

# Innovation Matters

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Innovative companies tend to enjoy greater profits, faster growth, higher profit margins and/or higher returns on capital than their peers. Not surprising, these benefits can result in greater stock market performance.<sup>1</sup> This explains the title of this report: Innovation matters.

While we like to think of innovation as a relatively new concept, it has been an area of academic study for over 100 years.<sup>2</sup>

## RAPID CHANGE & COMPETITION

Thus, while innovation is not a new concept, it is difficult to argue with the notion that innovation and change are occurring at an ever-increasing rate. Rapid change is a given and the rate of change is increasing.<sup>3</sup> This puts a great deal of pressure on businesses. Automation, information technology, the network effect, and advantages of scale are all contributing to increasing pressure on profit margins in a wide variety of industries. One article in the Harvard Business Review put it this way:

*We live in an era of risk and instability. Globalization, new technologies, and greater transparency have combined to upend the business environment...Since 1980 the volatility of business operating margins, largely static since the 1950s, has*



*“How about you just shout out innovative ideas and I’ll keep writing them down until this Post-it is all filled up.”*

1 See Praveen Kumar and Dongmei Li, *Capital Investment, Innovative Capacity, and Stock Returns*, University of Houston 2016.  
2 Joseph Schumpeter wrote about economics and innovation as early as 1911 in his now famous book *The Theory of Economic Development*. For more information see Schumpeterian Profits in the American Economy: Theory and Measurement by William D. Nordhaus of Yale University April 2, 2004.  
3 It’s not just a perception thing. See *Adaptability: The New Competitive Advantage* by Martin Reeves and Mike Deimler of the Harvard Business Review July-August 2011 issue. <https://hbr.org/2011/07/adaptability-the-new-competitive-advantage>

*more than doubled, as has the size of the gap between winners (companies with high operating margins) and losers (those with low ones).<sup>4</sup>*

This puts a premium on innovation: innovators enjoy the competitive advantages of innovation; non-innovators suffer from shrinking sales, declining profit margins and low returns on capital. Quite often the non-innovators become irrelevant or simply cannot survive.

## HOW INNOVATION MATTERS

Innovation can make a difference in a variety of ways.

### FASTER PROFIT GROWTH

Perhaps the most important benefit of innovation is that it can accelerate economic growth rates. This is often due to the ability to introduce new products that meet previously unmet consumer needs — as in the introduction of an improved product or an entirely new product category.

*“Sustained high profitability may result when a firm repeatedly introduces valuable innovations that service previously unmet consumer demands.”<sup>5</sup>*

The profits from any single innovation can be limited in time since competition grows as time progresses.

*“An innovative new product tends to face low competition at the point of introduction and therefore earns relatively high profits. These high profits attract imitators, which increases the level of competition faced by the product as time passes.”<sup>6</sup>*

Innovative companies protect against this inevitability through a process of continuous innovation.

*“...an innovation explanation recognizes that relatively high profits may persist at the firm level even though competition is relatively intense. In such a case, the excess profits associated with any single innovation are transitory, but firms successfully introduce multiple innovations over time.”<sup>7</sup>*

This is why truly innovative companies seek continuous innovation.

### LARGER PROFIT MARGINS

Innovation can lead to higher market share for the innovator. This is because innovators often introduce new products, and new product categories or enhancements of existing products.

*“Innovators...should take market share from non-innovators and grow at their expense, until such time as the quasi-monopoly position is undermined first by imitations of new products and processes, and ultimately by yet newer products. In the long run, therefore, innovators will grow faster, be more (dynamically) efficient, and ultimately be more profitable than non-innovators.”<sup>8</sup>*

New product innovation can create what is often referred to as a moat; a competitive advantage that competitors find hard to breach providing a barrier around the innovator’s market share. This competitive edge, which affords greater pricing power, often results in greater profit margins.

Greater profit margins can also be achieved by cost advantages which can result from process innovation. Process innovation can include the

<sup>4</sup> Reeves and Deimler 2011.

