

MBA 290T / ENG 290  
Haas School of Business  
UC Berkeley  
23 April 2012

# Models for managing design

Hugh Dubberly  
Dubberly Design Office

# How many designers does it take to change a light bulb?



**How many designers does it take  
to change a light bulb?**

**Why does it have to be  
a light bulb?**

# What is design?

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# What is design?

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Art and aesthetics?

Science and problem solving?

Politics and rhetoric?

# 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** → **B**

or

**A** → **B** → **C** → **D** → **E**

or perhaps

**10** → **3** → **1**

or even

**A** → **B** → **C** → **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.

## **Criteria for identifying wicked problems:**

- 1 No definitive formulation
- 2 No stopping rule
- 3 Solutions are not true-or-false but good-or-bad
- 4 No immediate and no ultimate test of a solution
- 5 Every solution is a “one-shot operation”
- 6 The set of potential solutions cannot be enumerated
- 7 Essentially unique
- 8 A symptom of another problem
- 9 Choice of explanation determines the resolution
- 10 The planner has no right to be wrong

— Horst Rittel & Melvin Webber, *Dilemmas In a General Theory of Planning*, 1972

# Principles for taming wicked problems:

- 1 Diverse backgrounds are required
- 2 Maximize involvement
- 3 Every step is a judgment
- 4 Reasons for judgments should be made explicit
- 5 The process cannot be “objective”
- 6 The planner is a facilitator
- 7 Casting doubt is a virtue
- 8 Activism and optimism are required
- 9 Risk should be shared widely
- 10 The process is argumentative

— Horst Rittel, *On the Planning Crisis*, 1972

“There is a **symmetry of ignorance** among those who participate, because nobody knows better by virtue of his degrees or his status.”

“Dealing with wicked problems is **always political.**”

— Horst Rittel

**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** = **setting a vision**  
(AKA brand management)

**Program management** = **managing dependencies**

**Project management** = **managing resources**  
(time + money + people)

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

**Design  
School**

**Product  
Management**

**Business  
School**

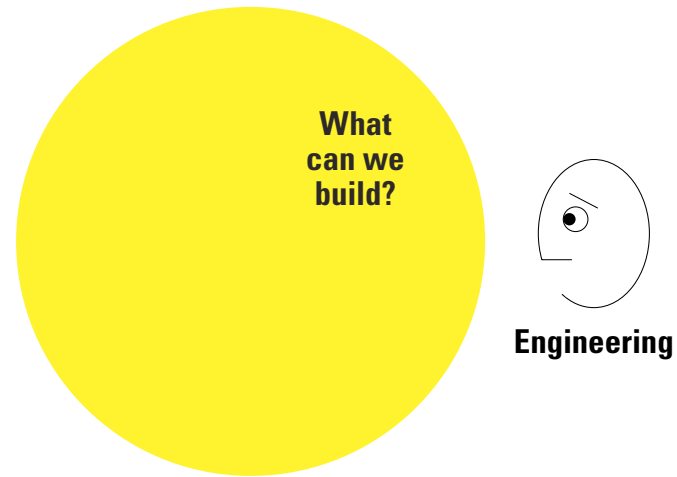
# Product management should be taught in both design schools and business schools.



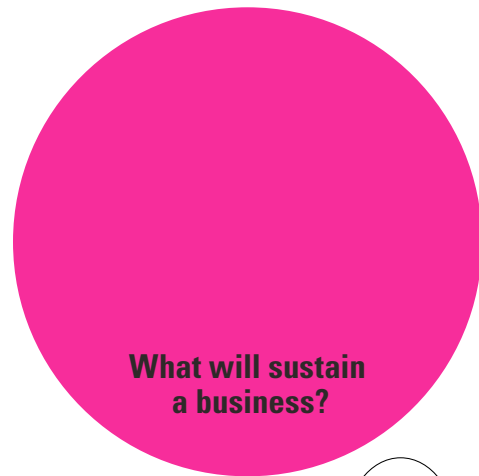
# **People who make products don't agree on how to do it.**

- 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.



# Managers tend to focus on making money.

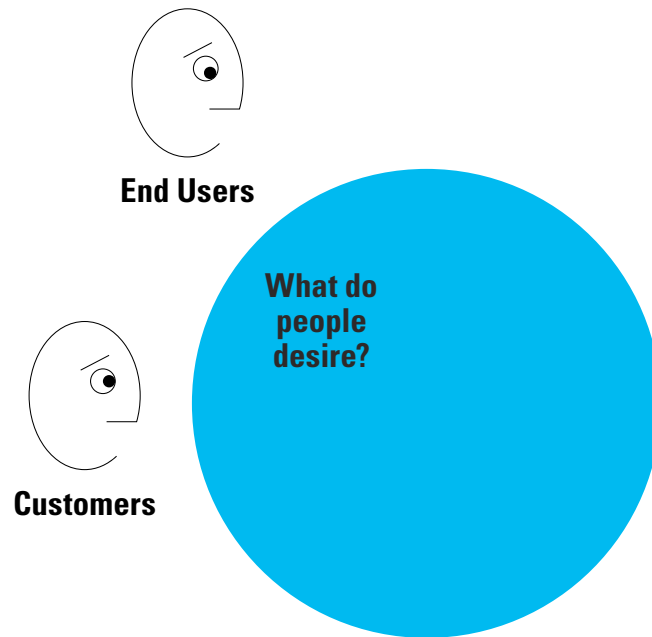


**What will sustain  
a business?**



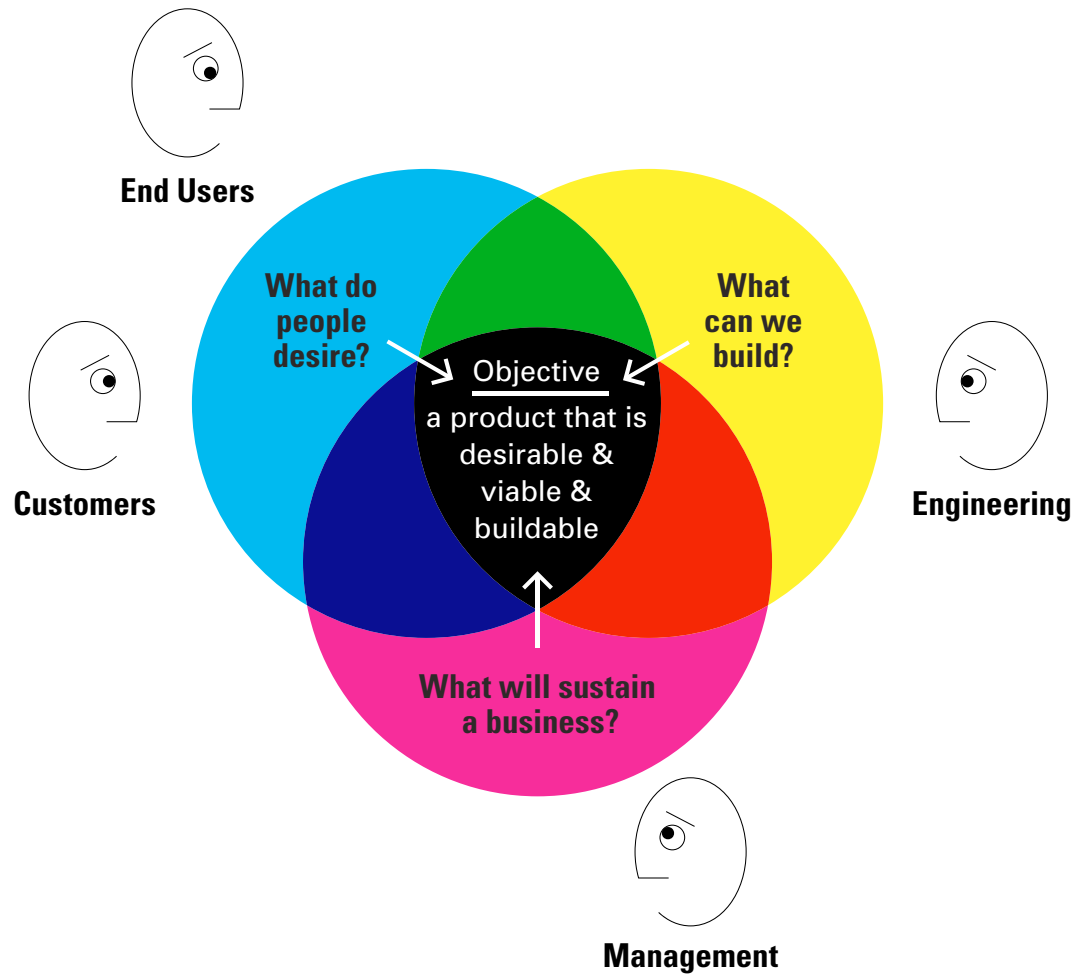
**Management**

**Designers tend to focus on **users** and their **goals**, taking a “user-centered approach” to their work.**

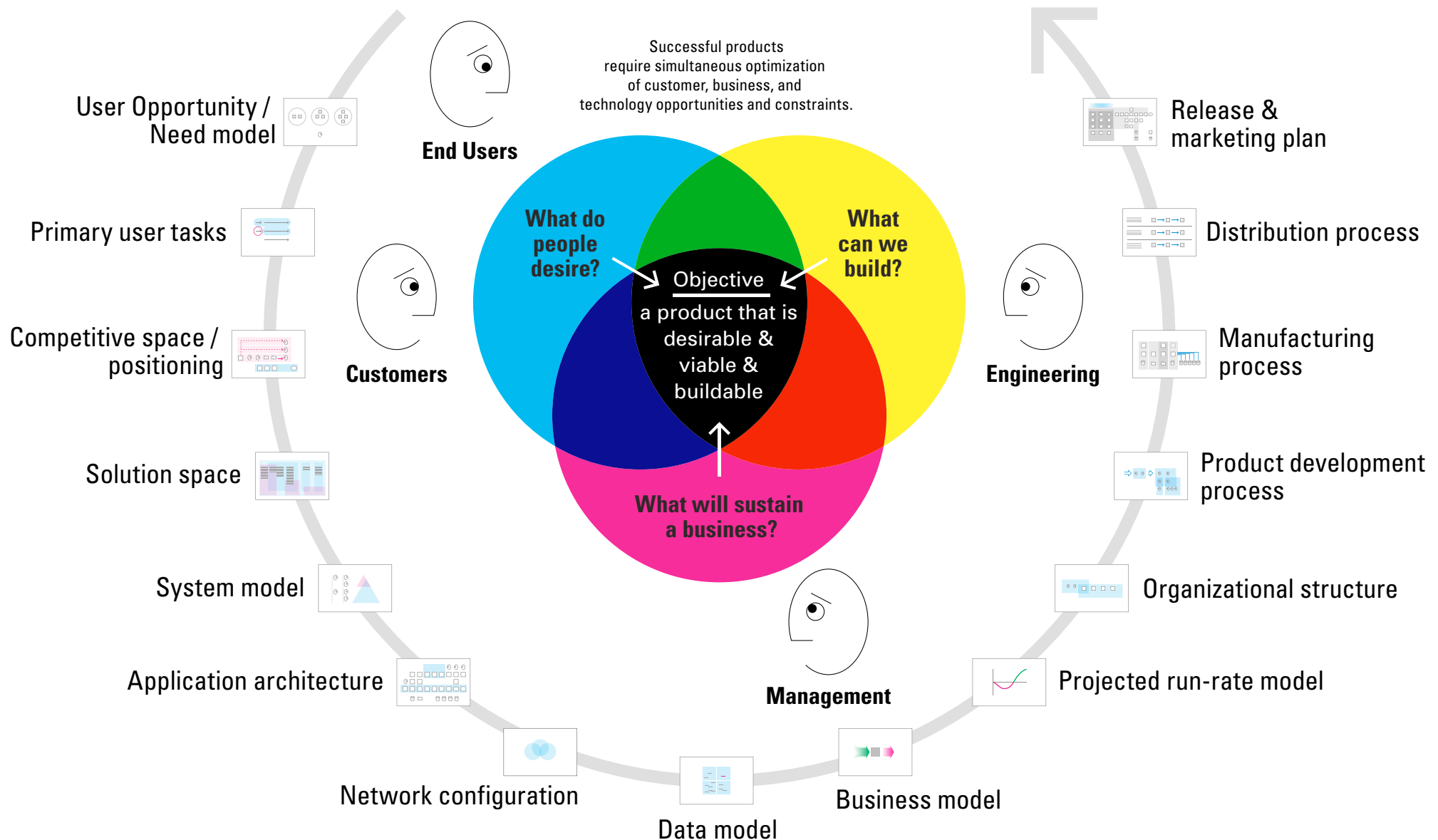




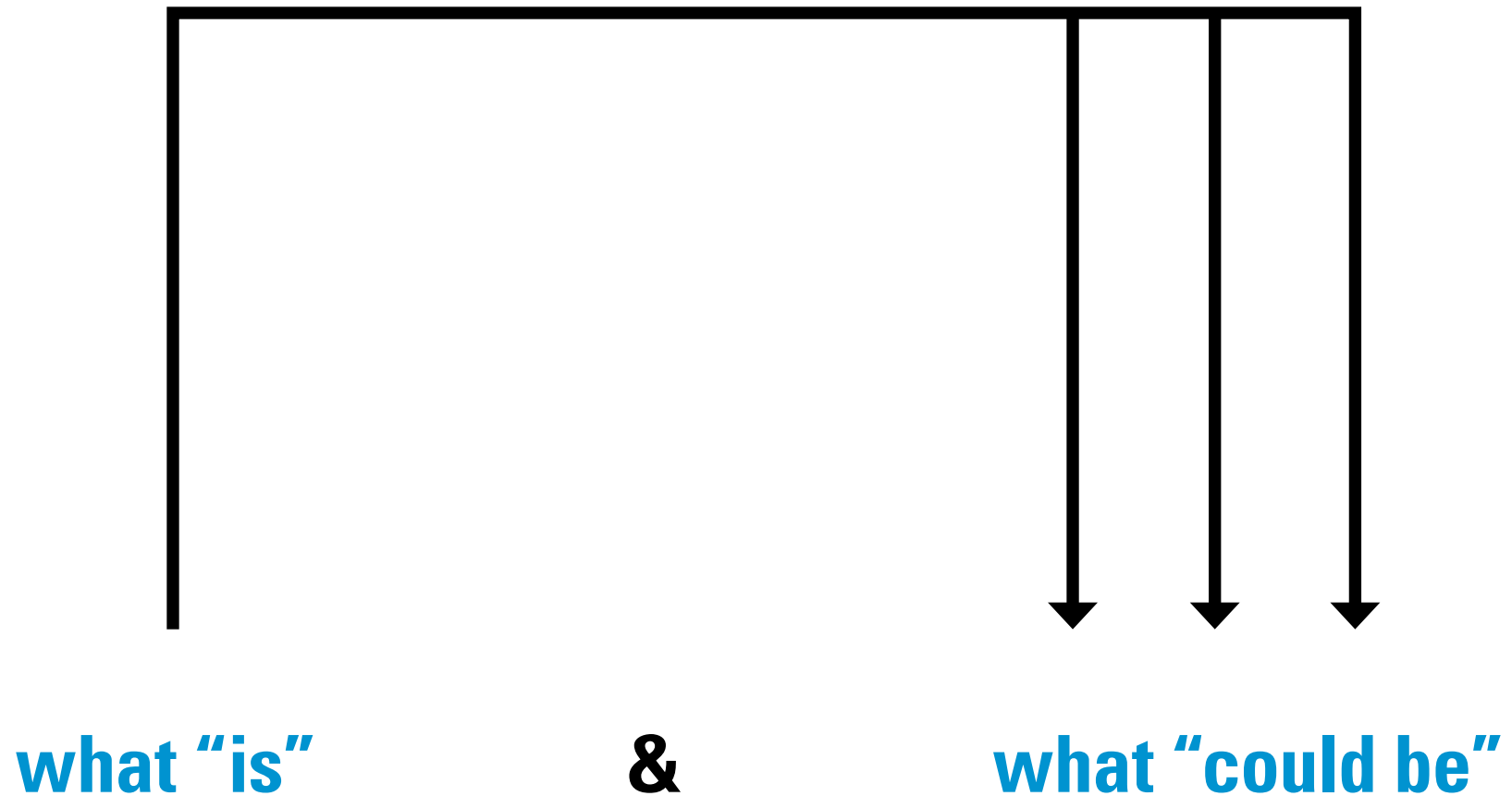
# Successful products meet several criteria:



