RESEARCH OUTPUTS / RÉSULTATS DE RECHERCHE

Supported approach for agile methods adaptation: an adoption study

Ayed, Hajer; Vanderose, Benoît; Habra, Naji

[Link to publication]()

36th International Conference on Software Engineering

ICSE 2014

Hyderabad, India · May 31 - June 7, 2014

A Supported Approach For Agile Methods Adoption: A Case-Study

Authors : Hajer Ayed, Benoît Vanderose, Naji Habra

UNIVERSITÉ DE NAMUR

OVERVIEW

1. Problem Statement

2. Case-Study

   ■ Understand

   ■ Propose

   ■ Experiment

   ■ Support

3. Conclusion and Future Work

1. PROBLEM STATEMENT

- Agile Software Development (ASD) is still controversial

- Adopting ASD is a wide and complex organizational change

- It implies changes in both the :
  - **way of thinking :** Values + Principles
  - **way of doing :** Methods + Practices

WAY OF THINKING

WAY OF DOING

BEING AGILE
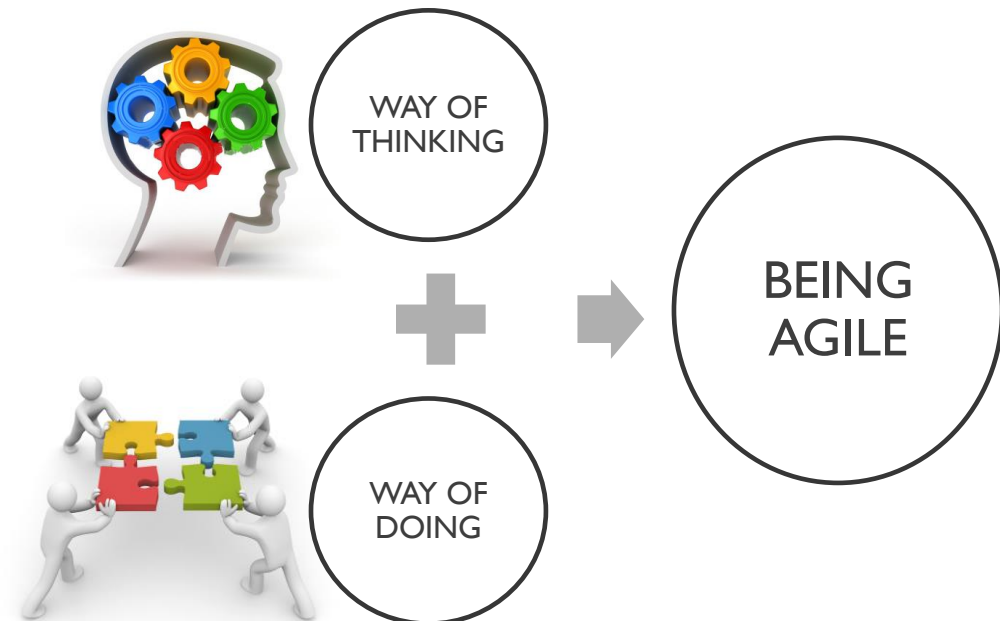
1. PROBLEM STATEMENT

Observations Related to Agile Adoption :

- OB. 1 : **NARROW / RESTRICTED ADOPTION** :
  - Generally only at Team - Project Level
- OB. 2 : **PROCESS WASTES** :
  - Misapplication of practices
  - Unused artefacts / Unnecessary practices
  - Unconvinced individuals …

  ➡ *the process is discarded overtime*

- OB. 3 : **"MONOLITHIC"** adoption :
  - Same method for every project : No process adaptation according to specific contexts
  - No process adaptation through iterations

Preliminary keys We consider

- KEY 1 : **HOLISTIC ADOPTION**
  - Consider ASD as a **MATTER OF THE WHOLE ORGRANIZATION**
  - Need to **spread the culture** at the organization level
  - Need to **assess the readiness** of the organization and **evaluate risks**
  - Agile experiences should be **capitalized**

- KEY 2 : Apply the **RIGHT = SUITABLE** process:
  - **Customize** in order to fit the specific context
  - **Continuously assess** ➡ **Continuously improve / evolve**

4

2. CASE STUDY : CONTEXT

- **ORGANIZATION CONTEXT :**

  - A middle-sized organization of **2,300 employees**

  - IT service : **84 people**, mainly focused on the IT activities of the Walloon payment agency in Belgium

