Models for managing design

Verison 1.1
May 11, 2012

A definition of design:

"*In most people's vocabularies,
design means veneer.
It's interior decorating.
It's the fabric of the curtains and the sofa.
But to me, nothing could be
further from the meaning of design.*
**Design is the fundamental soul
of a man-made creation
that ends up expressing itself
in successive outer layers of the product or service."**

— Steve Jobs, *Fortune*, January 24, 2000

**Herbert Simon argued that
the professions share a fundamental core;
that, at heart, they are about design:**

– Engineering
– Law
– Medicine
– Business

"Everyone designs,
who devises courses of action aimed at
changing existing conditions
to preferred ones."

— Herbert Simon, *Sciences of the Artificial*, 1969

Is that problem solving?

A $\longrightarrow$ B

or

A $\longrightarrow$ B $\longrightarrow$ C $\longrightarrow$ D $\longrightarrow$ E

or perhaps

10 $\rightarrow$ 3 $\longrightarrow$ 1

or even

A $\longrightarrow$ B $\longrightarrow$ C $\longrightarrow$ A ...

Not all problems are created equal.

Simple problems:
The goal is specified.

Complex problems:
We must agree on the goal.

Wicked problems:
We *cannot* agree on the goal.

Taming wicked problems requires reframing — finding a new frame which can encompass previously competing points of view.

That is, having your cake and eating it, too — **not accepting a tradeoff** of competing variables.

*"**Generative metaphor** produces a selective representation of an unfamiliar situation that sets values for the system's transformation.*

*It **frames the problem** of the problematic situation and thereby **sets directions in which solutions lie** and provides a schema for exploring them."*

—Donald Schön, *The Design Process*, 1990

**The generative metaphor is an insight —
a hypothesis, a product of abduction.**

It grows out of observation and emersion.

It requires experience and preparation.

Generative metaphor is an academic term.

**Business people talk about product concept
or positioning statement
or value proposition.**

**Defining the metaphor / concept / position / value
is a key responsibility of product management.**

Product management—
the art of making a successful product—
is rarely taught in design schools
or business schools.

Design
School

Product
Management

Business
School

Product management should be taught in both design schools and business schools.

Design School   **Product Management**   **Business School**

**People who make products
don't agree on how to do it.**

– Who manages the schedule and the budget?

– How do you determine requirements?

– Who owns design? Who owns the spec?

– Who can say, "No"? Who can say, "Yes"?
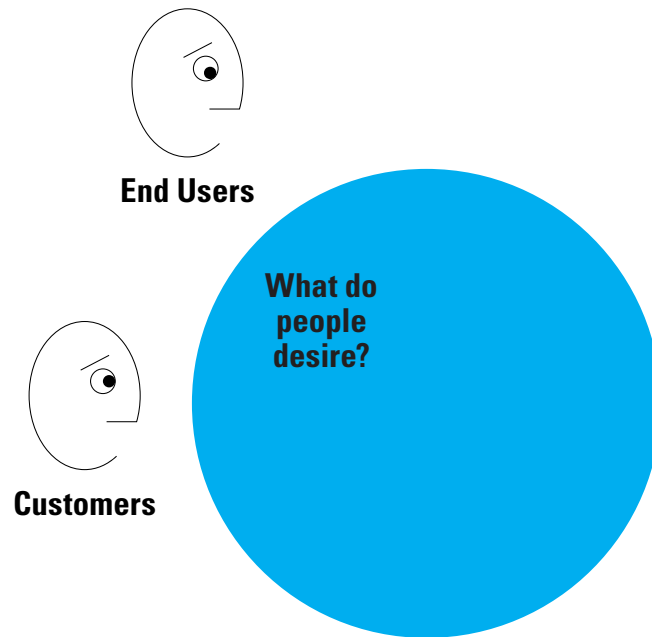
Engineers tend to focus on technology.

What can we build?

Engineering
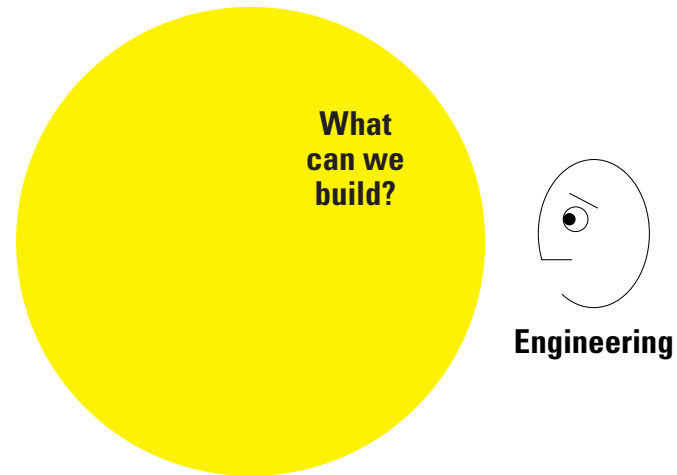
Managers tend to focus on making money.

**What will sustain
a business?**

Management

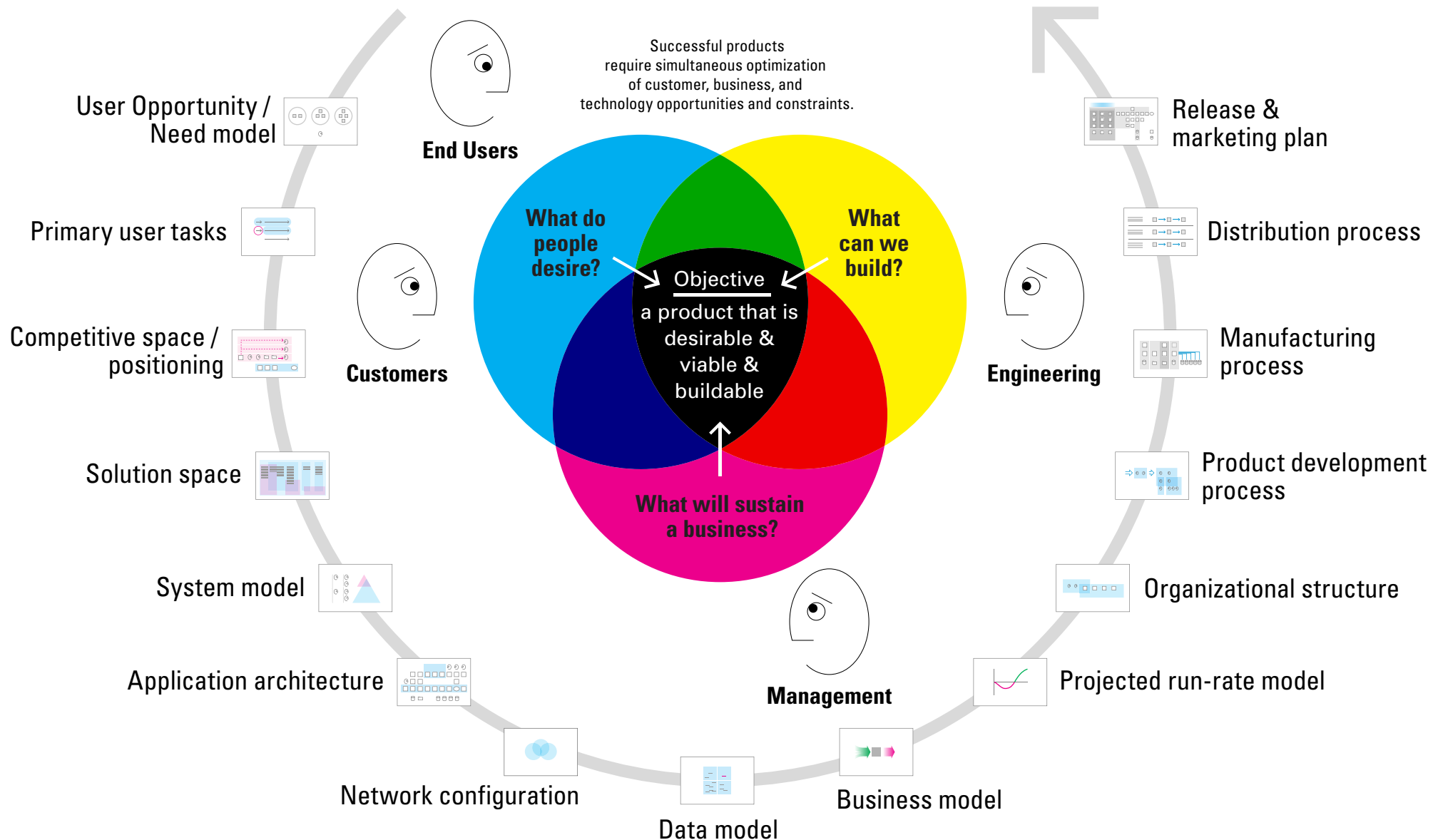# Designers tend to focus on users and their goals, taking a "user-centered approach" to their work.

End Users

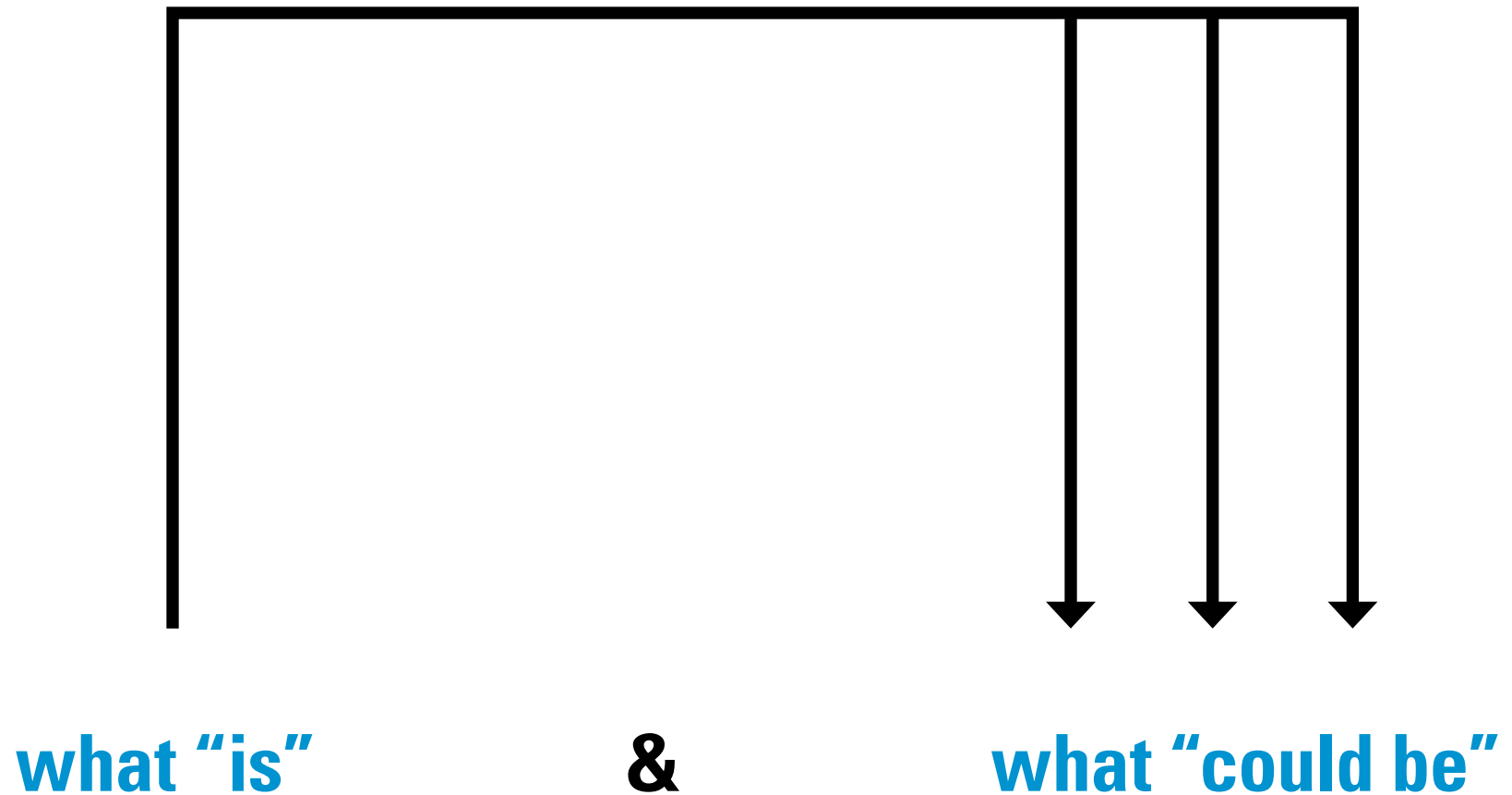**Customers**

What do people desire?

Successful products meet several criteria:

End Users

Customers

Engineering

Management

What do people desire?

What can we build?

