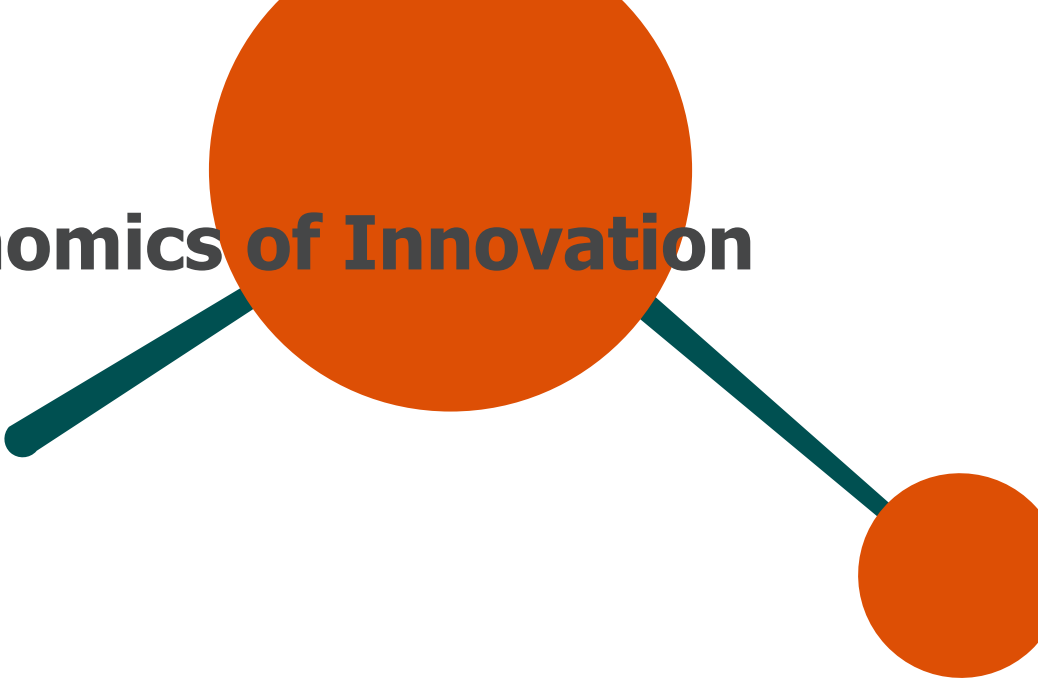
Course: Economics of Innovation



Topic: Genesis of innovation concept

PhD Bobur Tursunov

Innovation categories

- **sustaining** – better products that can be sold with higher margin to demanding customers; incumbents win
- **disruptive** – commercialization of simpler, more user-friendly products, which are chepaer and targeted to new or less demanding customers; new entrants win

Key elements of disruption

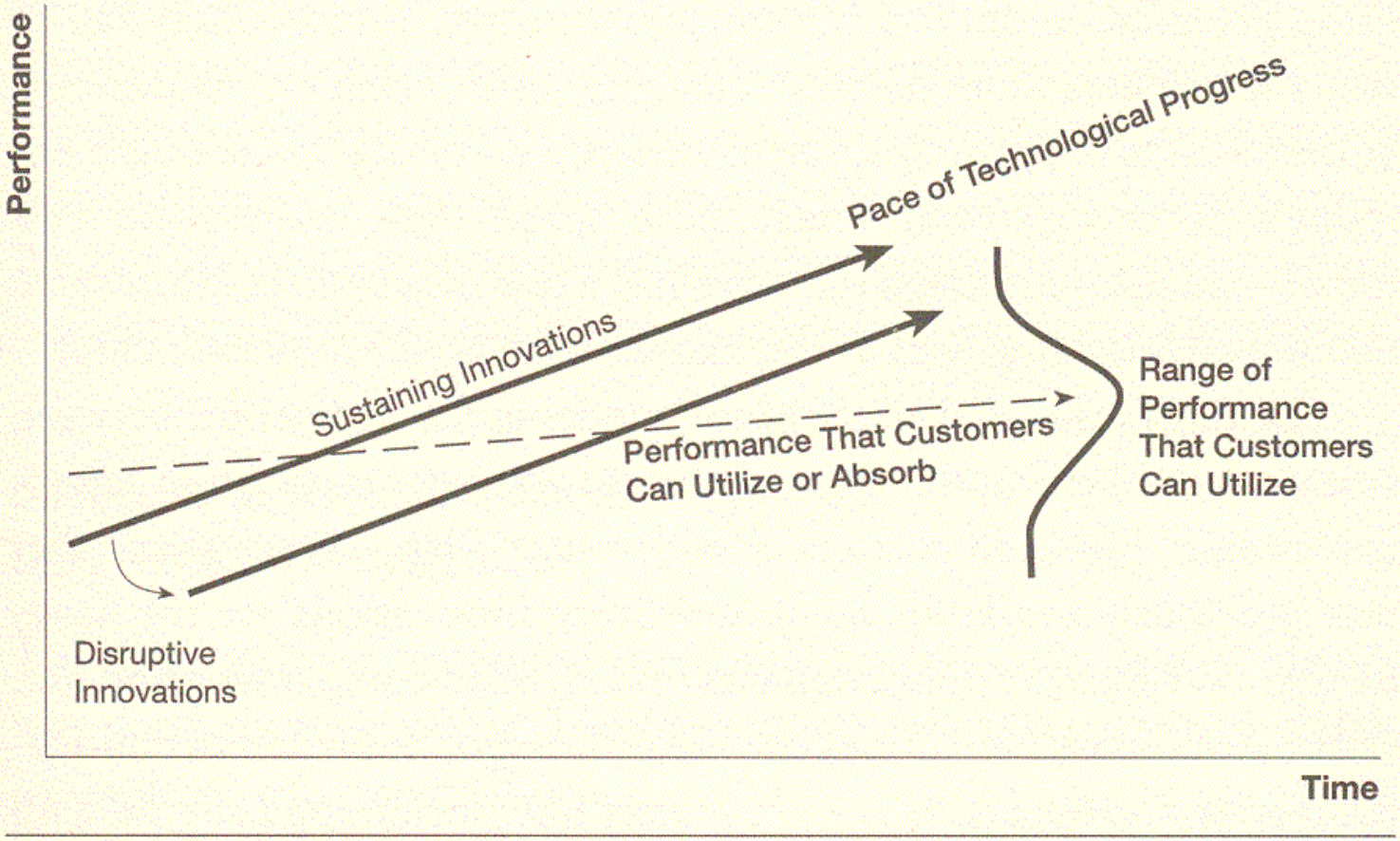
- Customers at each market has limited absorption capacity
- Technological progress usually is faster that the ability of the market to employ it. Companies focus on better products to be sold with higher margin to unsatisfied customers.

