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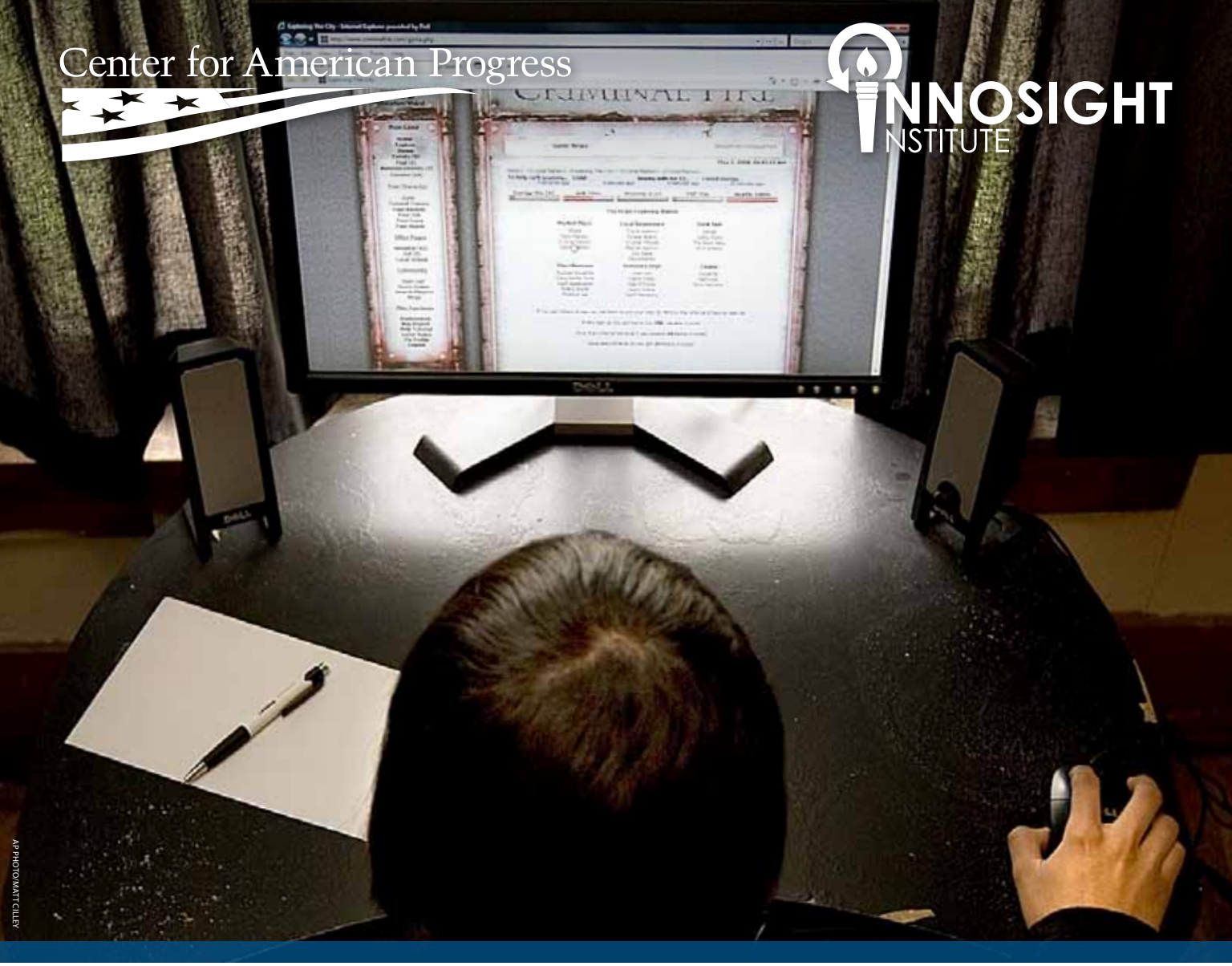

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Disrupting College

How Disruptive Innovation Can Deliver Quality and Affordability to Postsecondary Education

Clayton M. Christensen, Michael B. Horn, Louis Caldera, Louis Soares

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Contents

Executive summary

America is in crisis. Employers say paradoxically they cannot find the right people to fill jobs even though the country is facing its highest unemployment rates in a generation. Competition with a rising China and India and their vast populations lend urgency to the need for the country as a whole to do a better job of educating its citizens.

The institutions to which the country would turn to help tackle this challenge—its colleges and universities—are facing a crisis of their own. There is a rising chorus of doubts about how much the institutions of higher education that have been such a part of the country's past successes can be a part of the answer. Graduation rates have stagnated despite a long track record of serving increasing numbers of students over the past half century. None of America's higher education institutions have ever served a large percentage of our citizens—many from low-income, African-American, and Hispanic families. The institutions are now increasingly beset by financial difficulties, and the recent financial meltdown is but a shadow of what is to come. The further looming state budget crises spell difficult times for many colleges and universities. And there is a growing acknowledgement that many American universities' prestige came not from being the best at educating, but from being the best at research and from being selective and accepting the best and brightest—which all institutions have mimicked.

Our country's dominant higher education policies have focused on expanding access for more than half a century—allowing more students to afford higher education. Yet changing circumstances mandate that we shift the focus of higher education policy away from how to enable more students to afford higher education to how we can make a *quality* postsecondary education *affordable*. The challenge before the country also mandates a new definition of quality from the perspective of students—so that the education is valuable to them and that through it they improve their lives and thus improve the country's fortunes, too. And if a postsecondary education is fundamentally affordable—meaning lower in cost, not just price—this will also answer the question of how to extend access by enabling students to afford a higher education.

This report tackles these questions by treating the industry's challenges, at their core, as problems of managing innovation effectively. It examines the industry of higher education through the lenses of the theories that have emerged from our research on innovation. A theory, by its very nature, is forward looking. It is a statement of what causes what and why, so a good theory allows you to predict the result of taking a certain action ahead of time. The theories employed in this paper were built inductively and have been tested deductively across categories and through anomalies. They have been employed to make innovation far more predictable in a range of sectors, from the for-profit to the nonprofit to the governmental and from the highly regulated to the deregulated.

This report does not provide "the answer" to fixing higher education. The problems confronting the country and its institutions of higher education are multifaceted and complex in nature. They defy an easy fix, especially given the diversity of higher education institutions in this country that are often in very different circumstances. Instead, our hope is that shining these challenges through the lens of these theories on innovation will provide some insights into how we can move forward and a language that allows people to come together to frame these challenges in ways that will create a much higher chance of success.

The disruptive innovation of online learning

The theory of disruptive innovation has significant explanatory power in thinking through the challenges and changes confronting higher education. Disruptive innovation is the process by which a sector that has previously served only a limited few because its products and services were complicated, expensive, and inaccessible, is transformed into one whose products and services are simple, affordable, and convenient and serves many no matter their wealth or expertise. The new innovation does so by redefining quality in a simple and often disparaged application at first and then gradually improves such that it takes more and more market share over time as it becomes able to tackle more complicated problems.

A disruptive innovation has a couple key elements or enablers that are particularly salient to the future of higher education. The first is a technology enabler. This allows the innovation, which starts in a simple application and competes first against nonconsumption—by serving people who were not able to be served or were not desirable to serve—to be "upwardly scalable" and improve year over year without replicating the cost structure of the old products and services it gradually replaces.

Online learning appears to be this technology enabler for higher education. It is for the first time disrupting higher education—and indeed helps explain much of the rapid growth in the up-start for-profit higher education sector over the last 10 years, even as many colleges and universities have struggled financially and had to cut back. Roughly 10 percent of students in 2003 took at least one online course. That fraction grew to 25 percent in 2008, was nearly 30 percent in the fall of 2009, and we project it will be 50 percent in 2014.[1]

The second element of a disruptive innovation is a business model innovation. Disruptive innovations are plugged into new models, which allow organizations to serve a job to be done in the lives of customers at this new lower price point or in this new, far more convenient fashion without extra cost. Plugging a disruptive innovation into an existing business model never results in transformation of the model; instead, the existing model co-opts the innovation to sustain how it operates. What this means is that, generally speaking, the disruption of higher education at public universities will likely need to be managed at the level of state systems of higher education, not at the level of the individual institutions, which will struggle to evolve. And if private universities are able to navigate this disruptive transition, they will have to do so by creating autonomous business units.

Furthermore, what we see when we examine the existing institutions of higher education through this lens is that for decades now they have offered multiple value propositions around knowledge creation (research), knowledge proliferation and learning (teaching), and preparation for life and careers. They have as a result become conflations of the three generic types of business models—solution shops, value-adding process businesses, and facilitated user networks. This has resulted in extraordinarily complex—some might say confused—institutions where there are significant coordinative overhead costs that take resources away from research and teaching.

A typical state university today is the equivalent of having merged consulting firm McKinsey with Whirlpool's manufacturing operations and Northwestern Mutual Life Insurance Company: three fundamentally different and incompatible business models all housed within the same organization. Using online learning in a new business model focused exclusively on teaching and learning, not research—and focused on highly structured programs targeted at preparation for careers—has meanwhile given several organizations a significant cost advantage and allowed them to grow rapidly.

This emerging disruptive innovation also presents an opportunity to rethink many of the age-old assumptions about higher education—its processes, where it happens, and what its goals are—and to use the disruptive start-up organizations to create institutions that operate very differently and more appropriately to address the country's challenges. The first of these assumptions is that prestige is the domain of institutions that accept the best students and do the best research. Knowledge was scarce during the rise of America's top universities and colleges, which implied that research and teaching should be coupled tightly. Yet that is no longer the case, as the amount of information on the Internet now attests. Online learning can enable learning to happen in a variety of contexts, locations, and times; it allows for a transformation of curriculum and learning. And tightly structured programs that do not offer students the ability to chart their own paths but are laser focused on preparing students for a career will often be beneficial both for mitigating costs and improving student outcomes for those historically poorly served by college. Policy and rankings should therefore not discourage their creation.

This emerging disruptive innovation also allows for an escape from the policies that focus on credit hours and seat time to one that ties progression to competency and mastery. Online learning courses can easily embed actionable assessments and allow students to accelerate past concepts and skills they understand and have mastered and instead focus their time where they most need help at the level most appropriate for them. Time is naturally a variable in online learning, so these courses can instead hold outcomes constant—and outcomes will be a more appropriate measure for judging students and institutions. Shifting policy to focus on outcomes rather than the build up of ancillary services for their own sake will encourage these services to wrap around and support each institution's core value proposition and its students' core jobs to be done.

Online learning is a natural medium and platform for many of these changes. And using the old assumptions and policies to measure its disruptive emergence is inappropriate and could hamstring the innovations so that they fail in their promise to deliver a more affordable, higher quality system for many more of the country's population.

Several recommendations for policy makers flow from these observations. Policy makers should:

- **Eliminate barriers that block disruptive innovations and partner with the innovators to provide better educational opportunities.** It is critical to promote new, autonomous business models that have the freedom to re-imagine higher

education. Policymakers should not frame the disruptive players as threats, and instead see them as opportunities to bring affordable education to more people.

- **Remove barriers that judge institutions based on their inputs such as seat time, credit hours, and student-faculty ratios.** Too many of the disruptive innovations in higher education still focus on inputs and are time based. Policymakers should open up the policy environment to allow more institutions to use online education to move toward next-generation learning models focused around things such as competency-based learning with actionable assessments, not just make the traditional model of education more convenient.

- **Not focus on degree attainment as the sole measure of success.** Degrees are a proxy for skill attainment, but they are far from a perfect one, as seen in the amount of retraining that employers do as well as the current unemployment figures. Real outcomes and real mastery—as often shown in work portfolios for example—are more important.

- **Fund higher education with the aim of increasing quality and decreasing cost.** Policymakers should change access to federal funding from the all-or-nothing one of today to a sliding scale based on how one does relative to its peers on these dimensions. We call the formula we propose to jumpstart this policy a QV Index. The QV Index formula is composed of the 90-day hire rate plus change in salary over some amount of time divided by total revenue per conferral plus retrospective student satisfaction plus the cohort repayment rate indexed to credit scores.

- **Recognize the continued important of research institutions.** These institutions of higher education remain vital—indeed those that focus on research as well as those that train people for the academy will still be critically important for the country's future. Most of America's elite colleges and universities will continue to fulfill this job. But we should no longer force those institutions that are focused on teaching and learning to compete on the same metrics and play by the same rules. Pushing these institutions to adopt a mission of knowledge creation has created institutions that have two conflated value propositions and business models—and added significant overhead costs. We need institutions focused solely on knowledge proliferation—and need to regard those that do a good job on this dimension as being of high quality at what they were meant to do.

Recommendations for existing institutions of higher education also emerge from an understanding of disruptive innovation. These colleges and universities should:

- **Apply the correct business model for the task.** These institutions have conflated value propositions and business models, which creates significant, unsustainable overhead costs.

- **Drive the disruptive innovation.** Some institutions have this opportunity, but to do so, they need to set up an autonomous business model unencumbered by their existing processes and priorities. They can leverage their existing fixed resources in this autonomous model to give themselves a cost advantage over what to this point have been the low-cost disruptive innovators.

- **Develop a strategy of focus.** The historical strategy of trying to be great at everything and mimic institutions such as Harvard is not a viable strategy going forward.

- **Frame online learning as a sustaining innovation.** Institutions can use this new technology to disrupt the existing classroom model to extend convenience to many more students as well as provide a better learning experience.

American higher education is facing complex challenges, but there is significant reason for hope. Understanding the causal forces at play that have led us to where we are now and how these same forces will continue to interact and play out is critical to fashioning a dialogue that can shape the road ahead. Policymakers and heads of universities can use this understanding to come together to harness these forces and put in place the conditions to foster innovations that drive quality for students—and allow both the students and the country to move toward a much brighter future.

The shift in higher education

The United States is facing its highest unemployment rates in a generation. Yet many employers say they cannot find qualified Americans to hire.[2] The country's higher education institutions are seemingly a natural partner to help solve this problem, but they are facing their own set of problems. The majority of the world's top-ranked universities remain in the United States according to most rankings as well as public perception around the world.[3] Yet stagnation, financial struggles, and a rising chorus that questions their actual quality and what value they provide students increasingly besets the industry as a whole. There is doubt about whether the institutions as we have traditionally known them can be a part of the answer to America's problems.

Challenges from abroad make the answer to this question all the more pressing. The United States has maintained its technological leadership in the world in significant part because our universities have attracted the highest-potential engineers and scientists from throughout the globe.[4] These graduates found that America was an attractive home for them, as it was filled with opportunity to practice their professions and start the companies that have been the engine of America's prosperity. This structural advantage is ceasing to exist.

As the economies of Israel, China, and India prosper, fewer of their best technologists feel the need to remain in, or even come to, the United States to pursue their career opportunities. The United States cannot afford to waste any talent or limit any of its citizens from realizing their fullest human potential given China and India's sizable population. The United States population had the largest percentage of adults between the ages of 25 to 34 with a high school diploma and college degree 30 years ago, but university-level graduation rates across OECD countries have nearly doubled since then, and they have largely stagnated in the United States. The percentage of U.S. adults in that same age range with college degrees now lags behind that of many countries.[5]

The United States' dominant higher education policies during the past 50 years have focused on expanding access—allowing more students to afford higher education through such mechanisms as Pell Grants, student loans, and subsidies. These policies have had remarkable success, as the number of students enrolled in postsecondary institutions in the United States has tripled since 1965. Expanding access is still important. But as the above numbers illustrate, the strategy that has worked so well in the past has reached its limits. We can't get to where we need to go from where we have been.