# Each criteria suggests a series of models.



# Designers bridge the gap between

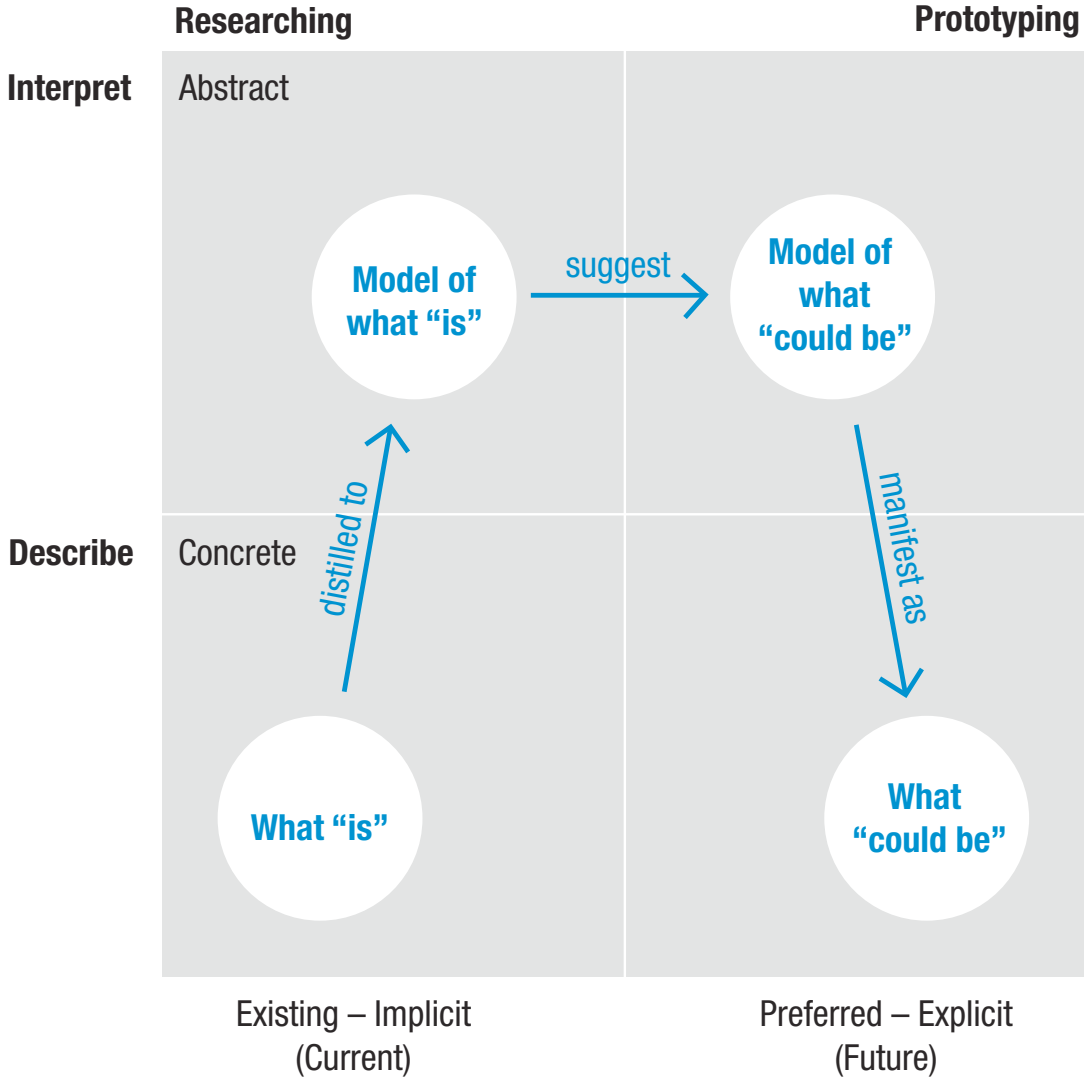




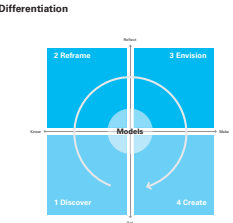
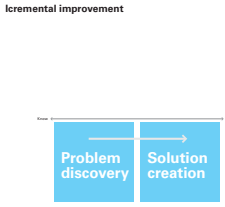
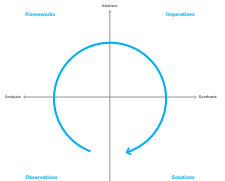
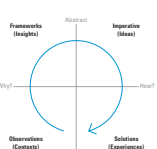
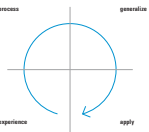
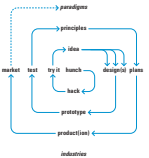
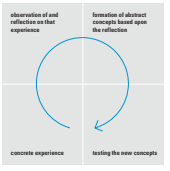
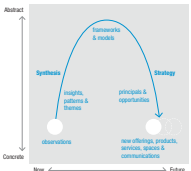
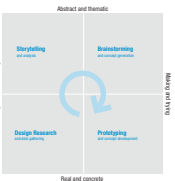
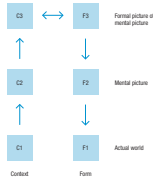
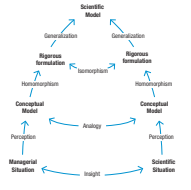
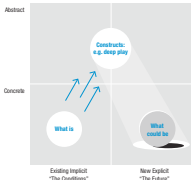
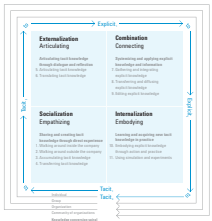
**or “should be”**

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

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

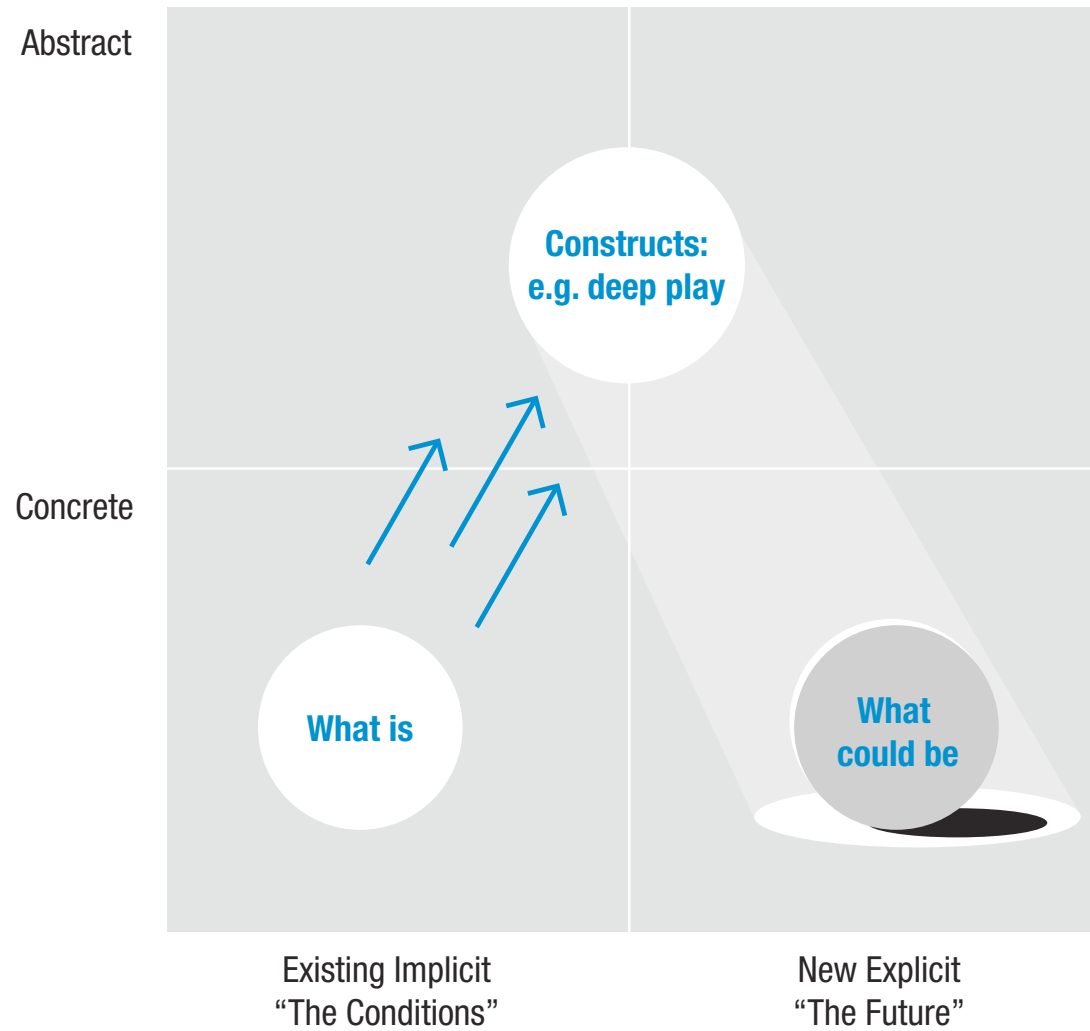


# The bridge model has many variations and is shared by many others.



# 1

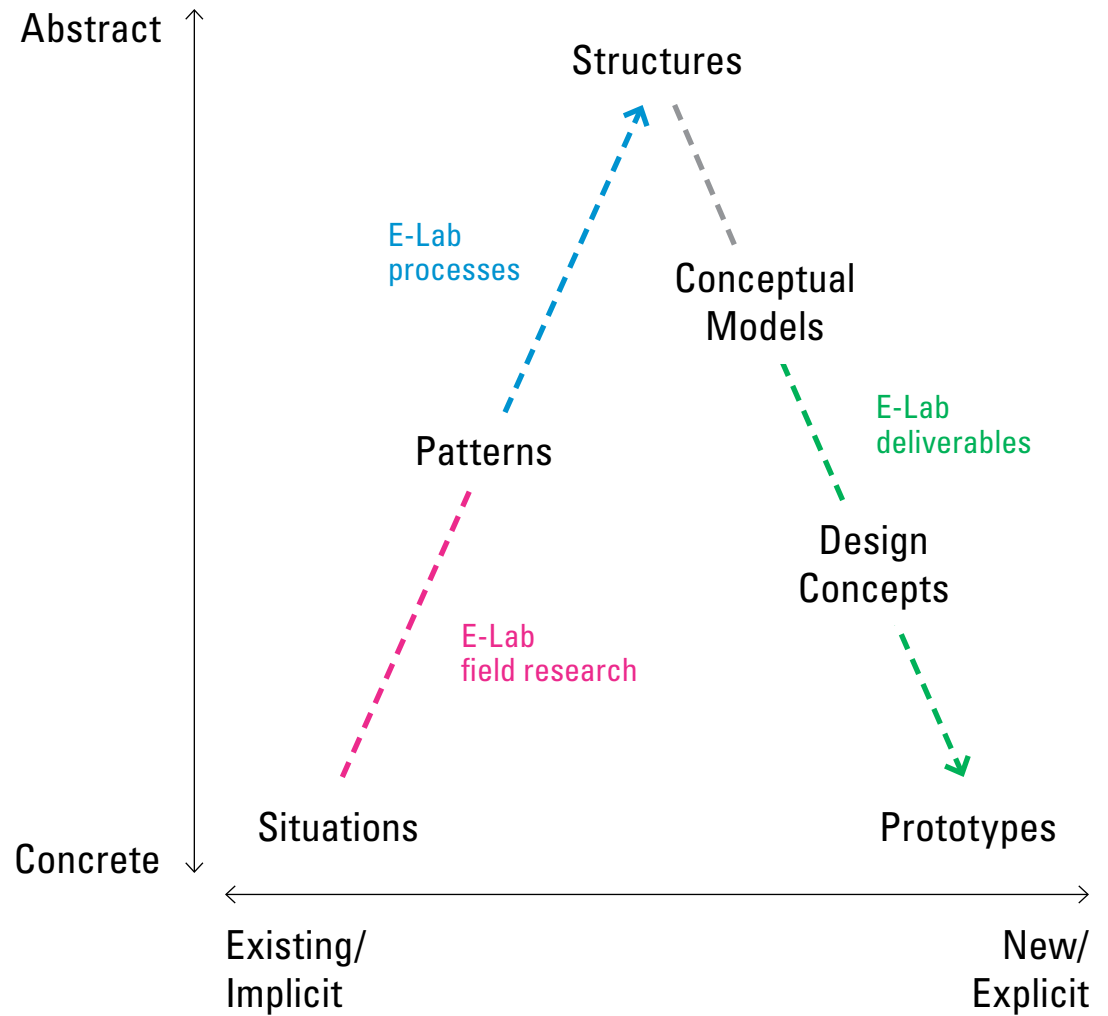
**Robinson Model**  
Rick Robinson  
(2005)



# 2

## Design Research Process

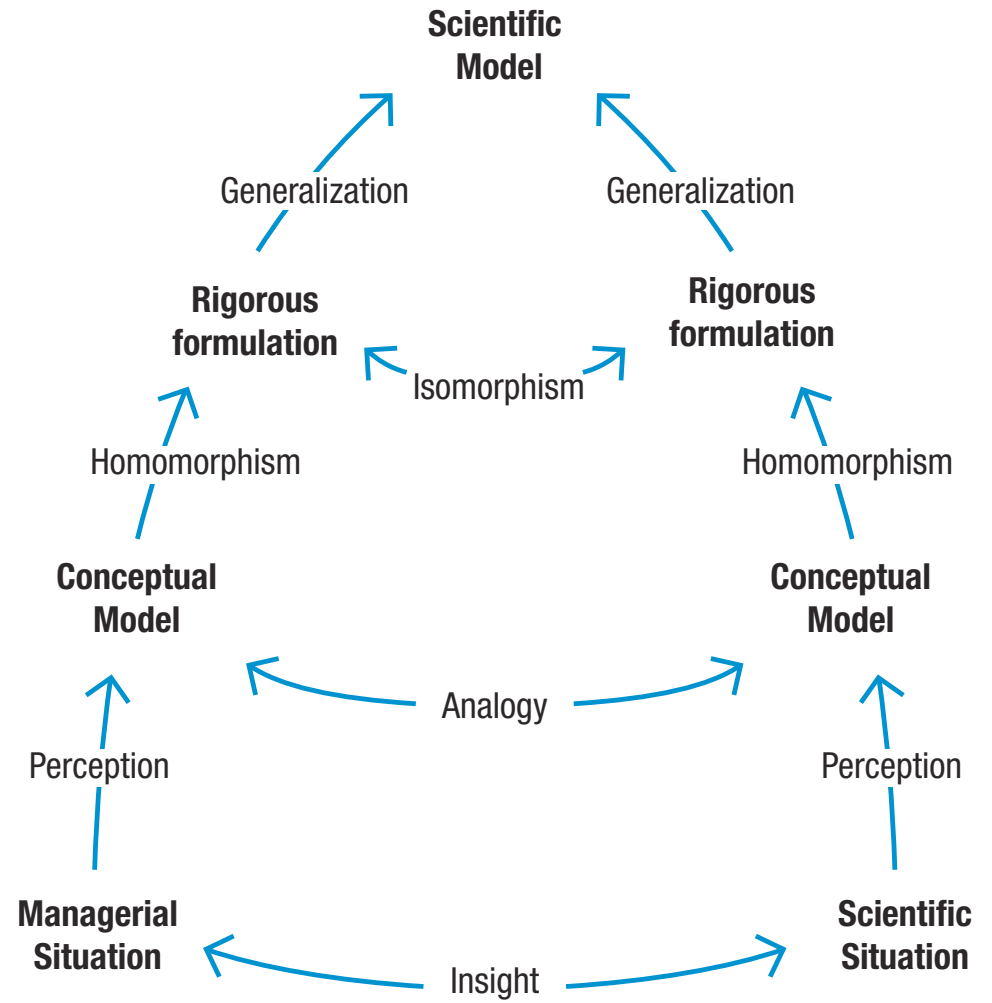
Rick Robinson & John Cain, E-Lab  
(1993)