Sustaining vs. disruptive

- **Sustaining**: focused on demanding customers; both incremental and radical. Incumbents have resources and motivation.
- **Disruptive**: introduce products and services not as advanced as existing ones, but offering other advantages (simpler, cheaper, more user friendly, ...) and focus on new or less demanding customers.

FIGURE 2-1

The Disruptive Innovation Model

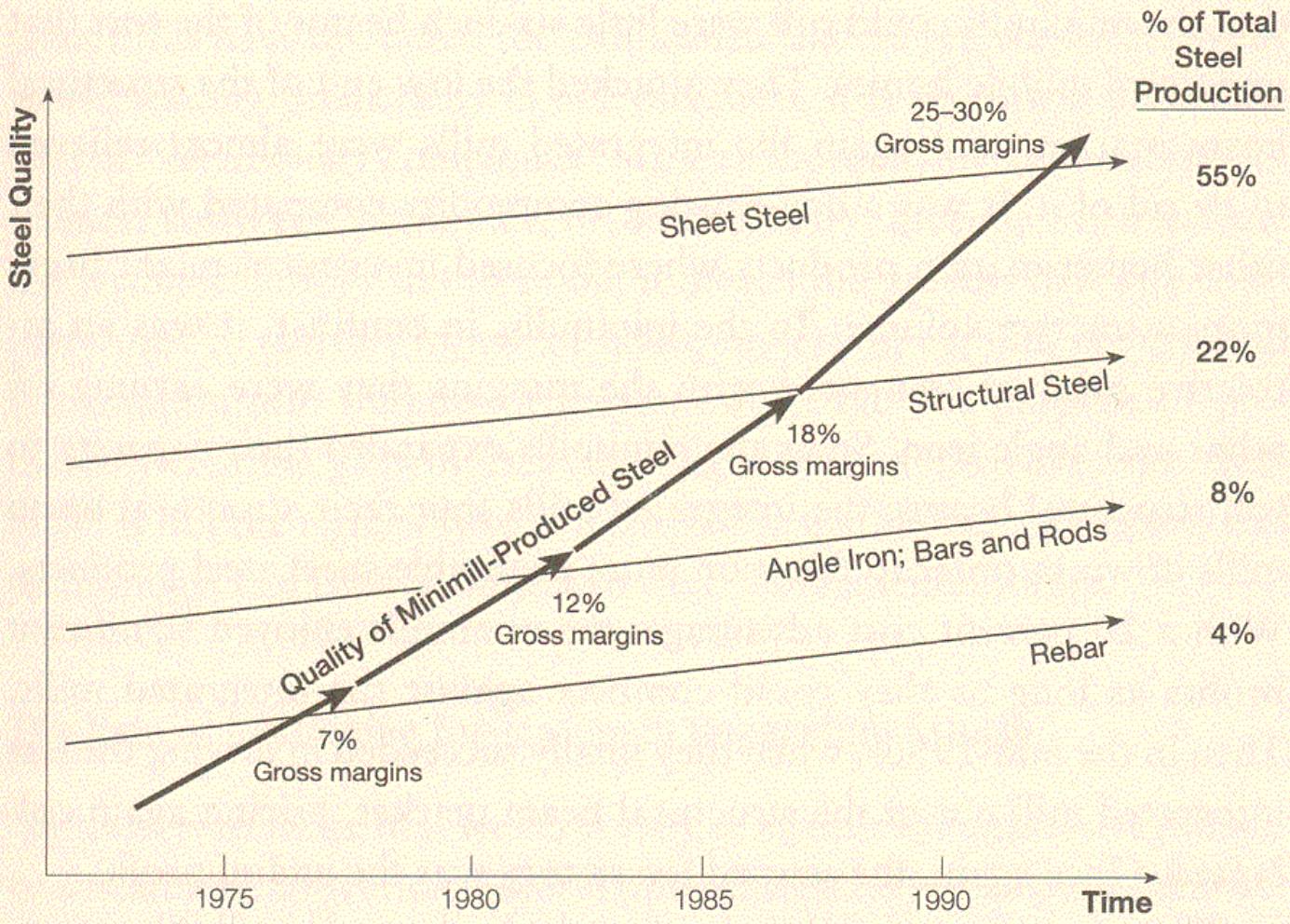


Clayton M. Christensen: The Innovator´s Solution, Harvard Business Press, 2003

- Due to technological progress the trajectory of the disruptive innovation after some time crosses the trajectory of demands of more demanding customers and starts to replace incumbents who are not principally ready to react adequatelly, as they are motivated to suceed at „better" markets, not to defend themselves on „inferior" ones.

