

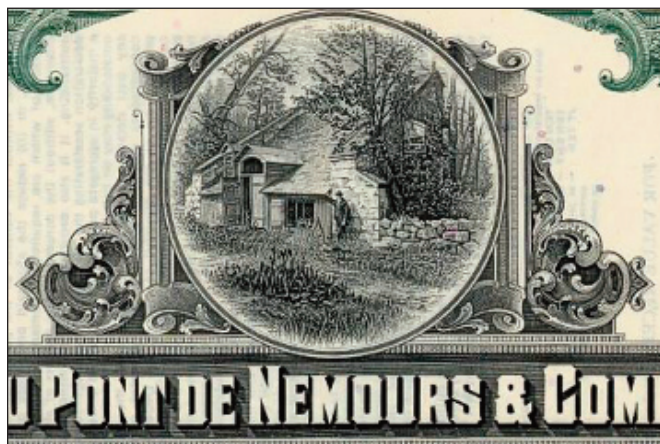
A Brief History of Management Accounting

By Monte R. Swain, Ph.D., CMA, CPA, CGMA

EXECUTIVE SUMMARY

The history of management accounting evolution in the U.S. is an evolution process based on competitive need and the ability of bright professionals to creatively solve specific needs in their organizations. Today's professionals who understand this history are better positioned to anticipate and develop new concepts and solutions. Meanwhile, management accounting continues to evolve.

You are probably unfamiliar with E.I. du Pont de Nemours and Company, but you have certainly heard of its more common name, DuPont. Some of this company's best-known brands are Teflon resins, SilverStone nonstick finish, Lycra brand spandex fiber, Stainmaster stain-resistant carpet, Antron carpet fiber, Dacron polyester fiber, Kevlar brand fiber, Corian solid surface material, Mylar polyester films, Tyvek spunbonded olefin fabric, and Coolmax and Cordura textile fibers.¹



DuPont Bond Certificate, dated 1974.
Source: scripophily.com

In 2015, DuPont had revenues of \$25.1 billion and a net income of \$2 billion with \$41.2 billion total assets. It ranked 87 on the *Fortune* 500 list while operating in approximately 90 countries and employing 52,000 people worldwide. This is a big company! At the end of 2015, DuPont announced a merger with its rival Dow to form DowDuPont, an even bigger chemical company that both companies' boards of directors decided to split into three separate organizations.

What does DuPont have to do with you, outside of the fact that you probably use many of its products? In 1903, the owners created a challenge that no one had ever attempted, and the way they handled that challenge profoundly affected how we manage companies today and permanently changed our approach to management accounting. If you want to understand financial accounting in the United States, you need to study the underlying theories of Generally Accepted Accounting Principles (GAAP) and the process the Financial Accounting Standards Board uses to create GAAP. But if you want to understand management accounting in the U.S., as well as in many other countries, you really need to put yourself in the shoes of a young man who had an opportunity to impress his boss in the summer of 1914.

French immigrant, Eleuthère Irénée du Pont de Nemours, established the DuPont company in 1802 on the banks of the Brandywine River near Wilmington, Del. He built his company to produce black powder. Essentially, E.I. du Pont built a product that ignited when it was supposed to. Thomas Jefferson, as well as other citizens of the fledgling republic, greatly appreciated this product, and in 1811 Jefferson wrote a note to du Pont celebrating the quality of his powder and requesting a large order to clear the land at Jefferson's Monticello plantation.² Public enthusiasm for blasting powder continued, and the company grew into a major family corporation.

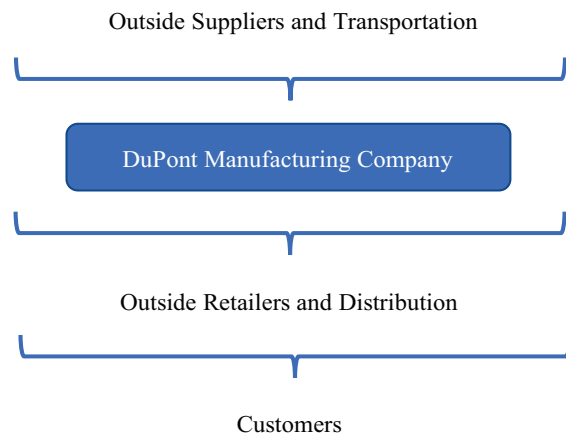
At the start of the 20th Century, DuPont fell on hard times because of increased competition. Seizing the opportunity that the crisis created, three great-grandsons of the founder—Thomas Coleman du Pont, Alfred Irénée du Pont, and Pierre Samuel du Pont—offered to purchase the company's assets from the family in exchange for bonds and stock in a new

corporation. Today this transaction is known as a leveraged buyout. The offer was accepted, and in 1902, the great-grandsons restructured the company to look for new business and create new products through research and development.

Coleman (who went by his middle name), Alfred, and Pierre had innovative ideas about running a business. In 1903, the gunpowder industry looked much like other industries in the U.S. with several competitors focused primarily on manufacturing. They purchased raw materials, such as charcoal, sodium nitrate, and crude glycerin, from suppliers and distributed their blasting and gunpowder products to customers using independent wholesalers and general merchants. For the du Pont cousins, the business they purchased looked a lot like Figure 1.

