Measuring the Impact of Bad Requirements

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Requirements impact subsequent Software Development Activities

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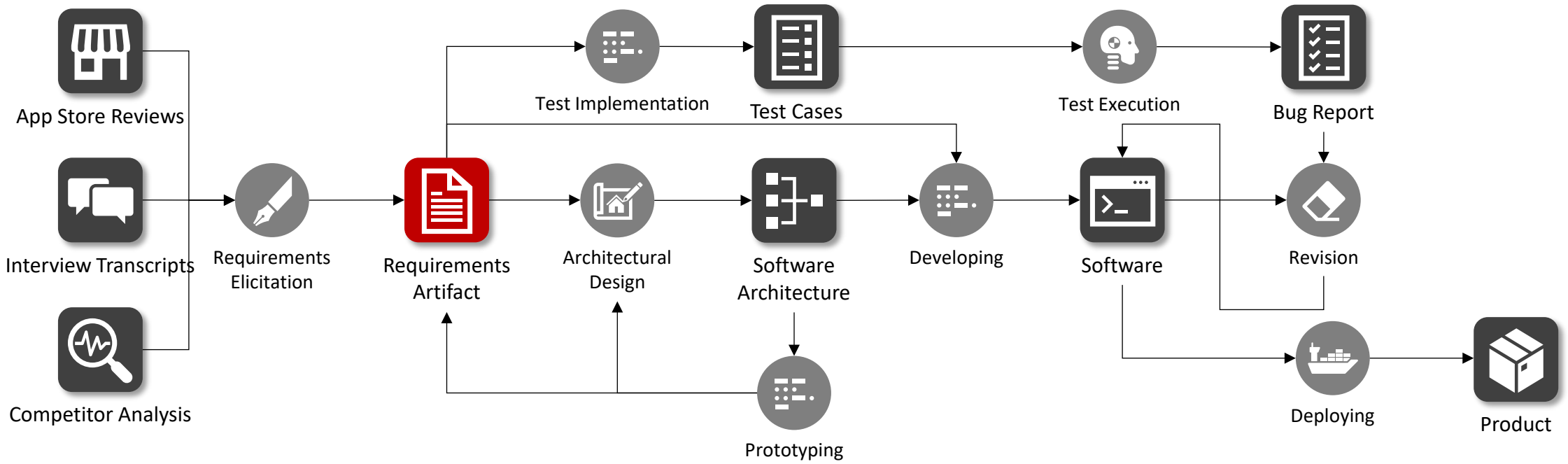

Quality Assurance of Requirements often means checking against normative rules

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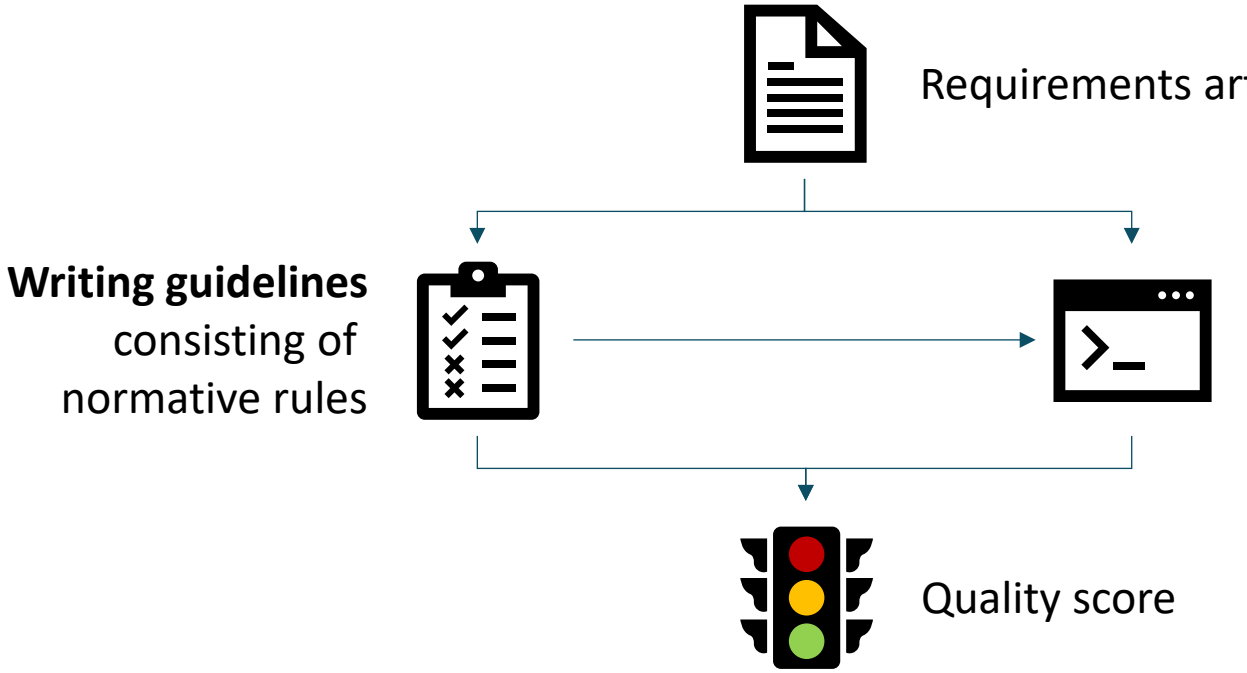

Normative rules are often easy to check and can often be automated.