  - 15 projects in progress

  - **Five units organized by business roles** : Architecture, Quality insurance, Developers, Project managers, Analysis
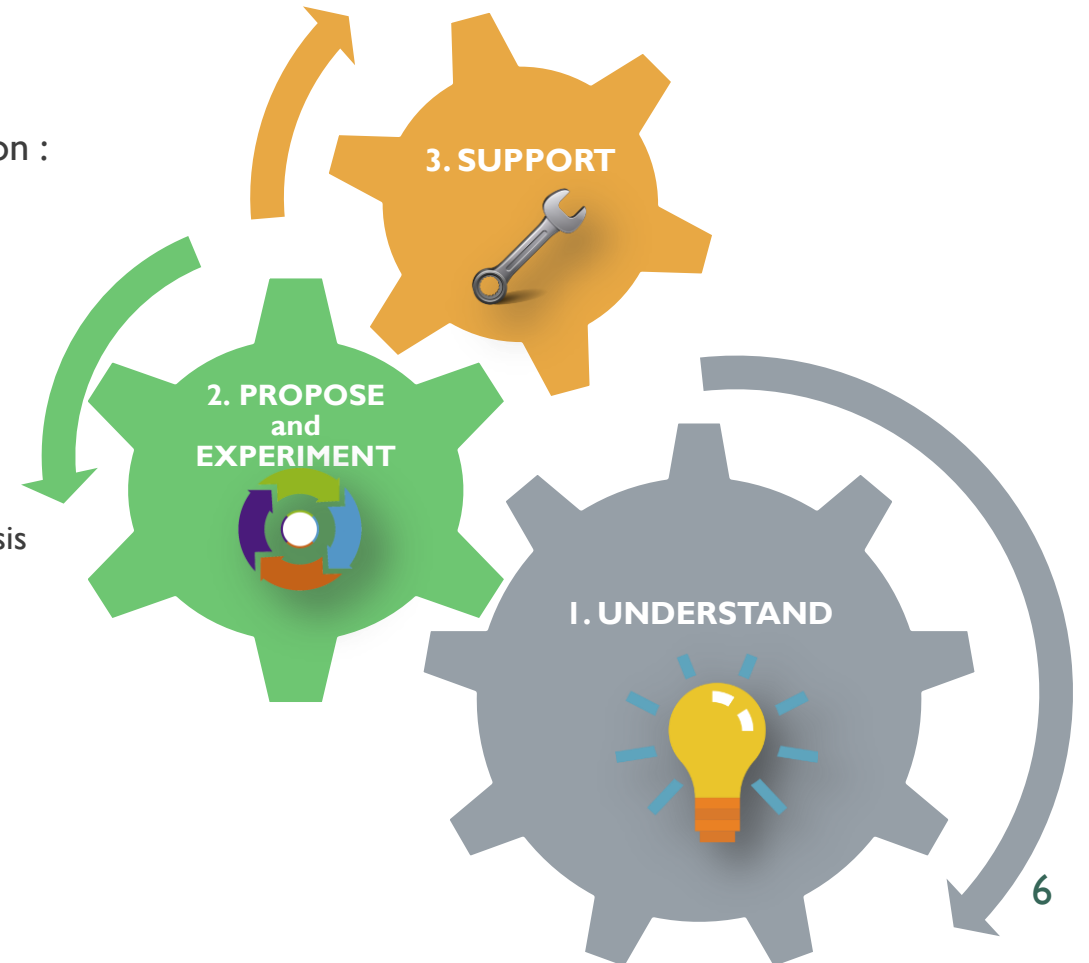
- **FIRST PROJECT:**

  - **Bottom-up Agile adoption** : the project-team members are the initiators

  - **Scrum at the team level**

- **SECOND PROJECT:**

  - Step-by-step transformation

2. CASE-STUDY : METHODOLOGY

- STEP 1 : **UNDERSTAND "in vivo"** the key challenges of ASD adoption :

  - **TOOLS :** Project Retrospective (using affinity diagram) , 4-DAT methodology assessment

- STEP 2 : **PROPOSE structured and systematic steps**

- STEP 3 : **EXPERIMENT:**

  - **TOOLS :** Preliminary semi-structured interviews, Process surveys, Risk analysis (SWOT matrix, Radar chart of Agility Risk factors)

- STEP 3 : **SUPPORT** the approach with **objective guiding tools** :
  - to help through the **CUSTOMIZATION** of the process
  - to **ASSESS PROCESS SUITABILITY** and to enable its **REFINEMENT**