The economic crisis in traditional higher education

Many of America's colleges and universities—hereafter called "traditional universities"—are plunging into economic crisis despite consistent increases in overall spending across higher education.[6] Although the cancerous 4.9 percent annual cost increases plaguing the health care industry—9.8 percent in nominal terms—have grabbed the headlines most recently,[7] the *prices* in higher education have been increasing even more rapidly as of late.

Undergraduate tuition has risen dramatically—at a 6.3 percent annual clip for nearly the last three decades—or 10 percent in nominal terms.[8] According to the American Institute for Economic Research, the price of college tuition and fees increased 274.7 percent from 1990 to 2009, which was a faster increase than the price of any basket of goods and services outside of "cigarettes and other tobacco products." The increase in the price of college ranks higher than even "hospital services, nursing homes, and adult day care," which ticked in at a 245 percent increase over the same time period, whereas the overall Consumer Price Index increased 71 percent.[9] The increase in the true cost of higher education has actually been hidden from many students and families over the years because gifts from alumni, earnings from private university endowments, subsidies from state tax revenues for public universities, and federal subsidies for students have been used to mitigate some costs. But universities are exhausting these mechanisms.

Endowments that took decades to build were decimated in 2008. State-supported schools have increasingly been shifting the burden of tuition to students and their families over the last 15 years,[10] but students and their families were largely shielded from this until 2004, as aid increased so rapidly that the net price to students fell on average. Offsetting government dollars have not kept up as of late.[11] State universities have felt the budget crunch and resorted to all sorts of devices to

try and stay afloat including cutting back on the number of students they enroll—at the very time the country needs more of its population to be educated. Severe governmental budget crises have only exacerbated the trend of shifting the costs of higher education to students and their families, which is likely to be far more intense in the future.

Federal, state, and local governments have enormous obligations to fund the health care costs of their current and retired employees—as well as the aging baby boomers.[12] The appetite of these health care budgets will be far more difficult for lawmakers to suppress than spending on higher education, and we can say with some confidence that past budgetary crises in higher education are but a shadow of things to come. Even as universities have raised tuition prices year over year, as a whole they are facing economic models that are breaking. This means that these traditional institutions are unlikely to reach the populations we have not historically been able to educate well in the past—those who are all too often from low-income, African-American, and Hispanic populations.

These changing circumstances mandate that we shift the focus of higher education policy away from how we can enable more students to afford higher education no matter the cost to how we can make a quality postsecondary education affordable. This mandates a new definition of quality from the point of view of the students—so that the education is valuable to them by improving their lives along with the country's fortunes. If a postsecondary education is fundamentally affordable—meaning lower in cost, not just price—this will also answer the old question of extending access by enabling students to afford a higher education.

The rise of a new educational model

Even as the traditional universities' economic models are showing themselves to be increasingly unviable, there is another group of universities whose financial health is strong and their enrollments are booming.[13] This group is made up predominantly of the for-profit universities, although they are certainly not the only ones in this group. The for-profit universities have increasingly provided capacity for the higher education sector at a time when educating more students is crucial. They have grown three to four times faster than the public and not-for-profit universities over the last decade. And the for-profit sector now serves 9 percent of all postsecondary students in the United States, up from a mere fraction of a percent a decade ago.[14]

The brands of these schools are weak. Other than student loan assistance and federal Pell grants, they receive little subsidy from government. They do not discount their prices and mask the full cost of the education like at most traditional universities, so students bear the full brunt of the costs through tuition—although the relatively low debt repayment rates at these universities does suggest that the government is still seriously subsidizing the costs of the education over a longer time horizon. And yet they are rising from the crises that beset conventional universities. Students are flocking to fill their literal and virtual classrooms, and they are thriving financially.[15]

The fastest-growing for-profit universities have driven innovation with online learning more aggressively than their not-for-profit and public university counterparts—and their growth has coincided with the explosion in enrollments in online learning, which itself grew 17 percent from 2007 to 2008. Twenty-five percent of students took at least one online course in 2008.[16] How can we square this explosion in enrollment and healthy finances with the troubled budgets at traditional universities, many of which are cutting back the numbers of students they serve?

The success of these online attackers and the crisis among many of higher education's traditional institutions may seem unusual, but it is far from unique. We are seeing steps in a process called disruptive innovation that has occurred in industry after industry. It is the process by which products and services, which at one point were so expensive, complicated, and inconvenient that only a small fraction of people could access them, become transformed into ones that are simpler, more convenient, lower in cost, and far more accessible.

What the theory of disruptive innovation suggests is that the business model of many traditional colleges and universities is broken. Their collapse is so fundamental that it cannot be stanched by improving the financial performance of endowment investments, tapping wealthy alumni donors more effectively, or colleting more tax dollars from the public. There needs to be a new model. The only question is whether traditional universities will undertake this replacement themselves, or whether community colleges, for-profit universities, and other entrant organizations aggressively using online learning will do it instead—and ultimately grow to replace many of today's traditional institutions.

This emerging disruption, still in its early stages, offers an opportunity to answer the challenge posed above: to redefine the meaning of quality in higher education and make a quality education fundamentally affordable. The current traditional

institutions that dominate the higher education landscape do what they were built to do very well. The most elite of them will even likely maintain that elite position and continue to do the things for which they were built. It is not that the traditional universities have failed, but instead that they have succeeded so spectacularly, as we explain below.

The problem is that we are now asking them to do something for which they were not built. Traditional universities were not designed to address a metric of quality around effectively serving all students around their distinct needs and desired jobs outside of the academy, no matter their incoming academic achievement. Asking universities to do this represents a seismic shift in how society, broadly speaking, has judged high quality—moving away from a focus on research and knowledge creation and instead moving toward a focus on learning and knowledge proliferation. Indeed, there is a significant and legitimate question of whether many of the institutions in this first wave of educational disruptive innovation will be the ones to make the transformation given that they too have come of age when student outcomes were not prized by the mechanisms and policies through which they received funds.

The process of disruptive innovation

The theory of disruptive innovation originally emerged from a study of the disk drive industry to explain why the leading companies were unable to sustain their industry leadership from one generation to the next. It has been shown to explain the histories of literally hundreds of industries where the dominant companies or institutions have been replaced by entrants. These range from product to service industries, for-profit to not-for-profit ones, and slow- to fast-moving industries. Disruption is the causal mechanism behind the phenomena that the great economist Joseph Schumpeter termed "creative destruction." Figure 1 summarizes this model.

Sustaining innovations

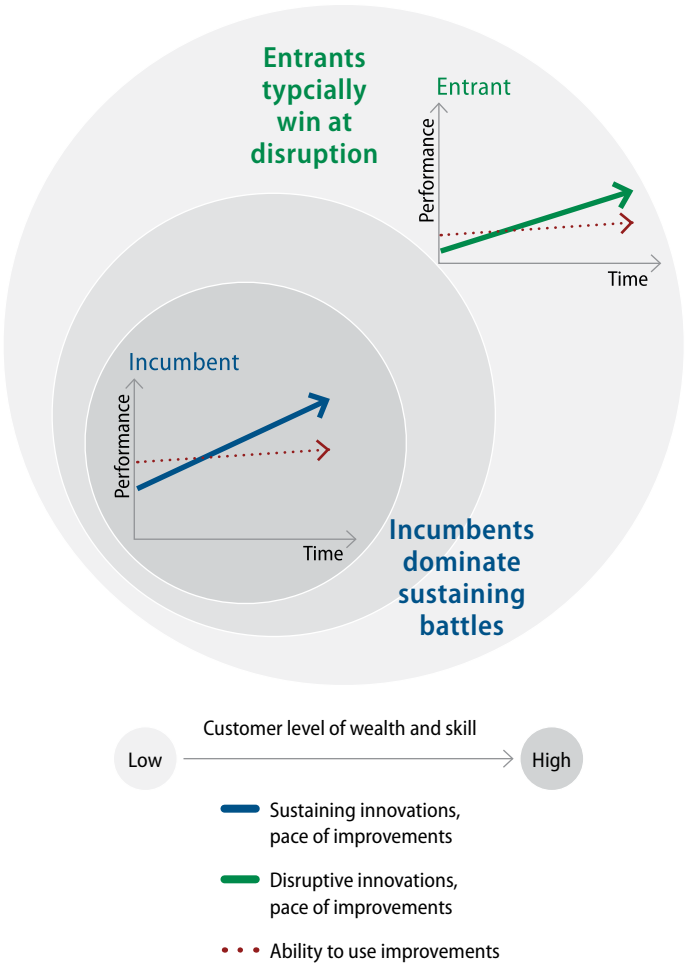
Some of the innovations that improve product performance are incremental ones, and others are dramatic breakthrough technologies. But we call these sustaining innovations so long as the purpose of the incremental and breakthrough innovations is the same—to help companies sustain their movement upward along the trajectory of performance improvement to make better products that can be sold for better profits to their best customers. We have found that the companies that lead their industries on the left side of this chart, before the battles of sustaining innovation begin, are almost invariably still the leaders in their industries when these battles are over.[17] And it does not matter technologically how difficult the innovations are. If their purpose is to help the leaders make better products that they can sell for better profits to their best customers, the leading companies in the industry invariably find a way to get it done.

This model suggests that the history of most industries can be characterized almost in geographic terms as a set of concentric circles, where the innermost circle represents customers who have the most money and skill. The outermost circle represents customers that have the least. The initial products or services at the beginning of most industries take root in the innermost circle because they

are so expensive, complicated, and centralized that only the best-endowed customers have the money to afford the products and the skill and access to use them. Disruption is the process by which such products become affordable and accessible to those in the outermost circles.

The vertical axes in the graphs in the diagram plot the quality of the product, as measured over time (the horizontal axes). There are two elements of the model. The first is that there is a trajectory of performance improvement that customers are able to utilize in every market. This line, depicted in Figure 1 as the dotted line in the graph in the inner circle, represents the average customer's ability to utilize improvement over time. The second element of the model is that there is another trajectory in each market, which is the pace of technological progress. This is represented by the solid line that slopes more steeply upward. The most important finding about this is that the pace of technological progress almost always outstrips customers' ability to use the progress. This means that a technology that is not good enough to meet customers' needs at one point in time (the region toward the left side of this chart) is very likely to improve to the point that it is more than good enough for what customers can use at a later point in time.

FIGURE 1
The theory of disruptive innovation



Disruptive innovations

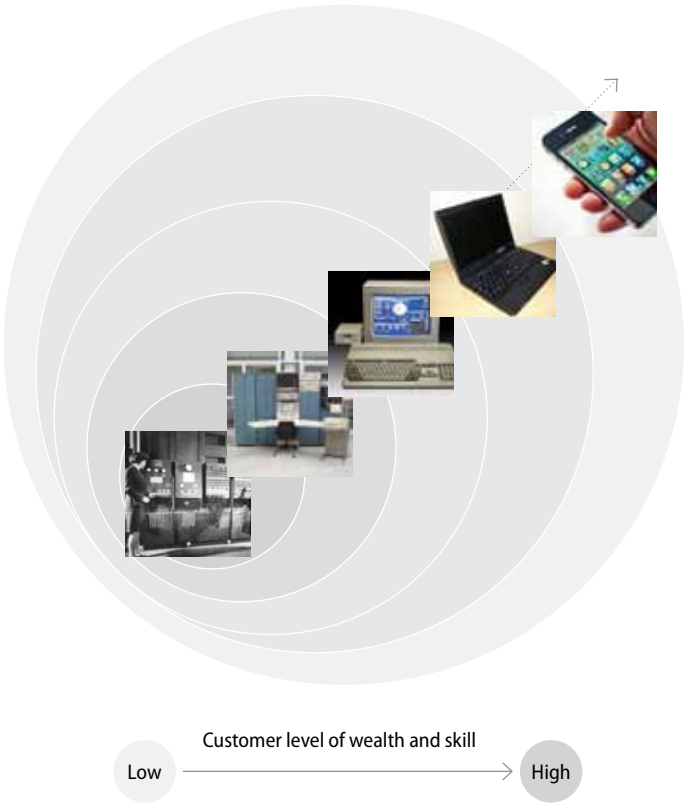
There is another type of innovation that has historically proven almost impossible for the incumbent leaders in the industry to catch. It is called a disruptive innovation. The term disruption was chosen not because it represents a radical, breakthrough improvement along the existing trajectory in the center of Figure 1. Rather, it is an innovation that replaces the original complicated,

expensive product with something that is so much more affordable and simple that a new population of customers in the next larger circle now has enough money and skills to buy and readily use the product. New companies almost invariably enter and grow to dominate the industry when one of these disruptive innovations emerges.

Why are the odds of success at the two types of innovation so different? It is the pursuit of profit and prestige. Improved profitability tends to drive the decision making in for-profit circumstances. But in not-for-profit circumstances, the ambition to do more and have a bigger footprint—an ambition driven both by administrations and often alumni in the case of education—precipitates precisely the same behavior as profit maximization in the for-profit world.[18] The companies on the sustaining trajectory, when faced with the choice of making better products that merit better profit margins vs. making lower-priced, simpler products that merit slimmer margins, invariably find it more attractive to build and offer more and better.

FIGURE 2

How complicated, expensive computers became affordable and accessible



Disruption in the computer industry: an illustration

Figure 2 illustrates how this process of disruption has transformed the computer industry. It began in the innermost circle, with mainframe computers. These cost several million dollars apiece, filled an entire room, and required years of training to be able to operate. Only the largest universities and the largest corporations could afford to own and operate mainframe computers. We had to take our computational problems to these centralized computing centers, where experts solved them for us.

The cost and inconvenience of this centralized solution then precipitated a sequence of disruptive innovations that decentralized the industry. The first step, which took computing

to the next circle of customers, was called a minicomputer. These machines were the size of a filing cabinet, and reduced the cost to about $200,000, which made them affordable enough for engineering departments to begin owning and operating their own machines. Minicomputers could only solve the simplest of problems at the beginning, and their owners still had to take the complicated ones to the mainframe center where those with more expertise solved them. But minicomputers became better and better and were soon capable of doing more and more of the things that previously required the power of mainframes and the experts that operated them. We ultimately needed fewer and fewer mainframe computers.

The next disruptive step was the personal computer, which reduced the cost to $2,000 per machine and made it so much more affordable and simple that an even larger population could own and use a computer. We could only do the simplest of things at first, such as typing and spreadsheets. But as the technology got better and better, we could do more and more things on the simple, affordable PC platform that formerly required a larger and more powerful machine. We eventually didn't have much use for mainframes or minicomputers. The key reason for this is that the pace of technological progress outstrips the ability of customers to utilize that progress.

