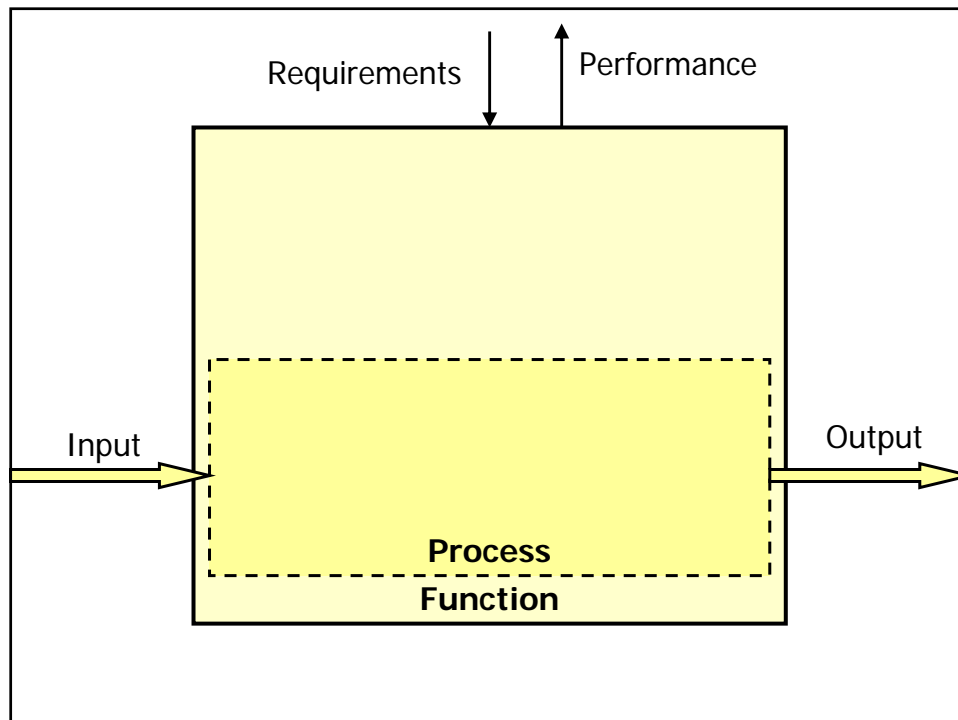
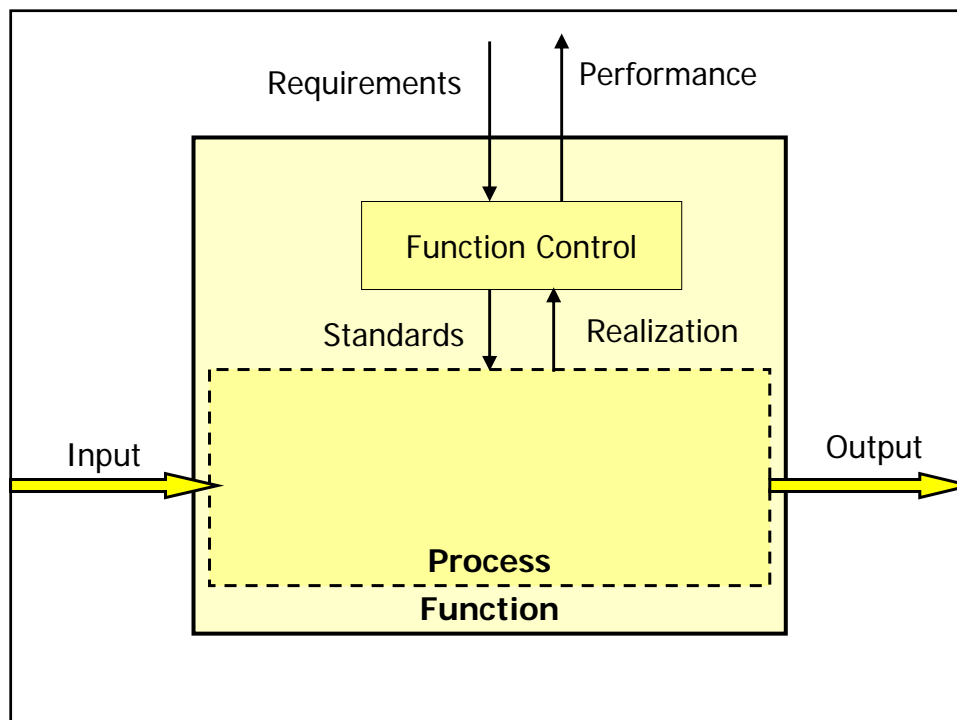


