Architecting and Standardization

by Gerrit Muller University of South-Eastern Norway-NISE

e-mail: gaudisite@gmail.com

www.gaudisite.nl

Abstract

Many products today are developed for highly dynamic markets while the products and functions get more and more integrated. The product and service realization is based on fast changing technologies that come together in complex value chains. The challenge for modern companies in innovative domains is to survive in this dynamic world.

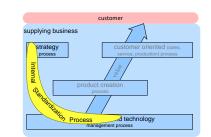
In this paper we explore the contribution of architecting and standardization to the company success. We look at the *why*, *when*, *who* and *how* questions of standardization and at the role of architecting in the standardization process.

Distribution

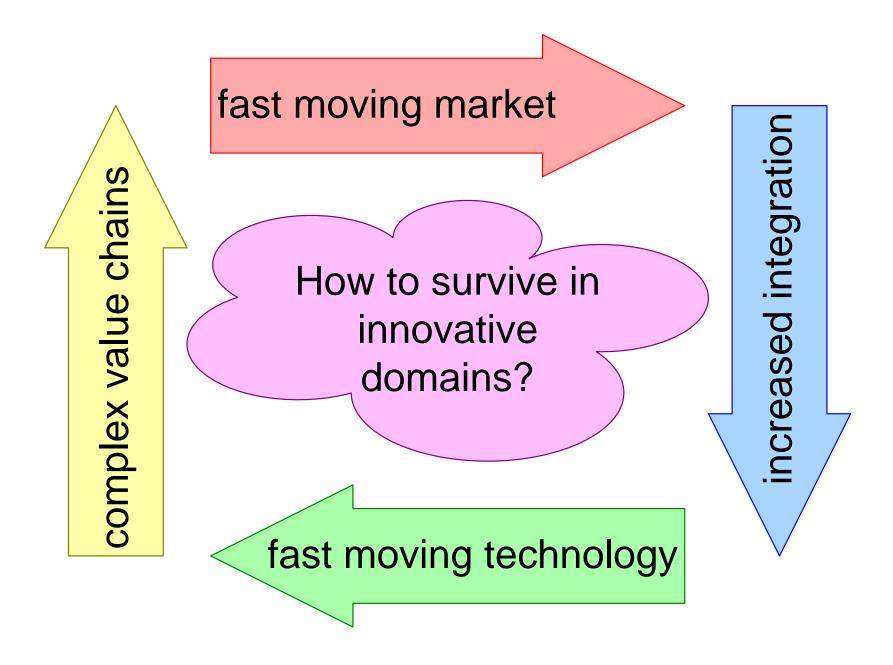
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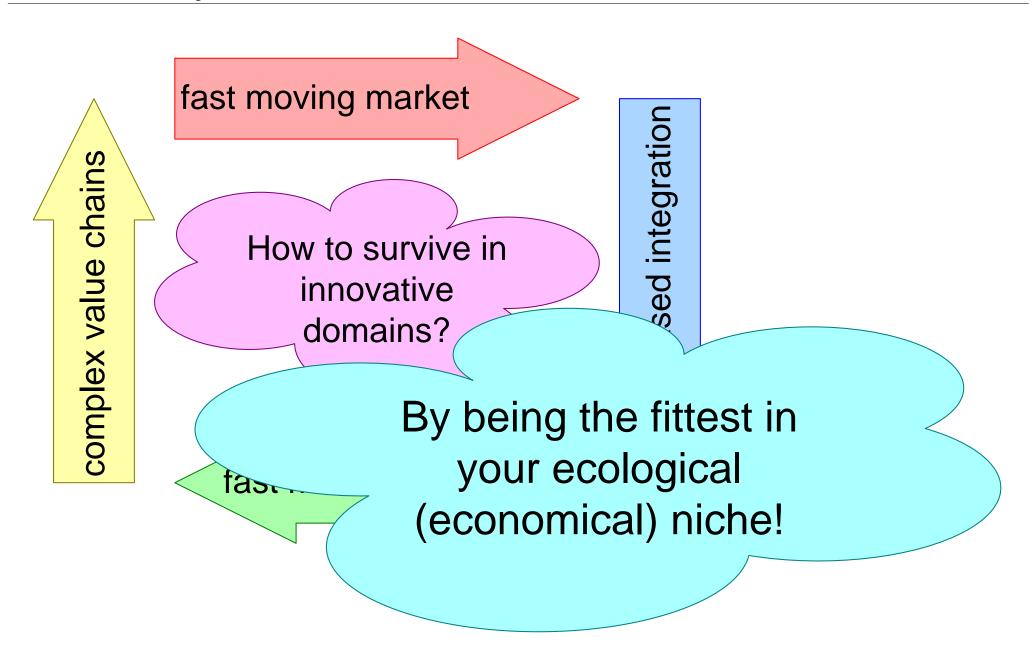