<sup>5</sup> Peter W. Roberts, Graduate School of Industrial Administration, Carnegie Mellon University, *Product Innovation, Product-Market Competition and Persistent Profitability in the US Pharmaceutical Industry*. 1999

<sup>6</sup> Roberts, 1999.

<sup>7</sup> Roberts, 1999.

<sup>8</sup> Mica Ariana Mansury and James H Love, Economics and Strategy Group, Aston Business School, Aston University, Birmingham, UK. *Innovation, Productivity and Growth in US Business Services: a Firm-level Analysis*. 2008

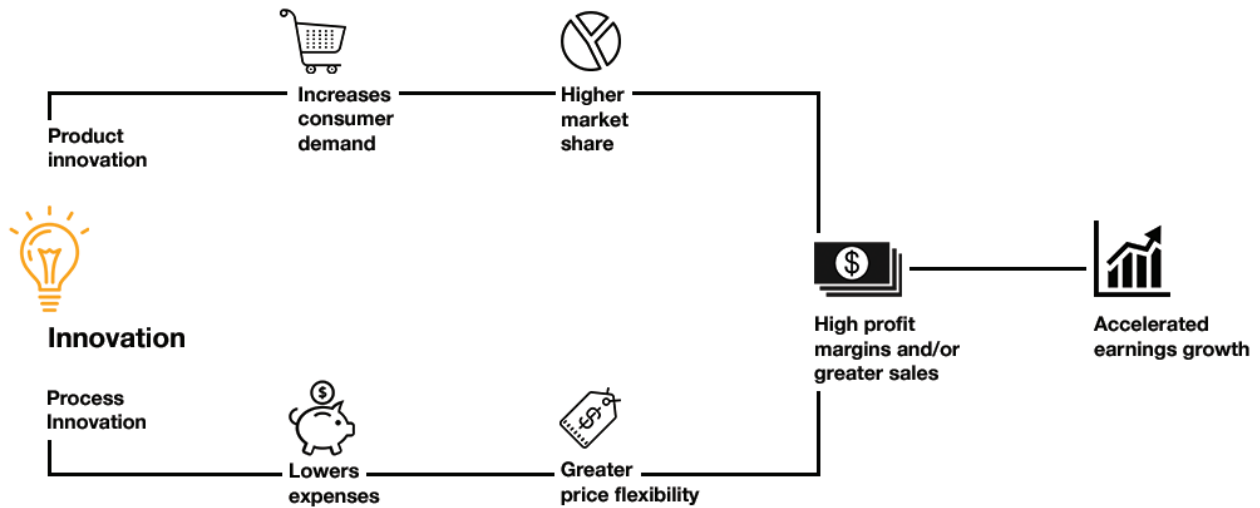


Figure 1. How both product and process innovation matter when attempting to reach high profits/increased profits.

way a company does business; a business model can be highly innovative. “A better business model often will beat a better idea or technology.”<sup>9</sup>

*Just in time* delivery, an innovation that has been largely credited to a Toyota, was able to provide a sustainable competitive advantage. By reducing the amount of inventory required at each stage of the manufacturing process Toyota gained a substantial cost advantage. While this innovation was copied by manufacturers worldwide, Toyota gained market share on its global competitors. Where it was once one-half the size of the largest automobile manufacturers it is now the world’s largest.<sup>10</sup> This suggests that while one can copy specific innovations it is more difficult to systematically innovate. And it is systematic innovation that wins the day.

According to the Economist, one study characterized the average savings among

American firms adopting just in time processes as “...a 70% reduction in inventory, a 50% reduction in labor costs and an 80% reduction in space requirements.”<sup>11</sup> The strategy that preceded *Just in time* delivery was known as “just in case;” manufacturers would maintain excess inventory to meet a wide variety of production and sales circumstances.

This competitive advantage of just in time delivery is most obviously found in cost savings but can include “improved service offered to customers, more effective operations, improved working environment and lower costs...”<sup>12</sup> Sometimes, it pays to save money.