Most requirements quality assessment measures produce only vague results.

Does the precision of quality assessments matter?

Effort spent on Requirements Artifacts needs to be justified

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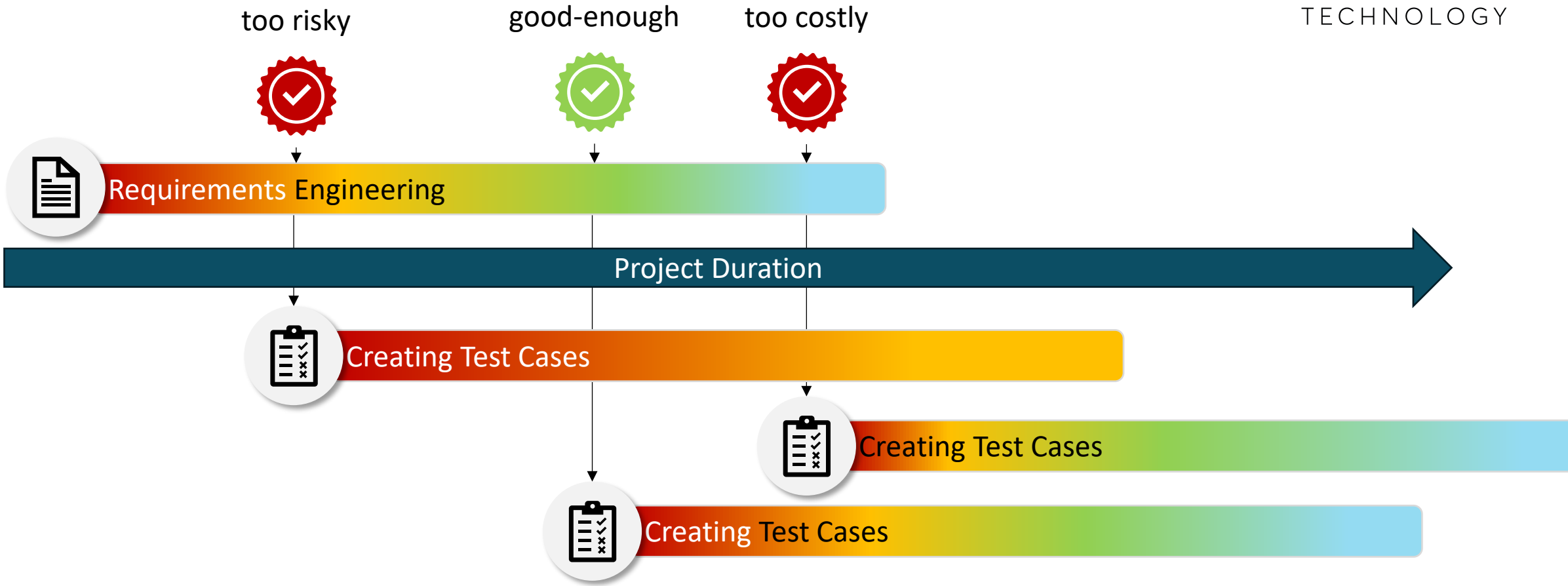

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Good-enough Requirements Engineering

How good is good enough?

