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*Startups and
the Remaking
of the Firm*
From Whirligig to Flying Machine

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Startups and the Remaking of the Firm

From Whirligig to Flying Machine

This report is the result of a collaboration between High Alpha and Bret Swanson of Entropy Economics.

High Alpha is a venture studio that partners with exceptional founders to create and fund companies through a new model for entrepreneurship.

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Foreword

We have yet to meet an executive who is not frustrated by the pace and degree of change produced by his or her company's innovation efforts. For many, the sense of frustration is only growing. In the face of shrinking corporate life spans, everyone knows innovation is more critical than ever, but it also seems harder to achieve. What to do?

The ground has shifted, and few seem to recognize it. The old, mainstay approaches to innovation do not work as reliably as they once did. From our unique vantage point as a venture studio that builds and invests in startups—often in partnership with corporations—we see what is working, and what is not. This article is the fruit of our close collaboration with corporate executives and startup leaders. The hope is that it will contribute to a serious conversation about the role that startups should play in the innovation ecosystem, and provide a framework for corporate executives to evaluate their current innovation strategy. For many corporations, deep and deliberate engagement with startups will be the only way to realize the transformation they seek.

Elliott Parker

*Managing Director, Business Design
and Corporate Innovation*

High Alpha

Introduction: Disaggregation

The dominant business story of the coming decade will be the disaggregation of the firm. After reaching a peak of corporate and industry concentration, the undeniable forces of technology have unleashed a new phase of decentralization. Many of today's executives are still hoping they can innovate within the existing corporate architecture, but they also worry that when the dust settles, their well-meaning but expensive efforts will have been only for show.

Even history's greatest geniuses were good at pretending. Some of Leonardo da Vinci's most superficially impressive inventions were built for the theater. His famous notebooks show a whimsical whirligig, an "aerial screw" that some believed was the first realistic helicopter. More likely, it was designed just to impress the crowd. "Like some of his mechanical birds," Walter Isaacson concluded in his biography of Leonardo, "the aerial screw was probably made to transport spectators' imaginations rather than their bodies."¹

Today, thousands of smart people at hundreds of important companies are spending millions of hours and billions of dollars to advance an illusion of innovation. The evidence can be seen in the individual challenges of big firms and the macroeconomic data of a pronounced productivity slowdown in the traditional industries, which make up 70 percent of the economy.² Although firms in these sectors think they are deploying bold new strategies, their innovation contraptions are simply not effective in the real world. All the activity seems impressive, yet firms are realizing innovation theater does not produce lasting change.

Big companies are trying new tactics—for example, empowering internal teams to mimic the creativity and pace of younger and more agile firms. One large financial services company we interviewed employs 200 workers in its innovation division, where it spends more than \$50 million per year. Yet this program, year after year, produces no incremental revenue. We also interviewed a national supermarket firm, which operates an innovation center with more than 1,000 employees. In 2018, it set a target of \$100 million for innovation investment, but as of September it had only deployed \$16 million.

new formula for a new type of organization: an alloy of old and new, big and small, hard and soft, tangible and intangible, atoms and bits. This transformation is made possible by the information tools, financial architectures, and entrepreneurial institutions that are lowering transaction costs and commoditizing expertise.

The borders of the firm are evaporating, and big companies, venture firms, and startups can now coordinate in sufficiently sophisticated ways to turn startups from threats into assets. Highly decentralized resources can be harnessed to larger objectives. Meanwhile, the digital tools that revolutionized the information industries, such as media, finance, and communications, are now poised to sweep through the grungy, greasy, fleshy industries, too. Bits were relatively easy; atoms are much harder. Although most big firms now understand this concept, many are ill-equipped to exploit the opportunities internally.

One large firm indicated spending
\$50 *million per year*
with no discernible
incremental revenue

Incumbents need a wholly new approach, based on a redefinition of the firm itself. Today's micro- and macroeconomic shifts are so profound, they suggest a

Today's micro- and macroeconomic shifts are so profound, they suggest a new formula for a new type of organization: an alloy of old and new, big and small, hard and soft, tangible and intangible, atoms and bits.

