kela. Startegic focus areas in year 2015 are

- Enhancing the customer experience, strengthening confidence and developing the quality and effectiveness of the customer service processes.
- Make Kela as great place to work by improving co-operation, well-being competence development.
- Kela as social security executor and developer is societally active and socially, ecologically and economically sustainable.

The project impacts of balanced scorecard metrics are also analyzed. Operative impacts are analysed towards optimization of operative cost-effectiveness, staying in external agreements, improvements of operational reliability and process metrics as well as client satisfaction.

4.2 Key person interviews

The high level topic for the interview discussion was the biggest pain points in our development work. ICT standard was used in planning the interviews and to support the interviews. From ICT standard the ‘Sourcing and Vendor relationships’ and ‘Service Management’ streams were mainly out scoped from the discussion. Kela is doing development work mainly by itself and vendor management didn’t rise up as big pain point currently. Vendor Management was touched in one interview, but it was concluded as possible own topic for someone’s thesis. Kela has systematically developed the IT Service Management during past two years and this development is moving into right direction. ‘Strategy and Governance’ and ‘Project Management’ streams were more in a focus in discussion.

Figure 12 ICT standard – management streams and functions, (ICT Standard, 2015).

Interviewees were selected to represent different parts and different levels of the organization to achieve a comprehensive view of the current situation. The interviewees were:

- One member of the Board
- Director, Operational Development
- Director, ICT
- CIO
- Program Director of the biggest development program
- Financial Director
- Manager responsible of development methodologies portfolio management and competence development,
- Agile development Project Manager
- 3 Senior Project Managers

Each interview was conducted individually with the interviewee. Interview lasted one hour and the notes of the interview were written right after the interview by the interviewer. Interviews were conducted in Finnish language and the notes were written in Finnish. Most of the interviewees wanted also to see and comment the notes by themselves. The notes of the interviews and the planned supportive questions are attached to this thesis. (Appendix 1 and 2). The summary of all interviews was written based on Finnish notes of each interview.

4.3 Summary of the interviews

Based on the interviews strategy and strategic planning seems to be too weak or its communication hasn't succeeded in case organization. Another reason for challenges in portfolio management is the size and amount of the project proposals. The planning is done from bottom up and the planning items are too small. The linkage to the strategy is difficult with too many or too small parameters.

Based on the interviews the biggest challenge in current development work is the thing that **resources have to work simultaneously in several projects** and the same persons are quite often keeping up the production systems. The challenge is caused by the too **high amount of concurrent development projects**. In October 2015 enterprise level development project portfolio for year 2016 has 220 projects and 160 of those include remarkable ICT development work. On the other hand 40 projects of 220 have 60% of work estimates, what may mean that there are **a lot of small projects**. The organization doesn't have enough competent persons to each project; there is around 40 man year's shortage in ICT specialist resources. One experienced person has to be allocated to the several projects at the same time and in addition the person might have responsibility of production system maintenance. Example of one person resource allocation chart is in attached. (Appendix 5).

Assigning people to multiple projects is one source of waste and inefficiency. Every time software developers switch between tasks a significant switching time is incurred. Belonging to multiple teams usually causes more interruptions and thus task switching (Poppendieck. 2006, 6). Working in multiple projects at the same time makes an illusion that all projects are in progress. The reality is that the projects need to be planned relatively long or the compact project plan can't be kept. For a long lasting project the scope is hard to keep compact. Current organization is working hard to get the portfolio balanced with competent resources. Despite of this establishing new project outside of the portfolio is quite easy and the impacts are not necessarily updated to the current portfolio. Another challenge is that projects are not able to keep their schedules what impacts to the entire plans in portfolio. Too big amount of concurrent projects causes also administrational overhead. Huge amount of various meetings is needed to clarify roles and requirements as well as find out and agree resources, before any row of code is written.

Two interviewees with long career in Kela emphasized the long history of ICT technology utilization in Kela. Traditionally ICT development has been driven by engineers and the technology itself. End-users were not at the center. Nowadays ICT industry is developed

strongly customer/end user centric. Traditional pain point is the interaction between business and IT. This is still somewhat seen in Kela. Currently the direction is strongly towards digital services where the co-operation between IT and business has to work seamlessly.

One common theme in almost all interviews was the big problem in focus of development work, what is important and what not, or other symptoms caused by the weak strategic drivers. The main purpose of the whole organization should be kept in mind. The strategy could be clearer, **focus is missed** easily. Strategic ICT drivers have tried to describe in action plan of Information Management, but it has been challenging. Strategy is not driving enough strongly, instead divisions, departments or even individuals are able to decide what is important and what not. Individual superiors have to interpret their own focus areas from strategy. This leads to **inconsistent targets** and to unnecessary internal competition. This is one source for ICT development inefficiency.

The process for **project portfolio planning** is defined, but it is not used effectively. One challenge in portfolio planning is the dependency management. Another challenge is the decision making what projects will start and what not, **prioritization is inadequate**, the projects are started e.g. without proper resourcing or projects are not started due to inadequate specifications and missing resources. **The portfolio is not driving the development work**. There are at least two competing targets in project portfolio management:

- Others think that project portfolio includes all possible development needs or blank projects, during the year the decisions are done what project will start and what not,
- While others think that only the implementation of projects are coming to the project portfolio and portfolio should be updated if the decisions of changes are done.

Change management of project portfolio management should be better. Now the problem is that portfolio is increasing without control during the year. New projects can be added but others are not taken away. This leads to the situation that portfolio contains projects which are not going to start at all. Important things in portfolio management are for example data quality, work amount estimates, cost estimates and monitoring. Needed data have to be defined and collected so that portfolios can be managed based on facts. One improvement proposal for this is to define metrics e.g. the size of portfolio should be +/- 10% of originally planned. **Prioritization and portfolio management** problem is caused by **too many owners** for requirements. Each owner has had equally much power to demand their needs to the implementation; internal requirements are competing with each other. Rules for prioritization should be defined and portfolio shouldn't be bypassed. Strategic level prioritization is done. E.g. Arkki, Hake… but it stays in high level. At the same

time project portfolio includes relatively small project initiatives taking too much effort to prioritize properly.

All interviewees raised up the problem with too many ongoing projects. One reason for the slowness of development is that there are **too many projects** ongoing at the same time. There is several mega size projects, what makes them long ant take several years. All ongoing projects can't be resourced in a way that projects can proceed in an efficient timetable or the projects have to be planned for rather slow timetable. **Project portfolio** planning should be better. Enough time should be used in project planning. The scope, definitions and business cases are currently too weak. Lean thinking in portfolio management is needed, so that unnecessary waste can be eliminated.

Almost all interviewees are expecting that the **new centralized operational development unit** will help to solve the prioritization and other problems in portfolio management. New structure enables centralized view to the organization needs. Managing the wholeness requires well defined and well organized portfolio management. **Current scorecard process** does not support effective portfolio management. It has concentrated too much to the headcount management, not so much to the content of doings. Organization should be able to produce to the management the right information for making decisions. A good quality **business cases** would make decision making and prioritization easier. The targets should be clarified. Now too many features are implemented or not all functions are required to support by information system. Workload estimates of projects should be harmonized.

Resourcing is currently very challenging since so many projects are ongoing. Each project should get enough competences so that it is realistic to achieve the targets of project. Consequently, **one person works on several projects at the same** time. This is **one root cause for inefficiency**. When the pipeline is full it gets jammed. Proposal to manage this is to define target to have 50% of project personnel with 50% allocation in a project.

