

Module Platform and Evolvability; Process and People

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Abstract

This module provides processes and insights in people, processes and organization issues for evolvable platforms.

Product Families and Generic Aspects

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Abstract

Most products fit in a larger family of products. The members of such a product family share a lot of functionality and features. It is attractive to share implementations, designs et cetera between those members to increase the efficiency of the entire company.

In practice many difficulties pop up when product developments become coupled, due to the partial developments which are shared. This article discusses the advantages and disadvantages of a family approach based on shared developments and provides some methods to increase the chance on success.

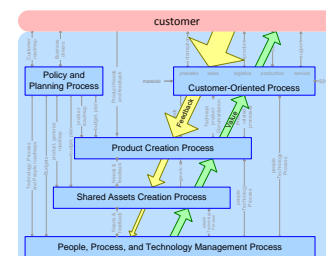
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December 31, 2017

status: concept

version: 2.3



Typical Examples of Generic Developments

Platform

Common components

Standard design

Framework

Family architecture

Generic aspects, functions, or features

Reuse

Products (in project environment)

Claimed Advantages of Generic Developments

Reduced time to market	building on shared components
Reduced cost per function	build every function only once
Improved quality	maturing realization
Improved reliability	
Improved predictability	
Easier diversity management	modularity
Increases uniformity	less learning
Employees only have to understand one base system	
Larger purchasing power	economy of scale
Means to consolidate knowledge	
Increase added value	not reinventing existing functionality
Enables parallel developments of multiple products	
“Free” feature propagation	product-to-product or project-to-project

Experiences with reuse, from counterproductive to effective

bad

longer time to market
high investments
lots of maintenance
poor quality
poor reliability
diversity is opposed
lot of know how required
predictable too late
dependability
knowledge dilution
lack of market focus
interference
but integration required

good

reduced time to market
reduced investment
reduced (shared) maintenance cost
improved quality
improved reliability
easier diversity management
understanding of one base system
improved predictability
larger purchasing power
means to consolidate knowledge
increase added value
enables parallel developments
free feature propagation

Successful examples of reuse

homogeneous domain

cath lab
MRI
television
waferstepper

hardware dominated

car
airplane
shaver
television

limited scope

audio codec
compression library
streaming library

Limits of successful reuse

struggle with integration/convergence with other domains

TV: digital networks and media
cath lab: US imaging, MRI

poor/slow response on paradigm shifts

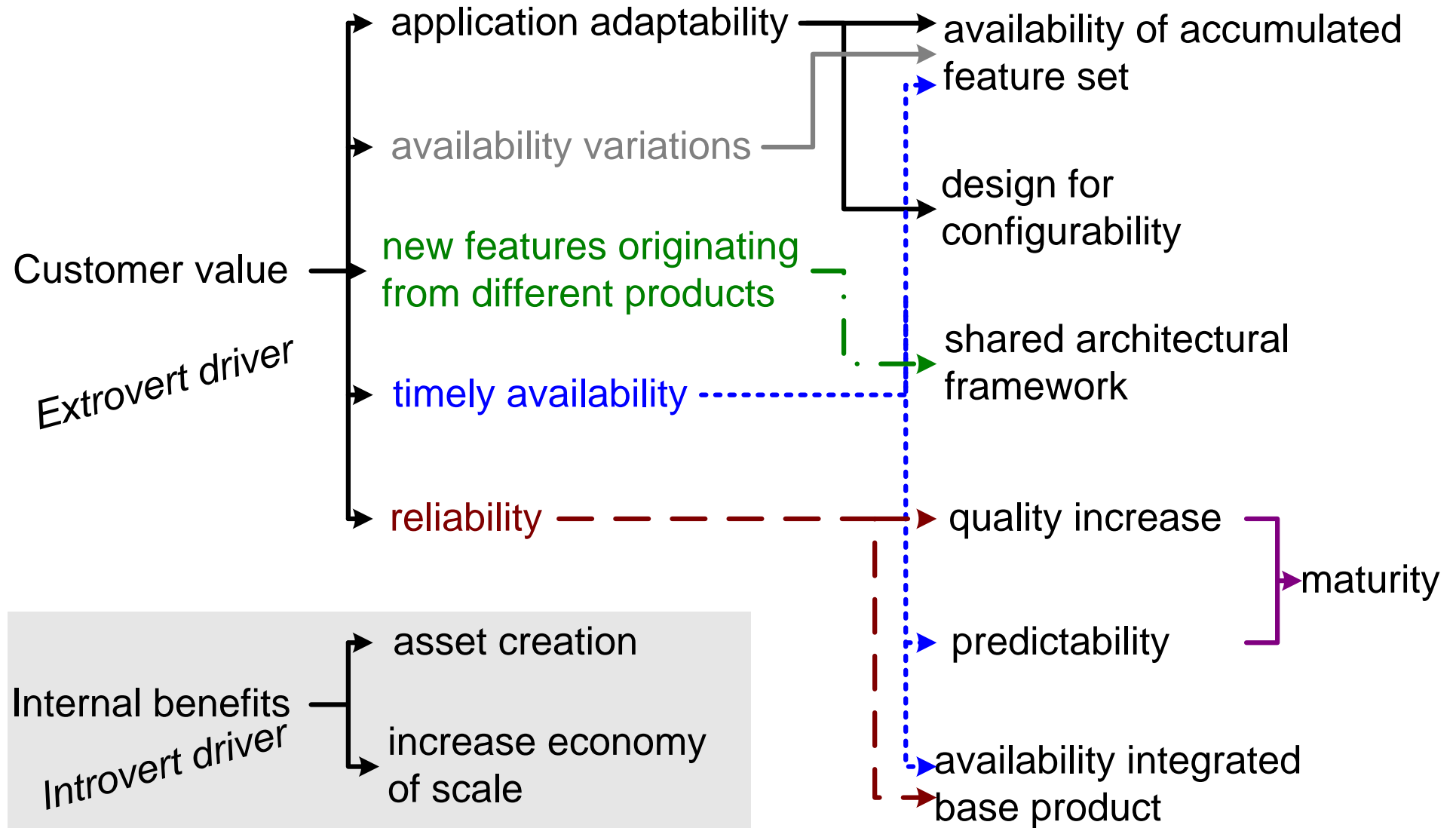
TV: LCD screens
cath lab: image based acquisition control