3. SUPPORT

2. PROPOSE and EXPERIMENT

1. UNDERSTAND

QUALITATIVE ANALYSIS
Project Retrospective – Affinity Diagram

Lack of involvement of business units

Lack of guiding and indicator tools

Unclear definition of Scrum Roles

Weak collaboration with the client
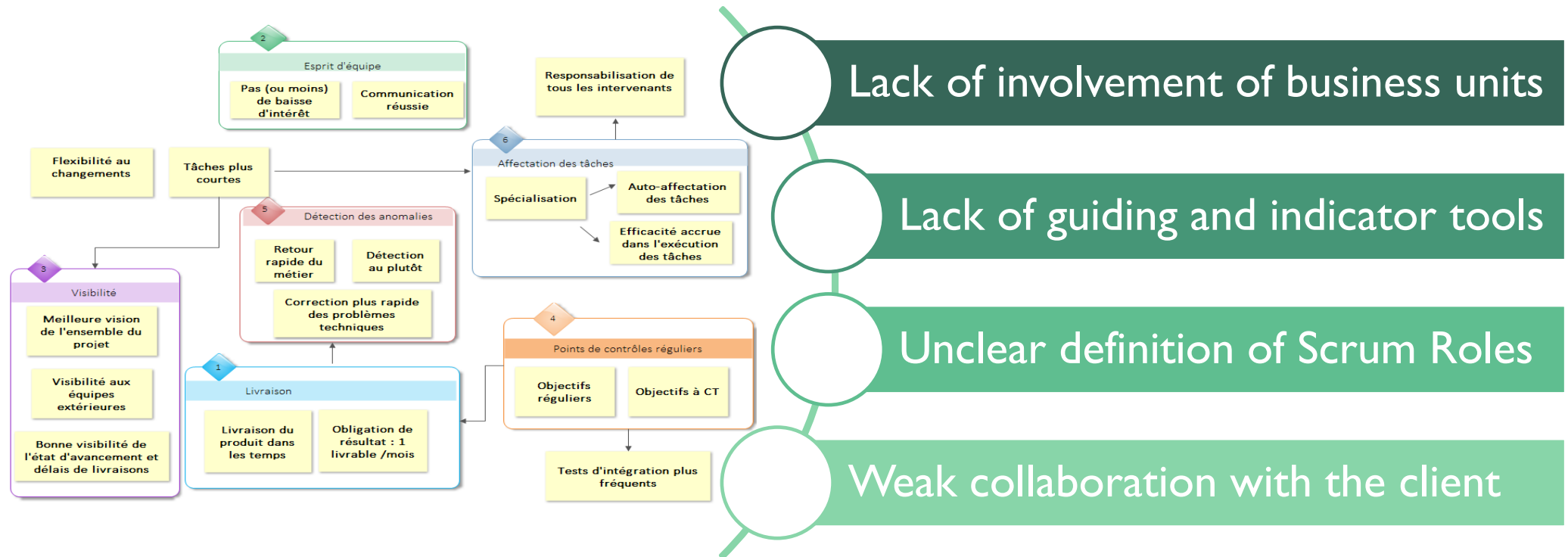
QUANTITATIVE ANALYSIS
4-DAT framework – dimension 2 (Qumer, 2007)

- **4-DAT (Qumer, 2007) :**
  - Agility characterization : FY, SD, LS, LG, RS
  - If one phase or practice supports a particular agile feature allocate 1 , else 0
- **Goal :**
  - Evaluate the extent to which the process respects agile values
  - Compare Level of agility across business units

Table 2: Degree of agility in the applied method (4-DAT - Dimension 2)