Another challenge in resourcing is that the expertise is settled down to only a limited number of persons. There are a few persons who are needed in everywhere. Maintenance needs them at the same time with development. This is caused by long working history in same areas. **Competences** have developed during years. Key resources are too busy to teach others. They are also willing to keep up of own expertise area as they love their own baby. People are afraid to move to uncomforted zones. The employees have a deep respect for the barriers between organizations. Breaking the barriers might be fruitful since it makes resourcing more flexible and offers bigger chances for reusability of solutions. One

idea raised up in one interview was to use role based competence groups, like benefit groups (etuuskori) in the field, for competence development. The superior of the group should be expert in his/her area so that he/she can effectively lead the competence development of own group.

Well planned competence strategy and vendor management would make resourcing easier. When core vs. context competences are clear the context is rather easy to purchase from outside or corresponding services can be even outsource. The law of procurement for public organizations is thought as restriction.

Architecture is not seen as a problem. Architecture supports and on the other hand is steering the portfolio management. There are shortages of architect resources but architecture as such is not a problem.

Arkki-program itself is rather satisfied to the program organization and how it works. **Business processes has been harmonized**, but could be harmonized more. Already now the level of process harmonization enables end users to manage wider amount of benefits and the customer decisions would be done quicker. Also information systems would be more similar what makes maintenance easier and cheaper. Human resources planning should be tied to reforms. When processes and systems are harmonized there should dare to reduce the resources or allocate them elsewhere. Top management is strongly behind process harmonization but two strong business organization makes the implementation challenging. Three interviewees were thinking if something radical should be done for the Arkki-program so that enough big renewal can be achieved. They also tough that processes should be more radically renewed. So far there hasn't been enough courage and aim to achieve so ambitious targets. Something radical could be piloted with some small rather independent area. Radical renewal in social security, e.g. basic income may offer possibility to radical renewal in this organizations service offering.

One interviewee challenged me to think if current renewal is paying enough attention to the **possibilities of digitalization**. How big is the risk that only technology is changed and small cosmetic fine tuning is done for business processes and services? Digitalization is much more than automation. Whole social security services should be thought again in very innovative way. He also encouraged me to propose big changes to the Arkki-program management i.e. program portfolio management. For example, what kind of portfolio management options there are and what kind of roadmap would direct towards those. What are the risks and are the big radical changes realistic in our organization?

One interviewee emphasized the importance of information of the processes e.g. how much time is spent for performing the task and how much ‘waste’ there is in between the tasks. With the intelligent usage of this information the processes can be optimized effectively.

Several interviewees mentioned that project management has developed a lot during past years. Good project management culture has emergence. Measurements for projects and programs should still be defined, data collected and reporting to be done. Now the problem is that the **steering group doesn’t get good picture** what is achieved and what still needs to be done. Project management improvements have gone even too much to the details. Project managers need freedom to lead their projects, only an agreed necessary metrics, milestones and deliverables have to be harmonized. The organization has a culture when something is done; it is done extremely comprehensively based on instructions or methodologies. Everyone should know where information is used and for what purpose the information is. Unnecessary waste could be omitted. Quite many of interviewees are thinking that project based development is good model for the development of benefits systems where needs are based on laws. The waterfall methodology may work well. Agile methodology is more suitable for other areas.

One interview concentrated mostly to the experience of agile system development in current organization. There has been couple of pilots of agile way of working. Agile toolbox with instructions is under development. Specialists, especially newcomers, are keen on agile development and they are motivated to do development in agile way. They have grown to it or they have used to do development in agile in their earlier companies. Agile pilots have been mainly successful. Challenges in agile pilots have been the **surrounding environment what are not agile**. Steering groups haven’t yet adopted the changing role. Product owner need to get power for decision making and steering group should be ‘only’ steering. Project managers are taking care of traditional pm-tasks like resourcing and reporting. The culture of the organization is not yet ready to resign traditional steering groups and project managers. In agile they have different role. **Increased management awareness and understanding of agility**, its roles, etc. is needed to bring agile thinking forward. In project management and middle management level the agility is not so well known, so there is still doubt.

4.4 Key metrics from projects

The centralized project and portfolio management tool, Clarity, was taken into use in 2014. All ongoing projects in 2014 what included IT development work and the mainte-

nance works of IT services were moved to this centralized repository. Also the resource management of development and maintenance work was centralized to the same tool. Project management, portfolio management as well as the resource management processes was developed remarkably during the implementation. Almost all interviewees mentioned that especially project management has been improved a lot during and after the Clarity implementation. The biggest benefits of the harmonized processes and centralized tool so far has been the overall visibility to the projects and resources. Analysis possibilities are still under construction. The values add of the centralized project and resource data repository can be realized.

The project data was exported from the tool and it includes: project name, projects managers' name, owner department, responsible IT team, project start and end dates, realized internal work amount, realized total work amount, planned and total costs. IT services maintenance work was separated as own tab and the development work of KanTa services (the National Archive of Health Information) were cleaned out. Calculated figures of the raw data: the amount of finalized projects, the total costs of the projects, the cost of 20 biggest projects, the percentage of cost of 20 biggest projects, the percentage of the amount of 20 biggest projects and the average length of 20 biggest projects. Raw data sheet is attached to this thesis. (Appendix 6.)

	Amount	Total cost EUR	Average cost/proejct EUR	20 biggest EUR	Average cost/20 biggest EUR	20 biggest %	20 biggest of total amount %	average lenght of 20 biggest
Finnished developmetn projects 2014-2015	223	27 391 582	244 586	18 699 457	934 973	68	9	29 month
Maintenance 2014	165	5 806 765	35 193	3 703 322	185 166	64	12	
Project lenght 12 month or more	89	21 935 098						
Project lenghth 24 month or more	27	15 145 146						

Table 1 Project data

Before centralized project and portfolio management system the IT project information was collected manually into the excel files since 2003. Those excel files was analyzed but the quality of the data wasn't known. Data was fragmented and many inconsistences were found in comparison with overlapping data in Clarity. It was decided not to use this data as a reference for this study. Some individual project metrics could be used and the raw data is attached to this study. (Appendix 7).

5 Suggestions for guidelines

5.1 Portfolio Management framework for Kela

The purpose of the Portfolio management is to establish and communicate strategic themes in organization. Following picture illustrates my proposal for the solution creation framework for Kela. It is based on earlier described frameworks, IT4IT and SAFe, as well as read theory literature mentioned earlier in this study. I propose that entity called Solution is established in Kelas Operational Development unit.

