INSTITUTO FEDERAL DE EDUCAÇÃO, CIÊNCIA E TECNOLOGIA PARAÍBA

Universidade Federal de Pernambuco

FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

An approach based on design practices to specify requirements in agile projects

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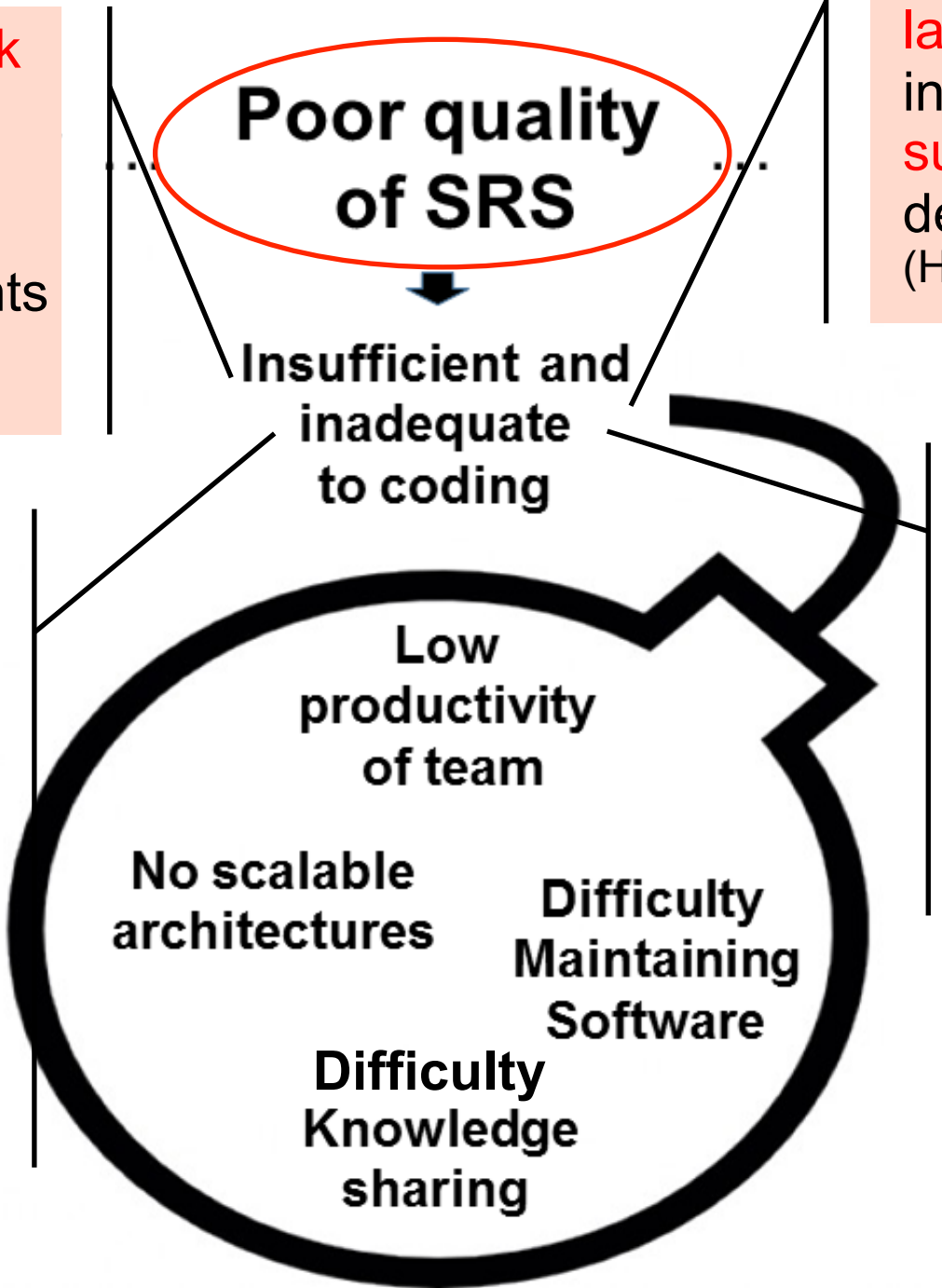
Agenda

- Motivation
- Research Steps
- RSD Approach
- Evaluation
- Final Considerations

Motivation

User Stories (US) lack expressiveness and capture only simple, customer visible, functional requirements (HEIKKILA, 2015);