Problem Statement





That is easy...





Postulated Solution

- 1. employ skilled system architects
- 2. apply an agile system architecting process
- 3. determine the right subjects and moments for standardization
- 4. apply a sensible standardization process

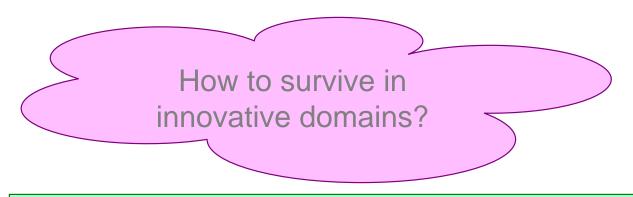


Figure Of Contents™

How to survive in innovative domains?

standardizationwhatwhyhowwhenwho

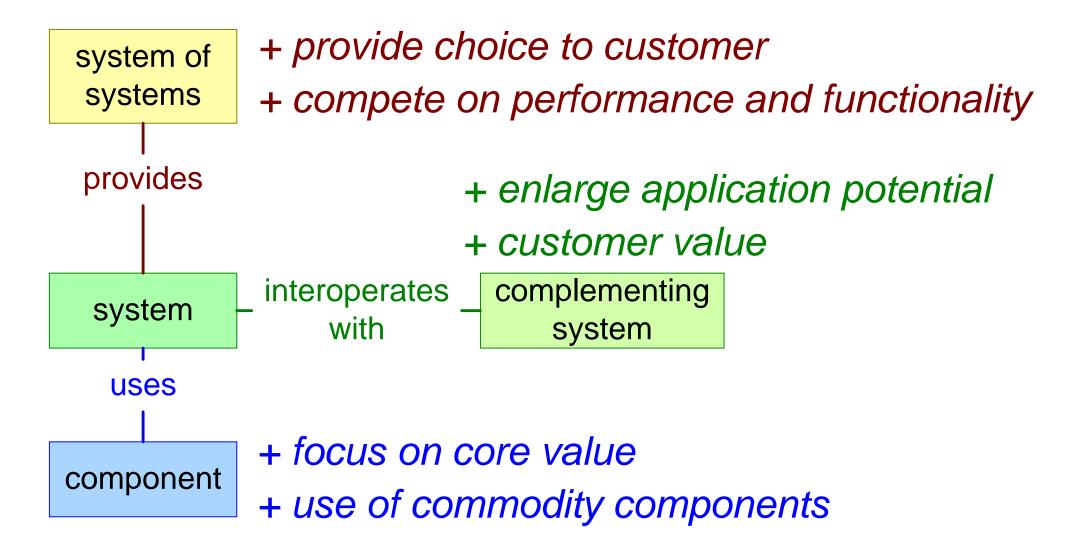




