

# Fluency in Large-Scale Agile Development



student: Greice Roman  
supervisor: Sabrina Marczak

**“In our experimentation with Scrum (...) we found that small teams can be flexible and adaptable.”**

LINDA RISING AND NORMAN S. JANOFF  
AG COMMUNICATION SYSTEMS, 2000



# sixteen years go by...

The logo for Yahoo!, featuring the word "YAHOO!" in a purple, stylized serif font with a registered trademark symbol.

Agile Conference '09



Information and Software Technology '11

The Ericsson logo, featuring the word "ERICSSON" in dark blue, bold, sans-serif capital letters next to a stylized blue symbol consisting of three slanted parallel bars.

ESEM '13



IBM Global Services '10



Addison-Wesley Professional '12

9<sup>TH</sup> ANNUAL

# State of Agile™ Survey

**53%**

of all  
respondents  
had more  
than 1,000  
people  
in their  
software  
organization

**35%**

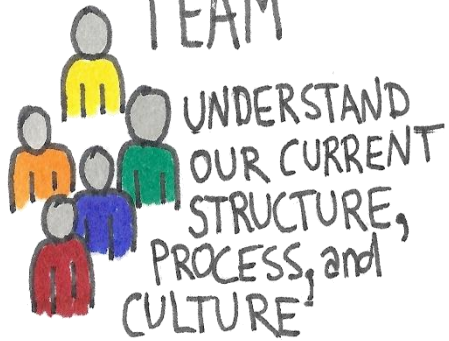
had more  
than 5,000  
people in  
their entire  
organization

**20%**

worked in  
very large  
organizations  
with more  
than 20,000  
people

# some practices for agile transformation

TRANSFORMATION TEAM



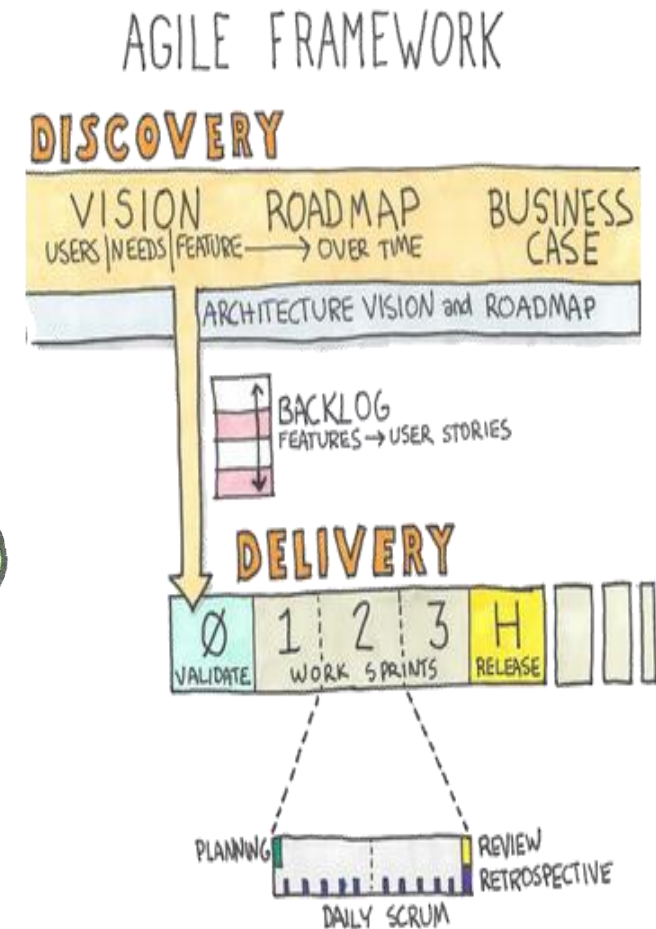
BEHAVIORS  
LANGUAGE  
RELATIONSHIPS

HOW?

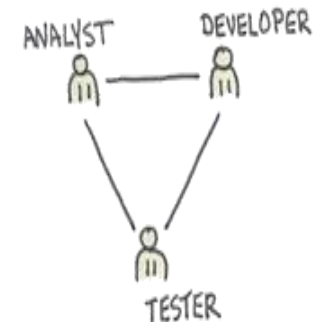
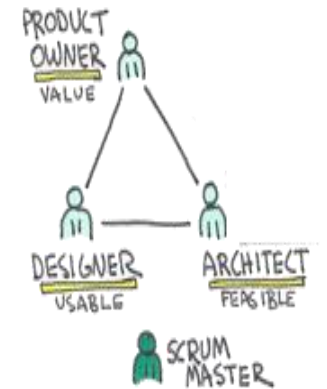
ROLES • TASKS  
WORK PRODUCTS

DEFINE  
OUR  
VALUES  
WHY?  
PURPOSE  
PRINCIPLES

TRANSFER  
OWNERSHIP



TEAM



The term 'scaled agile development' was introduced in academia by Sutherland in his study "Agile can Scale".

Five large companies adopt Scrum method.

Sutherland, J. "Agile can scale: Inventing and reinventing scrum in five companies", Cutter IT journal, vol. 14–12, 2001, pp. 5–11



LeSS BOOK CHAPTER 2:  
INTRODUCTION



LEAN  
THINKING



SYSTEMS  
THINKING



PRINCIPLES

FEATURE  
TEAMS



TEAMS

...