A function is physically realized by a process



A function is physically realized by a process

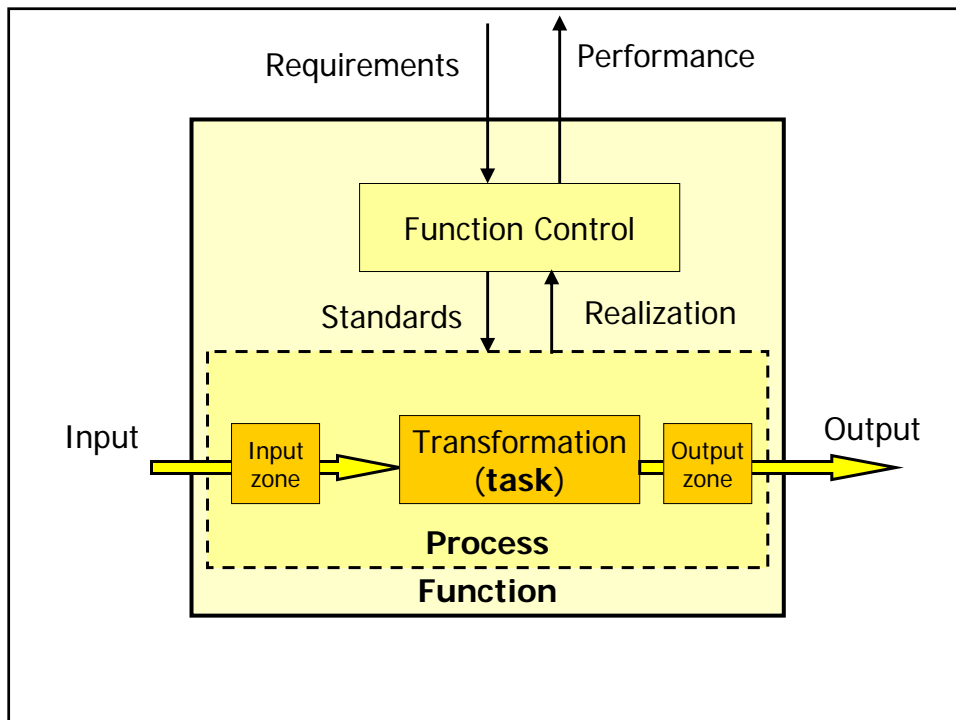
The performance should be achieved in a controlled way (Control paradigm)



A function is physically realized by a process

The performance should be achieved in a controlled way (Control paradigm)

The process "transforms" "correct" input into "correct" output.

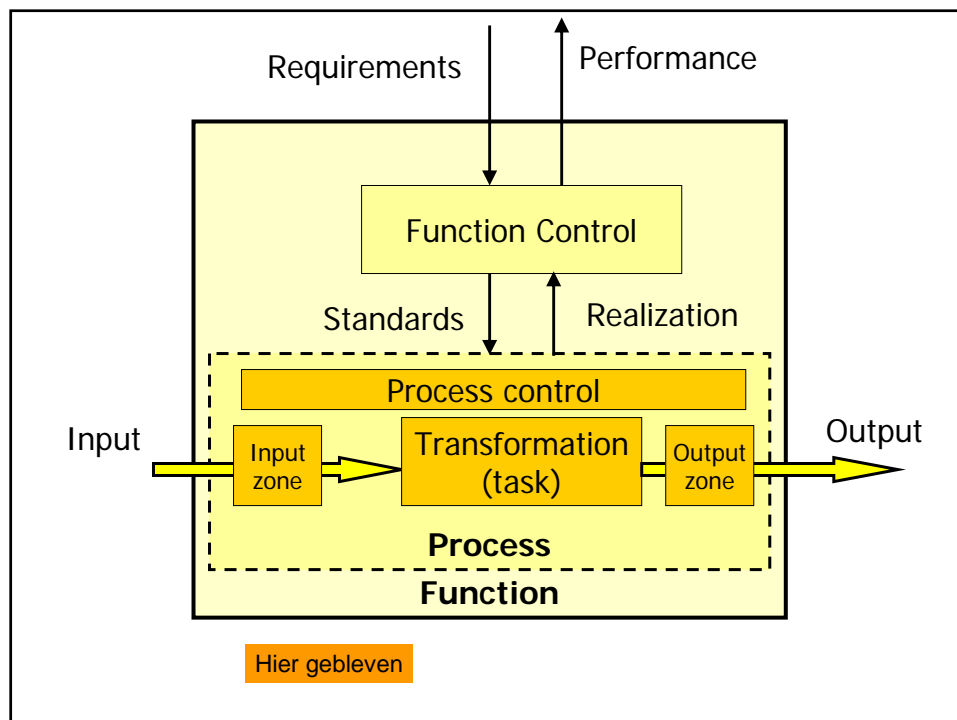


A function is physically realized by a process

The performance should be achieved in a controlled way (Control paradigm)

A single execution of the process  
"transforms" "correct" input into "correct"  
output.

Repeated transformations should achieve  
the required result.