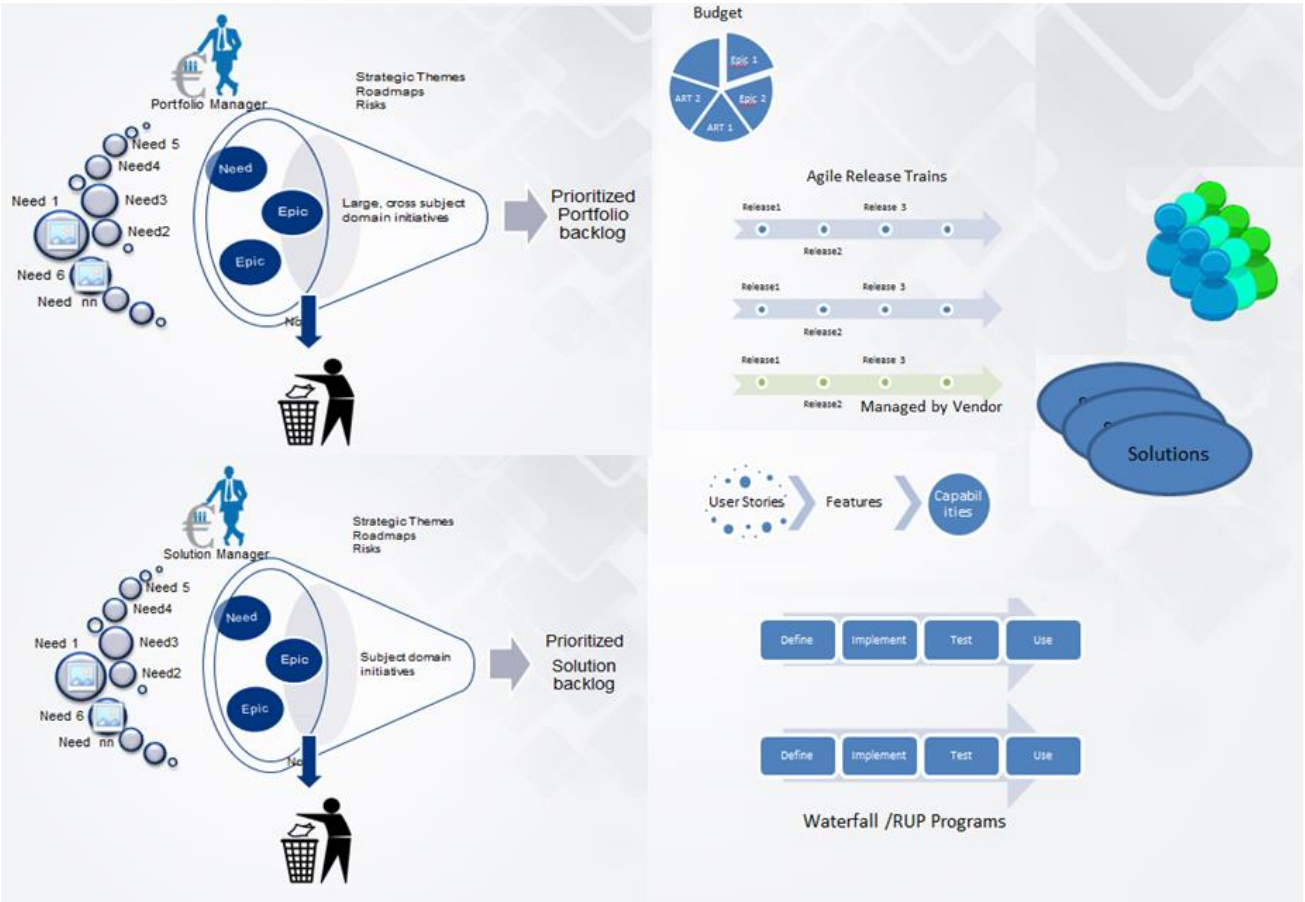

Figure 13 Solution creation model

Solution is the business service what is produced by Agile release Trains in Value Streams, or it may be produced by traditional waterfall or RUP based programs. Solution usually includes one or more IT Services, or one IT Service may belong to several Solutions. Solution is responsible to offer fit for purpose products or services to end users and/or customer organization. Solution is also responsible to gather customers need and manage the backlog of solution development in a way that strategic themes will be ac-

complished in cost-effective manner. Solutions consist of capabilities, capabilities consist of feature and feature is the implemented set of user stories.

Big organization like Kela has several Solutions, the portfolio management will coordinate and facilitate the accomplishment of strategic themes in enterprise level. Large, cross-solution needs are managed in enterprise level portfolio. Portfolio management is the highes body what ensures that operational development is producing the expected value add in enterprise level.

Lean and agile way of managing the portfolios and solutions can answer to the many of the raised challenges in current situation. Agile provides a methods and tools but lean thinking provides the values behind the agile development. The fundamental values in lean thinking are **maximize customer value** while **minimizing waste**, **amplify learning, decide as late as possible, deliver as fast as possible, empower the team, build integrity in, and see the whole.** I will concentrate to the maximize customer value while minimizing waste in my improvement proposals for Kela.

5.2 Proposal for Portfolio planning and Portfolio categorizing

To be able to achieve the benefits of the lean principles, many changes need to be started from portfolio management. One source of waste is **current portfolio planning and budgeting process** where the planning is done from bottom up with too detail level of requirements. Basically projects are representing business requirements. The size of projects in portfolio can vary a lot. Business cases are required for all projects. It leads easily to the situation where strategic drivers are not necessary driving the portfolio planning and the portfolio planning is very laborious process. Also the portfolio change management is very laborious. The problem with project planning accuracy was raised up in the interviews of this thesis. E.g. Only 40% of the 2014 planned project was started by September 2015.

One **research question was: How Lean-Agile Portfolio Management can improve productivity?** Instead of planning and estimating individual small development projects from bottom up for a year ahead, the level of portfolio planning should be increased in to the Solution level and it should concentrate to increase value. The planning should concentrate to the epics of solutions or epics of cross-solutions. If portfolio planning is derived from strategic drivers and objectives and it is kept in a business value producing level, the portfolio will drive the development work to the correct direction. This requires the structur-

ing the portfolio based on value stream and solutions, like SAFe is recommending. The planning item is epic, i.e. a large need. Higher level portfolio planning is also eliminating the waste of unnecessary re-planning. SAFe model guides to create 'only' light weighted business cases in epic level.

The end result of portfolio planning is prioritized portfolio backlog and solution backlogs. Budgeting will be done for portfolio and solution backlogs based on agile budgeting principles in SAFe model. Budgeting is concentrating to estimate the needed size of Agile Release Trains and Enterprise level cross-solution epics. The budget is good to check every half year, no more often and no more seldom. Half year is enough long to achieve remarkable value and on the other hand the focus of higher level epics may change in half year. Half year checkpoint may be just quick checkpoint. When the work concentrates to the implementation of prioritized requirement backlog, the resources (includes budget) and schedule stays stabile. The scopes for the releases are set based on business targets and throughput value of each Agile Release Train. If the scope can't be achieved the continuous backlog prioritization ensures that most important and valuable requirements are implemented in agreed schedule.

Categorization of portfolios – The enterprise level portfolio consists of several portfolios. Currently portfolios are divided based on Business Units i.e. own portfolios for Benefit Services, Customer Services, Common/shared Services, Management services (esikuntapalvelut), Operational Development Services and ICT services. The portfolio deviation based on organization structure is one choice. The value streams and solutions should be defined in enterprise business architecture. Organization structure may support value stream deviation, but organization structure shouldn't be the driving force for solution division. The Operational Development Service unit carries the biggest portfolio including all ICT development projects.

Based on Scaled Agile Framework (SAFe) the enterprise portfolio level epics are split to the different solution areas and possible individual subject domain needs are collected in solution level. The needs in Operational Development Services should be divided based on Solutions. Each solution is developed in one or more Agile Release Trains. The size of one Agile Release Train is typically 50-125 persons and it holds all needed competences to develop the area. Business cases are created for all portfolio and solution level epics. For Solution level epics the prioritization discussions are done with portfolio management to ensure the achievement of enterprise level strategic targets. There are two ways to collect needs: Epics in portfolio level, where epics are large and typically cross several solution areas and epics in solution level, where epics are in solution.

Collecting & defining portfolio epics i.e. collecting and reviewing needs: A need is a free-formed written statement indicating any change in processes or services, in SAFe model large needs are called epics. A need can trigger a very small or a very large requirement. Basically, a need can be initiated by anyone. The initiator of the need should prepare a short presentation (e.g. 3 min sales pitch) of a need with an argumentation why it is important and what are the benefits if/when the need is implemented. Each portfolio has a funnel for needs. The portfolio management facilitates the highest level need management process. Wide organization level or cross-solution area needs, typically derived from strategic themes, are added to the enterprise/business unit level need funnel. Portfolio management is discussing all initiated needs periodically and all potential needs are sent to the further review. In the review the needs are roughly sized, valued and business benefits are estimated. After the review the needs are approved or rejected. Approved needs are turned to the epics and sent to the deeper analysis.