STRUCTURE



ORGANIZATION



COMMUNITIES



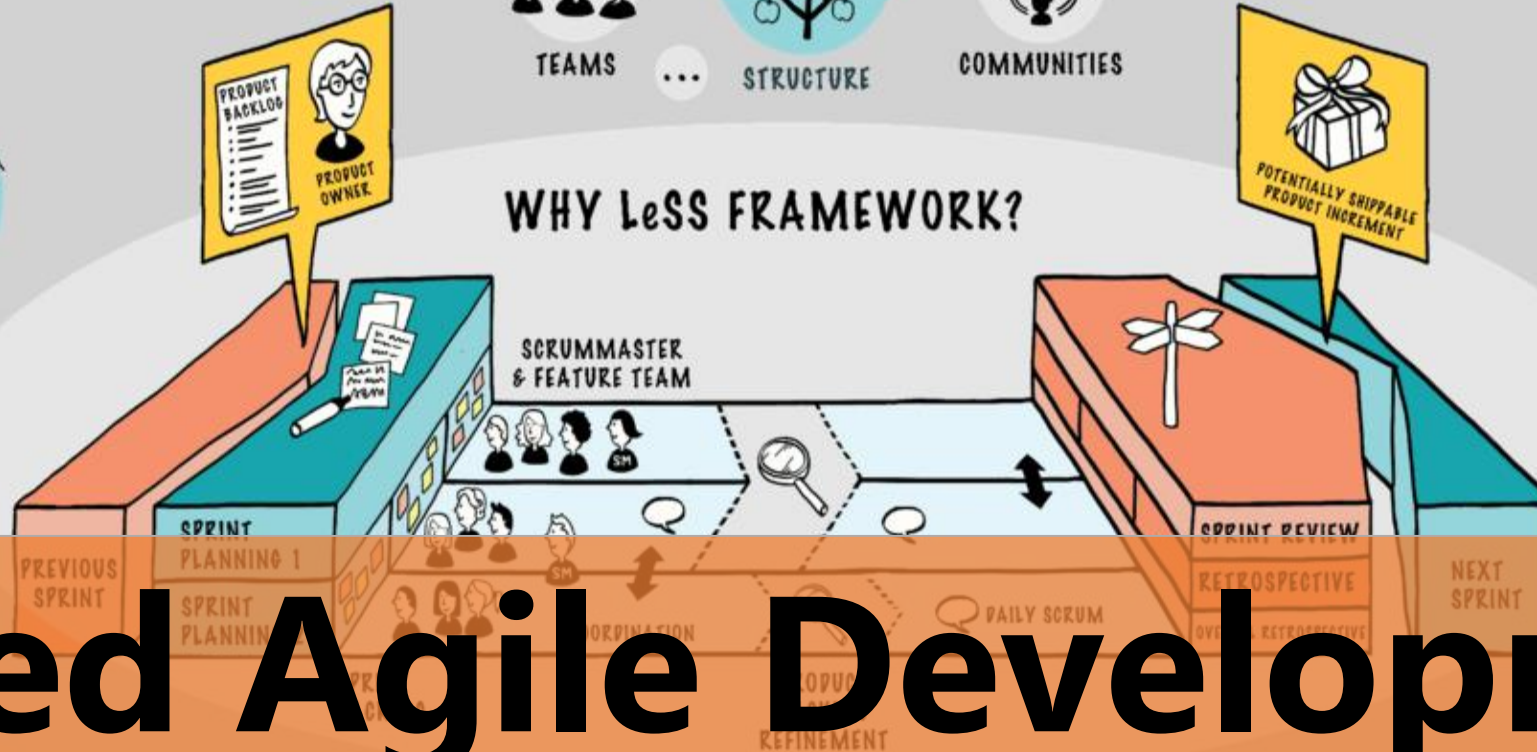
CONTINUOUS  
INTEGRATION



TECHNICAL  
EXCELLENCE

ARCHITECTURE  
& DESIGN

## WHY LeSS FRAMEWORK?



# Scaled Agile Development



COACHING



ADOPTION



CONTINUOUS  
IMPROVEMENT



PRODUCT  
OWNER TEAM



LESS HUGE