# 3

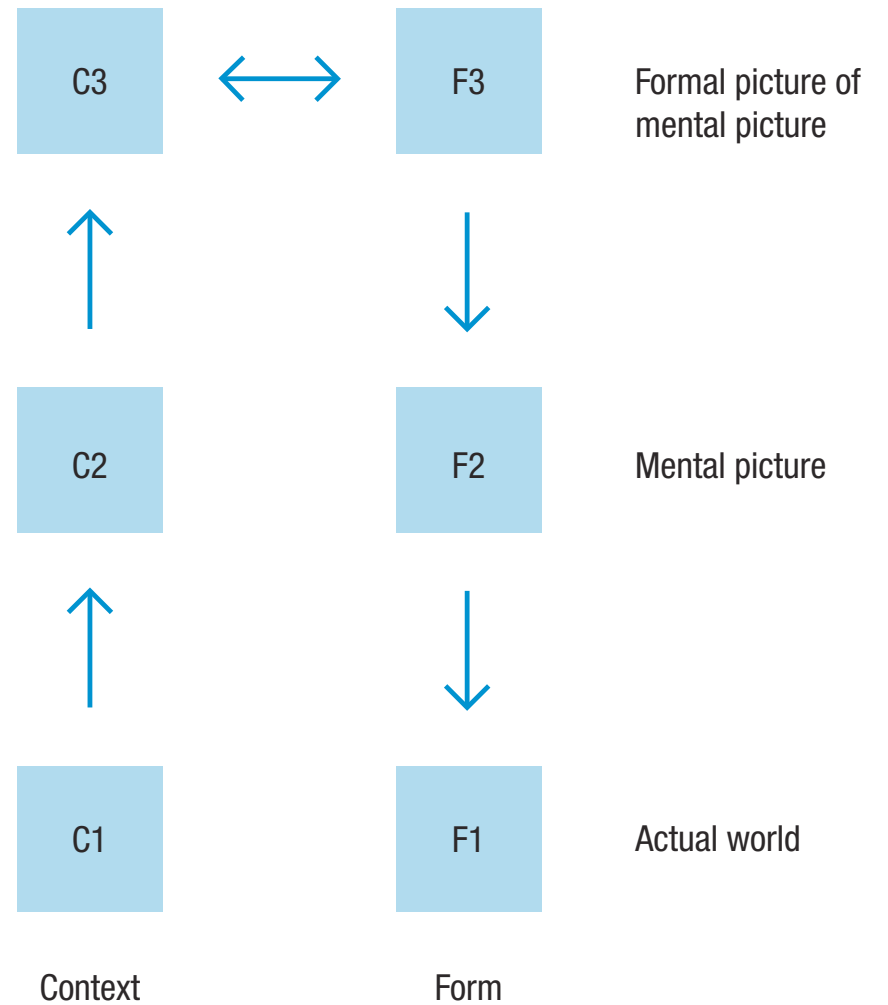
## Beer Model Stafford Beer (1966)



# 4

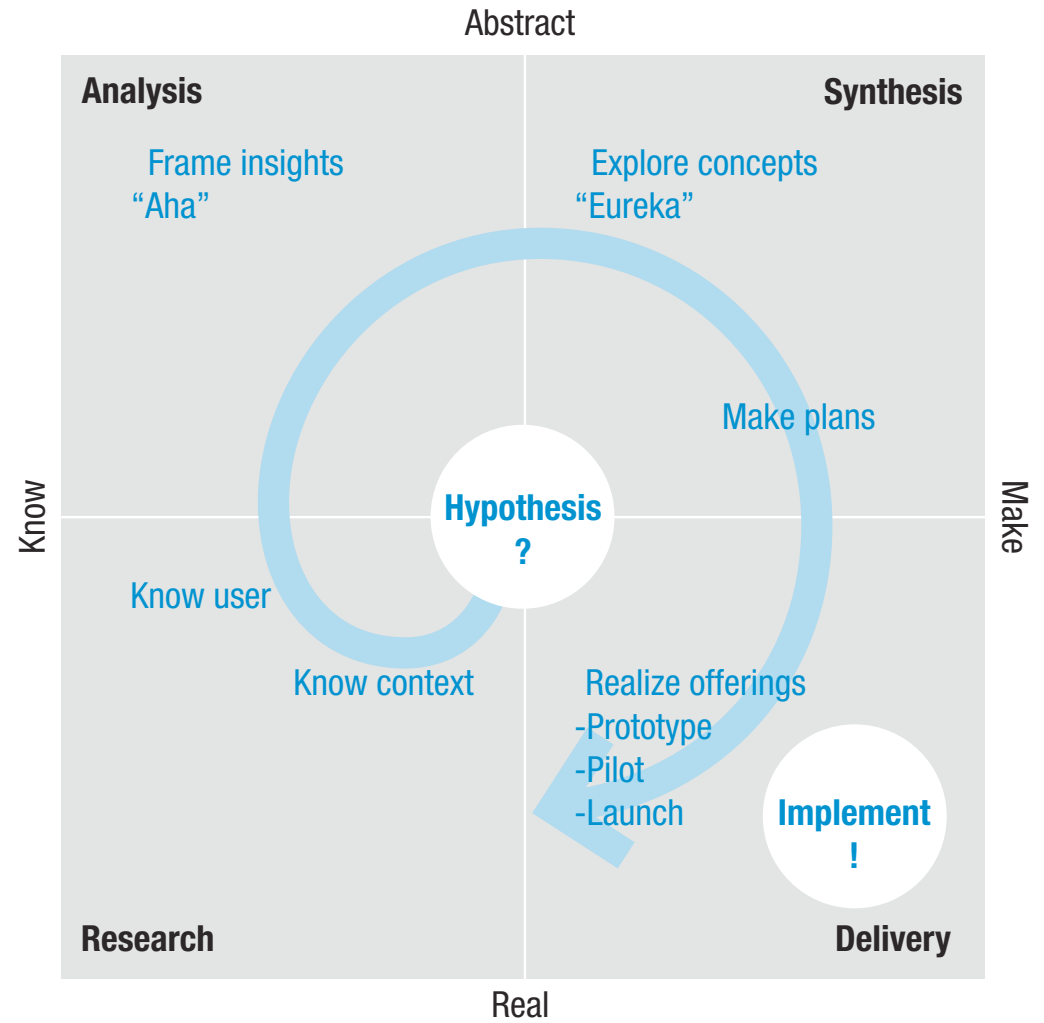
## Alexander Model

Christopher Alexander  
(1964)



# 5

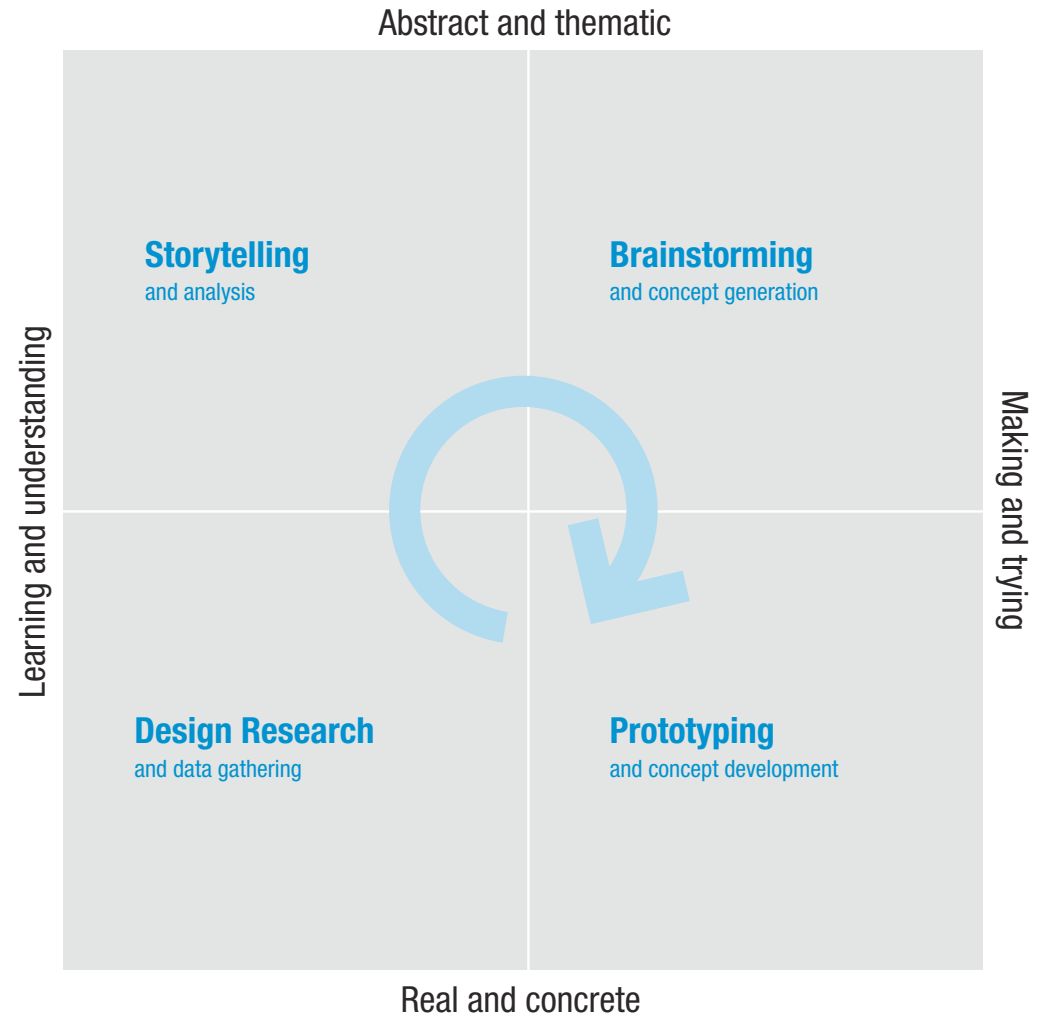
## Kumar Model Vijay Kumar (2003)



# 6

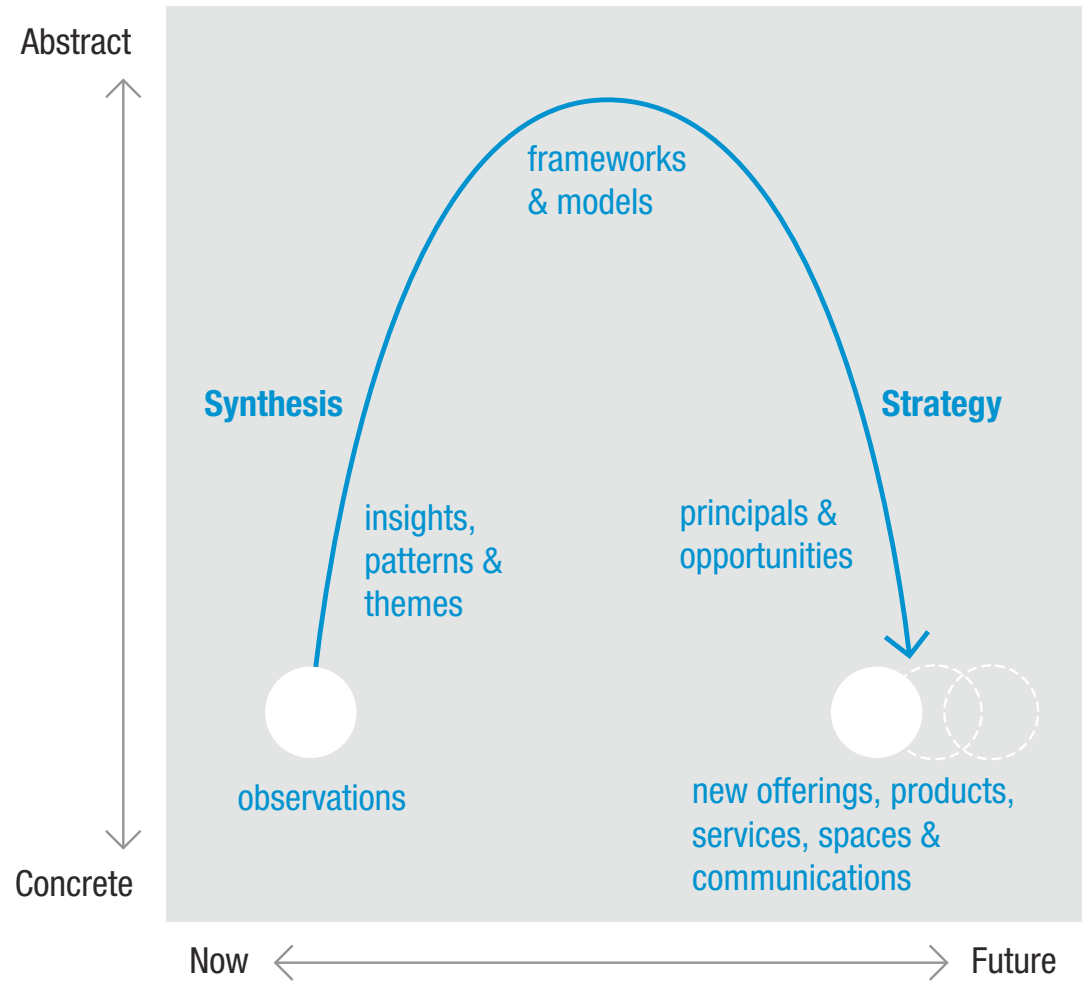
## Kaiser-IDEO Model

Kaiser Innovation Center + IDEO  
(2004)