software maintenance, configurations, integration, release

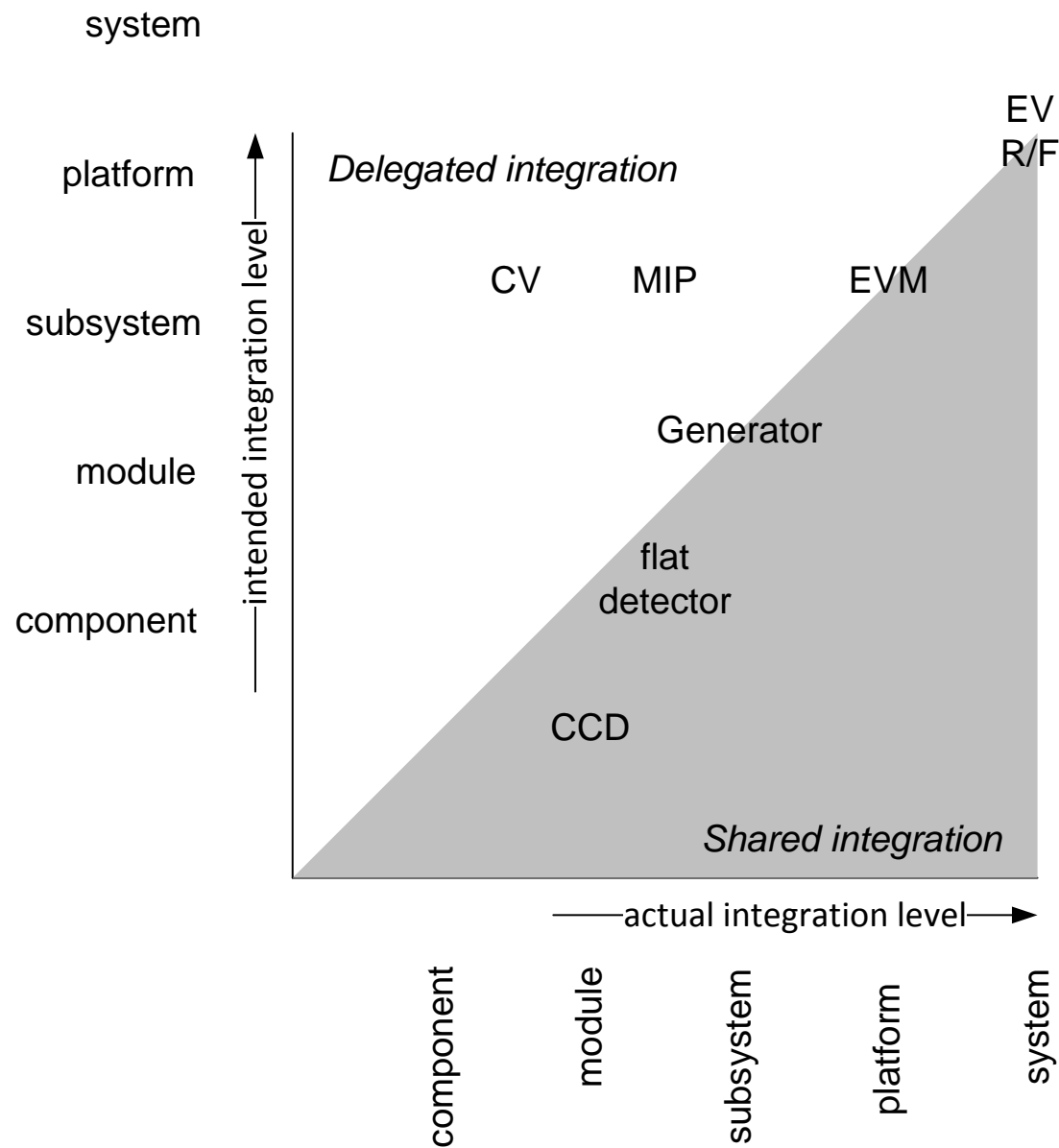
MRI: integration and test
wafersteppers: number of configurations

how to innovate?