REQUIREMENT  
AREAS

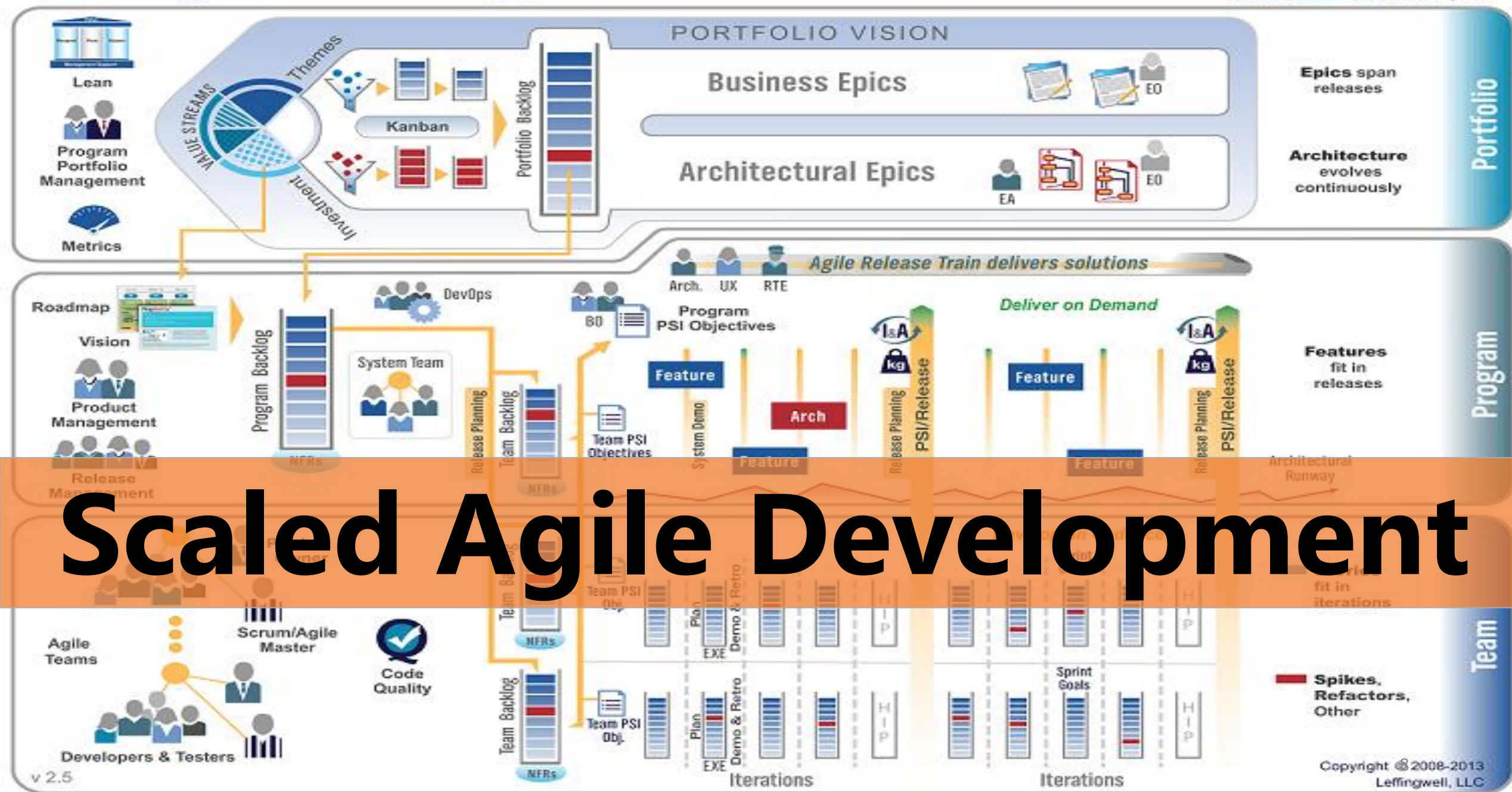


MANAGEMENT



GO SEE

# Scaled Agile Framework® Big Picture

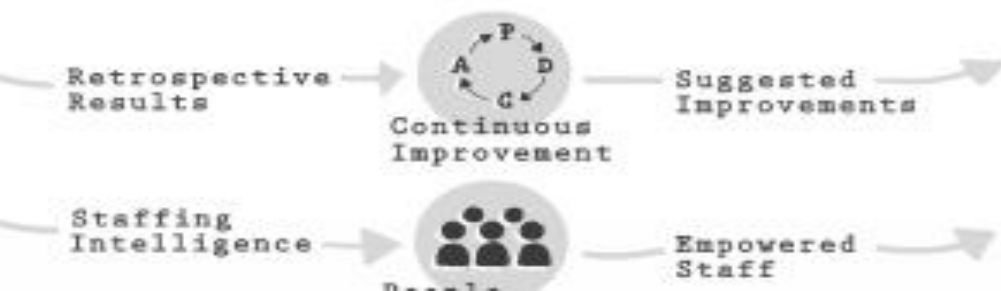
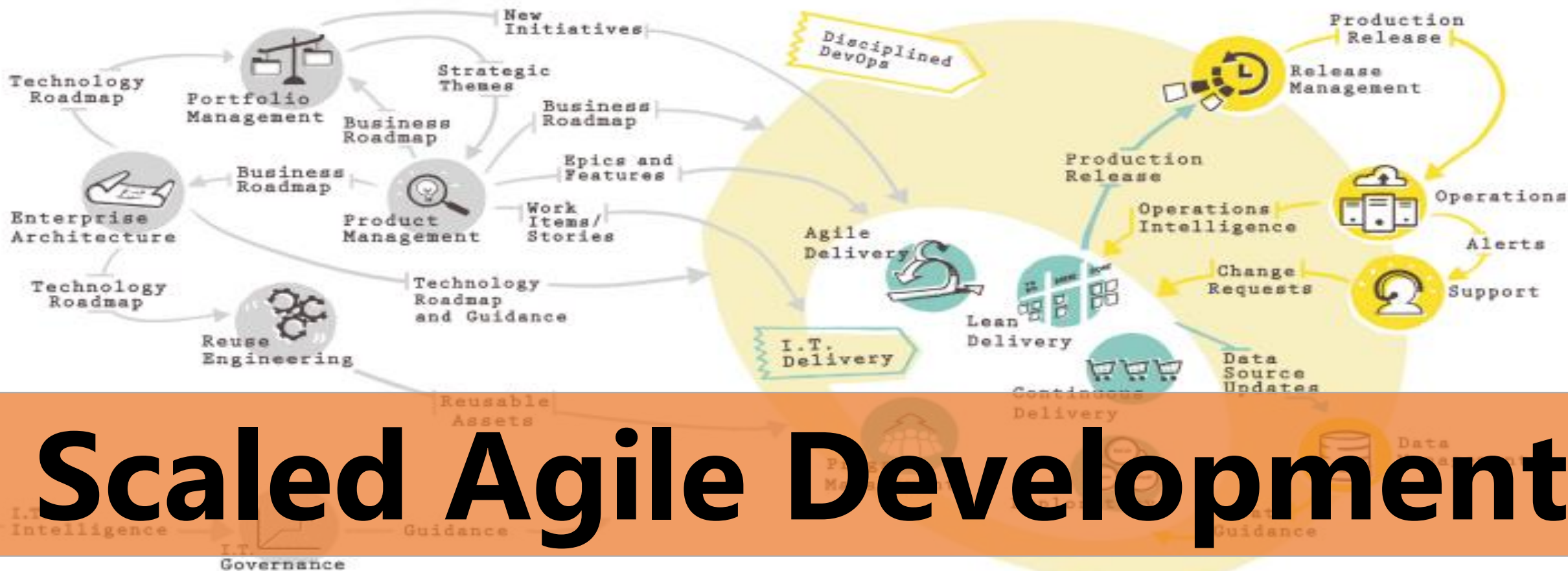


# Scaled Agile Development



# Disciplined Agile 2.0

A Process Decision Framework for Enterprise I.T.

