THE POWERFUL GALE OF INNOVATION

PART THREE IN THE INNOVATION SERIES

By Brad Neuman, CFA®

Powerful storms of innovation profoundly revamp economic landscapes. A “gale of creative destruction” can force well-established businesses to sustain damage or even collapse while others climb to new heights.[1] As new ideas, products, or processes revolutionize the economy, destroying the old and creating the new, we believe our research can help answer one of the central questions of investing: who will win and who will lose?

New Framework Required for Intense Innovation

Our research and experience show that innovation is the greatest creator and destroyer of wealth. Consider the following:

- The pace of innovation is accelerating.
- Intense innovation requires a different investment approach because traditional measures of valuation are less effective.
- Powerful themes are supporting creative winners while destroying legacy companies.

The Transportation Industry Moves On

Creative destruction occurs frequently. From the demise of the telegraph and the decline of postal mail to the rise of wireless telephony and e-mail, and from radio to television to online video, change consistently condemns losers and anoints new winners.

Transportation is an example. In the beginning of the twentieth century, the horse and carriage dominated transportation in America’s cities. There was little reason to believe that a dramatic change was at hand given that the horse had been the primary form of transportation for hundreds of years. In fact, skepticism in the idea of the automobile was commonplace, with the president of the Michigan Savings Bank telling Henry Ford’s lawyer and early investor in the Ford Motor Company, “the horse is here to stay, but the automobile is only a novelty—a fad.”[2]

As competition in the automobile industry increased, manufacturing evolved and drove down car prices, which allowed for widespread adoption of the new form of transportation. In 1907, the median cost of an automobile was $3,700, or approximately eight times the annual wage at that time. By 1916, the cost had declined to $1,000 and today, the median price of a car is less than the annual average wage.[3] The rise of the automobile was marked by the number of horse and carriage companies dropping from more than 4,600 in 1914 to fewer than 90 by 1929.[4] Also, by 1916, the automobile industry employed more individuals than horse and carriage companies.

Clearly, horse and carriage companies were the biggest losers of the transportation evolution, but why was the industry unable to adapt? Indeed, there were strong brand names and employees with knowledge and skills for making vehicles. Their failure was not for lack of trying, as they strived to produce horseless carriages or “buggy-type autos.”[5] However, these companies faced the following obstacles:

- Their skills were largely in woodworking, while automobiles required more metalworking expertise.
- They had a bias in favor of producing automobile bodies, like carriages, rather than effectively integrating engines.
- They struggled to adopt assembly-line manufacturing.

The Michigan Buggy Company is an example. It focused on “producing wood bodies, paint, and upholstery work”—it outsourced engine production given its lack of engineering expertise.[6] The company, however, ultimately folded.[7] In the end, Michigan Buggy and other traditional companies couldn’t compete with the more innovative automobile manufacturers.[8] Ford’s lawyer, fortunately for himself, ignored claims that the automobile was a fad. He held on to his $5,000 investment in Ford until 1919 when he sold it for $12.5 million!

Now another revolution in the transportation industry is unfolding with electric vehicles poised to take significant market share from automobiles built around the internal combustion engine. The history of creative destruction implies that the transition for the automobile market incumbents will be difficult to navigate.

CREATIVE DESTRUCTION DRIVES ECONOMIES FORWARD

The U.S. economy has historically been driven forward by creative destruction, or when new and innovative enterprises cause the demise of older, more well-established companies or industries. Creative destruction can wipe out entire professions while giving birth to new ones, usually in different parts of the economy. The workforce is flexible, however, and in some instances, more jobs are created than lost.

In the early twentieth century, hundreds of thousands of Americans were employed as carriage, harness, and blacksmith workers. Today, there are fewer than 5,000 workers in those positions, but there are more than three quarters of a million auto mechanics and almost three million truck drivers—jobs that did not exist in the horse and buggy era. The flexibility of the workforce is a testament to the ingenuity of humankind, which is more than can be said for workhorses, whose population has fallen over 80%.

