



# The 23<sup>rd</sup> International Asset Facility and Maintenance Management Conference



## Digital Facility Design: Risk Mitigation Through Premises and Interfaces

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„What is the role of Digital Twins in Risk management Sustainability within Facility Planning?“



## Situation

Importance of project management and risk addressing in facility design



## Risks in Preparation Phase

- Change Management Risks
- Interface Risks



## Best Practices

- Project Steering Culture and Active Premise Management
- Establishment of Project Interfaces
- Feasibility as First Filter
- Robust Design



## Take Aways

Key messages from the article to consider when reviewing the approach to ongoing and future projects

# SITUATION

EXAMPLES from real-life:

*„The machine was designed for yearly output 3 years ago“*

*„We need to stop CMMS implementation as is not in compliance to group standard“*

*„The data may be provided by this department, but they do not own them“*

*„We need to ask for additional 200K USD for HVAC, as supplier was designing based on old data“*

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**Planning is a key** in design of Asset with advanced Digital Management systems. The asset is only as strong as is defined and brought to operation.

Preparation phase including funding strategy, design development, technology acquisition planning for smart building systems **creates fundamentals effective asset management.**

**Planning of advanced systems is key because of CAPEX and ROI, interoperability requirements, low flexibility for changes.**



Source: [sketchfab.com](https://sketchfab.com)

# RISKS



# CHANGE MANAGEMENT RISKS

## Premise-Driven Approach to Asset Management

**Without premises agreed-upon starting point**, projects are vulnerable to decision making without understanding of **impact to project time, scope, quality and costs**.

Failure to define **initial project premises (referred to as “point zero”)** critically impacts stakeholder’s expectations.

The project steering loses **visibility over changes**, which makes difficult **to defend such changes in front of internal and external partners**.

Agreed premises are also key for **valid feasibility study** including simulations with digital twins and **condition to enter contract with partners**.



**No agreed „point zero” premises -> No valid baseline solution -> Extra costs, Delays**

# CHANGE MANAGEMENT RISKS

## Setup of “point zero” premises:

No.	Premise Category	Description and Examples
1	<b>Corporate Digital Strategy</b>	Ensure compliance with corporate goals such as sustainability through smart energy systems, automation via robotics and AI and digitalization through ERP/IoT integration.
2	<b>User and Stakeholder Requirements</b>	Define services the facility must deliver— real-time tracking for logistics, predictive maintenance, user-friendly interfaces for staff, and integration with stakeholder platforms.
3	<b>Data Requirements</b>	Specify data standards along the value chain. Different departments (IT, engineering, logistics) will require tailored data access and visualization tools.
4	<b>Scalability of IT/IS Infrastructure</b>	Validate initial and projected data volumes, device counts, and user loads. A smart building must scale number of devices and plan local to cloud-based AI processing.
5	<b>Operational Regime</b>	Define digital support for operational schedules—e.g., 24/7 monitoring via IoT sensors, automated shift scheduling, and AI-driven energy optimization.
6	<b>Quality Standards</b>	Designated standards such as ISO 27001 (information security), ISA/IEC 62443 (industrial cybersecurity), and traceability protocols into system design and operations.

# CHANGE MANAGEMENT RISKS

## Setup of “point zero” premises:

No.	Premise Category	Description and Examples
7	<b>Procurement Strategy</b>	Decide on sourcing for digital platforms—e.g., cloud vs. on-premises, open-source vs. proprietary, and vendor lock-in risks. Consider SLAs for software and data services.
8	<b>Smart Manufacturing Design</b>	Define automation levels using robotics, AI, and MES systems. Ensure compatibility with digital twins and real-time analytics. Labor strategies must consider human-machine collaboration.
9	<b>Environmental Controls</b>	Include smart HVAC, energy dashboards, and AI-driven waste reduction. IoT sensors can monitor air quality, noise, and emissions in real time.
10	<b>Compliance with Standards</b>	Integrate cybersecurity, data privacy (e.g., GDPR), and smart building certifications (e.g., LEED, WiredScore) into design and procurement.
11	<b>CAPEX &amp; OPEX Planning</b>	Budget for digital infrastructure (e.g., servers, sensors, licenses) and operational costs (e.g., cloud subscriptions, AI model training). ROI must consider agreed planning horizon and interest rate.
12	<b>Maintenance Strategy</b>	Define predictive and remote maintenance protocols using IoT and AI. Decide between internal teams or external managed service providers. Include lifecycle management including specifics related to digital management systems.