**Function** expresses the *goal*

**Process** expresses the *repetition* of actions

**Transformation** expresses the single *action*

**Task** is a transformation with a specific *resource*

Systems Approach is primarily used

to ANALYZE a problem

The analysis is successful if

- The **cause** of the problem has been found
- The problem can be **reformulated** in terms of a solution

**Realization** is the result of  
**process and process control**

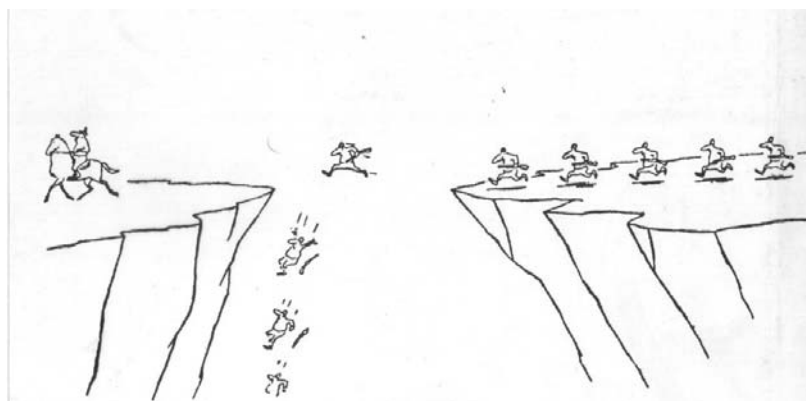
**Performance** is the result of  
**realization and function control**

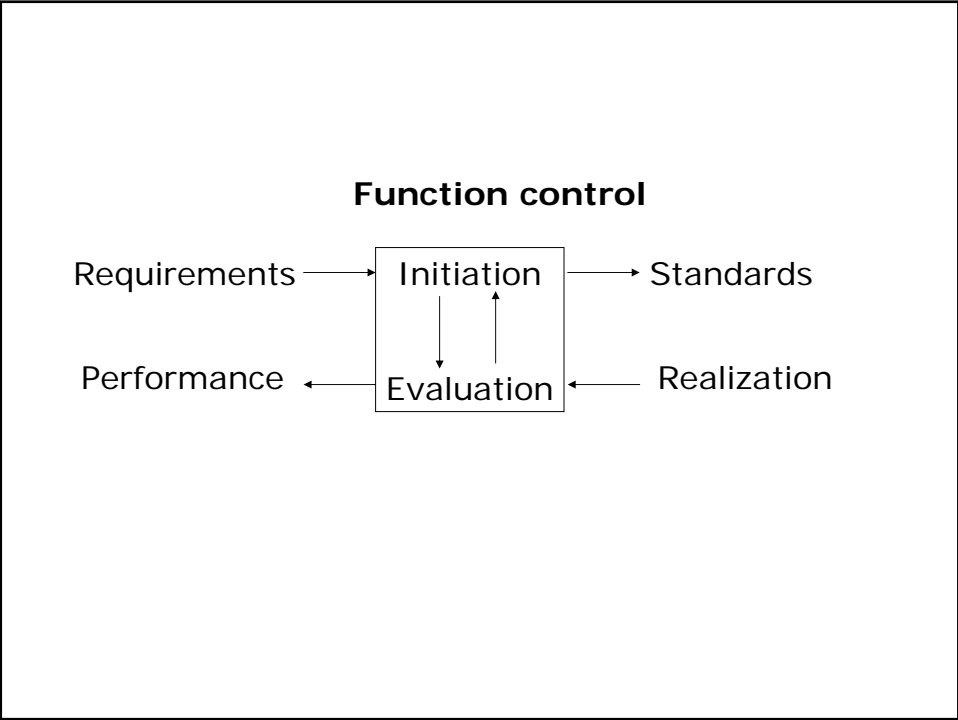
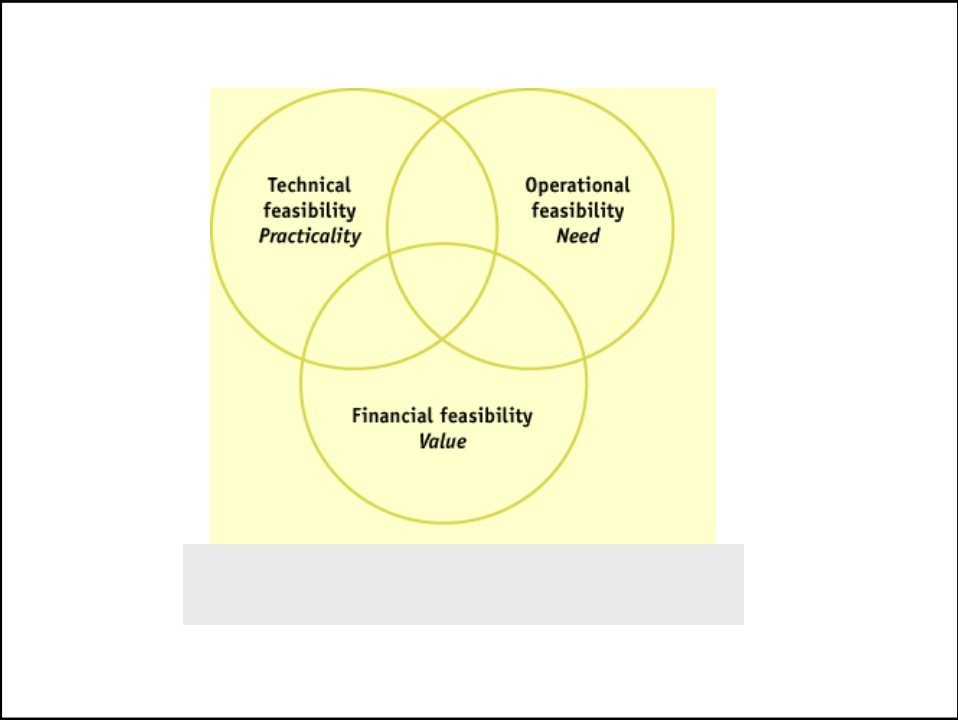
**System control:**