To succeed, large firms should not try to act like startups. Corporate strength lies in coordination, not nimbleness, and in efficiency of execution, not speed. Instead, large firms must recognize that the resources to coordinate are now more broadly distributed than in the past. Centralized approaches to innovation will not work as well as they once did. Firms need an approach that can boost innovation in the short term and dramatically expand optionality in the long term. In this new environment, the key element for innovation success is the startup.

Only startups can reimagine and redeploy resources—money, technology, and, most importantly, people—to the radical degree required. Only startups can learn fast enough, discover new products and markets cleverly enough, incentivize and coordinate talent effectively enough, and deliver real value under constraints jarring enough to achieve breakthrough innovation. That's great for startups, but where does that leave big firms?

In better shape than one might think—*but only if the big firms recognize this shift and aggressively exploit it.*

The Decline of Financial Engineering

Transformative innovation and rapid growth in established enterprises are notoriously difficult. For a time, the firms that excelled at basic research and development (R&D) beat their rivals and drove the broader economy; think Bell Labs, IBM, and Xerox PARC.

Then came an era of financial engineering, including mergers and acquisitions (M&A), private equity (PE), and globalization. GE was this era's exemplary firm, focused on operational efficiency, geographic arbitrage, and financial plays like GE Capital. By some measures, these approaches are more popular than ever. R&D expenditures, M&A activity, and private equity deal volume are at or near all-time highs.³

As primary drivers of breakthrough growth, however, these top-down strategies are running out of steam.

Companies are buying back their own stock in record volumes. On net, over the last two decades, companies purchased \$3.6 trillion more stock than they offered.⁴ Then in 2018,

U.S. firms announced plans for an additional \$1 trillion in share repurchases. Despite record deal flow, private equity firms are struggling to deploy their trillions of dollars of "dry powder."⁵ Fundraising is slowing.⁶ Buybacks are an appropriate way to return value to shareholders, and private equity is a positive force, but these multi-year trends suggest large firms are struggling to find big projects and generate new ideas.

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THE SUPPLY OF EQUITIES IS GETTING SQUEEZED AT THE TOP AND BOTTOM

US 12-month trailing buybacks and issuance (\$, bn)



— Buybacks — Issuance

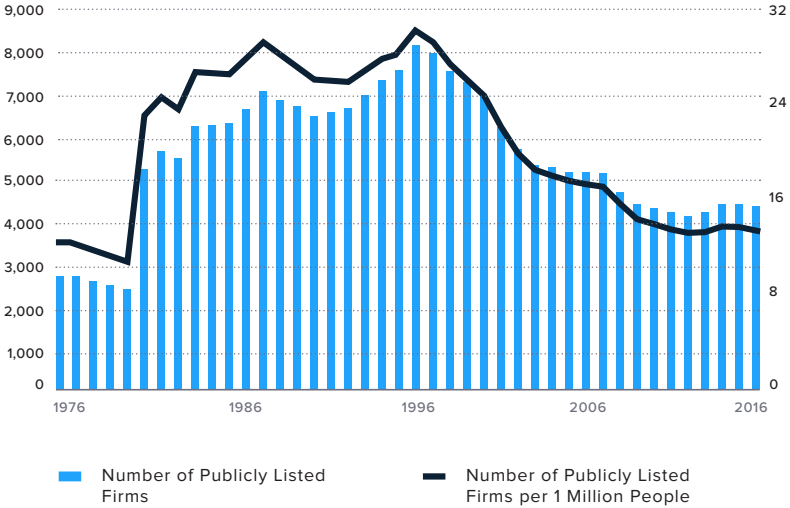
Source: Bernstein, Bloomberg, Datastream

The larger companies get, the more they rely on acquisitions to grow and transform. However, as the average lifespan of companies declines due to faster cycles of innovation, it is reasonable to expect the length of time over which companies can extract rewards from their acquisitions will also shrink.

Over the last few years, the number of acquisitions has decreased while valuations have increased, signaling that good deals may be harder to come by.⁷

The era of globalization, too, is not over, but most of its efficiency gains may have been achieved. Over the past 30 years, billions of people moved

PUBLICLY LISTED U.S. FIRMS



Source: World Banks Entropy Economics LLC

to cities and joined the middle class. Complex supply chains proliferated, competitors merged, and foreign brands stretched across the world. That process isn't finished, but the gains are diminishing. The politics of globalization have also turned. At the margin, therefore, firms won't be able to rely on geographic arbitrage for their edge.