Objective

a product that is desirable & viable & buildable

What will sustain a business?
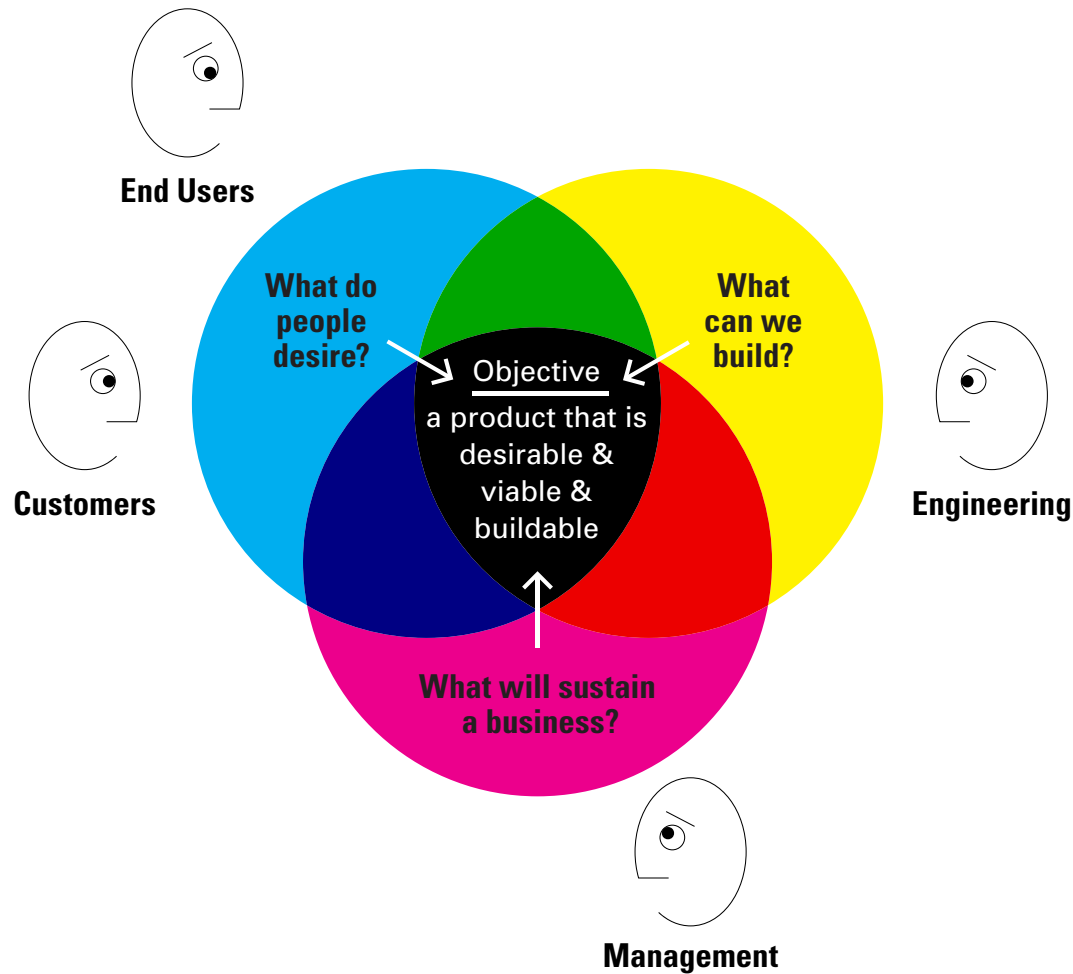
Each criteria suggests a series of models.

User Opportunity / Need model

Primary user tasks

Competitive space / positioning

Solution space

System model

Application architecture

Network configuration

Data model

Business model

Projected run-rate model

Organizational structure

Product development process

Manufacturing process

Distribution process

Release & marketing plan

End Users

Customers

Management

Engineering

Successful products require simultaneous optimization of customer, business, and technology opportunities and constraints.

What do people desire?

What can we build?

What will sustain a business?

Objective
a product that is desirable & viable & buildable

Designers bridge the gap between

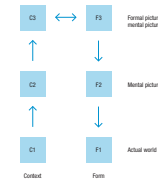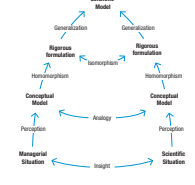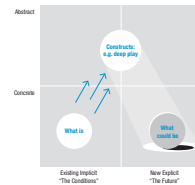what "is"   **&**   what "could be"

or "should be"

Models are the tools designers use to bridge between what is and what should be.

Analysis-Synthesis Bridge Model
Dubberly, Evenson & Robinson
(2008)

Researching

Prototyping

Interpret Abstract

Model of what "is" → *suggest* → **Model of what "could be"**

distilled to

Describe Concrete

manifest as

What "is"

What "could be"

Existing – Implicit
(Current)

Preferred – Explicit
(Future)
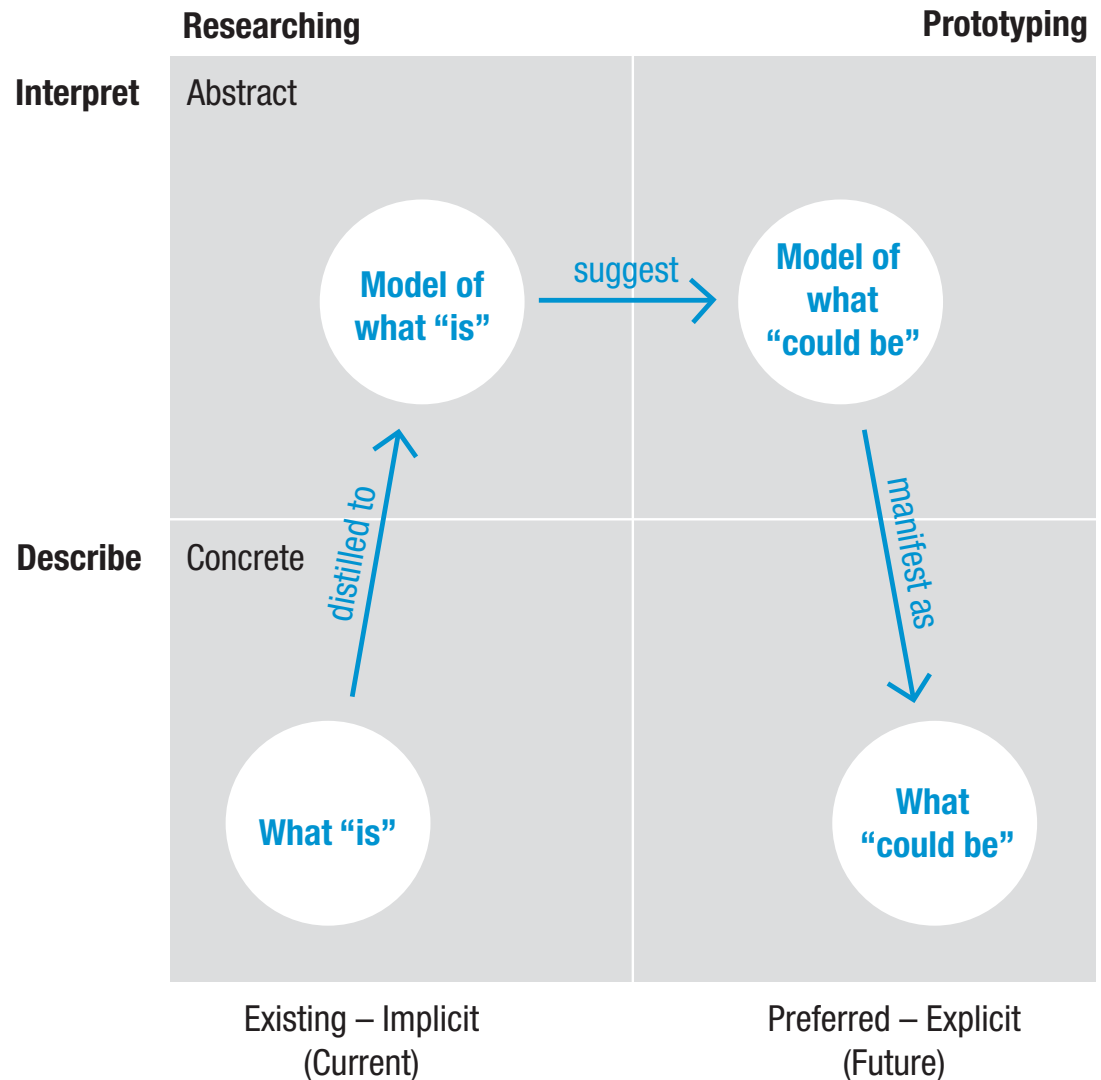
The bridge model has many variations and is shared by many others.
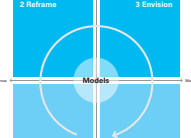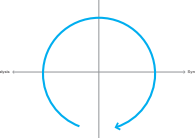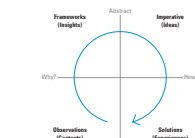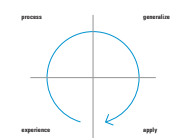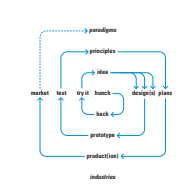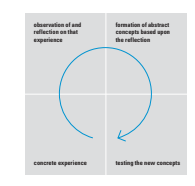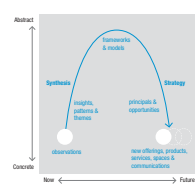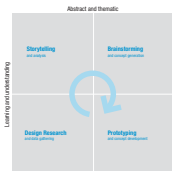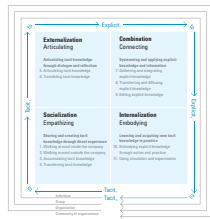
Learning bridges the gap between

tacit   **&**   **explicit**

This model describes the learning process.

**SECI model of
knowledge creation**
Ikujiro Nonaka
(1995)

Explicit₁

to

to

Tacit₂

Explicit₂

Externalization
Articulating

**Articulating tacit knowledge
through dialogue and reflection**
5. Articulating tacit knowledge
6. Translating tacit knowledge

Combination
Connecting

**Systemizing and applying explicit
knowledge and information**
7. Gathering and integrating
explicit knowledge
8. Transferring and diffusing
explicit knowledge
9. Editing explicit knowledge

Socialization
Empathizing

**Sharing and creating tacit
knowledge through direct experience**
1. Walking around inside the company
2. Walking around outside the company
3. Accumulating tacit knowledge
4. Transferring tacit knowledge

Internalization
Embodying

**Learning and acquiring new tacit
knowledge in practice**
10. Embodying explicit knowledge
through action and practice
11. Using simulation and experiments

to

Tacit₁
Tacit₃

to

Individual
Group
Organization
Community of organizations
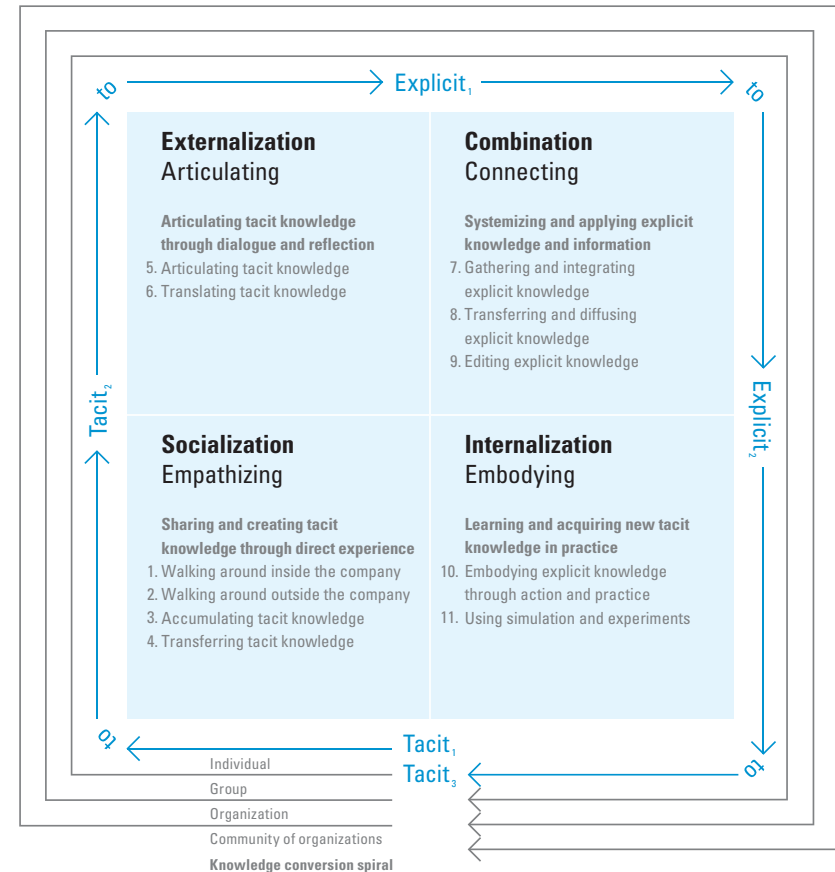**Knowledge conversion spiral**

