

Module Modeling and Analysis: Simulation

by *Gerrit Muller* HSN-NISE

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

Abstract

This module addresses Modeling and Analysis Simulation. Especially light weight simulation is discussed.

Module Content

goal of this module

to be able to decide when to go from modeling to simulation

to understand success factor for simulation

content of this module

High level method

Success factors for simulation

exercise

Threads of Reasoning

Light Weight Simulation

by *Gerrit Muller* University of South-Eastern Norway-NISE

e-mail: `gaudisite@gmail.com`

`www.gaudisite.nl`

Abstract

Many simulations suffer from the fact that the investment and the maintenance costs more than the harvested value of the simulation results. In this presentation we show a light-weight approach to simulation. Key success factors are discussed to keep the simulation light-weight and to get useful results nevertheless.

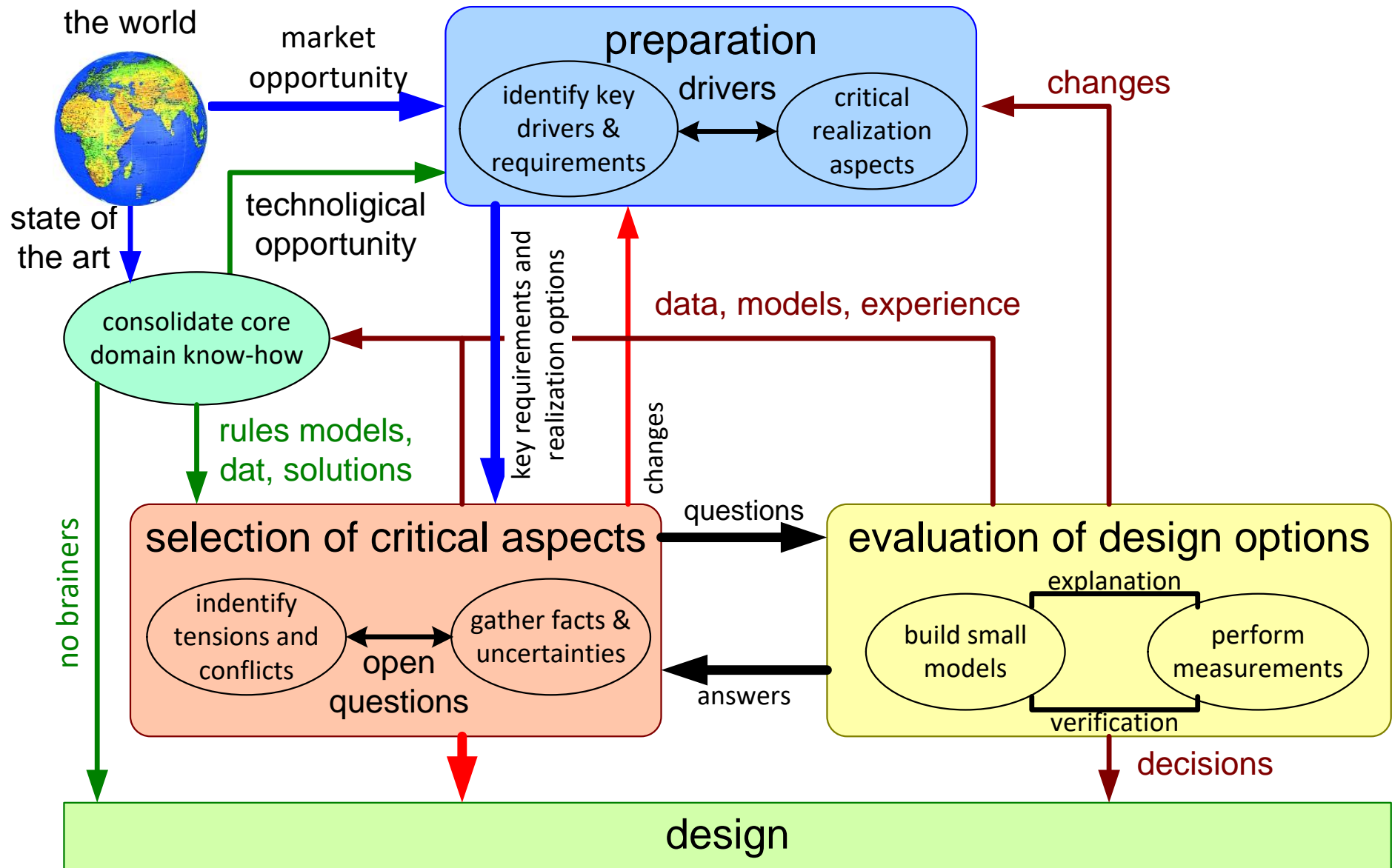
Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