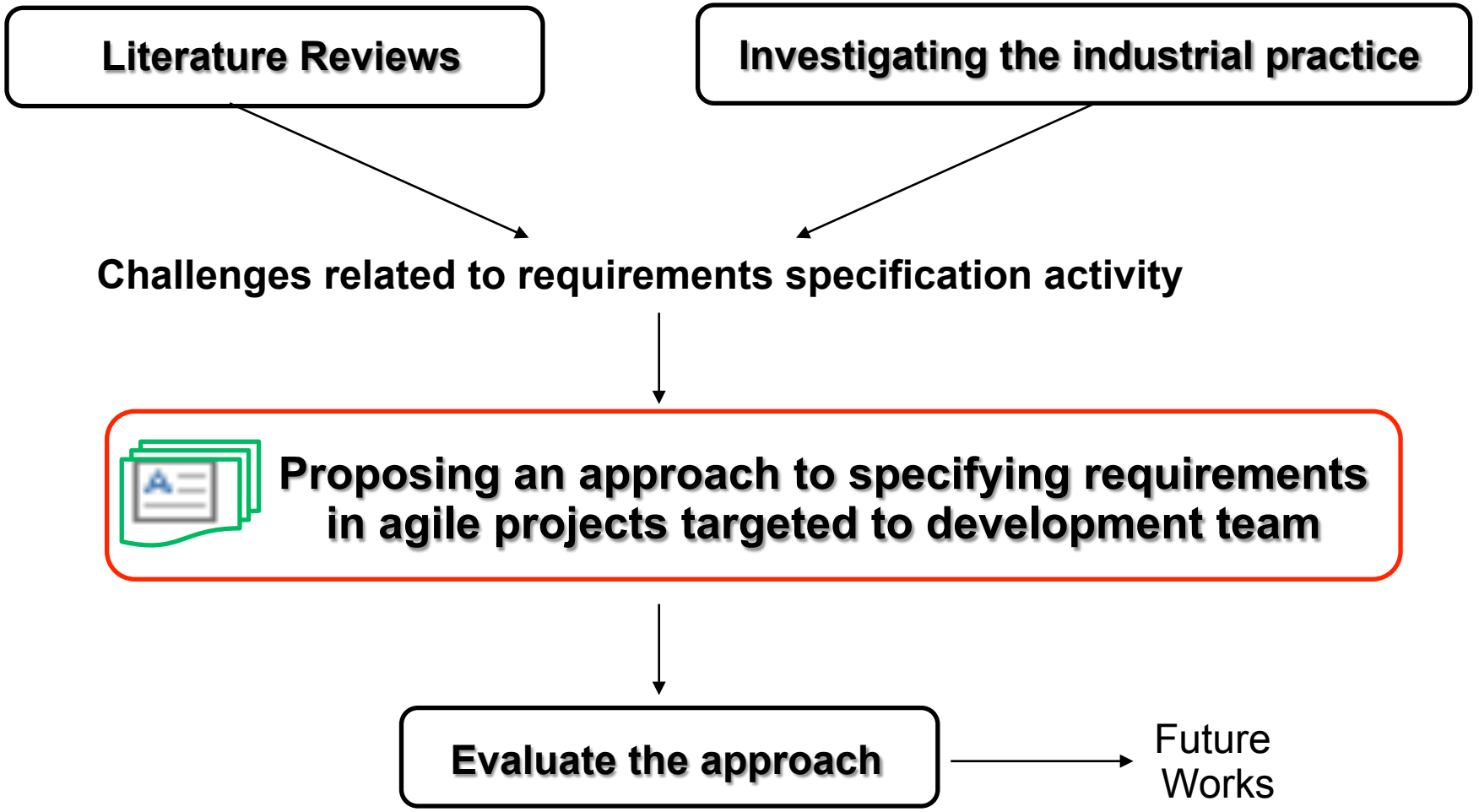
The SRS in ASD lacks design information to support the development team (HECK, 2014)



The focus on functional requirements often leads to overlooking technical aspects, making their development harder at later stage (DANEVA, 2013; INAYAT, 2014).

US are written in the language of the problem domain, targeting the customer (POVILATIS, 2014).