### COMPETITIVE THREATS

In a hyper competitive business environment innovation may provide some protection against adverse business conditions. Economist Paul Geroski found that,

9 Henry Chesbrough, Executive Director, Center for Open Innovation, University California Berkeley. *Business Model Innovation: It’s Not Just About Technology Anymore*, 2007.

10 Note that ranking the largest automobile manufacturers is a bit of a sticky wicket. This ranking from Forbes from May 30, 2017 has Toyota “firmly” on top. <https://www.forbes.com/sites/bertelschmitt/2017/05/30/worlds-largest-automakers-renault-nissan-outranks-volkswagen-could-pass-1-toyota/#48881137e51a>

11 The Economist Online Extra *Just-in-time* July 6, 2009.

12 *Just-In-Time Manufacturing, An Introduction* (Second Edition) T.C.E. Cheng and S. Podolsky. Published by Chapman & Hall 1996.

*"...the process of innovating may affect a firm's general competitive abilities, sharpening its ability to perceive environmental threats and opportunities, and then to respond flexibly to them."*<sup>13</sup>

This sharpened ability can help guard against unexpected innovation from industry peers or new entrants or allow a business an enhanced ability to weather recessions or business downturns.

## STOCK PERFORMANCE

Our interest in innovation is a direct result of our belief that innovative companies provide superior stock market returns. In a 2016 study, Praveen Kumar and Dongmei Li of the University of Houston found that "...innovative capacity is positively related to subsequent cumulative stock returns..."<sup>14</sup> In other words, the equities of innovative companies have the ability to outperform their non-innovative peers. This shouldn't be too much of a surprise given that **based on a large number of academic studies, we know that innovative companies tend to enjoy greater profits, faster profit growth, larger profit margins and other profit metrics as compared to non-innovative firms.**

Another study found that firms that have been successful innovators

*"...in the past earn substantially higher future stockmarket returns than firms that invest identical amounts in R&D but that have poor track (innovation) records..."*<sup>15</sup>

This same study found that these firms can be identified, "...a firm's ability to innovate is predictable (and) persistent."<sup>16</sup> This predictability and persistence means that those who understand and appreciate innovation are able to identify these companies.

## CONCLUSION

There is a large volume of academic research to suggest that innovative firms enjoy a meaningful competitive edge. This edge can manifest itself in a variety of ways but in the end usually means greater profits and/or greater market share. As investment managers, we prefer to focus on cash flow return metrics in our investment process. We favor companies that produce cash flow returns that are well in excess of average, typically seeking companies that are in the top decile. We believe that starting with a universe of innovative companies puts us in an advantageous position as our starting universe is inherently biased towards companies that have a competitive edge.

<sup>13</sup> Geroski, P. (1995) *Innovation and Competitive Advantage*, OECD Economics Department Working Papers, No. 159 OECD Publishing

<sup>14</sup> Kumar and Li, 2016

<sup>15</sup> Lauren Cohen, Harvard Business School and NBER, Karl Diether, Tuck School of Business at Dartmouth College and Christopher Malloy, Harvard Business School, *Misvaluing Innovation* 2012.

<sup>16</sup> Cohen, Diether and Malloy 2012.

## CASE STUDIES

We present two case studies, one of which is an innovative tech company, Nvidia and the other, Boeing, as an example of an innovative company in an old line durable goods industry. Both of these companies are in extremely competitive industries and have been able to fend off challengers for long periods of time. Boeing is now recognized as one of the top names in aerospace technology while Nvidia is the leading force in augmented reality and artificial intelligence.

### BOEING

Boeing, the well-known aerospace and defense company, has had a long and successful history of aerospace leadership and innovation. Formed in the early twentieth-century, this durable goods manufacturer is both a process and product innovator. They have used their innovative nature to become the world's largest aerospace company.