JOB DESTRUCTION

Occupation	Current Employees	Early 20th Century Employees
Railroad Employees	109,470	2,076,000
Carriage & Harness Makers	*	109,000
Boilermakers	*	74,000
Cobblers	12,450	102,000
Watchmakers	*	101,000
Farm Workers	480,130	11,533,000
Blacksmiths	*	238,000

JOB CREATION

Occupation	Current Employees	Early 20th Century Employees
Air Transportation	271,880	*
Medical Technicians	1,868,550	*
Engineers	1,761,030	38,000
Computers/Systems/Software	4,184,740	*
Auto Mechanics	809,750	*
Truck Drivers	2,715,640	*
Electricians	655,840	51,000

*Less than 5,000

Source: Federal Reserve Bank of Dallas and Bureau of Labor Statistics. Note: Early 20th Century refers to varying points in time (depending on occupation) during 1900-1920 and current refers to 2018 data.

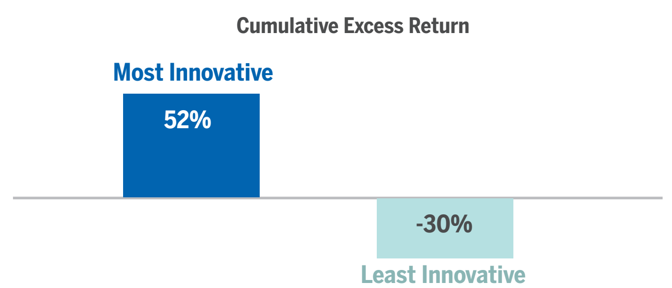
Growth Versus Value in the Winds of Innovation

Much like the dawn of the automotive industry, companies that profit from the "gale of creative destruction" are often the most innovative. Systematically identifying companies that will benefit from intense change is difficult, but history provides valuable insight into identifying winners and avoiding losers of innovation.

Multiple academic studies illustrate that within bursts of innovation, measured by patenting activity, growth equities have higher future profitability and stronger returns than value stocks.[9] We believe this is an important observation at a time when the speed of innovation is accelerating. Older innovations such as the stove, washing machine, and dishwasher took many decades to reach 50% penetration of U.S. households, while the internet/World Wide Web and social media took only 14 and 9 years, respectively.[10] The faster pace of innovation may mean that value stocks that appear inexpensive may more often be victims of change. On the other hand, more expensive growth stocks may turn out to be much more reasonably priced if growth curves accelerate or shorten. This may be why more innovative companies have significantly outperformed less innovative companies over the past decade (see Figure 1).