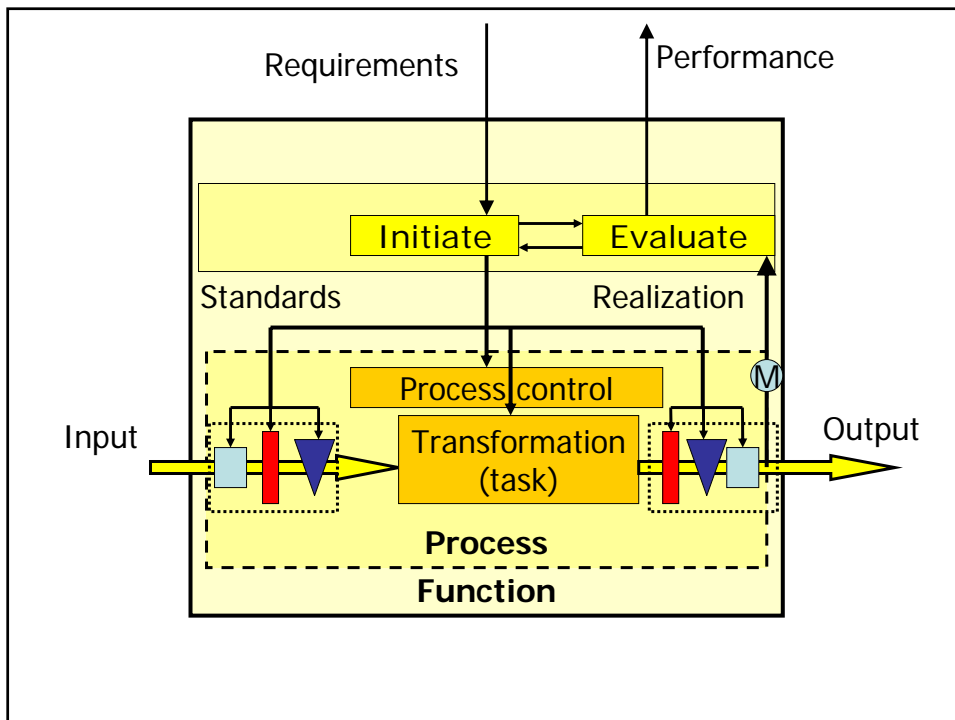
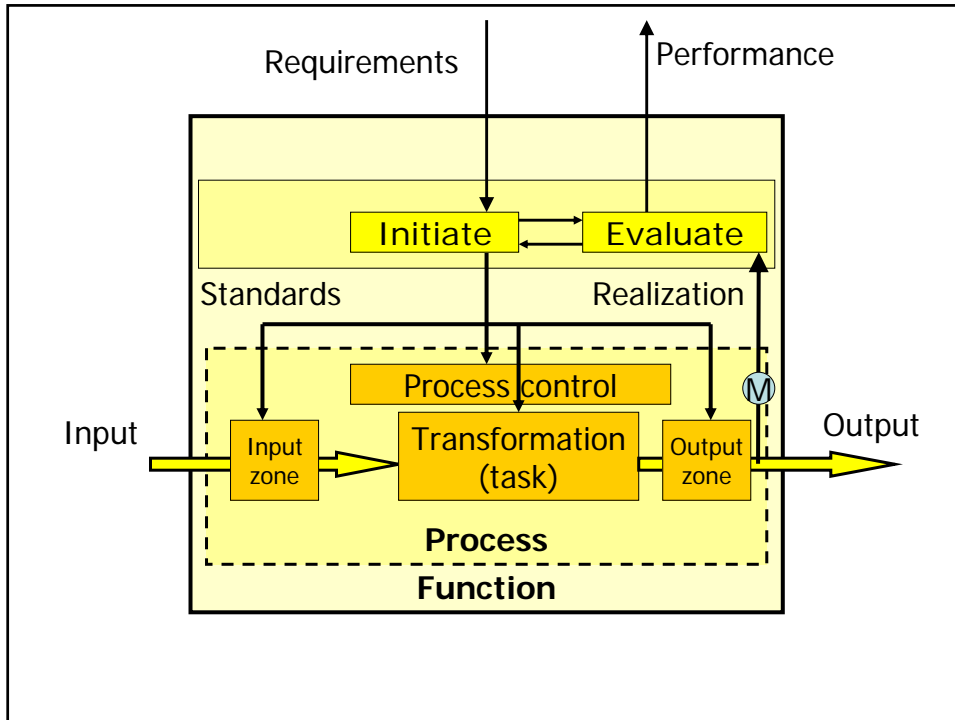
1. Function Control
2. Process Control