Requirements Quality is the Impact of Requirements Artifacts on Activities

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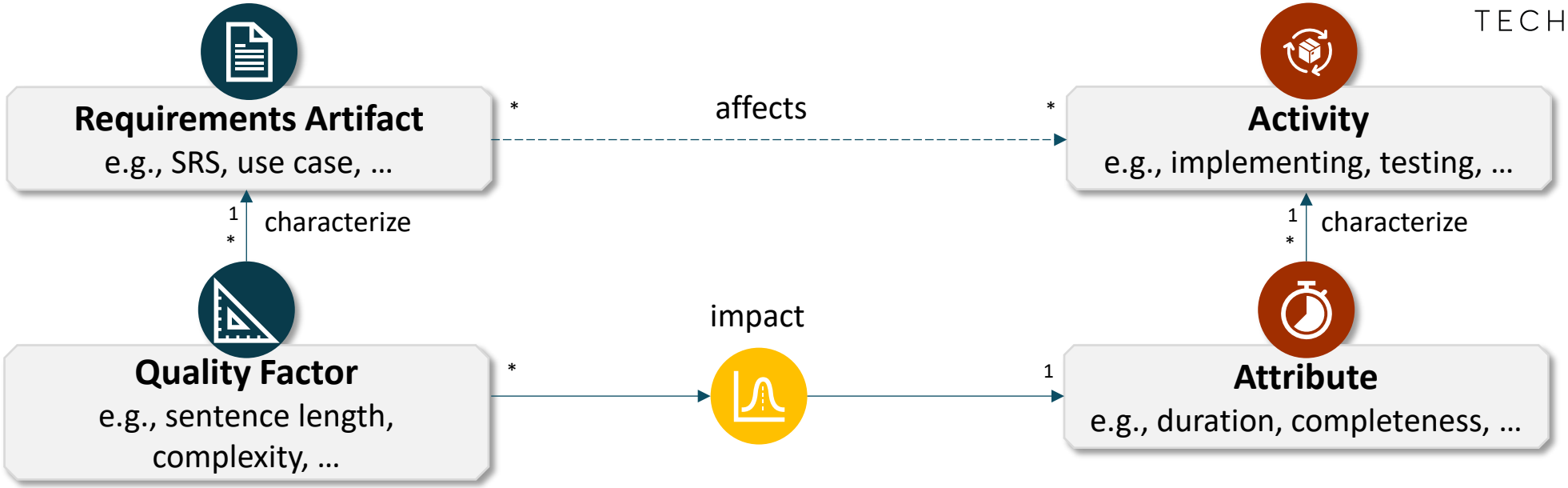

Requirements artifacts are only as good as they support the activities in which they are used.

Writing guidelines fail to properly reflect quality because they are void of the actual impact.

The local Context mediates the Impact of Quality Factors on Activities' Attributes

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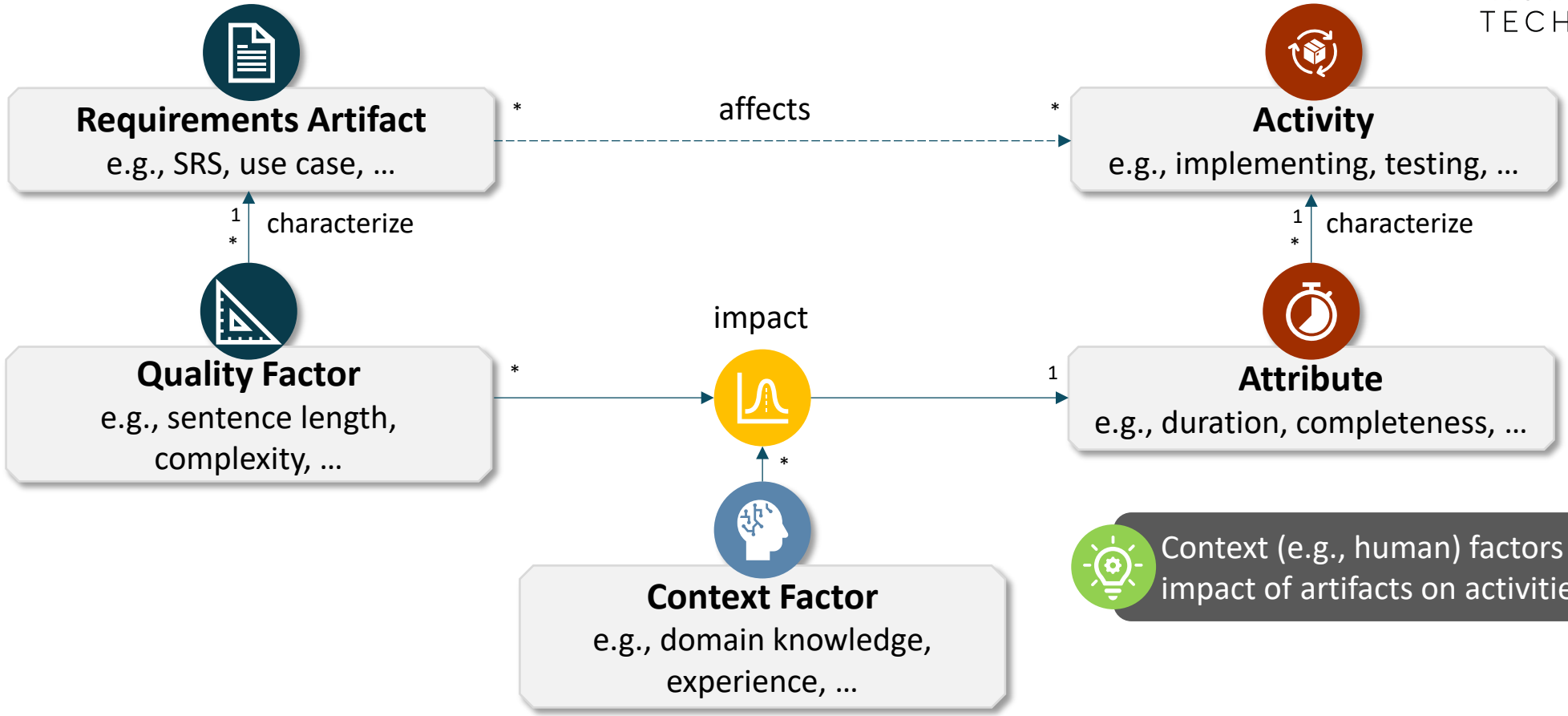

Context (e.g., human) factors influence the impact of artifacts on activities.