The third and fourth waves of disruption in the computing industry were notebook computers and handheld smartphones. These reduced the cost to a few hundred dollars apiece and put computing first into our briefcases and ultimately into our pockets and purses. We have seen the same pattern in these disruptions. We could do only the simplest of things on these new platforms at first, and still had to use our desktop computers for the complicated ones. But as they became better and better, we needed fewer and fewer of the prior machines. We are now able to do most of what we need on our notebooks, and ultimately on smartphones.

The inexorable movement up-market

One of the most important findings in our studies of disruption is that disruptive companies must move up-market through sustaining innovation once their business model has been established in one of the outer circles in order to sustain profitability and organizational vitality. The reason: If they stop this up-market pursuit and compete only against equal-cost competitors, then they

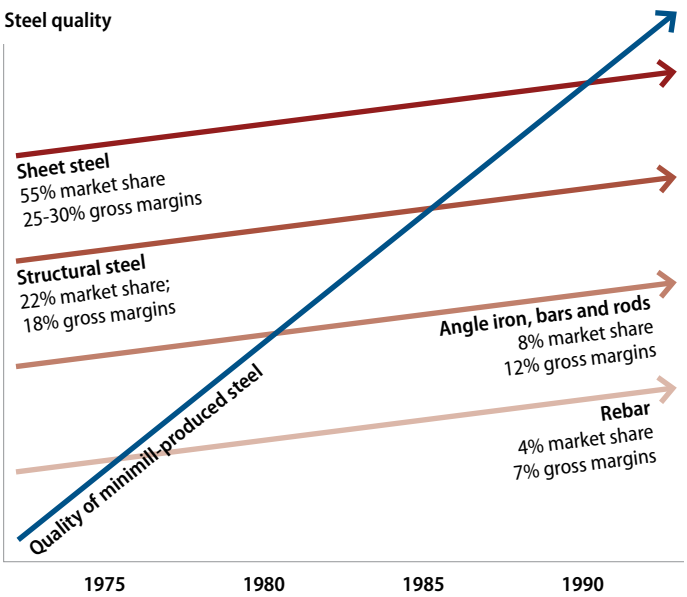
have no cost advantage. It is only if they carry their low-cost business model up-market that they can retain their cost advantage against competitors. This section shows how this force transformed the steel industry and then examines the up-market forces at work in higher education.

Disruptive forces in the steel industry

Most of the world's steel has historically come from massive integrated mills that cost about $10 billion to build. A different way to make steel is in a minimill, which melts scrap steel in electric arc furnaces—cylinders that are approximately 20 meters in diameter and 10 meters tall. Because they can produce molten steel in such a small chamber, minimills don't need the massive-scale rolling and finishing operations that are required to handle the output of efficient blast furnaces, which is why they are called minimills. Minimills can also make steel of any given quality for 20 percent lower cost than an integrated mill.[19]

Steel is a commodity. You would think that every integrated steel company in the world would have aggressively adopted minimill technology. Yet not a single integrated steel company has yet successfully built and operated a minimill, even as the minimills have grown to account for more than half of North America's steel production and a significant share of other markets as well.[20]

FIGURE 3
The disruptive attack of the steel minimills



The theory of disruption explains why something that makes so much sense has been so difficult for the integrated mills. Minimills first became technologically viable in the mid-1960s. The quality of the steel that minimills initially produced was poor because they melted scrap of uncertain and varying chemistry in their furnaces. The only market that would buy what the minimills made was the concrete reinforcing bar, or rebar, market because the specifications for rebar are loose. Once rebar is buried in cement, you can't verify whether the steel has met the specifications. Rebar was therefore an ideal market for low-quality steel.

As the minimills attacked the rebar market, the integrated mills were actually happy to be rid of that business. Their gross profit margins on rebar often hovered near 7 percent, and it just didn't make sense to invest in defending their least-profitable products when they had the option to invest in growing higher-profit tiers of the market, as shown in Figure 3. The integrated mills reconfigured their rebar lines to make more profitable products as the minimills established a foothold in the rebar market. A cathartic thing happened when the integrated mills lopped off the least profitable products and added up the remaining numbers: their profitability improved as they got out of rebar. And the minimills made *tons* of money as they got into rebar because they had a 20 percent cost advantage. It was a symbiotic relationship.

All was well in this relationship until 1979, when the minimills finally succeeded in driving the last integrated mill out of the rebar market. Historical pricing statistics show that the price of rebar then collapsed by 20 percent. Why? A low-cost strategy only works when there are high-cost competitors in your market. After the last integrated mill had fled up-market and the low-cost minimill was only pitted against other low-cost minimills in a commodity market, competition quickly drove prices down to the point that none of them could make money.

The minimills soon looked up-market, and what they saw spelled relief. If they could just figure out how to make bigger and better steel—shapes such as angle iron, rails, and rods—they could roll tons of money again because the margins there were 12 percent. As the minimills extended their ability and attacked that tier of the market, the integrated mills were again relieved to be rid of that business because it just didn't make sense to defend a 12-percent-margin business when the alternative was to invest to gain share in structural beams, where margins were 18 percent. So the integrated mills shut their lines down or reconfigured them to make more profitable structural beams. The integrated mills' profits again improved as they got out of the less profitable market. And the minimills' profits rebounded as they got into the same products with a 20 percent cost advantage again. Peace characterized the industry until 1984 when the minimills finally succeeded in driving the last integrated mill out of the bar, rod, and rail market, which caused the minimills to reap the same reward for their victory: With low-cost minimill pitted against low-cost minimill, prices collapsed by 20 percent.

The minimills had to move up-market again. At the beginning of their invasion into structural beams, the biggest that the minimills could roll were little six-inch

beams of the sort that under-gird mobile homes. It made little sense for the integrated mills to defend this market either, when they had the option of investing to grow in sheet steel, where margins were 25 to 30 percent. Again, integrated mills' profitability improved as they lopped off their least profitable products and added up the remaining numbers. And with a 20 percent cost advantage again, the minimills could again roll tons and tons of money by entering the same market. When they finally succeeded in driving the last integrated mill out of the structural beam business in the mid-1990s, pricing again collapsed. The reward for victory was the end of profit, and the minimills had to stretch up-market to attack the sheet steel business to restore prosperity.

The minimills now control nearly 60 percent of the market, and all but one of the integrated mills has gone bankrupt. But this is not a history of bungled steel company management. It is a story of rational managers facing the innovator's dilemma. Should we invest to protect the least profitable end of our business, so that we can retain our least loyal, most price-sensitive customers? Or should we invest to strengthen our position in the most profitable tiers of our business, with customers who reward us with premium prices for better products?

Disruption is the process by which Toyota overtook General Motors, Cisco felled Lucent and Nortel, WalMart and Target toppled the department stores, and Apple seized music distribution. Disruption is how Charles Schwab and online brokers unseated Merrill Lynch, and how Google pre-empted newspaper advertising. Disruptively attacking world markets is the engine that drove Japan's economic miracle from 1960 to 1990; the economic transformations of Korea, Taiwan, and Singapore from 1980 to 2000; and the ongoing economic growth of China and India.[21]

General observations about disruption

There are four additional observations about the phenomena called disruption that are salient to the future of higher education. This section highlights how existing organizations must introduce disruptive innovations for them to be successful, how to think about a disruptive innovation's quality, how disruption functions in highly regulated sectors, and how disruptive and sustaining innovations affect cost.

Disruption and the process of natural selection

The companies that led their industries in the innermost circles were in almost every instance unable to maintain their leadership as larger markets emerged because of disruptive innovations. The driving reason, as noted in the case history of the steel industry, is that the new, larger markets were financially unattractive to the leaders. This is further illustrated in Table 1, which shows the gross margin percentages required to profitably cover overhead costs in different computer markets and the price for the typical machine. Minicomputers were economically unattractive given the cost structure required to succeed in the mainframe computer business compared to the alternative of making bigger and better mainframes. Companies whose economic models were designed around minicomputers similarly found making personal computers economically unattractive when compared to the alternative of making bigger and better minicomputers.

There is no instance in the history of the hundreds of industries where disruption has occurred in which a significant company in one of the inner circles becomes a leader in a subsequent disruptive circle if it attempted to navigate that transition from within its mainstream business. In those few instances in which the leader in one generation became the leader in the next disruptive one, the company did so by setting up a completely autonomous business unit, giving it the freedom to create its own disruptive business model, and giving it an unfettered charter to pull the customers out of the original business unit.

IBM was the only mainframe computer manufacturer that became a significant manufacturer of minicomputers. It did this by setting up a completely independent business unit in Rochester, Minnesota and giving it the autonomy to create a different economic model that was consistent with the minicomputer business.

TABLE 1

Differences in the economic models for each stage of disruption[22]

Generation of computer	Characteristic unit volumes produced per year	Gross margins required to cover overhead costs	Typical sales price
Mainframes	Thousands	60%	$2,000,000
Minicomputers	Tens of thousands	45%	$200,000
Desktop computers	Millions	30%	$2,000
Notebook computers	Tens of millions	15%	$1,000
Smartphones	Hundreds of millions	15-40%	$300

IBM was also the only minicomputer company that became a leading supplier of personal computers. This was because the corporation set up an independent business unit in Florida and gave it the flexibility to create yet a different economic model that was appropriate to the PC business. The only instances where the leaders in the inner circles became leaders in disruptive markets have been when the company set up a completely independent subsidiary and gave it the flexibility to create an appropriate, new economic model.

The reason for this, as we discuss in more detail below, is that business models by their very nature are designed to solve one class of problem very well and to make money via a particular profit formula. But business models do not evolve easily. In biological evolution, individual organisms do not evolve. They are born, and they die. But a population can evolve, as mutants gradually gain market share. Similarly, business units rarely evolve. They are started and shut down. But corporations can evolve, as IBM did, by opening and closing business units.

What this means is that, generally speaking, the disruption of higher education at public universities will likely need to be managed at the level of state systems of higher education, not at the level of the individual institutions, which will struggle to evolve. And if private universities are able to navigate this disruptive transition, they will have to do so by creating autonomous business units, just as IBM did.

Disruption and quality

The providers of the products in the inner circles in each of these waves of disruption viewed the products that enabled the emergence of markets in the larger circles to be of poor quality because they could not handle the sorts of problems that customers were confronting in the inner circles. Early personal computers, for example, were first used as toys for children, then for typing and spreadsheet analysis. They could not handle the complicated computational problems for which mainframes and minicomputers were used. It was therefore natural for those in the inner circles to disparage personal computers as little more than toys. From their perspective, they were absolutely right.

But the customers in the outer circles viewed these affordable, convenient products as very high quality because they simply did not have access to computing at all prior to their emergence. Indeed, the very definition of quality changed with each wave of disruptive decentralization. Speed and computing capacity defined

quality in mainframes, for example, whereas the essence of quality in notebook computers is light weight and long battery life.

Our research on the marketing dimensions of innovation has shown that the causal mechanism behind the purchase of products and services is that jobs arise in our lives that we need to do, and we "hire" products to get these "jobs" done. As the great marketing professor Theodore Levitt was known to teach, "The customer doesn't want a quarter-inch drill. He wants a quarter-inch hole." Hence, when one customer hires a product to do one job she may be delighted with its quality because the product did that particular job well. Another customer with a very different job to be done, however, might hire the same product and judge it to be very low in quality—not because the product is different, but because the job is different.

When a company has a product offering that gets an important job done, its customers will "pull" that product into their lives with minimal marketing by the company, whenever the job arises. When a company's product offerings are not structured around a job that customers are trying to do, the company typically must spend marketing dollars mightily in order to persuade customers to buy its products. A good metric of whether a company's products are doing an important job for customers, in fact, is whether customer acquisition costs are falling or rising over time.

Quality can only be measured relative to what customers value in their own context—their job to be done—and relative to their alternative solutions. This element of the theory of disruption—how the very definition of quality changes—is crucially important in understanding the future of higher education, as we show below.

Disrupting regulated markets

Many are suspicious about the prospect of disruptive innovations sweeping through highly regulated industries that have a variety of gateways erected to block change. And yet disruptive change has swept through many such industries. How does it happen? Success in these situations never came through a head-on attack against the regulations and the network effects that constituted the power of the status quo. Rather, the disruption first prospered in a completely independent space outside the reach of regulators. Once the new value network had proven itself to be viable and better and the bulk of the customers had migrated to the unregulated system, its regulators responded to the fait accompli. Rarely has revised regulation preceded disruptive revolutions.

Southwest Airlines didn't disrupt the airline industry by seeking approval in the early 1970s from the federal Civil Aeronautics Board for discount prices on long, interstate routes. It began flying short routes within the state of Texas, where the federal regulators lacked jurisdiction. The rates and route structures of interstate trucking similarly collapsed under their own weight in the late 1970s after corporations began operating their own truck fleets, which fell outside the jurisdiction of the Interstate Commerce Commission. And Merrill Lynch was able to topple the regulation of bank interest rates because it was not a bank and therefore not regulated by the Federal Reserve when it introduced its interest-bearing cash management account.

There are dozens of comparable examples. In each case, markets that were dominated by entrenched competitors surrounded by powerful network effects and protected by regulation ultimately gave way to the fait accompli of a new network, and to efficient, safe markets that emerged by circumventing regulation. Head-on attacks almost never work.[23]

Disruption and cost

Most economists believe that competition drives market prices down, but this is not always true. The conventional thinking is that competitors in any given industry will be driven to be more efficient and reduce their costs so that they can price their goods or services below that of their competitors and thereby gain market share.

But if you put yourself in the shoes of the competitors themselves, lowering their prices would not be the preferred course of action. They would like to charge more money for what they do. And they try to do this by adding features or functionality that they hadn't previously offered. They will likely be successful in their effort to raise prices as long as they have not yet reached the point where their goods or services have satisfied the fundamental demands that the job their customers are trying to do requires. As propositions for innovation emerge and compete for resources within a company, those that propose to develop better products that can be sold for higher prices and profits always trump proposals to make simpler, lower-priced products. The way mainframe computer companies fought against each other was therefore to make bigger and better mainframes than those of their competitors.

Companies often satiate customers' needs relatively quickly because the rate of technological improvement generally outpaces the rate at which our lifestyles change. Price competition tends to set in once customers' needs are satisfied. An indication that this has started to happen is that companies will, without success, continue to add features and functionality that had formerly allowed them to raise the prices of their offerings. A company may increase the number of megapixels on their phone's camera from four to eight, for example, but they aren't going to be able to charge more money for the new phone than they did for the predecessor when it was new.

Experience in producing a good or service in many instances allows the producer to realize where they can reduce costs and improve yields. And most industries have some sort of scale economies so that unit costs decrease as they make more of the offering. Economies of scale are a function of the increasing efficiency that technology brings to labor; the reduction in per unit cost is directly related to the increase in the number of units produced per unit of labor input. So when food today is a substantially lower proportion of the developed world's income than it was 100 years ago, it is not because farmers today are substantially more capable than their predecessors, but rather because the equipment they use allows them to do far more than was the case in the past. The amount of food produced per farmer is greater than it has ever been. Cars, electronics, air travel, homes, and countless other goods and services have similarly gotten substantially less expensive over time.