### System control

- the system needs a **target** state in order to achieve the goal
  - the system must be **capable** of achieving the target state
- FEASIBILITY







Standards depend on:

- Requirements
- Expectations (or model) of the process behavior
- Realizations of the past

Function control is

a medium- to long-term feedback loop

to match functionality and reality.

It does NOT react to individual circumstances!!!

*(don't confuse statistics with individual instances)*

The goal of initiating is  
*to derive feasible standards*

The goal of evaluation is  
*to preserve the feasibility*

**Function control** is sufficient  
iff there are no disturbances

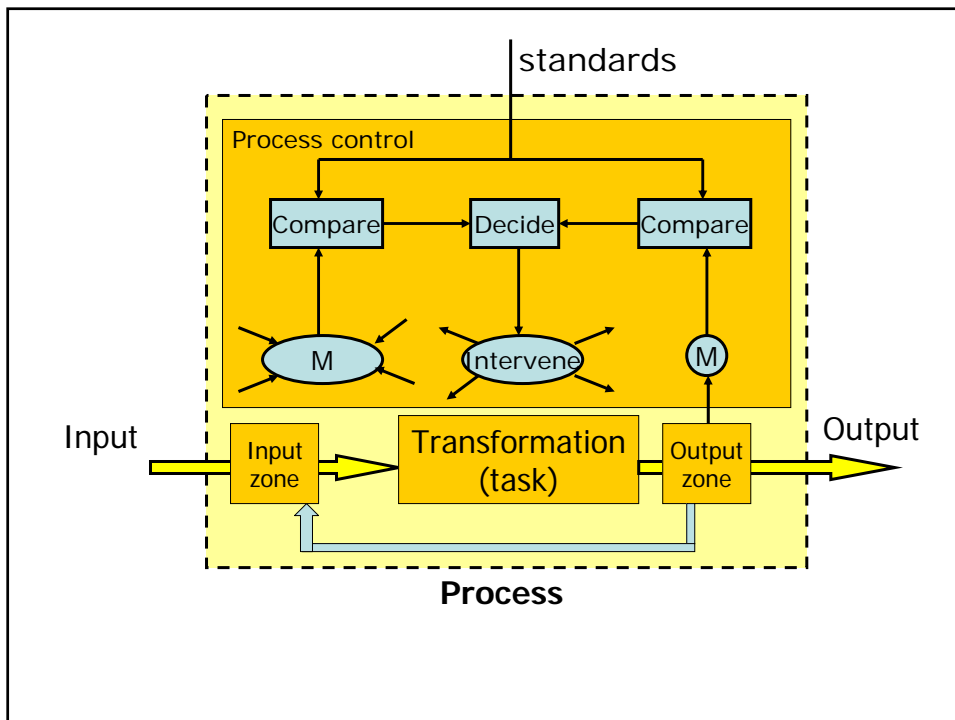
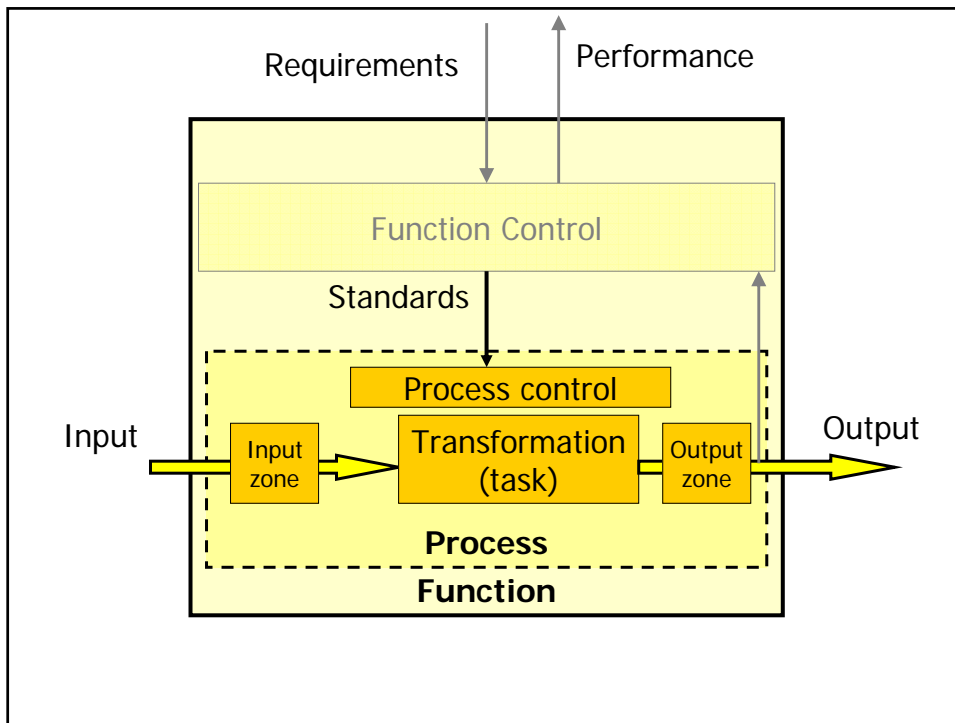
The function of **process control**  
is to deal with disturbances  
in processing