FIGURE 2-2

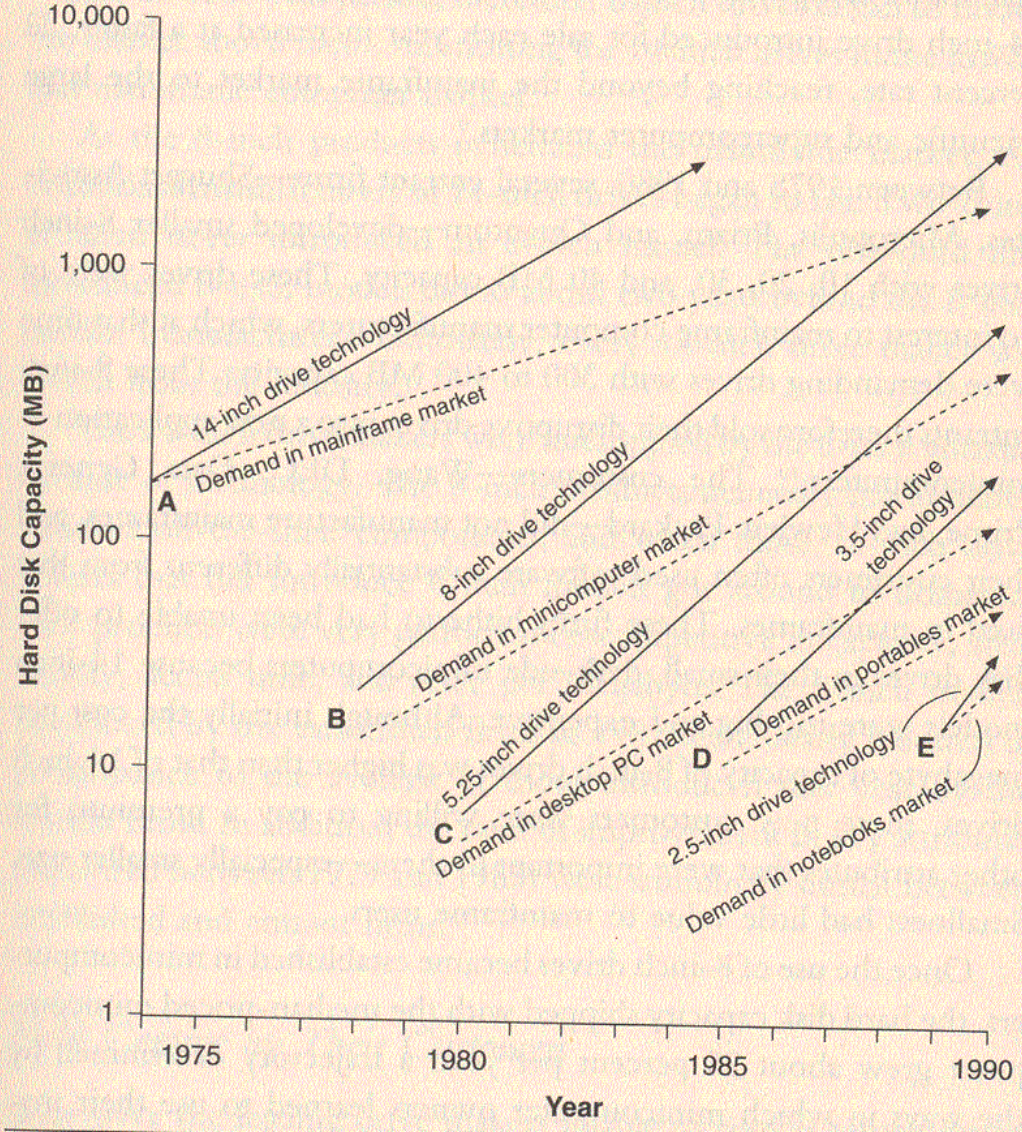
The Up-Market Migration of Steel Minimills



Source: American Iron and Steel Institute; interviews with company executives. Note that the tonnage percentages do not sum to 100 percent because there are other specialty categories of steel.

Clayton M. Christensen: The Innovator´s Solution, Harvard Business Press, 2003

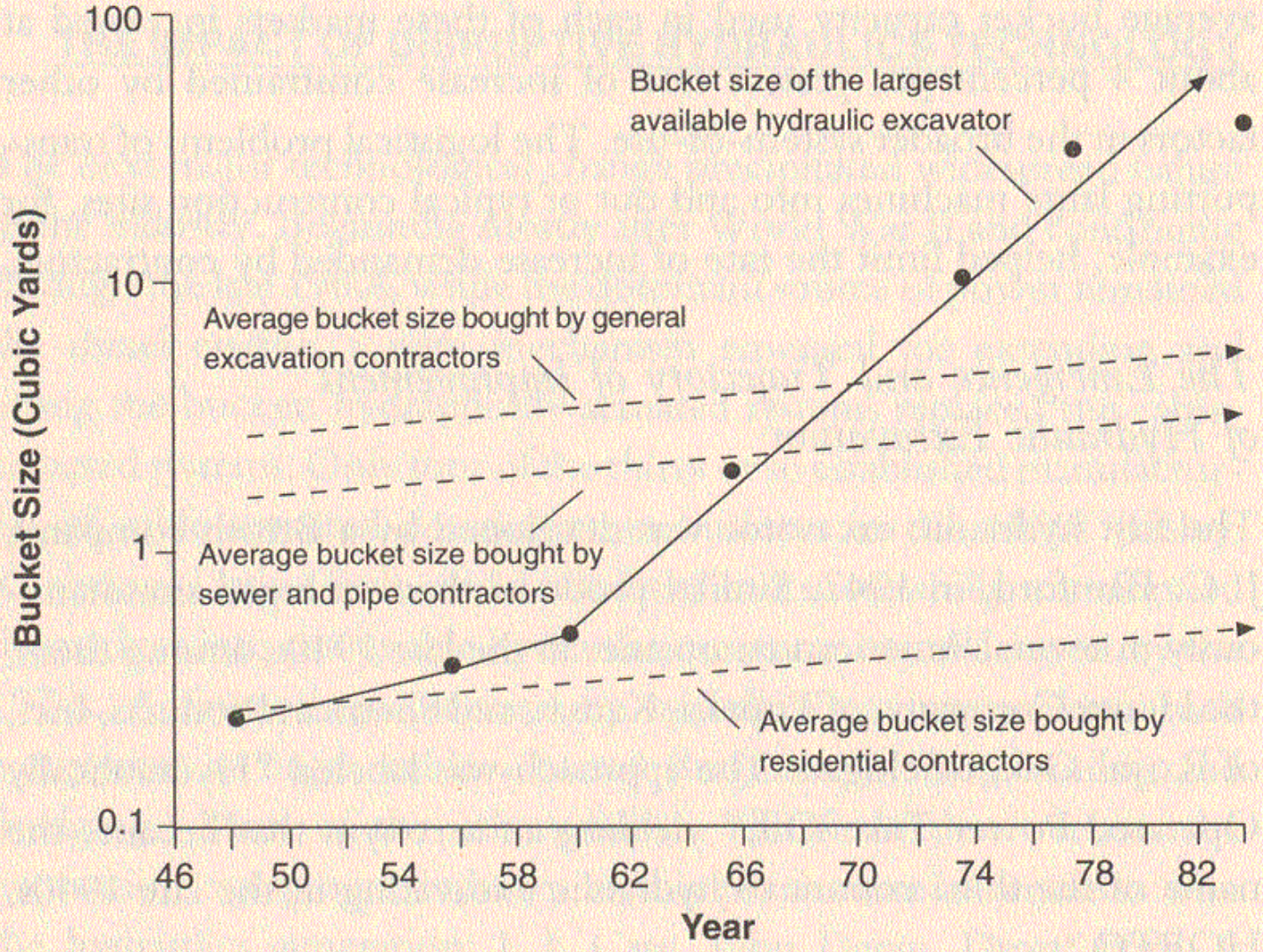
Figure 1.7 Intersecting Trajectories of Capacity Demanded versus Capacity Supplied in Rigid Disk Drives



Source: Clayton M. Christensen, "The Rigid Disk Drive Industry: A History of Commercial and Technological Turbulence," *Business History Review* 67, no. 4 (Winter 1993): 559. Reprinted by permission.