#### EXAMPLES OF INNOVATION

Quite often, large companies struggle to stay nimble and innovate with the necessary speed to remain a market leader. This often leads to disruptors displacing incumbents or dramatically reducing their market share and profitability. However, some companies have a longstanding culture of innovation. Boeing has a proven history of adapting and improving its business through innovation. When military orders reduced dramatically in a post-World War One environment, Boeing expanded into fields beyond aircraft manufacturing. In order to maintain business, Boeing used their skillset to manufacture boats and furniture instead. More recently, Boeing's success in streamlining the manufacturing of its 737 airplane has led to an assembly time of just 9 days<sup>17</sup>. The production methods have evolved dramatically since the first 737 was produced in 1966. A major improvement being that the aircraft is no longer assembled while stationary, but on a moving assembly line more commonly found in car production. Boeing is on target to produce 52 aircraft a month by 2018, up from 31 in 2005.

<sup>17</sup> <https://www.wired.com/2016/09/boeing-builds-737-just-nine-days/>

<sup>18</sup> <http://www.boeing.com/innovation/>

### SYSTEMATIC INNOVATION

Boeing's systematic approach to innovation is by no means effortless to maintain. Continual investment is highlighted by their annual research and development (R&D) spend of around \$3 billion. According to Boeing, "...there's more innovation underway today at Boeing than at any time in [their] 101-year history."<sup>18</sup> They publish their "Innovation Quarterly" as a collective reminder of the innovation taking place in their offices around the world. Boeing recently established an innovation cell, HorizonX, that "applies its momentum to new business ventures to unlock the next generation of game-changing ideas, products, and markets." Innovation is not only encouraged from within. Boeing also works with the Washington University's Olin Business School, through the Boeing Center for Supply Chain Innovation to further advance their thinking on operational processes and supply chain capabilities and to meet their assembly time targets.

### MARKET LEADER

A large part of Boeing's success can be attributed to innovation, but as with any complex corporation it is not the only factor that enables its success. Boeing is a well-run, quality company with a strong balance sheet. They have shown a consistently high cash flow return on investment, and an inflation-adjusted return on capital metric. They have been generating returns above their cost of capital for many years, showing their strong cash generative abilities and ability to create value.

Even though Boeing is not a disruptive company, innovation is a key part of how this company drives its growth and profitability. Boeing is exposed to exciting, innovative themes. They are striving for further improvements in production times. Their latest planes use carbon fiber for the fuselage rather than aluminum which means the fuselage is lighter, stronger and able to endure a higher air pressure in the cabin. In turn, this allows people to arrive less jet lagged.<sup>19</sup> They are constantly working to improve the noise pollution and energy efficiency of their planes by employing modern design techniques and smart materials.

There has been a large body of academic research written on the benefits of innovation.<sup>20</sup> Less unifying are the theories on how one can identify 'good' investors in innovation. Identifying innovation through spending on R&D does not guarantee market leading success. However, a strong track record of spending their cash effectively and generating a return on capital can be a good indicator.

What started out as a focus on identifying technological and process innovations to improve manufacturing output has led to an effective corporate growth strategy. It's obviously not a disruptive company, but innovation is key to how this company drives its growth and profitability.

## **NVIDIA**

Nvidia began life in 1993 as an American computer graphics card designer and has developed a reputation for high-quality and high-performance graphics cards. Building on their knowledge, Nvidia is now gaining a position as *the* technology company with market leading expertise across a breadth of numerous innovative themes, such as self-driving cars, augmented reality, data centers and artificial intelligence. The leveraging of this expertise is no accident; Nvidia has built a technology infrastructure with a goal of meeting the technology needs across a variety of future

market demands. It is this multisector appeal that has led, in part, to the rapid rise of Nvidia. As stated by Nvidia, "Innovation is a core component of NVIDIA's DNA." They promote this not only through research and development but also in how they manage their business and supply chain.

## **EXAMPLES OF INNOVATION**

In a highly competitive technology sector innovation is a must. With a product life span of as little as four years, failure to innovate can be a death sentence. Industry leaders one day can be irrelevant the next. Nokia and Blackberry are good examples of technology companies that were not able to keep pace with the quick turnover of such an innovative industry. The product cycle is similar within chip designers, and the competition is just as unforgiving.