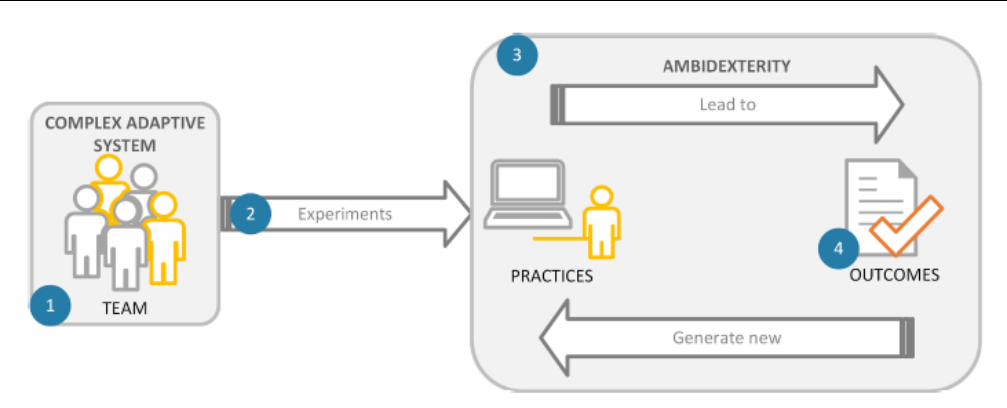


Although the proposals above, being an 'agilist' involves more than merely adopting practices or frameworks.

Teams and organizations need to acquire maturity and master new behaviors and change culture.

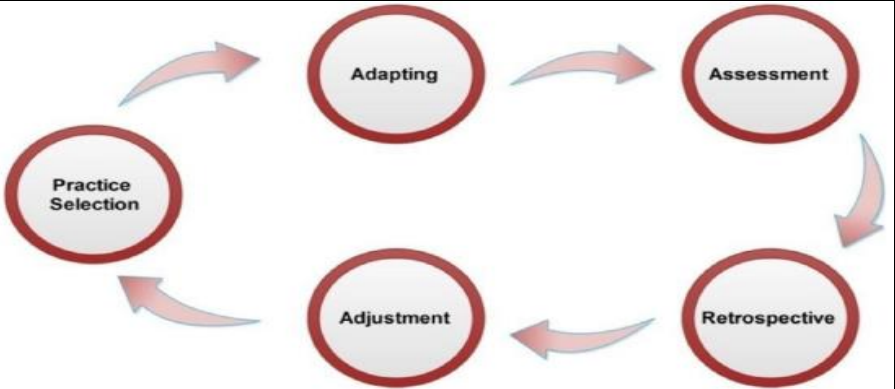
Ranganath, P. "Elevating teams from 'doing' agile to 'being' and 'living' agile". In: Proceedings of the Agile Conference, Salt Lake City, USA, IEEE Press, 2011, pp. 187–194.

# Maturity Models



Fontana et. al. '15

The Journal of Systems and Software



Gandomani and Nafchi '15

The Journal of Systems and Software

|                             | Principles  |  |   |  |   |
|-----------------------------|---|--|---|--|---|
|                             | <i>Embrace Change to Deliver Customer Value</i>   | <i>Plan and Deliver Software Frequently</i>  | <i>Human Centricity</i>   | <i>Technical Excellence</i>  | <i>Customer Collaboration</i>   |
| <i>Level 5 Encompassing</i> | <ul style="list-style-type: none"><li>L5P1: Low process ceremony</li><li><b>L5P2: Continuous SAFe Capability Improvement</b></li></ul>  | <ul style="list-style-type: none"><li>L5P3: Agile project estimation</li></ul>   | <ul style="list-style-type: none"><li>L5P4: Ideal Agile physical setup</li><li><b>L5P5: Changing organization</b></li></ul> | <ul style="list-style-type: none"><li>L5P6: Test driven development</li><li>L5P7: No/minimal number of level -1 or 1b people on team</li><li><b>L5P8: Concurrent testing</b></li></ul> | <ul style="list-style-type: none"><li>L5P9: Frequent face-to-face interaction between developers and users (collocated)</li></ul>   |
| <i>Level 4 Adaptive</i>     | <ul style="list-style-type: none"><li>L4P1: Client driven iterations</li><li>L4P2: Continuous customer satisfaction</li><li><b>L4P3: Lean requirements at scale</b></li></ul> | <ul style="list-style-type: none"><li>L4P4: Smaller and more frequent releases</li><li>L4P5: Adaptive planning</li><li><b>L4P6: Measuring business performance</b></li></ul> | <ul style="list-style-type: none"><li><b>L4P7: Managing highly distributed teams</b></li></ul>                              | <ul style="list-style-type: none"><li><b>L4P8: Intentional architecture</b></li><li>L4P9: Daily progress tracking meetings</li></ul>   | <ul style="list-style-type: none"><li>L4P10: CRACK customer immediately accessible</li><li>L4P11: Customer contract revolves around commitment of collaboration</li></ul> |

Stojanov, Turetken, and Trienekens'15

Euromicro Conference

# The Problem

There are also only a few studies based on the aspects and principles related to scaled agile development, but none of them discusses extensively and comprehensively what characterizes this scenario and what it means to teams acquire fluency in this setting. My work aims to fill in this gap.