Solution level needs are managed in similar way than portfolio level needs. Solution level needs are added to the solution level need funnel. Small, team level needs are added to the product level need funnel. Lowest level need management manages typically new issues or small enhancements from production. Most of the needs should be established in portfolio level, based on strategic themes, and lower levels are getting requirements what are already prioritized in portfolio management. SAFe enables to get in new requirements in all levels.

5.2.1 Analysis and prioritization of portfolio epics

The epic owner is assigned for epic. He or She, together with architects, development teams, solution management and key stakeholders of potentially affected agile release train is analysing the epic. Design and implementation choices are explored; a light-weight business case is created. Epics are analysed taken risks, roadmap and targets into account. The approval of analysed epic is an investment decision in organization and it should be done by authorized body. The approval decision is done based on earlier created business case. Approved epics are moved to the portfolio backlog queue.

Portfolio Management need to **balance the portfolios** before go/no-go decision. Below is one useful tool to visualize the risks and values of portfolios.

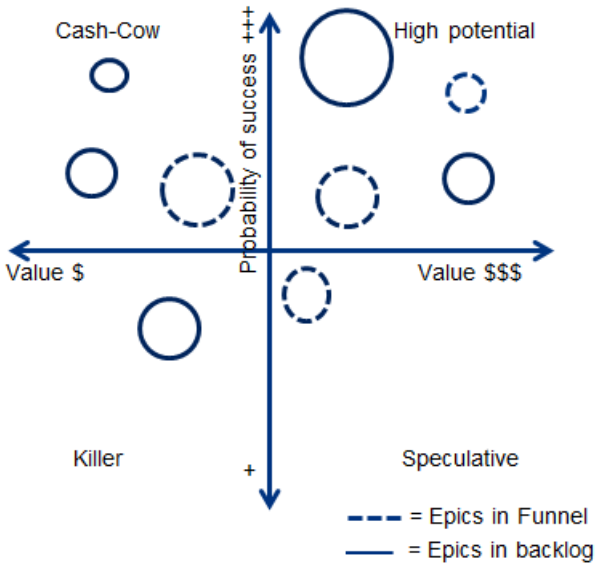

Figure 14 Risk and value diagram for Epics

The target for balancing the portfolio is to ensure that there are innovative initiatives, basic business support initiatives, technology renewals etc. in development backlog queues. The initiatives with low value and high risk need to be considered carefully. I recommend that risk and value diagram is created for all solutions. The portfolio management together with solution management is balancing them regularly.

Each solution will be divided to the agile release trains. The release trains takes also care of the maintenance work. Release train has all needed competences and it has prioritized backlog. Release management creates a schedule for releases. It is typical that separate release trains has same release schedule. This enables to manage dependences between trains. One train consists of several agile development teams who are implementing the prioritized features. The team is selecting the items for implementation by themselves from prioritized backlog.

5.3 Proposal for resourcing process

Maximizing customer value by minimizing the waste could mean in Kelas development organization to **change fundamentally the resourcing principles**. This **answers also to resourcing problem related research question**. In agile development one person belongs to one agile development team and he/she is able to concentrate to the productive work without disruption. In SAFe model Agile Release Train has all needed resources and competences; this makes resource management easier and lighter. By doing this the waste in job switching could be eliminated and the continuous resource puzzle could be

stopped. It moves the focus of resourcing towards competence development and strategic resource planning.

The requirements, or epics and features like SAFe calls, are located in different level of prioritized backlogs. Instead of wasting time for resource hunting, arrangements and negotiations with all ongoing and coming projects the project- and resource managers can concentrate for example to the requirement purification, business case calculation and prioritization, strategic resource planning and competence development - to the work what provides more value. When resources are in release trains and agile teams there are no need for question: 'Do you have resources to do this?' Instead the question is: 'How does this requirement position in our backlog?' During the requirement prioritization the business value need to be analyzed; otherwise the requirement is not getting priority.

The same thinking is scaled up in Solution and Portfolio management. There the abstraction level is rising up to the epics or themes, not individual requirements. Agile development team and release trains have throughput value what is used to illustrate the capacity in upper level planning and budgeting. Throughput value is in the beginning calculatory value but it evolves based on done sprints and releases.

5.4 Suggestion for pilot case - Statistic and reporting

Statistics and reporting is good candidate to be one solution and it will be developed in one agile release train. This one release train takes care of development and maintenance activities for old and new statistic and reporting services. All needs will be collected, analysed, purified and put into the one solution level backlog. Releases are planned in the solution level and items (features) from solution level backlog are divided to the team level backlogs (sprint backlog). Small items can be added to the team level. Product owner has the authority to decide new items and their priorities in to the team level backlog. Agile release train consists of 4-6 agile development teams. 1-2 of them could concentrate to the maintenance of old systems and rest could take care of the new system development. If some specific competence is need in other agile team, he or she could be 'borrowed' there for one sprint or one release, but not for one task inside a sprint.

The solution management need to be established to be able to manage the portfolio for statistic and reporting. Solution management is responsible of collecting, analysing and prioritizing the business needs. It is also responsible to take care that the solution architecture is sustainable and technological possibilities and other possible innovations has

been utilized. Doing this in professional manner requires tight cooperation with business as well as portfolio management organizations. Good strategy, technology and subject domain understanding enables to keep solution backlog in good balance.

When all requirements are in one solution backlog and the prioritization is continuous process, the agile release train can concentrate to the implementation work of most important items. Resources can concentrate to the one task in a time. They can do the work effectively ready at one time. Unnecessary switching between simultaneous tasks can be stopped. This releases a big amount of worktime to the productive work. When resources are in one agile release train and in one agile development team the resourcing is lighter. Line management can concentrate to the competence management and to the more strategic level resource planning.

The managements time released from resourcing can be used for requirement analysis, prioritization and to the removing obstacles of development work. One solution backlog and relatively small amount of items under development enable a good visibility to the development work. All ongoing work is visible and the release schedule is known. Good visibility to the development work increases customer satisfaction and creates the atmosphere of trust in the organization. Instead of several small development projects one solution level backlog requires only one steering group per solution, or if responsibilities are clear enough and organization gain trust, steering groups are not needed at all. All above mentioned changes are enabling personnel to concentrate to the value added things. Worktime is used to the productive work and essential business value is produced faster.

5.5 Roadmap proposal towards Lean-Agile portfolio management and resourcing

I am proposing two major changes to the current way of working in operational development in Kela; agile portfolio planning and resourcing into the Agile Release Train level. Those changes require that new entity called Solution needs to be established. When those two upper levels are implemented the rest of the organization may transform to the agile development or parts of it may continue with traditional ways.

Since the changes impacts largely in Operational Development and ICT Services organization I recommend to use John P. Kotters eight step change management method to support the transformation. Kotter is internationally recognized authority of leadership and change. He’s leading change instructions are one of the famous teaching for organiza-

tions to achieve successful transformation. Kotter's model provides an eight step model how larger changes can be led:

1. Establishing a sense of urgency
2. Creating a guiding coalition
3. Developing a vision and strategy
4. Communicating the vision
5. Empowering the employees to act on the vision
6. Plan and generate short term wins
7. Consolidate improvements and produce more change
8. Institutionalize the new approaches

(Kotter, 2012)

The assumption is that all of these steps should be concluded to make the change happen. It indicates that a change like agile is not something what happens overnight, it is paradigm change impacting the company culture. Even though that Kotter's model has nothing particularly to do with agile it still uses a lot of similar principles as in agile;

- Guiding coalition - not steering
- Providing an overall goal - not giving the exact steps needed to reach it
- Empowering
- Short term wins - incremental approach

Important is also that even the transformation project will end, there need to be still effort to get the change anchored in the organization.

I recommend transforming towards lean-agile in agile way. It means that the transformation is done incrementally. Setting up the transformation program will be practical way to organize the work. The first release in roadmap is planned in more detail level and the coming ones in more draft level.