After the purchase, they decided to expand the business beyond manufacturing high explosives, smokeless gunpowder, and black blasting powder. Between 1903

Figure 1: DuPont before 1903



and 1914, the cousins expanded and changed the family business by “forward integrating” into the sales and distribution business, as DuPont created its own network of branch sales offices scattered across the U.S. They also “backward integrated” as DuPont bought out most—but not all—of its suppliers. When the dust finally settled, DuPont was one of the U.S.’s first large-scale “vertically integrated” organizations (see Figure 2). To accomplish the feat, the company had consolidated

outside companies that either sold and shipped raw materials to DuPont or sold DuPont products to customers.

While this type of organization is quite common today, it was a strange-looking company at the turn of the century. Coleman, Alfred, and Pierre were confident, however, that their new way of doing business was going to make them a lot of money, and they were right. In those early years, however, their efforts had created a serious challenge for themselves. They knew how to run a manufacturing business, but now they were also in the business of mining, transportation, sales, and distribution; all were very different businesses with each having its own way of communicating results and measuring success.

The three cousins had a limited amount of time and resources to grow their company. How were they going to effectively plan schedules, control operations, and evaluate divisions to determine additional investment needs? Essentially, they had an accounting problem, but what they did to handle the challenge was, to say the least, impressive.

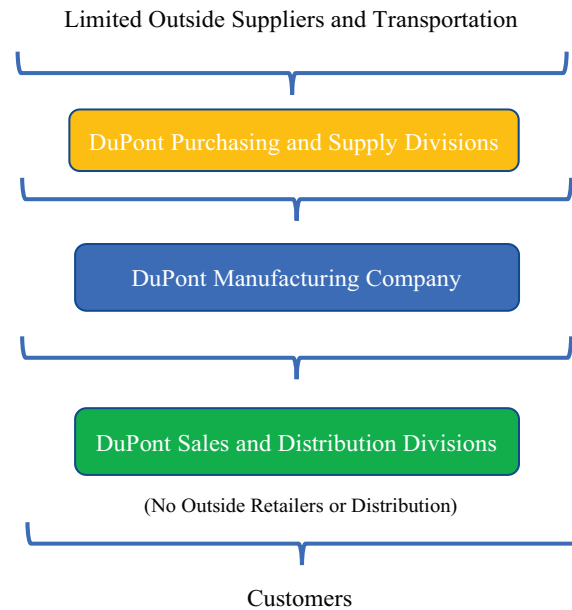
BACK TO THE BEGINNING

Prior to 1810, U.S. business was basically made up of a loose bunch of independent contractors, each of whom focused on doing one thing well. If you wanted to purchase groceries, you went down to a local market that an independent proprietor owned and operated. If you went to the next town to buy groceries, you would deal with a different store owner. If you needed a plow, you went to a blacksmith. If you needed a barrel, you went to a cooper. If you needed a wagon, you went to a wainwright.



Wheelwright and Wagon Shop, early 1900s.
Source: dcnhistory.org

Figure 2: DuPont after 1903



And just like their customers, each of these small manufacturers generally had to deal with several independent suppliers of raw materials, such as lumber, coal, and iron. As you can imagine, the wheels of commerce turned rather slowly.

On the other hand, businesses were easy to manage. Owners at the turn of the 19th Century generally did not employ large numbers of people and did not have many complex processes to manage. Cost accounting, if we can say it existed at all, was not a difficult procedure. If the wainwright wanted to know how much it cost to build a wagon, he simply added up the costs of buying lumber products from the sawmill, leather products from the tanner, and iron products from the blacksmith. He then set the price for a wagon high enough to compensate him for his (and his family's) assembly labor. Essentially, for most of these small businesses, market prices supplied every conceivable bit of information for decision making and control.

Nothing Feels Quite Like Cotton

Remember the Industrial Revolution that you learned about in high school? It began in Britain and spilled over to the U.S. sometime after 1812. Big business started appearing on the East Coast, beginning with the



Power loom weaving, circa 1834.
Source: Wiki Commons

mechanized integrated cotton textile factories of New England.

In 1814, the American industrialist Francis Cabot Lowell established a cotton mill, the Boston Manufacturing Company, on the banks of the Merrimack River in Waltham, Mass. For the first time, all the steps of an industrial process were combined under one roof. Instead of contracting with dozens of little family-owned businesses to card, spin, and sew raw material into cloth, Lowell brought raw cotton fiber into a heavily equipped factory staffed with workers organized by specialty who created a finished product ready for sale.

This was a new concept of doing business, and it complicated the accounting process. To run this textile mill, Lowell and his managers required a reporting system to provide the information needed to plan, control, and evaluate work they were not actually doing themselves. History shows that Lowell's early textile mill developed a remarkably good accounting system to manage inventory, payroll, and production work. Most importantly, the "Waltham-Lowell system" of production and accounting separately tracked direct and indirect costs of manufacturing and began reporting on the efficiency of materials, labor, and overhead costs.

It is important to understand that the birth of management accounting was the result of an opportunity to obtain a competitive edge in the textile business. Remember that the purpose of *financial accounting* is to comply with requests of outside investors, creditors, and regulators for fair and consistent reports of operations.

But the *only* reason we do *management accounting* is to satisfy a competitive need.

Bringing It Home on the Railroads

Shortly after the launch of the textile industry, the advent of the railroad business presented some of the most complex administrative problems of the 19th Century. The locomotive demonstrated its practicability in 1829, and the locomotive quickly began replacing the horse and mule as the primary means of mass commercial travel in the U.S. By 1869, the Union Pacific Railroad from the east and the Central Pacific Railroad from the west were joined at Promontory Point, Utah.