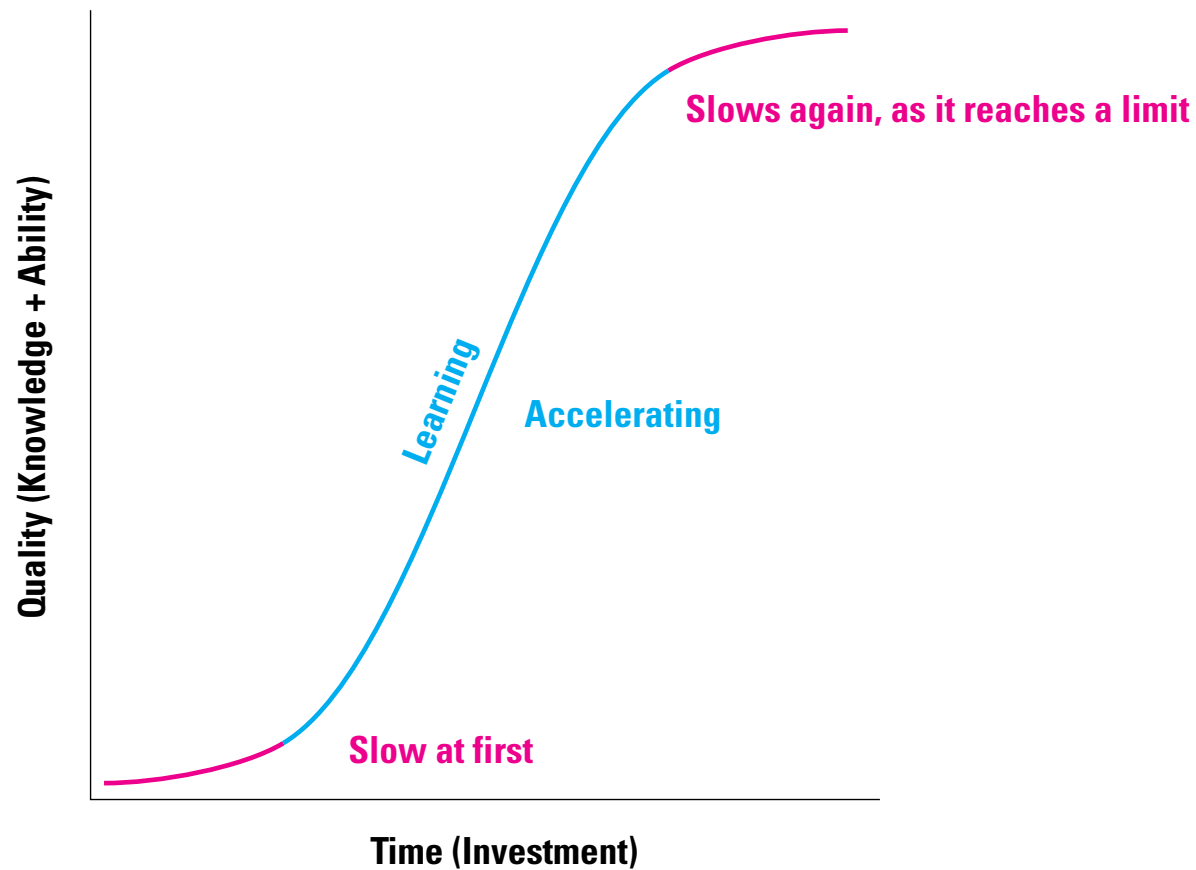# Designing is analogous to learning.
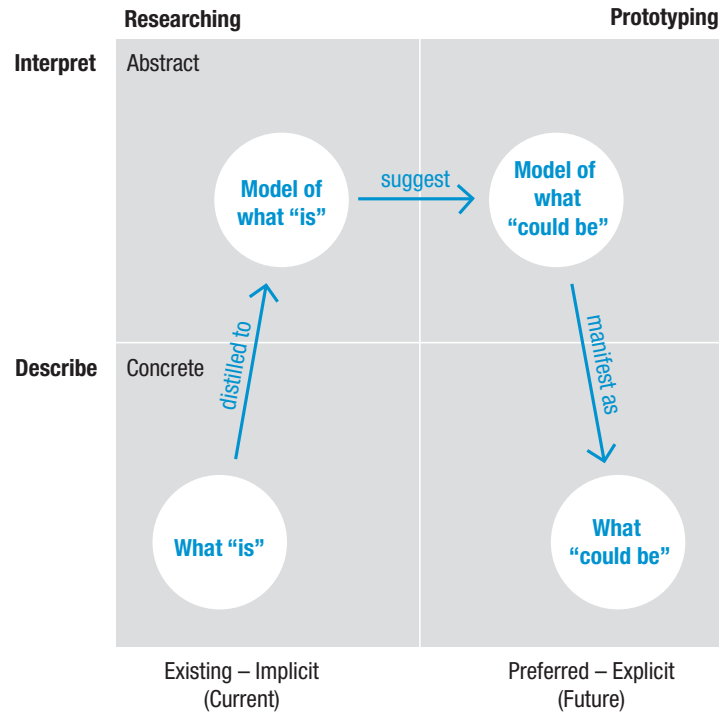
Analysis-Synthesis Bridge Model
Dubberly, Evenson & Robison (2008)

**SECI model of knowledge create**
Ikujiro Nonaka (1995)

Learning can be described in terms of **curves**— or **waves**.

Quality (Knowledge + Ability)

Time (Investment)

Slows again, as it reaches a limit

Learning

Accelerating

Slow at first

Learning happens at different scales—small + large.

– Individuals have insights, which they refine and share with colleagues, building support within an organization or discipline.

– Companies that master new skills first gain a lead over their competitors, but competitors soon copy success and catch up.

– Eventually, knowledge becomes distributed throughout an industry—and innovative practices become standard operating procedure.

Over the last 30 years, product innovation has occurred in 4 waves. New waves offer competitive advantage; over time they become competitive necessity.
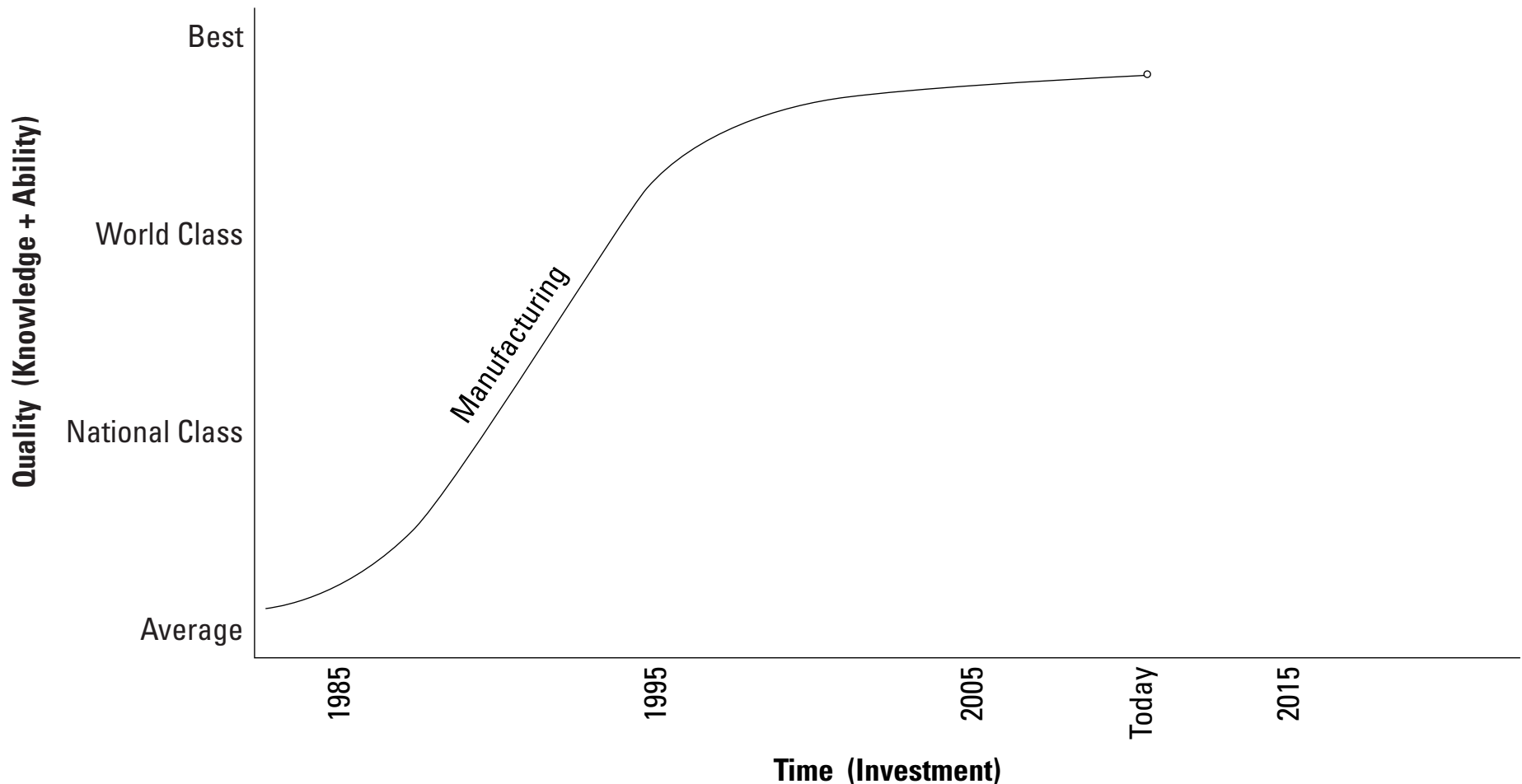

Quality (Knowledge + Ability)

Manufacturing

Product Form

Interaction

Systems

Time (Investment)
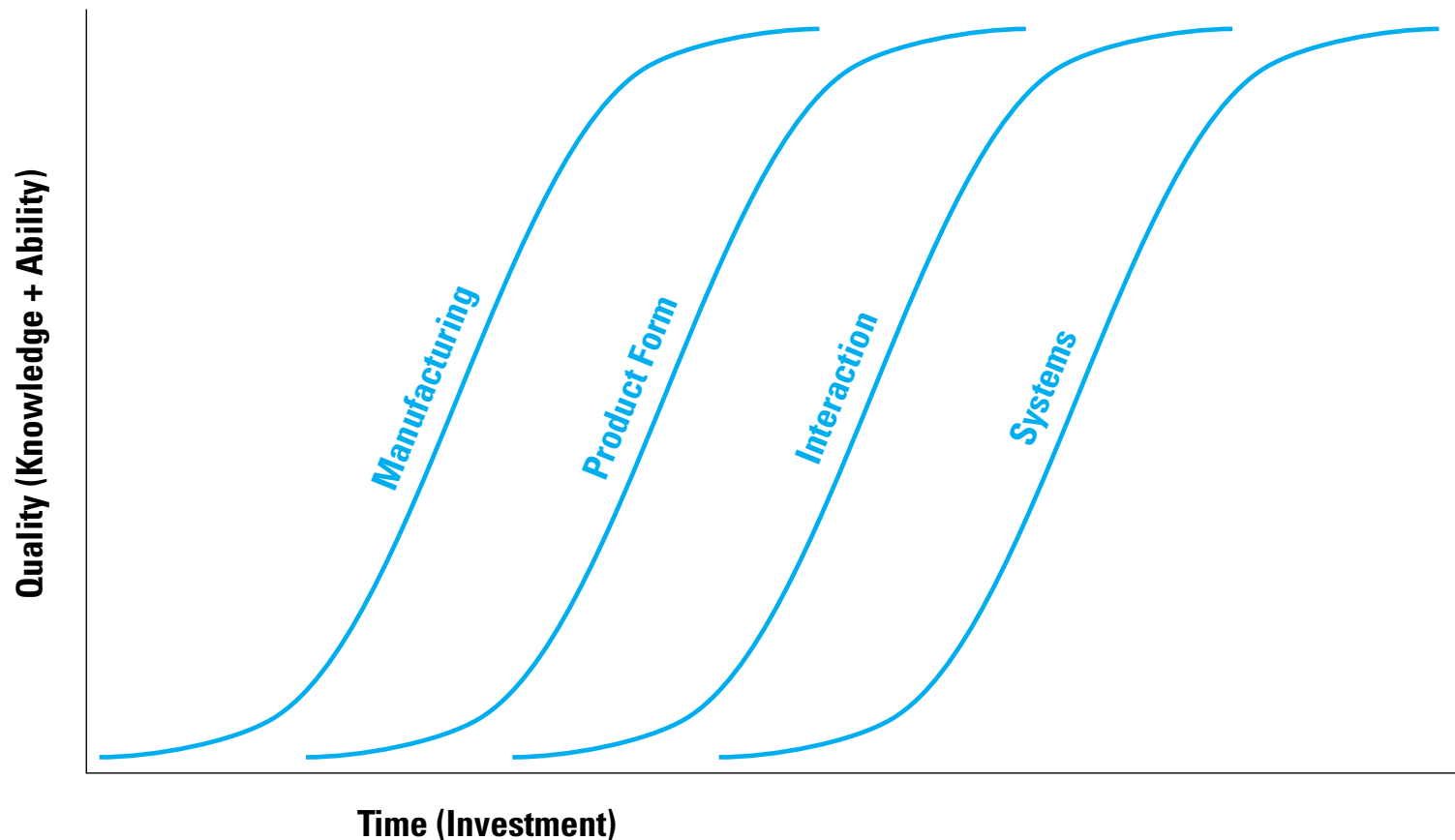
Improving manufacturing quality.