Research Steps



Requirements Specification for Developer – RSD Approach

- It focus on the development team;
- It could be used with XP, Scrum, or any other method that follows the agile principles;
- It systematizes three design practices:
  - the benefits of identifying the problem domain concepts (conceptual modeling);
  - the visual representation of interface requirements (mockups);
  - the business, NFR and technical constraints (specified as acceptance criteria + or AC+).

AC+ Types

Type	Description
Business (B)	Represents a restriction related to the intrinsic nature of the business.
Validation (V)	Represents a validation that the application needs to perform but it is not directly related to the core business.
Interface (I)	Represents any restriction related to the user interface.
Technical (T)	Represents a technical restriction on how the solution should be implemented.
Non-Functional (N)	Represents concerns about tracking quality, e.g., performance constraints, reliability constraints.
Other (O)	When it does not fit in any of the previous types.

	AC (XP)	AC+
Link	Specific to a single user story (WHICHARD, 2016);	Can be reused by several requirements;
Scope	Focus on constraints related to the business rules (BECK, 1999);	Can be a business rule, interface, validation, technical or any other type of constraint;
Oriented to	Directed to the customer and described at high level, without much detail to developer (MAMOLI, 2016);	Directed to developer and technical jargon can be used;
Writer	Should be written by customers (BECK, 1999);	Any stakeholder;
Domain	Problem (POVILAITIS, 2016).	Problem and solution.

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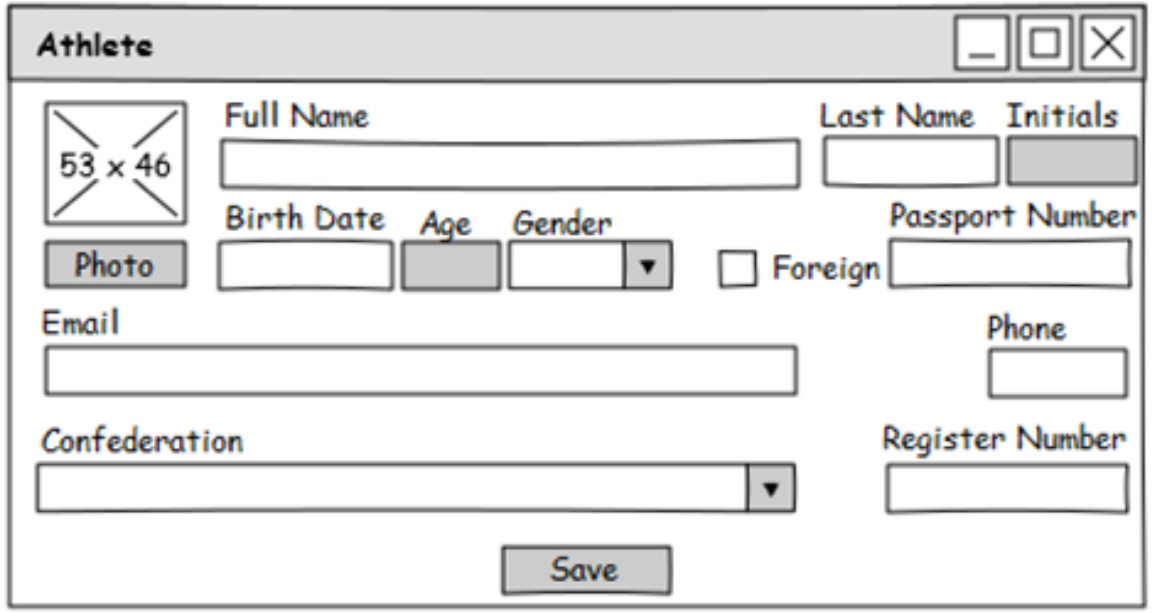
AC+ Examples

ID	Description	Type
AC01	The email address must be valid	V
AC03	To save, it is necessary that all required fields (*) are filled	V
AC04	Only active records must be displayed	V
AC07	The age must be calculated from the date of birth	V
AC08	The routine to save an athlete should also save the corresponding addresses	T
AC09	The operation to read and write files in the file system should be done through relative address	T
AC12	The sequential code to identify the record must be generated by the database	T
AC13	The initials of the athlete must be extracted from the athlete's name, e.g., if the name is "Fabiana de Almeida Murer", initials must be "F.A.M".	T
AC17	All foreign athletes must have a passport number	B
AC20	The drop-down list must only display the confederations that the user logged has access permission in your profile.	B
AC21	There cannot be two athletes with the same registration number in the same confederation	B
AC50	The label must use the multilingual resource	N
AC90	The widget is read-only	I