Railroad companies soon grew to sizes that dwarfed the scale of the largest textile factories, and names like J.P. Morgan and Edward Henry Harriman became famous (or infamous, depending on your perspective). Managing these huge administrative entities required special record-keeping systems that logged enormous numbers of daily transactions and summarized essential information for frequent internal reports to management.

The real issue, however, was that railroads required a hierarchy of management (i.e., managers managing other managers). At a textile mill, the manager works right there in the factory with a group of workers. In contrast, given the vast and complex scale of the business, railroad managers were literally spread all over the map. Owners and senior managers needed some way to assess the performance of submanagers at terminals and yards across the country. The answer came in the 1860s from business professionals like Albert Fink, senior vice



William Crooks steam locomotive, 1864.
Source: Wiki Commons

president of the Louisville & Nashville Railroad. Fink kept track of operating expenses in his railroad using a calculation called costs per ton-mile (the average cost to move a ton of material one mile).

Using the costs per ton-mile metric, Fink could monitor costs throughout Louisville and Nashville and pinpoint reasons for cost differences to specific stations and station managers. In addition, Fink and other railroad executives used operating ratios (operating expenses divided by revenues) to provide competitive information indicating how the performance of various submanagers would affect the company's total financial performance. The message to railroad submanagers was obvious—keep the costs down.

And what was the message to executive managers and management accountants? A company can use performance measures to delegate responsibilities and to control and evaluate the business from a distance. This message contributed to the growing realization that good management accounting provides competitive insight and allows companies to spread out geographically.

The Steely-Eyed Business Tycoon

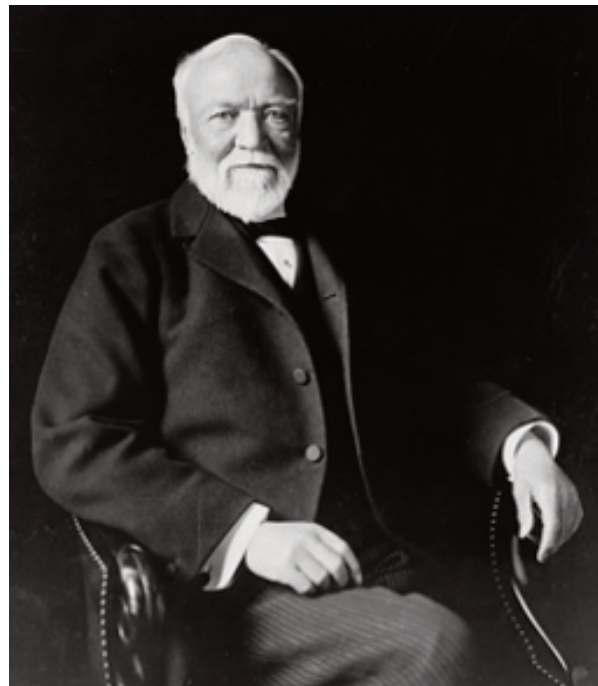
At this point, management accounting (known then as cost accounting) focused strictly on cost measurement and cost management. Business owners were making a great deal of money using this information to build and grow large companies—and no one understood cost information quite like Andrew Carnegie.

Born in Scotland in 1835, Carnegie came to the U.S. in 1848 and soon began work as a bobbin boy in a cotton mill in Allegheny, Pa., for \$1.20 per week. Later, he worked at the Pennsylvania Railroad where he advanced through the company to become the superintendent of its Pittsburgh division. A smart investment in the Pullman Company laid the foundation of his fortune, and he was off to the races.

After the Civil War, Carnegie left the railroad and formed a company to produce iron railroad bridges. He later started a steel mill and was extremely successful in acquiring a controlling interest in other large steel plants. By 1899, when he consolidated his interests in the Carnegie Steel Company, he controlled about 25% of U.S. iron and steel production. One of the shrewdest entrepreneurs of his time, Carnegie earned his educa-

tion in the U.S. textile mills and railroad companies. He learned his lessons well.

Although few have ever gained access to the accounting records of Carnegie Steel Company, those who have agree that Carnegie was obsessed with costs. One of his favorite sayings was, “Watch the costs, and the profits will take care of themselves.”³ Every department at Carnegie Steel reported on the amount and cost of



Andrew Carnegie, 1913.
Source: Wiki Commons

materials as well as labor on each order of steel as it passed through its production zone. Carnegie was always asking department heads the reasons for any change in costs.

Carnegie went far beyond the railroads' efforts, using costs to evaluate the performance of department managers. He and his executive managers relied on their cost charts to check the quality and mix of raw materials, to evaluate improvements in processes and products, and to price contracts. Carnegie Steel would never accept a customer contract until its costs were carefully estimated. The accounting system at Carnegie Steel was particularly focused on the effort to understand and

assign overhead costs to intermediate and final products.

Was Carnegie's management accounting technique successful? In 1901, he sold his company to United States Steel Corporation for \$250 million and retired. During his lifetime, he gave more than \$350 million to various educational, cultural, and peace institutions, many of which bear his name. Not bad for a lad with no formal education.