The term 'fluency' refers to the scaled-teams' maturity to perform in large-scale agile development

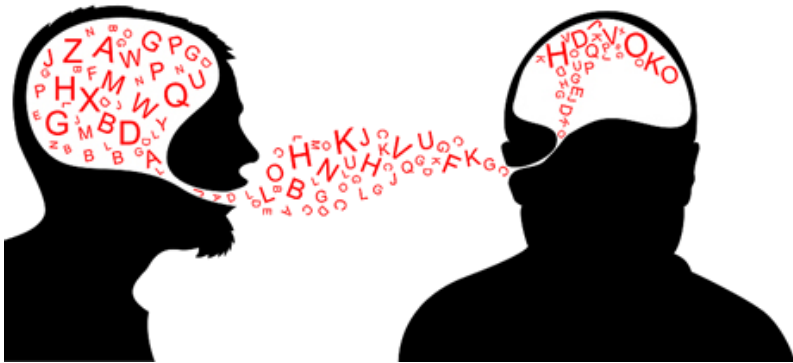


# Research Question

What are the aspects and stages involved in large-scale agile development that can be used for teams to acquire fluency in this setting?

# My proposal

To characterize fluency in large-scale agile software development



# Objectives

**(Obj1)** To understand the related concepts of Agile Development, Agile Transformation and Fluency in Agile Development;

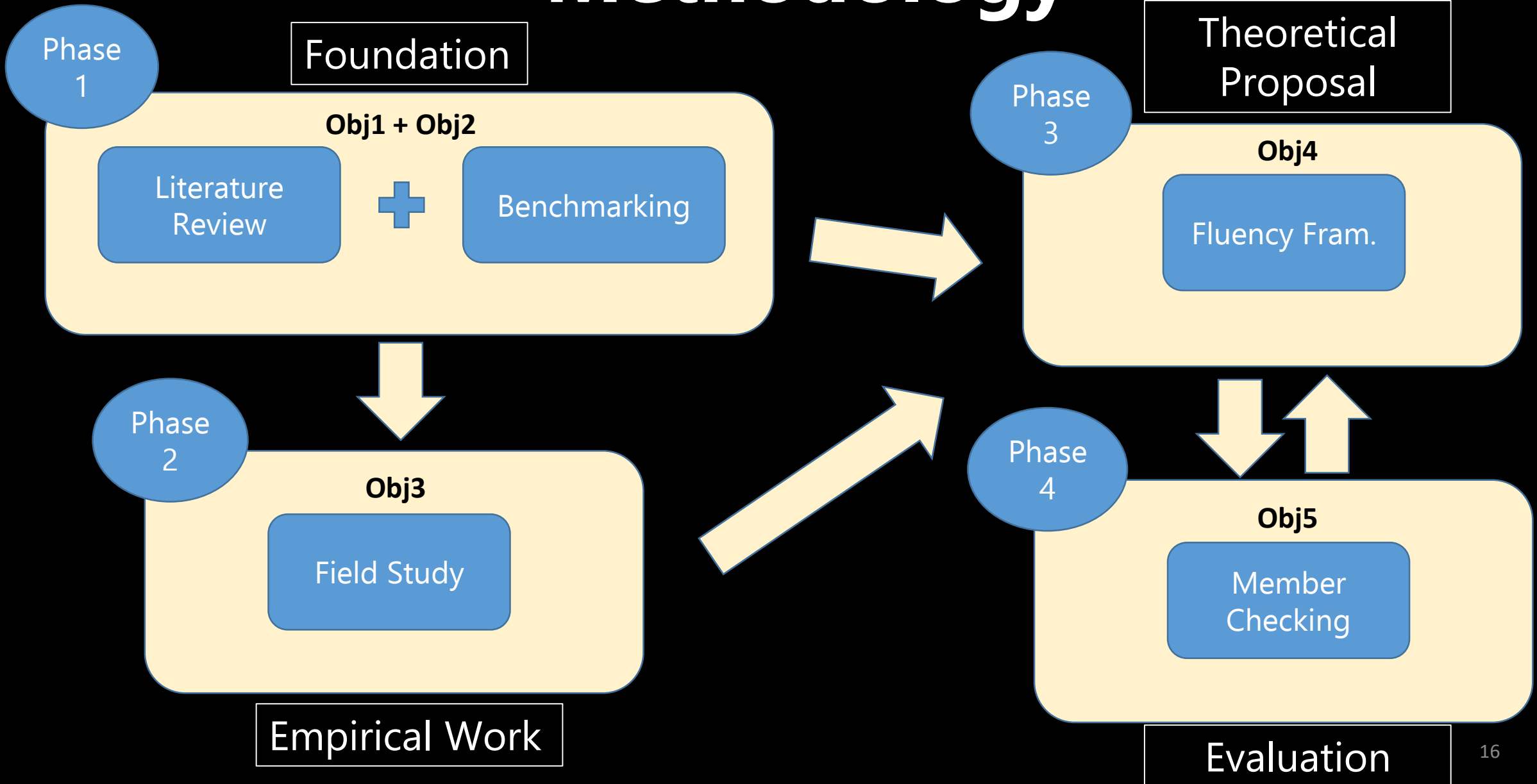
**(Obj2)** To identify the literature state of art in Large-Scale Agile Development;