These M&A, PE, and globalization trends, combined with a prolonged slump in initial public offerings (IPOs), have resulted in pronounced centralization. The number of publicly listed firms in the U.S. has plunged over the last 20 years—from around 8,000 in 1996 to fewer than 4,000 today.⁸ Public firms are fewer and larger, but not more innovative.

To succeed, large
firms *should not try*
to act like startups.

The Decline of R&D

Corporate R&D is running up against a wall. U.S. firms still invest massive amounts of money on scientific and technical searches for new ideas, upwards of \$569 billion in 2017.⁹ But there is evidence that the returns to R&D are diminishing, perhaps dramatically so.

In the Bell Labs era, it made sense to gather a relatively small number of elite scientists and engineers under one roof with expensive equipment. The centralized university did the same thing with professors and libraries, but technology-driven democratization of expertise and information suggests the end of the centralized model.

One reason R&D is less effective? Good ideas are getting harder to find.

In order to keep up with the Moore's law pace of improvement in semiconductors, for example, the microchip industry has to spend increasingly massive amounts on R&D. "The number of researchers required to double chip density today," Stanford and MIT economists found, "is more than 18 times larger than the number required in the early 1970s."¹⁰

The diminishing returns to R&D in other industries are even worse. Research productivity for the aggregate U.S. economy has declined by a factor of 41 since the 1930s, an average decrease of more than 5% per year.¹¹ So even as average firm size has grown, the large firms that tend to do most R&D have become less innovative. That's not an encouraging combination.

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year.*

Trapped Human Capital

By a number of measures, U.S. business dynamism has been declining over the last three to four decades. By this, we mean a slower rate of business entries versus exits.¹² With a falling ratio of smaller upstarts to large incumbents, the process of reallocating resources across the economy slows.

At the frontier of the world economy, new ideas are the only way to grow. Following the cycle of business history, centralized innovation and efficiency enhancements are giving way to decentralized approaches. Increasingly, therefore, the future success of the large enterprise may be determined by the quality of its engagement with startups. The degree to which an enterprise is able to transform will increasingly depend on its ability to effectively acquire startups, partner with them, invest in the right ones, and, perhaps especially, build them from scratch.

A growing stack of cutting-edge economic research says startups are the key to economic revival. Using fine-grained data, for example, MIT's Daron Acemoglu and colleagues estimate that young upstart firms are

about 50 percent more innovative even than R&D-focused incumbents (that is, older firms that spend lots on innovation).¹³

If young upstarts are far more productive but we aren't creating as many of them as we used to, we are leaving innovation on the table. We

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The future success of the large enterprise may be determined by the quality of its engagement with startups.

are misallocating resources, especially high-skilled workers. Far too many of our best people are working in operational jobs and low-productivity R&D jobs at older, larger firms.

The effects of the startup deficit are so powerful that Acemoglu's team reached a startling conclusion. They simulated policies that would optimally shift financial and human capital to various types of firms. The goal was to maximize innovation and thus economic growth. Acting as an omniscient industrial planner, they would apply a very high tax, around 70 percent, on the operations of low-productivity incumbents to encourage them to exit product lines and shed workers.

The key to boosting innovation, it turns out, is getting large firms to stop doing things! Among other effects, this frees up resources for more innovative activities at other companies. Their optimal policy "forces low-[productivity] incumbents to exit at a very high rate, reduces their R&D, and increases the R&D of high-[productivity]" firms.¹⁴

The key to boosting innovation, it turns out, is getting large firms to stop doing things!

This industrial deity may be too heavy-handed for our taste. Nevertheless, the latest research on entrepreneurship and productivity reinforces our central theses. First, there are fewer startups than there should be in an efficient economy. Second, innovation theater is inhibiting the real thing. And third, corporations (and the economy more broadly) would benefit from a bold reallocation of investment, from centralized R&D to decentralized startups.