Clayton M. Christensen: The Innovator´s Solution, Harvard Business Press, 2003

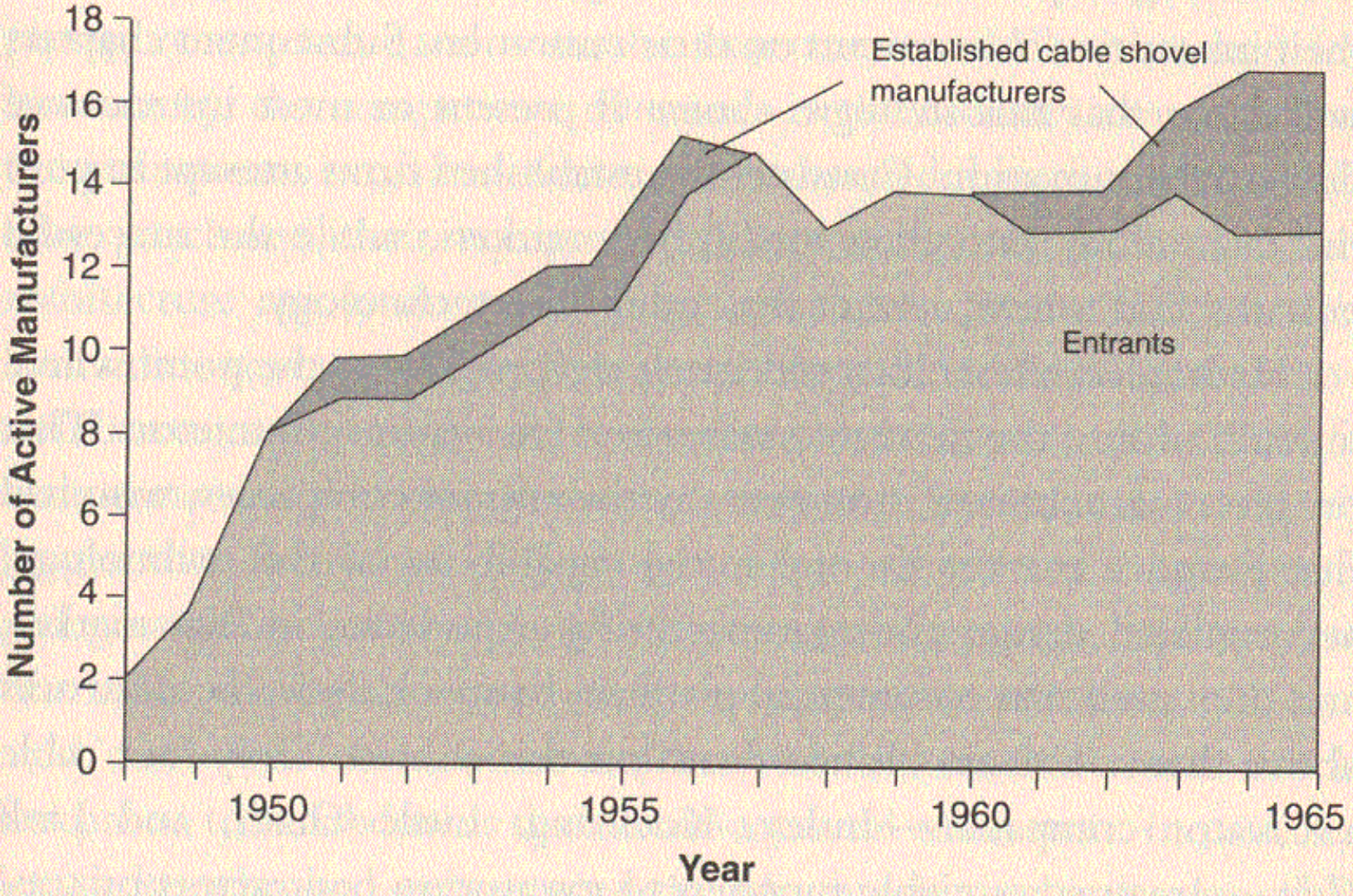
Figure 3.3 Disruptive Impact of Hydraulics Technology in the Mechanical Excavator Market



Source: Data are from the Historical Construction Equipment Association.

Clayton M. Christensen: The Innovator´s Solution, Harvard Business Press, 2003

Figure 3.6 Manufacturers of Hydraulic Excavators, 1948–1965



Source: Data are from the Historical Construction Equipment Association.

Clayton M. Christensen: The Innovator´s Solution, Harvard Business Press, 2003

Conditions of success - 1

- Disruption is successful, as it is easier to defeat competition that tries to escape than the competition who fights
- Innovation must be disruptive for all companies in the industry
- Ex. Internet – for Dell sustaining, they sold computers formerly by mail, phone, etc.

Conditions of success - 2

- Following the trajectory upwards to market tiers where it is possible to attain higher margins is what good manager is expected to do.
- Each company therefore prepares its own disruption. This is the innovator´s dilemma, but also the start of innovator´s solution.
- The advice to new, growing firms: focus on products and markets ignored or neglected ba incumbents.

Two types of disruption

- New markets: compete with non-consumption: simpler, more user frindly, can be used by less sophisticated customers (PC, transistor radio, desk copiers).
- Low-end: focus on lower tiers of main markets (minimills, discount stores, Korean auto-makers); motivate incumbents to leave the market