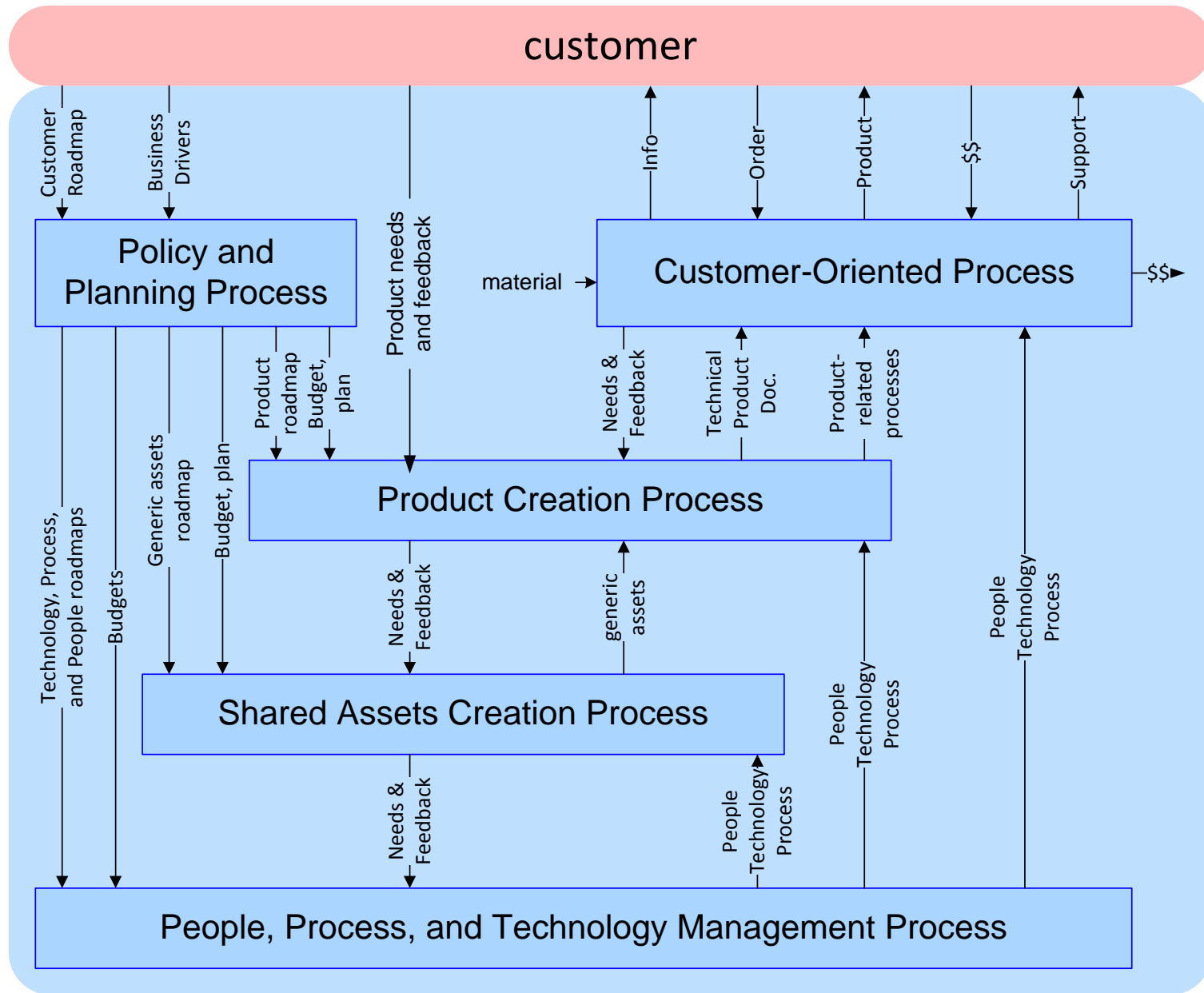
Drivers for Generic Developments



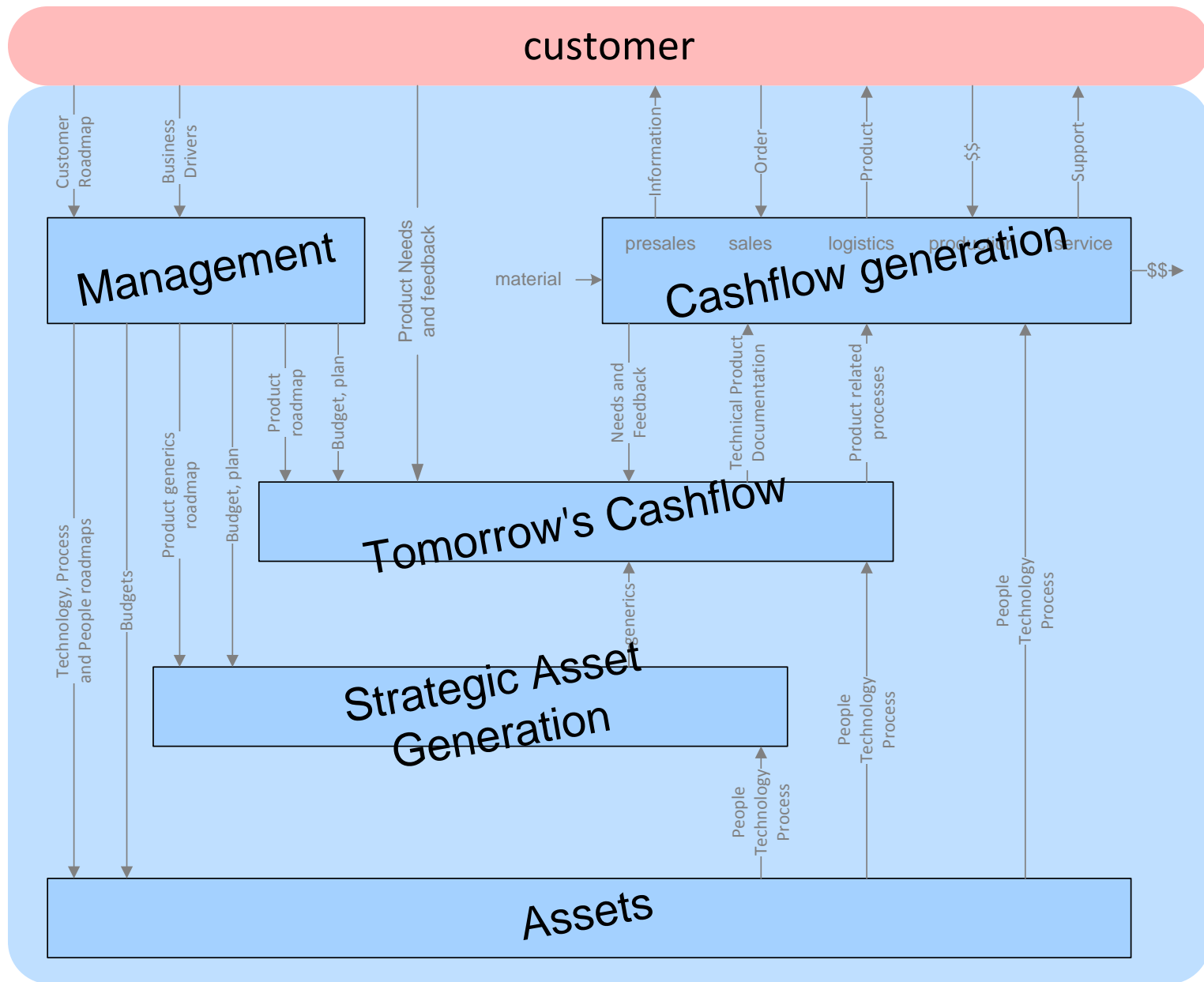
Granularity of generic developments shown in 2 dimensions