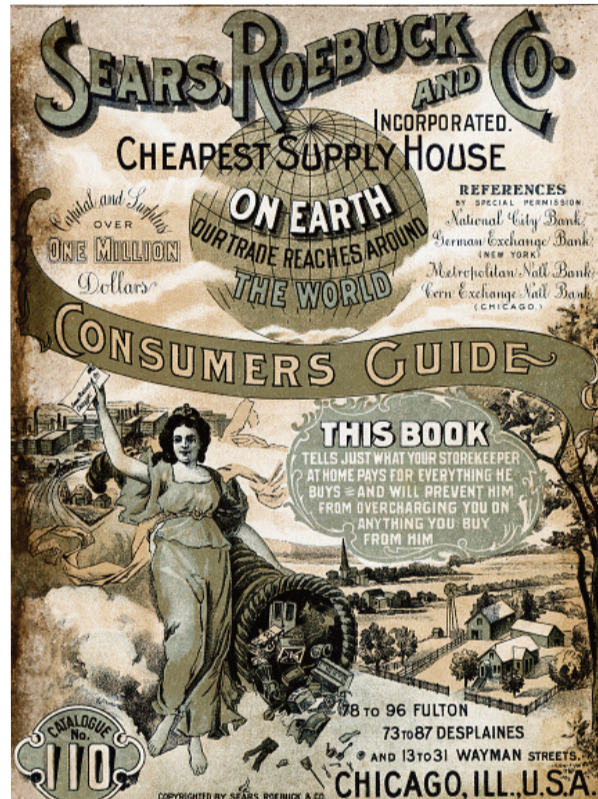
A Focus on Selling

While textile, railroad, and steel industries were making tremendous advances in the science of production and management, other businesses were paying attention. The last quarter of the 19th Century brought with it an incredible outpouring of inexpensive, mass-produced goods and services for consumers. Much of the reason that large companies could develop and produce extremely high volumes of goods for the American public was the emergence of a new breed of business—large-scale wholesalers and retailers. Besides making many diverse items available for purchase from one source, these wholesalers and retailers provided other critical services, including distribution, delivery, and credit service on account.

The emergence of large-scale retailers in the U.S. began with companies such as R.H. Macy & Company, Inc., in New York City and Marshall Field in Chicago. Founded in Chicago in the latter part of the 19th Century, Sears, Roebuck and Company became *the* mail-order catalog store for urban and rural communities throughout the country. By bridging the price gap between small local producers and huge mass producers, these retailers and distributors achieved tremendous financial success.

Managers and accountants in this industry learned to focus on a very important idea: move inventory. The success of the mass merchant hinged on inventory turnover, typically called “stockturns” (inventory divided by sales). By selling goods faster than smaller local merchants, large-scale wholesalers and retailers could charge lower prices and still realize tremendous profit. Up to this point, big business had focused almost exclusively on costs in the U.S.

Wholesalers and retailers introduced a new concept



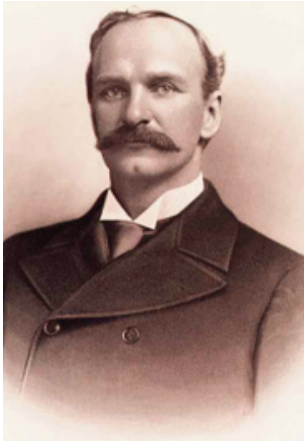
Sears, Roebuck and Company Consumer's Guide, No. 110, circa 1900.

Source: Bettmann Archive/Getty Images

to management accounting. Companies could make a lot of money by controlling and evaluating the way managers use *assets* (in this case, inventory). As early as 1870, Marshall Field and other large-scale retailers began monitoring stockturns throughout their organizations with great interest. This was an important step toward modern-day techniques of asset (or capital) management.

DUPONT'S DILEMMA

Now back to the DuPont story. By the time Coleman, Alfred, and Pierre du Pont finished buying out their suppliers and setting up their sales offices throughout the country, they had created a giant organization. The fact that their company was big, however, was not what makes their situation interesting. Lowell, Morgan, Carnegie, and Sears each had already created and successfully managed huge companies. Those companies, however, were all focused on doing *one thing well*—making cloth, moving railway cars, producing steel, or selling goods.



Thomas Coleman du Pont
1863–1930



Alfred Irénée du Pont
1864–1935

Source: Wiki Commons



Pierre Samuel du Pont
1870–1954

The du Ponts, on the other hand, were trying to combine many different types of businesses (mining, transportation, manufacturing of both raw materials and finished goods, and retail distribution) under one umbrella. They had a huge management hierarchy, complicated production processes, geographically dispersed business locations, and inventory in the hands of store managers needing to turn it over as quickly as possible. Each division constantly required attention and additional capital investments to grow and do well. The du Ponts knew they could make or lose money in any part of this new monstrous company. Obviously, they and their capital could not be everywhere at once, so they needed to make trade-offs.

The problem was that these divisions were very different from each other. How were they to know which divisions should receive additional investments of time and money? They could not really compare the cost reports of retail stores in Denver with a black powder manufacturing factory in Delaware or a sodium nitrate processing plant in Chile. All these unique business activities also made it quite impossible to relate various measures of efficiency, such as operating ratios or stockturns, directly to overall company profit.