FIGURE 2-3

The Third Dimension of the Disruptive Innovation Model

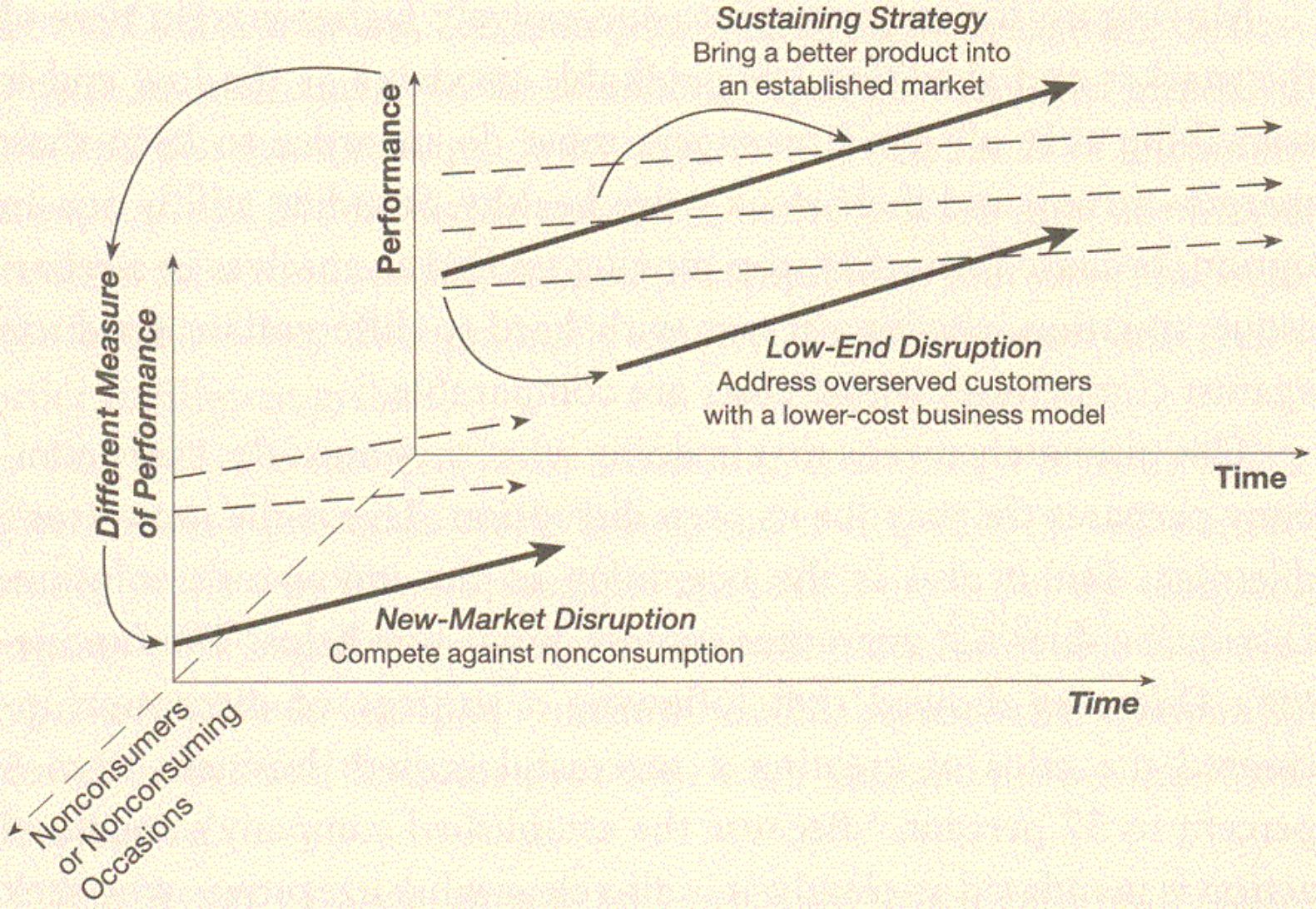


FIGURE 2-4

Examples of Companies and Products Whose Roots Were in Disruption