– Statistical Process Control (SPC)
– Total Quality Management (TQM)
– Six-sigma
– Fit and Finish
– Craftsmanship

In the late 1980s, Samsung focused on improving manufacturing quality; now they make 30nm DRAM.
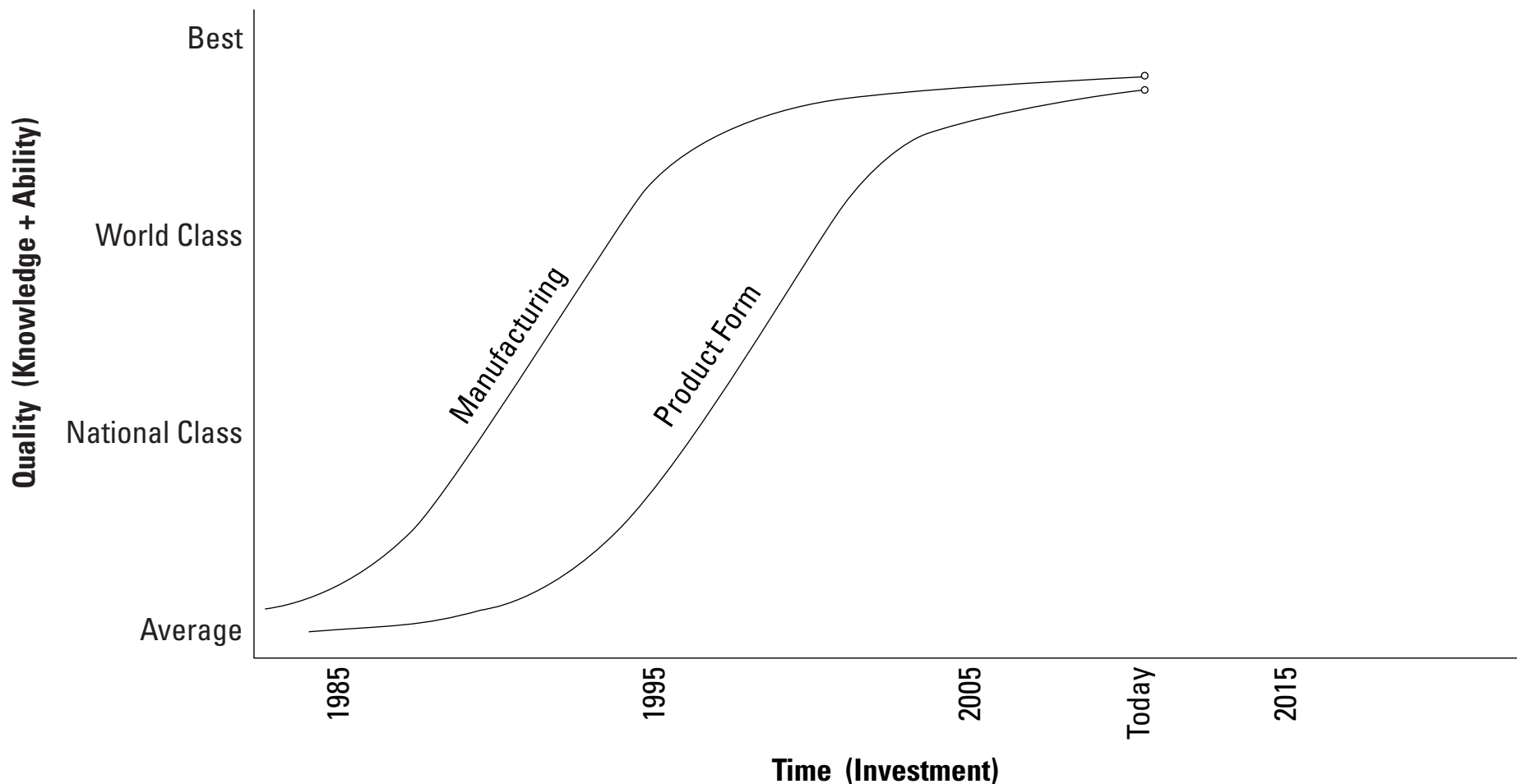
Improving product form.

– **Immediate connection**
"This looks interesting."

– **Clear communication**
"I understand what this does."

– **Emotional resonance**
"This is really great."

In the 1990s, Samsung improved product design; now they win as many design awards as Apple.
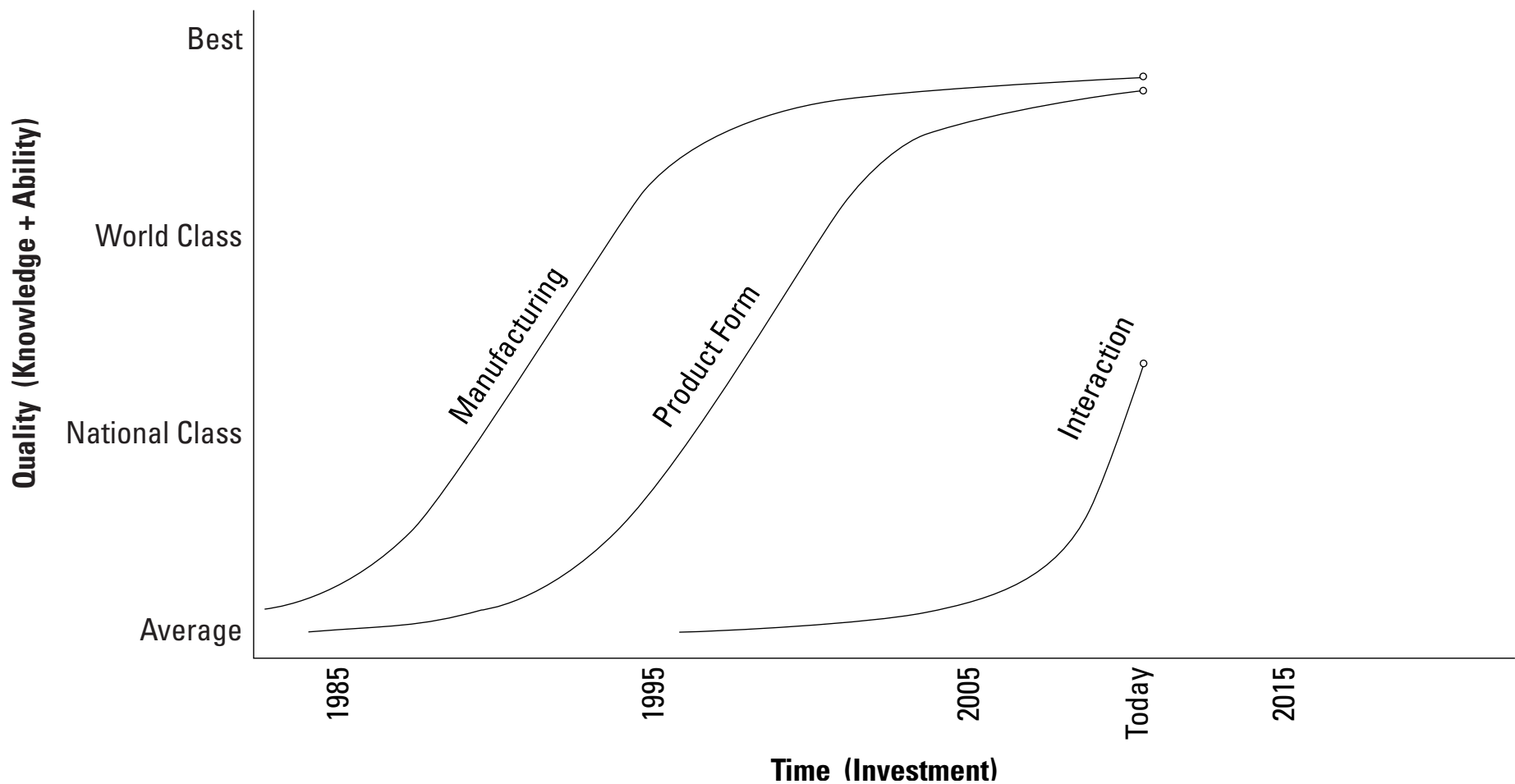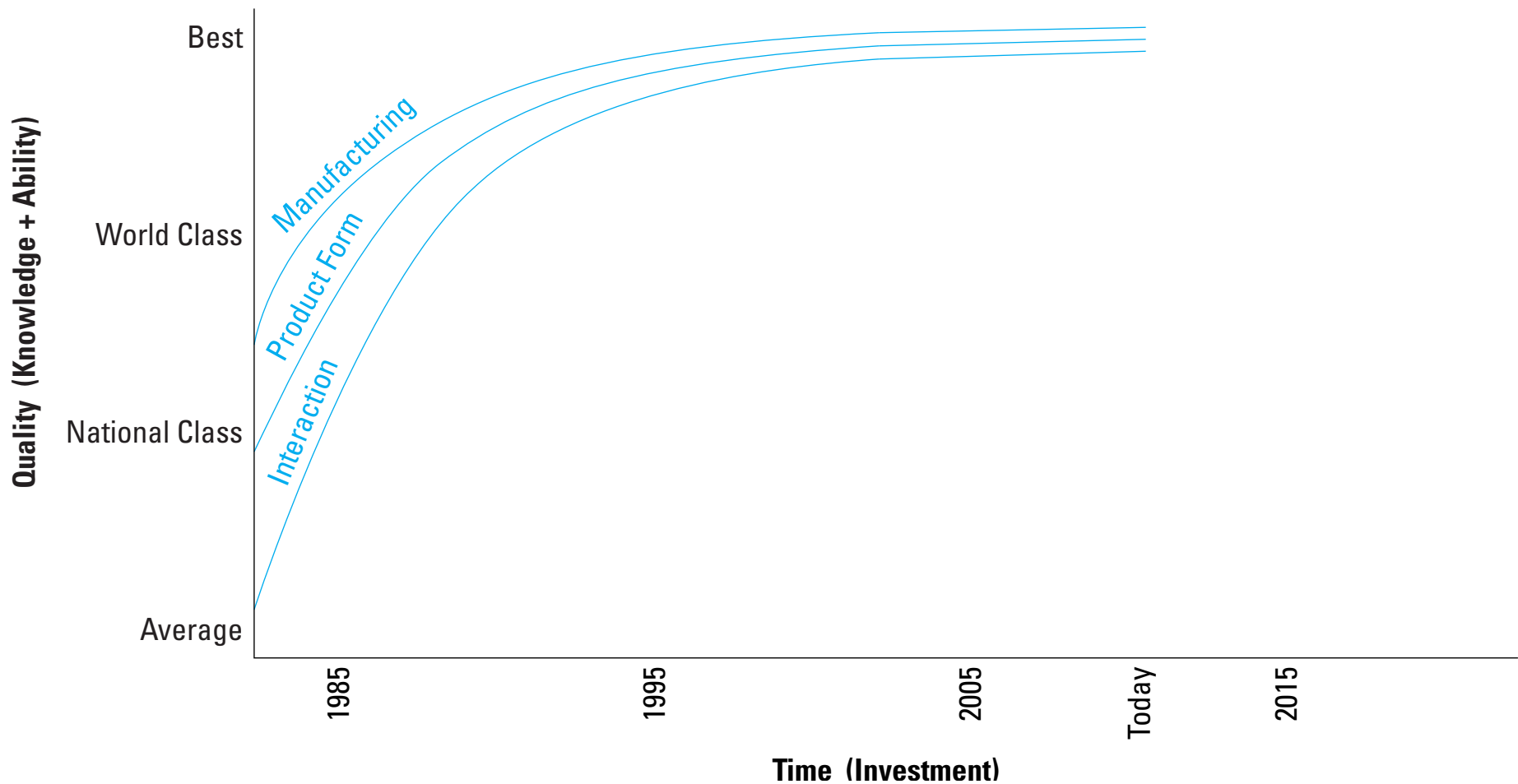
Improving user interaction.

– **Minimizing learning time**
"This is easy."

– **Efficient, effective, delightful operation**
"This is fun."