Custom meth.	Agility features					
	FY	SD	LS	LG	RS	Total
Phases						
Business study (BA)	0	0	0	0	0	0
Pr. initiation (DEV)	0	0	0	0	0	0
Analysis (FA)	1	0	0	0	0	1
Design (AR)	1	0	0	0	1	2
Dev. sprints (DEV)	1	0	0	1	1	3
Testing (QA)	0	0	0	0	0	0
Final QA & release	0	0	0	0	0	0
Maintenance (SM)	1	0	0	0	0	1
Total	4	0	0	1	2	7
Agility degree	4/8	0/8	0/8	1/8	2/8	7/(8*5)
DEV practices						
Iterative incremental	1	1	0	1	1	4
Sustainable pace	1	1	0	1	1	4
Regular builds	1	1	0	1	1	4
Work specialisation	0	1	0	0	0	1
Sprint planning	1	1	1	1	0	4
Daily Scrum	1	0	0	1	1	3
Sprint review	1	1	0	1	1	4
Stories splitting	1	1	0	0	1	3
Total	7	7	1	6	6	27
Agility degree	7/8	7/8	1/8	6/8	6/8	27/(8*5)
FA and AR practices						
UC to US	0	0	0	0	0	0
Fine-grained stories	1	1	0	0	0	2
Arch. envisioning	1	0	0	1	1	3
Arch. iterations	1	1	0	1	1	4
Total	2	1	0	3	2	9
Agility degree	2/5	1/5	0/5	3/5	2/5	9/(5*5)

Table 3: Degree of agility in Scrum and the customised method

| Process	Scrum	Customised method
Phases	0.6	0.17
Practices	0.8	Dev. unit : 0.67 Other units : 0.36

8

KEY FINDINGS

- The applied process do not provide **satisfactory and coherent** level of agility :
    - high coupling with other non-agile units
    - practices were chosen according to preferences and not context suitability

Investigate structured and context-oriented adoption steps to guide and assist agile adoption efforts

2. CASE-STUDY : PROPOSE
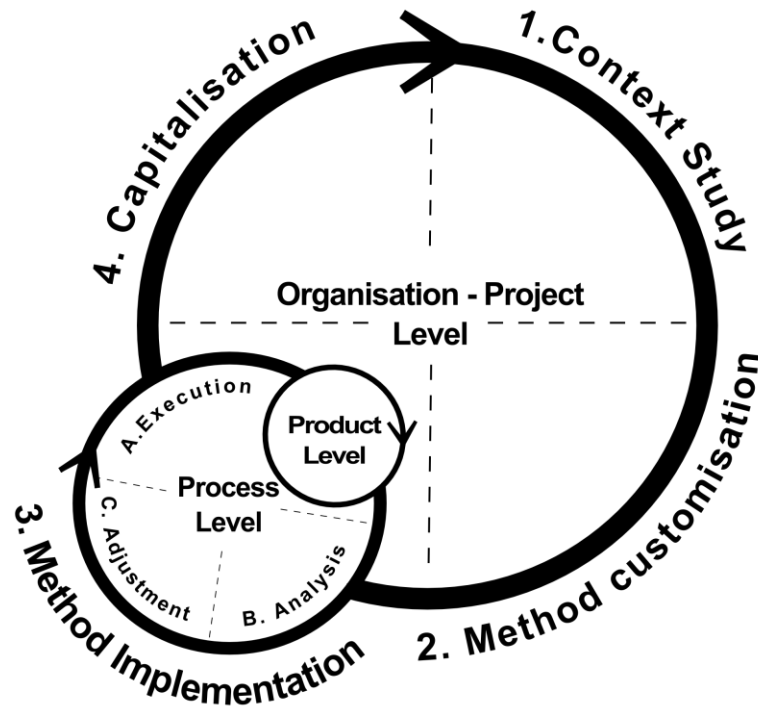
- **AM-QuICK Framework**

- **Proposed structured steps (based on QIP):**

  1. **Context analysis :** characterize the context through interviews, GQM-based diagnosis, risk assessment tools, etc.

  2. **Customized agile method design :** Selection of suitable practices, Method Composition

  3. **Implementation :** Enactment of the designed method (Process level), analysis of feedback to allow later adjustments

  4. **Capitalization :** Future incoming projects have to profit from the gained experience

2. CASE-STUDY : EXPERIMENT (PROJECT 2)

CONTEXT STUDY

- **Semi-structured Interviews :**
  - 1h – 2h per. Business role unit
- **2 questionnaires :**
  - 15 project teams
  - 1st Questionnaire : **Analyze the current process** in terms of agility degree : Team organization, Project management, Requirements analysis, Development practices
  - 2nd Questionnaire : **Identify the desired and/or applicable agile practices**
  - **64 participant**
  - **74 % participation rate**