standardization what what how when who

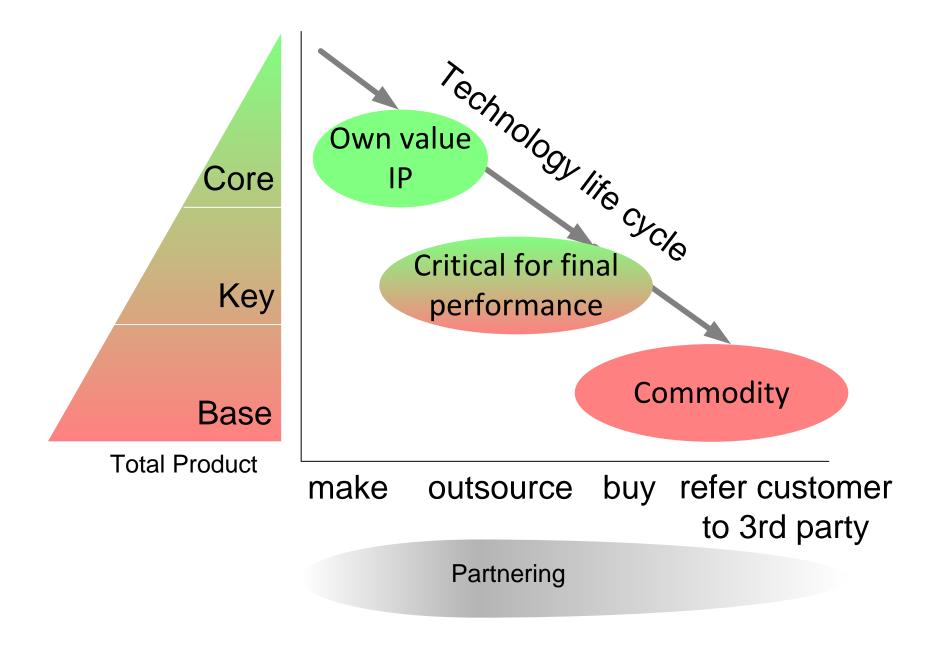


Classification of Standardization Tactics

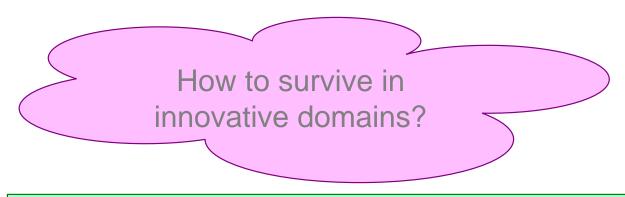




Focus on Core; not on Key or Base Technology?







standardization what what how when who



too early ← right moment ← too late

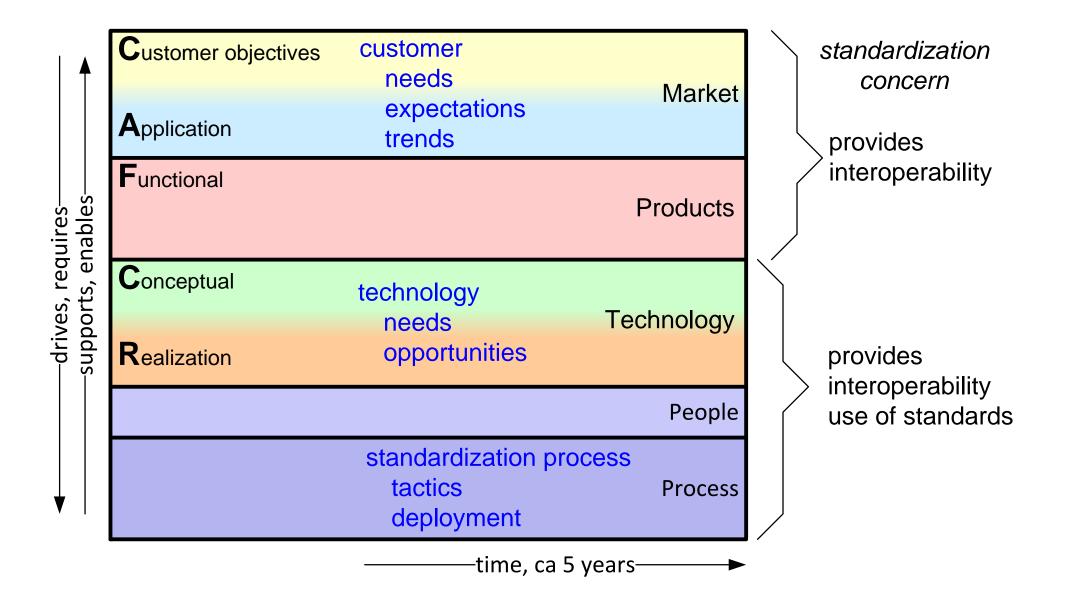
problem is understood
domain structure is clear
broadening set of stakeholders
technology is ripe