– **Creating unexpected opportunities**
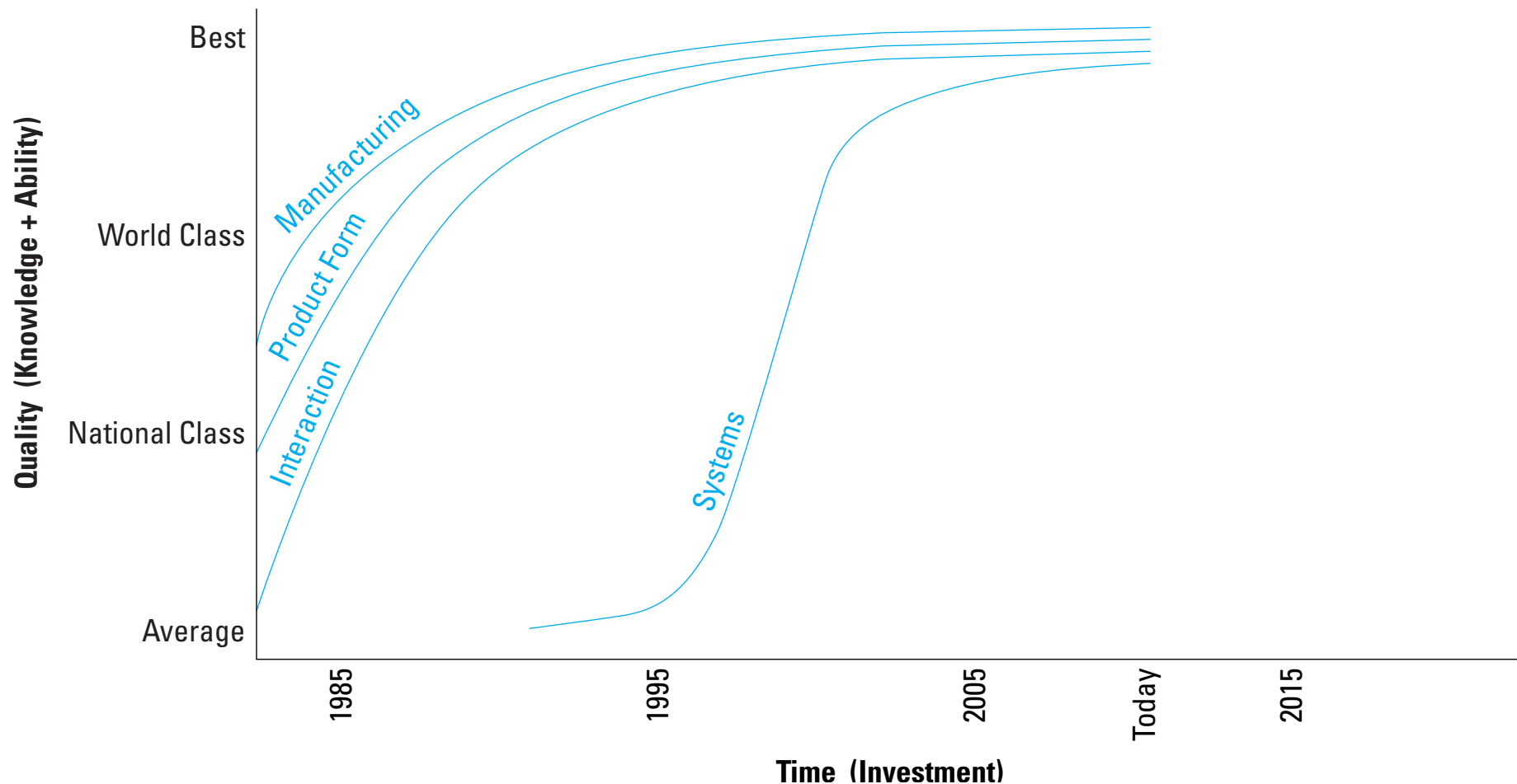"Look what I can do now."

Recently, Samsung began to climb a third curve, improving the quality of its user interfaces.

But Apple achieved world-class manufacturing, product design, and user-interfaces, years ago.

More recently, Apple has focused on integrating its products into sophisticated services.

Chart: Quality (Knowledge + Ability) vs. Time (Investment)

Y-axis (Quality): Best, World Class, National Class, Average
X-axis (Time/Investment): 1985, 1995, 2005, Today, 2015

Curves: Manufacturing, Product Form, Interaction, Systems

The success of iPod is more than product design; it depends on all four measures of product quality.
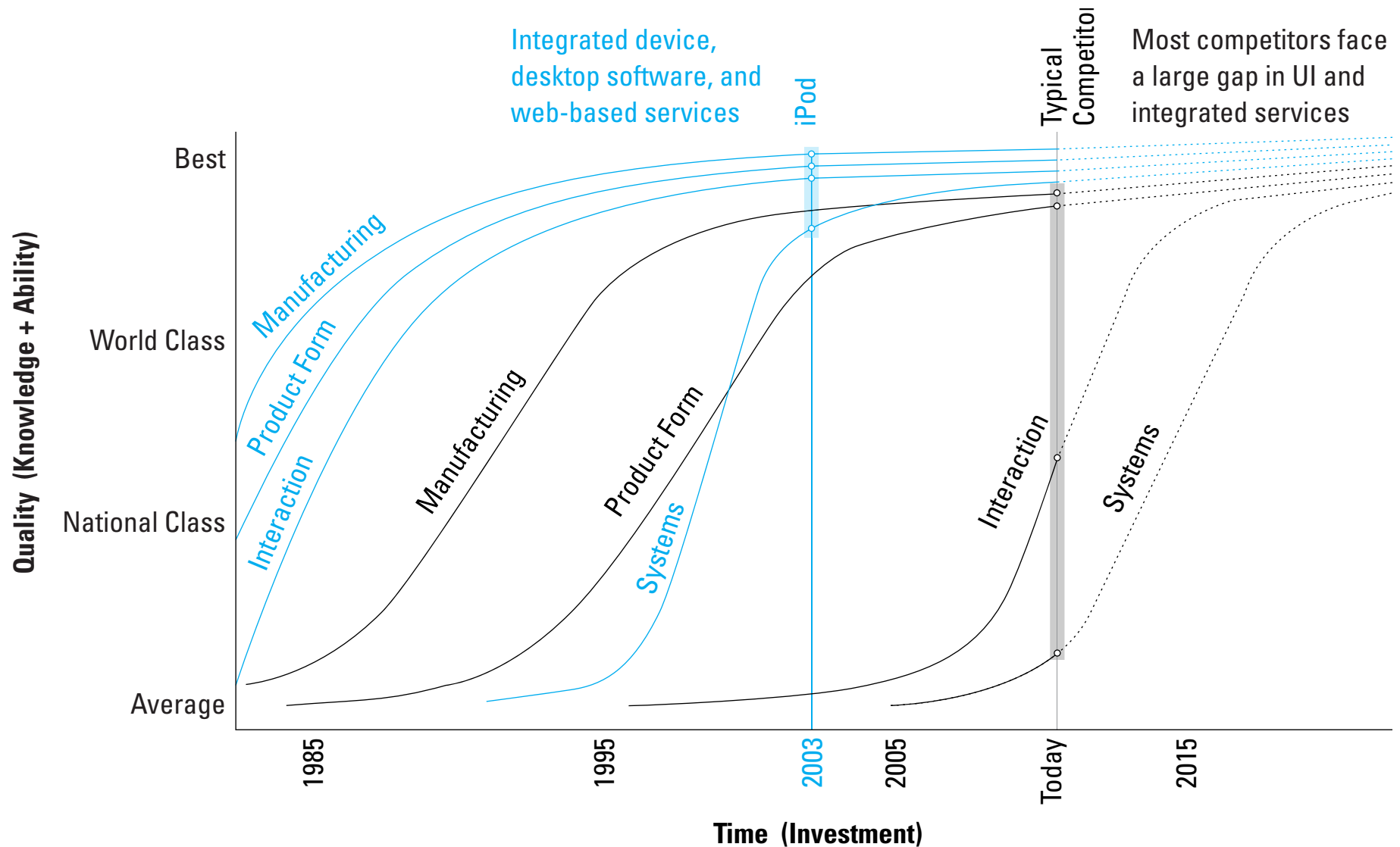
Thinking in terms of systems.

– **Looking at whole systems, not individual products**
roadmaps, product lines, platforms, APIs

– **Enabling feedback**
goal-action-measure-compare loops

– **Adopting metaphors from nature**
ecology, evolution, conversation, bio-cost

Systems affect many dimensions of design.

– Creating and managing (networked) services

– Connecting products + services

– Integrating across products

– Building a seamless brand experience

– Communicating with consistency

– Creating a sustainable business (green design)

– and building relationships (CRM) by managing "big data"

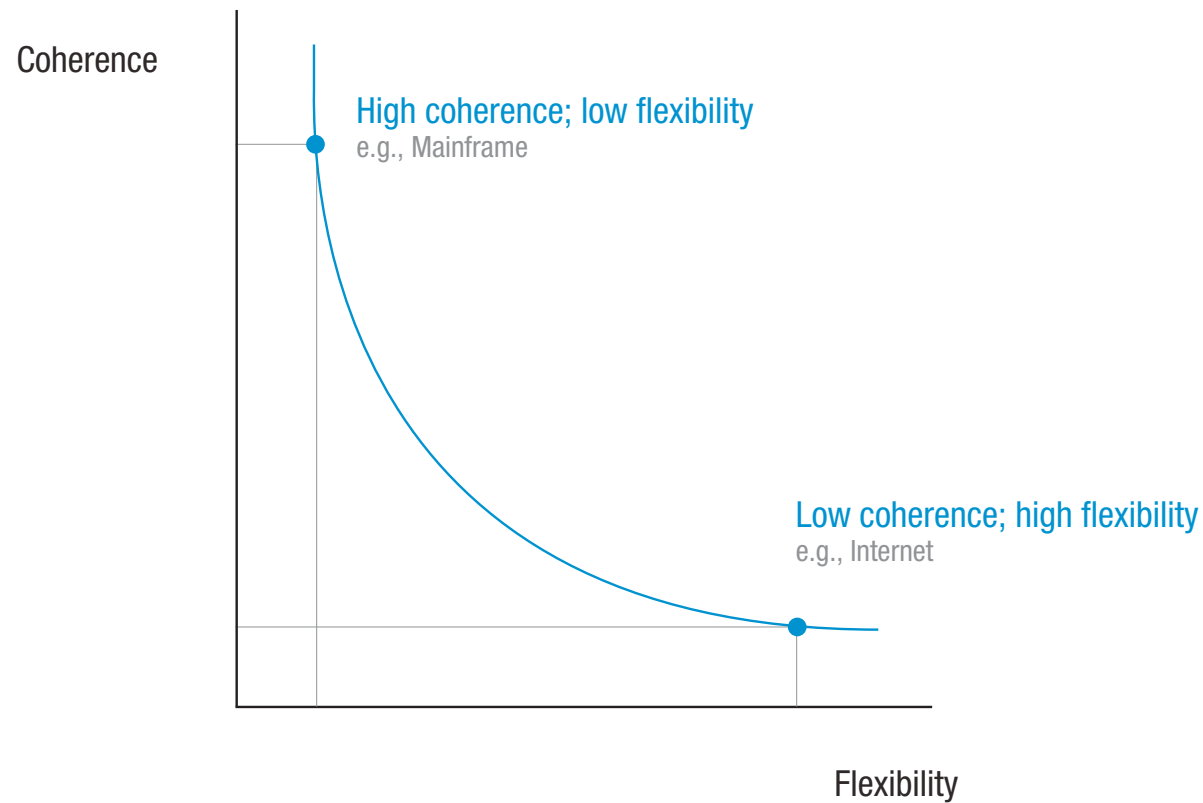# A big challenge in developing systems is balancing coherence and flexibility.