# BEST PRACTICES



# BEST PRACTICES

## Project Steering Culture and Active Premise Management

**Establish a checklist of project premises** and make it a routine part of planning. Set up point zero.

**Absence of information is also a valid premise.** Missing data triggers a flag for clarification and risk assessment.

**When a premise changes, team must initiate a structured evaluation.**

### BUSINESS REQUIREMENTS DOCUMENT TEMPLATE

**PROJECT DETAILS**

PROJECT NAME	DOCUMENT #
CREATOR	DATE
VERSION #	

**1. EXECUTIVE SUMMARY SNAPSHOT**

Provide an executive summary (overview of your business requirements) here. Your executive summary should be a "snapshot" of the purpose of your business requirements, including a brief description of any analysis, findings, project needs, scope, business drivers, proposed process, current process, and functional requirements. An executive summary provides an overview of a larger document or of research and is usually the first thing your reader will see. How can the questions you should answer when writing your business requirements executive summary:

- What is the goal (purpose) of this business requirements document?
- Who is the audience for this business requirements document?

**2. PROJECT DESCRIPTION**

In this section, describe the problem to which you are writing the business requirements document. Describe the project's purpose, what the reader can expect to find in the project, what the challenges are, and why you need a business requirements document.

**3. PROJECT SCOPE**

Provide a high-level description of the project's scope, including the project's goals, tasks, deliverables, constraints, assumptions, risks, and "out of scope" items for the project. The project's boundaries should be clearly defined to the reader of the project to help them understand the project's scope.

SCOPE ITEM	OUT OF SCOPE ITEM
Item 1	Item 1
Item 2	Item 2
Item 3	Item 3
Item 4	Item 4

**4. BUSINESS DRIVERS**

Identify the drivers (business goals) that are driving the project. Drivers are the primary reasons for the project's existence and are the primary reasons for the project's success. Drivers are the primary reasons for the project's success and are the primary reasons for the project's success.

Business Driver	Provide a detailed description for this driver.
Business Driver 1	Provide a detailed description for this driver.
Business Driver 2	Provide a detailed description for this driver.
Business Driver 3	Provide a detailed description for this driver.
Business Driver 4	Provide a detailed description for this driver.

**5. PRESENT PROCESS**

Provide a brief overview of your current process for addressing the primary issue your project attempts to solve. How has it been designed, developed, or implemented?

**6. PROPOSED PROCESS**

Provide a brief overview of the proposed process for addressing the primary issue your project attempts to solve. How has it been designed, developed, or implemented? Provide a brief overview of the proposed process for addressing the primary issue your project attempts to solve. How has it been designed, developed, or implemented?

**7. FUNCTIONAL REQUIREMENTS**

Identify the functional requirements (features) that are driving the project. Functional requirements are the primary reasons for the project's existence and are the primary reasons for the project's success.

**8. NON-FUNCTIONAL REQUIREMENTS**

Identify the non-functional requirements (constraints) that are driving the project. Non-functional requirements are the primary reasons for the project's existence and are the primary reasons for the project's success.

ID	REQUIREMENT

**9. GLOSSARY**

Provide a brief overview of the terms, abbreviations, and acronyms that you include in this document.

TERM/ABBREVIATION	DEFINITION

**10. REFERENCES**

Provide a list of references (websites, documents, etc.) throughout the document.

NAME	LOCATION

**PROJECT**

Use the following table to identify the project's primary goals, objectives, and outcomes. Use the table to identify the project's primary goals, objectives, and outcomes.