requirements unknown
technological compromises
loss of competitive edge
insufficient and uncertain facts
wrong expectations
intuition not calibrated

caught in proprietary legacy
poor interoperability
customer demands standards
focus on key i.s.o. core
market does not take off
(Metcalfe's law)

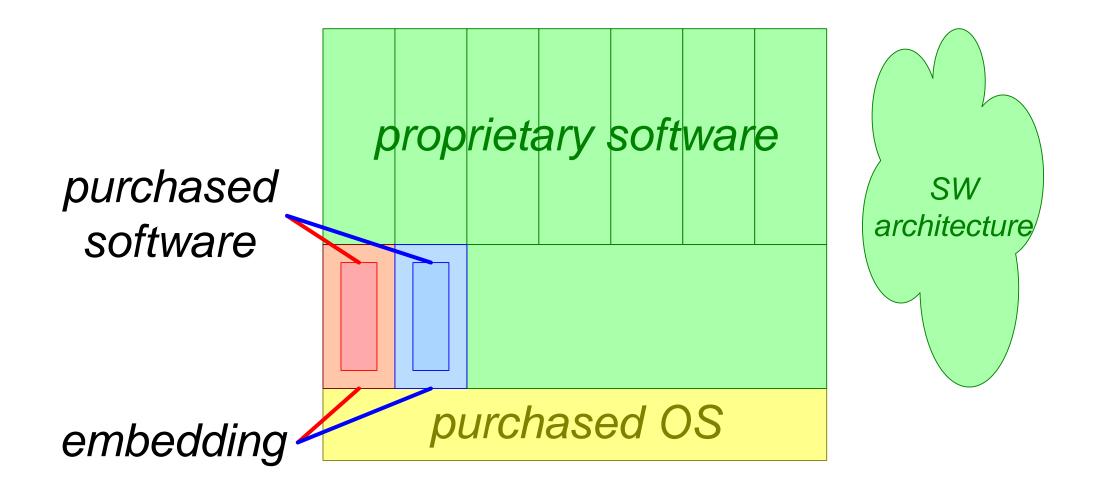


Roadmapping as Tool





Purchased SW Requires Embedding





Embedding Costs of Purchased SW

Installation

Configuration

Customization

Start up, shutdown

Specifications

Interface to application SW

Exception handling

Resource allocation and monitoring provision

Resource tuning, see above

Safety design

Security design

functional system design sw design

add semantics level use of appropriate low level mechanisms match to high level mechanisms:

- notification, scheduling

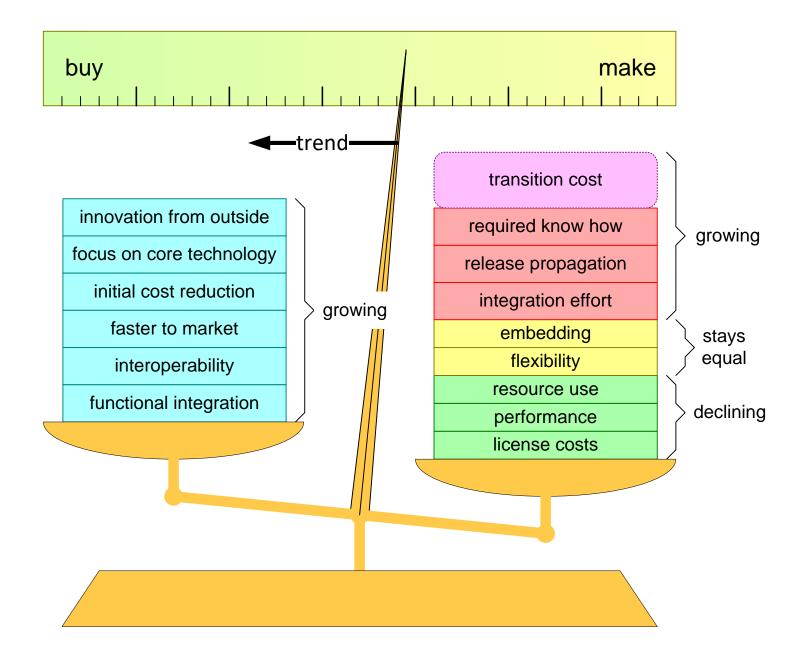
- job requests, subscriptions

System monitor Error propagation Logging

CPU Memory Disk



Balance of Considerations and Trends





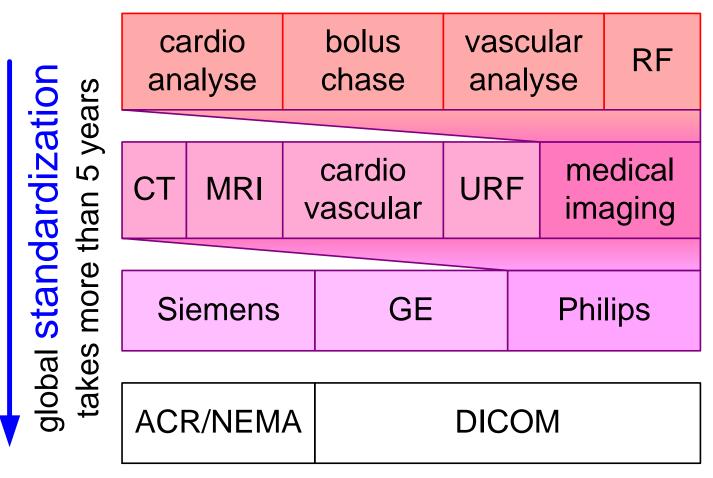
Example of Lifecycle Reference Model

information archiving entirely distributed wide variation due to "socio-geographics": handling psycho-social, political, cultural factors imaging and image handling treatment distributed service business *limited* variation due to "nature": not health care specific localised extreme robust human anatomy patient focus pathologies fire, earthquake, safety critical flood proof imaging physics limited variation life time due to "nature": 100 yrs (human life) human anatomy pathologies imaging physics base technology not health care specific short life-cycles rapid innovation



Evolution from Proprietary to Standard

high innovation rate



legend

applications

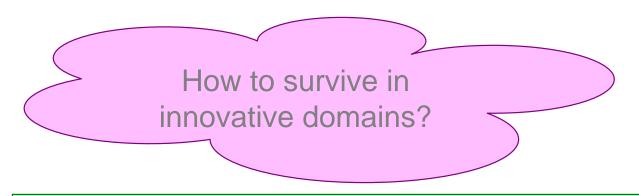
product family

vendor

world standard

high interoperability

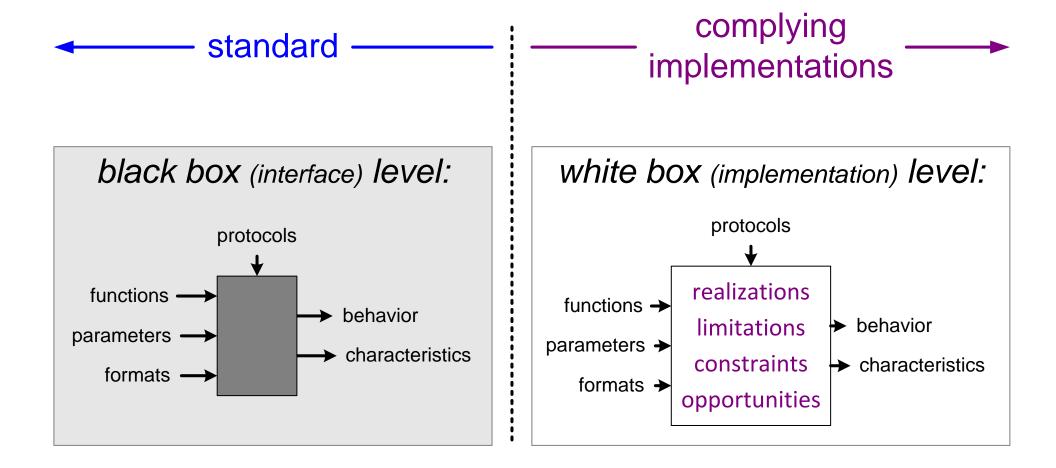




standardization
what
why
how
when
who



Standards describe what





Input from implementation know how

white box know how:

current and future realization:

design choices

technology capabilities

domain concepts

limitations

constraints

opportunities

what needs to be defined

functions
parameters
formats
protocols
behavior
characteristics

realism/acceptance level

time effort cost



Towards a Standard

market needs expectations concerns

black box level:

functions

parameters

formats

protocols

behavior

characteristics

white box know how:

current and future realization:

design choices

technology capabilities

domain concepts

limitations

constraints

opportunities

future proof; room for innovation market enabler; room for added value not locked into specific technology constraints realistic and acceptable; time, cost, effort



What Should be in a Standard

Standard: what

requirements at conceptual level,

no design or implementation

the minimal set of (interface) requirements to:

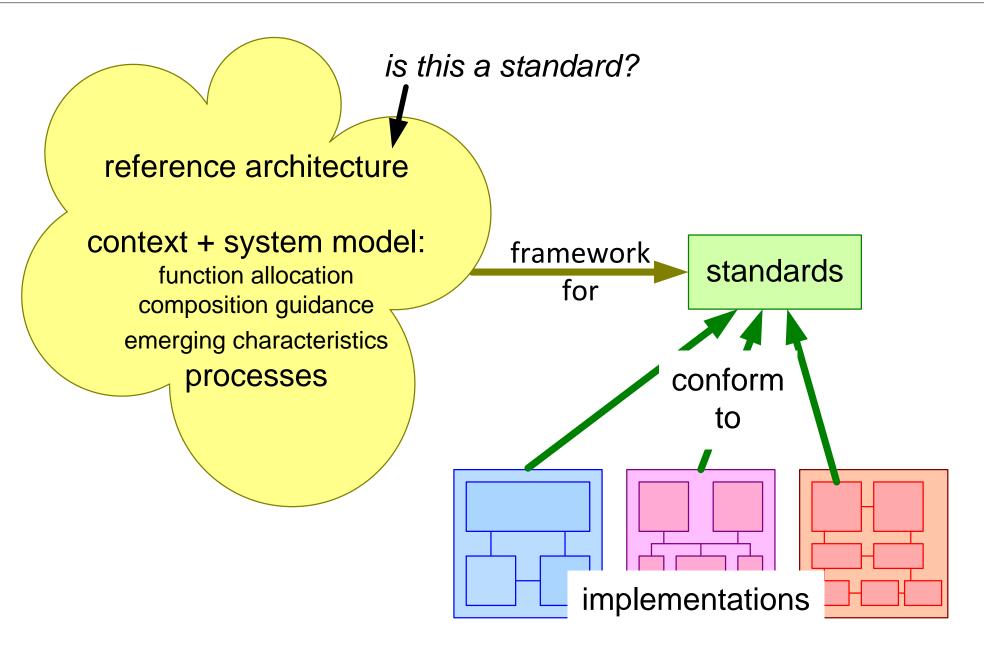
as minimal as possible

- 1) ensure interoperability
- 2) foster innovation and
- 3) maximise the room for added value.