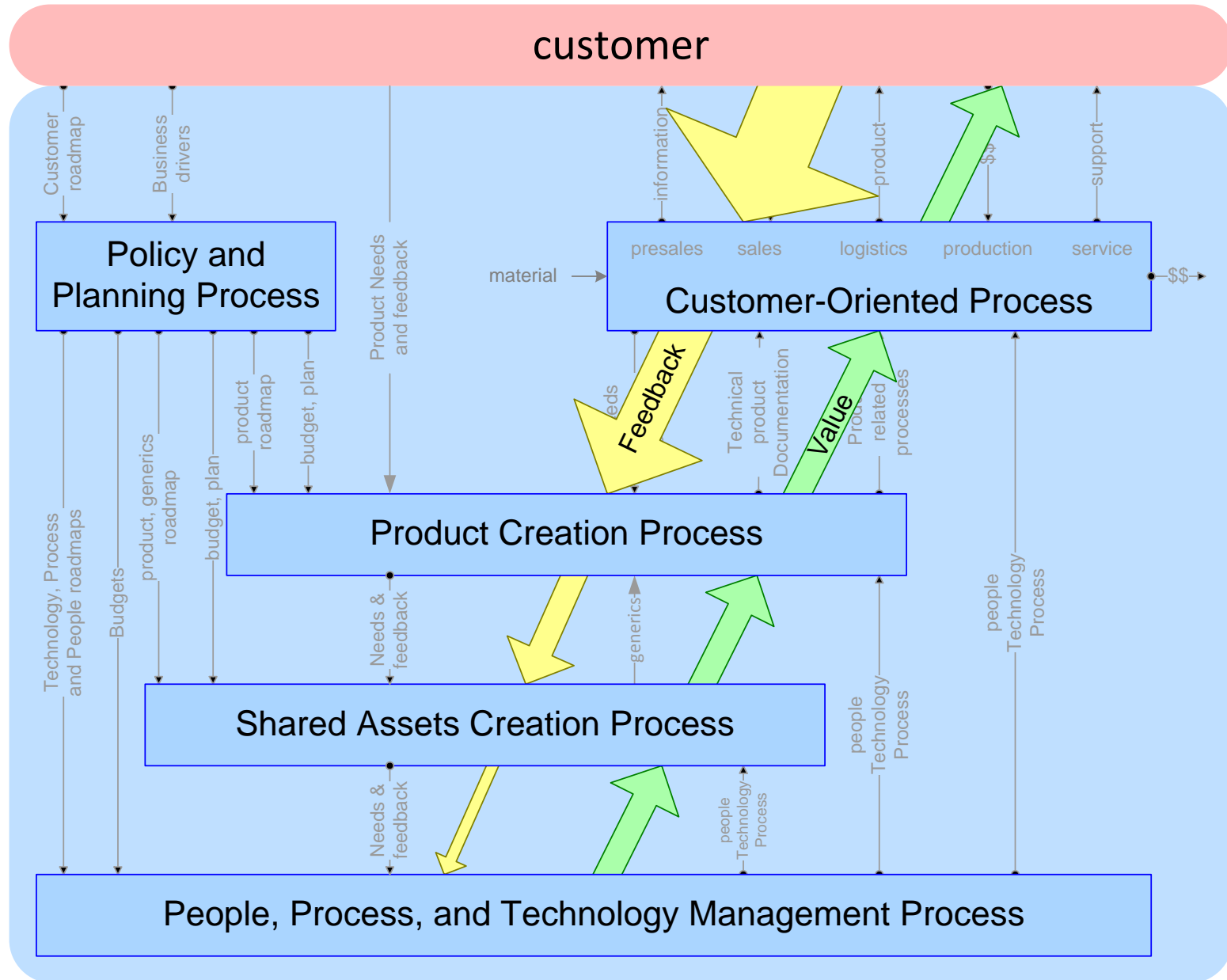
Modified Process Decomposition



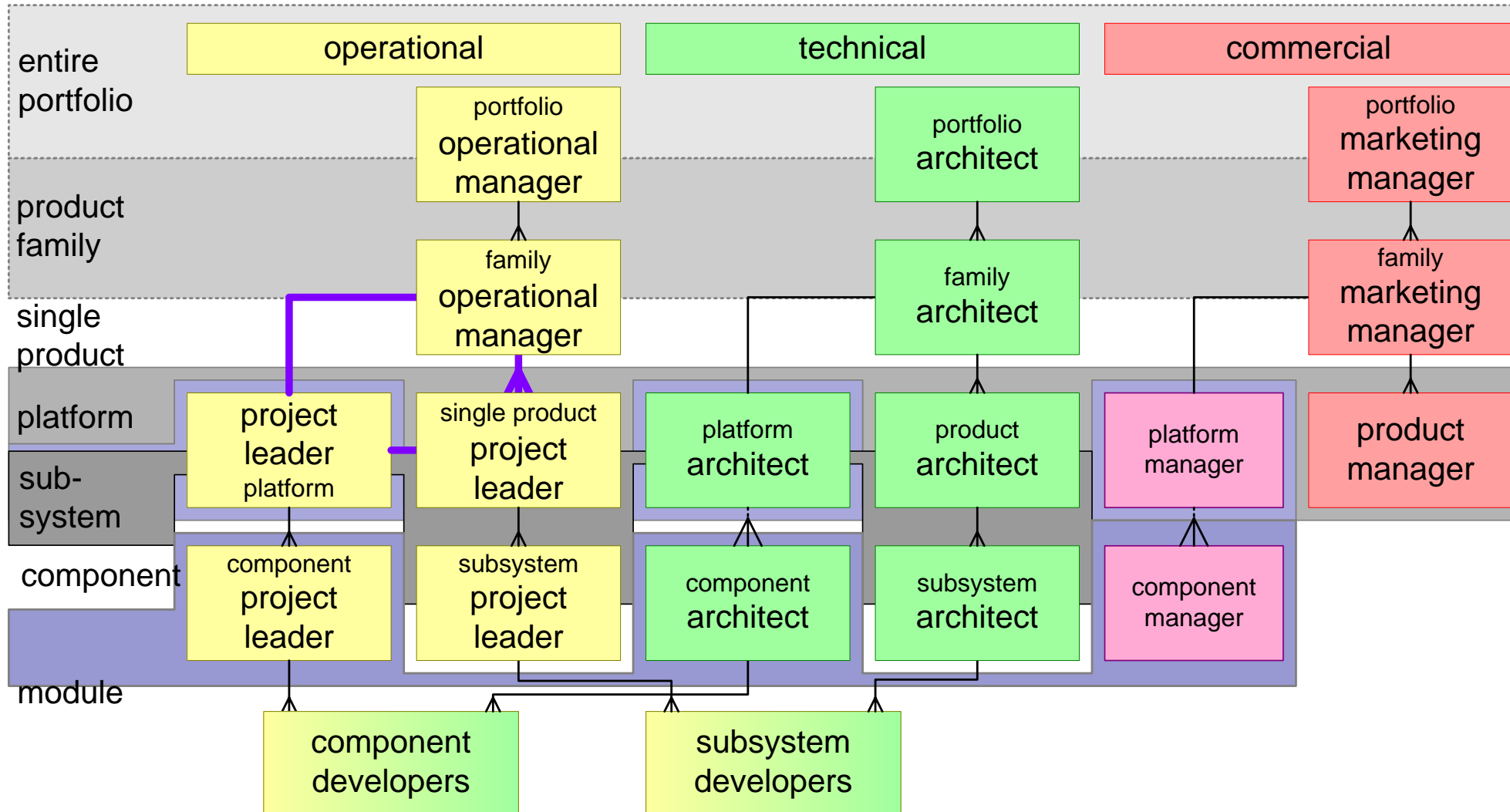
Financial Viewpoint on Process Decomposition