The first thing the new DuPont management team did was develop

extensive budgets to coordinate the flow of resources from raw materials to the ultimate customer. But they still needed a metric that could compare performance in the company's separate divisions with overall company performance. Enter the accountant, F. Donaldson Brown (actually, he was an electrical engineer turned accountant). (And let this brief his-

tory be another call for Brown to be admitted into the Accounting Hall of Fame.⁴)

BROWN MAKES ACCOUNTING HISTORY

Graduating from Virginia Polytechnic Institute in 1898 at age 17 with a degree in electrical engineering, Brown began his career in the railroad industry before moving to a position with General Electric. After a short stint as an entrepreneur in the coal-moving business, Brown accepted a position in 1909 at DuPont as an explosives salesman.⁵

The story of Brown's career at DuPont reads like a classic Horatio Alger novel. In 1912, the DuPont general manager recognized Brown's abilities and asked him to join the general office staff. In 1914, during a time when the general manager had taken a leave of absence due to poor health, company president

Coleman du Pont called for a report on the operating performance of departments. In Brown's words, "I undertook the job..., and I have often wondered what might have been my fate and fortune in industrial management if I had not, that summer, hit upon the mathematical equation $(R = T \times P)$."⁶

Brown was not the first to evaluate performance measures involving turnover (T) and profit margin (P). A hundred years earlier, Francis Lowell



Accounting Hall of Fame pin.
Source: Wiki Commons



F. Donaldson Brown, 1905.
Source: Hagley Museum and Library (Wilmington, Del.)

had focused on planning, controlling, and evaluating costs to manage profit margins in the textile industry. Later, managers in large-scale organizations like railroad and retail merchandise companies fashioned cost- and inventory-based performance measures to compete in increasingly complex industries. Those who did well, such as industrialist Andrew Carnegie, had helped develop cost accounting into strict management disciplines. In the 25 years preceding Brown's "eureka summer" of 1914, large-scale retailers had established asset turnover measures as a key competitive tool in merchandising industries.

But Brown spent the summer in 1914 expanding the simple return on investment (ROI) formula (see Figure 3) into a complex and interrelated view of key performance indicators that integrated together as a financial performance model *for any kind of business* (see Figure 4). By the end of the summer, Brown was setting up detailed charts to track and report specific data related to each segment of DuPont's operations, and department heads began focusing their discussions to better manage specific weaknesses or

opportunities in sales, costs, and assets. By the end of 1914, Coleman du Pont promoted Brown to assistant treasurer. In 1918, Pierre du Pont, now president of the company, promoted Brown to treasurer of the entire company.

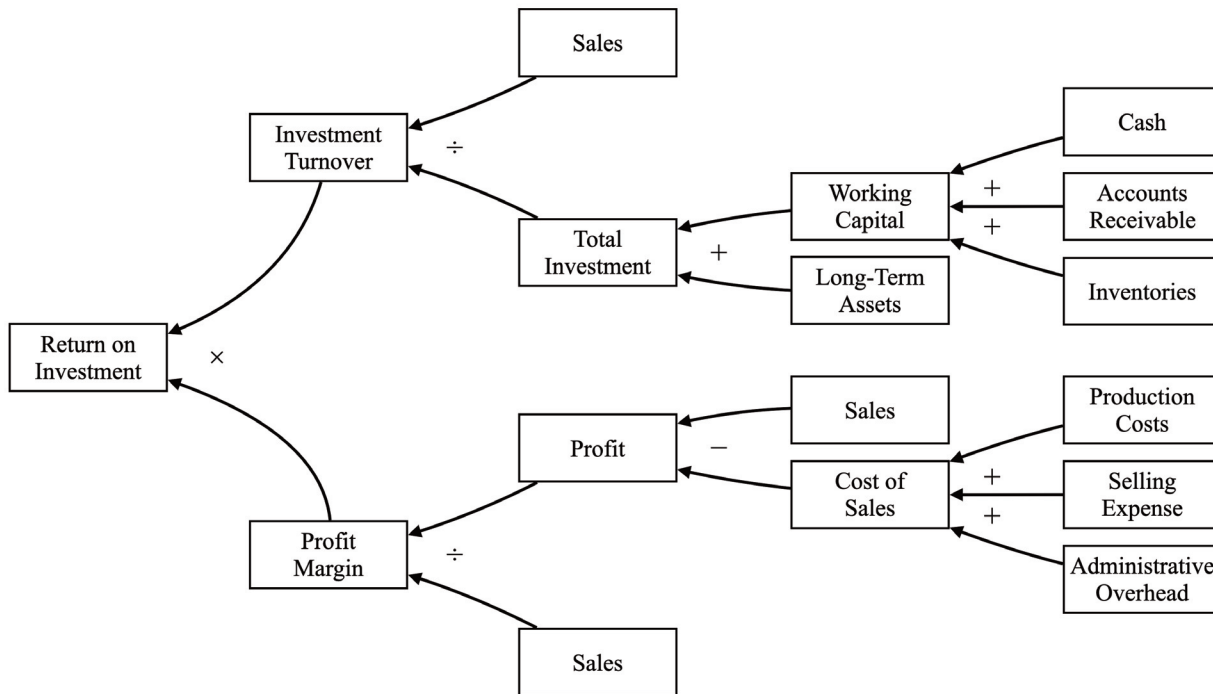
ROI became the primary performance measure for all DuPont operations. Recognizing that every division required an investment in capital (assets) to be in business, Pierre du Pont and the DuPont management team committed the company to use its assets as effectively as possible to make a profit. They recognized that an explosives plant and a major distribution division each earning \$50,000 in annual profit were likely not making the same contribution to overall DuPont value. If the explosives plant required capital investments of \$1 million to run its business, while the distribution division only required \$500,000 in capital assets, then the distribution division is earning a 10% return ($\$50,000 \div \$500,000$) on the DuPont investment in inventory, equipment, and buildings, while the explosives plant is only earning a 5% ROI.