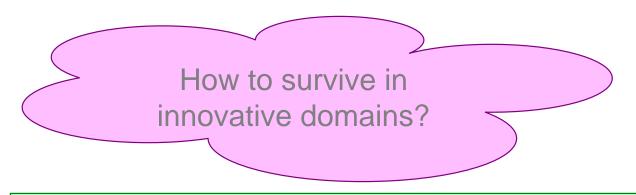
ambitious but cautious



Embedding in a Reference Architecture







standardization what why how who



Flow of Standardization

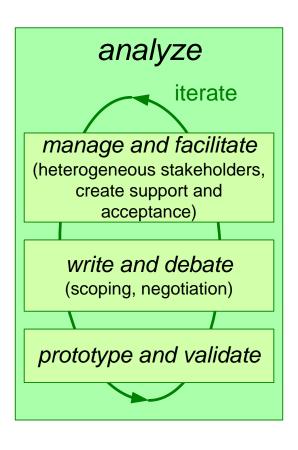
explore

market needs

stakeholders (competitors, suppliers, partners, customers, ...)

existing realizations

implementation issues



standardize

decide

publish

provide reference implementation (optional)

deploy

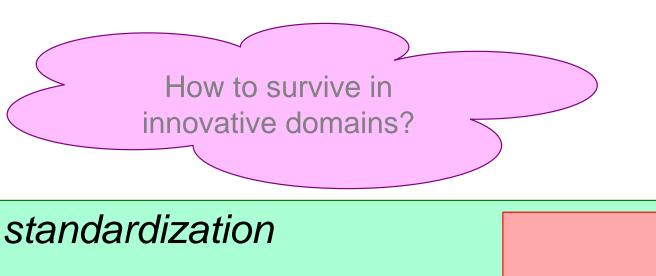
push

manage compliance

evolve standard



Who Contributes and Participates?