The Startup Solution

We can see glimmers of this future. Firms that have decentralized their R&D with startups are innovating faster than others. Consider Apple’s purchases of Siri, the foundation of its natural language and A.I. efforts, and of P.A. Semi, which turned into its “A” microprocessors that power billions of iPhones and iPads. Amazon similarly revolutionized its fulfillment centers through its purchase of Kiva Robotics, and its acquisitions of Yap in 2011 and Evi in 2012 turned into Echo-Alexa in 2014.

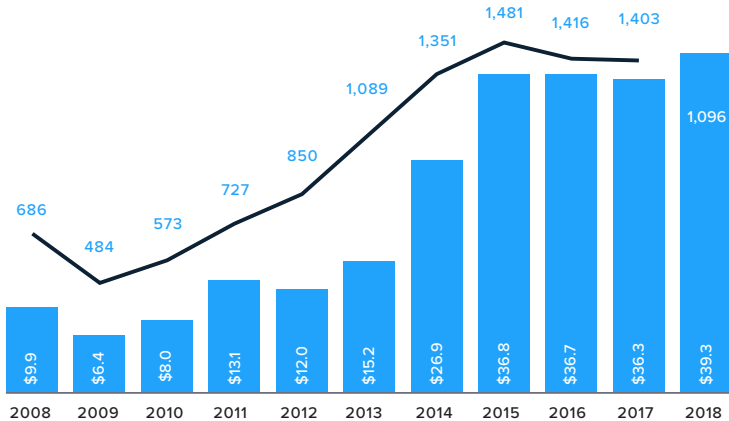
For incumbents in most industries, it will require an even more expansive reimagining of R&D, M&A, corporate venture capital, and the boundaries of the firm itself. The new idea is to build and support fully autonomous startups that produce strategic and tactical streams of technology, talent, and economic value, exploitable by the larger partner.

We now have the tools to build high-performance flying machines, not just theatrical whirligigs. A number of factors are conspiring to make the new architecture a reality. Most importantly, technology is driving down Coaseian information costs, allowing a new strategy of “modular coordination”:

startups are cheaper and easier to launch, and expertise is more widely distributed.¹⁵ The methods by which people collaborate to get work done are becoming ever more decentralized, and eventually, autonomous. At the same time, venture capital networks are maturing, and startup ecosystems are expanding. The art of launching startups is now a specialty, an expertise; a new breed of “venture studios” are *in the business* of quickly standing up new companies—often in a matter of weeks. And these trends are marching beyond traditional technology-heavy industries into the physical economy, as software continues to “eat the world.”¹⁶

2018 CORPORATE VENTURE CAPITAL PARTICIPATION SURPASSES LAST YEAR'S TOTAL

U.S. deal activity with CVC participation



■ Deal value (B)
 — # of deals closed

Source: Pitchbook-NVCA Venture Monitor
 *As of September 30, 2018

To imagine what this new decentralized organization might look like, think about Silicon Valley itself. As history's most successful economic entity, Silicon Valley is constantly funding and acquiring new businesses (and, yes, potential rivals), while creating an expanding and self-reinforcing web of human capital. There is no central authority

or guarantee that every firm will succeed, and yet the model of distributed, interlinked, autonomous firms supercharges the value of the whole system. Big firms can learn from the model, acting more like a borderless cosmopolis or industry cluster—like Silicon Valley—but without geographic limitations.

The Flying Machine

The curtain must come down on innovation theater and big firms must recognize the forces of decentralization that are shaping our times. In the quest for transformation, there is no single formula for success. Each company's approach to transformation should be customized, but external engagement with startups must be central to every serious strategy.