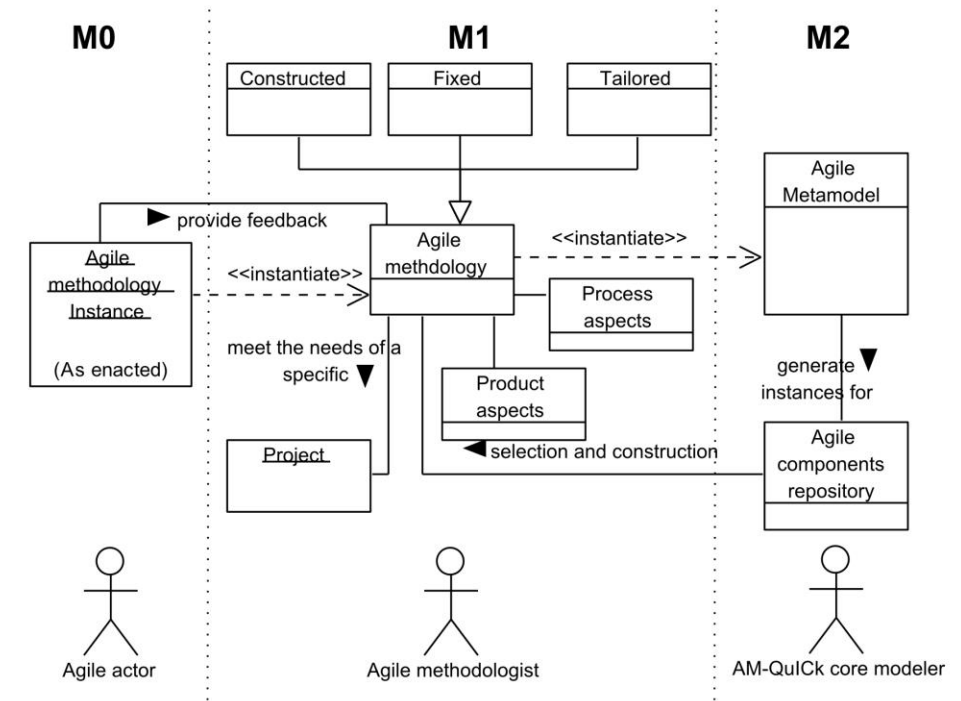|	Helpful to achieving the objective	Harmful to achieving the objective
Internal Origin	• Team autonomy (Q1-1.2.1, Q1-1.2.3) • Team problems management (Q1-1.3.2) • Good technical practices (Q1-4, Q2-3) • Iterative lifecycle (Q2-2.5), (I) • High-level architecture (Q1-3.1, Q1-3.2, Q2-2.12), (I)	• Lack of process visibility (Q1-2.2.3) • Inflexibility to change (I) • Long iterations (Q1-2.1.4) • Inter-team communication (Q1-1.1.3) • Tasks estimation (Q1-2.2.1, Q1-2.2.2) • Business and technical stakeholders cooperation (Q1- 3.1, ..) • Non-collective specification and task estimation (Q1-2.2.1) • Organisation structure (Q1-1.1.1 , Q1-1.1.2) and (I) • Agile knowledge (Q2-1, Q2-2)
External Origin	• Awareness of the need to change Q2-2, (I) • IDéES agile experience (I) • Management enthousiasm (I) • Management enthusiasm (I)	• Customer implication (Q1-2.2.4) and (I) • Business stakeholders implication (I) • Contract negociation (I) • Budget management (I) • Some business units reluctance (I)
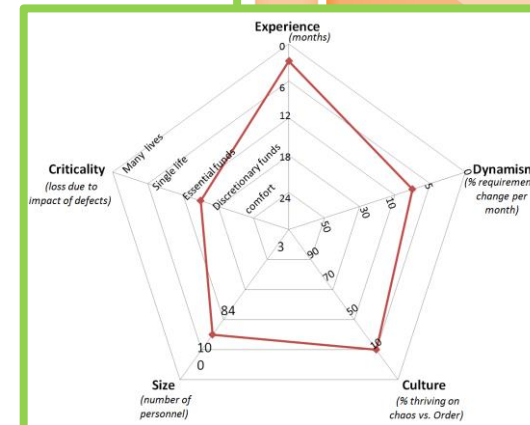
2. CASE-STUDY : EXPERIMENT (PROJECT 2)

KEY FINDINGS

- The context analysis helped in the customization process :

  - Based on the results : implementation of a **project-wide methodological backlog** : prioritization of actions to be undertaken in order to guarantee that specific agile practices would be applicable and efficient