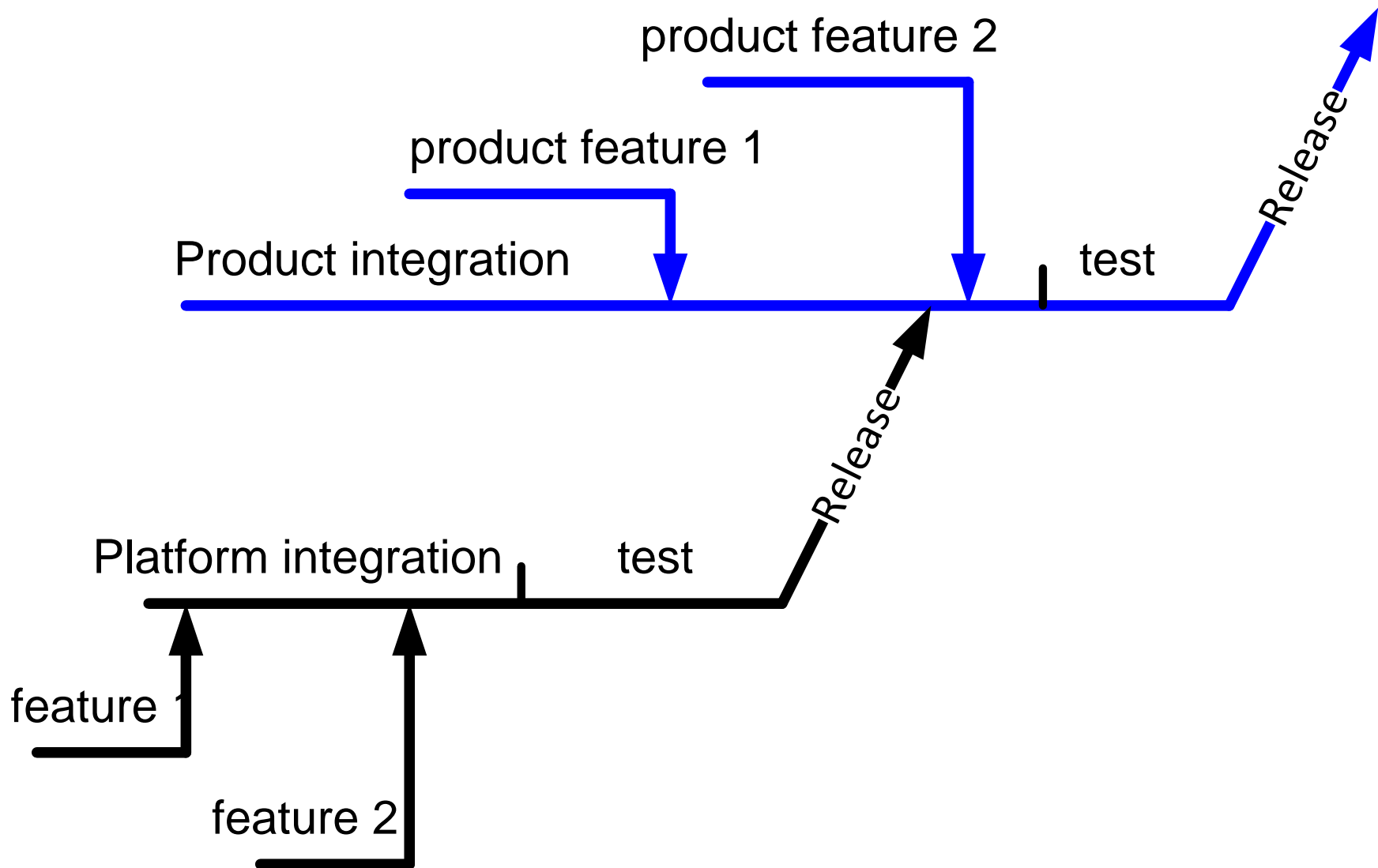
Value and Feedback Flow



Modified Operational Organization PCP



Propagation Delay Platform Feature to Market



Sources of Failure in Generic Developments

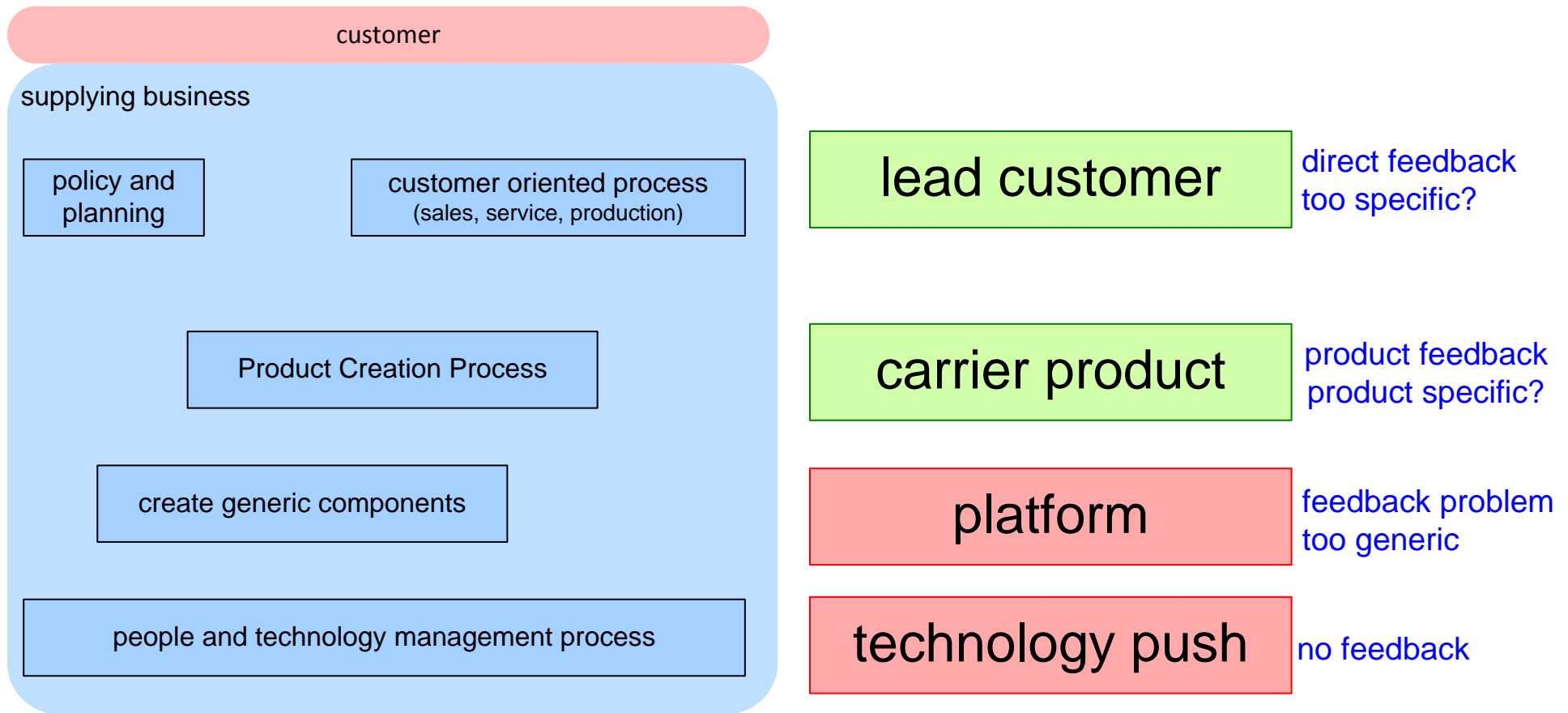
Technical

- Too generic
- Innovation stops (stable interfaces)
- Vulnerability

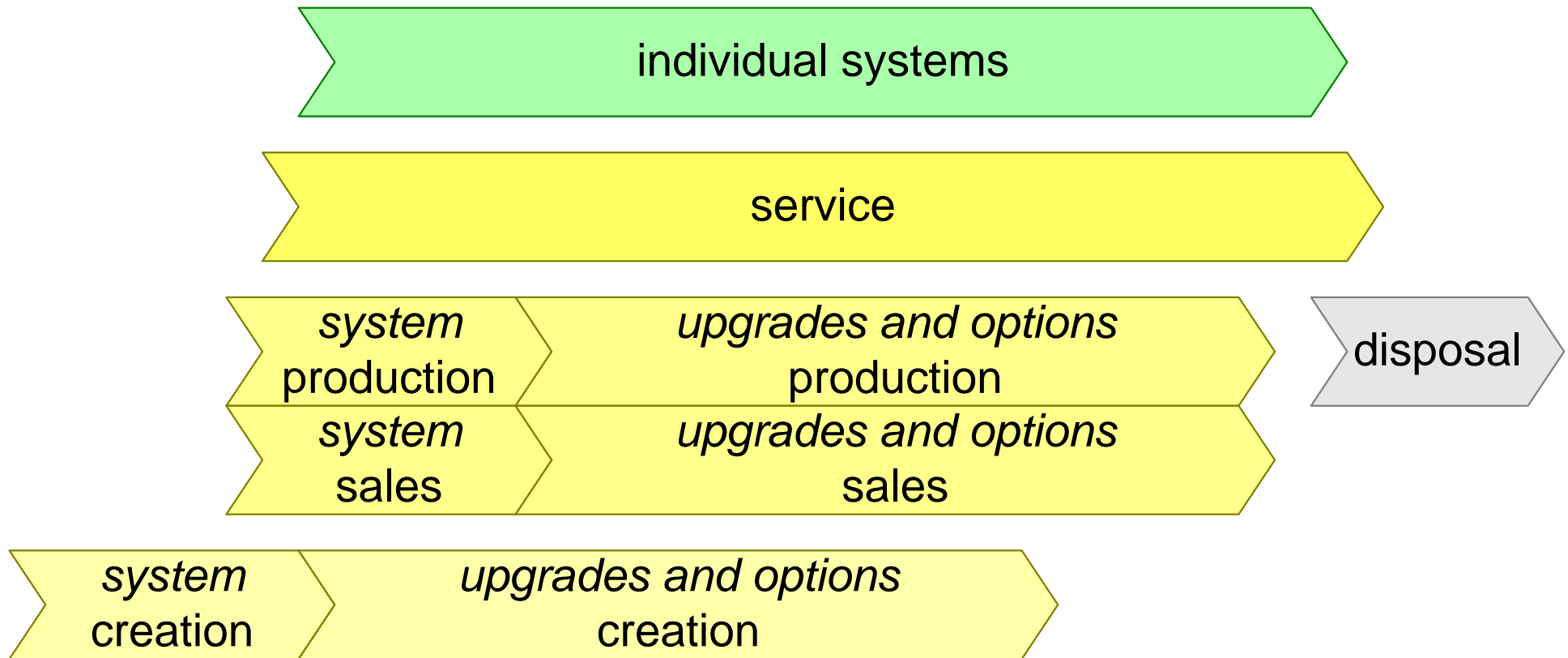
Process/People/Organization

- Forced cooperation
- Time platform feature to market
- Unrealistic expectations
- Distance platform developer to customer
- No marketing ownership
- Bureaucratic process (no flexibility)
- New employees, knowledge dilution
- Underestimation of platform support
- Overstretching of product scope
- Nonmanagement, organizational scope increase
- Underestimation of integration
- Component/platform determines business policy
- Subcritical investment