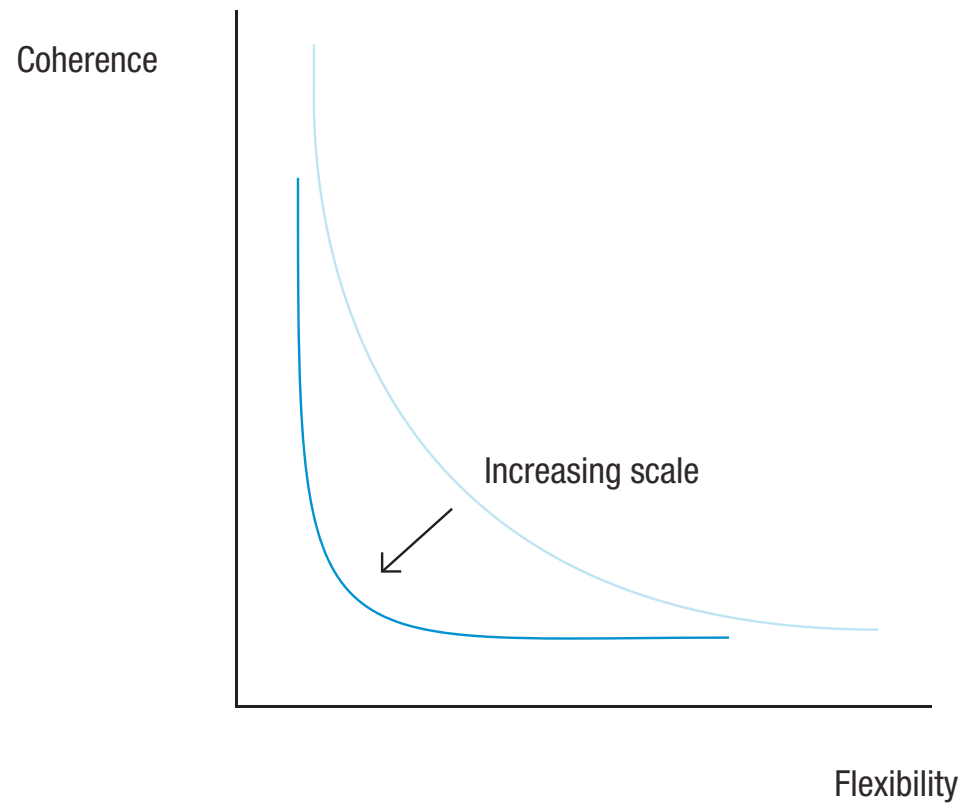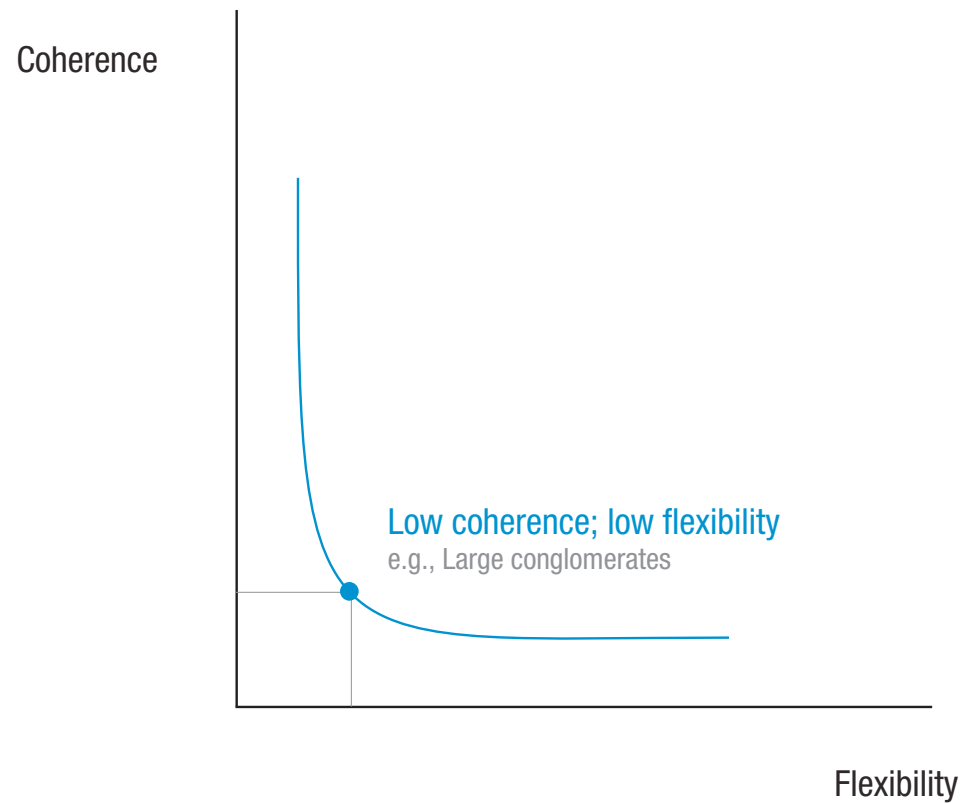|	
– Top-down	– Bottom up
– Apple walled garden	– Android open-source
– Cathedral	– Bazaar
– Steve Jobs management style	– Agile method
– Hardware editions	– Continuous release on the net
– Consistent	– Resilient

Mainframe   Internet

⟵————●————————————●————⟶

Coherence   vs.   Flexibility

These may be independent dimensions, which seem to require a tradeoff.

Coherence

High coherence; low flexibility
e.g., Mainframe

Low coherence; high flexibility
e.g., Internet

Flexibility

Increasing scale may make the trade-off worse.

Coherence

Increasing scale

Flexibility

As organizations grow they often become both less coherent and less flexible.

Coherence

Low coherence; low flexibility
e.g., Large conglomerates

Flexibility

Conversely, innovation or leadership may reduce the need for tradeoff.

Coherence

Increasing innovation
and leadership

Flexibility
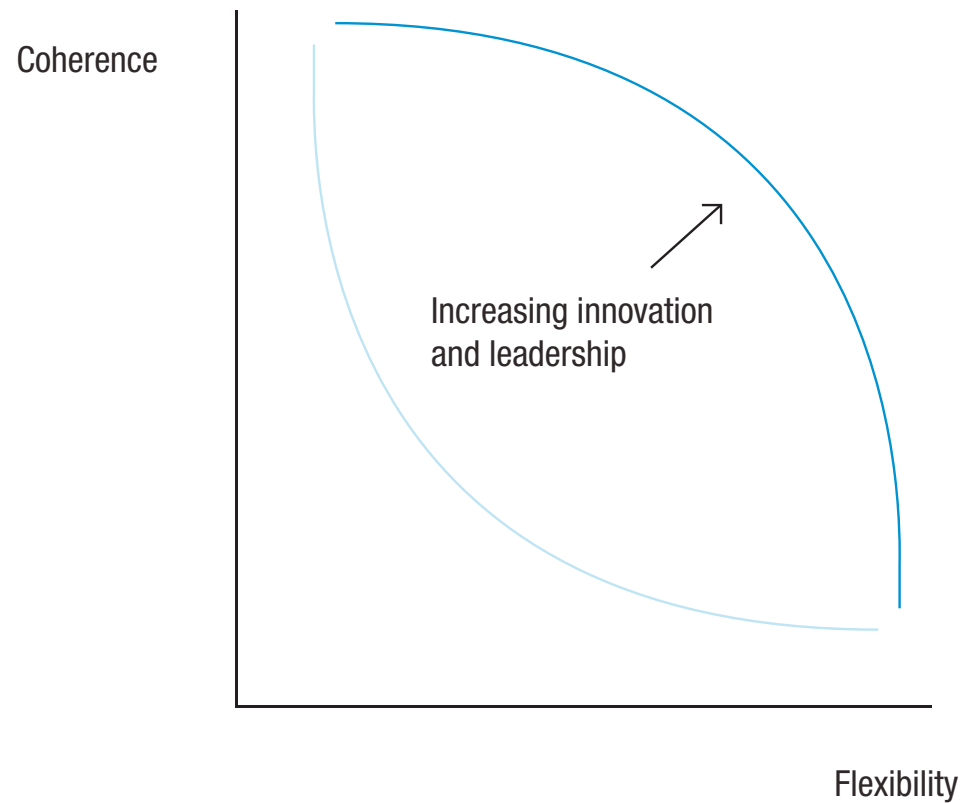
Great innovations, such as the U.S. Constitution, don't accept dilemmas.

Coherence

High coherence; high flexibility
e.g., U.S. Constitution

Flexibility
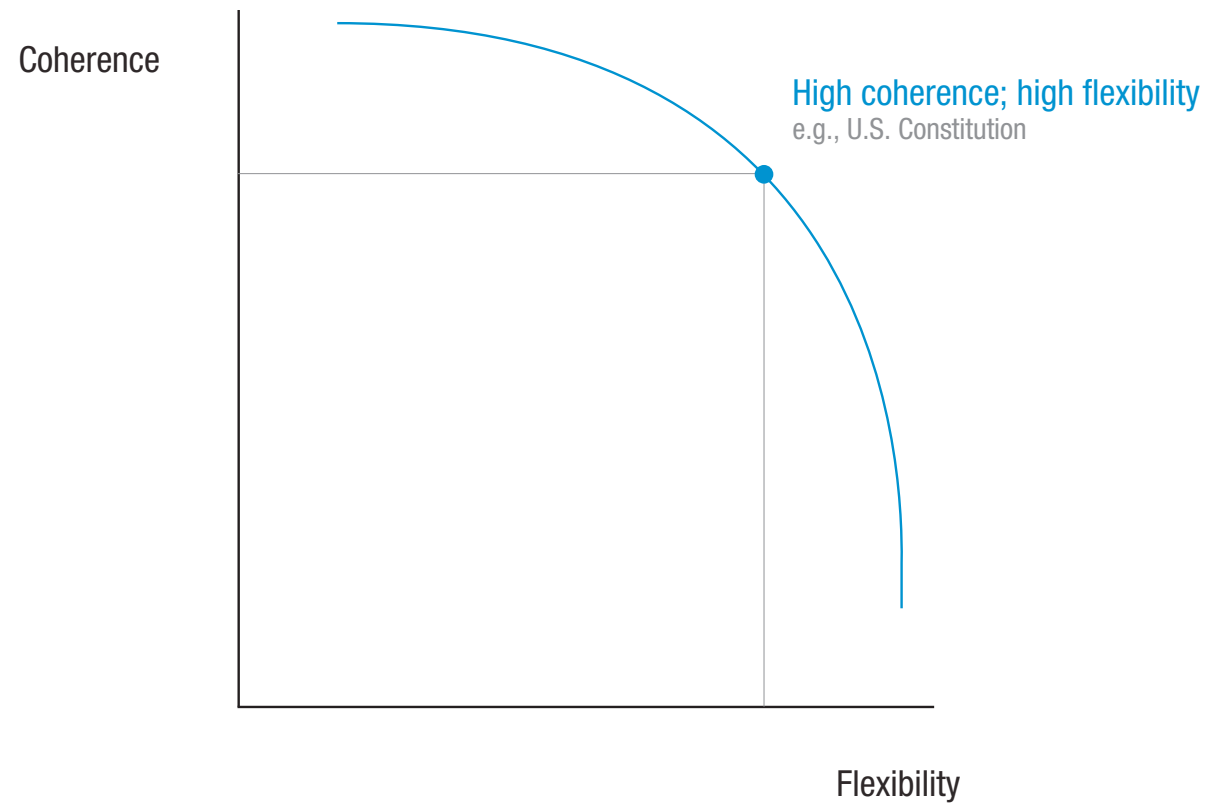
Design education focuses on the form of objects; much of practice does likewise.

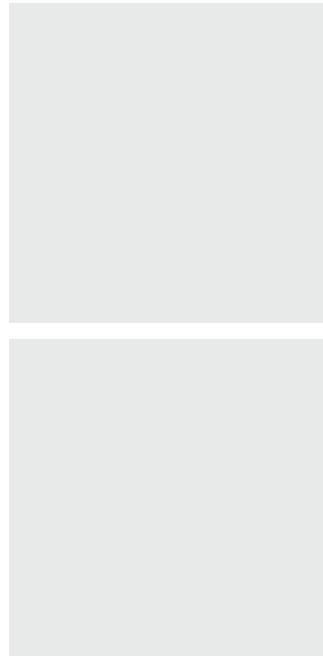**How** are we making it?
Form/Grammar
Syntactic
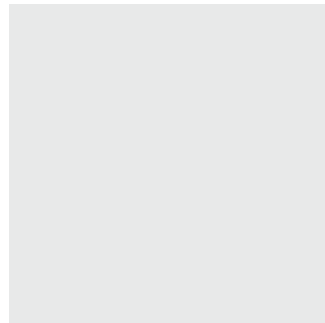
Object
Component

Form is governed by meaning and structure, though they are also affected by form.
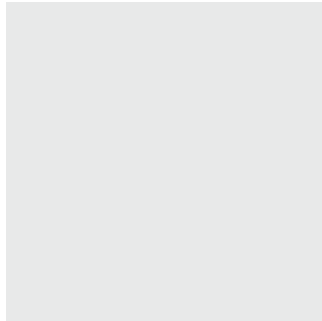
What are we making?
Meaning/Definition
Semantic

How are we making it?
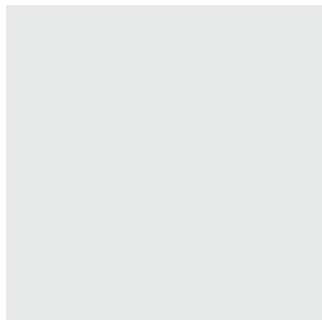Form/Grammar
Syntactic

Object
Component

Meaning + structure are governed by context; context is also affected by meaning + structure.

Why are we making this?
Context/Need
Pragmatic

What are we making?
Meaning/Definition
Semantic

How are we making it?
Form/Grammar
Syntactic

Object
Component

Objects are often embedded in systems.

Why are we making this?
Context/Need
Pragmatic

What are we making?
Meaning/Definition
Semantic

How are we making it?
Form/Grammar
Syntactic

Object
Component

System
Systems of components
Organism

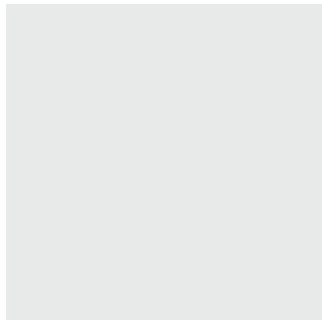# Systems are often embedded in ecologies—communities of systems.