But not every industry offers these economies of scale. Education has historically been one such industry. This is made explicit to some degree in the way that the ratio of teachers to students is watched so closely.[24] Technology and experience may have changed the way that teachers work, but they have not reduced the amount of time a teacher has to work to produce a similarly educated class of students.

Our observation has been that as a general rule, head-on, sustaining competition among competitors with comparable business models, which lack economies of scale, drives prices up 6 percent to 10 percent per year in nominal terms. It is disruptive innovation that drives prices down. The overall rate of inflation in an industry is the high rate of inflation created by sustaining innovation, offset by the countervailing cost reductions that stem from disruptive innovators gaining market share.

The measured rate of inflation in industries where disruptive innovation has not occurred—such as health care—is much higher than the overall rate of inflation in the economy. The nominal rate of inflation in tuition at private universities has been, true to form, just above 10 percent for several decades as the universities compete against each other for the best students, the best faculty, and the most prestigious and lucrative research grants. Competition drives this inflation.

The facilities for student dining, athletic activity, and classroom learning that existed 30 years ago at Harvard University were Spartan compared to the opulent facilities that today's students enjoy. Harvard has no option but to keep ratcheting up its attractiveness and, therefore, its cost structure in order to compete successfully against the likes of Stanford and Yale. As the Universities of Michigan, Virginia, Texas, North Carolina, and California toil to emulate the elite private universities, they too keep adding costs at a rate substantially faster than the overall rate of inflation. For those institutions that choose to bow out of this arms race, they cease to add the ancillary services necessary to stay competitive, as the competition has been defined in this inner ring. The overall nominal 10 percent rate of inflation in the tuition of higher education is a synthesis of the rising costs of sustaining competition within each circle, mitigated by the countervailing effect of lower-cost institutions such as community colleges and for-profit universities gaining market share, and therefore accounting for more weight in the overall mix.

It is easy to frame disruption as a threat from the point of view of specific companies and institutions. Yet disruption is an unambiguously good thing from a macroeconomic point of view. It is a primary driver of economic growth and a key force that mitigates inflation. It is the process by which expensive, complicated products and services become simple and affordable.

But to this point disruption has not occurred in a significant way in higher education. America has instead sought to make higher education available to all through massive spending to subsidize its cost through government and philanthropic funding. These subsidies for affordability are becoming constrained, and in many ways the institutions of higher learning need to disrupt themselves, or be disrupted, for the industry to survive.

Disruptive innovation in higher education

Figure 4 depicts the institutions of higher education in the same schematic used in Figure 3 for the computer industry. Elite private universities comprise the innermost circle, accessible primarily by those with the best academic credentials and the ability to afford very high tuition. The next circle is comprised of state universities, whose admissions standards and tuition typically make them more accessible to a larger population of students. The third circle represents junior and community colleges, whose costs are lower still, and which typically have open admission policies. The outermost circle represents online education, which is accessible to an even larger population of students such as those from rural areas and working adults who cannot attend classes at traditional times. For-profit universities stand astride the three outer circles.

FIGURE 4

Potentially disruptive forces in higher education

Higher education is characterized by the same impetus to move up-market found in the computing and steel industries. The so-called California "master plan" adopted in 1960—which established by law who the University of California, California State University, and community college systems could serve—cemented the definition of quality and thus what this up-market drive would look like. It established that the colleges allowed first crack at the brightest students, as measured by standardized tests, would "also get the most money, enroll the most graduate students, run the biggest research projects, and have the most prestige."[25] Other states adopted similar plans over the next decade, which,

TABLE 2

The up-market evolution of institutions of higher education in Utah[30]

	Enrollment, by year					
Institution	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**
University of Utah	17,000	20,000	22,200	24,650	27,400	30,429
Utah State University	7,600	9,500	11,900	14,850	18,600	23,229
Weber State university	4,000	5,750	8,200	11,750	16,750	20,953
Southern Utah University	3,300	3,900	4,575	5,400	6,325	7,448
Utah Valley University			4,625	8,250	14,750	26,322
Dixie State College	2,200	2,850	3,650	4,680	6,000	7,693
Salt Lake Community College			4,000	7,900	15,250	29,332
Snow College	1,900	2,200	2,550	2,900	3,350	3,851
College of Eastern Utah	1,400	1,525	1,650	1,800	1,960	2,135
Utah College of Applied Technology				2,900	14,500	43,914
Western Governors University*					1,000	20,000
Total	**36,400**	**44,725**	**63,350**	**85,080**	**125,885**	**214,306**

* The students who attend Western Governors University reside all over the country, not just in Utah.

Key

Bachelors, master's, doctoral	Bachelors, master's	Bachelors	Associate	Certificate

as Anya Kamenetz writes in her book about higher education titled *DIY U*, triggered a race to move up the ranks to "be eligible for more cash from federal and state governments, not to mention alumni…Whenever and wherever they could, normal colleges became state teachers' colleges, became state colleges, became state universities. The best proxies for prestige are spending per student and selectivity, both of which drive up costs. The perception, and sometimes the reality, has been that colleges for the poor must be poor colleges."

Table 2 shows, by illustration, how public institutions of higher education in Utah have evolved over the last 50 years.[26] Campus-based junior and community colleges have been established in hopes of using their low-cost business models—adjunct faculty, no faculty research overhead burden—to affordably absorb much of the growth in higher education enrollment in the state. But the low-cost entrants have exhibited the same intoxicating up-market drive as the minimills. What were once junior and community colleges have sought to offer bachelors,

and then graduate degrees. None have strived to offer less.[27]

Provo-based Utah Valley Community College, for example, evolved from offering a two-year associate degree at its inception in 1987, to offering bachelors degrees as Utah Valley State College in 1993, and is now initiating master's degrees as Utah Valley University in 2010.[28] Its new president, Matt Holland, has a purebred academic pedigree from Duke and Princeton, and UVU competes in NCAA Division 1 athletics in seven sports. Weber State University has similarly humble origins.

The *U.S. News & World Report* rankings of top colleges have further cemented this definition of quality in the minds of the public as well. Twenty-five percent of its rankings are from peer ratings, whereas the other 75 percent come from "either direct or proxy measures of spending per student and exclusivity."[29] In other words, the costliest institutions—those that spend the most per student—are ranked higher.

Despite the up-market movement of institutions like these, however, the established leaders in higher education have rarely been disrupted. Until the present crisis in funding, most have continued to thrive. Why? Certain industries are immune to disruption. Higher education historically has been one of these.

Immunity from disruption

Disruption occurs in industries where there is an enabling technology that can "scale" upward and allow the disruptive entrants to take their low-cost business models up-market. Minimills' processes for cleaning and shredding scrap, electric furnaces, and rolling capabilities were all upwardly scalable. They were the engine that enabled low-cost manufacturers to make a sequence of progressively more sophisticated products for still lower cost than the integrated mills. The computer microprocessor was similarly scalable up-market because it enabled Dell first to attack entry-level machines and then carry its model up-market into workstations and servers and so on.

There are some industries where disruption has been impossible up to this point, and in each case, it has been where there hasn't been an upwardly scalable technology. Hotels are such an industry. When Holiday Inn attacked the low-end of the market in the 1960s, established hoteliers were disinterested in going down-

market to compete. But Holiday Inn couldn't move up, either. If it wanted to move up-scale, it would have needed to hire a concierge just like the Four Seasons, re-furnish its rooms to emulate Marriott, and so on. It would have to replicate the cost position of the higher-end hotels and compete as belated entrants in a sustaining-innovation attack against incumbents. Our research has shown that head-on attacks such as these rarely succeed.

The "dining-out" business has been similarly immune to disruption. McDonald's entered the low end of the industry without attracting a response from higher-tier restaurants. But there has been no upwardly scalable technology that could carry McDonald's low-cost business model up-market, and McDonald's has therefore remained a fast-food restaurant with fast-food profit margins.

Higher education has not had an upwardly scalable technology driver up until this point. Community colleges that have become four-year institutions and then research universities offering graduate degrees have not been able to carry their low-cost business models up-market. They have had to transform from their original form and replicate the cost structure of the institutions they are striving to emulate by competing with them on the basis of sustaining, rather than disruptive, innovation. This is why the growth of community colleges has not substantially mitigated the rate of inflation in higher education.

Although the absence of an upwardly scalable technology driver has rendered higher education impossible to disrupt in its past, we believe that online learning constitutes such a technology driver and will indeed be capable of disruptively carrying the business model of low-cost universities up-market. This is vital in order to make higher education fundamentally affordable to both students and society—especially if universities see themselves as being in the business of knowledge proliferation rather than knowledge creation and prioritize teaching and learning over research and prestige, as we have traditionally thought of it.

Look in Table 2 at the growth of Western Governors' University, a not-for-profit university. It had enrolled 20,000 students just a decade after admitting its first students in 1999, was fully accredited in each field in which it offered major courses, and it offered bachelors and masters degrees—and it had not morphed into a research institution (29 percent of its students are graduate students). And Western Governors' University is financially healthy like the for-profit universities noted in the beginning pages of this report.

The speed of transition to online learning

The transition to widespread adoption of a disruptive innovation such as the delivery of content online is rarely abrupt or immediate. The substitution pace almost always follows an S-curve, as depicted on the left side of Figure 5, where the vertical axis measures the percent of the market for which the new approach accounts. The S-curves are sometimes steep; other times they are gradual. But disruptions almost always follow this pattern. The initial substitution pace is slow, then it steepens dramatically, and finally it asymptotically approaches saturation of the potential market.

A persistent problem emerges for the incumbent industry leaders when one of these substitutions occurs. When the nascent technology accounts only for a tiny fraction of the total market (they're on the flat part at the bottom of the S-curve), the leaders project linearly into the future and conclude that there is no need to worry about the new approach because it will not be important for a long time. But then the world flips quickly on them and cripples the established companies. Digital photography, for example, spent a decade of incubation on the curve's flat portion, but then flipped on the film companies very rapidly during the early years of the 21st century. The result? Polaroid is gone for all intents and purposes. Agfa is gone. Fuji is seriously struggling. Kodak alone caught the wave—and it's been a rough ride.

You might think companies would learn from this experience, but the S-curve adoption pattern begs a vexing question. How can we know whether the world will flip next year or in 10 years—if it flips at all?

It turns out that there is a way to forecast the probability and timing of the flip. One plots the ratio of market share held by the new innovation divided by the old innovation on the vertical axis as shown on the right side of Figure 5 (if each has 50 percent, this ratio will be 1.0) and arrays it on a logarithmic scale—so that .0001, .001, .01, 0.1, 1.0, and 10.0 are all equidistant. The data always falls on a straight line

FIGURE 5

Patterns of the new substituting for the old

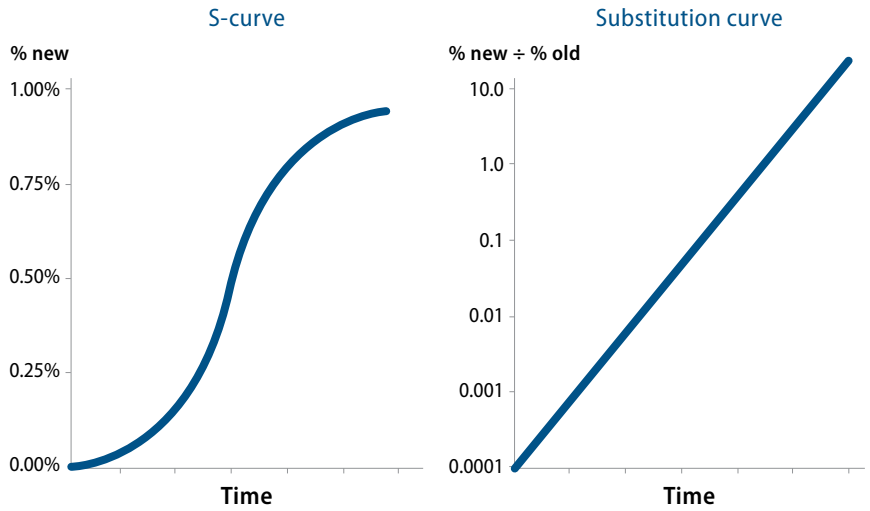


FIGURE 6

The substitution of online learners versus students that have only taken in-person courses[32]

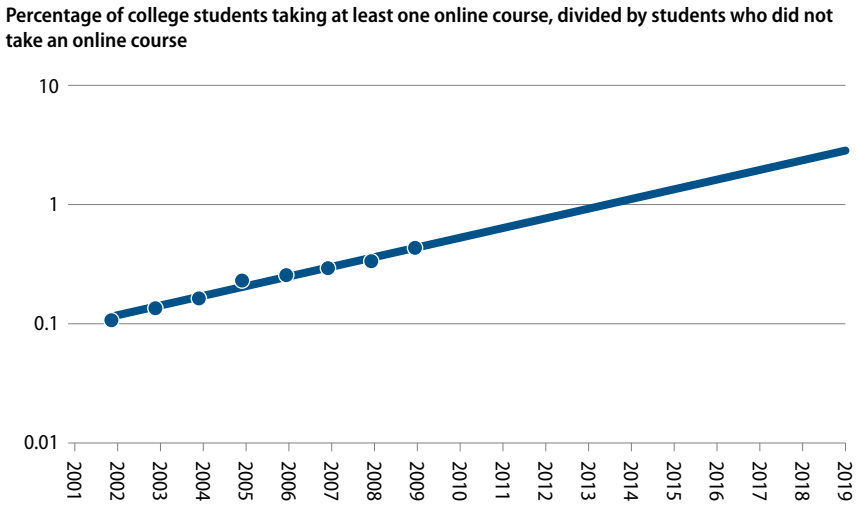
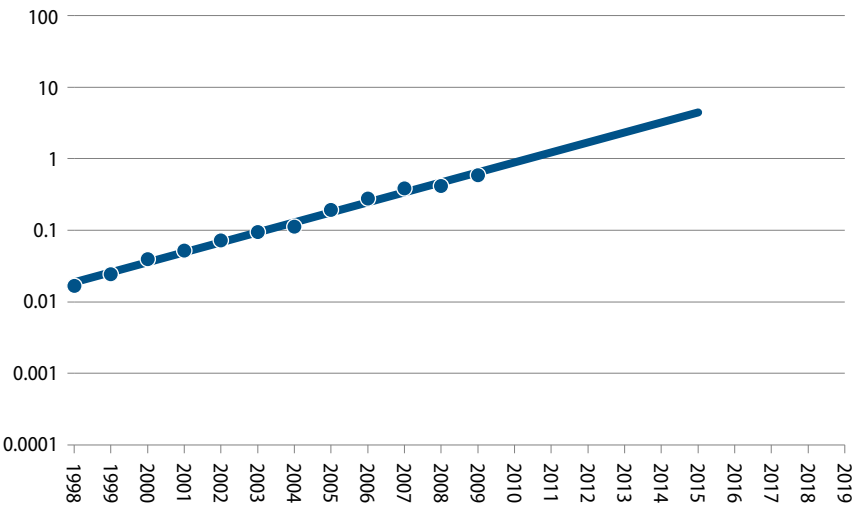


FIGURE 7

The substitution of online courses versus traditional courses

North Carolina community college system



when plotted in this way when an S-curve is developing.