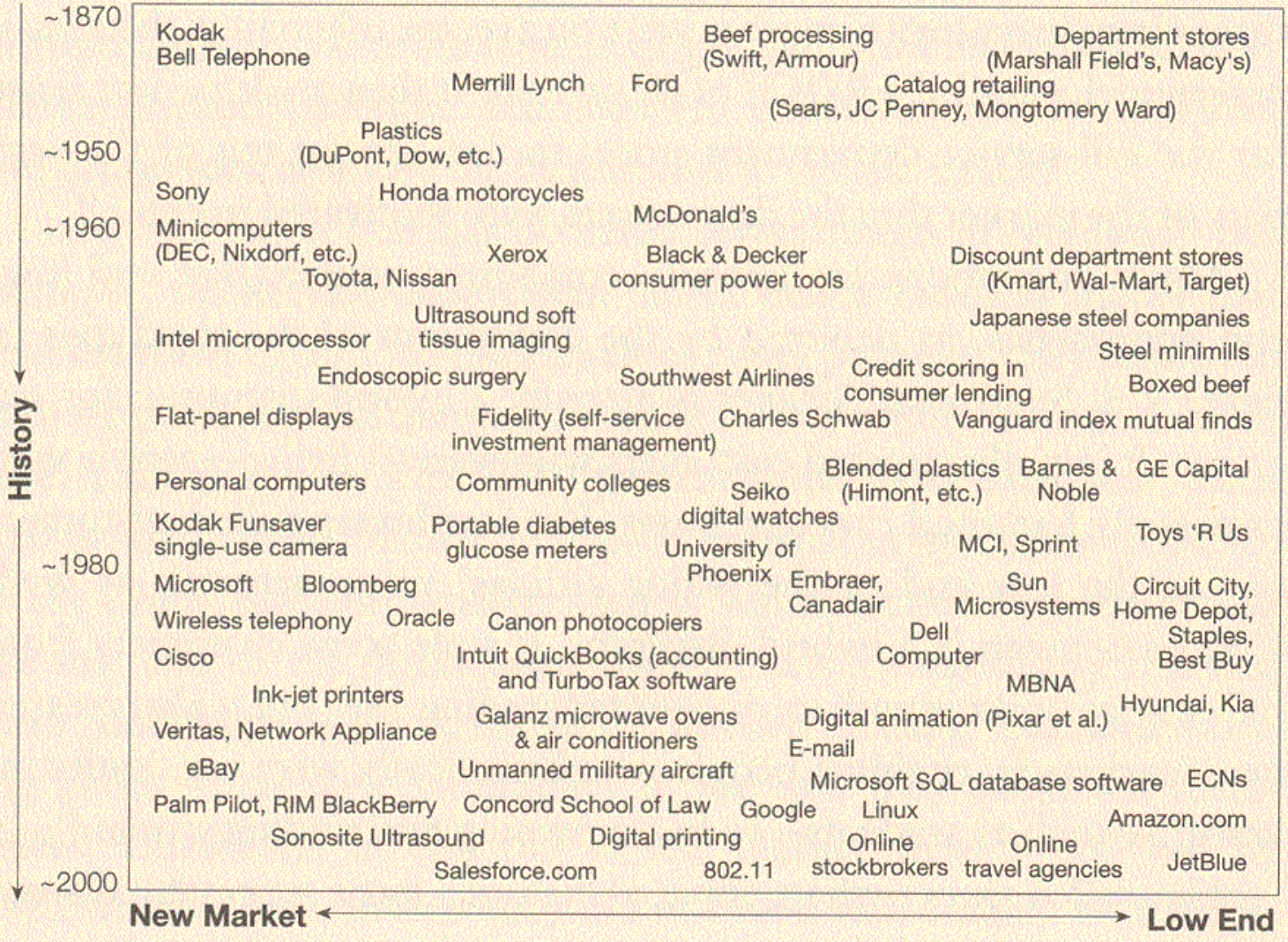


FIGURE 4-1

Value Networks for Vacuum Tubes and Transistors

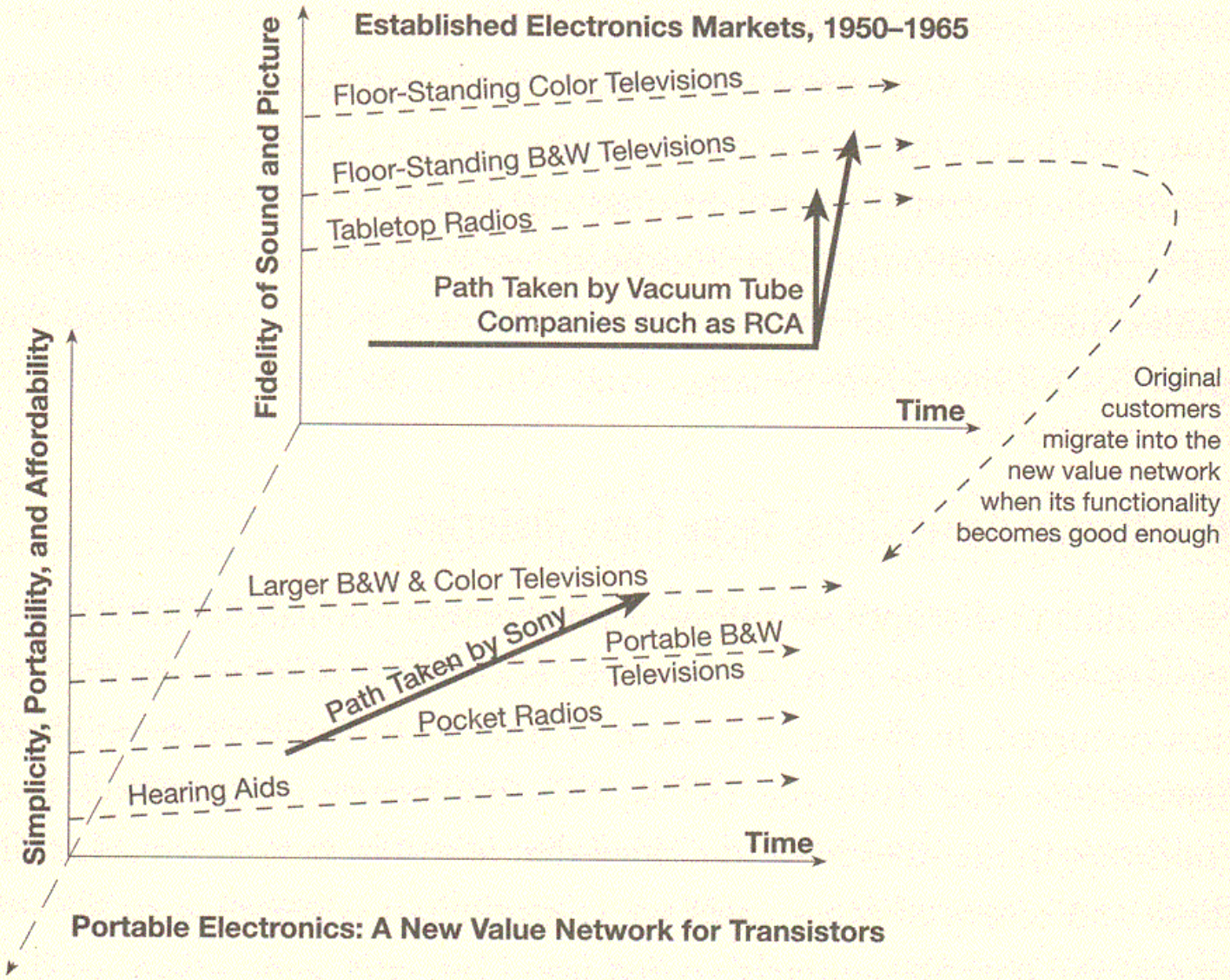
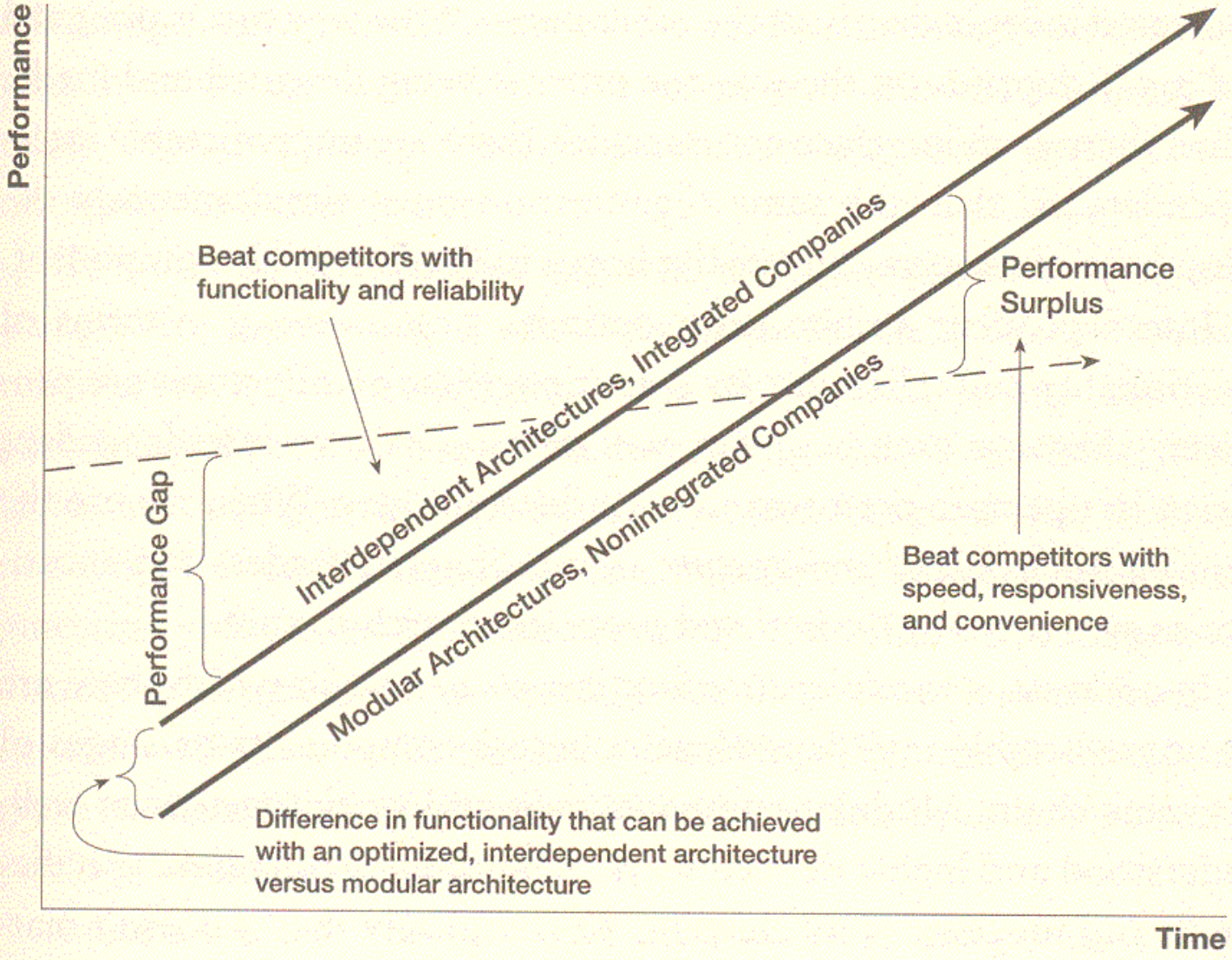