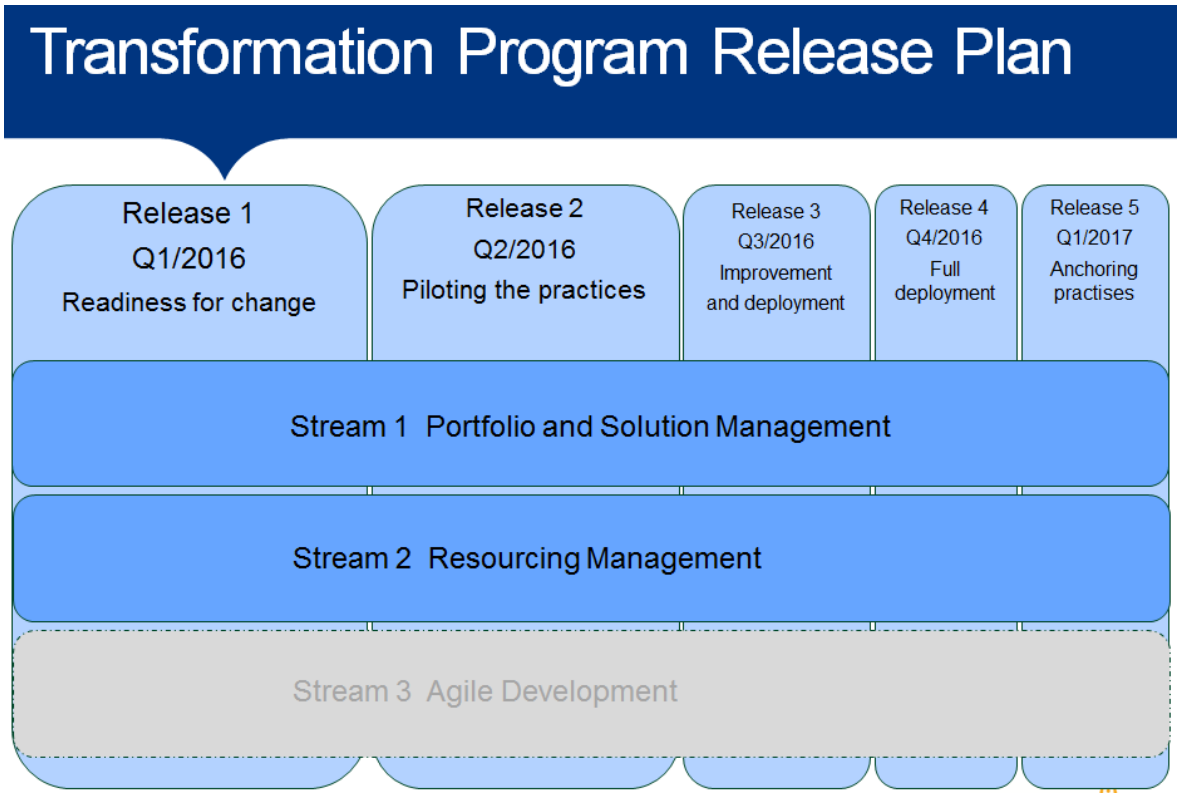

Figure 15 Lean-Agile transformation program release plan

The first release is creating the readiness for a change and piloting with some solution(s). Second release could be piloting the practices. Third release could improve the processes and practice based on experiences from pilot(s) and starts the deployments of the model. Forth release could include full deployment of the model, and fifth release should anchor the deployed processes and practices to business as usual. Each release has two streams, one for portfolio and solution management, other one for resource management process. If organization has an interest towards agile development, the third stream can be added to the transformation program. The objectives for first release, portfolio and solution management stream could be:

- Current state and stakeholder analysis
- Cultural and behavioral change training
- Agile trainings for effected personnel focus in portfolio management (stakeholders)
- Vision, strategy and objectives for a change
- Change plan, including communication plan, select change agents and nominate other roles
- Effective change leadership
- Portfolio structure modelled (solution structure), this may be outcome from enterprise level business architecture
- Portfolio management practices, governance model and portfolio backlog created (incl. Clarity readiness)

- Solution management practices, governance model and solution backlog created (incl. Clarity readiness)
- 1. version of light weighted business case template created
- 1. version of portfolio balancing and prioritization model created
- 1. version of budgeting process created
- Portfolio and Solution level epic purification support available
- Define metrics and KPI's to measure business success
- Consolidated improvements and produced more change for coming releases

The objectives for first release, resourcing management stream:

- Current state and stakeholder analysis
- Cultural and behavioral change training – can be combined with portfolio management
- Agile trainings for effected personnel focus in resourcing (stakeholders)
- Vision, strategy and objectives for a change
- Change plan, including communication plan, select change agents and nominate other roles
- Effective change leadership
- Resourcing process created
- Agile Release Trains defined including needed roles
- Resource Management practices, governance model created (including Clarity readiness)
- Define metrics and KPI's to measure business success
- Consolidated improvements and produced more change for coming releases

5.6 Feedback to suggestions from Kela

The summary and findings of the interviews and preliminary change proposals was presented to the group of nominated key responsible persons in coming Operational Development organization including; the client of this work, director of Operational Development, Operational Development Program Director, CIO of Kela, and responsible Manager of Portfolio Management. The presentation material is attached to this study. (Appendix 8).

The group was agreeing the findings of the interviews and they have the willingness to improve those areas during coming year. Some quick fixes are already done during the portfolio planning round in this autumn. The group agreed the need for solution level. CIO was highlighting the importance of business architecture design when defining the solution

structure. In optimum case the business architecture design would be done in very close cooperation with top management of Kela. The solutions may have the best possibilities to bring value if the structure supports well planned business architecture.

The operational development program director was highlighting the opportunities of scaled agile development in portfolio management and in program management level. They are investigating opportunities to renew the way how the operational development program is lead in the future. She was very interested of my proposals and the first planning workshops for SAFe model implementation are already booked to the calendars. The client of the work has told that this work has generated an interest towards lean and agile way of leading the operational development. He is already committed to improve the areas find out in interviews. He is the key promotor in SAFe implementation planning. The presentation material of the work is in appendix 8.

6 Conclusions

The conclusions on the research results for lean and agile portfolio management in the case organization are discussed in this chapter.

This research was conducted as a case study in Finnish Social Insurance Institution's (Kela) Operational Development. Client of the work was the future Director of Operational Development in Kela. The objective for the study was to find out development opportunities to the current system development processes and create improvement proposals for the agreed topics. More details about the objectives are discussed in chapter 1.3.

The development opportunities in case organization was evaluated by open interviews with selected 10 key persons from the organization. Two big themes were raised up in interviews:

1. Portfolio has a lot of small projects and new projects can be established during the year without updating the portfolio -> too many projects ongoing at the same time.
2. Resources are working in too many initiatives at the same time -> key resources are overloaded and their effort is used for task switching. On the other hand administrative work to maintain current resourcing process is enormous.

From those themes the actual research questions were agreed together with the client:

- How Lean-Agile portfolio management would improve productivity?
- How Lean-Agile portfolio management would solve current resourcing problem?
- How Lean-Agile agile portfolio management impacts to the current portfolio management?
- What kinds of changes are needed to be able to move to the Lean-Agile portfolio management (roadmap)?

The Open Groups IT4IT reference architecture, lean principles and Dean Leffingwells Scaled Agile Framework (SAFe) was studied as a framework for the study. Also the Mary and Tom Poppendiecks Lean Software Development, Dean Leffingwells Scaling Software Agility, Jochen Krebs Agile Portfolio Management, and Modig & Ahlström's This is Lean were studied quite carefully. More as a reference material the PMI's The Standard for Portfolio Management and Bonham's IT Project Portfolio Management were studied. John P. Kotters Leading Change was used to support the roadmap proposal creation. Other

literature and articles were also studied; references are added to the study if used. Strategy to portfolio part of IT4IT reference architecture, basics of SAFe model and Lean-Agile portfolio management theories are described in chapter 3.