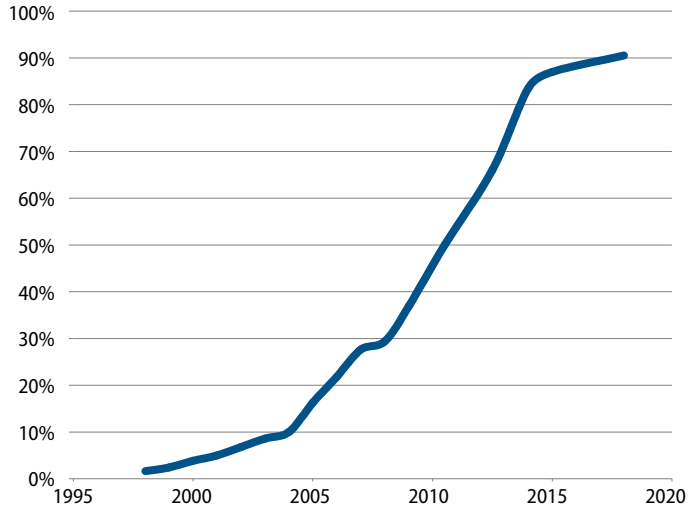
The line slopes upward steeply sometimes, and other times it is more gradual. But it is always straight. The reason is that the mathematics of "logging" the ratios "linearizes" the S-curve. When the substitution pace is plotted in this way, whether it's the substitution of 5.25" for 8" disk drives, VOIP for circuit-switched telephone calls, or women's sportswear for dresses, the slope is so clear within the first few years of the substitution that people can make reasonable estimates for when the new innovation will account for 50 percent and 90 percent of the market. We call this line a "substitution curve." If a log-linear pattern has not emerged within five years and the data points are a scatter rather than a resolute line, it is a symptom that there is not a compelling economic or performance driver for the new approach, and it is likely to sputter away.

The data are hard to aggregate on a consistent basis, but Figure 6 summarizes our sense for the pace of substitution of fully online-delivered learning vs. tradi-

tional teacher-in-the-classroom instruction in American colleges and universities nationally. The vertical axis measures the percentage of college students who report having taken at least one of their college courses in a given year online, divided by the percentage of graduates who did not take even one online course. It shows that about 10 percent of students took at least one online course in 2002. That fraction grew to 25 percent in 2008; was 29 percent in 2009; and will be 50 percent in 2014—and this calculation does not include the number of students who may not be taking fully online courses but are taking "blended courses," which are those in which a significant component of the instruction is delivered online . In other words, the online learning in college train has left the station.[31]

FIGURE 8

The growth of online courses as percentage of all courses in the North Carolina community college system



The North Carolina Community College System offers a case study that tells an even more dramatic picture. Figures 7 and 8 show that the growth of online learning in the system has been so rapid that online courses accounted for 37 percent of all courses taken in 2009, up from 2.4 percent just 10 years earlier. The administrators in the system count an online course as one in which the learning is delivered through a learning management system, so this number also includes blended courses—ones in which there is some face-to-face interaction. The pace of substitution is following a classic S-curve pattern, which indicates that 50 percent of all courses will be delivered online in the second semester of the 2010 school year, and 90 percent of all courses will be delivered online by 2018. Figure 8 converts the substitution curve into an S-curve diagram to give another image of what this will look like.[33]

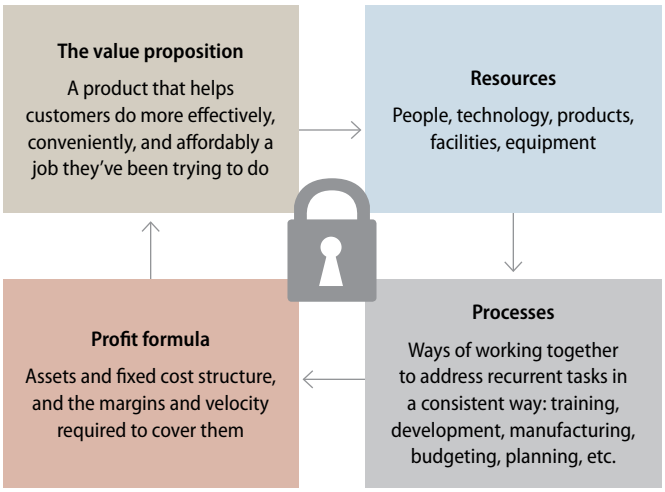
The next section focuses on what we mean by the term business model and what is known about business model innovation in order to explore the sources of financial crisis among traditional universities and the effect that low-cost institutions such as Western Governors will have on the industry now that they possess an upwardly scalable technology driver.[34] Business model innovation is a critical enabler of disruptive innovation because disruptive innovations cannot be forced into existing business models, as we discussed earlier.

What is a business model?

Business models are comprised of four interdependent elements, as depicted in Figure 9. They start with a value proposition: a product or service that helps customers do a job that they have been trying to do more effectively, conveniently, and affordably. The organization must assemble the set of resources to deliver that value proposition—such as people, products, technologies, equipment, and facilities. As the organization repeatedly uses its resources to deliver its value proposition, processes—habitual ways of getting recurrent things done—coalesce. Soon a profit formula emerges as the company follows these processes to use its resources to deliver the value proposition.

The profit formula defines how large the company must become to break even, what kind of gross and net margins it must achieve to cover the cost of its resources, and how rapidly it needs to turn its assets over to achieve an adequate return on investment. The profit formula in turn determines the kinds of value propositions that the business model can and cannot offer.[35] These four elements of the business model become interdependently locked very quickly.

FIGURE 9
The elements that comprise a business model



Innovations that conform to the business model are readily funded. Organizations sometimes reject an innovation that emerges to address a new need in the market, but doesn't fit these four elements of the business model. But the organization more frequently co-opts such innovations by forcing them to conform to the business model in order to get funded. When this happens—funding only flows to innovations that sustain or fit the business model—the organization loses its ability to respond to fundamental changes in the markets that it serves. This is what has happened to many universities.

Types of business models

There are three generic types of business models: solution shops, value-adding process businesses, and facilitated user networks. Each of these is comprised of its own value proposition, resources, processes, and profit formula.[36] Universities have become conflations of all three types of business models. This has resulted in extraordinarily complex—some might say confused—institutions where much of the cost is tied up in coordinative overhead rather than in research and teaching. A key reason why the for-profit universities and other universities such as Western Governor's have been gaining such traction in today's higher education market is that they don't conflate the three types of business models.

Solution shops

Solution shops are institutions focused on diagnosing and solving unstructured problems such as consulting firms, advertising agencies, research and development organizations, and the diagnostic work performed in general hospitals and specialist physicians' practices. Most university faculty research is solution shop-like activity. These shops deliver value primarily through the people they employ—experts who draw upon their intuitive, analytical, and problem-solving skills to diagnose the cause of complicated problems and recommend solutions.

Customers are typically quite willing to pay very high prices for the services of the professionals in solution shops because diagnosing the cause of complex problems and devising workable solutions has such high subsequent leverage. The revenue model for solution shops tends to be a fee-for-service model. Consulting firms have occasionally agreed to be paid in part based upon the results of the diagnoses and recommendations that their teams have made—but that rarely sticks. They must revert to being compensated for their inputs, not the results, because the outcome depends on so many other factors beyond the correctness of their diagnosis and recommendations.

Value-adding process businesses

Organizations with value-adding process business models bring in things that are incomplete or broken. They utilize their resources and processes to transform

them into more complete outputs of higher value. Most manufacturing companies are VAP businesses, as are restaurants, retailing, and procedures performed in hospitals after a definitive diagnosis has been made. VAP businesses do their work in relatively repetitive ways so that the capability to deliver value tends to be embedded more in processes and equipment rather than in the intuitive expertise of people, as is the case in solution shops. In some companies these processes are loose and highly variable, depending on who is doing the work. Other VAP companies have processes that are carefully defined and followed so conscientiously that they can consistently deliver high-quality services and products at low cost in ways that are much more insulated from the variability that arises when results are delivered in people-dependent ways.

VAP businesses typically charge their customers for the output of their work, not their inputs to it. Restaurants therefore print prices on their menus, automakers publish list prices, eye surgery centers can advertise their prices, and so on. Many VAP businesses even guarantee the result when the ability to deliver the outcome is embedded in repeatable processes.

Most teaching in K-12 and universities is a value-adding process business. As in manufacturing, food service and surgery, the processes followed can be idiosyncratic, with highly variable outcomes. Or the processes can be tightly specified and carefully followed, thereby yielding much more consistent, predictable results.

Facilitated user networks

The third type of business model is a facilitated user network—an enterprise in which the participants exchange things with each other. Mutual insurance companies are facilitators of user networks; customers deposit their premiums into the pool, and they take claims out of it. So are telecommunications companies, which facilitate customers sending and receiving information among themselves. The revenue models for these businesses are typically fee for membership, or fee for use. Thanks to the Internet, many university activities that were formerly conducted as solution shop and value-adding process businesses are evolving into facilitated networks among students and faculty, such as hosted discussion forums.

The conflation of business models in traditional universities

Universities emerged in the 17th and 18th centuries primarily as teaching institutions, but most gradually evolved to become expensive conflations of all three types of models with three value propositions: research, organized as a solution-shop model; teaching, which is a value-adding process activity; and facilitated networks, within which students work to help each other succeed and have fun. A typical state university today is the equivalent of having merged major consulting firm McKinsey with Whirlpool's manufacturing operations and Northwestern Mutual Life Insurance Company. They have three fundamentally different and incompatible business models all housed within the same organization.

How did this come to be? Most business executives' instinct when they see a proximate and powerful competitor near their competitive space is to seek to be different by focusing in a field where their firm can be the best. They develop different strengths that matter in different markets to avoid head-on copycat competition. Yet most university leaders copy Harvard by trying to be the best possible in everything—to be the most prestigious and to offer students a bewildering variety of major fields of study.[37] This instinct probably has its roots in the rationale for founding state-sponsored universities. State schools were obliged to offer something for everyone because most students lacked the resources, qualifications, and contacts to be admitted to elite eastern universities.

Yet this has created some significant costs. The next section reviews a case history of a network of manufacturing plants operated by Michigan Manufacturing Corporation.[38] The purpose of this case study is to introduce the cost of complexity as a driver of overhead costs and product quality problems—which are a major component of universities' total cost. What it will illustrate is that single-digit percentage cost improvement is possible without changing the university model. But cost reductions of 50 percent or more are only achievable through the creation of fundamentally focused university business models.

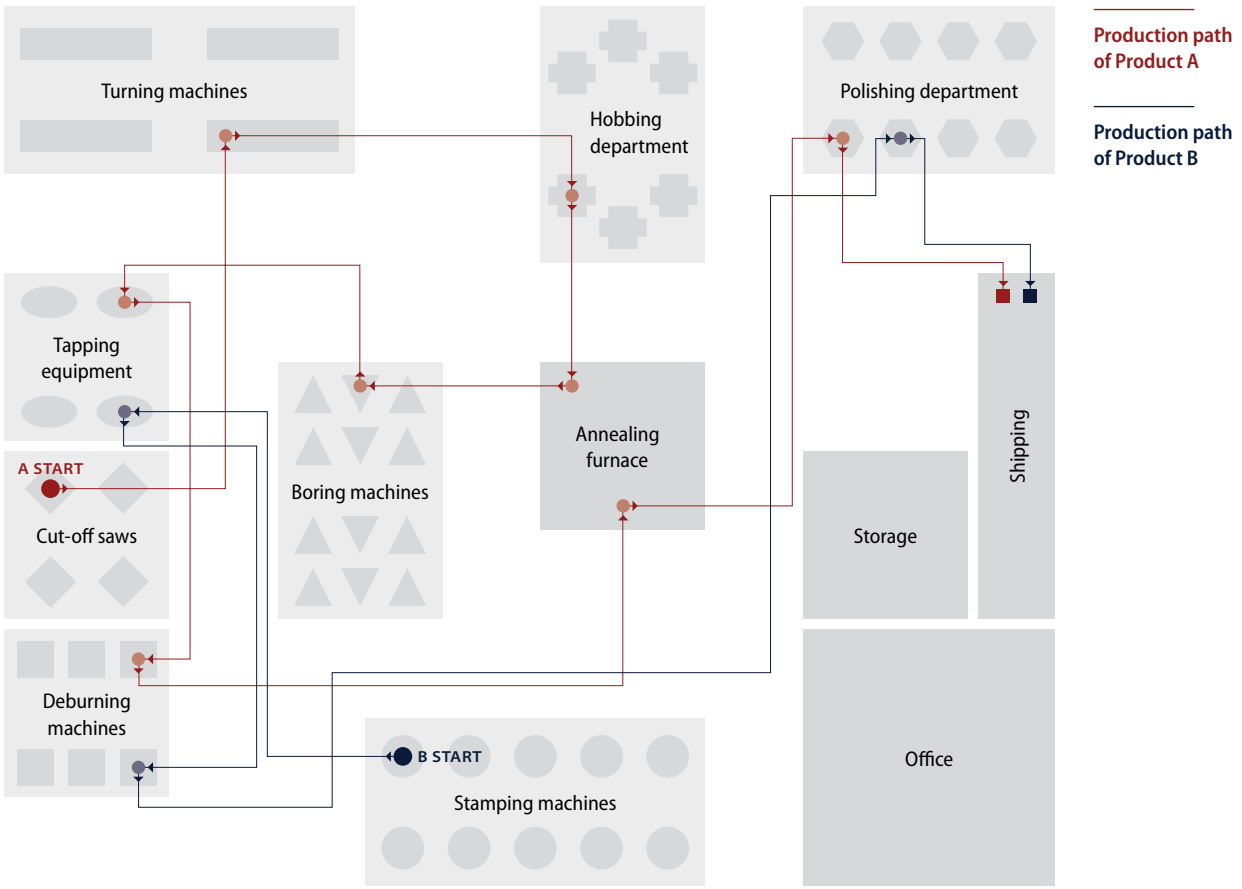
The organization of Michigan Manufacturing Corporation's plants

Michigan Manufacturing Corporation manufactured axles and gearboxes for automobiles and trucks in a network of nine plants in the midwestern United States. The setting of the case is MMC's plant in Pontiac, Michigan.[39] Plant man-

ager Noelle Allen had just ushered an accounting team from corporate headquarters out the door after they had served notice that they were going to close the plant and begin making its products in lower-cost factories in the system because the costs of the Pontiac plant were so high and the quality levels were so low. The Pontiac plant incurred $6.20 of overhead costs for every dollar spent in direct manufacturing cost. This ratio of 6.2, termed the "burden rate," was the highest of any plant in the system. The lowest-cost plant, in Maysville, Ohio, sported a burden rate of only 2.2. And about 15 percent of all products made in the Pontiac plant needed some form of repair or rework before they could be shipped. Allen knew that her costs were high and that the plant had quality problems. But she couldn't see overhead cost anywhere. They had stopped landscaping the plant long ago. It hadn't been painted in 20 years, and they had replaced the receptionist in the lobby with a telephone and plant directory.