Proposed approach – RSD Structure

Label: Registration of athlete **Priority**: Critical **Source**: Ana **Sprint**: 1
Description: The system should enable the inclusion and updating of data of national and foreign athletes of sports federations recognized by the International Olympic Committee



Widget	Concepts	Acceptance Criteria
Photo	person.name	AC09
Full Name	person.fullName	-
Last Name	person.lastName	-
Initials	athlete.initialsName	AC13, AC90
Birth Date	athlete.birthDate	AC05, AC06
Age	-	AC07, AC90
Gender	person.gender	-
Foreign	person.isForeign	AC17
Passaport Number	person.passportNumber	AC17
Email	person.email	AC17
Phone	person.phone	-
Confederation	confederation.name	AC04, AC20
Register Number	athlete.registerNumber	AC21
Save	-	AC03,AC08
-	person.idPerson	AC12

Widgets of the Mockup | Data Entities | AC+

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Proposed approach – Related Works

Quality Factors	Related Works						RSD
	Nawrocki (2002)	Losada (2012)	Batool (2013)	Rivero (2014)	(Gebhart (2014)	Wanderley (2014)	
Simplicity	0	-	0	+	-	+	+
Team-Oriented	0	0	0	0	-	0	+
Acceptance Criteria	+	-	0	-	+	0	+
Non-Functional Requirements	+	+	-	0	+	-	0
Tecnhical Aspects	-	0	-	+	0	0	+
Functional Requirements	+	+	+	+	+	+	+
Consolidated Information	0	-	0	0	0	0	0

+ addressed **0 partially addressed** **- not addressed**

SRS driven by							
Goals/Objectives		X			X		
User Stories	X		X	X		X	
Scenarios/Use Cases	X	X			X		
Tasks/Activities		X					
Mind Maps						X	
Mockups	X	X	X	X			X
Conceptual Model			X			X	X
Acceptance Criteria							X

- The **innovation** of the RSD approach is:
  1. **Systematize** the use of three design practices in ASD;
  2. Integrate the description of the functional requirements, technical aspects and NFR in a **single view** by using the **AC+**;
  3. Directed to the **development** team.

Evaluation of RSD

- **Method: Case Study.**
- **Research Questions:**
  - **RQ1: How the team evaluates the SRS produced using the RSD approach?**
  - **RQ2: How the RSD approach affects the work of the team?**
- **Data collected and analyzed:**

	Data	Observations	Documents	Interviews
Team Evaluation	The content and structure of the RSDs	X	X	X
	The effort required to specify requirements, code and test using RSD	X		X
	The difficulties that software engineers had when using RSD approach	X		X
	Dependence between stakeholders	X		X
	Impact analysis of change requests	X		X
	Amount of changes made in the RSD (volatility)	X	X	
	The type and number of Non-Conformities (NC) identified in the software by the team during acceptance tests	X	X	

Evaluation of RSD - Context

Company Size	Small
Period Investigation	8 months
Projects Investigated	1
Type of Software Developed	Information System
Project stage when approach was introduced	The project was still in the planning stage
Development Team	10 software engineers (2 trainees)
Roles	System Analysts (2) and Developers (8)
Agile practices used	Backlog, frequent releases, iterations, version control, continuous integration, automated build, refactoring
RSD practices	Use of the three practices equally
Tools used to specify the requirements	MS Word
Sprint Duration	Monthly
Internal Releases	Weekly
Acceptance Tests	Weekly

Evaluation of RSD

- 39 RSD and 257 AC+ were produced;