NUMBER	STATE	DESCRIPTION
1	Initiation	The project is initiated by the project manager.
2	Plan	The project manager identifies the project's goals and objectives.
3	Execute	The project manager executes the project's tasks and activities.
4	Monitor	The project manager monitors the project's progress and performance.
5	Close	The project manager closes the project and its activities.

**CATEGORIES (RCS)**

ID	REQUIREMENT	PROJECT	STATUS

Source: [smartsheet.com](https://smartsheet.com)

**Awareness of the premises on which the solution is made, contracted or communicated is crucial and often underestimated.**

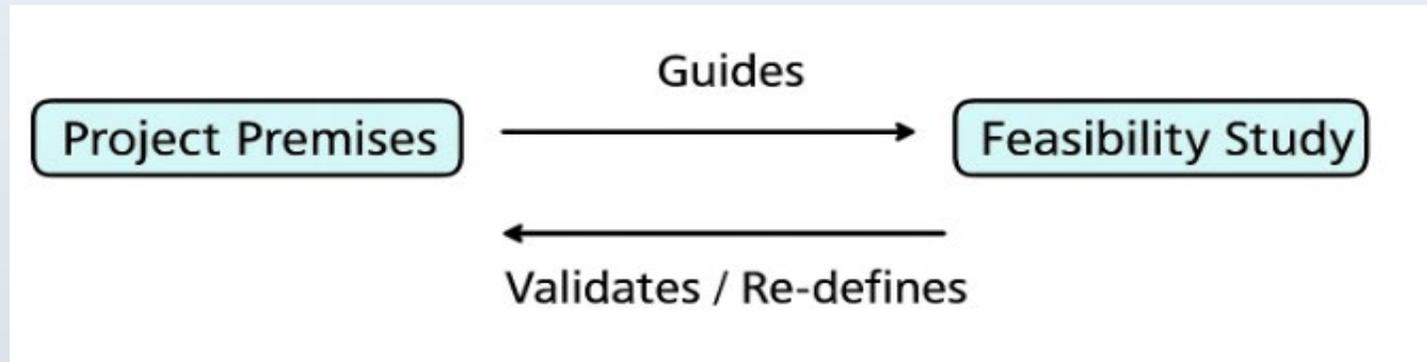
# BEST PRACTICES

## Feasibility as the First Filter

**Feasibility study** assess **whether the proposed solution is viable**, including site conditions, market demand, regulations, and infrastructure availability. **Digital twins and dynamic simulation are instruments to confirm feasibility.**

**Feasibility findings may halt or adjust the proposed solution and business case, which is a valid outcome.**

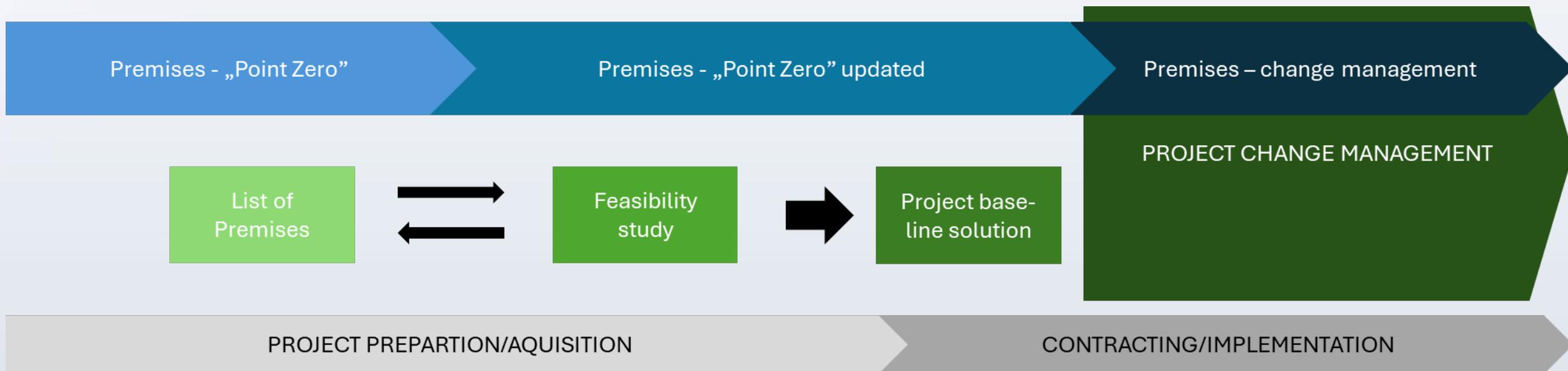
**Interconnection of feasibility study and premises is powerful.** Feasibility study **establishes a new “point zero”**, as it confirms, or redefines premises based on findings. This dynamic creates a feedback loop, **decreasing uncertainty and future risks.**