Portfolio management is the highest level where the decisions of the projects are done. It was found out in theory studies that to be able to solve the current challenges with the amount of projects and the resourcing challenges the focus should be put first into the portfolio management. When portfolio management is in good shape and it is in a position to drive development work towards strategic objectives, the improvements in other development areas are automatically adding value for the whole development process.

The first research question is answered in chapter 5.2. The analysis is based on pattern matching technique where theories in chapter 3 are used to analyse the current practises in case organization. The current practises were researched by open interviews and the documentation of current processes. Current practises are discussed and the summary of the interviews are described in chapter 4.

The result of the research indicates that the role and importance of portfolio management should be clarified by lifting up the level of the portfolio management. This is done by establishing new entity called Solution. Highest level of portfolio management operates in enterprise level by managing cross-solution requirement backlog and solution requirement backlogs. The focus in portfolio management is moved from development projects to the solutions. Solution is a permanent entity, which have responsibility to bring value to the customer organization. Solutions are collecting and defining the business needs keeping strategic themes in mind. Moving focus to the solutions portfolio management is able to steer whole development work towards strategic direction. Higher level portfolio management is also eliminating waste from the process by smaller amount of needs. In lean-agile portfolio management the business cases are created only for large entities.

The second research question is answered in chapter 5.3. Current organization is doing remarkable amount administrative work for organizing resources to the all active and coming projects and keeping resource plans up to date. Despite of that many resources are overloaded and they are allocated to the several projects at the same time. Big amount of waste is created when persons are switching from task to another and when management is keeping detailed, task level, plans up to date. SAFe model brings an effective solution to this challenge. When portfolio management is first modelled to the solutions, the solutions will be implemented in Agile Release Trains. Agile Release Train has all needed competences and resources in itself. Agile development teams are formed inside of Agile

Release Train. One person can belong to only one release train and to only one agile development team. All requirements for Agile Release Train are in prioritized backlog. The schedule for the train is agreed in release schedule. Agile Release Train concentrates to develop requirements from prioritized backlog. New requirements or changes to the existing ones are changing the order of backlog but the development work is not disturbed.

This resourcing model together with the agile development model ensures that resources are able to concentrate to the one task in a time. Task is done ready before the next task is started. This eliminates the task switching waste from development process. By concentrating to do one thing ready at a time and by eliminating task switching waste organization may achieve a lot bigger productivity than current way of working enables. When resources are in Agile Release Trains and in agile development teams almost permanently the big amount of waste from resourcing process is released. Management can concentrate to the more strategic level competence management and resource planning. Other released time can be used to add real business value in requirement backlog maintenance i.e. in requirement purification process.

The third research question is answered in chapters 5.1 and 5.2. Current portfolio management is concentrating to collect requirements bottom up. Development projects are representing business requirements. Business cases are created for all proposed projects and resources are tried to confirm already in portfolio planning phase. Challenge in current portfolio management is the laborious maintenance process. It leads to the situation that the portfolio is created once a year but not actively maintained when changes happens. The impact of this is that the current portfolio is not steering the development work. The portfolio management should concentrate to manage the value providing solutions. The requirements should be lifted up to the solution level and the requirement should be lead form strategic themes. Portfolio management should produce a prioritized requirement backlogs for large cross-solution requirements and for solution level requirements.

Fourth research question is answered in chapter 5.5. In roadmap proposal I am recommending to use John P. Kotter's eight step change management model to support the transformation work. Transformation program should be established and the transformation should be done in agile way. Transformation program may have five releases and two or three streams. The high level objectives for the releases are:

1. Readiness for the change
2. Piloting the practises
3. Improvements to the model and deployment
4. Full deployment

5. Anchoring the practises to the organization

The first stream is concentrating to transform portfolio management to the new model and establishing the solutions. Second stream is developing and deploying the renewed resourcing process to the organization. Program can establish a third stream for agile development. Agile development wasn't in a scope of this work and it is not discussed further in this study. The proposal of the content for first release is discussed in chapter 5.5.

7 Reflection

The done journey with this research has been interesting and educational. It was great opportunity to get such a large topic with a real interest from case organization. All invited interviewees accepted the invitation and they were very active in interviews. I got freedom to plan the study by myself. All these things enabled to proceed with the research as planned. Status meetings with the client and the advisor from Haaga-Helia University were held once a month. That was useful since I was able to get regular feedback of my thinking and they got the information to which direction the research is going. I was able to strengthen my knowledge about portfolio management in general but also the reference architectures and frameworks deepened my overall understanding of operational development and ICT positioning into it.

My personal thinking process with this study started during summer 2015. I read quite many master and doctoral thesis as well as other articles and some literature. I was figuring out the possible topic for my own thesis and on the other hand I wanted to learn how interesting thesis are done.

Actual topic discussion started in the mid-August when the client of the work, Esko Karjala, expressed an interest towards my study. He drafted the idea of the topic and in two weeks we agreed the target for the study.

During September I made a plan for the study, I selected and read literature of the topic. All interviews were done also during September. October was time for active writing and reading. The different theories and the results of the interviews started to form as a solution proposal. I created the solution proposal during November. The solution proposal was discussed with my external advisory group as well as the selected representatives from the case organization. The thesis was finalized in the beginning of December.

I would like to extend my warmest thanks to my client, Esko Karjala, and the advisor from Haaga-Helia, Jouni Soitinaho. Both of them were very supportive and each time after our status meeting I was more motivated and eager to get the work done. Esko was giving good guidance of what is realistic in Kela and he kept the target clear. Jouni gave very good advices for the structure of the work and pressed me to keep in schedule. He was also proofreading and commenting my work actively. I would like to thank you those who

gave the interview; Mikael Forss, Markku Suominen, Kai Ollikainen, Esko Karjala, Marjukka Turunen, Helena Lääperi, Ari Vähä-Erkkilä, Eija Hamina-Mäki, Raija Tuomi-Sarja, Marko Korhonen and Jaana Piipponen. You offered a good inside visibility to the challenges in today. On the other hand all of you had also a very good thoughts and ideas how those challenges could be solved. I had also an external advisory group; thank you Kirsi Ilkka, Mika Mäkinen, Lassi Salo, Laura Keränen and Sanna Rantonen. You gave me an excellent external viewpoint to the topic and confirmed my belief that such a solution is meaningful to propose. Last but not least, special thanks to my family who showed a great patience during the autumn time. For example right now they are cleaning and cooking so that I am able to finalize this work.

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Appendices

Appendix 1. Interview Questions

MASTER'S THESIS- INTERVIEW QUESTIONS

Interview

Current pain points:

ICT standard:

ICT standard – management streams and functions, (ICT Standard, 2015).

1. Biggest pain points in ICT development?
2. Strategy and governance
    - Is the vision and strategy well known by everyone? Communication?
        - Whole organization vision and strategy – does this give direction?
        - ICT development strategy or target stage - roadmap
        - Business targets – is the prioritization possible based on those?
    - Are business processes enough optimized (simple and lean)?
    - Are ICT governance in good shape?
    - Architecture? Benefits, challenges?
    - Do we've good metrics and visibility to the facts (data)? (Projects, business processes, Services…)
    - Does our budgeting impact to the efficiency of ICT system development?