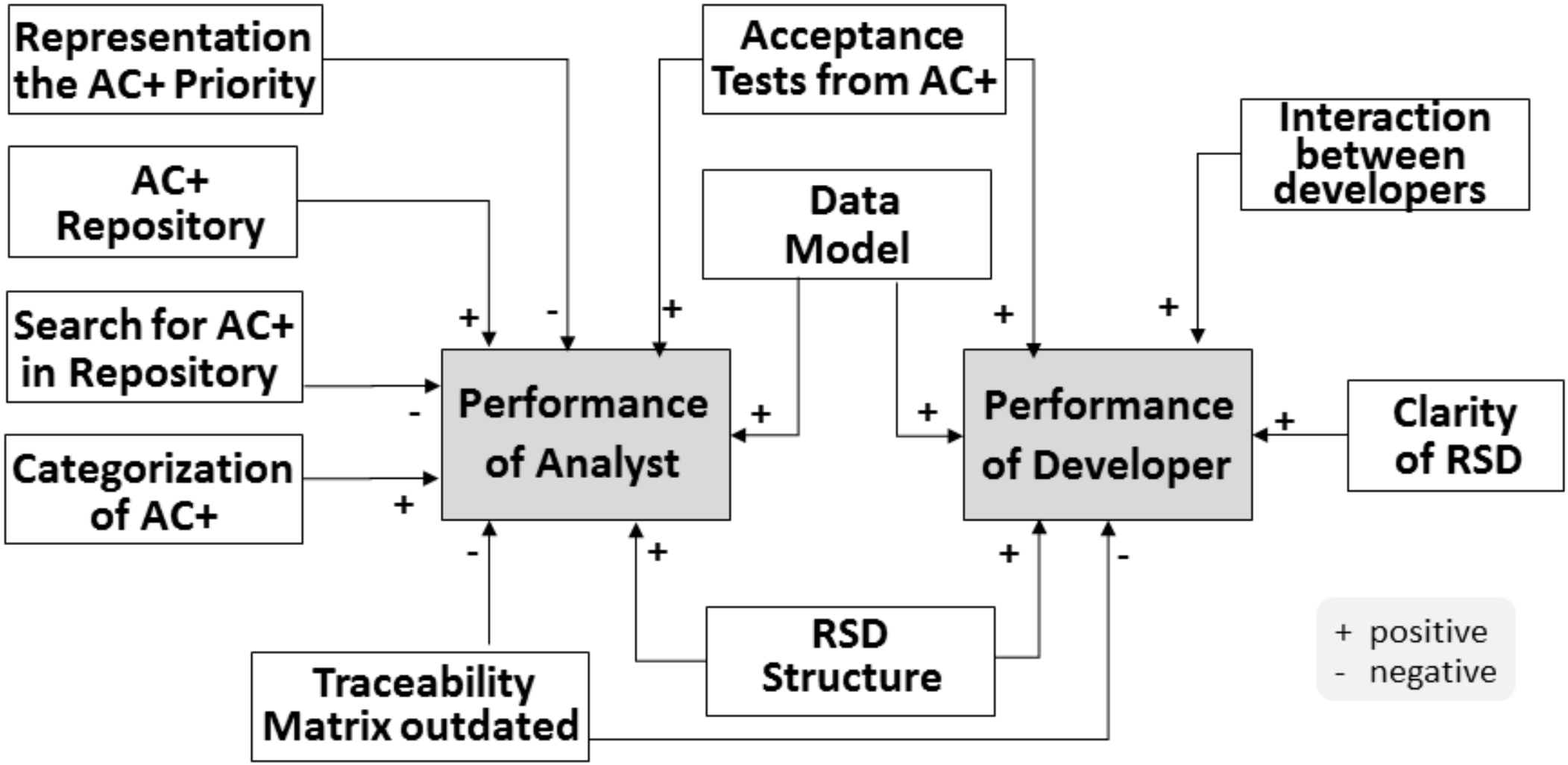
Table 4. Excerpt of the Interview Guide

Q8.	What helps or hinders you from using the approach?
Q9.	How do you assess the structure of RSD?
Q19.	How do you assess the effort required to implement the requirements from the RSD?
Q20.	How do you assess the effort required to create the RSD?
Q22.	Was the quality of the RSD different from what you expected?
Q28.	How do you assess the effort required to use the RSD compared to other approaches?
Q38.	How do you assess the RSD in relation to ISO\IEEE 830?

RQ1: How the team evaluates the SRS produced using the RSD approach?

- The structure is Very Adequate in the opinion of most respondents (80%);
- Most interviewees (60%) pointed out that the RSD structure is more appropriate than other approaches' structure;
- The approach provides a SRS that met the expectations of the developers.

RQ2: How the RSD approach affects the work of the team?



Final Considerations

- RSD approach:
  - Directed to the development team;
  - Systematizes the use of three design practices in ASD;
  - Integrates the description of the functional and design information in a single view;
  - Can help the coding activity, software maintenance, and transfer knowledge.
- Future Works:
  - Developing a tool to support the RSD approach;
  - Conducting further assessments in other agile contexts;
  - Conducting a controlled experiment to evaluate the RSD quantitatively.

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