**(Obj3)** To identify the aspects and stages of fluency in Large-Scale Agile Development in practice;

**(Obj4)** To define a Fluency Framework based on the findings from Objectives 1 to 3;

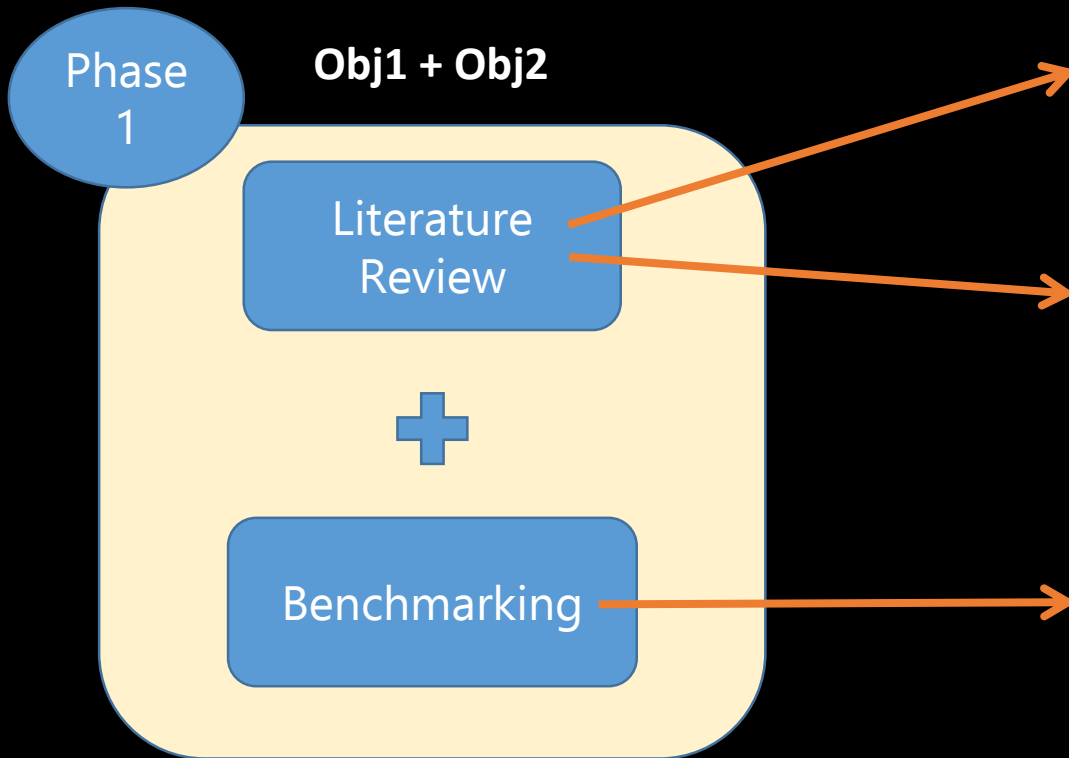
**(Obj5)** To preliminarily evaluate the proposed Fluency Framework in order to shed some light on its applicability in practice.