August 16, 2025
status: planned
version: 0.1

logo
TBD

High Level Method

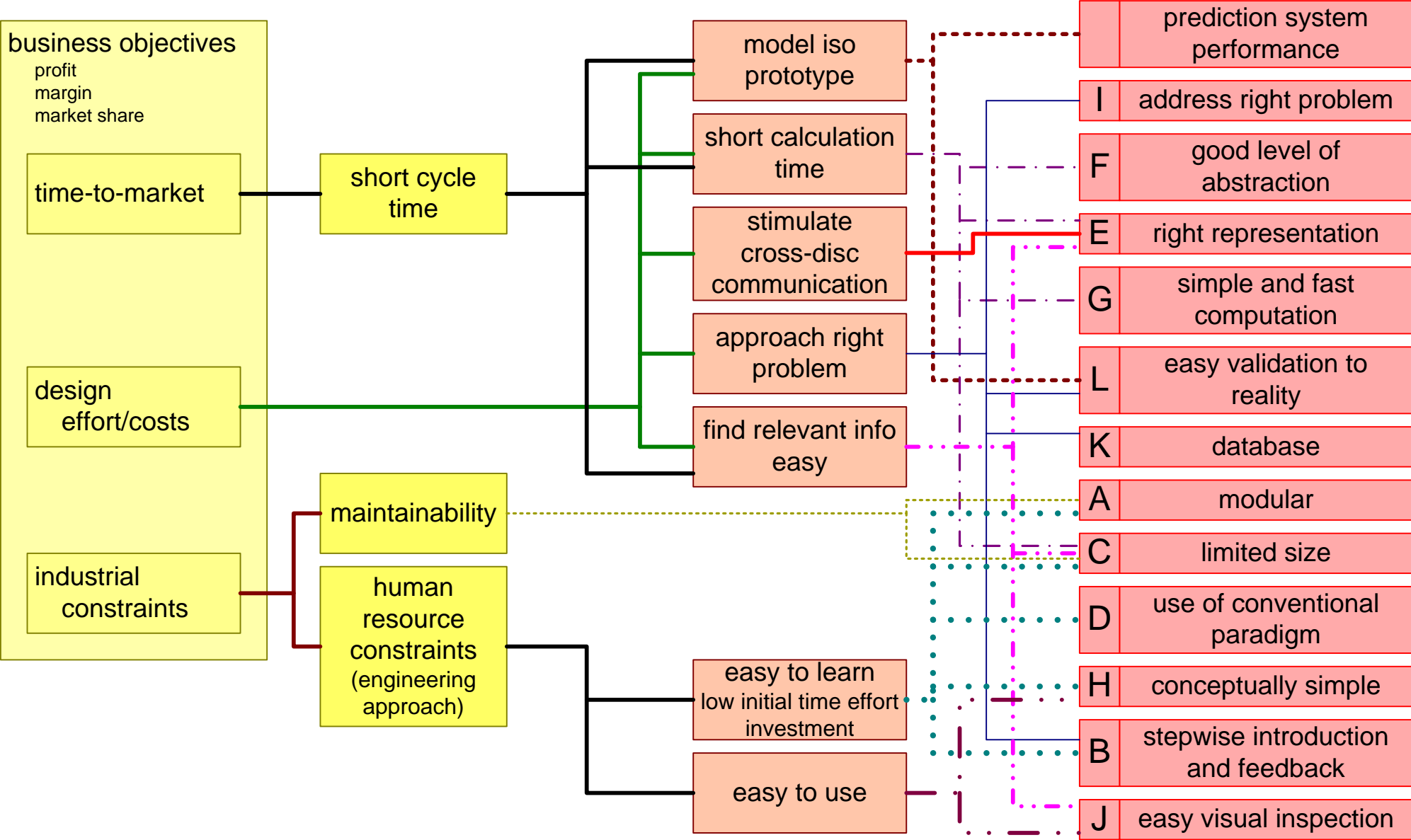


High Level Method Stepwise

1A. Identify (customer) key drivers	in terms of stakeholders and concerns
1B. Identify critical realization aspects	for instance due to cost, performance, robustness, technological maturity, et cetera
1C. Consolidate core domain know how	make implicit know how explicit
2A. Identify tensions and conflicts	
2B. Gather facts, identify uncertainties	figures of merit, design rules
3A. Build small models <i>hours .. weeks</i>	addressing tensions, using facts, and creating insight in the uncertainties
3B. Perform measurements	for calibration and validation

- Iterate many times
- Provide overview by means of visualizations

Success Factors Light Weight Simulation



Light weight simulation is based on research performed in the *Boderc* project.

Especially the work of

Jan Beckers (Océ) and *Maurice Heemels* (ESI)

has contributed.

Make a threads of reasoning graph

- Identify critical or sensitive design and technology issues
- Use key driver graph
- Identify tensions
- Extract the essential relations

- +The "big picture" is created
- +The rationale of choices is made explicit
- ~ It is not easy to get order in the huge chaos
- ? Did we extract the essence?

Conclusions

Simple goal-driven simulations are effective

The simulation stays close to the domain

Good simulations are created incrementally

Techniques, Models, Heuristics of this module

Success factors for simulation

Good simulations are domain dependent

Simulation modularity