Historical Perspective on Corporate R&D

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PERCEPTION OF DEGREE OF INTERNALIZATION OF CORPORATE R&D NEEDS, 1850-2050 (Idealized Model for Discussion Only)

100 percent

Golden Age of Corporate Research

Declining Commitment

R&D Pioneers

1850  1900  1950  2000  2050

0 percent
Corporate Research Pioneers

- GERL, 1900
- DuPont, 1902 & 03
- AT&T, 1909
- Kodak, 1912
- Hand full of others, as well, before 1915

- Significant moment in US history
- Part of what Alfred Chandler has called the rise of “the visible hand of management”
- Integration of innovation (R&D) into large, science-based firms
- Firms determined to lower their reliance on “the market” for innovations
- Integration of R&D into the firm lowered uncertainties associated with innovation and “the perennial gale of creative destruction”
- Response to threats to core products/technologies
- Magnified by federal antitrust policy
Research labs of these large firms had an influence far beyond their individual firms.

Research directors—Willis Whitney, Charles Reese, Frank Jewett, and Kenneth Mees—exerted an influence on US science and technology for well over a generation.
GERL @ Schenectady Works
Bell Telephone Laboratories, 1925
Dr Kenneth Mees,
Messrs Watten & Wainwright, Ltd.
Croydon.

Dear Dr Mees,

This is to confirm our conversation that it is understood that, when you come to Rochester, you will be entitled to a vacation every year, not exceeding one month, to be taken when most convenient to the business.

It is also understood that your Department will be allowed to publish the results of scientific investigations in cases where they do not interfere commercially with the business. Such communications before issue to be always submitted to and approved by the Company.

Yours very truly,
Dear Dr Mees,

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Yours very truly,

[Signature]
Success Breeds Growth

• Research Pioneers’ success led to emulation by other firms, including competitors in the 1920s and even during much of the Great Depression era.
• Corporate research tied to “The World of Tomorrow” as displayed at the 1939 New York World’s Fair.
• GERL promoted as “The House of Progress”
• DuPont’s announcement of discovery of nylon from an elite program of fundamental research (carried out in “Purity Hall” at the Experimental Station
• Kodak’s exhibition of color motion picture film
• Bell Lab’s exhibition of the first videophone
• RCA’s display and operation of its decade-long program to build an all-electronic television system
• The list goes on and on . . .
Industrial Research as Science
Industrial Research as Progress
World War II’s Role

• Unprecedented, massive federal investment in R&D for the war effort
• Brilliant successes in focusing on large-scale project involving university, industry, and government scientists and engineers
• For university-based scientists, WWII led to new research funding institutions
• For firms, it led to the Golden Age of Corporate Research in the USA
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RCA Princeton (NJ) Labs, 1944
Bell Labs, Murray Hill (NJ), 1945
DuPont Experimental Station Expansion, c. 1950
Bell Labs, Murray Hill
Invention of the Transistor, 1947
Ideology of Corporate Research in Its Golden Age

• “To my mind, the most important thing we have to do . . . is to re-establish our position in the *scientific world* . . . . (1944)

• “I am convinced that Ford will not have many ‘firsts’ unless we get a few good thinkers and have a real research department.” (E. Breech to Henry Ford II, 1949, which led to the establishment of the Ford Scientific Laboratory, 1951)

• “Westinghouse, in particular, had had a distinguished research staff. The company had decided that its research programs were not sufficiently relevant, or beneficial to the company. The research group . . . had felt that its mission was to benefit society in general, and that Westinghouse could receive these benefits like everyone else. The top management therefore placed research under engineering management, and the eminent scientists left.” (describing an IBM research program planning committee’s meeting with a Westinghouse Electric Mfg. Co. representative, c. 1955)

• My major job as Director of Central Research was to protect my scientists and to ensure that we published world-class science. (Paraphrasing a top corporate research program director from the 1970s and NAS member.)
Ideology (con’t)

• “To attract these top-notch research men [to the proposed central research organization], the company must display an enthusiasm for good science as an end in itself. It is generally true that the degree of company-oriented enthusiasm shown by the scientist is directly proportional to the degree of science-oriented enthusiasm displayed by the company. . . . The enthusiasm must be felt; it cannot be produced by edict.” (Sampling from a 22-page proposal that led to the establishment of North American Aviation’s corporate Science Center in 1963.)
Ideology (con’t)

• “The fact is that [corporate] research does work for a lot of companies. When research fails, it almost never is because of an intrinsic problem in research itself (i.e., the inability to think of something new). Instead, the research usually falls prey to problems that can be traced to general management issues . . . . The clear message that we have gotten from people in the research community is the most significant factor in attracting people is that we show sufficient commitment to research.” (Microsoft Research Plan, early 1991, that led to the establishment of Microsoft Research.)
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Major Corporate Research Organizations in Decline and Disappearance

- Defense industry: Boeing, Sperry, and NAA Science Center
- Semiconductor Industry: Texas Instruments; Motorola
- Electronics: RCA, Xerox PARC
- Telecommunications: Bell Labs
- Petroleum: Gulf Oil, Shell, Exxon
- Electrical: Westinghouse
- Chemical: Dow, DuPont
- Photographic: Kodak
- Metals: United States Steel, Alcoa
- Automotive: GM and Ford
- Computing: IBM
Hounshell’s List of Reasons Why

- End of strong antitrust enforcement
- Competitiveness issues
- Major economic disruptions of the 1970s
- Rise of institutional investors, short-termism, maximizing shareholder value (i.e., stock price); top-level management
- Consolidations, mergers, and hostile takeovers; dis-integration in some industries
- Bayh-Dole Act (1980)
- Breakdown of Mertonian norms in the universities, which facilitated the rise of the “entrepreneurial university”
- Offshoring of manufacturing
- Restrictions on “open science” in CRADA programs (lead to reduction in publication from extant corporate labs)
- Tectonic shift from hardware to software
- End of the Cold War and weakening of IR&D program
- “Simple economics” of basic science in industry