# Methodology





# Foundation



## Related Concepts

Agile Development, Agile Transformation, Agile Fluency

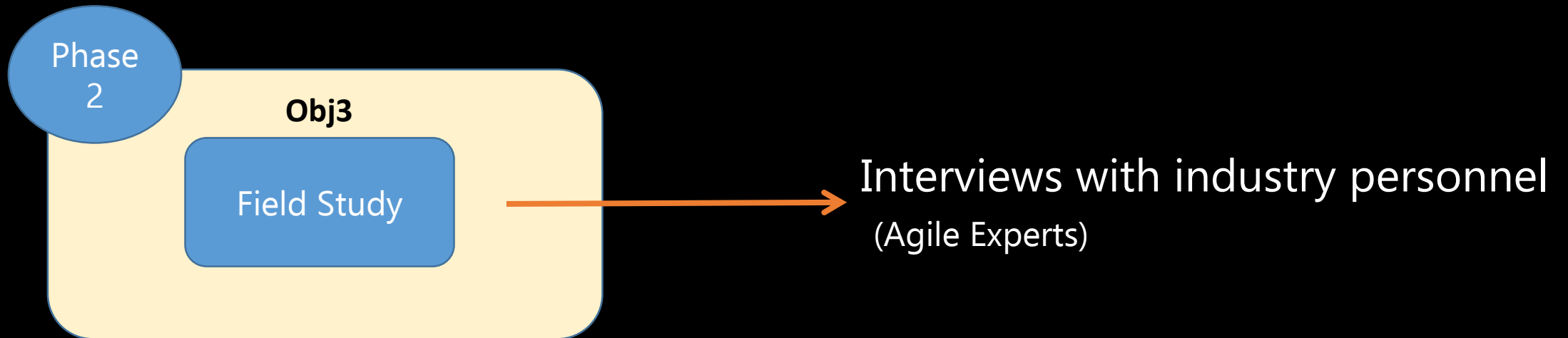
## Systematic Review

Large-Scale Agile Development

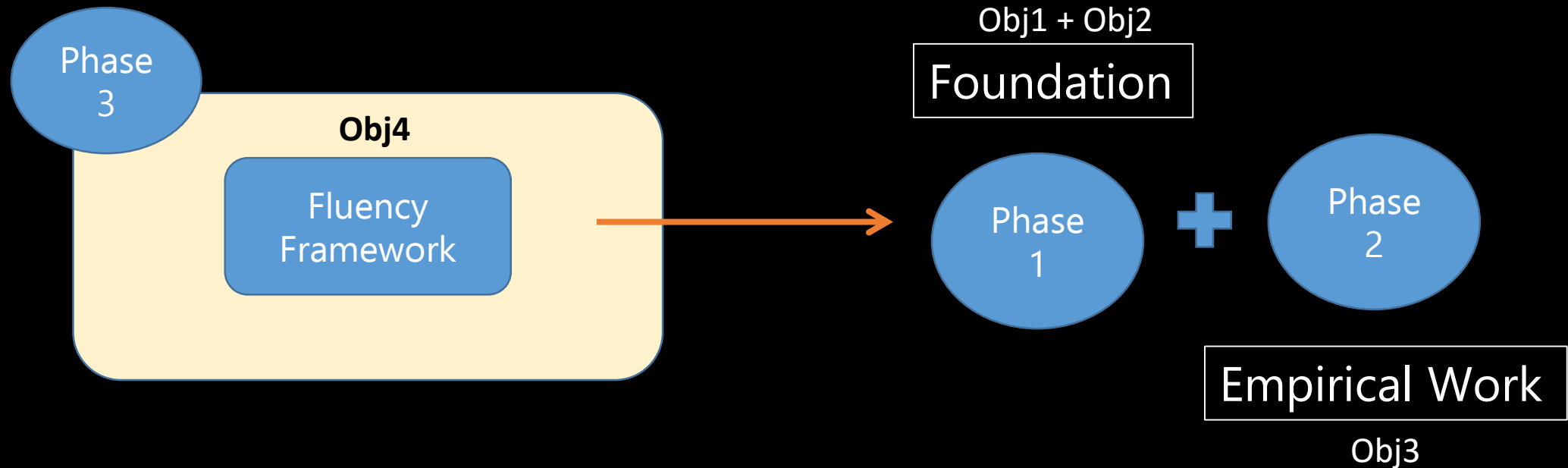
## To explore what companies have done

XP Conference + Agile Brazil Conference

# Empirical Work

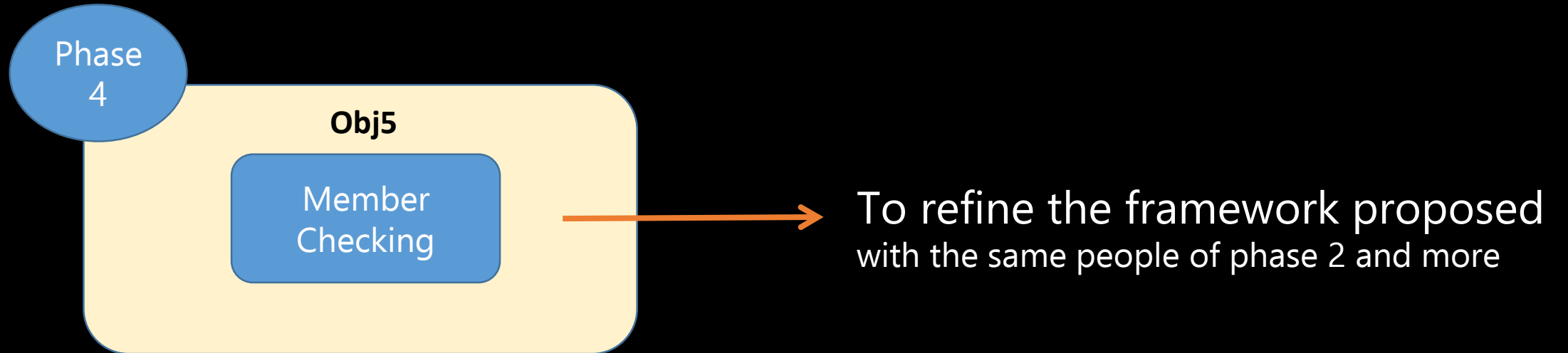


# Theoretical Proposal



Framework: a set of concepts and recommendations that helps to guide the implementation of a process

# Evaluation





# Schedule

| Activities | '15      | Jan'16   | Feb'16   | Mar'16   | Apr'16   | May'16   | Jun'16   | Jul'16   | Aug'16   | Sep'16   | Oct'16   | Nov'16   | Dec'16   | Jan'17   |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1.1        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.2        | X        | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 1.3        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.1        |          | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.2        |          |          |          | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.3        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.5        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.6        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.7        |          |          |          |          |          |          | X        |          |          |          |          |          |          |          |
| 3.1        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 3.2        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 4.1        |          |          |          |          |          |          |          | X        | X        |          |          |          |          |          |
| 4.2        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.3        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.4        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.5        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.6        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.7        |          |          |          |          |          |          |          |          |          |          | X        | X        |          |          |
| 4.8        |          |          |          |          |          |          |          |          |          |          |          |          | X        |          |
| 5.1        |          |          |          |          |          |          |          | Seminar. |          |          |          |          |          |          |
| 5.2        | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. |          |
| 5.3        |          |          |          |          |          |          |          |          |          |          |          |          |          | Dissert. |

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| 1.1        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.2        | X        | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 1.3        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.1        |          | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.2        |          |          |          | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.3        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.5        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.6        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.7        |          |          |          |          |          |          | X        |          |          |          |          |          |          |          |
| 3.1        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 3.2        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 4.1        |          |          |          |          |          |          |          | X        | X        |          |          |          |          |          |
| 4.2        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.3        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.4        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.5        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.6        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.7        |          |          |          |          |          |          |          |          |          |          | X        | X        |          |          |
| 4.8        |          |          |          |          |          |          |          |          |          |          |          |          | X        |          |
| 5.1        |          |          |          |          |          |          |          | Seminar. |          |          |          |          |          |          |
| 5.2        | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. |          |
| 5.3        |          |          |          |          |          |          |          |          |          |          |          |          |          | Dissert. |

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| 1.1        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.2        | X        | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 1.3        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.1        |          | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.2        |          |          |          | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.3        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.5        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.6        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.7        |          |          |          |          |          |          | X        |          |          |          |          |          |          |          |
| 3.1        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 3.2        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 4.1        |          |          |          |          |          |          |          | X        | X        |          |          |          |          |          |
| 4.2        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.3        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.4        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.5        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.6        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.7        |          |          |          |          |          |          |          |          |          |          | X        | X        |          |          |
| 4.8        |          |          |          |          |          |          |          |          |          |          |          |          | X        |          |
| 5.1        |          |          |          |          |          |          |          | Seminar. |          |          |          |          |          |          |
| 5.2        | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. |          |
| 5.3        |          |          |          |          |          |          |          |          |          |          |          |          |          | Dissert. |