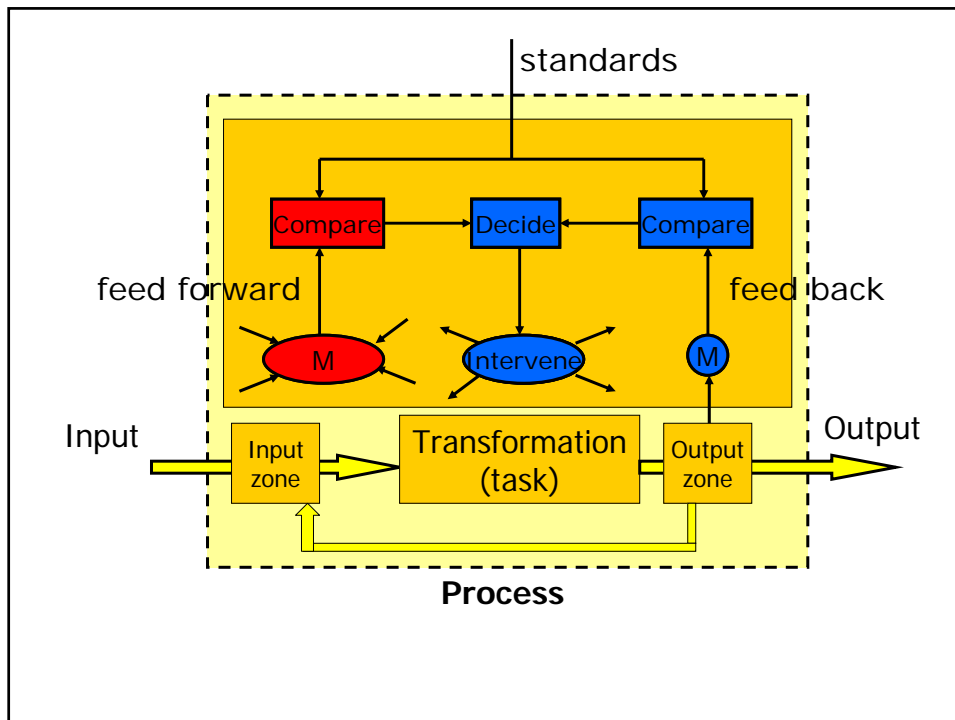
We all make mistakes,  
so now and then.



### System control

- the system needs a **target** state
- the system must be **capable** of achieving the target state
- It should be possible to influence the behavior of the system