FIGURE 5-1

Product Architectures and Integration



OPEN INNOVATION

- Chesbrough, H., "*Open Innovation*", Harvard Business School Publishing, Boston MA, 2003
- ***Closed innovation*** - requires control
- ***Open innovation***
  - companies use external as well as internal ideas and both external and internal ways to market
  - internal ideas can be taken to the market through external channels to generate additional value

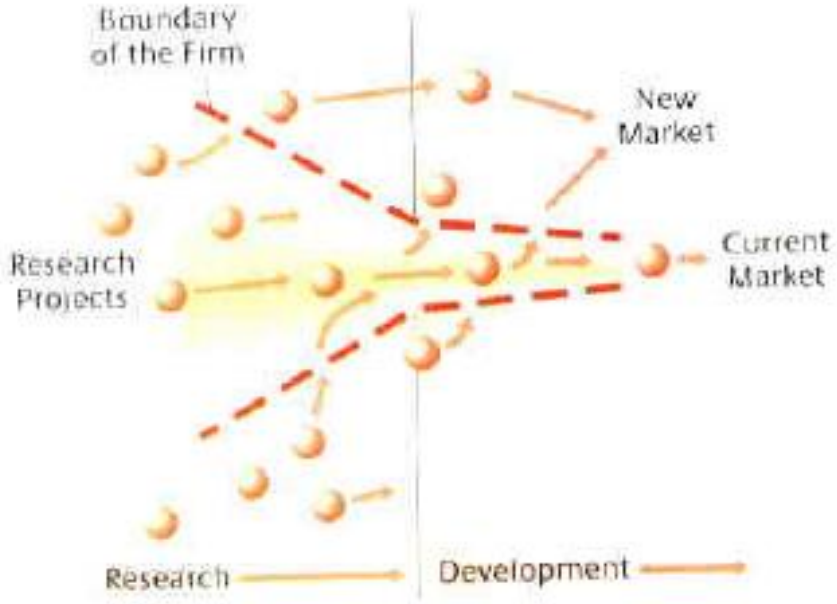
The Closed Innovation Model

In closed innovation, a company generates, develops and commercializes its own ideas. This philosophy of self-reliance dominated the R&D operations of many leading industrial corporations for most of the 20th century.

Chesbrough H.W.: The Era of Open Innovation, MIT Sloan Management Review, Spring 203, p. 35 - 41

The Open Innovation Model

In the new model of open innovation, a company commercializes both its own ideas as well as innovations from other firms and seeks ways to bring its in-house ideas to market by deploying pathways outside its current businesses. Note that the boundary between the company and its surrounding environment is porous (represented by a dashed line), enabling innovations to move more easily between the two.



Closed innovation	Open innovation
All the best people are working for us	Not all the best people are working for us . We must work with clever people within and outside our company.
R&D creates profit only when we invent, develop and market everything ourselves.	External R&D can create remarkable value; to employ it, we need absorption capacity, often as internal R&D.
If we develop the product ourselves, we will be the first on the market.	R&D can create profit even if we do not initialize and perform it ourselves.
Winner is who gets the innovation to the market first.	To develop better business model is more important than to be the first in the market.
We will win if we develop most of the ideas (an the best of them).	We will win if we make best use of internal and external ideas.
We must have our intellectual property under control so that our competitors can make advantage of it.	We must be able to profit from others using our intellectual property and we must license the intellectual property if it supports our business model.

Closed innovation	**Open innovation**
Examples: nuclear industry, mainframe computers	Examples : PC, movies
Mostly internal ideas	Many external ideas
Low workforce mobility	High workforce mobility
Low role of the venture capital	Active venture capital
Few new businesses, weak ones	Many new businesses
Universities are not important as the sources of ideas	Universities are not important as the sources of ideas and people

Business model

- Formulate ***value proposition,*** i.e. the value delivered to the customer by the product based on specific technology.
- Identify ***market segment***, ie. users to whom the technology brings value and performs the job to be done.
- Define structure of the ***value chain***, required for the product creation and distribution. Value creation is necessary, however not sufficient condition of profitability; value creation is conditioned by:
  - balance of forces among our business, suppliers and competitors
  - presence of complementary assets (e.g. in production, distribution, etc.) necessary for supporting the company position in the value chain.