The first step that led to Nvidia's successful history was the in-house invention of the graphical processing unit (GPU) in 1999. This cemented a growth path for the company into some of the most innovative corners of a wide range of sectors, far beyond IT. Recently the adoption of the GPU into the automotive industry and data centers has led to further revenue streams as a direct result of product innovation. The products Nvidia designs often outperform existing products by a significant amount, resulting in market leading margins and profitable growth.

Even though Nvidia invented the GPU in the late 1990s, they have continued to innovate with products such as their CUDA computing platform. This platform allows programmers to take advantage of their parallel processing power hardware. As a result, Nvidia's GPUs are more useful beyond processing video game graphics and are hard to replicate, protecting Nvidia's competitive edge.

Importantly, Nvidia has not forgotten to innovate within its core market. The computer gaming busi-

<sup>19</sup> <http://uk.businessinsider.com/boeing-787-dreamliner-777x-cabin-pressure-jetlag-2016-9>

<sup>20</sup> <http://www.people.hbs.edu/cmally/pdf/files/dimalco.pdf>

ness continued to grow by 44% year over year to January 2017 along with its new business streams gaining pace. Within the computer gaming market, they have continued to win support for their new Pascal architecture chips.

#### SYSTEMATIC INNOVATION

Nvidia not only allows innovation to flourish within its workforce, but the company also has a proven track record of acquiring interesting technologies that benefit the company's own products. This combination of cultivating internal talent and a good allocation of cash to acquisitions has helped Nvidia maintain a competitive edge over its opponents, arguably because of the "company culture of innovation."<sup>21</sup>

As innovation occurs, Nvidia has designed a business network that is adaptable. Nvidia can manage, in real time, its disaggregated supply chain. By managing the work-in-process and finished goods, they aim to effectively meet user preferences by limiting wasted resource and product, thereby driving sales and profitability. Nvidia is transparent with partners, publishing demand data so others can optimize their own processes.<sup>22</sup> The wider community has started to recognize Nvidia's continuous innovation. This year Nvidia was first place on the MIT Tech Review's 50 Smartest Companies 2017 and has been on the list for the last three years. As another indicator of their continual investment in innovation, they have

regularly spent more than 20% on R&D to sales. Over the last 12 months they invested around \$1.5bn in R&D.

#### MARKET LEADER

Within the technology sector, competition is extremely high. Nvidia has undeniably had excellent growth spanning many years, but what makes Nvidia a sustainable market leader?

The extremely short life cycles in the semiconductor industry require nimble and responsive supply chains. Also, the manufacturing process requires ever increasing investment to produce ever shrinking nanoscopic chips and there is pressure to maximize asset utilization. This leads to specialization of firms such as Nvidia. Nvidia has managed to forge a wide-spanning business network to manufacture its designs and bring its products to market. This allows Nvidia to invest exclusively in improving its GPU design and maintain a market leading position. In turn, Nvidia can stay innovative, produce the best GPUs, keep costs at an acceptable level, and retain its high margins.

The market has rewarded Nvidia for its persistent innovation at all levels, delivering "double digit growth every quarter in 2016"<sup>23</sup> with further growth seen in 2017. What began from a single invention of the GPU, has led to a culture of continual innovation and led to a disruptive company, with strong growth and good profitability.

21 <http://markets.businessinsider.com/news/stocks/nvidias-stock-price-secret-weapon-just-led-to-an-upgrade-from-wall-street-2017-7-1002167712>

22 Word, Jeffrey. Business Network Transformation: Strategies to Reconfigure Your Business Relationships for Competitive Advantage. Jossey-Bass, 2009.

23 <https://www.fastcompany.com/3067479/why-nvidia-is-one-of-the-most-innovative-companies-of-2017>

## IMPORTANT INFORMATION

Hilarious cartoon used by permission of The New Yorker and Condé Nast.

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4. NIKE Inc	3.47%
5. Samsung Electronics Co Ltd	3.46%
6. Catcher Technology Co Ltd	3.43%
7. Facebook Inc	3.43%
8. PayPal Holdings Inc	3.42%
9. Roper Industries Inc	3.38%
10. Intercontinental Exchange Inc	3.37%

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