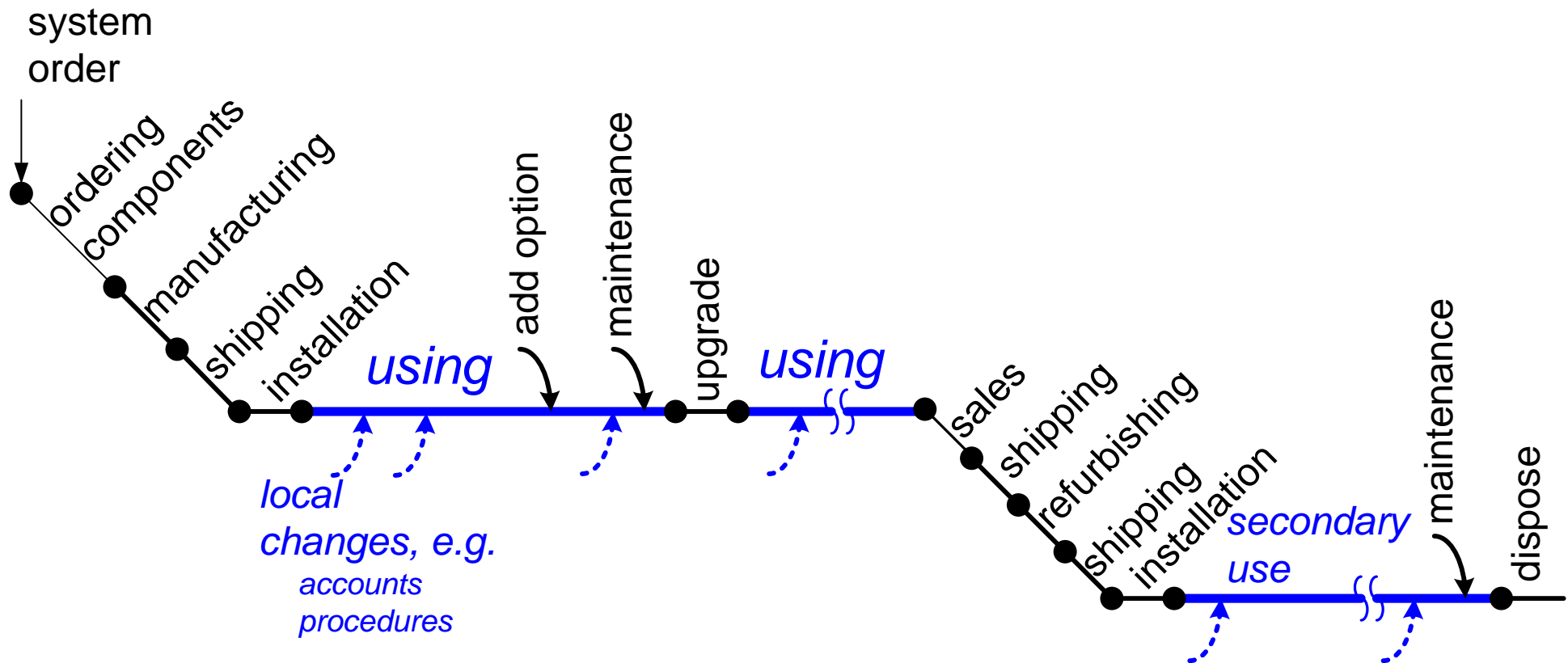
Models for Generic Development



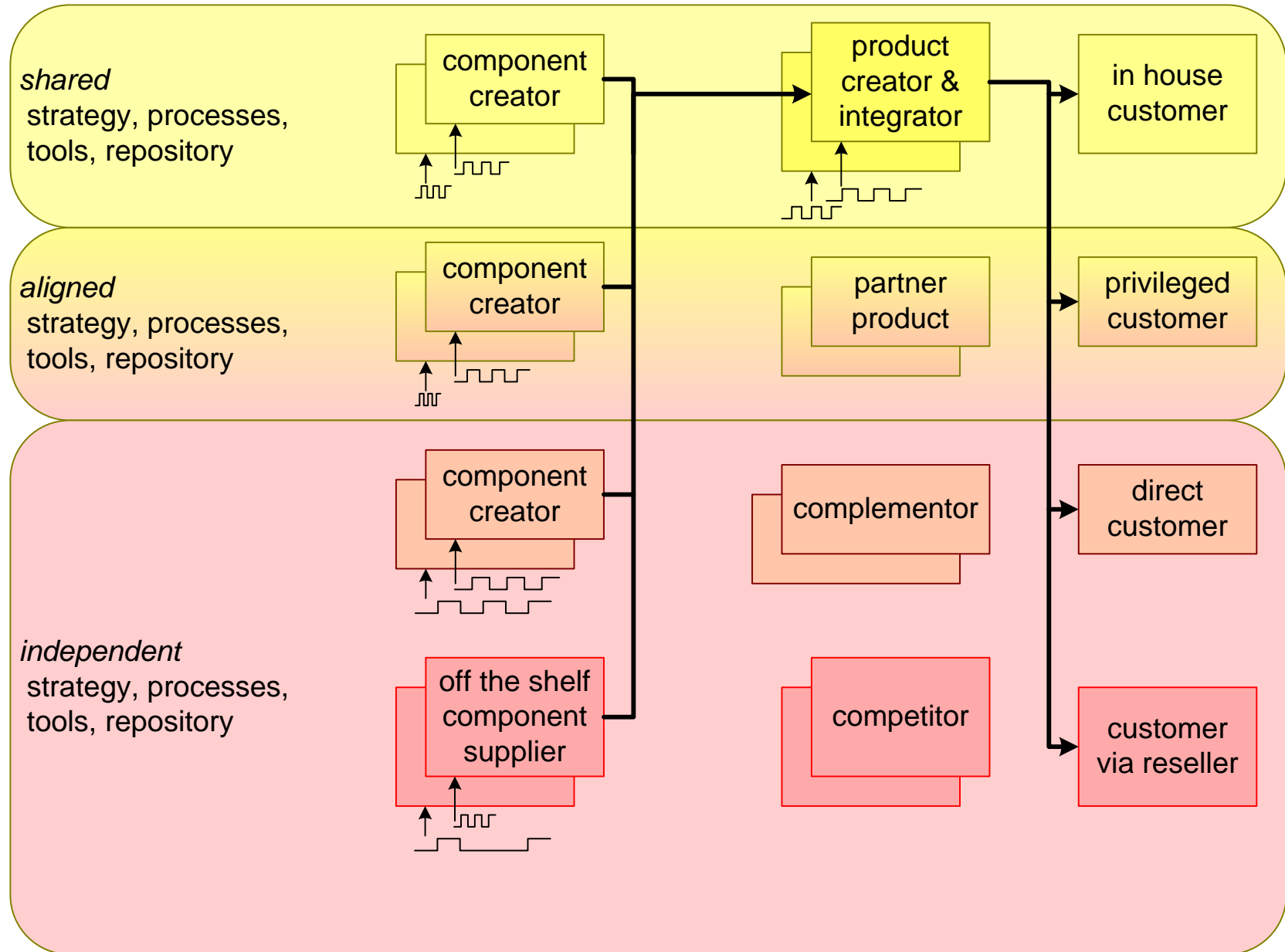
Product Related Life Cycles



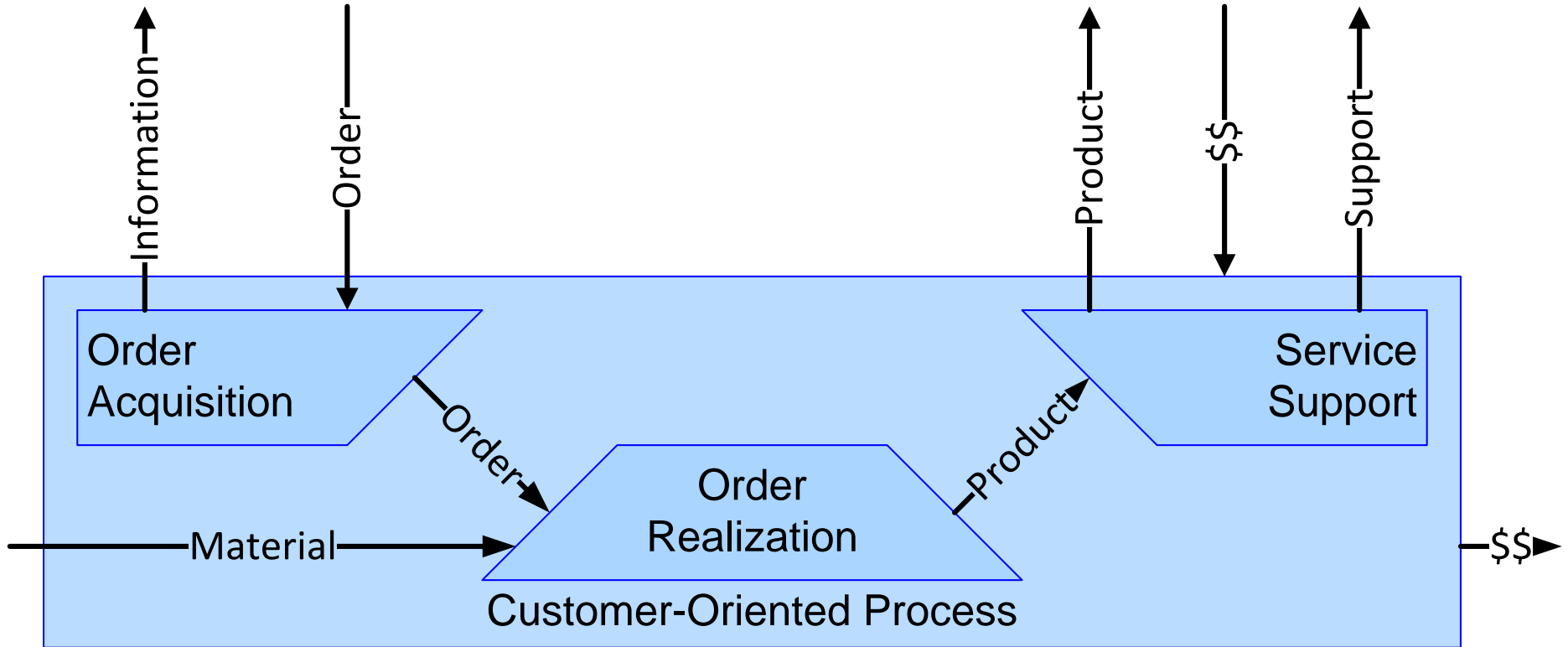
System Life Cycle



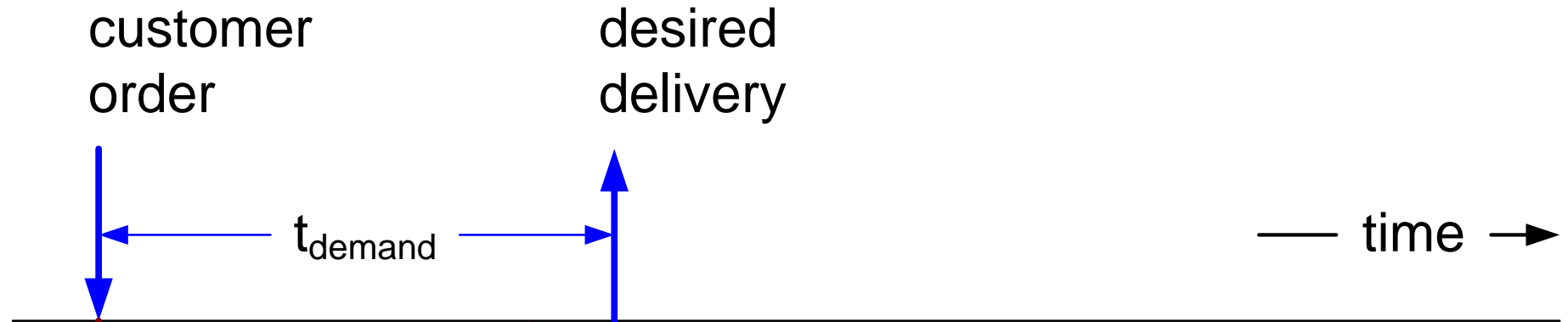
Creation Chain



Customer Oriented Process



Impact of Procurement Duration



$$\text{PD (Procurement Demand) ratio} = \frac{t_{\text{procurement}}}{t_{\text{demand}}}$$

if PD ratio < 1 then
build on order

else

forecast based procurement

less robust