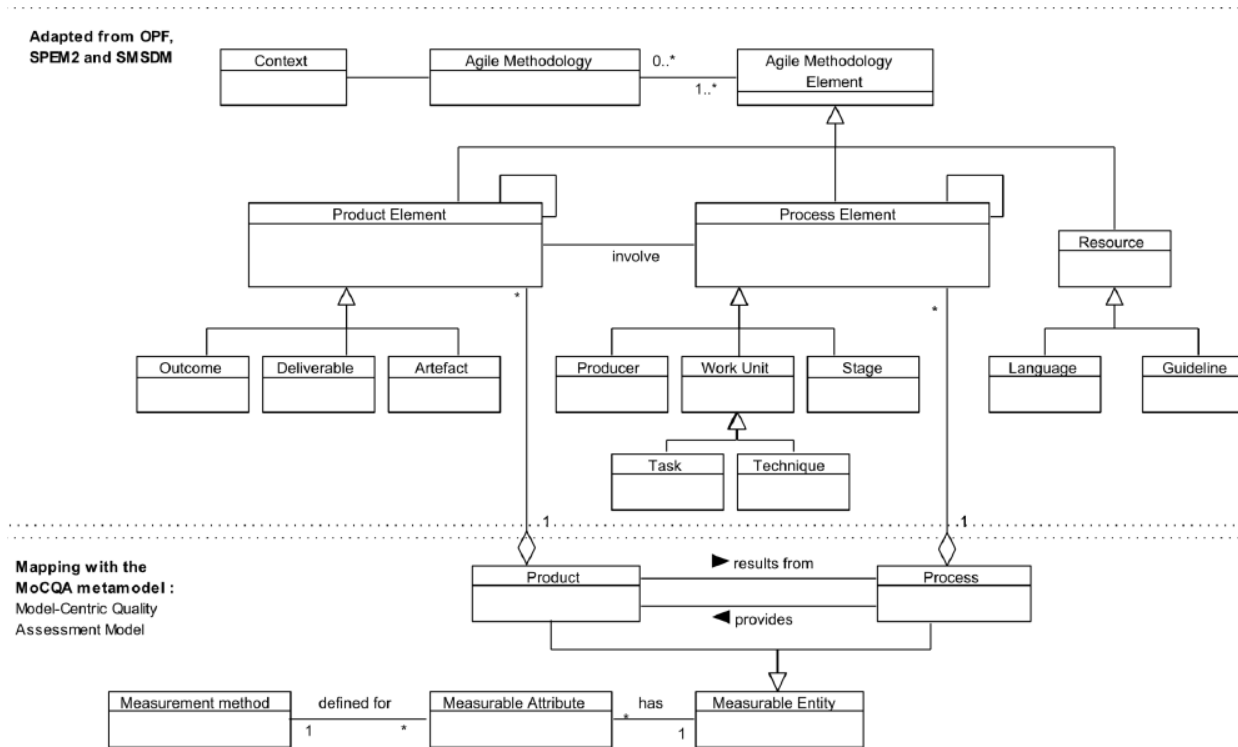- However the result of the context study are still **difficult to exploit in a systematic manner**.