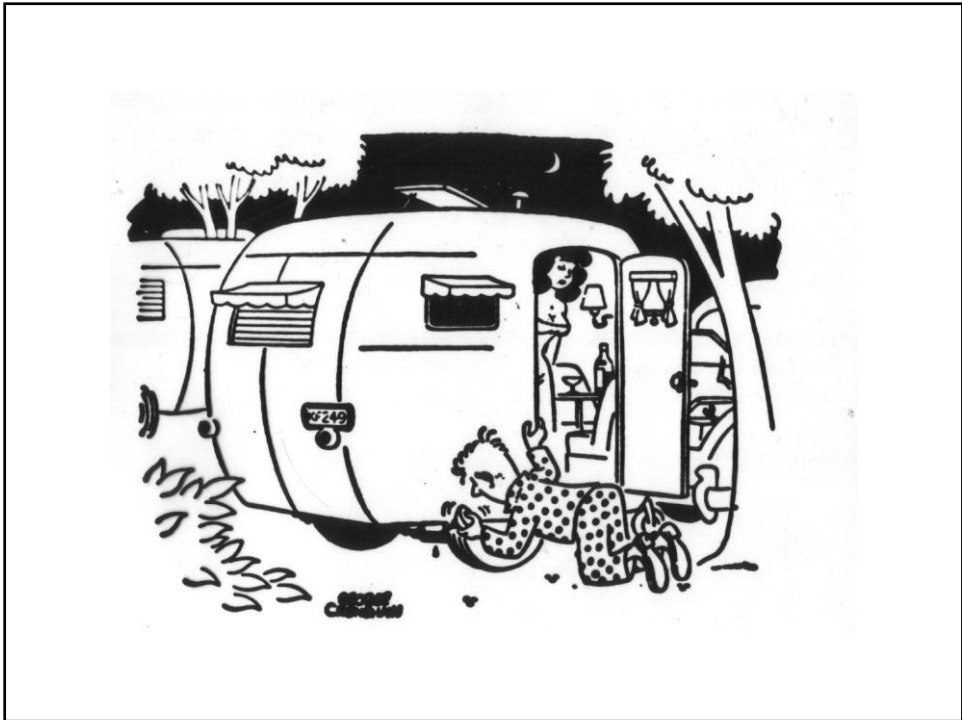
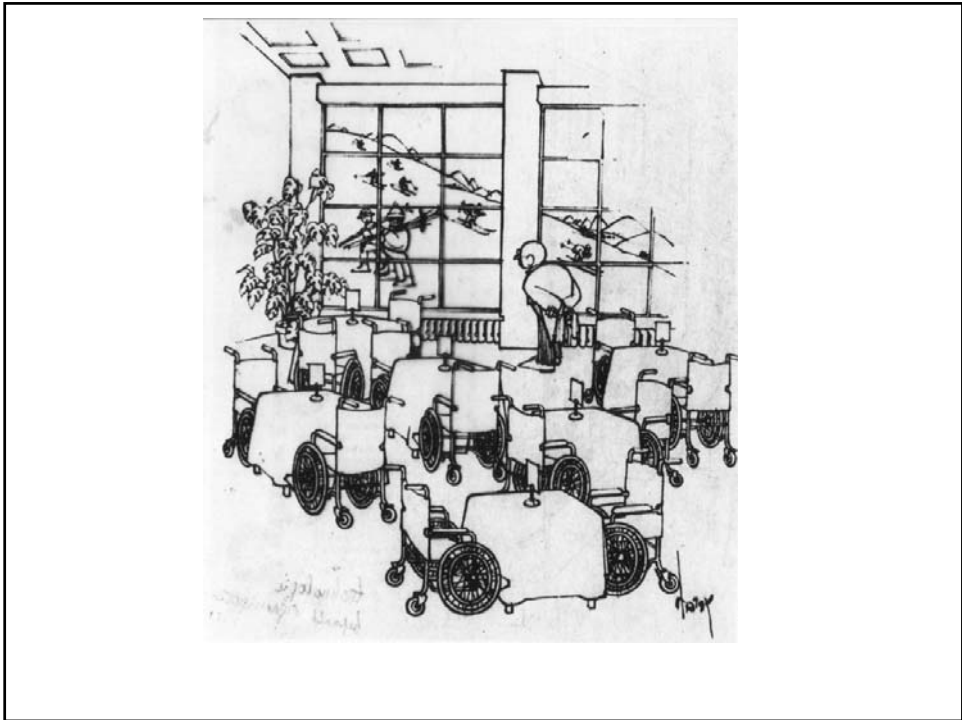


**Feed forward:**

**cause determines the intervention**

**Feed back:**

**result determines intervention**



System with feedforward only:

A company spends €100.000,- a year on advertisements.

Risks:

- The company spends too much
- The company spends too little

System with feedback:

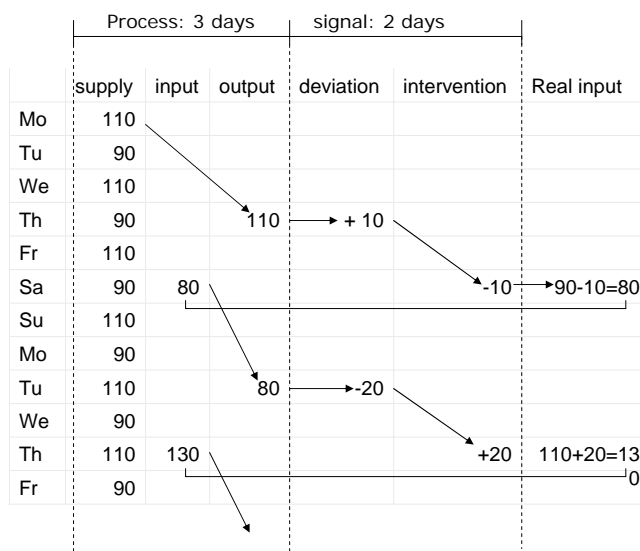
A company keeps on advertising until 10% of the market knows their product.

Everytime polls show that their reputation decreasing they automatically start advertising.