# 7

## Suri-IDEO Model Jane Fulton Suri (2006)

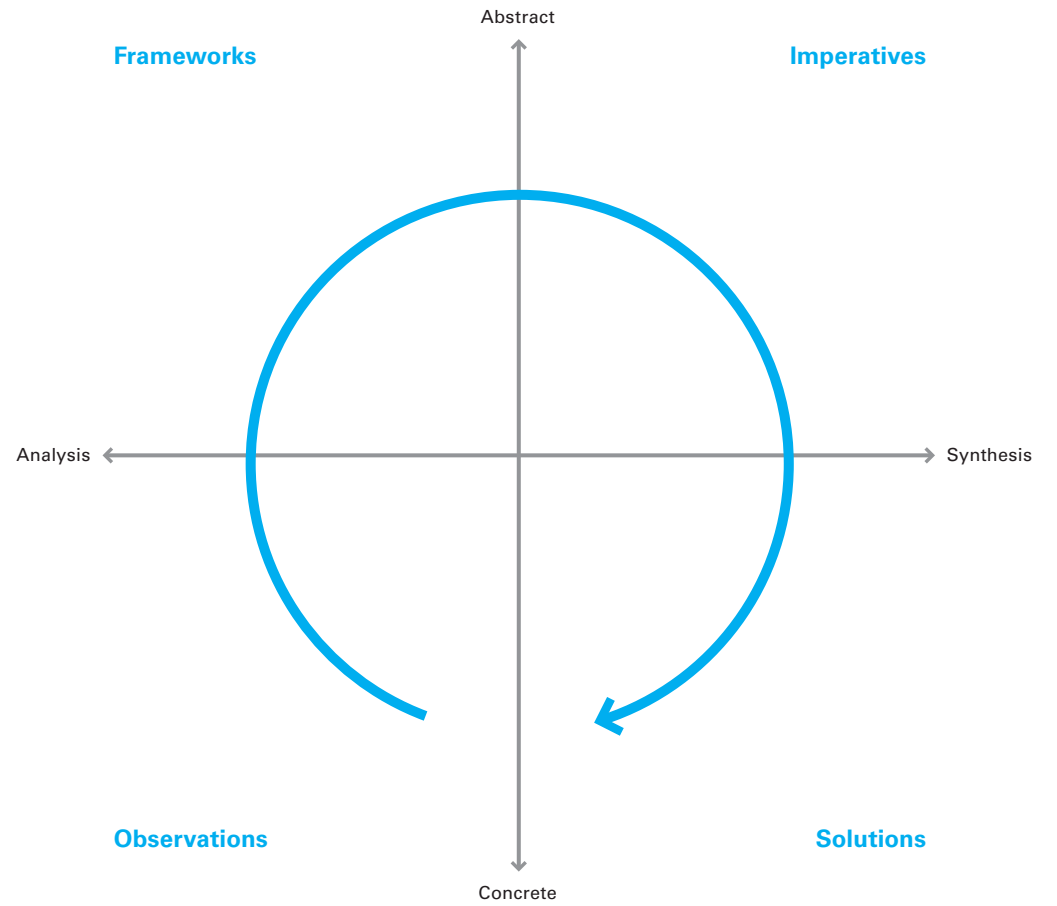




# 9

## The Jump Explore Process

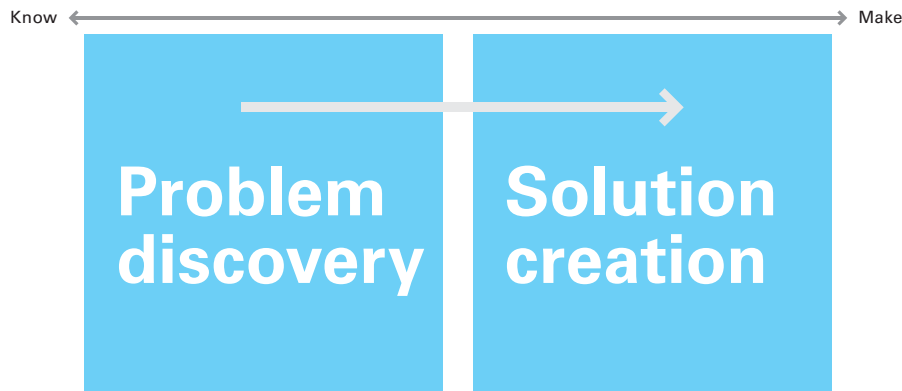
Colleen Murphy, Jump Associates  
(2009)



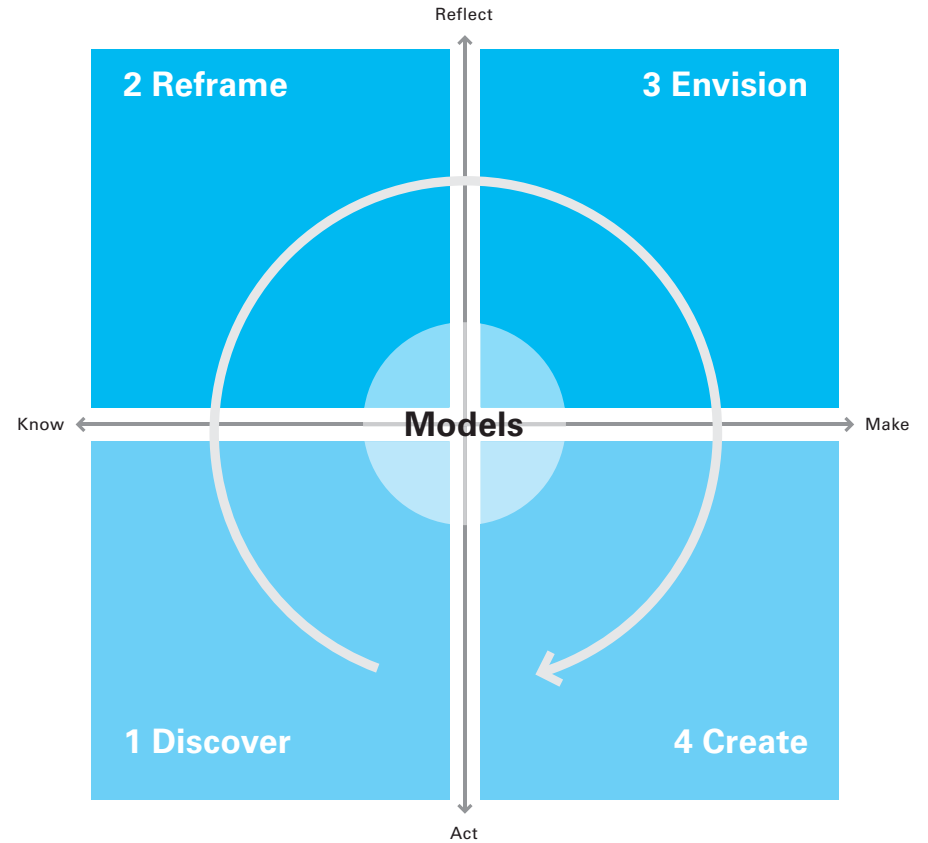
# 10

## Differentiation Model

Joanne Mendel  
(2010)



**Incremental improvement**

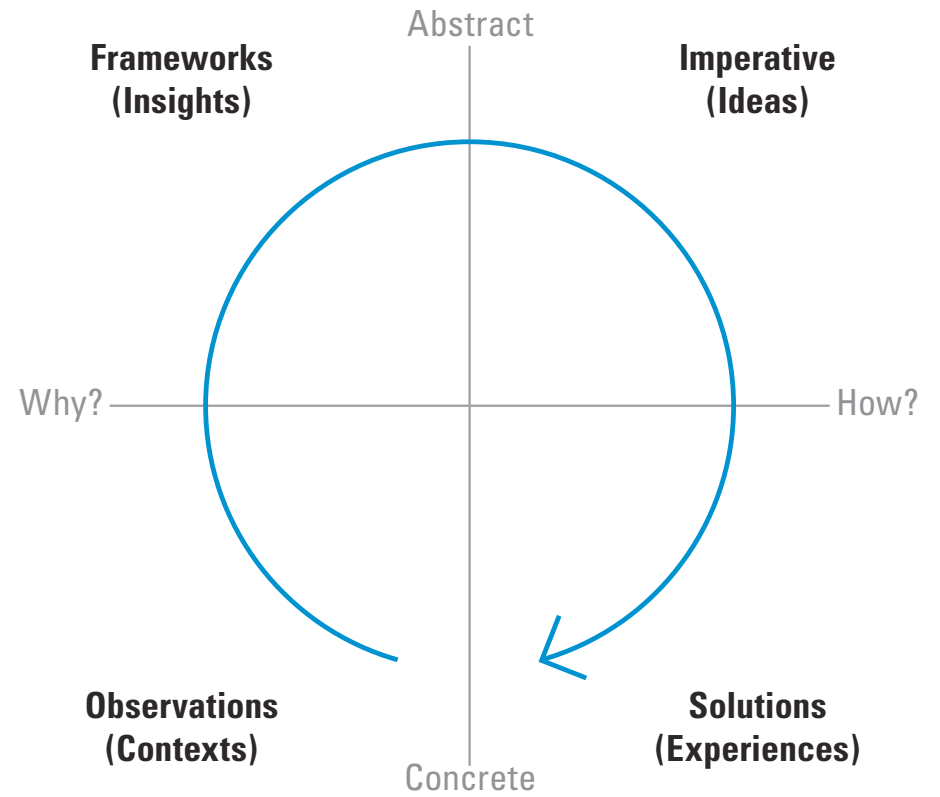


**Differentiation**



# 11

**Design Process**  
Sara Beckman  
(2010)

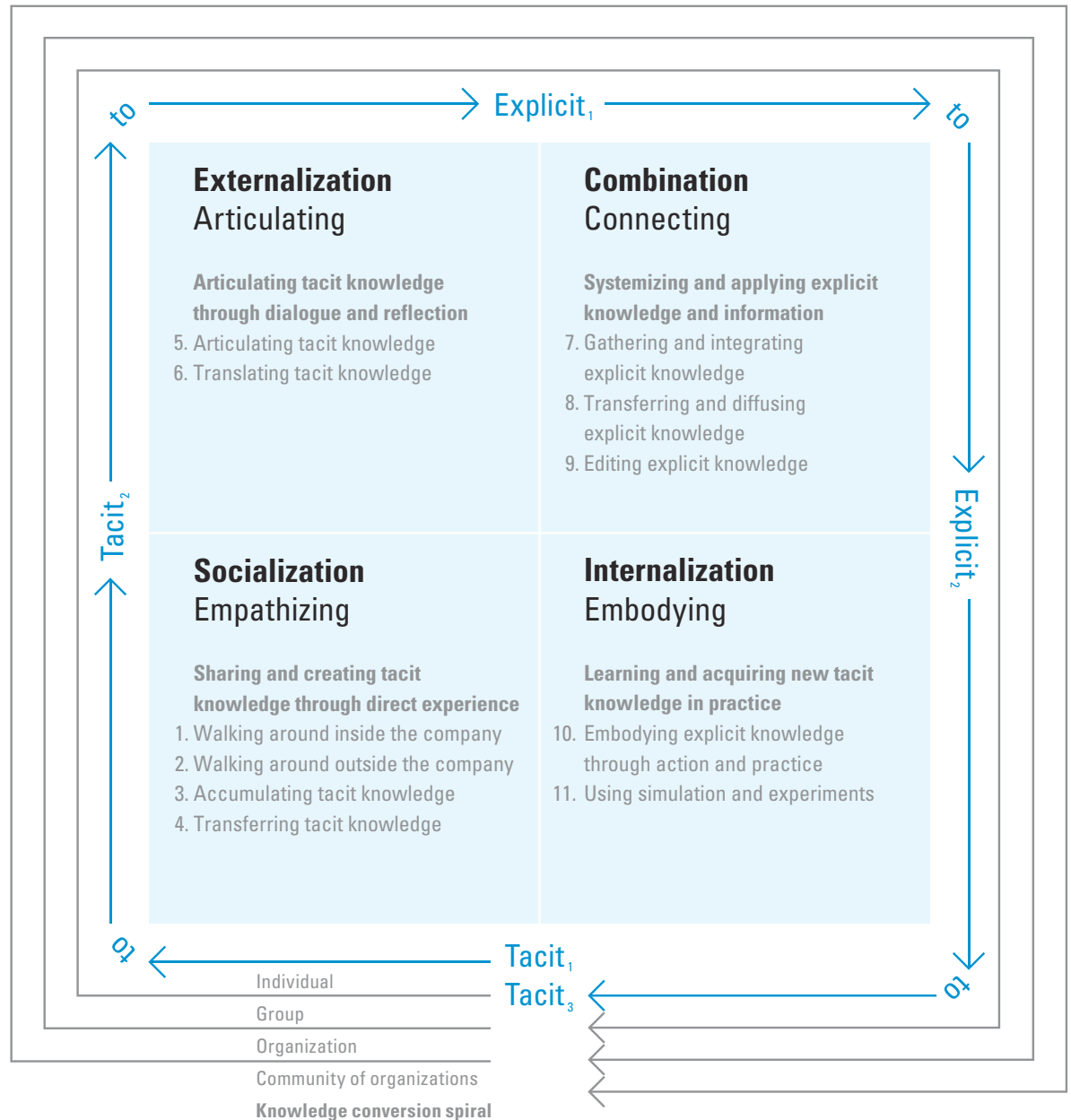


# Learning bridges the gap between

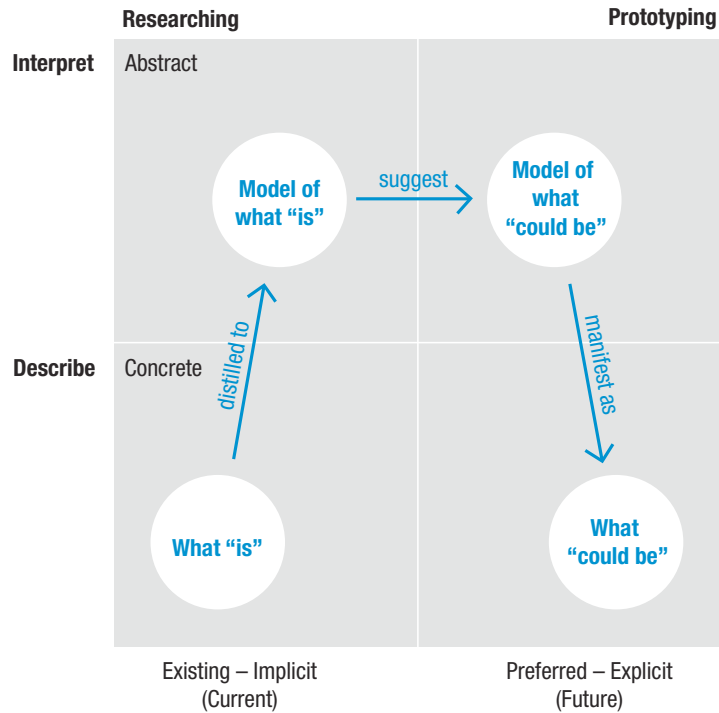


# This model describes the learning process.

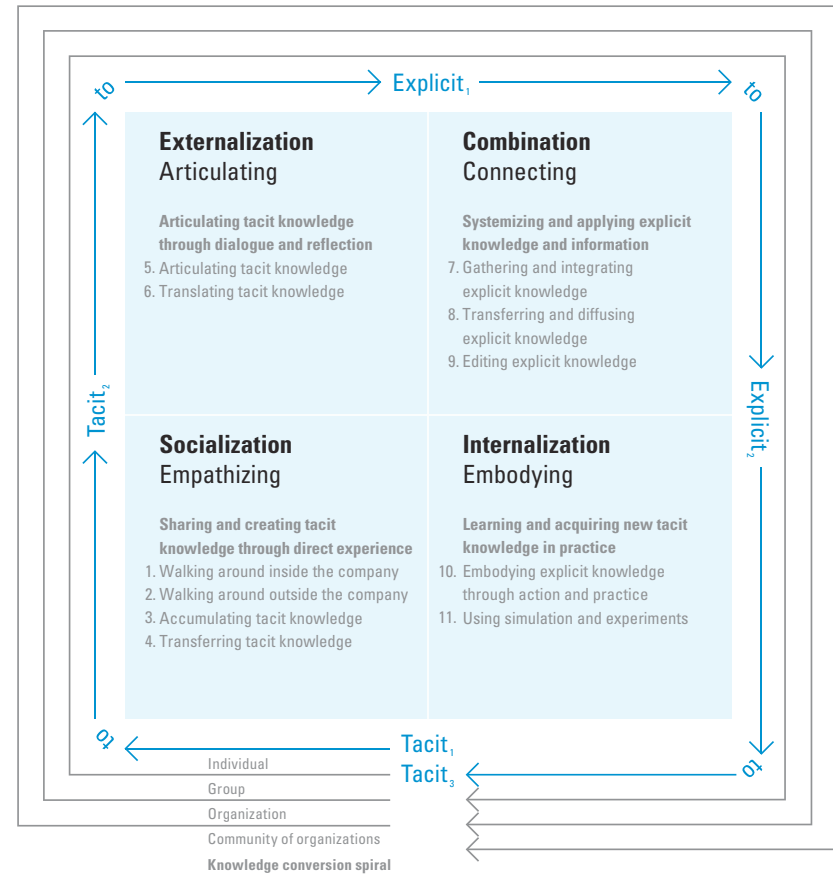
**SECI model of knowledge creation**  
 Ikujiro Nonaka  
 (1995)