Why are we making this?
Context/Need
Pragmatic

What are we making?
Meaning/Definition
Semantic

How are we making it?
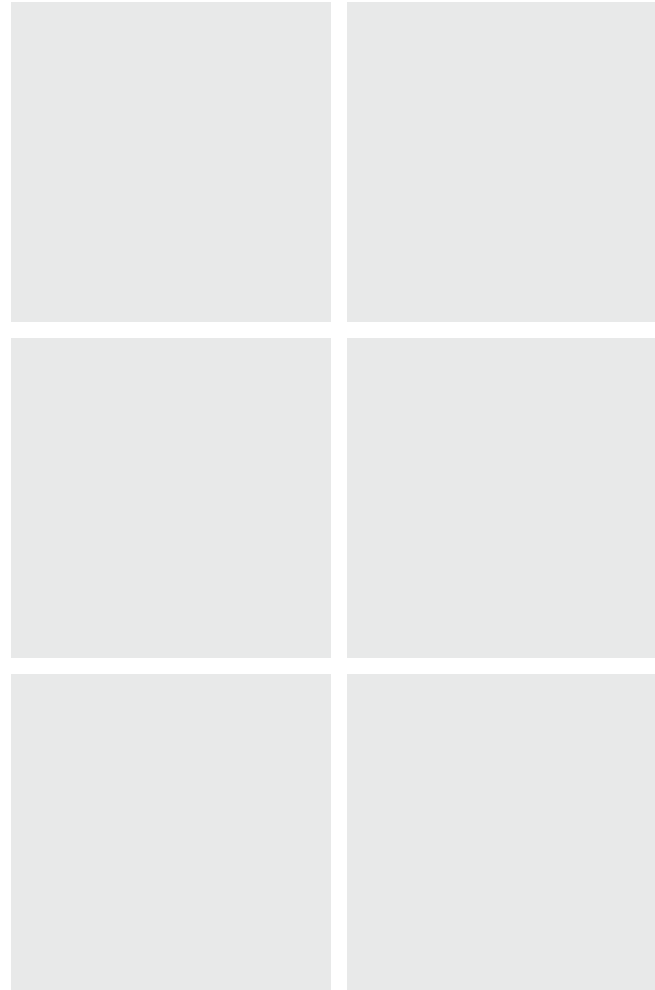Form/Grammar
Syntactic

Object
Component

System
Systems of components
Organism

Ecosystem
Systems of systems
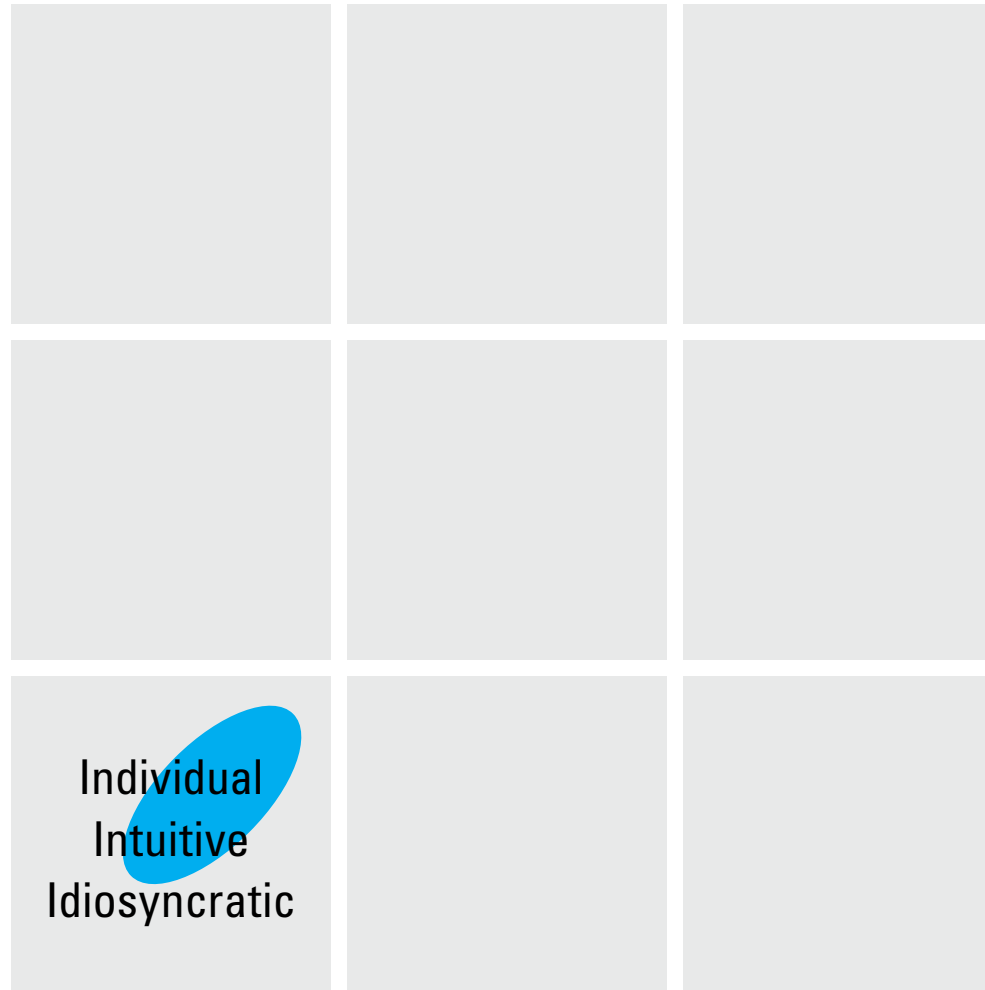Community
Market

Practice focused on the form of objects can be direct and unmediated.

Why are we making this?
Context/Need
Pragmatic

What are we making?
Meaning/Definition
Semantic

How are we making it?
Form/Grammar
Syntactic

Individual
Intuitive
Idiosyncratic

Object
Component

System
Systems of components
Organism

Ecosystem
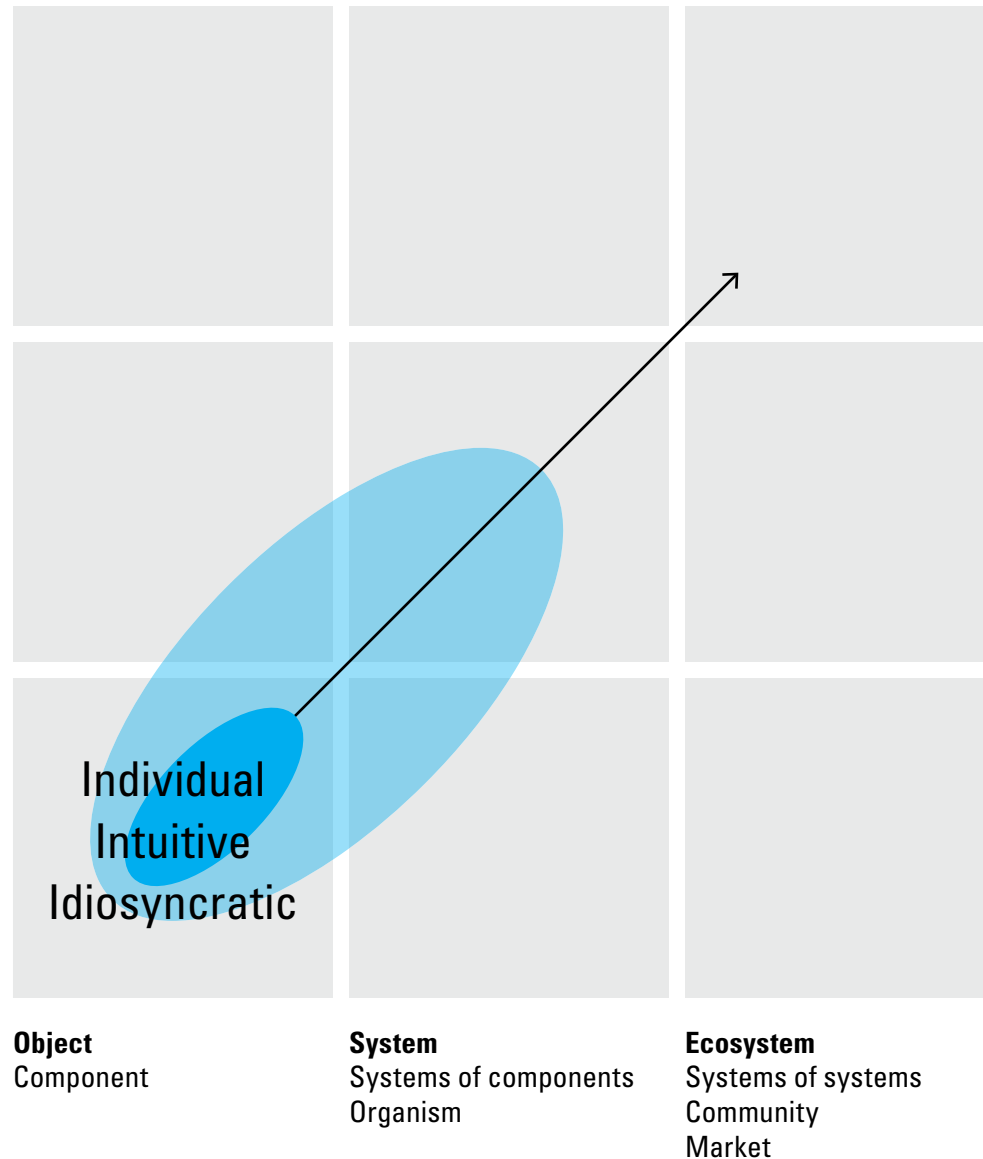Systems of systems
Community
Market

As practice expands, it becomes more complex.

Why are we making this?
Context/Need
Pragmatic

What are we making?
Meaning/Definition
Semantic

How are we making it?
Form/Grammar
Syntactic

Individual
Intuitive
Idiosyncratic

Object
Component

System
Systems of components
Organism

Ecosystem
Systems of systems
Community
Market

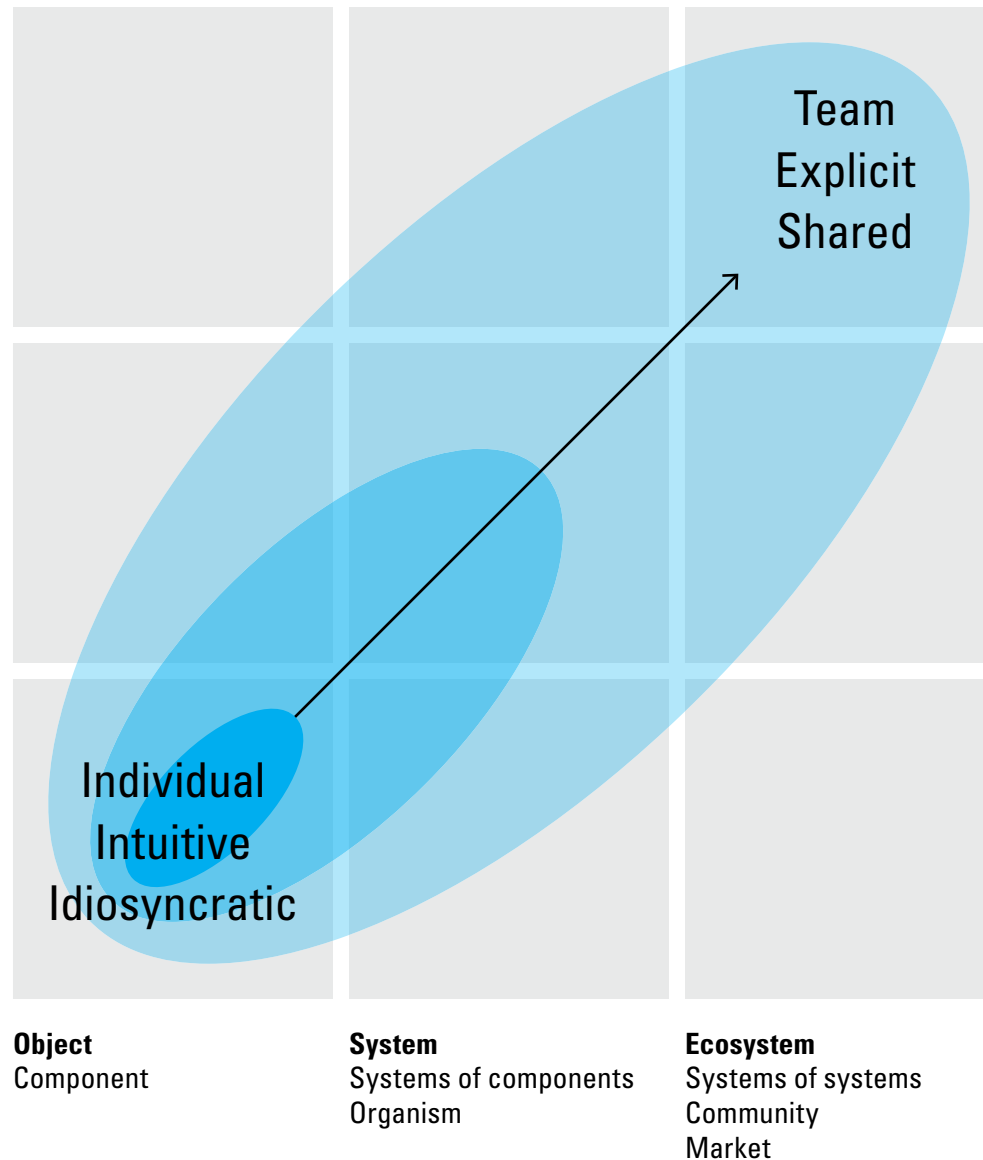# When practice also concerns context + ecologies, it requires shared methods.
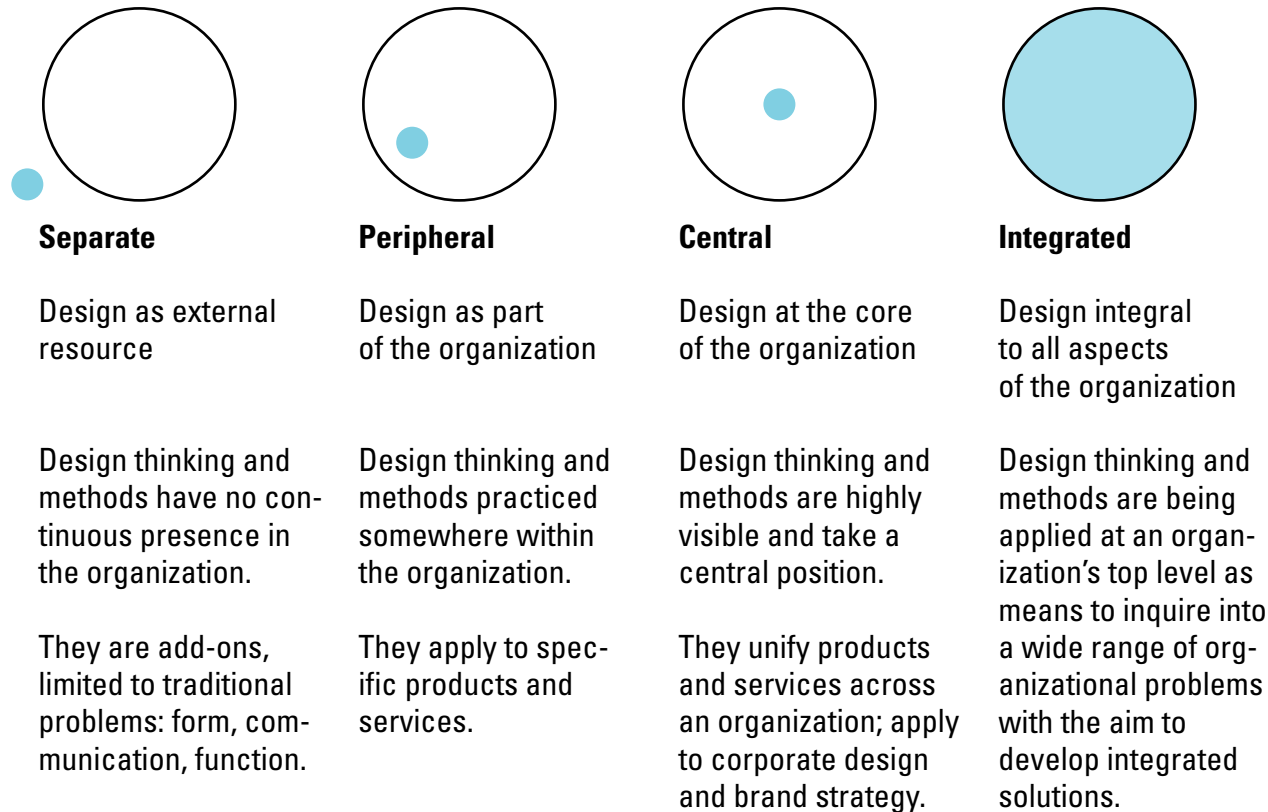
Why are we making this?
Context/Need
Pragmatic