what

why

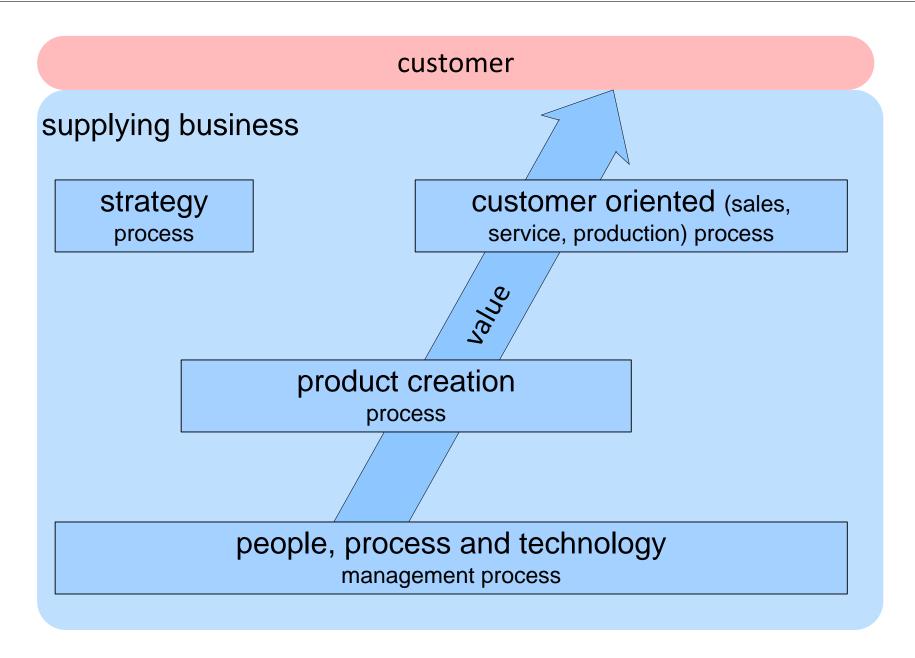
how

when

who

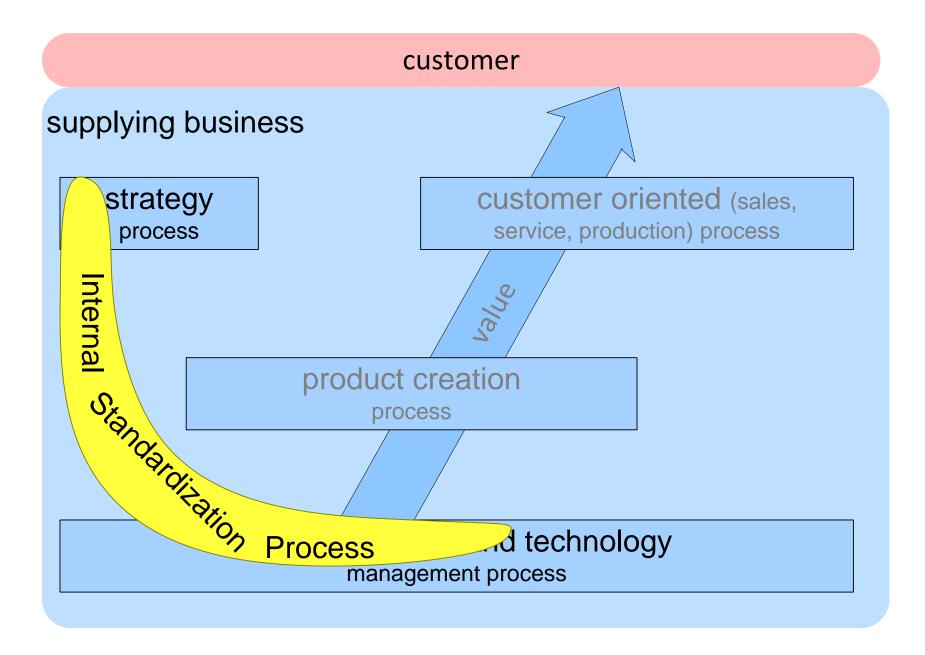


Simplified Process Decomposition



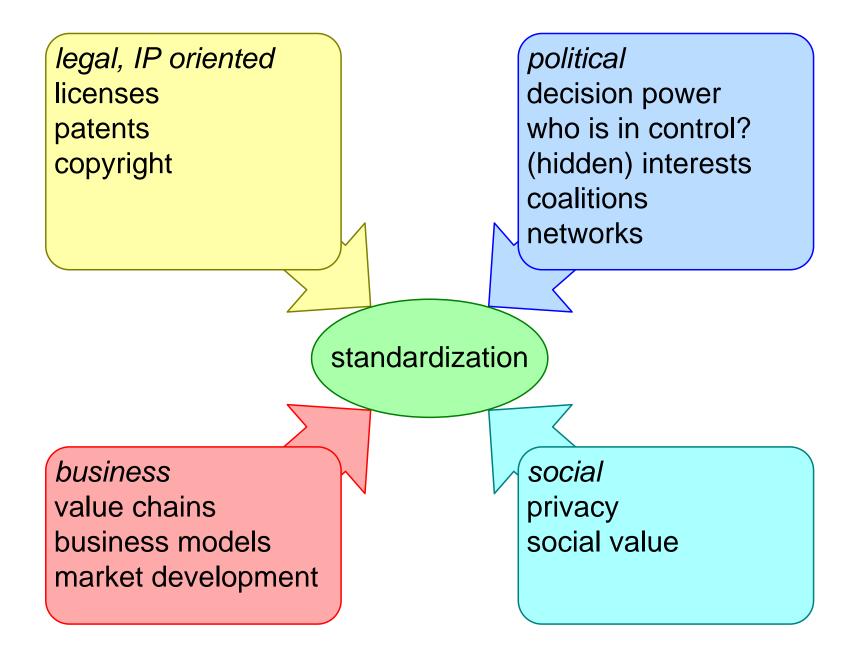


Internal Standardization Process == Highly Strategic!





Non technical aspects of standardization





Architect and Standards: Love-Hate Relationship

love

no worries: concerns are taken care of focus on core problems facilitates interoperability

hate

limits innovation (harnass)
limits solution space
simplistic management orders



Conclusions

why

How to survive in innovative domains?

- 3. determine the right subjects and moments for standardization
- 4. apply a sensible standardization process

what

standardization

unlock market (e.g. interoperability) focus on core assets

optimize supply chain

when problem is understood
domain structure is clear
broadening set of stakeholders
technology is ripe

minimal, as little as possible requirements (not design

or implementation)

room for added value and innovation

fast iteration

how make rationale explicit

roadmapping

strategic insight technology know how

who market know how

social and political insight

ambitious but cautious