For example, if the initial premise assumes a three-shift operation, the feasibility study will test its against labour availability, energy costs, and equipment wear rates. **The study shows stakeholders corresponding impact to time, cost, and risks.**

# BEST PRACTICES

## Premises Role in Project Development



When feasibility study is skipped, **the “point zero” premises are transferred directly to project implementation.** In this situation, baseline solution is assumed without prior validation, introducing elevated risks.

# BEST PRACTICES

## Establishment of Project Interfaces

1st step - understand functional interdependencies – **key input for one function must be planned as the output from another function.**

2nd step - **standardization of data interchange formats and communication channels.** These standards define the speaking partners, shared data storage locations, and the methods of communication (e.g., structured meetings, formal handover documents).

**Assumptions are made by the data provider, not the receiver.** Receiving function should not interpret or extrapolate beyond what is provided.

### PROJECT CHECKLIST TEMPLATE

PROJECT NAME				PROJECT MANAGER		
TASK COMPLETE?	PRIORITY	STATUS	TASK / DELIVERABLE	ASSIGNED TO	DATE DUE	NOTES
			PHASE 1		00/00/00	Running ahead of schedule
No	Low	Overdue	Task 1		00/00/00	
No	Medium	Not Started	Task 2		00/00/00	
Yes	High	Complete	Task 3		00/00/00	
No	Medium	Needs Review	Task 4		00/00/00	Awaiting mngr approval
No	High	Approved	Task 5		00/00/00	
No	Low	On Hold	Task 6		00/00/00	
			PHASE 2			
Yes	Medium	Complete	Task 1			
No	Low	In Progress	Task 2			

Source: [smartsheet.com](https://smartsheet.com)

# BEST PRACTICES

## Establishing a Robust Design

**Robust design is key for future-proof facility. Project premises must comply.**

**Digital twins and dynamic simulation** is ideal instrument to prove long-term adaptability.

For instance, to comply with:

- product requirements and production volumes, which dictate layout, equipment sizing, and automation levels
- operational regime - single-shift, multi-shift, or continuous, must be reflected in space planning and energy systems
- purchasing strategy must ensure supply chain resilience
- manufacturing concept – automation level, modularity, and digital integration based on product complexity, labour availability, and scalability goals
- environmental and sustainability goals must be incorporated early, including energy-efficient HVAC, waste segregation zones, and renewable energy options
- international and local standards, such as CE marking, fire codes, and occupational safety regulations must be verified during design reviews



## TAKE AWAYS

- 1. Establish "point zero,"** evaluate changes transparently, use digital twings for decision making -> transform uncertainty into clarity and managed expectations.
- 2. Perform Feasibility Study** to redefine project premises, validate assumptions, turn them into facts. verify by dynamic simulation and digital twins.
- 3. Manage Project Interfaces,** define inputs and outputs, standardized data exchange formats, and ownership of information.
- 4. Consider Robust Design** -> facility to be resilient to future demands.
- 5. Launch digitalization based on business case, in compliance to long-term strategic goals.**

**Before we fly, let's make sure we've fully exhausted the potential of running.**



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THANK YOU!



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