**“Time”** is important with feedback:

- the throughput time of the process
- the throughput time of the control loop

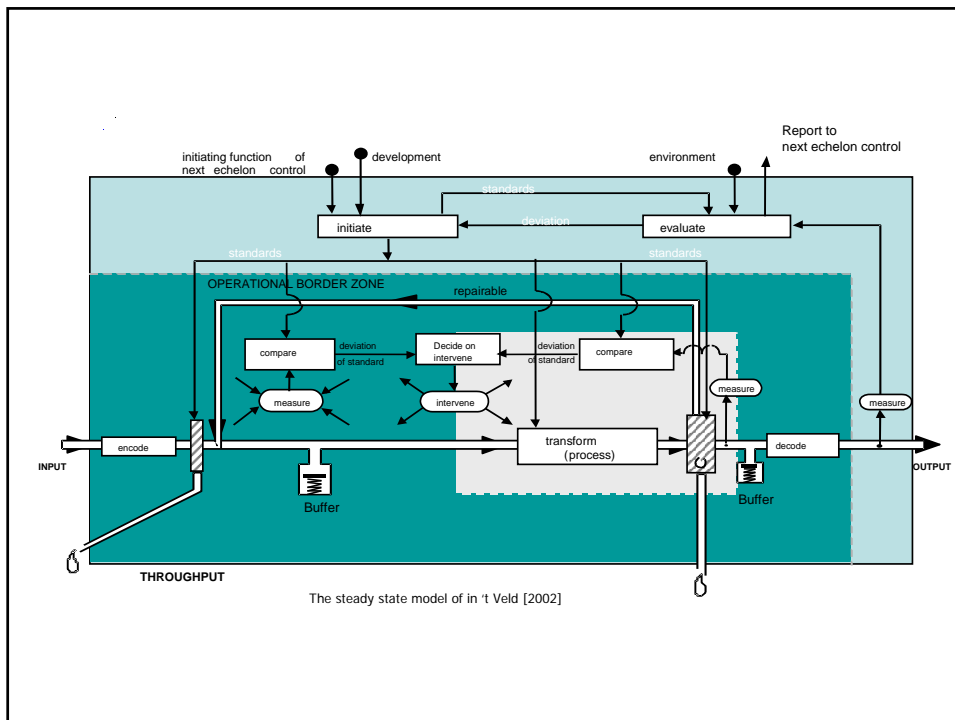
The cause may have changed, before the intervention takes place



positive feedback: acceleration

negative feedback: deceleration

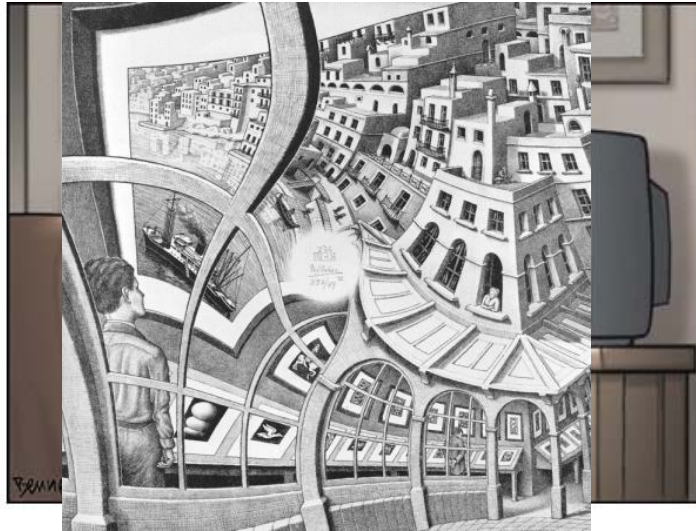
feed forward: you need to know the  
causes beforehand: you need standards



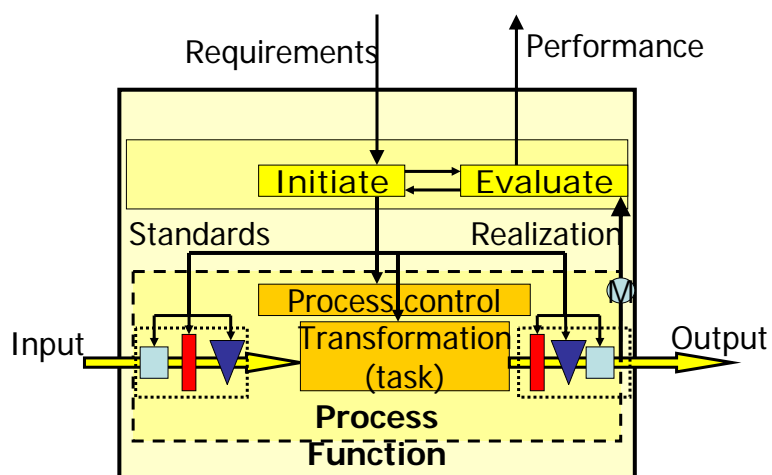
Property:

Each function inside the steady state model is a complete function again.

Droste  
effect



### "Opening a function"



Whenever you **open** a function you may always find:

- Transformation
  - Encoding/Decoding
  - Filter
  - Buffer
  - Process control
  - Function control
- functions