This idea of ROI was not new to U.S. business in the first part of the 20th Century, but DuPont took the simple ROI formula and turned it into a management technique that the company could use to manage any kind of business operation at DuPont. If the company or any division within the company is generating low ROI, the DuPont management team can immediately begin analyzing the problem. Is asset turnover too low? Perhaps the division needs to reduce its investment in assets or possibly work to improve sales. Is the profit margin less than adequate? Maybe the division needs to concentrate on reducing selling expenses or manufacturing costs? The ROI tool allowed DuPont to manage the

Figure 3: The DuPont Formula (simple)

$$\begin{aligned} \text{Return on Investment} &= \text{Investment Turnover} \times \text{Profit Margin} \\ \frac{\text{Profit}}{\text{Investment}} &= \frac{\text{Sales}}{\text{Investment}} \times \frac{\text{Profit}}{\text{Sales}} \end{aligned}$$

Figure 4: The DuPont Formula (expanded)



Source: T.C. Davis, *How the DuPont Organization Appraises its Performance*, American Management Association, New York, N.Y., 1950.

country's first integrated company with outstanding success by combining cost management with asset management and elevating it to an art form.

In 1919, DuPont established an ROI-based chart room on the renowned ninth floor of the DuPont Building in Wilmington, a few steps from executive committee offices. That room remained a key data library for DuPont for nearly 50 years before better technologies replaced the large library of key charts.⁷

It is likely that no management accounting technique has had as great an impact on business management than the DuPont ROI formula. In fact, Brown took the ROI approach with him when he followed Pierre du Pont in 1921 to help rescue a company in the midst of an inventory crisis. The company in crisis was General Motors. The success of the DuPont technique at General Motors can be witnessed today in any parking lot in the U.S.

THOSE WHO FAIL TO LEARN FROM HISTORY

Why is it so important to understand the history of management accounting? There are two reasons. First, many professionals have a difficult time separating the purpose of management accounting from financial accounting. As GAAP established, financial accounting is intended to provide external users, such as investors, creditors, and suppliers, with information to make economic decisions. These decisions include whether to invest in a company, whether to loan a company money, and whether it is financially sound to establish a long-term buyer-supplier relationship. The primary financial statements (the balance sheet, the income statement, and the statement of cash flows) provide information to external users in a standardized format, using a common set of accounting practices, so that external users can easily compare the financial statements for a broad array of different companies.



The DuPont chart room, circa 1950. Source: Hagley Museum and Library (Wilmington, Del.)

Management accounting is less precisely defined than financial accounting. A regulatory agency or an oversight board does not create it. Rather, individuals and companies work to create an information system that has competitive value. Every company is different; each has a different strategy for success and its own definition of success. As a result, the process of management accounting is really a unique experience for every organization. Each company creates its own internal customized view of how it does business. That view is (or should be) reflected in the kinds of performance measures and management processes the company develops. The nature of management accounting is that it evolves. Someone has a novel idea about tracking information in a way that provides a competitive edge, and the rest of us watch and try to duplicate and improve on the effort.

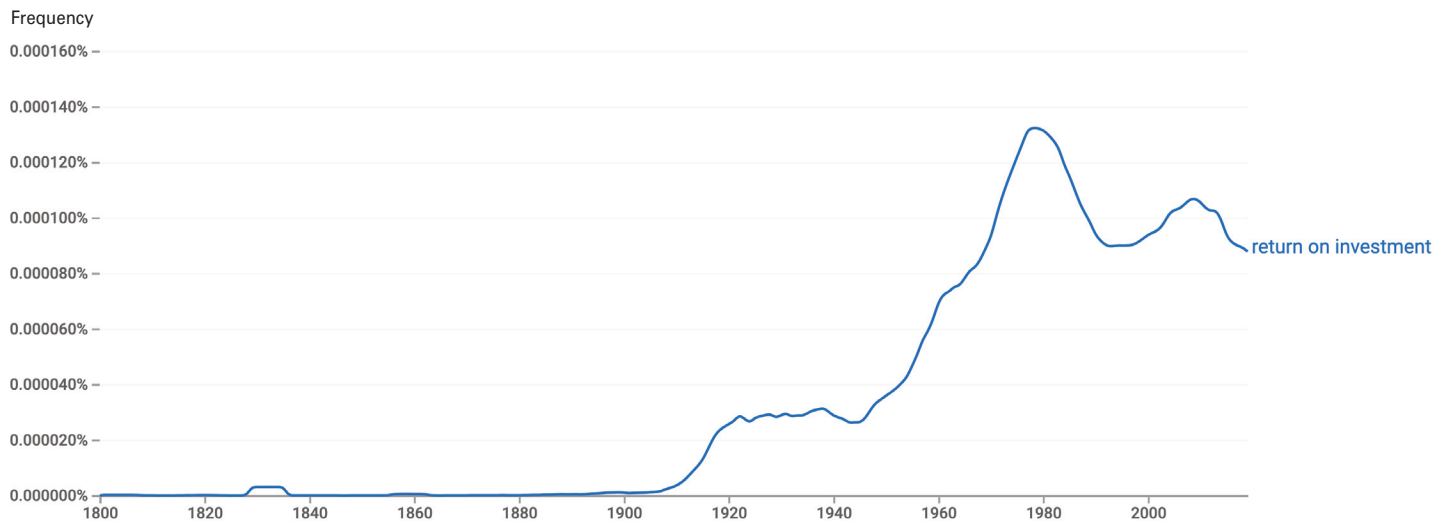
There are some rather consistent management accounting practices across organizations in the U.S. and around the world. Every organization must deal with the realities of *planning* for the future, *controlling* presenting operations, and *evaluating* past events. This is the second reason to learn a little history. We are all students of business. If we understand the historic evolution of management accounting, then we will watch how successful businesses (regardless of the industry they are in) approach the process of planning, controlling, and evaluating, as they pursue unique competitive strategies. Ultimately, we will invest in better, more innovative management accounting practices within our own organization.