Use Case: Distinguish Causes from Effects

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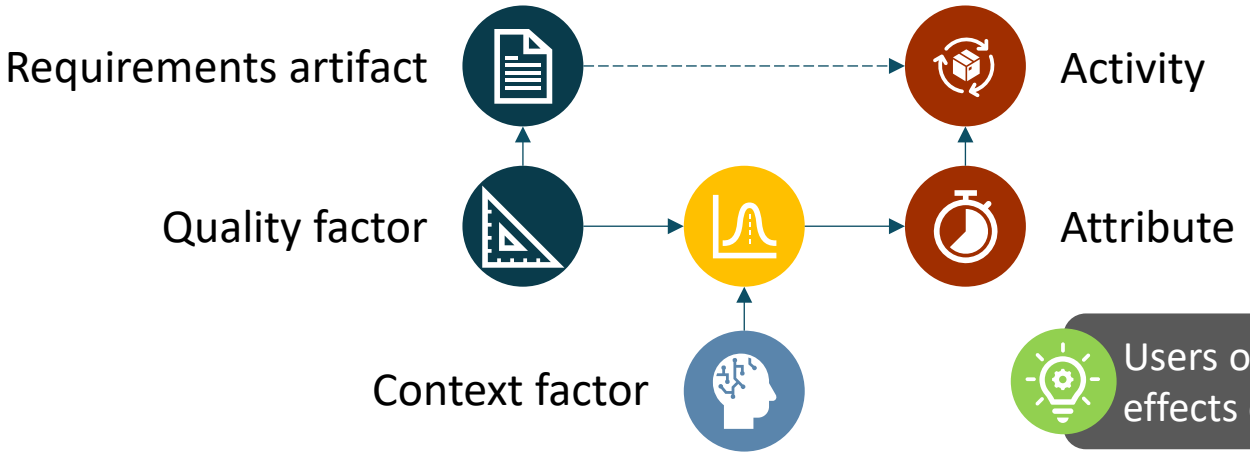
> ”It constantly takes more time to specify our test cases when our more junior testers are assigned, and the use cases do not contain clear postconditions.”



Users of requirements artifacts often focus on the effects of the bad requirements, not the causes

Historical Data can reveal the Impact of Requirements Quality

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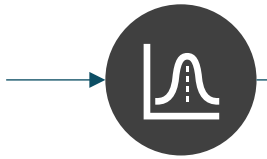
> ”It constantly takes more time to specify our test cases when our more junior testers are assigned, and the use cases do not contain clear postconditions.”

UC	Postcondition	Tester Exp.	Testing Duration
UC1	Exists	1 year	3:12h
UC2	Missing	2 years	6:04h
UC3	Missing	14 years	2:45h
UC4	Missing	11 years	2:39h
…			



Data Analysis

The **duration of specifying test cases** increases by a factor of 2 if a **use case lacks postconditions** and **a tester has less than 3 years of experience**.

Quantitative analyses on historical data identify quality factors that actually matter in a context.

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Requirements Quality Assurance at Scale

A holistic view on Requirements Quality

A Quality Factor may have different Impacts on different Activities

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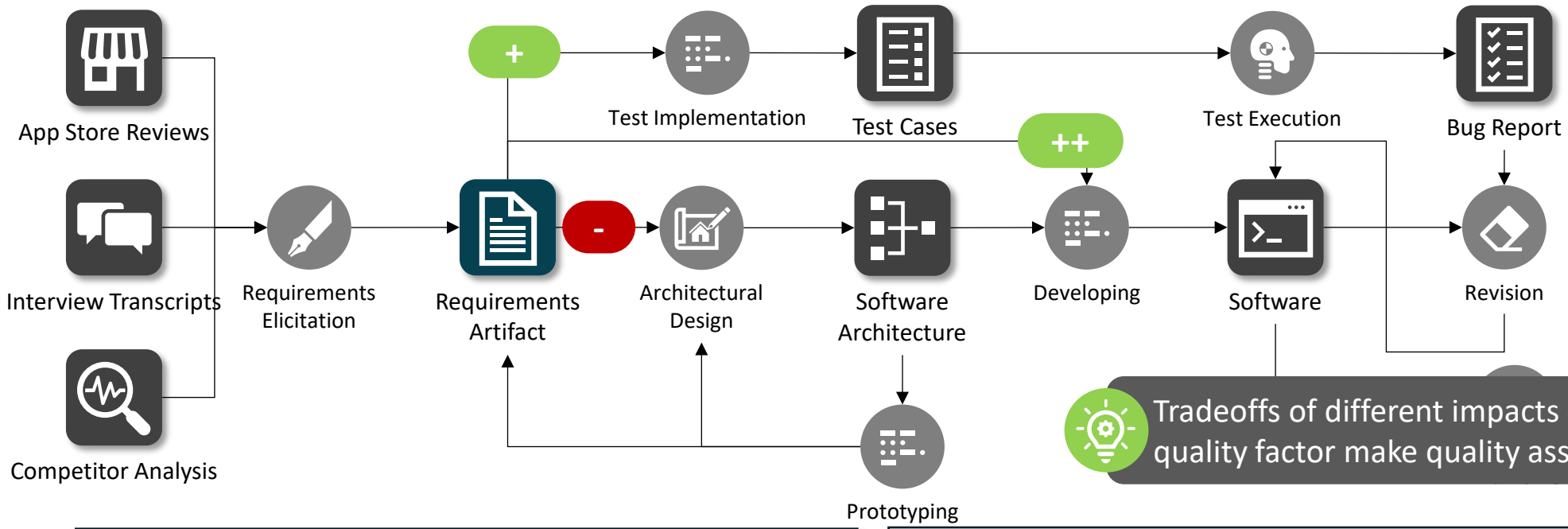