FIGURE 10

A schematic layout of the Pontiac plant of Michigan Manufacturing Corporation



The plant's manufacturing area was organized by type of manufacturing equipment, as mapped in Figure 10. The cut-off machines were grouped in one department, stamping machines in another, and so on. Each type of machine had its own department. This departmental organization gave the Pontiac plant several advantages, including that the departmental layout was consummately flexible—it was capable of producing any product. When a customer brought the drawing of a new axle to be manufactured, the manufacturing engineer studied the part drawings and then determined the sequence of operations that would need to be done to make it.

Figure 10 depicts that the design of axle A, for example, required a path through the factory shown by the dashed line. It began at the cut-off saw and continued through several steps until it passed through a polishing machine, after which the axle was ready to be shipped. Product B, a simpler bracket, needed fewer operations before it got shipped. Really complicated products could be routed through the same department multiple times. The beauty of this plant layout was that it was capable of manufacturing any part for any customer.

Allen arranged a visit to MMC's Maysville plant, eager to understand how its managers achieved such low levels of overhead cost and with just a fraction of 1 percent of the products it made having quality problems. Allen was surprised to see overhead cost everywhere. The plant sat in a beautifully landscaped campus. But when Allen went into the manufacturing portion of the plant, it was not laid out like Pontiac at all. She learned that the corporation had lifted the two highest volume pathways, or sequences of manufacturing operations, out of the Pontiac plant 15 years earlier. They had carefully carried those two snakelike sequences to Maysville and stretched them into two straight lines. The value proposition of the Maysville plant was fundamentally different from Pontiac's. Rather than make any product for anybody, Maysville's proposition was: "We will not make any product for anybody. But if you are willing to design your product so that it can be manufactured in one of these two sequences of operations, we will make it at very low costs, very consistently."

After learning that Maysville had only two pathways that products could follow, Allen calculated that the Pontiac plant had 20 distinctly different pathways that products were following through the plant at that time. She and her staff subsequently visited each of the plants in the MMC system and measured their number of active product pathways. They fell between the extremes of Pontiac and Maysville. Allen's analysis revealed that there were economies of scale in the

system. Overhead costs declined by 15 percent every time the plant doubled in size. But these economies could be offset by a countervailing cost of complexity. Overhead costs per unit increased 30 percent every time the number of pathways that products were taking through a plant doubled (from one to two; two to four; four to eight; etc.).

The reason why the Pontiac plant had such high costs was not inefficiency. Its overheads were inherent to the value proposition of the factory, which was to make any product for anybody. Coordinating 20 different serpentine pathways through the plant required lots of administrative oversight and planning. Things got lost easily. Mistakes and re-work were common because workers couldn't get in a standard "rhythm" of work. Bottlenecks would arise unpredictably when the same machine was needed at the same time by products whose pathways intersected at that point.

The Maysville and Pontiac plants comprised fundamentally different business models that were rooted in different value propositions. Maysville had a value-adding process business model. Pontiac's looked a lot like that of a solution shop. The two plants had different sets of resources to deliver on those value propositions, as well as different types of employees, and different types of machines. Their processes were different. The products in Pontiac each had unique paths that required a lot of overhead to manage the complexity. The products in Maysville moved rhythmically along two dedicated production lines. And the markup required to cover overhead in the two plants—their profit formulae—were different as a consequence. It was not a story of a good value proposition vs. a bad one. They were just different. Both plants were quite efficient in delivering upon very different missions.[40]

The value proposition and the organizational structure of traditional universities

Traditional universities are organized in departments, just like the Pontiac plant—for exactly the same reasons. This structure optimizes faculty members' ability to interact around similar interests and to publish in refereed academic journals. Students are routed from one academic department to the next to take courses, depending on their interests and needs. The fact that a good university has one of everything means that its faculty can serve the interests of a broad range of students. Many universities even allow students to design their own major if they cannot find a topic that suits their fancy.

Few universities calculate the "direct labor content" of the services they provide. They don't have a measured "burden rate" at their fingertips that summarizes the portion of total costs incurred in directly teaching students and conducting research compared to the complexity-driven overhead required to manage the number of pathways that students might take between admission and graduation. This calculation is particularly difficult because the "direct labor" in a university (faculty) spend a significant portion of their time in Pontiac-esque overhead activities such as scheduling, expediting, repair and re-work, record keeping; and moving, storing, and retrieving things and people. Our best guess is that the overhead burden rate in conventional universities is between 4.0 and 5.0.[41] In other words, universities spend four to five dollars on overhead for every dollar spent in teaching, assessment, and research.

The contrast between the business models of the Pontiac and Maysville plants helps explain the anomaly highlighted at the beginning of this section. Traditional universities trying to emulate the prestige of Harvard are structured like the Pontiac plant in order to optimize the "solution shop" activities of their faculty. The value-added process activities of teaching students are sub-optimally force-fit into this structure.

Low-cost—meaning the amount the university spends per student, which is different from low-tuition or low-price—schools such as Laureate's Walden University and Apollo Group's University of Phoenix are structured like the Maysville plant. They are not structured as solution shops to optimize the ability of faculty to publish, but rather as value-adding process organizations, structured to optimize the flow of students through the university. The impact of this simplicity is stunning. A typical traditional university incurs operating deficits of 10 percent of revenues, even while Laureate and Apollo both report operating profit as a percentage of sales to be roughly 30 percent. The cost advantage of these disruptive low-cost universities, in other words, is more than 40 percent even as they often charge roughly the same tuition as those four-year traditional universities.

The quality of low-cost universities

There are three counterpoints to conventional universities' efforts to disparage the "quality" of education offered by these low-cost disruptors. First, the very definition of quality changes from the consumer's perspective as waves of disruptive decentralization sweep through an industry. Low-cost universities indeed merit

disparagement from the point of view of faculty in traditional universities (who are a key constituent group and in one sense are customers) because their faculties conduct little research that is published in academic journals. Yet students tend to define quality in terms of convenience and cost—including opportunity costs. For-profit universities and other online disruptors have, for the most part, not competed on the basis of having lower tuition. Indeed, many actually have higher tuition prices than state-supported schools, which are subsidized so as to appear to be lower cost.[42] Students are instead pleased that low-cost universities offer courses any time of the day or night, at any time of year—even as the traditional universities disparage it.

The second counter-point relates to the job that students hire their universities to do. The job that many 18-year-old high school graduates hire a university to do is in some ways to provide an out-of-home transition to independent adulthood. Learning and receiving a degree from a prestigious institution are but dimensions of this core job. Yet the job that students typically hire low-cost universities to do is laser focused: Help me get better employment. The students that hire these universities are different as a result. The average age of students at the University of Phoenix is 36, about two-thirds are female, and half are drawn from racial minorities.[43]

The third point about the quality of low-cost universities is that online learning technologies now constitute an upwardly scalable engine in the arsenals of low-cost universities. The computer industry again serves as an example here. As the computer industry transitioned through sequential steps of disruption to lower-cost, more accessible machines, the central job that customers hired these computers to do was different in each of the broader market circles. When the technology was only able to do the job of the new circle and not the job in a prior circle, the markets existed separately. But when the disruptive technology had improved to the point that it did the new job and the prior job well enough, customers were quickly drawn into the outer next ring.

This suggests that the low-cost universities will figure out how to do the "transition to independent adulthood" job better and better over time. In fact the physical infrastructure likely already exists for them to grow into this job given that they already operate full campuses across the country.

Actions for policymakers and traditional universities

Society has been quite willing to allow the disrupted companies to fail in most industries where disruption has occurred. Control Data, Burroughs, NCR, Sperry Univac, Digital Equipment, Prime Computer, and Wang are all computer companies that were disrupted and ultimately failed in the computer business after having had some period of success. Nortel is gone, as is Polaroid for all intents and purposes. General Motors went through bankruptcy, and so on.

Yet it does not appear that society will tolerate the widespread collapse of the traditional universities that presently face financial crisis. We hope that the concepts in this paper will help leaders of these universities as well as policymakers formulate more permanent solutions than just relying upon increased fundraising or increased tuition to postpone the day of reckoning associated with business models that are vulnerable to disruption.

Decisions by state and federal officials

The evolution of institutions is best managed at the corporate level rather than the business unit level because business units are not organized to evolve, as discussed above. Elected state officials and boards of higher education, as well as federal officials—hereafter called "officials"—are therefore vitally important decision makers in the response to this crisis. They must honestly ask and answer two crucial questions.

The first is this: is the traditional universities' business model sustainable? These institutions have not historically been disruptable. Traditional universities have therefore competed only on a sustaining-innovation basis, which has inherently entailed increasing their tuition at 10 percent per year, year over year, in nominal terms if they were to remain competitive. They have not been forced to pass this full cost on to students because the country has been able to subsidize tuition through alumni donations, earnings from endowment investments, and govern-

ment funding. But it is unclear whether this can continue in the future—especially in the face of evidence that online education represents an upwardly scalable disruptive technology. We believe that there are few traditional universities that can answer yes to this question.

The second question that officials must ask is whether their primary stewardship is to facilitate the best possible postsecondary education and training for the people in their state or whether they are appointed to be the caretakers of the specific institutions that have historically provided higher education. This was historically not an either-or question, but now it is. If officials frame their responsibility in terms of the people in their states, then Kaplan, Walden, Phoenix, DeVry, and Western Governors must be viewed as powerful allies in the fight to provide more effective higher education and training. If officials view their charge as one of ensuring the health of today's institutions of higher learning, then these low-cost universities must be framed as competitors and enemies.

We believe that officials are responsible for training and educating the people they have been elected and appointed to serve, rather than acting as custodians of institutions. If that is correct, then officials need to begin viewing the for-profit universities and other disruptors as part of their portfolio of educational institutions, alongside the public and not-for-profit colleges and universities in their system. These are institutions that, after all, enroll more than 2 million students, are increasing enrollment by 30 percent every year, and provide education that students and employers seem to value highly at 40 percent lower cost—in terms of spending per student—than traditional universities. They are at present wildly profitable because of the pricing umbrella that their high-cost competitors hold over them along with several policies that have helped to create a price floor, below which there is little incentive to price their offerings. They are not benign curiosities. Many policy principles flow from these observations.

Allow low-cost disruptions to gain share

Policymakers must first address higher-education budget constraints by helping low-cost disruptive universities—public and private—gain market share by eliminating barriers and partnering with them to grow enrollments and capability. These partnerships should foster new models of higher education in autonomous business units separate from the existing institutions.

This is what Indiana Governor Mitch Daniels did recently when he signed an executive order creating WGU Indiana, which is Indiana's eighth state university as well as a new branch of Western Governors University. The move is in effect a white labeling—Western Governors will produce and manage the university, which will be branded as a state university. It is a perfect example of managing the disruption at "the corporate level," or at the level of the state system of higher education rather than at the level of individual institutions in Indiana. This expansion of Indiana's state education system will come at no extra cost to the state either, as WGU Indiana does not need state funding like the other colleges because it is self-sustaining on tuition alone.

Students will be able to use state financial aid for tuition at WGU Indiana, which is about $6,000 a year. With no additional state subsidies, that's truly a low-cost degree. WGU Indiana will also initially help adults—nonconsumers of traditional universities—earn degrees at their own pace and on their own schedule, in classic disruptive fashion. Another aspect of the arrangement also helps to frame the role that foundations may usefully play in making quality higher education affordable, as the startup costs for Western Governors were funded through grants from the Lumina Foundation for Education, the Bill & Melinda Gates Foundation, and the Lilly Endowment.[44]

Encourage the move toward competency-based and next-generation learning models

Western Governors University helps to suggest another role for policymakers—or at the very least actions not to take. Western Governors University awards degrees based on competency, rather than because students sat through a certain number of hours of classes and did not fail. Students are therefore able to move at their own pace, and instead of being charged by the credit hour, they are charged a flat rate for a six-month term. The student progresses when he or she demonstrates mastery of a skill or a set of knowledge.

Western Governors is certainly not unique—there are several institutions that have done something similar before both Western Governors and online learning existed. But this flexibility is something for which online learning is particularly well suited, and it has significant educational advantages. Time is fixed by credit hour or semester in most schools with traditional in-class, teacher-led instruction. Student learning is therefore highly variable, as not all students learn at the same pace.

Yet time is naturally a variable in most online learning programs. Students can learn when it is convenient for them and at the pace that is right for them. The learning can therefore be constant, so that students only progress once they have fully understood a set of concepts or a given unit. Actionable assessments can be easily embedded in online learning courses and allow students to accelerate past concepts and skills they understand and have mastered and instead focus their time where they most need help at the level most appropriate for them. Many of the conventional ways of measuring education do not apply to this disruptive innovation as a result because they tend to focus on inputs such as seat time, dollars spent per student (thereby rewarding those institutions that cost more), and student-teacher ratios. Policy efforts, such as regulation that the Department of Education is considering currently, that intentionally or unintentionally lock in the credit hour as the unit of measure based on seat time, for example, hold back the innovation in some significant ways to the detriment of students.[45] Few online universities beyond Western Governors currently take advantage of the inherent time variable-learning constant nature of the medium.

Moving beyond measuring degree attainment

This points to another policy challenge that is counterintuitive on its surface. Many—from both political parties and from many sectors of society—have framed the principal domestic challenge in higher education as restoring the United States to its former place atop all countries in higher education attainment as measured by degrees. The Lumina Foundation's goal for example is to increase the percentage of Americans who hold high-quality degrees, credentials, and certificates to 60 percent by 2025.

Yet only focusing on degree or credential attainment will not get the country—or its citizens—to where it needs to go in and of itself. This focuses policy on the wrong goal. Having more students merely holding higher education degrees does not guarantee that there will be jobs for them or that there will be more economic growth. One need only look at China for evidence. The country has done a remarkable job of increasing its population's higher education attainment with the result that the "marginal graduates" of colleges and universities have a tough time finding jobs.[46]

There are, of course, many countries where job opportunities have expanded as its citizens have obtained more degrees, but the reality is that a degree is an artificial measurement in and of itself. Higher education has used this metric in the past

because it is easily quantifiable and because the institution of higher education and the academy is structured around it. Employers have used attainment of a degree in hiring as a macro-branding signal to connote that someone likely had attained a certain set of skills.[47] But a degree does not convey or mean that one has attained the specific skills or knowledge needed to do a given job. This is evidenced both by the amount of retraining employers do as well as the paradoxically large number of domestic job openings in spite of large numbers of unemployed people with degrees in the country.[48] Focusing policy just around the pursuit of degree attainment creates a significant risk of accomplishing this goal with the outcome being a deflation in the value of a postsecondary credential. This in turn would only cause people to put more value on advanced degrees—and thereby cause individuals to waste money and time that they need not spend in their pursuit.

Western Governors University shows that online learning offers a natural medium to move toward focusing on competency-based measures around what one is actually able to do, about which employers and society at large are actually concerned. People do not go to college to attain a degree per se; receiving the degree is often just part of the experience they need to fulfill their job and signal completion. Some students might not need many of the courses required when they enroll in a credential-granting program at a university like the University of Phoenix. They often want better employment and acquiring a specific skill from a specific class may accomplish that for them. Completing the certificate itself has little value once they have completed that course. If they attained the skill and the University of Phoenix helped them do so without earning the degree, should we judge either the worse for it?

