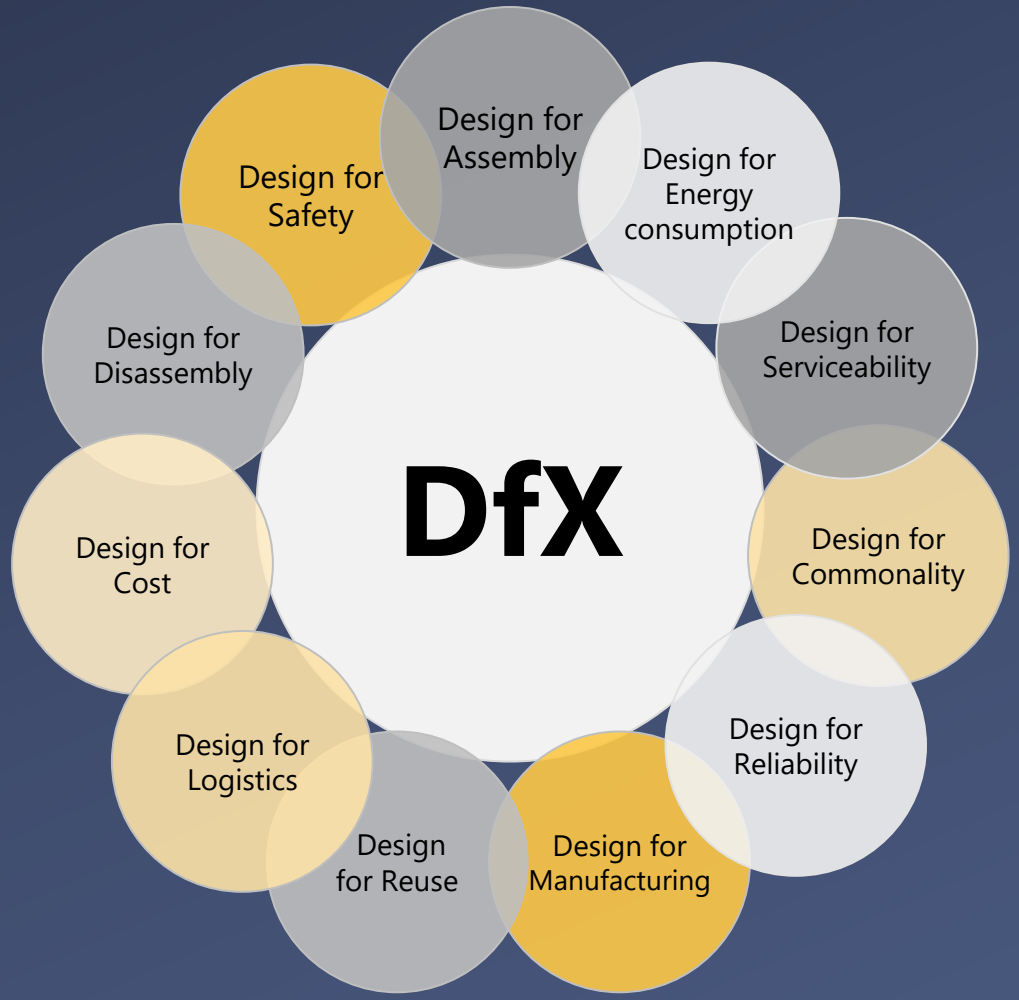
DfX



V1.0

Source: PULZ, 2022

Design for X

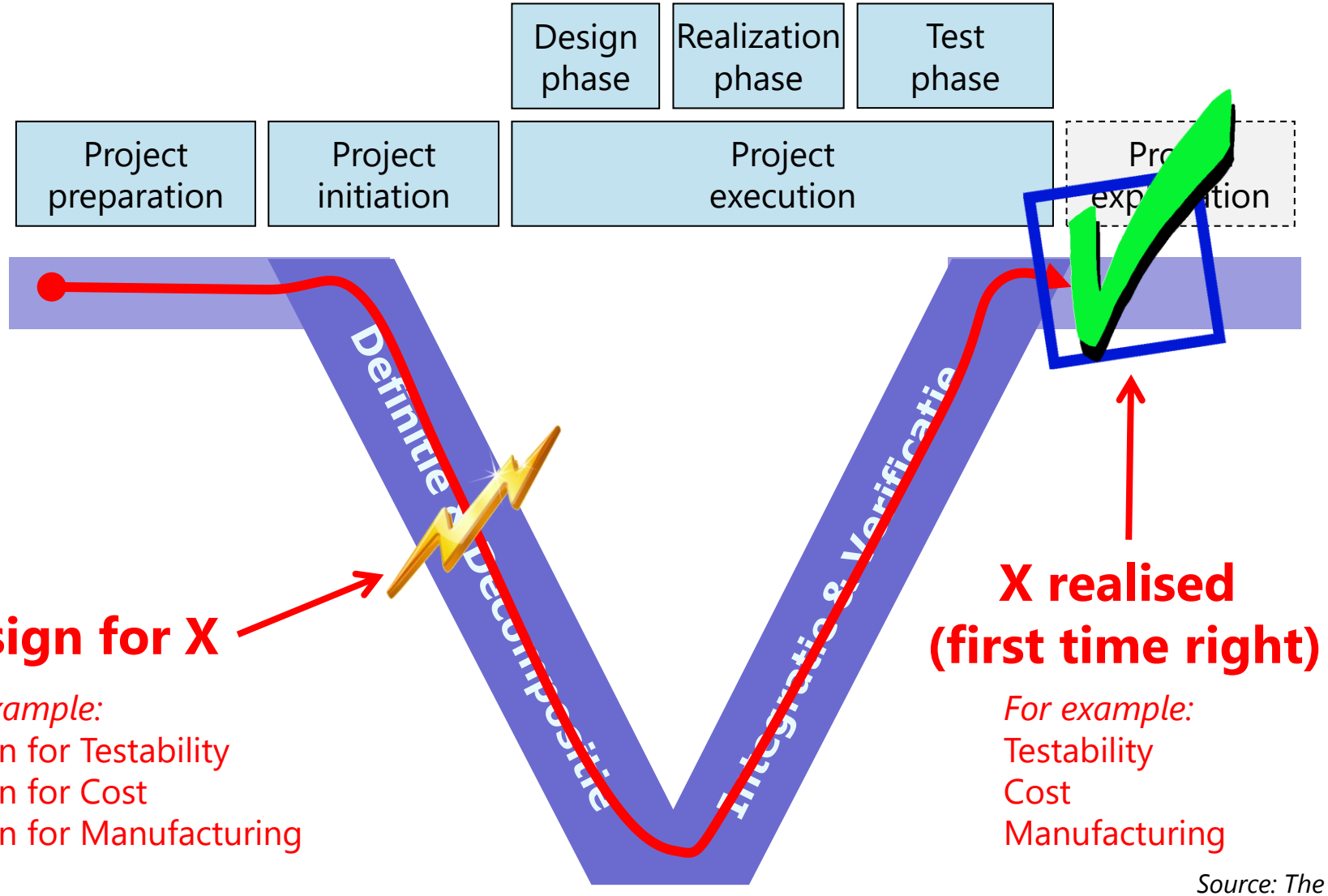
Design for X is a **design principle.** It means that you already take X into account during the design phase (i.e., left in the V-model), where X stands for the characteristic (or critical parameter) that must be realized at the end of the project (e.g., manufacturability, cost or serviceability).

Examples:

- **Design for Manufacturing (DfM):** make sure during the specification and design phase that the products can be easily produced and assembled later on in the project.
- **Design for Reliability (DfR):** ensure during the specification and design phase that expectations pertaining to the reliability and maintenance costs will be realized later on in the product's life cycle.
- **Design for Testability (DfT):** ensure during the specification and design phase that the product can be tested easily and effectively.
- **Design for Six Sigma (DfSS):** ensure during the specification phase that the product or service meets the client's wishes and ensure during the design phase that the variation in the critical properties of the service or produced products falls within the specified limits.

Source: The complete project manager, 2016

On the left side of the “V”!