REQ42: The current documentation shall be hosted on an AngularJS web frontend.

REQ42: The current documentation shall be *accessible as a static website*.

Requirements Artifacts affect all Activities that use them as Input

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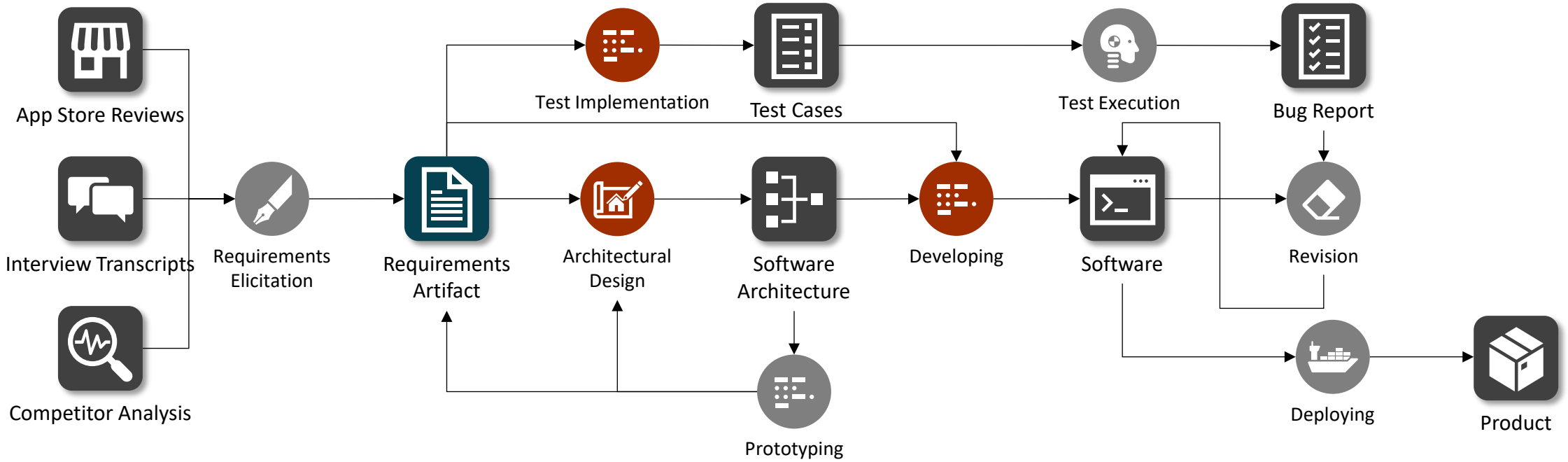