  ➡ Need to support the approach, to automate it

2. CASE-STUDY : SUPPORT

- **Situational ME**

- **AM-QuICK** aims at continuously assist during :
  - **Design of the customized method** by elements composition
  - **Process Refinement (evolution – co-evolution with the product)** thanks to quality assessment
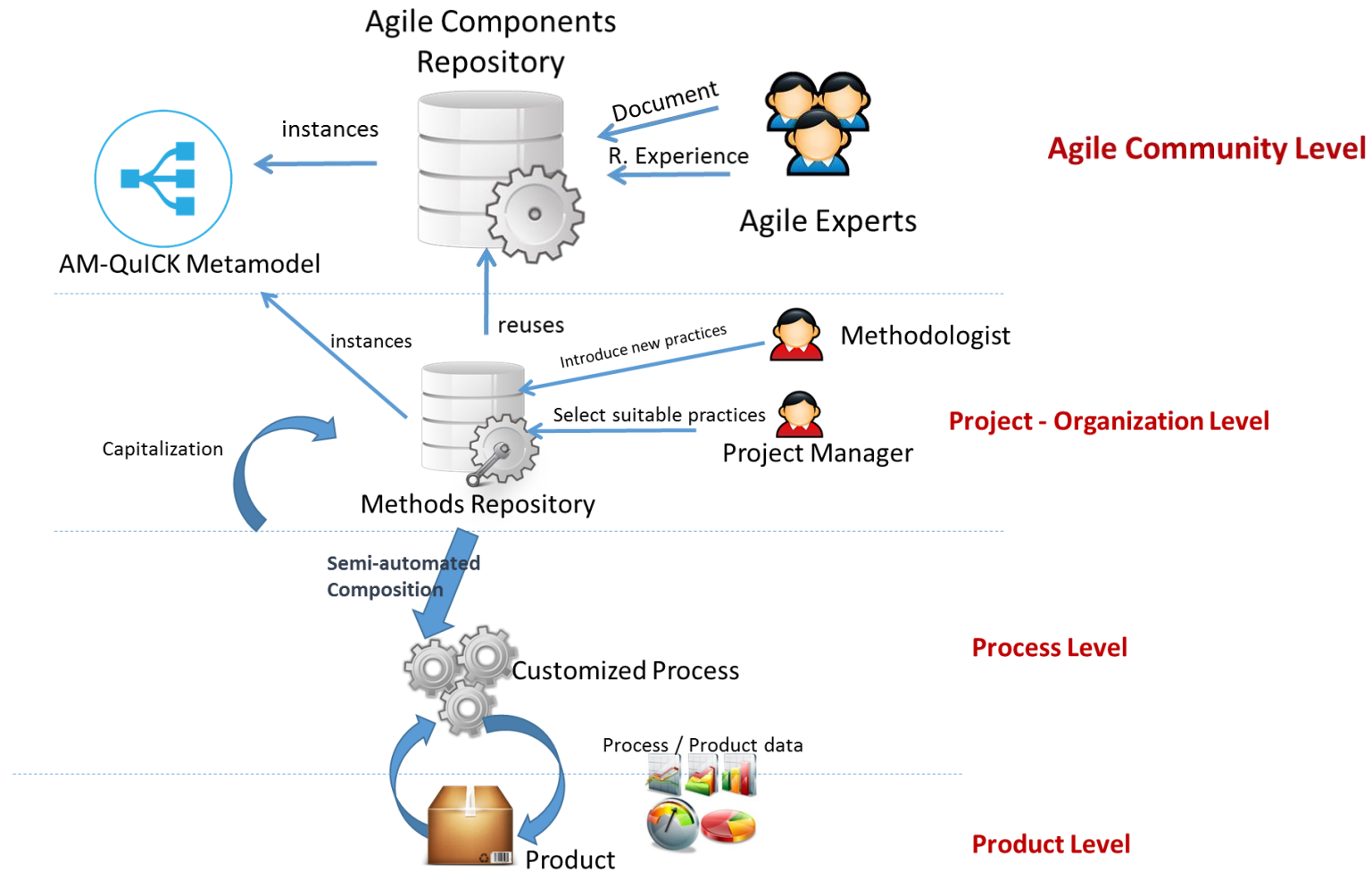
2. CASE-STUDY : SUPPORT

Adapted from OPF, SPEM 2 and SMSDM

Mapping with the MoCQA metamodel : Model-Centric Quality Assessment Model

- AM-QuICK proposes a metamodel which serves as a guide for agile methods design
  - Adapted from SPEM 2.0 and ESSENCE 1.0
- Integrated a quality assessment metamodel (MoCQA)

3. CONCLUSION

CHALLENGES :

- **Supporting** the Agile process adoption
  - **Analyze and model** the organization context
  - **Customize** accordingly
  - **Continuously assess :** Change is inevitable : the **enacted agile process should evolve incrementally,** just like the software evolve
  - **Capitalize**

RESEARCH DIRECTION :

- **Creating** a reusable framework to support adoption efforts
- Development of a **Methods Repository** (i.e., catalogue of reusable agile product and process elements, metrics, practices, tools …)
- Development of an **model-driven** and **automated composer** to guide the decision-making :
  - Need to capture the relationship between **methods components**
  - Need to enrich the metamodel with **Context Modeling** in order to be able to capture the Organization and Project context
- Need of a Knowledge DB for **the refinement and assessment rules :**
  - **Constraints definition** in order to capture the **dynamic behavior** between its elements so that it will be able to represent the interaction between product / process elements , and therefore their co-evolution

Thank you !

CONTACT INFORMATION

Hajer Ayed   hajer.ayed@unamur.be

Benoît Vanderose benoit.vanderose@unamur.be

Prof. Naji Habra naji.habra@unamur.be

UNIVERSITÉ DE NAMUR