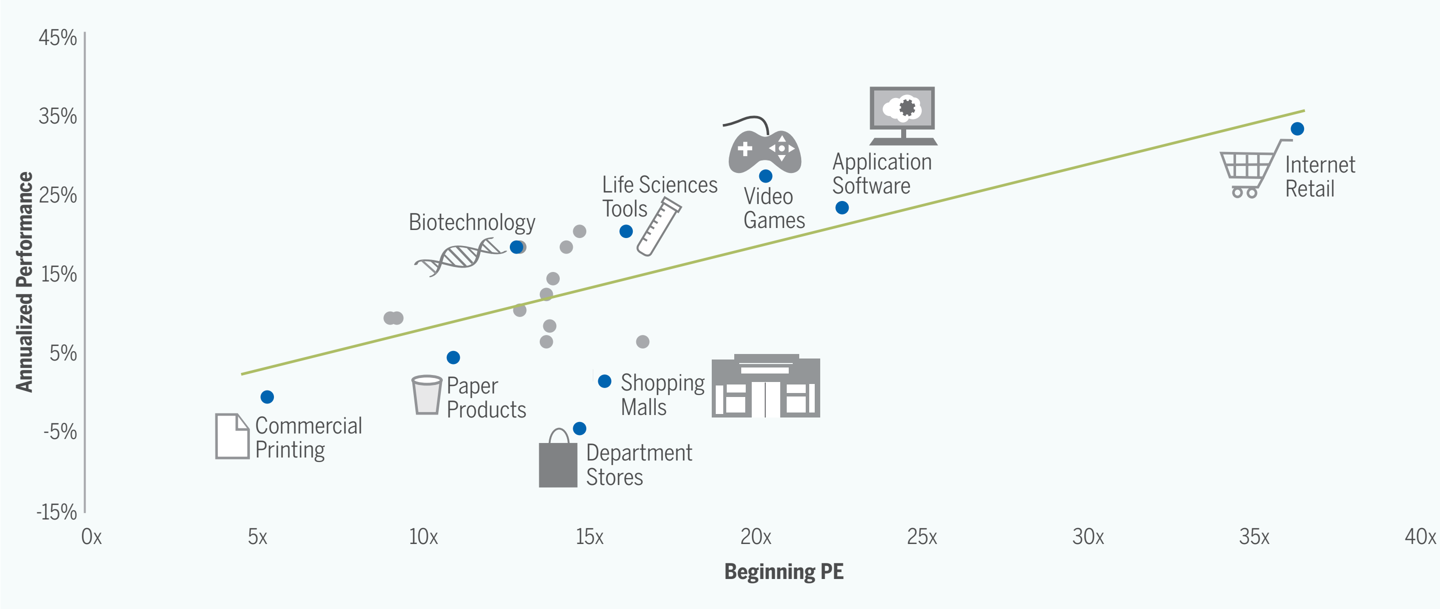
Our experience and research reinforce the idea that growth stocks are particularly attractive relative to value stocks in periods of intense innovation. In retail, for example, the department store industry looked reasonably valued in 2004 but actually declined over the next 15 years. During the same time, more expensive growth companies such as internet retailers within this sector dramatically outperformed. Additionally, with the digital transformation of business, relatively high multiple, expensive growth stocks of the application software and internet services industries have outperformed the much more inexpensive stocks of the traditional publishing, paper products, and commercial printing industries (see Figure 2.)

Figure 1: **Innovative Companies Have Outperformed Over the Past Decade**



Source: FactSet. Excess performance of the quintiles of R&D as a percentage of revenues with the most innovative being top quintile and the least innovative being bottom quintile of the stocks in the S&P 1500 index. Stocks were divided into quintiles based on R&D spending-to-revenue and calculated monthly for the 10-year period ended August 2021. Innovative companies may be defined as those companies with a high ratio of annual R&D investment to revenue. Investing in innovation is not without risk and there is no guarantee that investments in research and development will result in a company gaining market share or achieving enhanced revenue. **The performance data quoted represents past performance, which is not an indication or a guarantee of future results.**

Figure 2: **Innovation Changes the Rules of Valuation—Higher P/Es Yield Higher Returns?**



Source: FactSet. *S&P 1500 industries graphed: Apparel Retail, Application Software, Asset Management & Custody, Biotechnology, Commercial Printing, Computer & Electronics Retailing, Department Stores, Diversified REITs, Food Retail, General Merchandise Stores, Interactive Home Entertainment, Internet Retail, Internet Services & Infrastructure, Paper Products, Publishing & Printing, and Semiconductors for the 10 years ended 12/31/20*

Today's Thematic Winners and Losers

We believe that one of the greatest drivers of change is the economy's digital transformation. The rate at which companies digitally transform themselves is key to their ability to remain competitive and relevant within their respective industries. Virtually every industry is digitizing, from retail to media to financial services, advertising, payments, telehealth, dentistry, education, gambling and even dating has gone digital. Businesses are accelerating the digitization of every aspect of their operations from manufacturing to sales and customer service. Those who excel at this transformation will gain market share while the laggards risk becoming obsolete, in our opinion.