WHAT'S NEXT?

You may ask “What’s next?” One way to quickly view management accounting trends is with the Google Ngram Viewer, an online search engine that charts the frequencies of search strings based on a yearly count in printed books.⁸ Figure 5 presents the Google Ngram report on the phrase “return on investment” between 1800 and 2019. References to this phrase track quite well with the history of Brown and DuPont’s work with this management accounting tool. Further, the Ngram report suggests that beginning in the 1980s, the evolution of ROI may have leveled off and even declined somewhat.

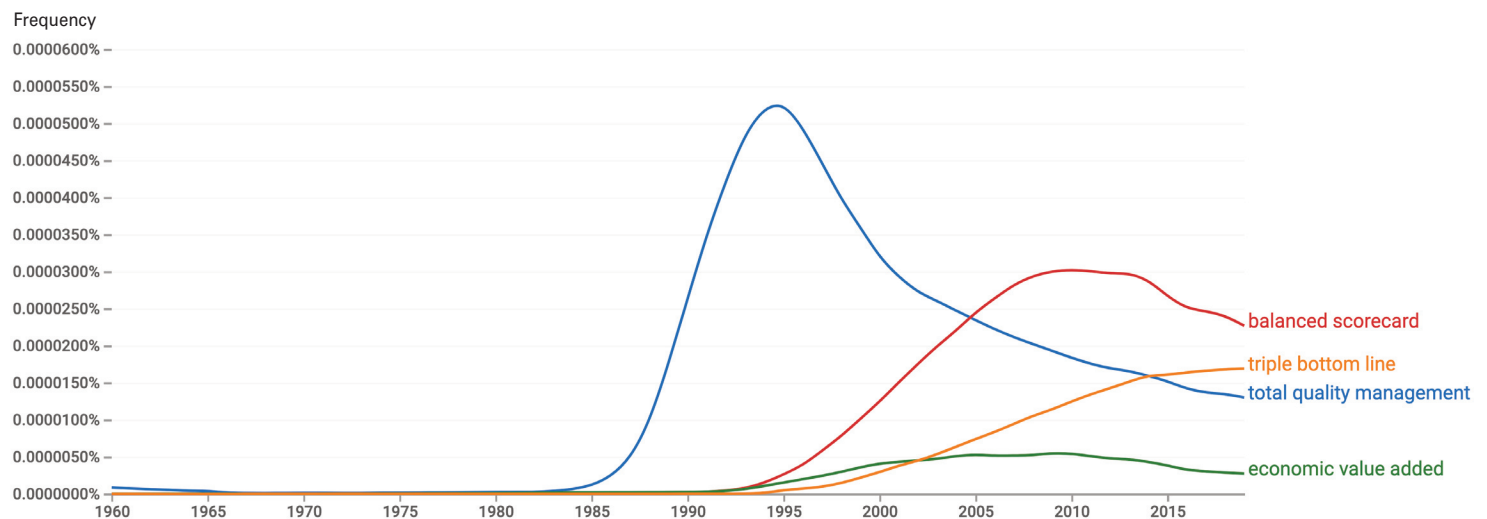
More recent advances in management accounting tools include total quality management (TQM), the balanced scorecard (BSC), Economic Value Added® (EVA), and triple bottom line (TBL) reporting. Figure 6 provides the Ngram report on these phrases. TQM is a planning, controlling, and evaluating technique that evolved in Japan beginning in the 1940s and migrated to the U.S. in the 1980s. The BSC, popularized by Robert Kaplan and David Norton, among others, is a strategy implementation tool that emerged in the late 1980s and began rising to predominance in the 1990s. The management consulting firm Stern Stewart & Co. devised EVA, a sophisticated version of the residual income concept, in the 1990s, and it has exhibited a reasonable level of management use since that time. Originating out of Britain, TBL is an expanded view of value creation focused on economics, society, and the

Figure 5: Google Ngram Report: “return on investment” between 1800–2019



Note: The Google Ngram Viewer provides a report on the frequency of a selected phrase within the corpus of English language digitized books in the Google database (currently, more than 8 million books). The y-axis represents the frequency of the phrase (gram) compared to all same-sized grams in the database, normalized by the yearly number of books in the database.