Design for X

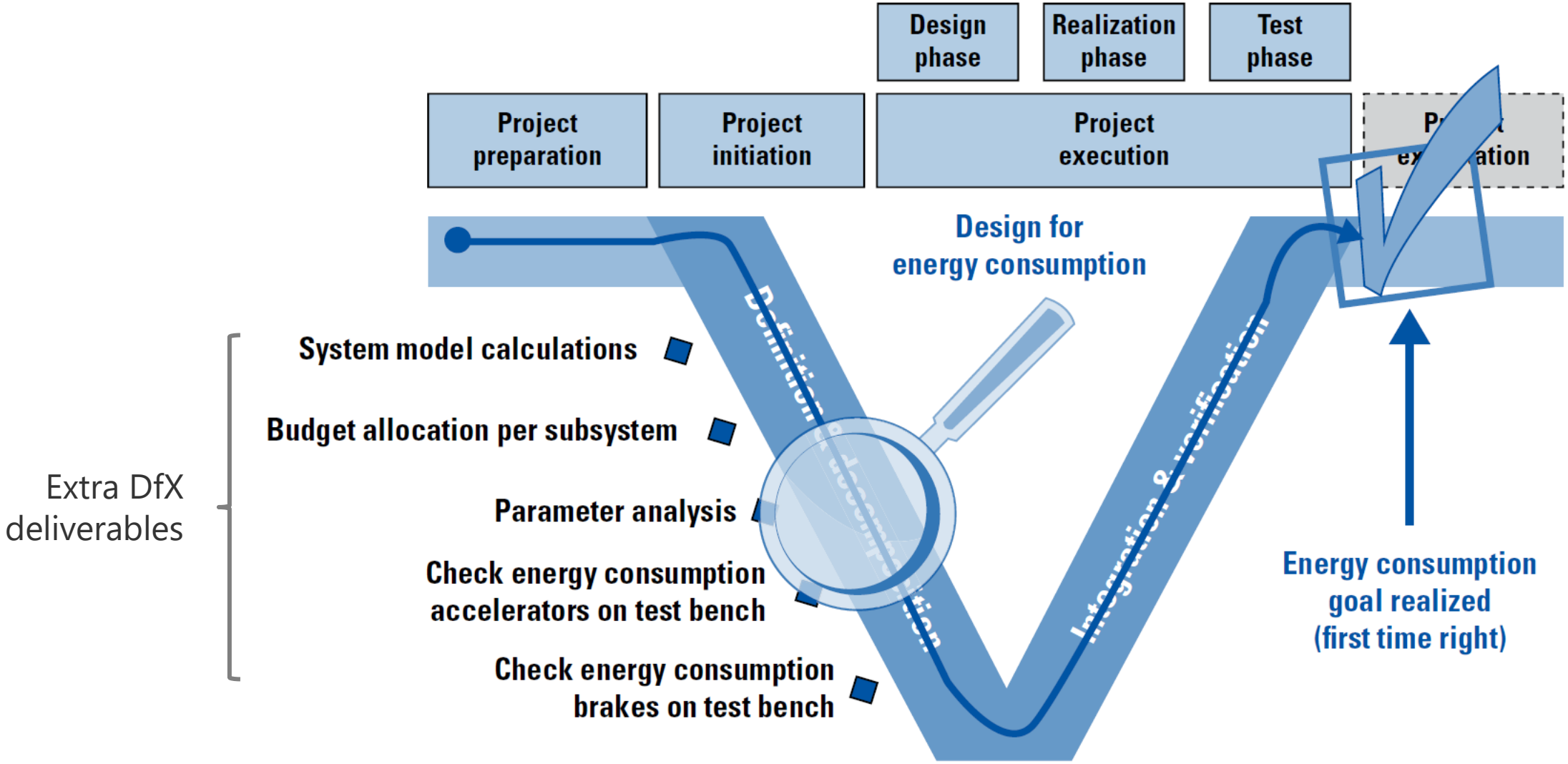
For example:
Design for Testability
Design for Cost
Design for Manufacturing

X realised (first time right)

