A Conceptual Model for Integrating Agile Practices into Systems Engineering Management

Ottaviani, F.M., Zenezini, G., Rebuglio, M., Narbaev, T., De Marco, A.
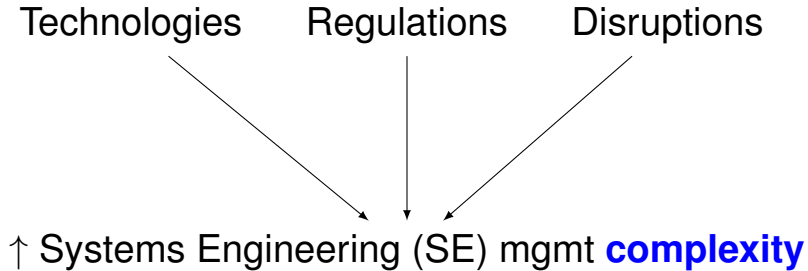
DIGEP — Politecnico di Torino

XXIX AIDI Summer School "Francesco Turco"
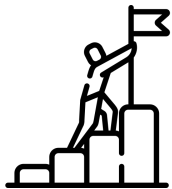September 16th, 2024

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INTRODUCTION — Background

Technologies   Regulations   Disruptions

↑ Systems Engineering (SE) mgmt **complexity**

INTRODUCTION — Foreground

Agility $\rightarrow$

Technical — Open systems architecture
JIT requirements baselining

Mgmt — JIT planning & execution

LITERATURE REVIEW — Gap

✓ studies 4 Agile SE **OR** Agile mgmt @ **theoretical** level

✗ studies 4 Agile SE mgmt @ **operational** level

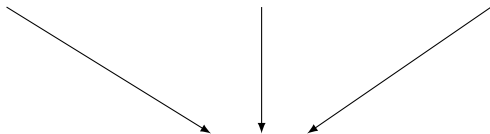# LITERATURE REVIEW — Aim

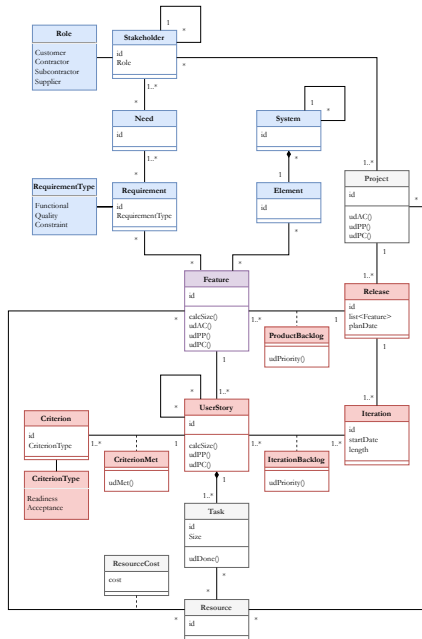$\rightarrow$ **Operating model** 4 Agile SE mgmt
1. Baselining system requirements
2. Modeling dependencies
3. Performance monitoring
4. Quality management

METHODOLOGY

"White" literature   Grey literature   Case studies

UML class diagram

Role

Customer
Contractor
Subcontractor
Supplier

Stakeholder

id
Role

Need

id

System

id

RequirementType

Functional
Quality
Constraint

Requirement

id
RequirementType

Element

id

Project

id

udAC()
udPP()
udPC()

Feature

id

calcSize()
udAC()
udPP()
udPC()

Release

id
list<Feature>
planDate

ProductBacklog

udPriority()

Criterion

id
CriterionType

UserStory

id

calcSize()
udPP()
udPC()

Iteration

id
startDate
length

CriterionMet

udMet()

IterationBacklog

udPriority()

CriterionType

Readiness
Acceptance

Task

id
Size

udDone()

ResourceCost

cost

Resource

id

Requirement
id
RequirementType

1..*
*

Element
id

1
*

*

Feature
id
calcSize()
udAC()
udPP()
udPC()

*
1..*

ProductBacklog
udPriority()

1

UserStory
id
calcSize()
udPP()
udPC()

*
1..*
*

1
1..*

CriterionMet
udMet()

IterationBacklog
udPriority()

1

1..*

Task

DISCUSSION

Class diagram

- ► Visual aid
- ► Simple & transparent
- ► Basis for software development

Conceptual model

1. Requirement $\propto$ Feature $\propto$ Element
2. Story $\propto$ Story
3. udAC(), udPP(), udPC()
4. Readiness/Acceptance criteria

CONCLUSIONS

Limitation	**Future Research**
Model	
Simplified $\rightarrow$ Add	
Not exhaustive $\rightarrow$ Extend	
Study	
Theoretical $\rightarrow$ Validate	
Subjective $\rightarrow$ Interview	