Shifting toward recognizing mastery of specific competencies where time is variable could even open up a path toward the recognition of lifelong learning, whereby people accumulate expertise over time through both formal and informal means. There are ways to measure that such that employers—in the governmental, not-for-profit, and for-profit realms—can see that a given prospective employee possesses the skill set to do what needs doing.[49]

The accreditation "barrier"

Many have framed accrediting agencies as one of the most significant barriers that prevent innovation from occurring in higher education. Accreditation plays a significant role in higher education today. Universities that are not accredited do not have

access to financial aid funding from the government. And accreditation is seen as a stamp of quality—such that if a university is not accredited, the assumption is often that there is something subpar about it. And sometimes that is indeed the case.

Yet the accrediting agencies are currently made up of the members of accredited universities—so it is a self-policing organization that often appears to be preserving its members and keeping outsiders that operate differently out of the "club," which bars innovative educational institutions from gaining legitimacy.

And yet several nontraditional universities have gained accreditation and innovated in different ways. Recall how disruption takes place in highly regulated industries. The disruptors almost never attack the incumbents and regulations head on. The successful disruptions have started by going around and outside of the reach of the regulations and avoiding head-on attacks. The disruptive innovators in higher education have been no exception.

Consider the case of Concord Law School, an online law school owned by Kaplan University. Concord was established in 1998 and is not an American Bar Association-approved law school although it did gain initial accreditation from the Accrediting Commission of the Distance Education and Training Council in 2000.[50] This means that its students are not eligible for admission to the bar in some states. And yet it has grown and thrived.

Concord initially targeted people—generally adults (the average age of a Concord student today is 43)—whose goal was not necessarily to practice law, but to gain the legal education. An online law school was great for these students because of its convenience, as they could tailor it to their existing schedule. Concord's first students sat for the California Bar Exam in 2003, and an increasing number of states have recognized their graduates as eligible for admission to the Bar as its graduates have proven themselves over time. Concord now serves roughly 1,500 students—up from 33 at its inception. And it became regionally accredited in 2007 through its merger with Kaplan, which made it eligible for the federal financial aid program. Other for-profit universities have gained accreditation through acquisition. They acquire not-for-profit universities that already have accreditation, which allows them to bypass the initial accrediting process and gain access to government dollars.[51]

Fighting political fights with accreditation agencies that represent the incumbent organizations is unlikely to be a productive use of political capital. It will likely be more fruitful for disruptive institutions to find pathways around the accreditation and other regulations—so that there are more ways of forging innovative

programs like Concord and Western Governors. The government can aid in this through a mechanism we discuss below—and in so doing, further address the crux of the question that has lingered throughout this paper.

Encourage disruptions to provide more value at lower cost

The dominant thrust of higher education policy for over half a century now has been toward allowing more people to afford a higher education that is accredited. This has resulted in Pell grants and other financial aid programs, subsidies, and access to low-interest student loans, among other policies. But allowing students to afford what is an unaffordable education is no longer a viable proposition because the country's traditional institutions of higher education, as well as the country itself, are under such heavy financial duress and only serving a very limited slice of the population.

Policymakers must shift their focus from how to enable more students to afford higher education, to how we can make a quality postsecondary education that delivers on a student's given job affordable—for which disruption is the answer.

A significant problem with current federal policies is that the all-or-nothing access to federal funds for institutions does not compel students to make rational quality-cost trade-offs. It is no easier for students to get loans to colleges that offer a stellar return on investment than it is to get them for colleges that offer a poor one. And policy has mostly focused on the supply side of the equation and ignored the demand side. Nailing users' jobs to be done on the demand side is what ultimately drives innovation.

Policy must change accordingly to encourage disruptive innovations and push them to be high quality and compete on price—which they largely do not do today—by influencing both the supply and demand sides. Rather than directly confronting existing organizations, federal policy could open up another way to its dollars other than accreditation—first through access to a new set of funds based on measures of quality and student satisfaction relative to cost, and later as an alternative path to the mainstream Title IV funds if this new path has proven itself effective without unintended consequences. The better a school performs on these measure compared to its peers, the more of its educational operation it could finance with federal aid—thereby eliminating the all-or-nothing access to federal dollars and encouraging students to make decisions based on quality and cost, which would drive institutions to innovate.

FIGURE 11

A new formula for accessing Title IV funds

Quality-Value Index Formula* = 90-Day Hire Rate + Change in Salary/Total Revenue per Conferral + Retrospective Student Satisfaction + Cohort Repayment Rate

* Each factor is normalized and measured relative to the average

The government could add together four measures to create this metric—an institution's Quality-Value Index (see Figure 11).[52] The first measure is whether the institution helps a student get where he or she wants to go—its job-placement or school-placement rate. The second is how much the students' earnings increase over some amount of time upon leaving the institution relative to the total revenue the institution received from all sources. The third is whether alumni would choose to repeat the experience. And the fourth measure is whether students are able to repay their loans—the institution's cohort default rate? If this measure is used, default rates should be indexed to credit scores or a similar measure upon matriculation, or else institutions would retreat from serving students who are the least well-off and need education the most.

This formula changes a college's access to funds from an all-or-nothing game, as it is now, to a sliding one based on how well it does on the QV Index. There are several advantages to a system like this. Students would feel the pressure to make smarter investment decisions in their education based on the historical quality of that investment because it would be easier to receive financing for schools that offer higher value. This would also be more effective than some of the policy proposals to create "shaming" lists that name poor quality institutions. And it is a departure from the current system in which an institution either clears a bar or does not—and therefore there is no pressure on the demand side for all of those institutions that clear the bar, which cannot be too high in the current system or it just eliminates access for many.

TABLE 4

Sample model: Percentage of revenue each university can receive based on QV ranking

QV ranking	Percent of revenue that can be drawn from Title IV
Top 25 percent	100 percent
50-75th Percentile	90 percent
25-50th Percentile	75 percent
0-25 percent	50 percent

Table 4 shows a sample of a potential sliding scale to determine how much an institution can finance its operations through federal Title IV funds. The ranking system, which is based on how an institution does relative to the others rather than an absolute number, is important because it will keep institutions competing to improve and jump into (or remain in) higher tiers.

The components of the QV Index itself are all based on the idea that the fundamental job for which students hire postsecondary education is to improve their futures. The government could change the weighting between the different components over time in the political process, but the fundamental equation would stay aligned on this job.

The first component—the 90-day placement rate upon a student's departure—is reasonably self-explanatory. If institutions are serving their clients well and placing them in line for the next step in their lives—no matter what that may be—there should be a clear connection here.

The second element is vital— a student's change in salary upon leaving an institution over some amount of time divided by the revenue per student or the total cost, which includes tuition, alumni gifts, financial aid, endowment payments, other subsidies. This serves as an incentive for institutions to offer an education that is affordable—not an education that we have just allowed people to afford regardless of true cost. There is currently little incentive to be lower cost in the market because of the ready access to the dollars regardless of price. Of course, paying more for that may make sense if an institution markedly increases one's salary or earning power over the longer term upon leaving. But this would end the up-market incentives that push institutions to be more costly and thus rise higher in the *U.S. News & World Report* rankings. Students should be able to make good money because of—and relative to the cost of—the investment.

The third element—one's retrospective satisfaction rating—would be based on answering the following question on a 10-point scale: "Knowing what you know now, would you choose to repeat your experience at X university?" The purpose of this is twofold. It corrects for the student that is not attending college to get the highest paying job and instead wants to work for a lower paying job—say in the not-for-profit sector—and believes it is worth paying more for that particular experience. It also judges whether students enjoy the experience while they are in attendance.

The fourth element is one that already receives significant attention in policy debates—the cohort default rate. This is another measure that asks whether people can afford the debt they have to incur to take what the university is offering.

This has significant advantages over measuring the quality of postsecondary institutions in tightly managed prescriptive ways—by creating assessments to measure learning and competencies for example—because students attend postsecondary institutions to gain a myriad of skills from culinary to academic. The various niche needs of society and the workforce are also always evolving. The overriding incentive here for students from this is to choose schools that are likely to deliver a lot of value at low cost because that's where the money is. And schools looking to take advantage of financial aid will have to innovate to improve outcomes relative to costs. Their incentives will be to:

- Target a student population they can serve uniquely
- Create new business models that don't push students out unless those students can pursue their goals better outside the system
- Deliver what the students need—whether that is good learning, connections, or something else
- More affordably serve students
- Make students happy
- Connect students to what they want

Both the not-for-profit and for-profit incumbents have been successful so far at warding off policies that seek to regulate quality. What the analysis from framing this through the disruptive innovation lens suggests is that perhaps this is not a battle that has to be fought on either side at the moment. Instead of managing the outcomes that we do not want to see, the goal of policy should be to unleash innovation by setting the conditions for good actors that improve access, quality, and value —be they for-profit, nonprofit, or public—to succeed. And if those institutions deliver, the landscape will shift over time, as it has in every other highly regulated market that was disrupted—especially if policymakers help to allow them to gain share and political power.

Actions by traditional university leaders

And what of the traditional universities—institutions that have marked the American education landscape for over a century and hold much in our collective nostalgia? We would be remiss in not addressing here what their leaders can

and should do. We are deeply sorry that we cannot offer a tried-and-true method for the nonelite public research universities to address their dilemma. We are not aware of a single instance in which a business unit has disrupted itself.

We offer, however, the below guidelines for those public universities that must do what has not yet been done. Most nonelite private universities will have to seize the power of disruption by creating autonomous business units, just as IBM did. And the top institutions in the American college landscape—Harvard, Yale, Stanford, and so forth—will likely be able to move forward as they always have. As elite institutions that allow their students to enter into an elite network, their highly selective admissions processes and elite brands are key attributes. Elite brands that compete not on volume but by charging high prices and remaining elite are not disruptable by their very nature. That said, they could certainly contribute further to educating far more students than they do today and recognizing that education with credit were they to choose to do so through autonomous business models and different brands themselves.

Apply the correct business model for the task

For traditional universities, the cost is in the overhead, which is high because of the complexity inherent to their business models—specifically the pervasive practice of using a solution shop organizational structure for teaching students. A key to the cost position of universities like Phoenix and Walden is that they are organized to optimize the flow of students through the school, rather than being organized to optimize faculty's ability to do their research. Brigham Young University-Idaho, which began its existence as a conventionally structured college, is in the midst of a dramatic restructuring to optimize the flow of students through the institution, as well by focusing on one value proposition.

The presumption of the business model innovators mentioned in the prior paragraph is that the business models of teaching and research are so different that the organization must choose one or the other. We know of only one institution—the Harvard Business School—that has successfully achieved international renown for excellence in teaching and research. Its MBA program is structured autonomously to optimize the flow of students through that program. Faculty research is organized in a solution shop manner. Administrative responsibilities for the two activities are kept separate, although individual faculty members participate in both enterprises. The vast majority of universities that try to carry on the work of both business models within the same administrative structure are mediocre and high cost at both.

Some institutions creating autonomous business models themselves, just as IBM did, will make it so that the overall university can survive even though the existing business unit may be disrupted. This path is certainly fraught with difficulty, but this is the only way that many universities will have a chance. Tiffin University, a nonprofit university in Ohio, for example, created an autonomous joint venture university called Ivy Bridge with a for-profit company, Altius. A few others have followed similar paths. It is unclear how these efforts will turn out. Universities that are able to leverage existing online courses—their existing fixed resources in effect—and utilize them in autonomous business models with very different processes and a very different revenue formula could very well have their own significant cost advantage over the current wave of disruptive low-cost institutions.

Develop a strategy of focus

The major category of costs in traditional universities is overhead costs, which are a function of the complexity created by the missions that most conventional universities have chosen for themselves. They aspire to become excellent in every field of research and instruction and to provide any course of study that any student might want. The beginning of a permanent solution for almost all universities is that they must choose in what area they will be excellent. It is only through focus that these institutions can reduce complexity. And it is only by reducing complexity that they can substantially reduce costs. Laying off faculty or administrative staff across the board or freezing employee salaries while leaving the basic mission and structure of the institutions unchanged is akin to straightening the deck chairs on the Titanic. It will not solve the problem of economic viability in the short run or the longer run—and it may very well drive quality faculty out and exacerbate and accelerate the institutions' demise. Universities that have chosen this course appear to have held down price increases below the 10 percent year over year nominal increase, but they are in fact simply not keeping up with the competition as it is currently structured.

Only a very few will be able to compete effectively in the broad-spectrum research game against the likes of Harvard, Stanford, MIT, and U.C. Berkeley. Others will need to focus on fields of research in which they can excel. And there is great opportunity for schools that seek to become the best teaching universities in America.

Frame online learning as a sustaining innovation for the job to be done

Established institutions succeed predictably only at sustaining innovations, and so administrators in conventional universities need to frame online learning as a sustaining innovation that helps students do the job that they hired the university to do. They need to essentially use it to disrupt the traditional classroom experience.[53] Indeed, this is what the North Carolina Community College has in effect been doing even in the absence of a deliberate strategy. And BYU-Idaho has adopted this approach as a deliberate strategy by leveraging its existing resources to offer online courses at a marginal cost, which has in turn allowed them to grow significantly.

Framing the structure of markets by the different jobs that customers hire a product to do instead of by product category quite often makes cows that formerly had been sacred become expendable, and vice versa. In-person teaching is one such sacred cow. Online learning would be fought and disparaged if students wanted only to sit at the feet of learned professors and absorb everything that could be learned from them. But if a large number of 18-year-old high school graduates do indeed hire college to facilitate their transition to independent adulthood, it is very possible that they would view online learning as a higher-quality experience than traditional teacher-in-the-classroom instruction.

Online learning is frequently disparaged because it is often asynchronous, and it is often done at a distance. This is a smokescreen. Distance learning was alive and well in 1970 when Clayton Christensen was seated with 200 other students in the 45th row of the massive Joseph Smith Auditorium at Brigham Young University in History 170, a general education course that he had to take for his social studies requirement. The teacher was never aware of Clay's presence or absence because everything was "distance" beyond the fifth row. And the process was asynchronous: Clay was asleep while the teacher was lecturing and the teacher was asleep when Clay was reading the textbook. Asynchronous, distance learning is nothing new.

Especially where online learning is pitted in competition against graduate assistants in lecture halls, many students will accept online learning as a better, faster, more engaging way to get the job done.

Working with and having fun with friends is an important experience associated with the job of making the transition to independent adulthood, and so another important sustaining innovation with great potential to reduce cost is to build opportunities for students to teach each other into the structure of students' pathways through college. Peer-to-peer teaching is not employing student teaching assistants to clarify issues that the professor did not teach clearly enough. It entails requiring students to be the primary teachers of the material. The reason we learn material much more deeply when we teach rather than when we listen to someone teach us is that in order to teach the material, we need to format it to fit our own experiences and cognitive abilities.[54] Peer-to-peer teaching is a sustaining innovation relative to the students' job to be done—even though it shakes many faculty members' beliefs about how learning occurs.