Team
Explicit
Shared

What are we making?
Meaning/Definition
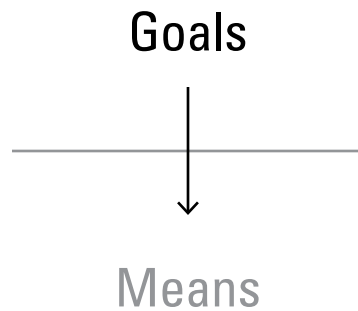Semantic

How are we making it?
Form/Grammar
Syntactic

Individual
Intuitive
Idiosyncratic

Object
Component

System
Systems of components
Organism

Ecosystem
Systems of systems
Community
Market

Possible relationships between a design function and the organization that it supports.

Separate	**Peripheral**	**Central**	**Integrated**
Design as external resource	Design as part of the organization	Design at the core of the organization	Design integral to all aspects of the organization
Design thinking and methods have no continuous presence in the organization.	Design thinking and methods practiced somewhere within the organization.	Design thinking and methods are highly visible and take a central position.	Design thinking and methods are being applied at an organization's top level as means to inquire into a wide range of organizational problems with the aim to develop integrated solutions.
They are add-ons, limited to traditional problems: form, communication, function.	They apply to specific products and services.	They unify products and services across an organization; apply to corporate design and brand strategy.	

— Sabine Junginger, 2009

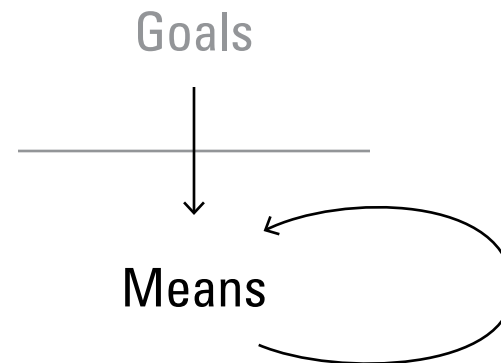# We often have conversations with ourselves.

Manager

Goals

Means

Reflecting:
Individual considers
possible goals.

Manager

Goals

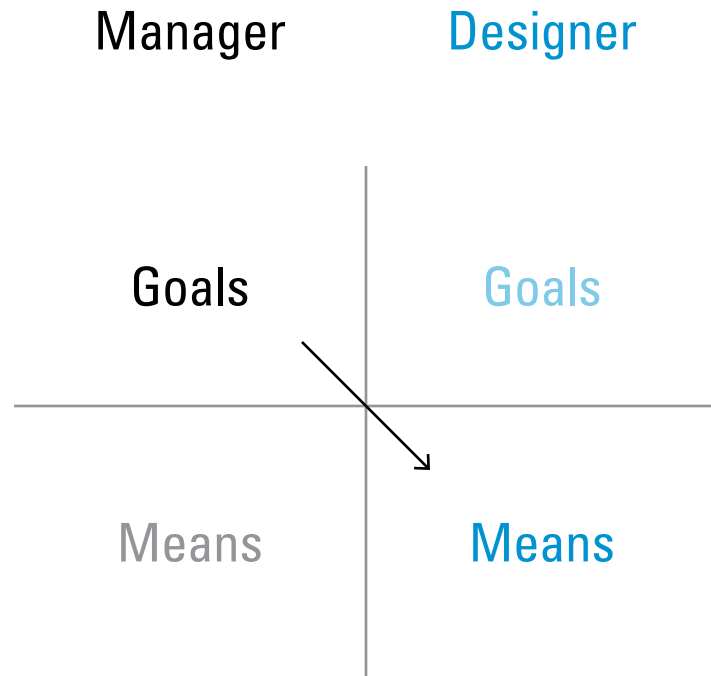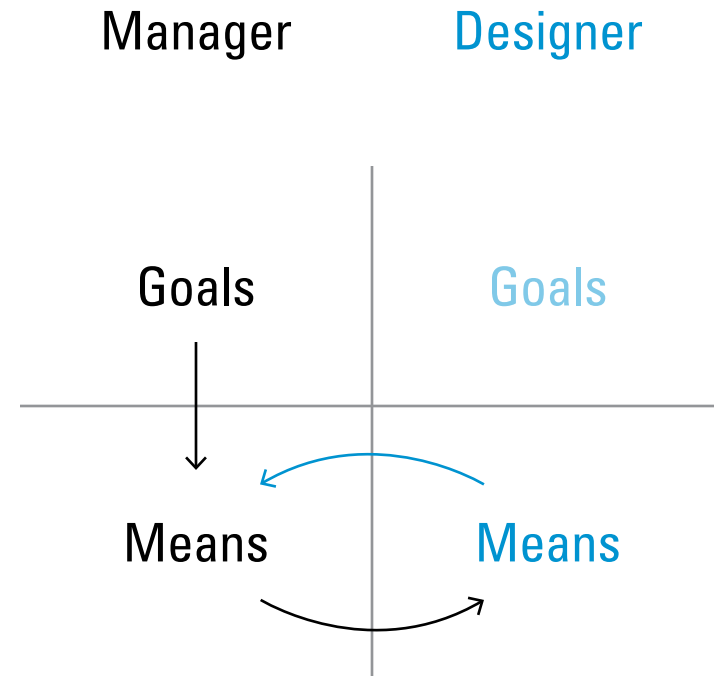Means

Reflection in action:
Individual considers
possible means
while executing

Traditional management is often hierarchical.

Manager   Designer   Manager   Designer

Goals   Goals   Goals   Goals

Means   Means   Means   Means

Controlling: **Mentoring:**
Manager tells designer   Manager sets goals
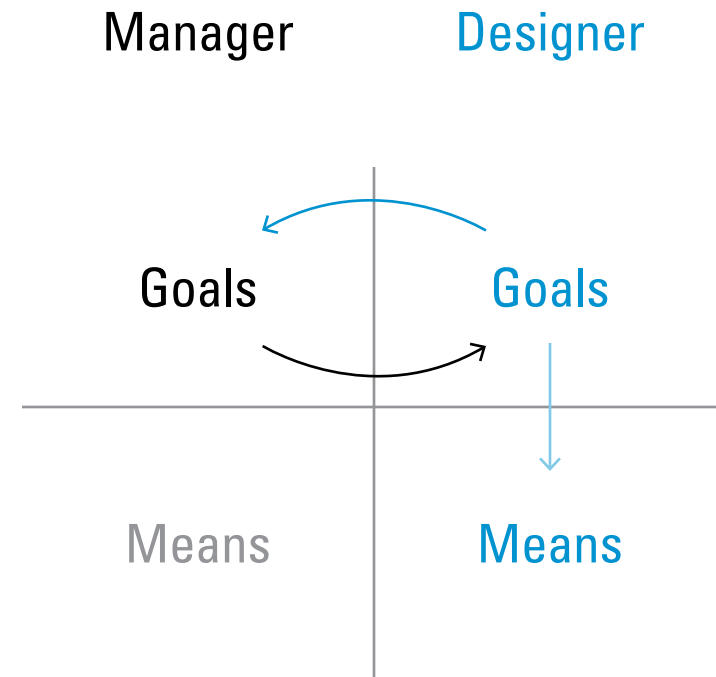what to do + how to do it;   but discusses means
designer executes.   with designer.

Information age management must be collegial.
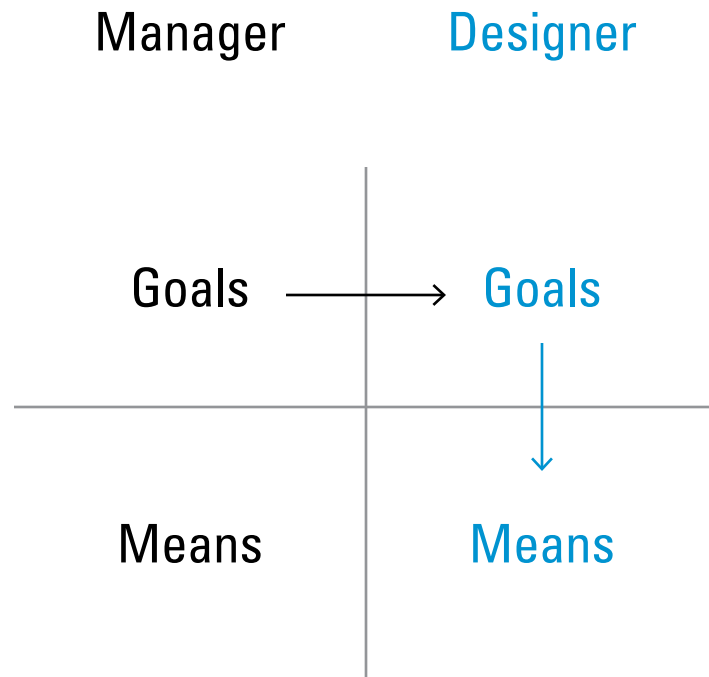
Delegating:
Manager sets goal
but leaves means
to the designer.

Collaborating:
Manager and designer
set goals together.

Great design, sustained over time, is the product of conversations that build relationships and trust.

Steve Jobs + Jonathan Ive	= Apple
Ed Catmul + John Lasseter	= Pixar
Tom Watson, Jr. + Eliot Noyes	= IBM
Walter Paepke + Herbert Bayer	= Container Corp.
Adriano Olivetti + Marcello Nizzoli	= Olivetti
Artur & Erwin Braun + Dieter Rams	= Braun
Max Dupree + George Nelson	= Herman Miller
William Paley + William Golden	= CBS
Frank Stanton + Lou Dorfsman	= CBS
Hans Knoll + Florence Schust	= Knoll
Martha Stewart + Gael Towey & Eric Pike	= Martha Stewart

Special thanks to
Shelley Evenson
Paul Pangaro
Jon Pittman
Michael Gallagher