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| 1.1        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.2        | X        | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 1.3        | X        |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 1.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.1        |          | X        | X        | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.2        |          |          |          | X        | X        |          |          |          |          |          |          |          |          |          |
| 2.3        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.4        |          |          |          |          | X        |          |          |          |          |          |          |          |          |          |
| 2.5        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.6        |          |          |          |          | X        | X        | X        |          |          |          |          |          |          |          |
| 2.7        |          |          |          |          |          |          | X        |          |          |          |          |          |          |          |
| 3.1        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 3.2        |          |          |          | X        | X        | X        | X        | X        | X        |          |          |          |          |          |
| 4.1        |          |          |          |          |          |          |          | X        | X        |          |          |          |          |          |
| 4.2        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.3        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.4        |          |          |          |          |          |          |          |          |          | X        |          |          |          |          |
| 4.5        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.6        |          |          |          |          |          |          |          |          |          | X        | X        |          |          |          |
| 4.7        |          |          |          |          |          |          |          |          |          |          | X        | X        |          |          |
| 4.8        |          |          |          |          |          |          |          |          |          |          |          |          | X        |          |
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| 5.2        | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. | Dissert. |          |
| 5.3        |          |          |          |          |          |          |          |          |          |          |          |          |          | Dissert. |



# Accepted Papers

Roman, Marczak, Dutra '15

(ELA-ES)

On the Transformation to Agile in a Large-Complex Globally Distributed Company: A Research Plan to Define Guidelines

Greice Roman, Sabrina Marczak, Alessandra Dutra

<sup>1</sup>Faculdade de Informática – Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS)  
Av. Ipiranga, 6681 – Partenon – 90.619-900 – Porto Alegre – RS – Brazil

greice.roman@acad.pucrs.br, {sabrina.marczak, alessandra.dutra}@pucrs.br

**Abstract.** *The transformation to agile is not a simple process and although there is vast literature on the topic, there is still no consolidated body of knowledge on how to proceed when this transformation happens in large-complex globally distributed companies. This paper presents the research plan to follow the transformation into agile of a large-complex distributed IT organization aiming to serve as an exploratory case study for our long-term goal of proposing a set of guidelines to guide the transformation in such type of company.*

## 1. Introduction

The Agile Manifesto [Beck and colleagues 2001] was written in February 2001. It offers new values to motivate software companies to deliver high-quality products faster and produce satisfied customers. Since then, companies are discussing whether to become agile and how to go about transforming themselves to achieve such 'agility'. The transformation process involves more than deciding on which agile method to adopt. It refers to making changes in such a way that the company and its projects will 'become' agile.

Academia has been supporting industry to go through the transformation process for as long as the agile philosophy is out there. However, reported success in large-scale companies (e.g., [Fry and Greene 2007]) is provocative and brings numerous challenges to organizations [Korhonen 2013]. For instance, how much can requirements keep changing when they cross hundreds of applications at a time? [Dingsøyr and Moe 2014] consolidated a research agenda on the topic showing that there are still several open questions. Given the significant number of large companies migrating to this philosophy, there is

On the Agile Transformation in a Large-Complex Globally Distributed Company: Why Boarding this Journey, Steps Taken, and Main Foreseen Concerns

Greice Roman, Sabrina Marczak, Alessandra Dutra, Rafael Prikladnicki  
MunDDos Research Group - Computer Science School  
Pontifícia Universidade Católica do Rio Grande do Sul  
Porto Alegre, RS - Brazil

greice.roman@acad.pucrs.br, {sabrina.marczak, alessandra.dutra, rafael.prikladnicki}@pucrs.br

**Abstract—**ORG, fictitious name, is a large company with complex-globally distributed projects that has recently started a "big-bang" transition to agile. About a year ago the new CIO announced it was time to aim for faster deliveries and decided on a company-wide roll-out to agile, including legacy systems. In this paper we report on an interview-based qualitative study that aimed to identify the reasons of why the company is moving to an agile approach, the steps towards becoming agile took during this first year of work, and the main concerns of senior management given the size of the company, the complexity of the projects developed, and the team's global distribution. We interviewed 18 senior managers, including members of the board committee that assess the CIO in strategic decisions. Our findings add to the current literature on the topic by discussing the transformation in a large-complex scenario that, to the best of our knowledge, has never been reported in literature.

## I. INTRODUCTION

Companies need to constantly improve their processes and revisit decisions made in order to keep up with new industrial paradigms such as globalization and time-to-market. Almost 15 years ago, new values such as frequent deliveries to the customer and agility have been foreseen as key to companies survive in a market that started to require rapid and flexible responses to change. The Agile Manifesto [1] was then born

"day after day" of this transformation to realize how puzzling it is to "acquire" such new culture, and to be as familiar as possible of the potential pitfalls ahead.

This paper presents a report of the initial steps of the company-wise transformation at ORG, a large company with complex-globally distributed projects. In our interview-based qualitative study we sought to understand what are the main reasons that motivated ORG to enter this journey, to identify the steps performed so far to implement the transformation and aim to become agile, and to name the majors concerns foreseen by seniors management to succeed in such endeavor.

Our main findings from our 18 interviews with senior managers located in the USA and in Brazil are: reasons for going agile are aiming to reduce delivery time to customers and to reduce the communication gap between business and IT departments; a major reorganization including redefining roles and responsibilities and the command-chain, and training people on agile practices and ceremonies were the main first actions taken to prepare the organization for the change; and the complex ecosystem of applications and their dependencies as well as the teams' global distribution with no or little overlapping working hours are among the most cited concerns by the participants. We discuss these findings in light to current literature and by considering the company's background.

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(WBMA)

# Fluency in Large-Scale Agile Development



student: Greice Roman  
supervisor: Sabrina Marczak