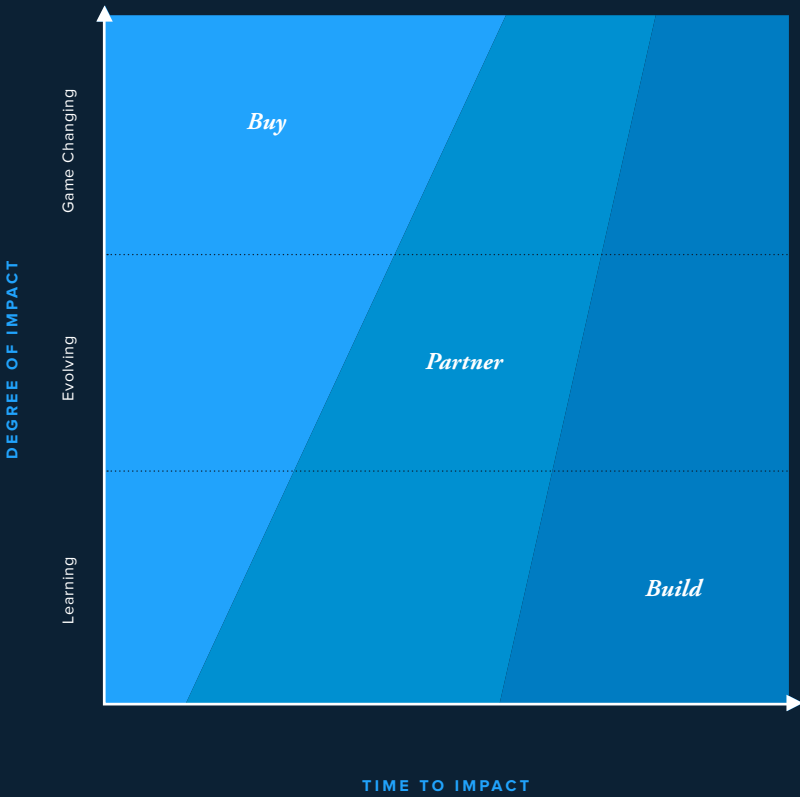
The tactics of startup engagement will of course depend on the nature of the existing firm. A firm's industry, age, market position, location, talent pool, and specific challenges will inform the best ways to engage startups through borrow, buy, or build strategies. On the spectrum of control, firms will have to decide how to tune the dials of independence.

For some companies, a complete and immediate reboot of the business model is required. For other companies, learning and exploration in anticipation of a future need to transform will suffice.

At a high level, here's how we think about it:

Companies that need to “change the game,” to radically reboot their business model, should focus their external innovation efforts primarily on acquisitions of late stage or mature startups. Companies that need to learn and create options for the future should prioritize startup investment, partnership, and external building—working with or creating brand new startups. Companies that need to evolve, to change important elements of the business without radical overhaul, should deploy a more balanced strategy of acquisition, partnership, investment, and building.

MODEL FOR START-UP ENGAGEMENT



In every case, a comprehensive portfolio approach to investment for transformation is best, with a mix of build, buy, and borrow strategies that aligns with a company's unique risk profile and needs.

While almost all corporations are making significant efforts to engage with startups, most are not doing it well or for the right reasons. Research shows that large companies that do many small acquisitions of startups outperform their peers that do occasional, larger deals—yet surprisingly, relatively few companies choose this strategy.¹⁷

While almost all corporations are making significant efforts to engage with startups, most are not doing it well or for the right reasons.

Most large companies are skilled at managing partnerships with late-stage startups, but few have developed the structures and governance to quickly advance partnerships with seed-stage startups—even though this is what companies must do to learn and create optionality. Most large companies have innovation teams that build and invest in internal startups, but most of these ventures end up providing only incremental benefit, if they succeed at all. Very few are pursuing the creation of new, external, standalone startups, even though this is a relatively inexpensive strategy for learning, evolving, and even game changing over time.

Over twenty years ago, Clayton Christensen suggested that the solution to the innovator's dilemma was to pursue innovation outside of the firm's existing business model.¹⁸ Despite the best intentions of executives, few companies have been able to break free from the innovator's dilemma and the cycles of innovation theater that create only incremental change, at best.

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The demise of many important companies shows that Christensen is right: executives really can do “all the right things” and still fail. Pursuing innovation outside of the core business model requires serious—even radical—engagement with startups. It requires a rethinking of the definition of the firm, and a recognition that the strongest firms are those with permeable, not solid, walls, that know how to coordinate broadly distributed, external assets and resources.

Whether companies want to learn, evolve, or change the game, startups are critical. Large companies that recognize this and act on it by

learning to engage with startups will be more likely to succeed as the economy grows ever more decentralized and autonomous. They will find startups capable of moving them from innovation theater to the real thing, from whirligig to flying machine.

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