# Designing is analogous to learning.



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

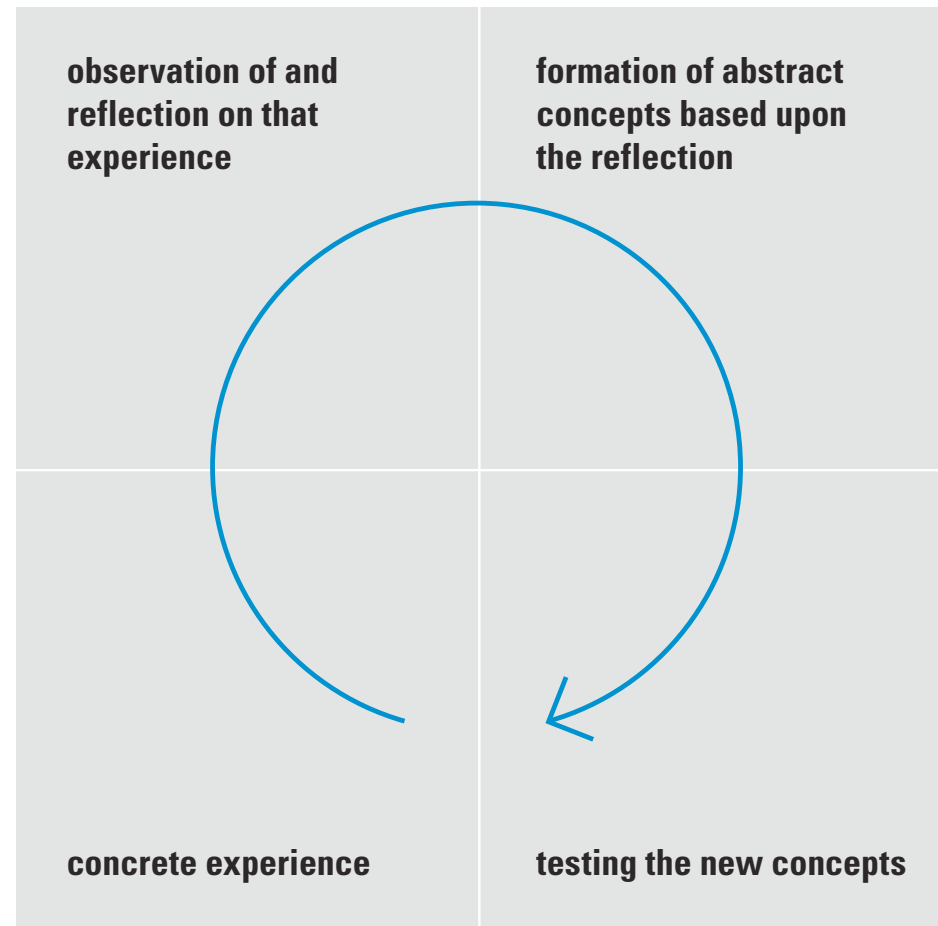


**SECI model of knowledge create**  
Ikujiro Nonaka (1995)

# 12

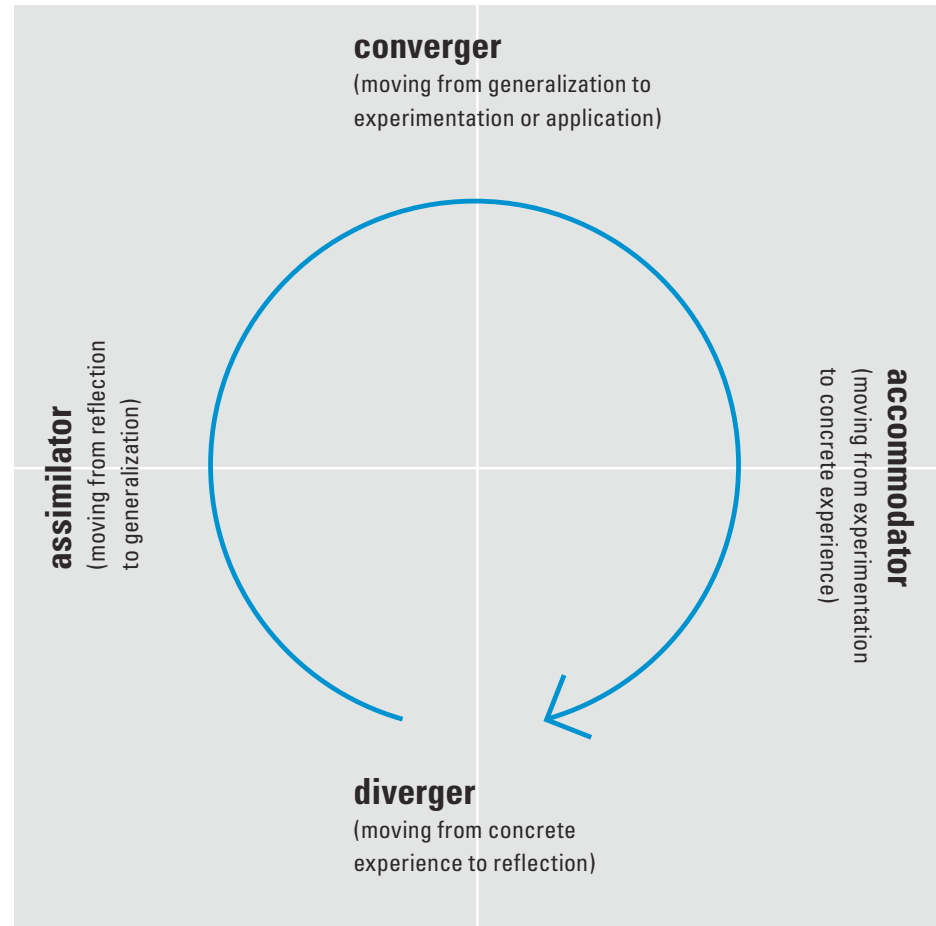
## Experiential Learning

David Kolb  
(1975)



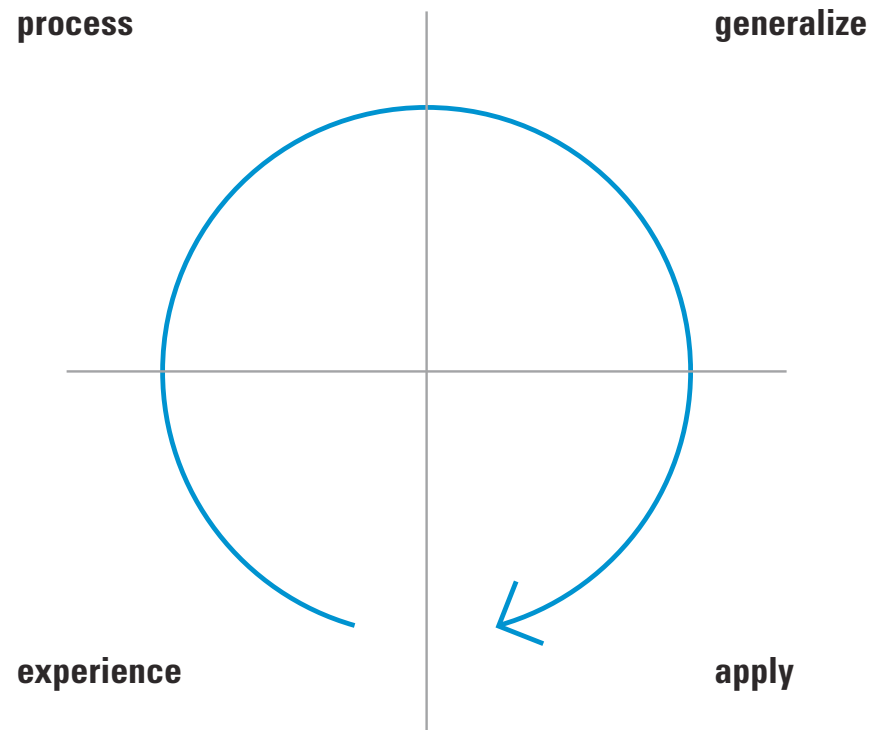
# 13

## Learning Styles M. Tennant (1997)



# 14

## **Experiential Learning Cycle** McCaffery (1986)



# What is design?

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Art and aesthetics?

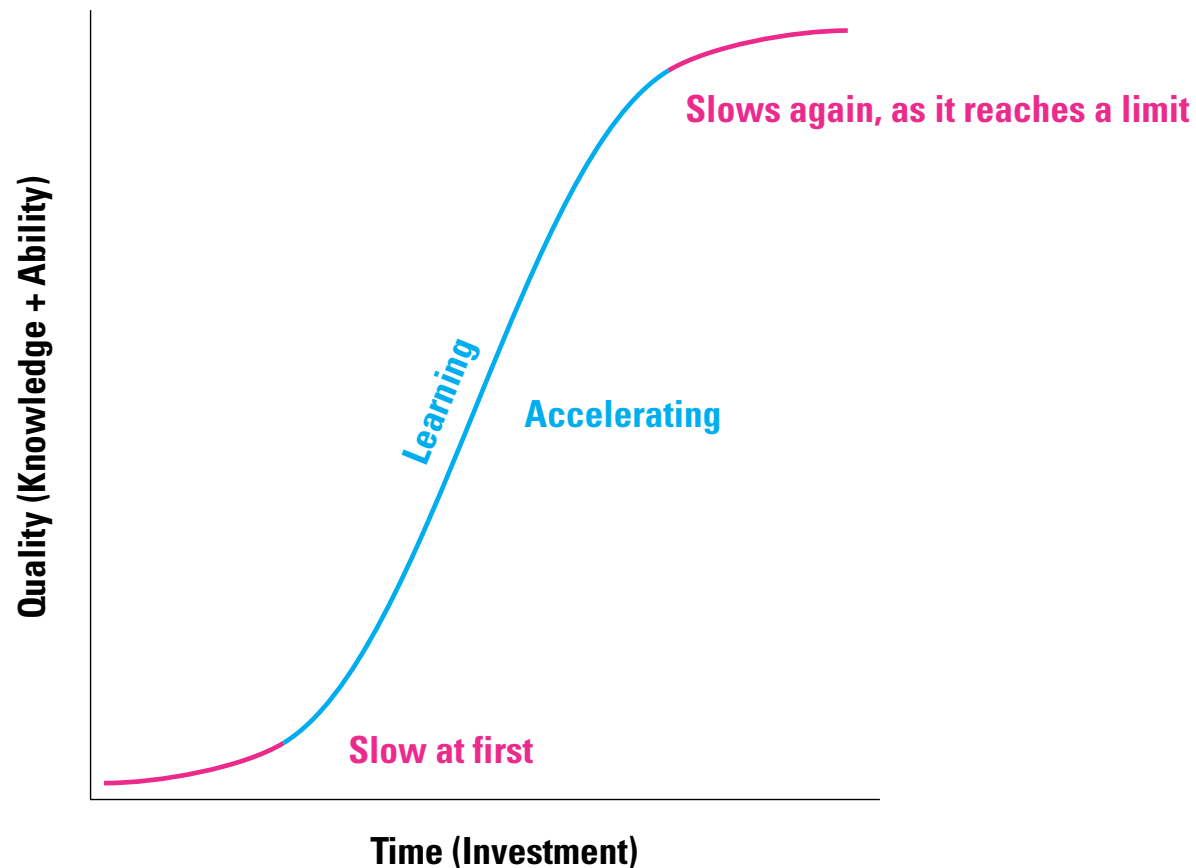
Science and problem solving?

Politics and rhetoric?

Learning and knowledge creation?



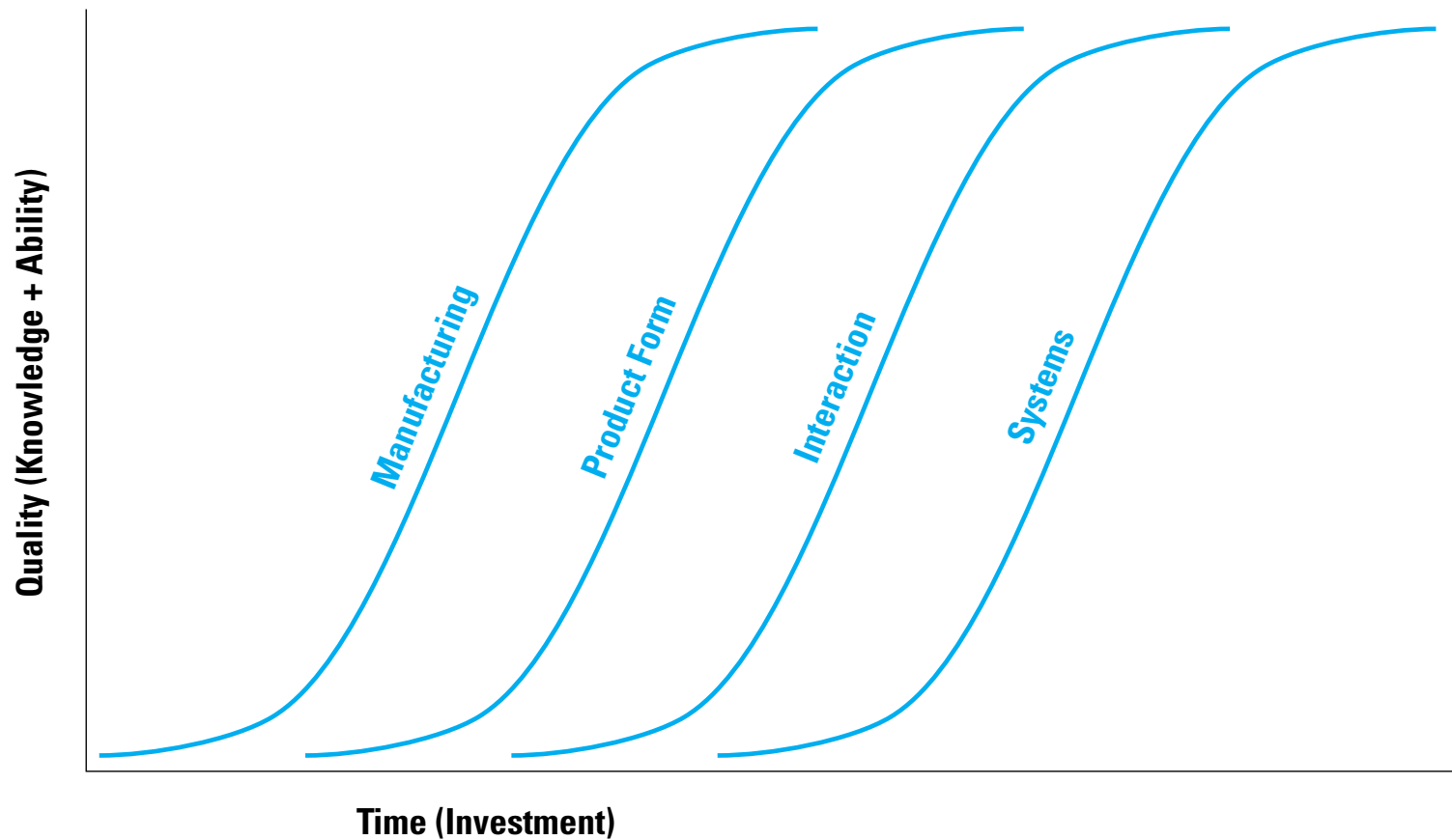
At first, a new wave offers **competitive advantage** but waves have limits. Eventually, new skills become a **competitive necessity**—a cost of entry.