Information Technology (IT) spending is also experiencing massive disruption. We expect many traditional IT vendors will struggle to grow revenues and will continue to lose share to cloud-based service providers. With cloud computing, customers essentially rent on-demand access to shared computing resources such as servers, storage, and software maintained at large data centers. This business model benefits from scale and is significantly less expensive for customers than buying expensive equipment for on-premises use. In fact, these services are so inexpensive that we believe they are accelerating innovation and disruption as it's now cheaper and more efficient to start a company.

Lastly, we believe a renaissance in drug discovery and development is occurring. New insights into the genetic causes of disease are making it possible to develop novel therapies that work more precisely with far better outcomes. While many medications have been designed to treat symptoms of diseases, new drugs target the genetic causes of ailments. Certain diseases that previously were considered to be individual disorders are now more accurately defined as collections of diseases with different genetic drivers. Instead of treating a disease with a one-size-fits-all approach, new more personalized therapies are used that are often more effective and have fewer side effects. We believe there are attractive investment opportunities among many of the drug makers employing these new technologies and among companies that provide services to them such as tools, materials, or software.

Which Way Will the Wind Blow?

The key for investors is to determine which way the winds of creative destruction are blowing and find companies that are producing innovation to exploit change. At Alger, our work suggests that short-term valuation metrics, while important, are less critical than innovation and its impact on long-term discounted cash flows. While simple arithmetic allows investors to calculate price-to-earnings and other similar ratios, we believe the best potential for excess returns resides with skilled analysts who understand the impact of change and can identify the industry leaders of tomorrow. Since our research shows that investing in innovation requires a different approach, we believe our experience, which spans more than 50 years and includes a focus on change and growth, is a valuable asset in the quest to generate value for our clients.

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[1] Joseph Schumpeter, "Capitalism, Socialism and Democracy," Stockholm University, 1943.

[2] The City of Huntington Woods, Historic District Proposal, Final Report, "Rackham Historic District," presented November 21, 2006, p. 9.

[3] Alasdair Nairn, "Engines that Move Markets," John Wiley & Sons, 2002.

[4] U.S. Bureau of the Census, "Fifteenth Census of the United States: Manufacturers, 1929," Government Printing Office, 1933

[5] Thomas A. Kinney, "The Carriage Trade," The Johns Hopkins University Press , 2004, p. 273.

[6] "Michigan Buggy Company," Kalamazoo Public Library. http://www.kpl.gov/local-history/business/michigan-buggy.aspx

[7] Alasdair Nairn, "Engines that Move Markets," John Wiley & Sons, 2002.

[8] Studebaker was probably the most successful horse and carriage company in transitioning to the automobile industry but it was easily outpaced by the newcomers, General Motors and Ford, which had market capitalizations approximately 13 times and 5,500 times that of Studebaker, which eventually entered receivership in 1926 (Nairn, 2002).

[9] Joachim Grammig and Stephan Jank, "Creative Destruction and Asset Prices," Journal of Finance and Quantitative Analysis," 2015; Leonid Kogan, Dimitris Papanikolaou, Noah Stoffman, "Winners and Losers: Creative Destruction and the Stock Market," 2015.

[10] Asymco.

The S&P 500 Index is an unmanaged index generally representative of the U.S. stock market without regard to company size. The S&P 500 Growth and Value style indices are weighted by float market capitalization and they measure the performance of U.S. equities fully or partially categorized as either growth or value stocks, as determined by Style Scores for each security. The S&P Composite 1500 is an unmanaged index that covers approximately 90% of the U.S. market capitalization. The indices presented are provided for illustrative purposes, reflect the reinvestment of dividends and do not assess fees and expenses that would have the effect of reducing returns. Investors cannot invest directly in any index. The index performance does not represent the returns of any portfolio advised by Fred Alger Management, LLC and actual client results might differ materially than the indices shown. Note that past performance is no guarantee of future results. Comparison to a different index might have materially different results than those shown. Earnings per share (EPS) is a company's net profit divided by the number of common shares it has outstanding. EPS indicates how much money a company makes for each share of its stock, and is a widely used metric to estimate corporate value.

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