Collections of potential Activities and their Attributes already exist

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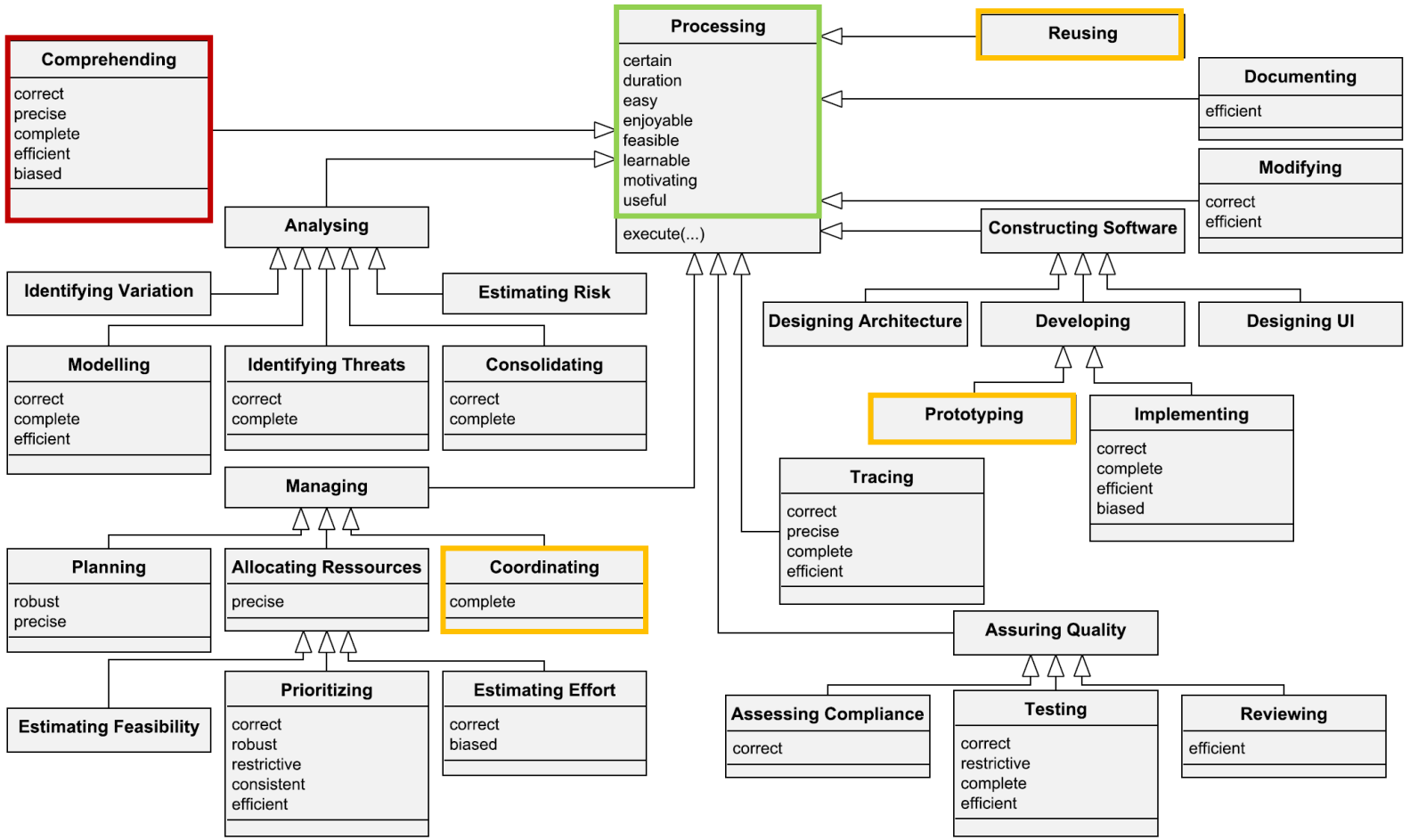

Requirements-affected activities have several (measurable) attributes.

Some activities are much less commonly studied than others.

Comprehending a requirement precedes all other activities.

Collections of potential Quality Factors already exist

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http://**reqfactoront.com**/content/factors

Requirements Quality Factor Ontology

Content ▾ Structure ▾ Overview

Without the activity-based quality perspective, this collection is just a set of normative rules again.

Factors

A quality factor (QF) represents a normative metric which maps a textual requirement of a specific granularity to a scale and therefore informs about the quality of that input.

Index	Name	Complexity	Scope	References
QF001	**Anaphora**	syntactic	sentence	R039, R045, R073
ID	*Definition(s)*		*Impact*	*Reference*
D261	"Anaphora occurs in a text whenever a pronoun (e.g., he, it, that, this, which, etc.) refers to a previous part of the text. The referred part of the text is normally called antecedent. An anaphoric ambiguity occurs if the text offers more than one antecedent options (Yang et al. 2011), either in the same sentence (e.g., The system shall send a message to the receiver, and it provides an acknowledge message - it = system or receiver?) or in previous sentences."			R039
D003	"An anaphor is a linguistic expression that refers to a preceding utterance in text."		"It is possible for different stakeholders to commit, legitimately, to different, incompatible readings of the same requirement."	R045
D002	"An anaphor is an expression used, in language, to refer to another expression. Personal pronouns, such as he, she, it, those, our, etc. are examples of anaphora, or anaphoric expressions."		"It is possible for different stakeholders to commit, legitimately, to different, incompatible reading of the same requirement."	R073
QF002	**Nocuous**	semantic	phrase	R049, R049, R073
QF003	**Passive Voice**	syntactic	sentence	R025, R027, R039, R095, R027