Figure 6: Google Ngram Report: “total quality management,” “balanced scorecard,” “economic value added,” and “triple bottom line” between 1960–2019



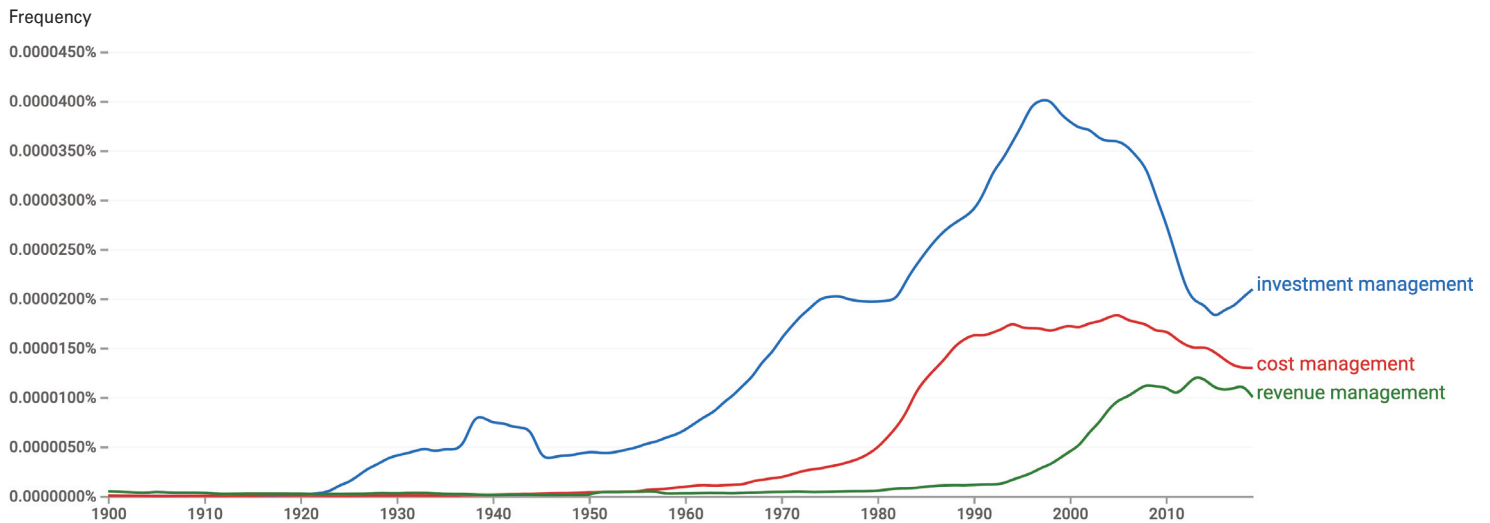
Note: Scale is not comparable with Figure 5.

environment (i.e., profits, people, and planet). Interestingly, while references to TQM, BSC, and EVA seem to have plateaued, interest in TBL appears to be increasing. The story behind each of these management accounting developments is a fascinating—and valuable—insight into the ongoing evolution of man-

agement accounting practice.

One possibility for the next great innovation in management accounting may involve coming back to the original ROI concept to more fully embrace all of its dimensions. What component is most present (i.e., impactful) in the ROI computation in Figure 3, as well

Figure 7: Google Ngram Report: “investment management,” “cost management,” and “revenue management” between 1900–2019



Note: Scale is not comparable with Figure 5 and Figure 6.

as in the DuPont chart in Figure 4? Of course, it is sales (or revenue). Revenue management, however, is not a central focus for management accounting systems in most organizations. The Ngram report underscores this circumstance in Figure 7, noting that since the advent of ROI, investment management and cost management have received more attention than revenue management. This is a strange circumstance, especially given the impact of sales revenue on value creation. It appears that there may be an opportunity, even a call, for investment and innovation to evolve and move forward this area of management accounting.

AN EVOLUTION STORY

The development of management accounting in the U.S. is a story of evolution that began with the Industrial Revolution two centuries ago. Great management accounting, the product of managers and professionals experimenting with methods of capturing and using information, provides a competitive edge in planning, controlling, and evaluating their organization. Information will always be a competitive tool.

What organization will be next to innovate a new and better approach to management accounting? With this history in hand, it is easy to imagine a young woman or man thinking hard right now about what it means to plan, control, and evaluate success in busi-

ness, perhaps within your own organization. Are you investing in that effort? That investment might have a tremendous ROI! ■

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ENDNOTES

- 1 The Dupont homepage, www.dupont.com/about/our-history.html; Alfred D. Chandler Jr., *The Visible Hand*, HBS Press, Boston, Mass., 1977; H. Thomas Johnson and Robert S. Kaplan, *Relevance Lost*, HBS Press, Boston, Mass., 1987; Dale L. Flesher and Gary John Previts, “Donaldson Brown (1885-1965): The Power of an Individual and His Ideas over Time,” *Accounting Historians Journal*, June 2013, pp. 51-78; Thomas C. Davis, *How the Dupont Organization Appraises its Performance*, Financial Management Series No. 94, American Management Association, New York, N.Y., 1950.
- 2 “Thomas Jefferson to Eleuthère I. du Pont de Nemours, 24 April 1811,” Founders Online, National Archives, www.founders.archives.gov/documents/Jefferson/03-03-02-0456.
- 3 Chandler, 1977.
- 4 The Accounting Hall of Fame, now hosted by the American Accounting Association (aaahq.org/AHOF), was originally established in 1950 at Ohio State University.
- 5 Flesher and Previts, 2013.
- 6 F. Donaldson Brown, *Some Reminiscences of an Industrialist*, Hive Publishing Company, Easton, Pa., 1977.
- 7 Gene Castellano, “The DuPont Company’s Chart Room,” Hagley Museum and Library, 2015, www.hagley.org/librarynews/dupont-companys-chart-room.
- 8 books.google.com/ngrams.