- How flexible is the budget? i.e. do we've process to make changes, when the needs changes?
- What are our core/context competences?
- Do we have correct competences?
    - In technology
    - In development methods
    - In project work
    - In agile
    - In security
    - Company culture – how it impacts?
- Resourcing – are we effective on it? Challenges?
- Is our target to optimize the usage of resources or the outcomes (customer needs)

3. Sourcing and Vendor Management
    - Sourcing strategy?
    - Usage of external competences?

4. Portfolio/Program/Project Management

    - Do we have optimized development portfolio? What impacts to it?
    - Is the size of the projects correct? Why?
    - Is the priority of the projects correct?
    - Processes
        - Are ICT development processes simple and lean?
    - Project preparation and business case?
    - Project planning, organizing, resourcing, starting?
    - Development, project management, testing?
    - Training, go live, realizing benefits?

5. Service Management
    - Development ongoing - ok

Appendix 2. Notes of the interviews (confidential)

Appendix 3. The Management of Operational Development (confidential)

Appendix 4. Portfolio Management Process (confidential)

Appendix 5. Resource Allocation Example (confidential)

Appendix 6. Project metrics data (confidential)

Appendix 7. Project metrics data – older (confidential)

Appendix 8. Summary of the Thesis

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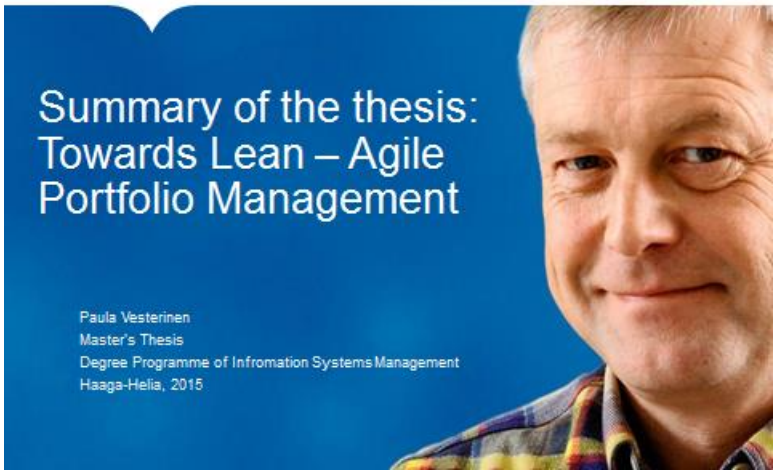

Agenda

- Interview results
- Research questions
- Answers to research questions
- IT4IT reference architecture
- Scaled Agile Framework – SAFe
- Solution creation model
- Portfolio prioritization

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Interviews

High level topic for the interviews:

- Biggest pain points in development work

11 open interviews held

- Esko Karjala, Mikael Forss, Kai Ollikainen, Markku Suominen, Marjukka Turunen, Ari Vähä-Erkkilä, Helena Lääperi, Eija Hamina-Mäki, Jaana Piipponen, Raija Tuomi-Sarja, Marko Korhonen

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Interview results

- Too many simultaneous projects
- Focus is missing easily
- Inconsistent targets
- The portfolio is not driving the development work
- Too many owners for requirements
- Project prioritization is inadequate
- Business Cases should be better
- Resourcing
  - Lot of administrative work, low relevance
  - One person in several projects -> inefficient work
  - Key persons overloaded
  - Hard to get resources
- Innovative digitalization possibilities – what is the needed BIG thing?

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Research questions

- How Lean-Agile portfolio management would improve productivity?
- How Lean-Agile portfolio management would solve current resourcing problem?
- How Lean-Agile agile portfolio management impacts to the current portfolio management?
- What kinds of changes are needed to be able to move to the Lean-Agile portfolio management (roadmap)?

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How Lean-Agile portfolio management would improve productivity?

- The level of portfolio planning should be increased in one or two level higher and it should concentrate to increase value
- The planning should concentrate to the epics of value streams or solutions –business drivers
- If portfolio planning is derived from strategic drivers and objectives, the portfolio will drive the development work to the correct direction
- Higher level portfolio planning is also eliminating the waste of unnecessary planning – makes planning process lighter
- SAFe model guides to create 'only' light weighted business cases in epic level

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How Lean-Agile portfolio management would solve current resourcing problem?

Lean principle 'Maximizing customer value by minimizing the waste' could mean in Kelas development organization to	• change fundamentally the resourcing principles.
In SAFe model Agile Release Train has all needed resources and competences	• Makes resource management easier and lighter • Waste in job switching could be eliminated • Continuous resourcing puzzle could be stopped • Moves the focus of resourcing towards competence development and strategic resource planning
One person belongs to one agile development team	• He/she is able to concentrate to the productive work without disruption • .

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How Lean-Agile agile portfolio management impacts to the current portfolio management?

- New entity called Solution to be established
- Portfolio focus from projects to the solutions
- Requirements i.e. epics to the prioritized portfolios
- Budget to the portfolio and solution level
- Implementation to the Agile Release Trains -> pull mode

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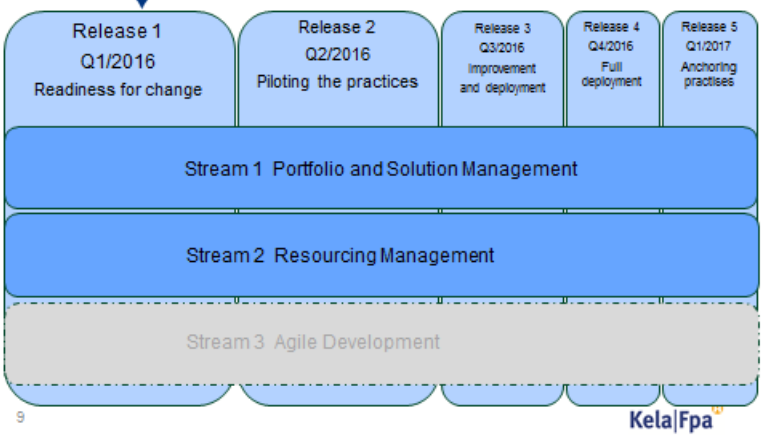
Transform Program Release Plan



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Kotter's 8 step change management model

- Establishing a sense of urgency
- Creating a guiding coalition
- Developing a vision and strategy
- Communicating the vision
- Empowering the employees to act on the vision
- Plan and generate short term wins
- Consolidate improvements and produce more change
- Institutionalize the new approaches

John P. Kotter, Leading Change, 2012

10

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IT Value Chain

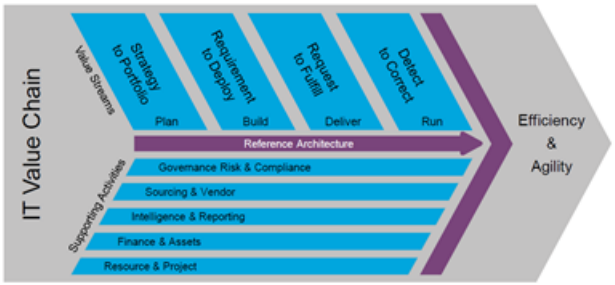

Figure 2: IT Value Chain The Open Group IT4IT™ Reference Architecture, Version 2.0

The functional components in the IT Value Chain are grouped into four primary IT Value Streams and five supporting activities

11

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IT Value Streams and Service Models

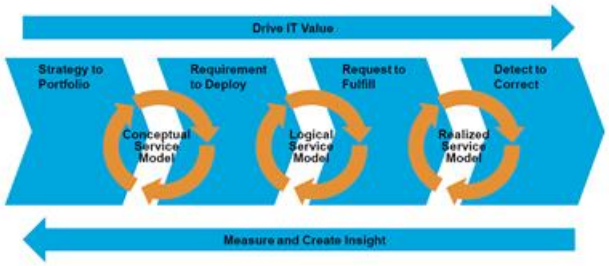

Figure 3: IT Value Streams and Service Models

The Open Group IT4IT™ Reference Architecture, Version 2.0

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Strategy to portfolio

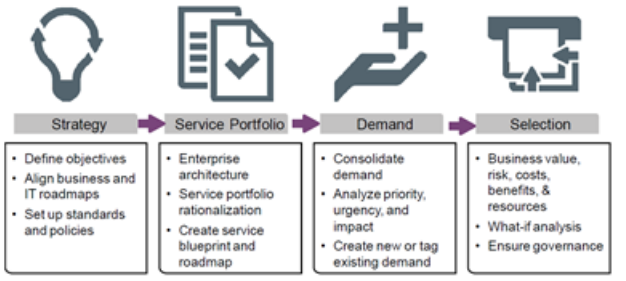

Figure 5: Strategy to Portfolio Activities The Open Group IT4IT™ Reference Architecture, Version 2.0