## 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**.

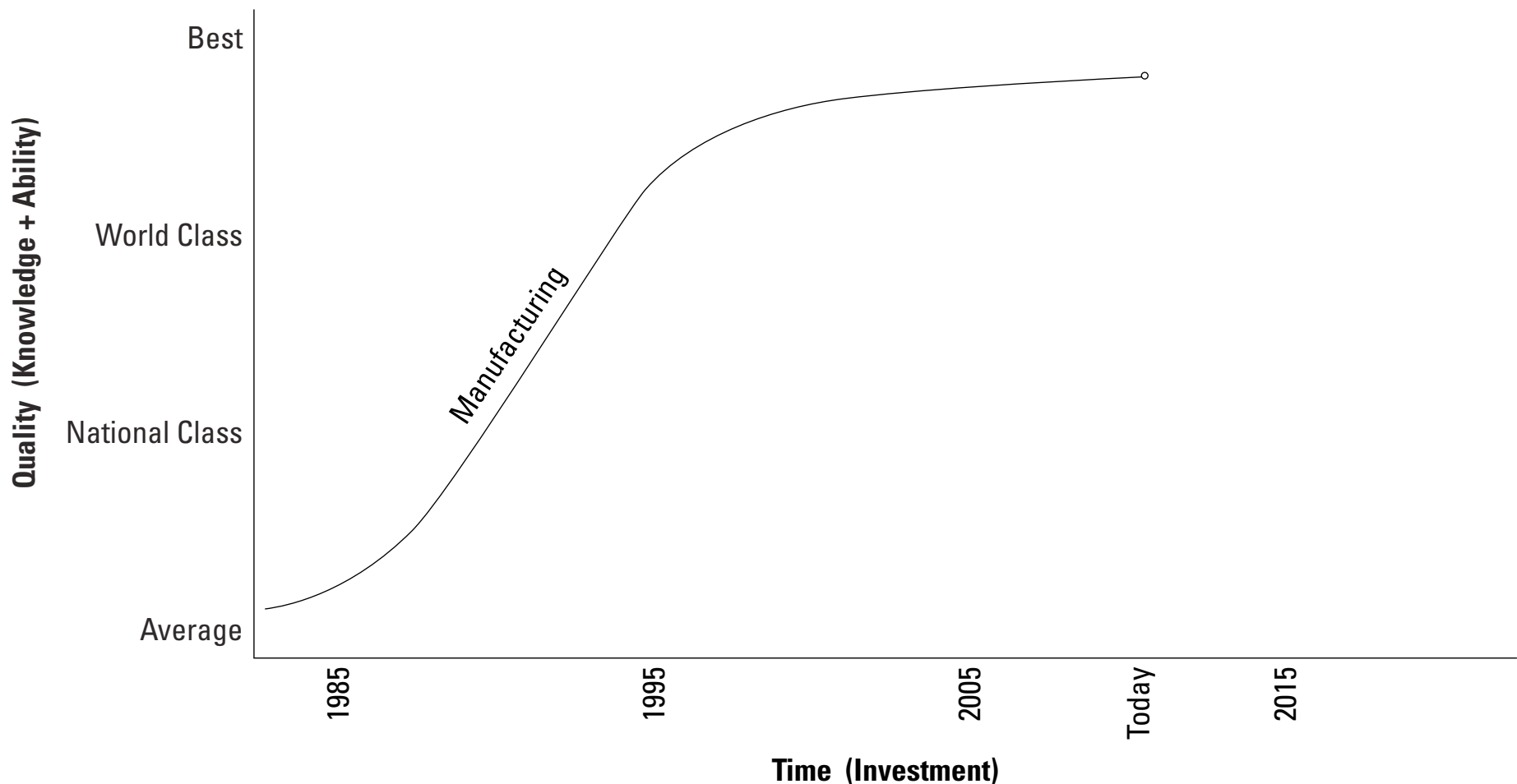


## CURVE 1

### **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.

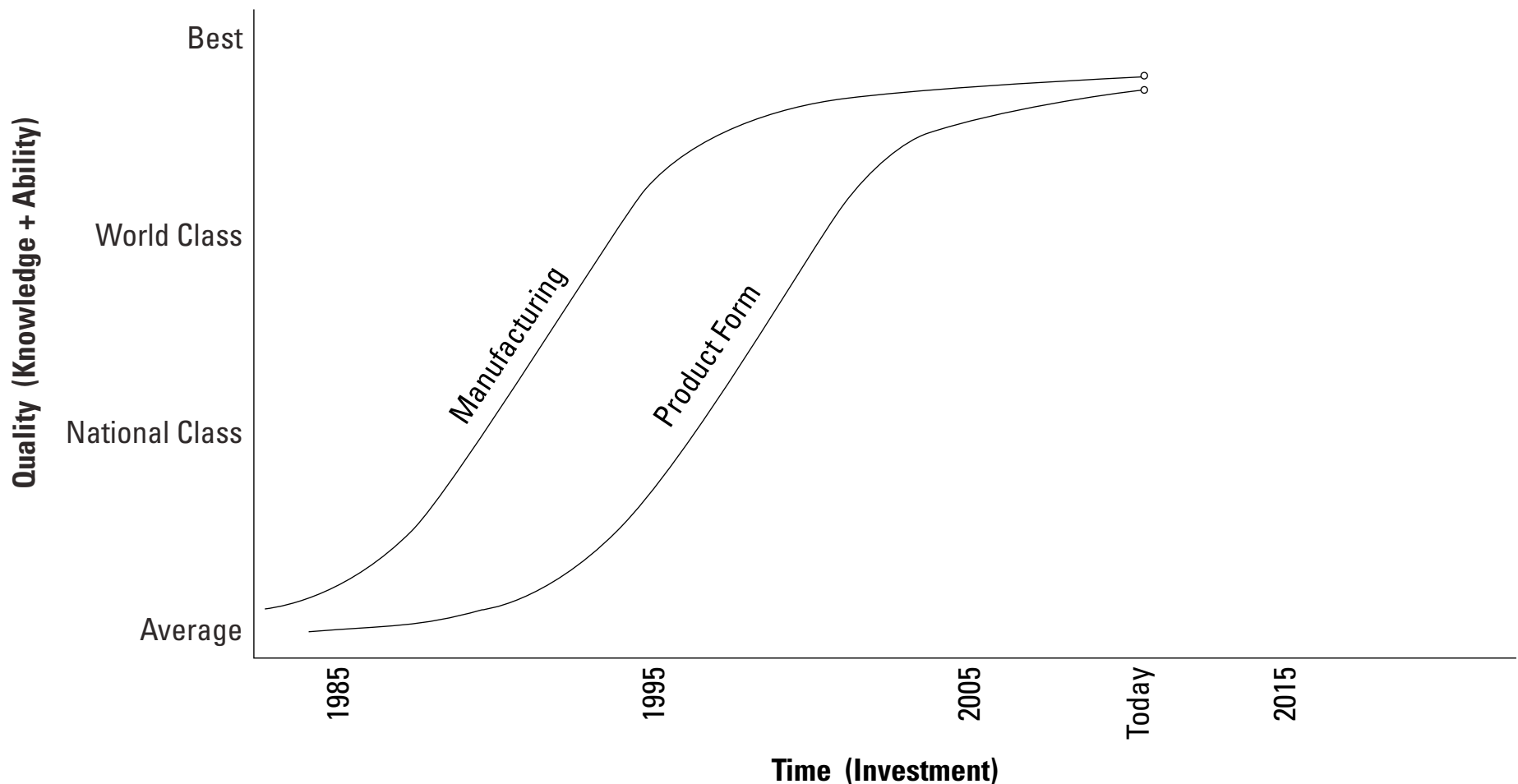


## CURVE 2

### **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.



## CURVE 3

### **Improving user interaction.**

- **Minimizing learning time**

“This is easy.”

- **Efficient, effective, delightful operation**

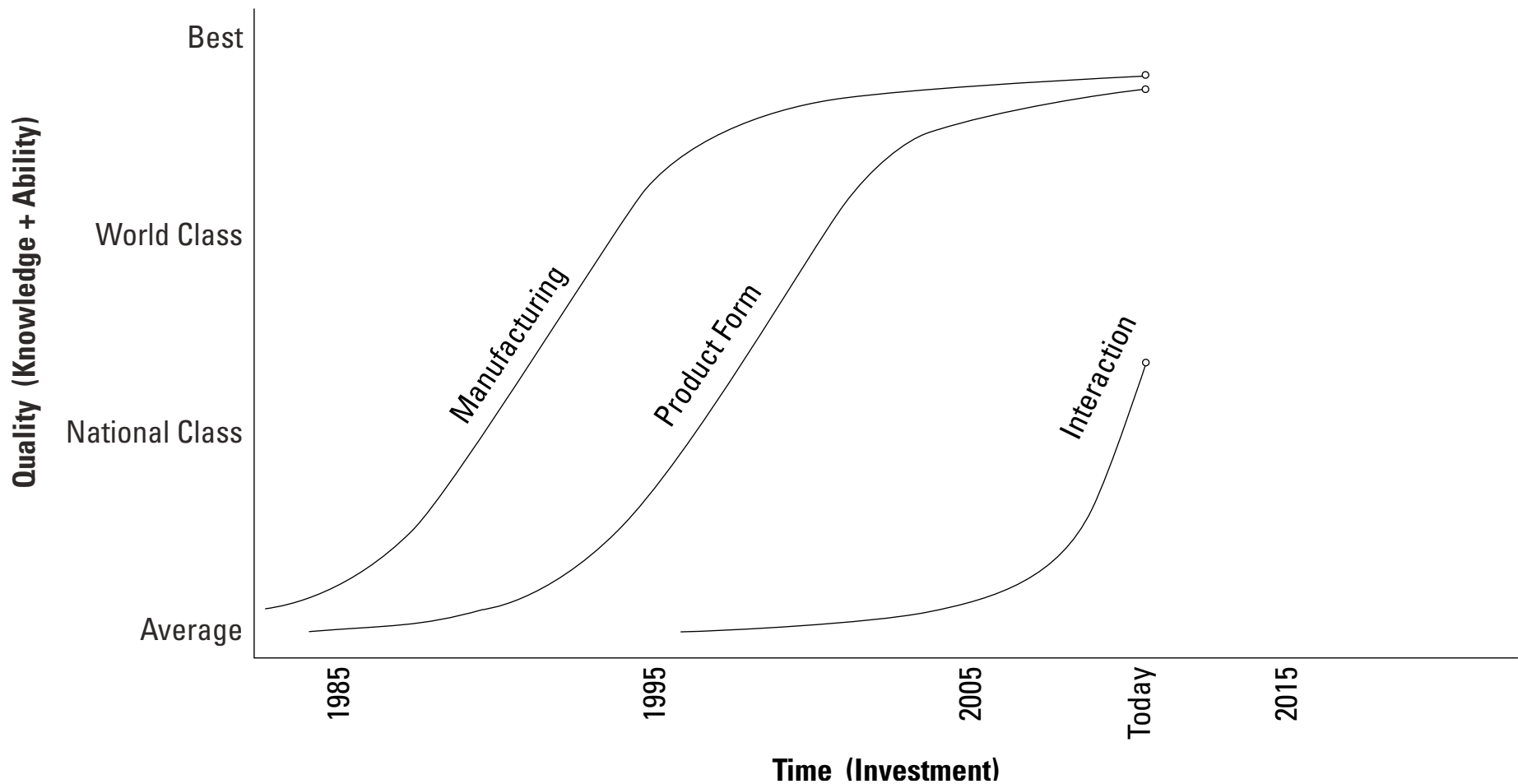
“This is fun.”

- **Creating unexpected opportunities**

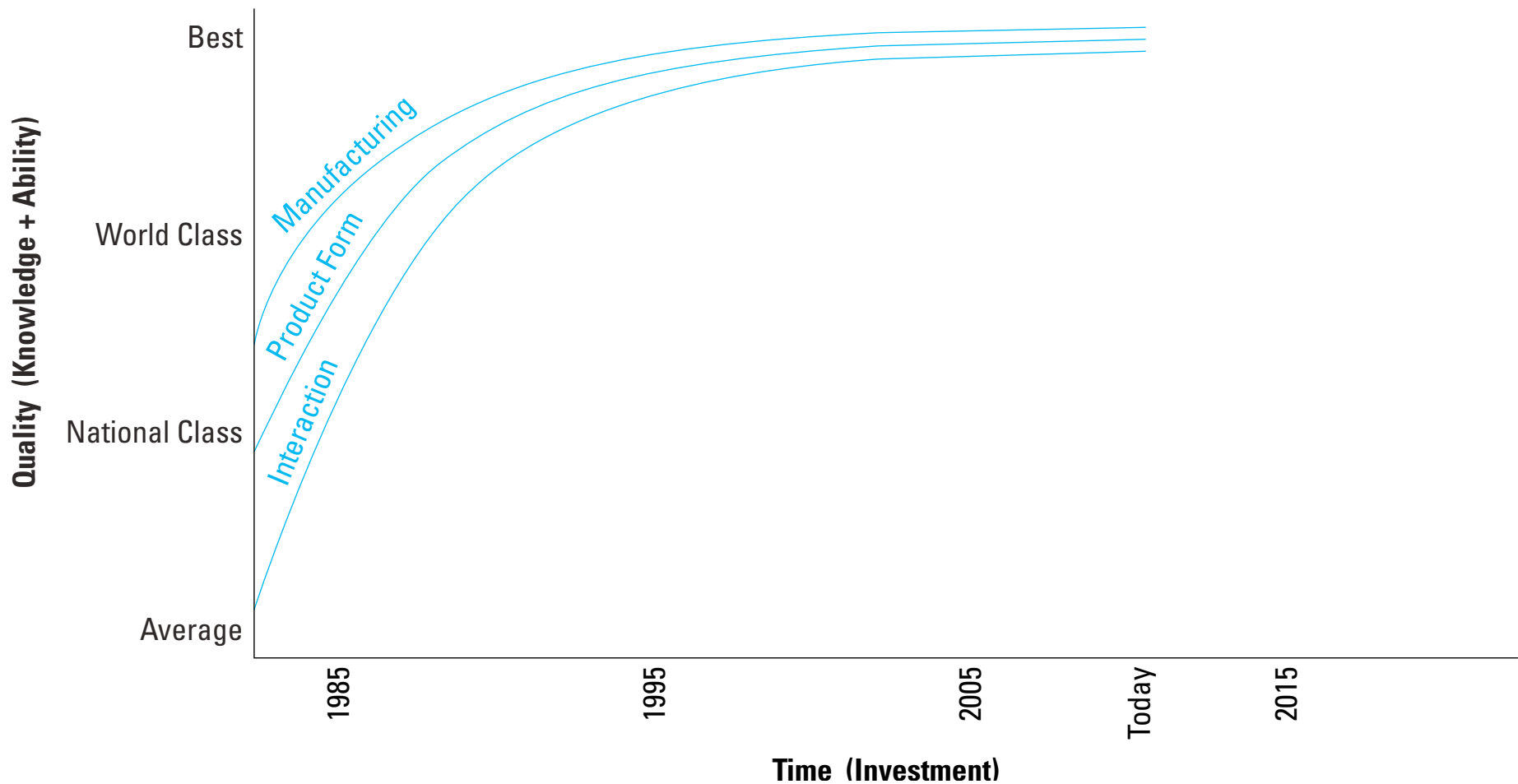
“Look what I can do now.”