Use Case: Systematically evaluate Requirements Quality in your Context

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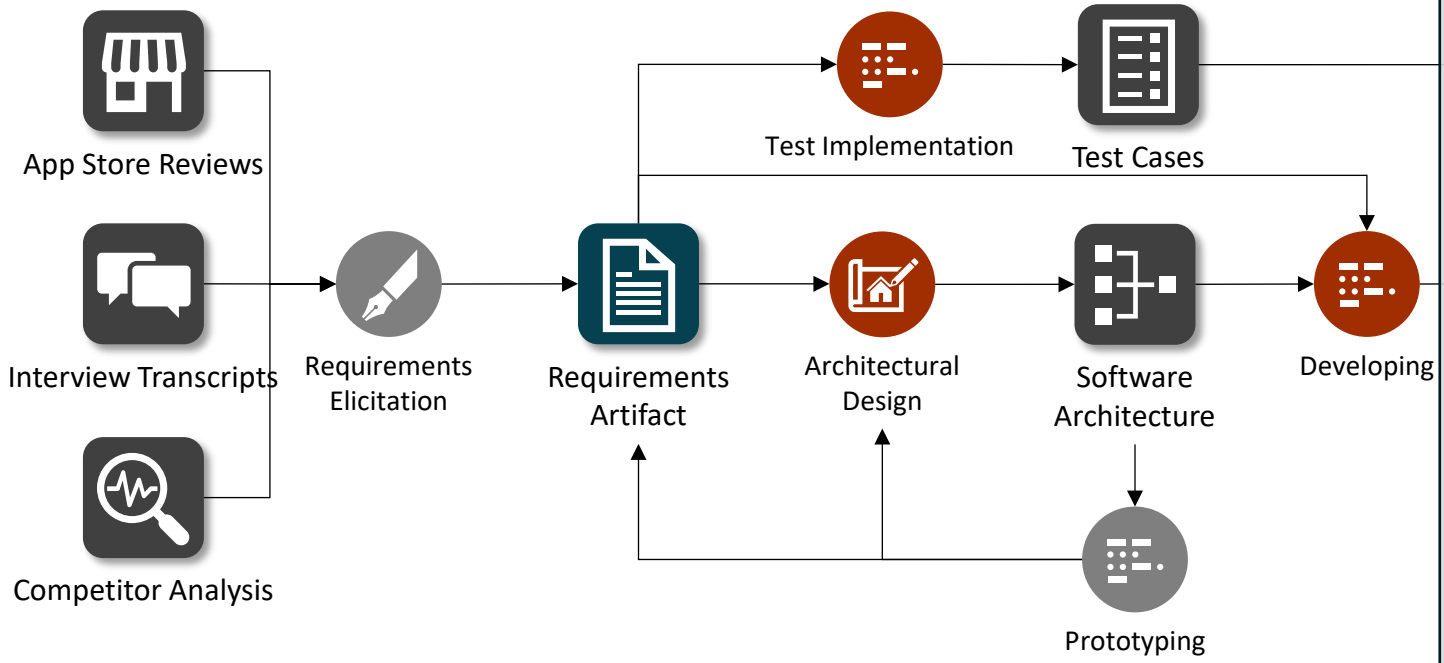

1. **Identify the requirements artifacts** in your process that you want to subject to quality assurance.
2. **Identify the activities** in which these artifacts are involved, and **which attributes** represent their performance.
3. **Find out which factors** might influence their attributes.
4. **Identify context factors** that may mediate the impact.
5. **Measure these factors**.
6. **Conduct a data analysis** on historical data to quantify the alleged effect.

Use Case: Assemble relevant Requirements Writing Guidelines

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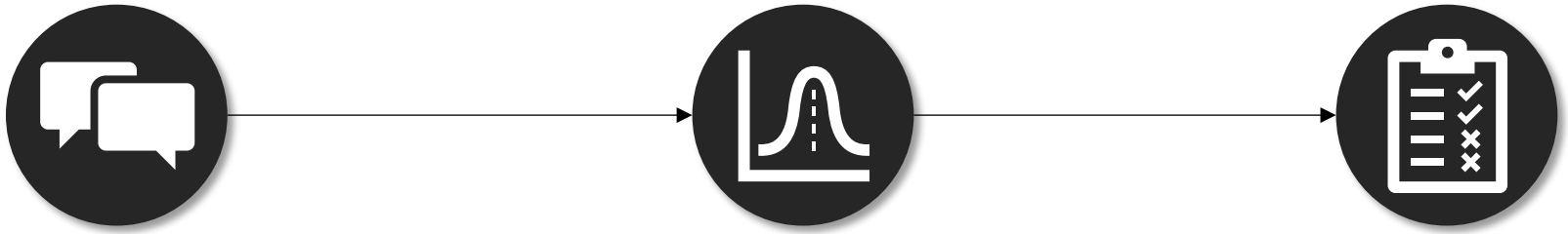

"It constantly takes more time to specify our test cases when our more junior testers are assigned, and the use cases do not contain clear postconditions."

postcond × test.exp = -

length = --

passive = ~

Requirements Writing Guidelines
All requirements engineers must adhere to the following writing guidelines:

1. Requirements must be **no longer than 70 tokens**.
2. Use cases should **always contain**

Following guidelines based on quality factors proven to be relevant in your context ensures requirements that are *good enough.*

Conclusion

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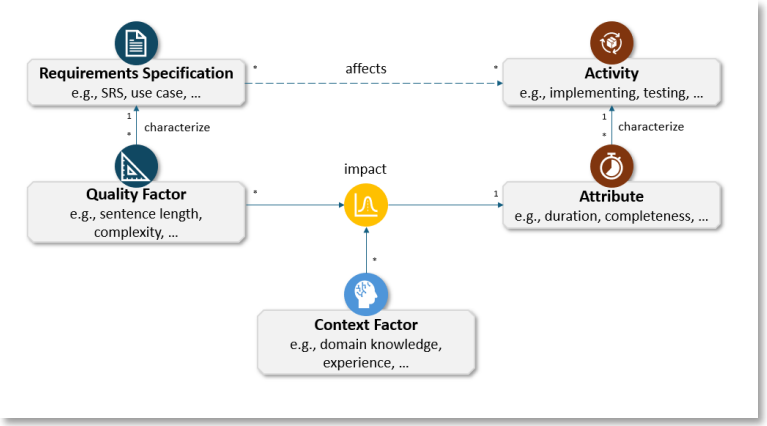

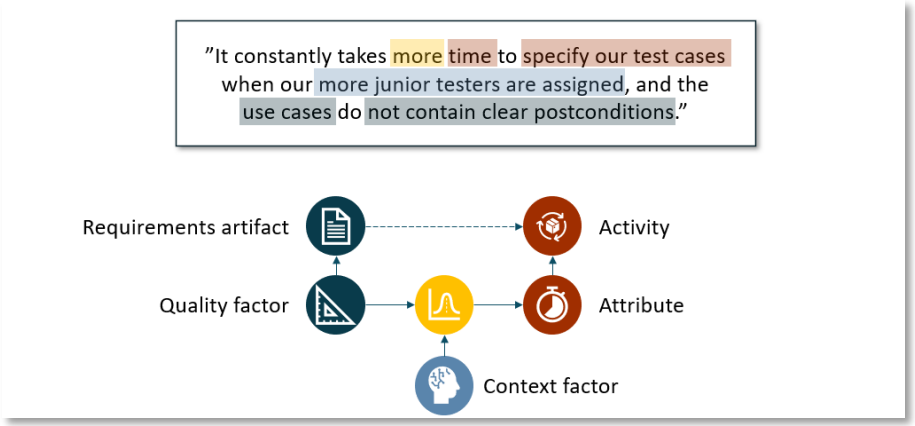

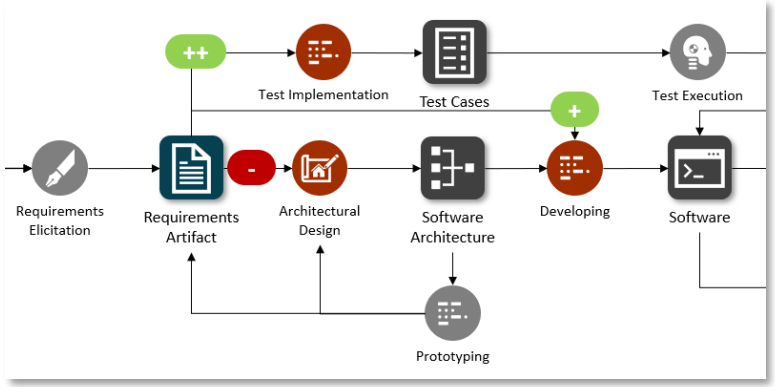

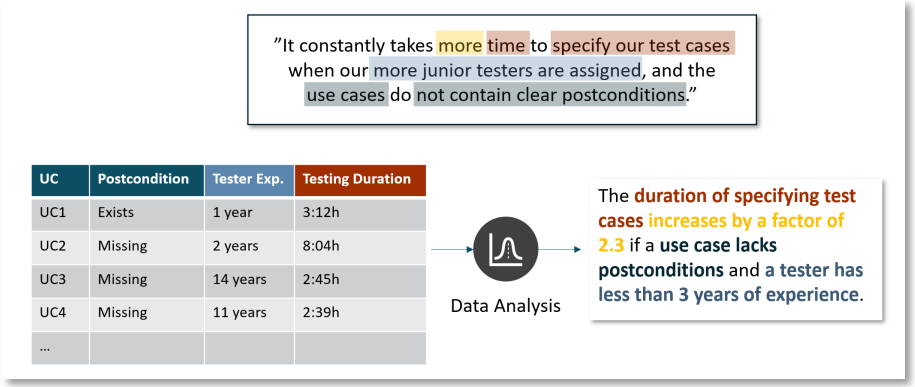

Contact

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Experiencing issues with requirements quality in your context? Feel free to reach out!

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