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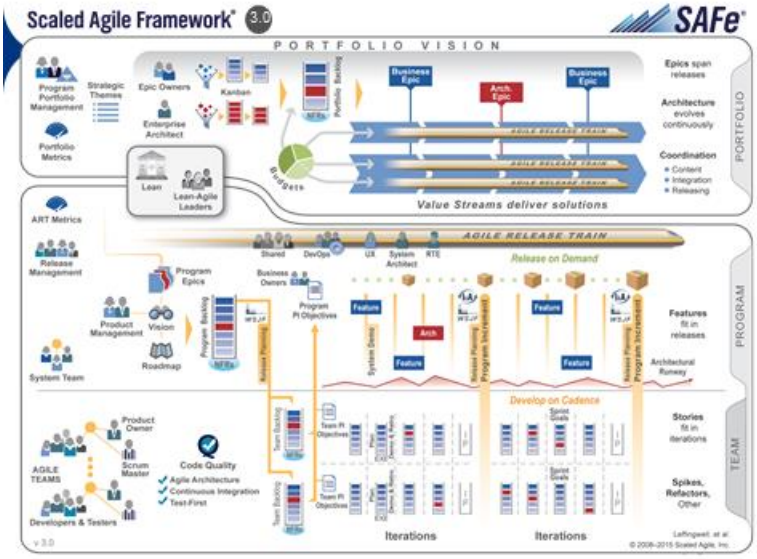
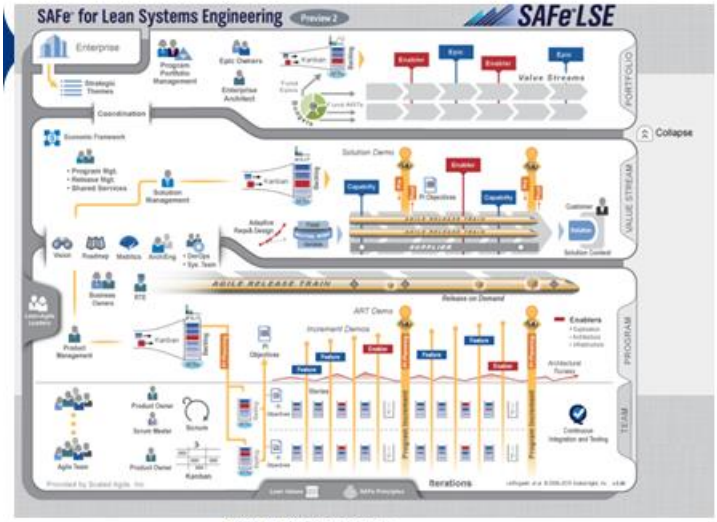
Appendix





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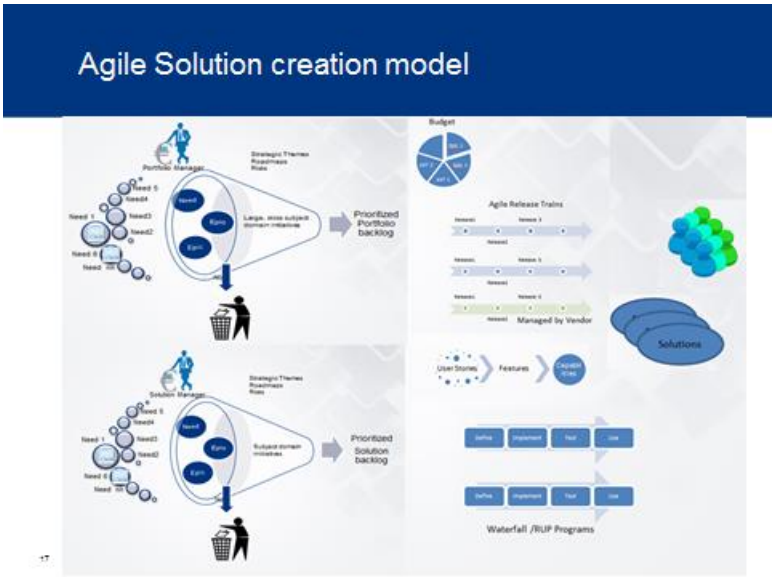
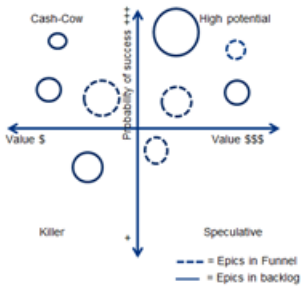


Epic prioritization – Risk and Reward model

- Risk and reward diagram



- Weighted Shortest Job First - WSJF
  - Backlog prioritization method using the cost of delay and remaining job size
  - Target is to continuously update the epic priorities based on current business context, time, value, development facts, risks and efforts
  - Used when the implementation decision is already done???

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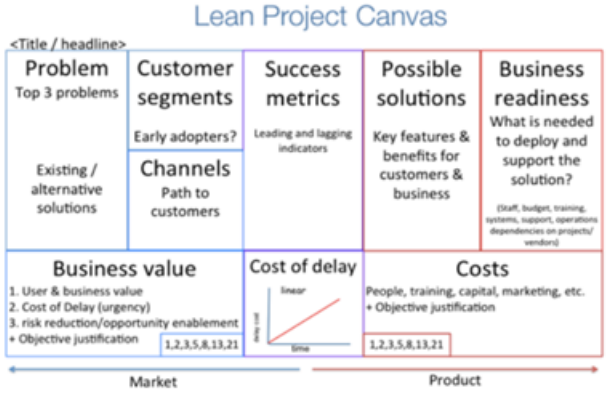
Epic prioritization – Lean Project Canvas



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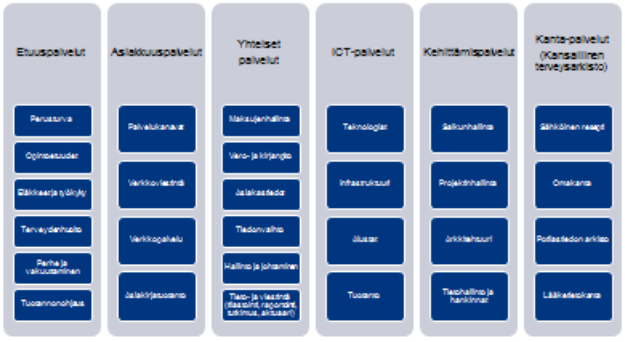

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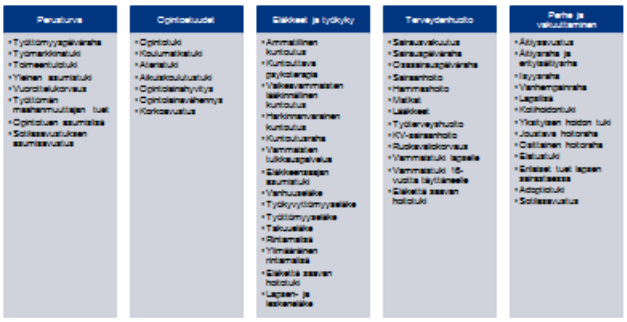

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