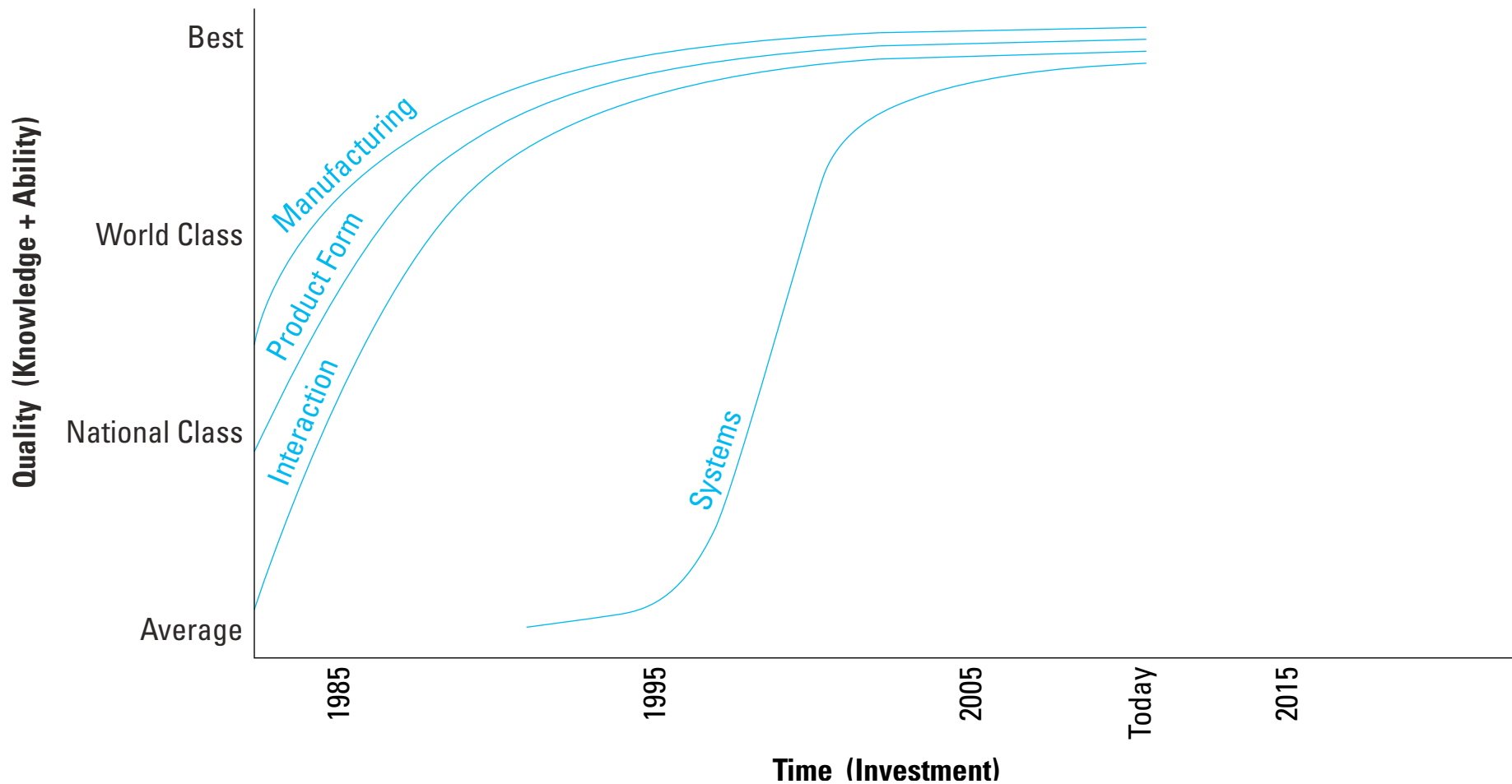
# Recently, Samsung began to climb a third curve, improving the quality of its user interfaces.



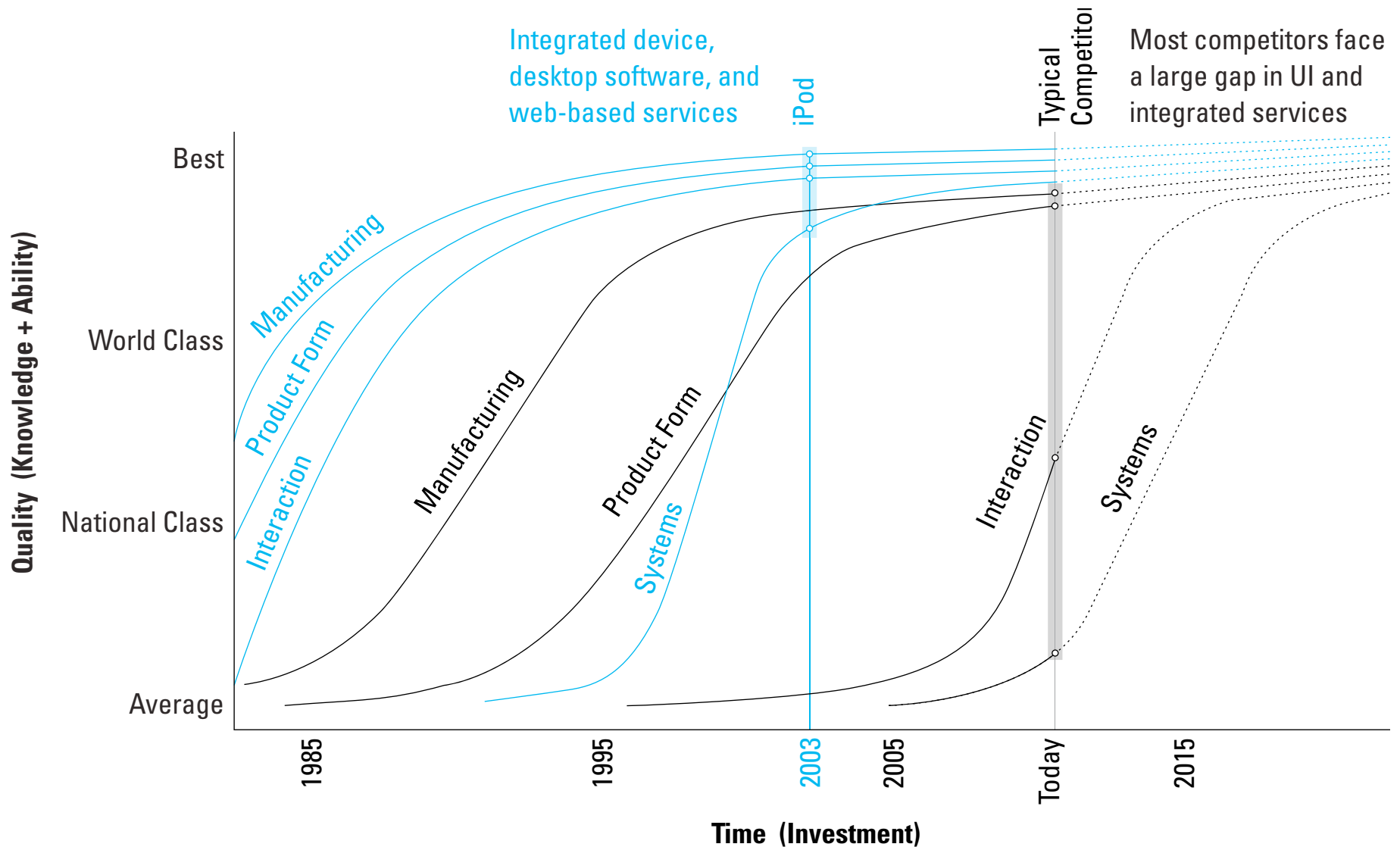
# But Apple achieved world-class manufacturing, product design, and user-interfaces, years ago.



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



# The success of iPod is more than product design; it depends on all four measures of product quality.



## CURVE 4

### **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**”

# What is design?

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Art and aesthetics?

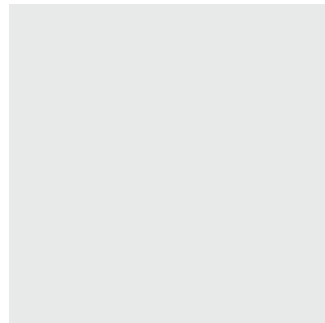
Science and problem solving?

Politics and rhetoric?

Learning and knowledge creation?

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

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



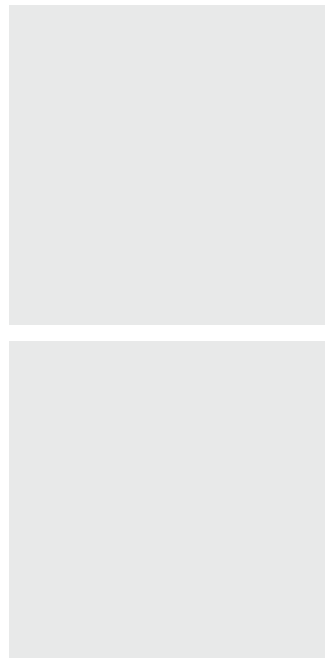
**Object**  
Component



# 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



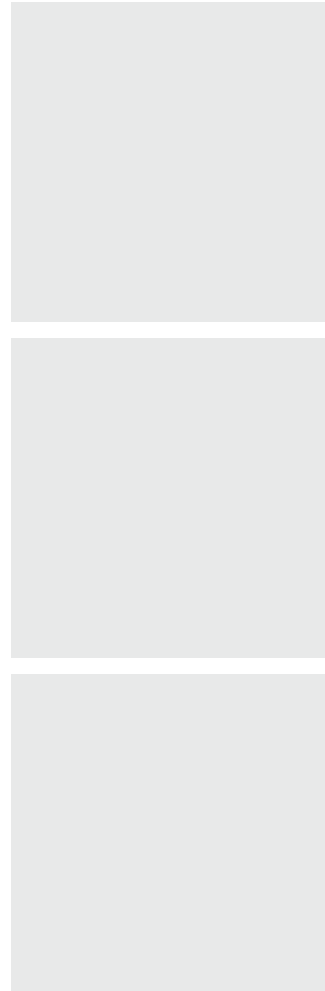
**Object**  
Component

# 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



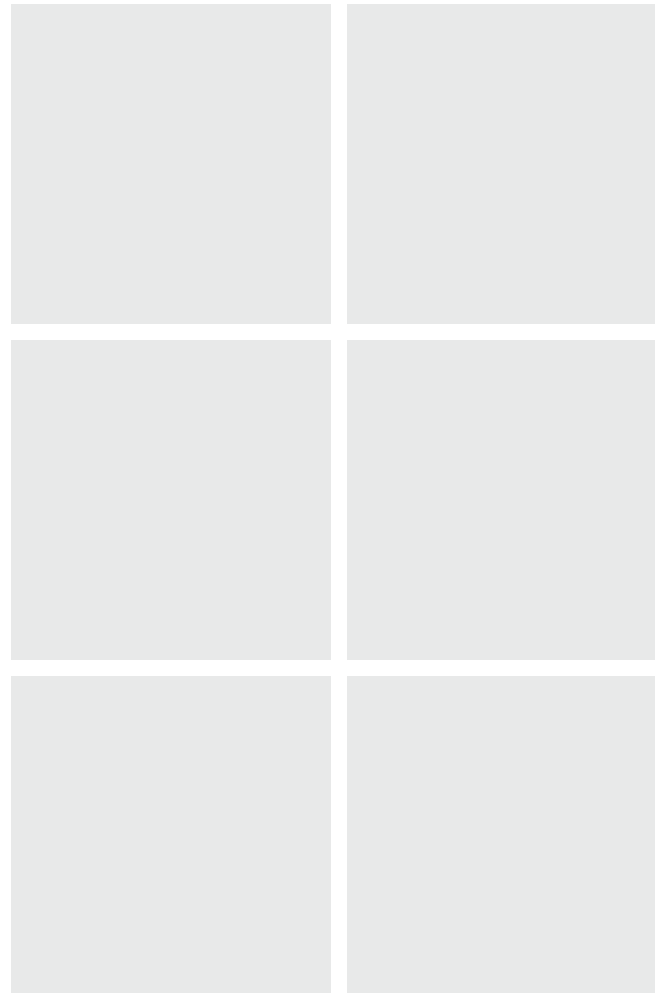
**Object**  
Component

# 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<br>Intuitive<br>Idiosyncratic |  |  |

**Object**  
Component

**System**  
Systems of components  
Organism

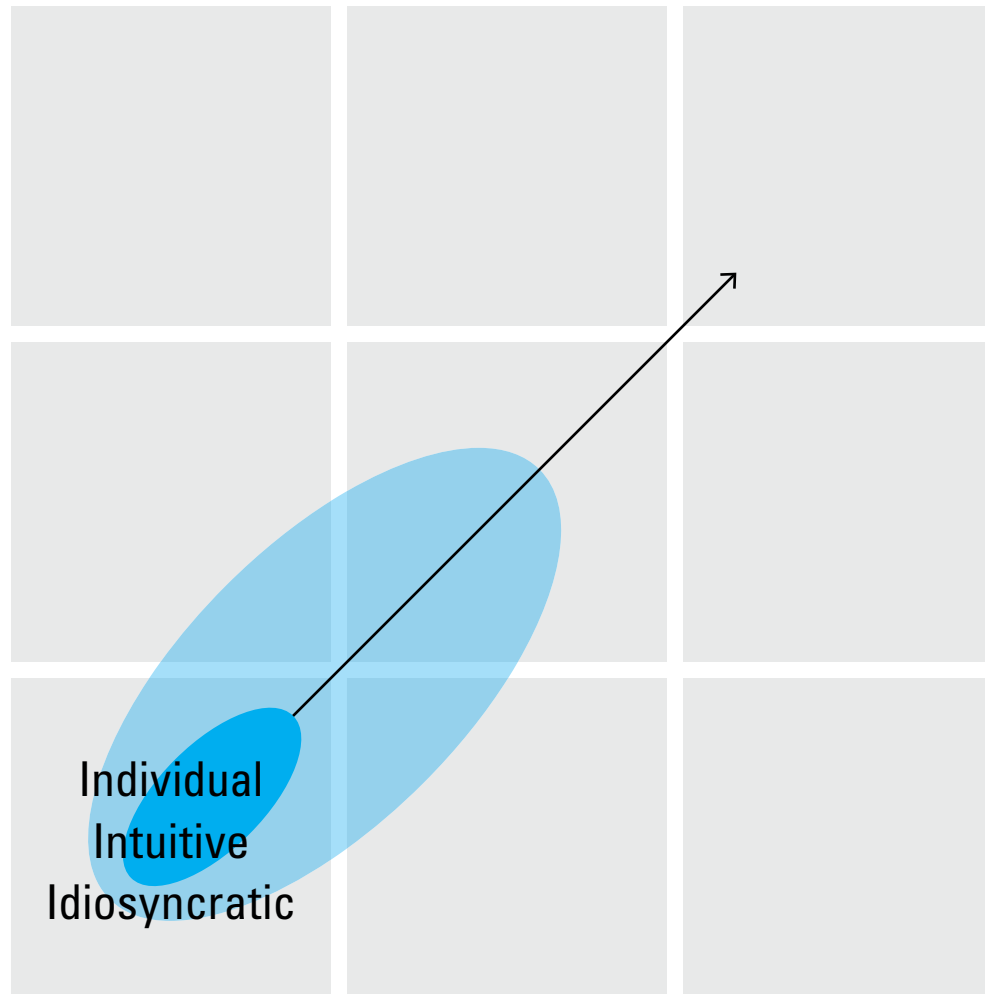
**Ecosystem**  
Systems of systems  
Community  
Market