For example:
Testability
Cost
Manufacturing

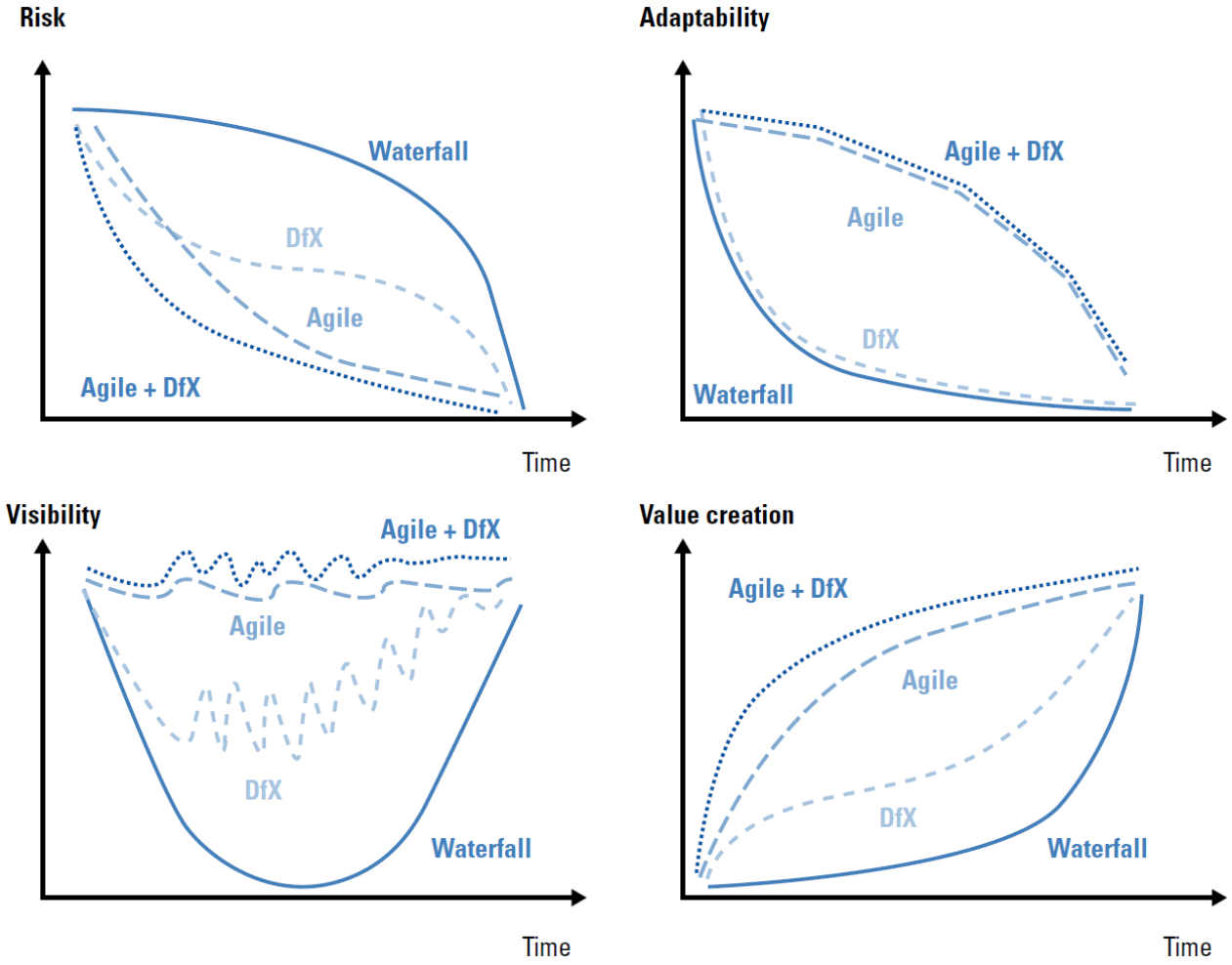
Source: The complete project manager, 2016

Examples extra deliverables Design for Energy consumption



Source: The complete project manager, 2016

Effect of Design for X and Agile compared to the waterfall model



■ **Risk reduction:** development using the waterfall model will only offer risk reduction during the concluding tests. DfX offers a significant reduction early on with the evaluation moments on the left of the V-model. With Agile, interim products are delivered, which results in the swiftest risk reduction. The combination with DfX results in an additional reduction, particularly during the definition phase (before the start of the first sprint).

■ **Adaptability:** this is low for the waterfall model, because changes mean you have to go "backwards" along the V. DfX does not change this. However, Agile does since modifications can be made before each sprint. The more sprints that remain and the shorter each sprint is, the more flexible you will be.

■ **Visibility:** once again, the waterfall model performs relatively poorly. At the start of the project, you "dive under water with your submarine" and you only show results during the integration and test phase. DfX improves the visibility because evaluation moments are also communication moments. Agile offers the highest visibility, since each sprint ends with at least a demonstration for the client and possibly even a commercial interim product. The combination with DfX improves the visibility a bit more, because the status of the critical parameters is shown alongside the sprint results.

■ **Value creation:** the waterfall model will only offer results – and therefore value for the client – after the concluding test phase. DfX creates value sooner because the confrontation moments prove that the product or service performs well in terms of the critical parameters. Agile is once again the best option, since each iteration results in a finished interim product. DfX amplifies this effect with the additional validation of the activities on the left side of the V.

Source: The complete project manager, 2016

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