

From Dyes to Blockbuster Drugs: Database and Visualization of Pharmaceutical Industry Value Creation from early roots to 2020

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Proposal Description: The modern pharmaceutical industry had its beginnings in the major European, American and Japanese chemical companies of the late 19th century. Over time, increasing understanding of biology drove these companies to produce chemical medicines instead of just chemicals for industrial purposes. For example, Swiss dye producers Ciba, Geigy and Sandoz were founded in the 1880s, and over time increased their pharmaceutical production (and decreased or sold off their other chemical production), culminating in a merger in 1995 that created Novartis – today one of the largest pharma companies in the world.

Starting in the 1970s, understanding of molecular biology began to be used to produce “biologic” drugs – larger molecules produced by living organisms rather than by chemical synthesis. Many of these early “biotech” companies have been acquired or merged so that they are part of much larger consolidated companies. Genentech, the most famous biotech company of the 1970s/1980s, was purchased by the Swiss pharma company Roche in 2009.

In fact, all but a couple of the top 20 global drug companies have a history of growth by merger and acquisition.

This research project starts from both ends to create a comprehensive database: (a) tracing the top early chemical companies of Europe, America and Japan through >100 years of mergers and acquisitions (M&A) to their successor companies today; and (b) looking at today’s top 20 global pharma companies to see where value has been created, and which companies they acquired, along the way.

The key outputs of the project will be a database of company creation and M&A activity in the pharmaceutical industry over the course of >140 years; a dynamic, animated visualization of the data; and eventually a paper on the topic. We will also be monitoring things like research and development (R&D) spend, and how that compares to M&A in terms of value creation.

Previous RAs have worked through the past 50 years or so of the top 20 pharma companies by market capitalization. We have started to put together advanced visualizations of the data. This semester we hope to extend and augment the financial research (there are pockets of data held in libraries and archives outside of Yale), continue synthesizing the data, and complete the first of the visualizations. We also hope to settle on a database structure and the best way to preserve and present the research.

Requisite Skills and Qualifications:

Award: John Brockett

Aryan Sehgal

Tobin Application Link: [Tobin Application](#)

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