# 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



**Object**  
Component

**System**  
Systems of components  
Organism

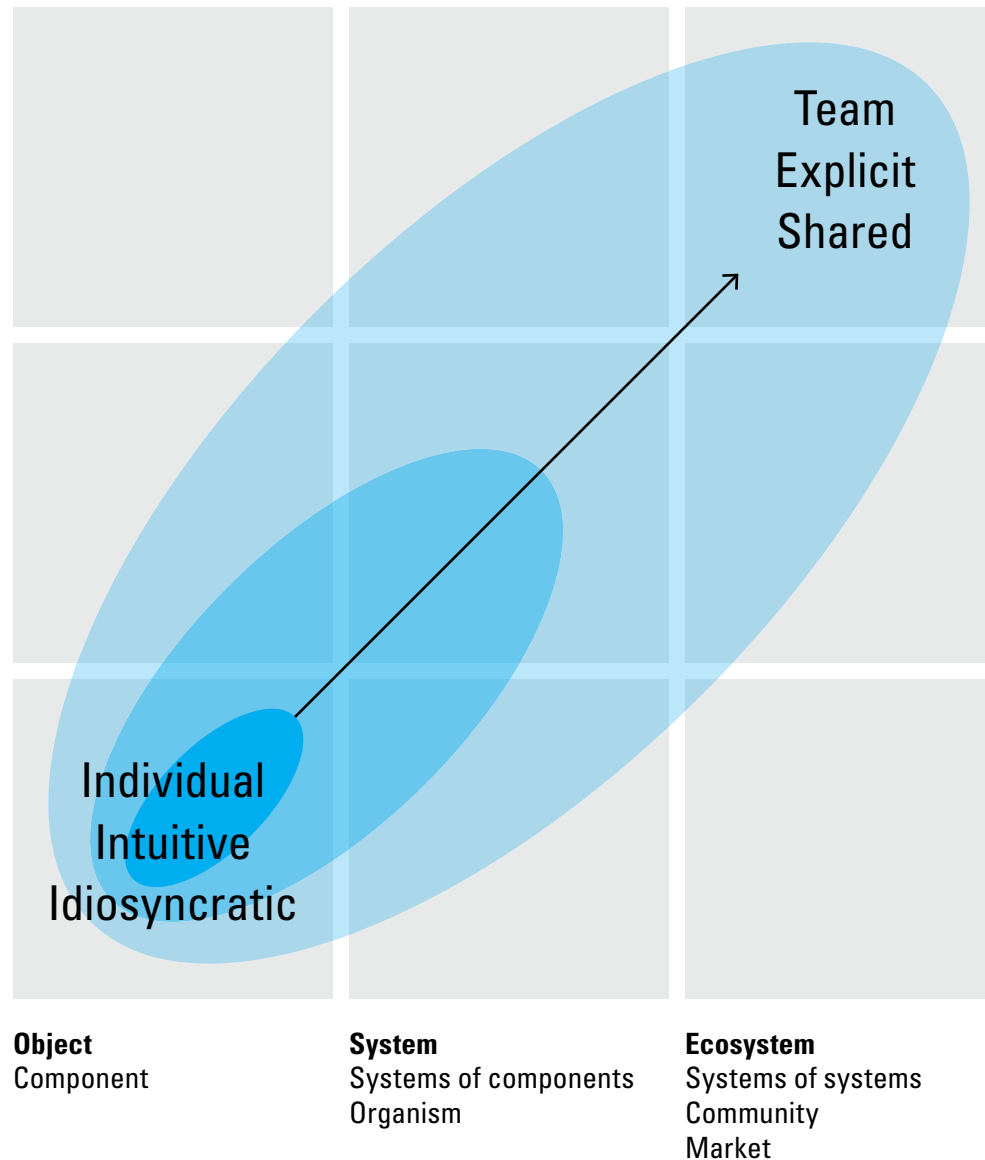
**Ecosystem**  
Systems of systems  
Community  
Market

# When practice also concerns context + ecologies, it requires **shared methods**.

**Why** are we making this?  
Context/Need  
Pragmatic

**What** are we making?  
Meaning/Definition  
Semantic

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



# What is design?

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Art and aesthetics?

Science and problem solving?

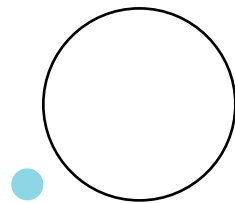
Politics and rhetoric?

Learning and knowledge creation?

Conversation and collaboration?



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

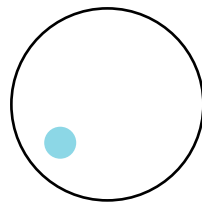


## **Separate**

Design as external resource

Design thinking and methods have no continuous presence in the organization.

They are add-ons, limited to traditional problems: form, communication, function.

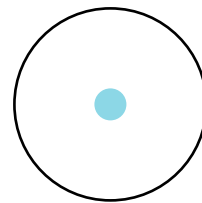


## **Peripheral**

Design as part of the organization

Design thinking and methods practiced somewhere within the organization.

They apply to specific products and services.

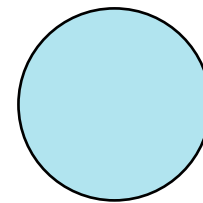


## **Central**

Design at the core of the organization

Design thinking and methods are highly visible and take a central position.

They unify products and services across an organization; apply to corporate design and brand strategy.



## **Integrated**

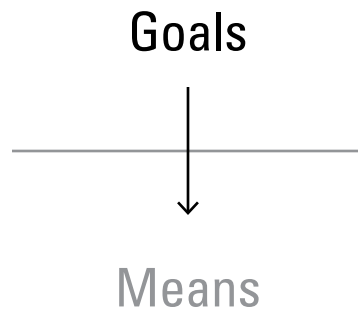
Design integral to all aspects of the organization

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.

— Sabine Junginger, 2009

# We often have **conversations** with ourselves.

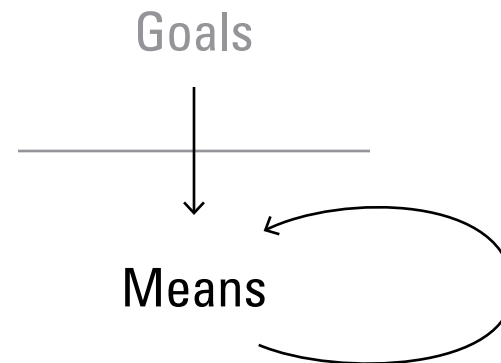
Manager



## **Reflecting:**

Individual considers possible goals.

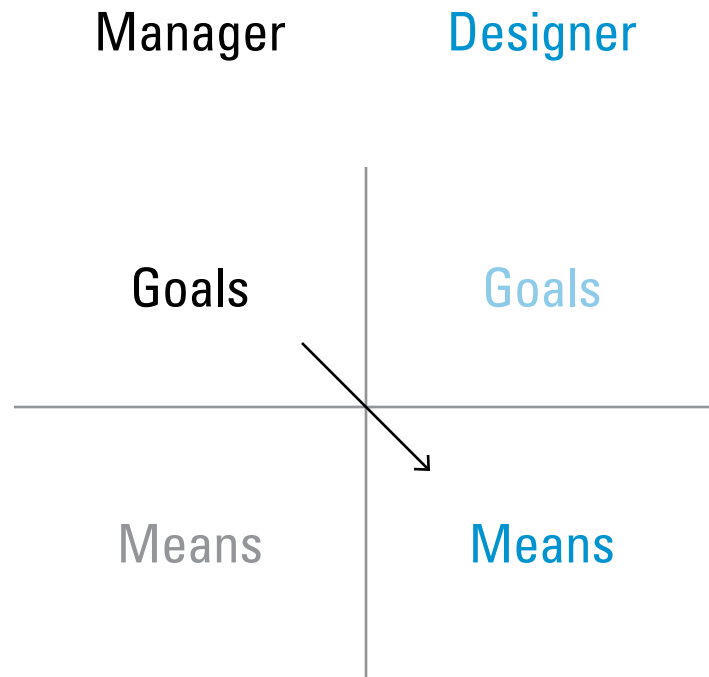
Manager



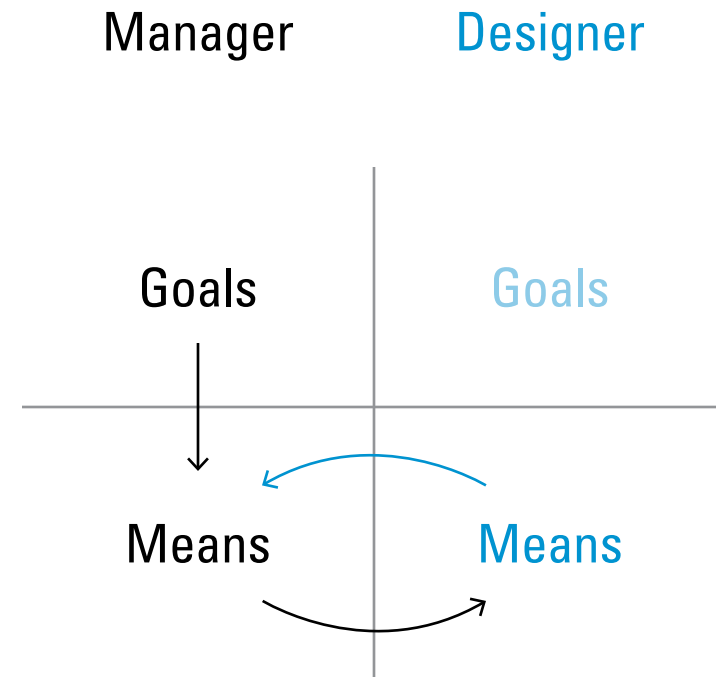
## **Reflection in action:**

Individual considers possible means while executing

# Traditional management is often **hierarchical**.

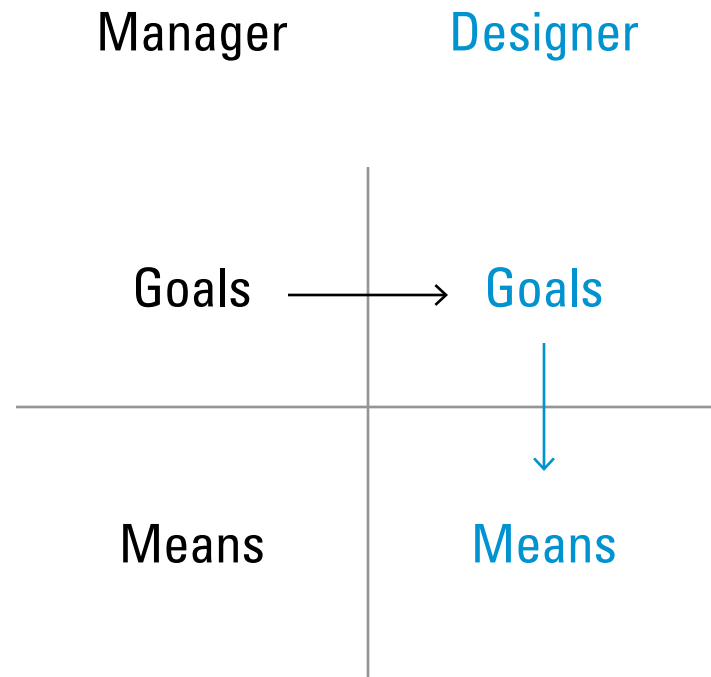


**Controlling:**  
Manager tells designer  
what to do + how to do it;  
designer executes.

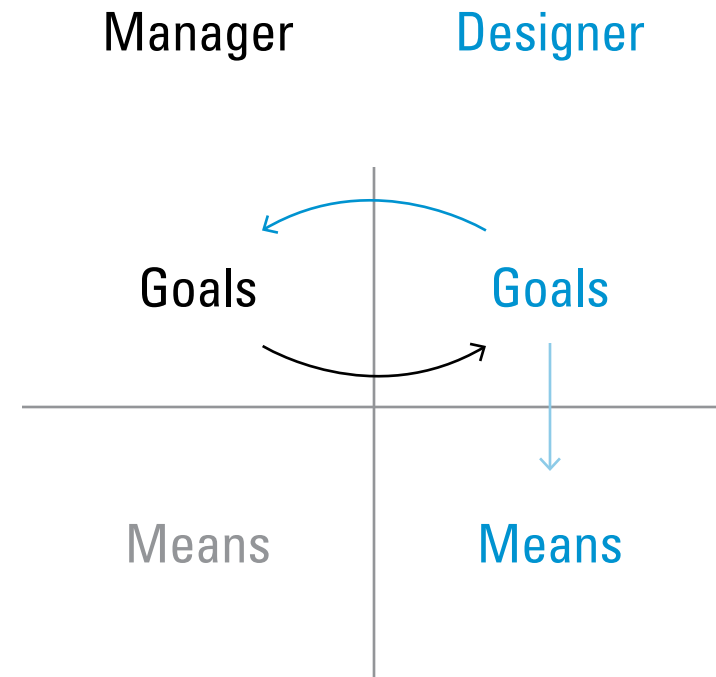


**Mentoring:**  
Manager sets goals  
but discusses means  
with designer.

# Information age management must be **collegial**.



**Delegating:**  
Manager sets goal  
but leaves means  
to the designer.

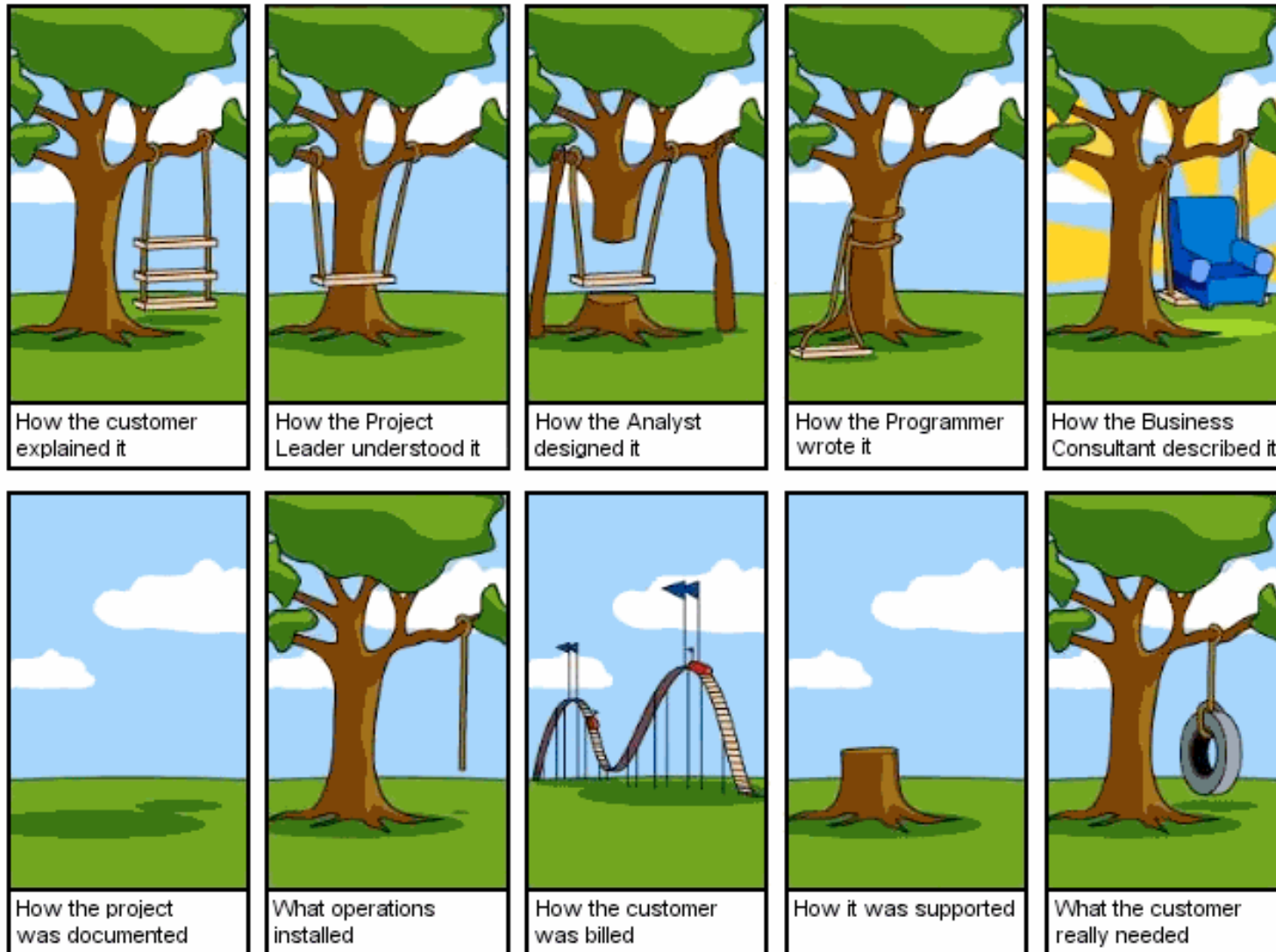


**Collaborating:**  
Manager and designer  
set goals together.

# 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  |

# Delighting customers requires special conversations. It's easy to have the wrong conversations.



— Alex Gorbachev

**Special thanks to**  
**Shelley Evenson**  
**Paul Pangaro**  
**Jon Pittman**  
**Michael Gallagher**

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