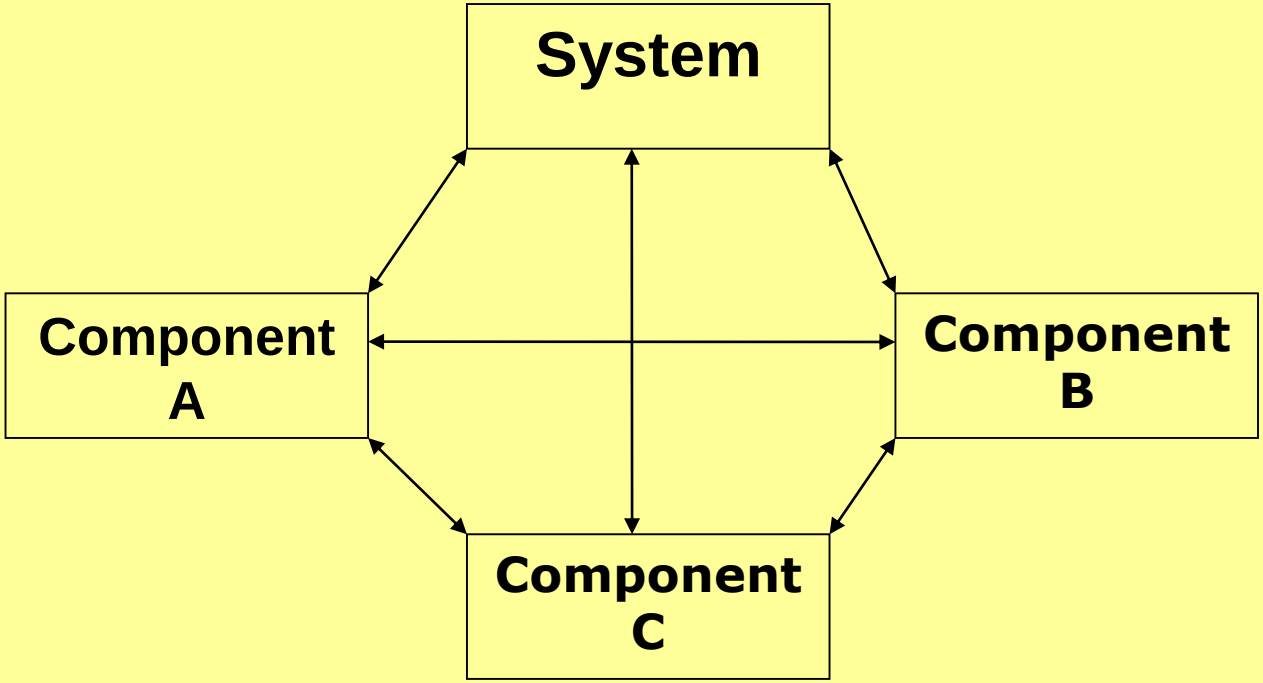
Business model– cont´d

- Specify the mechanism of profit creation and evaluate product ***cost structure*** and ***target margin***
- Describe the company position in the ***value network*** that connects suppliers and customers, including identification of potential alternative producers and competitors.
- Formulate ***competitive strategy*** enabling to the innovative company to gain and keep competitive advantage.

Product architecture

Hierarchy of connections between disparate functions within a system

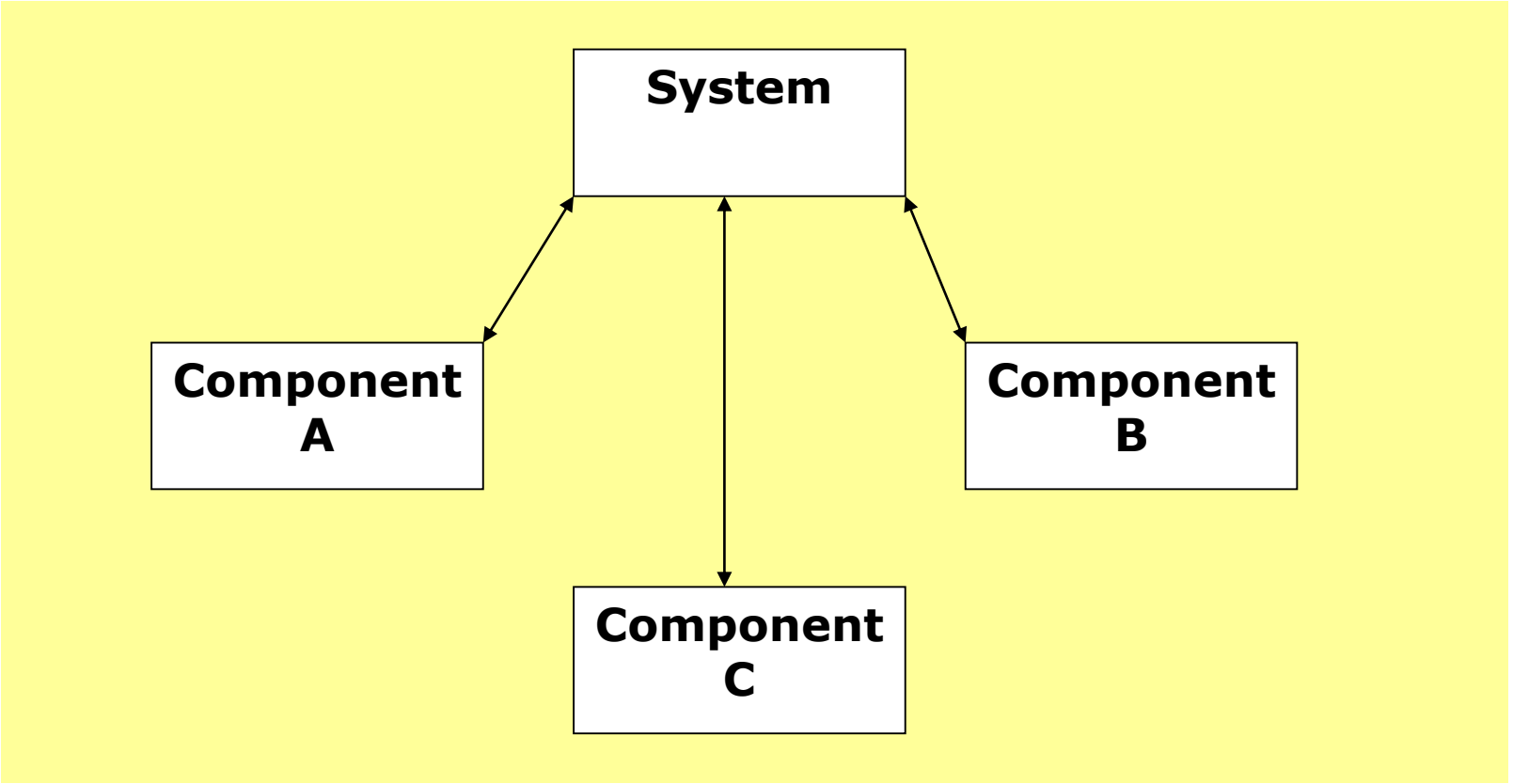
Interdependent Architecture



Interdependent Architecture

- changing one component requires changes in all other parts of the system, because the relationships between the parts are not clearly understood
- can be best managed through internal processes

Modular Architecture



Modular Architecture

- components could change without causing any change in other components
- modular design enables to assemble system more easily, from “plug and play” components whose interfaces are well understood
- modular architecture makes it easy for many companies to innovate components without worrying about possible impact on other parts of the system

IMPLICATIONS FOR NPD

- extended circle of company ***stakeholders*** - customers, NGOs, local and regional governments
- not only superior quality, but also environmentally friendly, aesthetically appealing new products
- ***designed for X***, where X can be quite large and multi-faceted set
- ***after-sale service*** plays an increasing role – and brings increased turnover and profit

Reference and source

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