Conclusion

This report has not sought to study higher education to reach conclusions about higher education. Rather, it has been to treat the industry's challenges, at their core, as problems of managing innovation effectively. We therefore examine the industry through the lenses of the theories that have emerged from research on innovation.

Higher education has seen incredible cost inflation in recent years, which is reflected in the 10 percent annual rate of inflation of tuition in nominal terms. This is the perfectly natural result of head-on competition in the plane of sustaining innovation. Disruption hasn't historically been possible in higher education because there hasn't been an upwardly scalable technology driver available. Yet online learning changes this. Disruption is usually underway when the leading companies in an industry are in financial crisis, even while entrants at the "low end" of the industry are growing rapidly and profitably. This is currently underway in higher education.

This report is meant to give policymakers as well as the administrators and trustees of traditional universities a language and a way of framing the problem so that they can formulate and implement viable strategies for staying strong in the future.

Endnotes

1 I. Elaine Allen and Jeff Seaman, "Class Differences: Online Education in the United States" (Newburyport, MA,The Sloan Consortium, 2010) p. 8.

2 See for example Dr. Ira S. Wolfe, "Small Businesses Struggle to Find Skilled Workers," The Perfect Labor Storm 2.0, August 31, 2010, available at http://hrblog.typepad.com/perfect_labor_storm/2010/08/small-businesses-struggle-to-find-skilled-workers.html, which has links to many stories documenting the paradox. A different take can be found in a *Slate* piece. See Daniel Gross, "Is Any Job Better Than No Job?" *Slate*, August 9, 2010, available at http://www.slate.com/id/2263335/. Many stories abound that counter its points, however, and paint the same paradox, including for example, Dana Hunsinger, "Even in this economy, some jobs are in demand: 22% of employers can't find right person for certain positions," *The Indianapolis Star*, September 6, 2010, available at http://www.indystar.com/article/20100906/BUSINESS/9060322/Even-in-this-economy-some-jobs-are-in-demand.

3 See *U.S. News & World Report*, "World's Best Universities: Top 400," February 25, 2010, available at http://www.usnews.com/articles/education/worlds-best-universities/2010/02/25/worlds-best-universities-top-400.html, for example. Also, see *The Economist*, "Declining by Degree," September 2, 2010, available at http://www.economist.com/node/16941775?story_id=16941775&fsrc=nlw|hig|09-02-2010|editors_highlights, in which it cites that 17 of the top 20 universities are American according to the Shanghai Ranking Consultancy and 35 of the top 50 are in the U.S. U.S. universities employ 70 percent of the living Nobel prizewinners in science and economics.

4 For example, "Rapid declines in STEM interest among U.S. born students and weakness compared to international STEM graduation have created a good deal of unused capacity in engineering and science programs at the graduate level. This has necessitated the importation of foreign students to populate graduate programs. Fully fifty five percent of engineering doctoral students in the U.S. are now foreign born (NAE, 2007 p. 35)." See Daniel Joseph Sturtevant, "America Disrupted: Dynamics of the Technical Capability Crisis" (Massachusetts Institute of Technology, 2008), p. 31. His work is citing NAE, *Rising Above The Gathering Storm: Energizing and Employing America for a Brighter Economic Future* (Washington, D.C.: The National Academies Press, 2007), p. 35.

Also see Clayton Christensen, Michael B. Horn, Curtis W. Johnson, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns* (New York: McGraw-Hill, 2008), pp. 5-6.

5 "Education at a Glance 2009: OECD Indicators," Organisation for Economic Co-operation and Development," available at http://www.oecd.org/document/24/0,3343,en_2649_39263238_43586328_1_1_1_37455,00.html, accessed August 16, 2010. For a quick interpretation of this report, see also The Quick and the Ed, Education Sector, "Education at a Glance: International Comparisons," September 10, 2009, available at http://www.quickanded.com/2009/09/education-at-a-glance-international-comparisons.html, accessed on August 16, 2010.

6 The great management guru Peter Drucker forecast these struggles over a decade ago. For example, Forbes quoted him as saying: "Thirty years from now the big university campuses will be relics. Universities won't survive. It's as large a change as when we first got the printed book. Do you realize that the cost of higher education has risen as fast as the cost of health care? And for the middle-class family, college education for their children is as much of a necessity as is medical care—without it the kids have no future. Such totally uncontrollable expenditures, without any visible improvement in either the content or the quality of education, means that the system is rapidly becoming untenable. Higher education is in deep crisis…It took more than 200 years (1440 to the late 1600s) for the printed book to create the modern school. It won't take nearly that long for the big change. … Already we are beginning to deliver more lectures and classes off campus via satellite or two-way video at a fraction of the cost. The college won't survive as a residential institution. Today's buildings are hopelessly unsuited and totally unneeded." Robert Lenzner and Stephen S. Johnson, "Seeing things as they really are," *Forbes*, March 10, 1997.

7 See the first endnote in Clayton M. Christensen, Jerome H. Grossman, Jason Hwang, *The Innovator's Prescription, A Disruptive Solution for Health Care* (New York: McGraw-Hill, 2009). The endnote reads: "According to the Kaiser Family Foundation and the Centers for Medicare and Medicaid Services, the average annual growth rate in national health expenditures was 9.8 percent in nominal terms between 1970 and 2005. The nominal growth rate of GDP was 7.4 percent over the same period. See Kaiser Family Foundation, "Health Care Costs: A Primer" (2007). For the purposes of this paper, we have converted the figure from a nominal one to a real one, after inflation.

8 Calculations based off of data from U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 2008* (U.S. Department of Education, 2009), Table 331. This cost increase includes the increases in tuition and fees and room and board rates for full-time students in degree-granting institutions. According to the website where this is posted, "For the 2007–08 academic year, annual prices for undergraduate tuition, room, and board were estimated to be $11,578 at public institutions and $29,915 at private institutions. Between 1997–98 and 2007–08, prices for undergraduate tuition, room, and board at public institutions rose by 30 percent, and prices at private institutions rose by 23 percent, after adjustment for inflation." See "Fast Facts," available at http://nces.ed.gov/fastfacts/display.asp?id=76, accessed July 29, 2010.

9 American Institute for Economic Research Economic Bulletin, Vol. L, January 2010.

10 Anya Kamenetz, *DIY U: Edupunks, Edupreneurs, and the Coming Transformation of Higher Education* (White River Junction, Vermont: Chelsea Green Publishing, 2010). In Chapter 3, Kamenetz discusses the financing of higher education in some detail. She notes that, "State subsidies per full-time-equivalent higher-education student hit a twenty-five-year low in 2005" such that even as—and likely in part because—Pell Grants and federal support of higher education has risen year after year, they have covered less and less of total tuition because of the university cost increases and the cost shifting at state universities. She quotes The Delta Cost Project as well: "Between 1995 and 2006 the dominant revenue pattern across public institutions was the growing dependence on tuitions as a primary source of revenue. … By 2006, students in public research universities were covering close to half of their educational costs, up from about 39 percent just four years earlier." See Jane Wellman and others, "Trends in College Spending: Where does the money come from? Where does it go?" (Washington, DC: Delta Cost Project, 2009), p. 26.

11 As Kamenetz writes: "For families, too, subsidies cushion tuition increases. According to the College Board, the average total charges at a public four-year university in 2009-10 were $15,213, but the average student at those colleges received $5,400 in grants and tax benefits, and some received far more. So net price was closer to $10,000. Between 1993 and 2004, aid increased so rapidly that the net price of college to the average student, after inflation, at a four-year public university actually fell slightly despite large annual tuition increases, although since 2004 it has climbed back up. Despite the dip, the overall growth in the cost of college has far outpaced the growth of federal subsidies for three decades." Kamenetz, *DIY U*, Chapter 3.

12 Christensen, Horn, and Johnson, *Disrupting Class*, p. 102.

13 Enrollments across all of higher education grew only 1.2 percent in both 2007 and 2008. I. Elaine Allen and Jeff Seaman, "Learning on Demand: Online Education in the United States, 2009" (Newburyport, MA, The Sloan Consortium, 2010) p. 5.

Also, as Kamenetz writes, "College-going continues to rise, but more slowly, and graduation rates have fallen slightly since the 1970s. Just 30 percent of young people today get a four-year college degree, and another 8 percent get a two-year degree or less, putting America now behind ten other countries." Kamenetz, *DIY U,* Ch. 1. Also see Michael Horn, "In Education, For-Profit Gets a Bad Rep," The Huffington Post, May 20, 2010, available at http://www.huffingtonpost.com/michael-horn/in-education-for-profit-g_b_583908.html.

14 It is worth noting here that several for-profit schools have recently come under scrutiny for various business practices that are afoul of government regulation. Furthermore, there are a few companies operating for-profit universities that have longer track records of legal violations. Although there may be a number of bad actors in the group, our intent here is not to endorse the bad behavior of some of the for-profit universities, but rather to call attention to the fact that they have identified a substantial need in the higher education market and, on average, have done a better job of targeting it than the majority of their not-for-profit peers. Some may object to our characterization of the for-profit schools generally doing a "better" job, but this is partly our point. Working adults generally do not enroll in these programs to get the best education they can get, but rather, they enroll to advance their career in the way that is least intrusive to their existing responsibilities. For many of these people, it essentially boils down to buying a credential that will allow them to get a raise. Ironically, many of our school systems perpetuate such a utilitarian view of higher education; we pay people more money because they have a master's or doctorate degree, even when they're remaining in the same job. Thus, teachers and administrators have an incentive to get graduate degrees, even when it won't affect the way they do their current job. And because it won't affect the way they do their job, they aren't particularly picky about what they are learning. To say that for-profit universities offer an inferior product is to miss the point. As far as their customers are concerned, an education that can be done online, on nights and weekends, and with a flexible schedule, is the most important measure of quality. We make a mistake when we tell these customers that they aren't wanting the right things given their circumstance.

In addition, there have been a slew of studies and reports that have emerged over the past couple of years that alternatively paint for-profit universities as either doing a far better job on average than are the not-for-profits in serving low-income students and seeing them graduate or engaging in deplorable recruiting and marketing practices that incentivize would-be students to enroll so as to gain access to loan dollars even when the students will have little chance of graduating. Whenever there is a disagreement of this nature—where there are reports on both sides showing virtues or negatives of one or the other side—it is likely that we have the wrong categorization scheme in use. Indeed, in part because of the way federal legislation governing institutions of higher education makes a distinction between these two categories, this heated debate has been framed incorrectly. The question is not one of for-profit versus not-for-profit, but instead who nails this job well. Just as there are some for-profits that do a wonderful job of this, there are some notable not-for-profits that do a wonderful job, too, but just as there are deplorable for-profits, there are also deplorable not-for-profits. On average for-profits have done a better job, but just because an institution is for-profit it does not follow that they will be better—just witness the egregious cases of abuse by for-profit universities that have been profiled in many media outlets.

15 At a recent presentation, an executive of Laureate Education, the world's largest operator of for-profit universities, announced that their revenues were growing at over 25 percent per year, and that their net profit after fully allocated costs was about 30 percent. Notes by Clayton M. Christensen. Indeed, over the last decade publicly traded for-profit universities have been bright spots on Wall Street. Between 2000 and 2003, they represented the highest-earning stocks of any industry and had two of the only successful IPOs in 2008 and early 2009. Kamenetz, *DIY U,* Ch. 3.

16 Allen and Seaman, "Learning on Demand: Online Education in the United States, 2009," p. 5.

17 For the full explanation of this phenomenon see both Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Boston: Harvard Business School Press, 1997) and Clayton M. Christensen and Michael E. Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth* (Boston: Harvard Business Press, 2003), Chapter 2.

18 In addition, as processes and priorities coalesce in not-for-profit organizations, just as in for-profit organizations, various groups often become entrenched in the organization's particular value network, and they strive naturally to expand and grow and preserve themselves. They therefore chase opportunities that have greater money.

19 See Christensen and Raynor, *The Innovator's Solution,* Chapter 2 for this and the account that follows about to the story of the minimills.

20 A few integrated steel companies have belatedly acquired minimills after entrant companies have built them.

21 Christensen and others, "The great disruption", *Foreign Affairs* 80 (2) (2001):80-95.

22 This chart is based upon Christensen's work in studying disruptive innovation in the computing markets. It suggests directionally and in terms of order of magnitude the market characteristics of the different computing segments expressed in the columns.

23 This section is taken from the authors' book Christensen*, Disrupting Class*, pp. 141-142.

24 Many cite Baumol's disease to explain this phenomenon. The basic notion is that labor-intensive industries struggle to accomplish more with fewer resources and therefore demand more and more to deliver the same product or service. Baumol famously invoked an analogy from a music performance, as he asked how one would improve the productivity of a string quartet playing Beethoven. Would you drop the second violin or ask the musicians to play the piece twice as fast? The Baumol analogy comes from the book authored by William J. Baumol and William G. Bowen, Performing Arts: The Economic Dilemma (Cambridge, Massachusetts: MIT Press, 1966).

25 Kamenetz, *DIY U,* Chapter 1.

26 We have chosen Utah because its system has relatively few institutions, and because its history typifies that of other states. The histories of most other states' systems of higher education would show the same pattern.

27 Indeed, as of late even community colleges in some locales have had to consider moving "up-market" and shedding their traditional "open door" admissions policy for budgetary reasons. See Caralee Adams, "Community Colleges Rethink 'Open Door' Admissions as Remedial Costs Rise," *Education Week*, August 13, 2010, available at http://blogs.edweek.org/edweek/college_bound/2010/08/chicago_considers_ending_community_college_open_admission.html?cmp=clp-edweek..Also, as the article suggests, remedial costs for students not prepared for college have become a larger share of the budget for many universities. And yet these are courses that professors tend not to like to teach and are not very profitable for the universities to offer. As a result, an increasing number of universities and colleges have in effect outsourced these courses to various online course providers, who in effect have started the disruption of "class" at these universities in ways that we discuss more at the end of the paper.

28 The predecessor institution to UVU was the Utah Technical College, Provo, which was established in the years following World War II. It was incorporated into Utah Valley community college in 1987.

29 Kamenetz, *DIY U,* Chapter 3. Kamenetz writes further that this means that "if a college wants to rise in the rankings, the logical thing to do is to raise tuition while accepting fewer applicants." This further solidifies that we typically do not evaluate or judge universities based on how well they teach and how well their students learn, but instead based on the intelligence of their entering students. Despite this Dartmouth President Jim Kim says he is aiming to reduce the cost the university spends on educating a student. "Kim said nonprofit organizations, including universities, are often run inefficiently. He isn't afraid to upset people to make changes, he said. 'When you're focused on social goals, it often seems to me that not only is poor execution tolerated, poor execution is celebrated,' Kim said. 'You wear your Birkenstocks, you've got your Guatemalan rags, you don't know what your budget is, you don't know what your outcomes are, you don't measure that stuff but, by golly, you're on the right side. The time for that is ended.' At Dartmouth, the goal is to reduce the cost of

educating a student by as much as 25 percent, to $75,000 from $100,000 a year, and creating a 'Dartmouth model' for efficiency that is "the envy of the educational world," Kim said.Oliver Staley, "Kim Rekindles Dartmouth Alumni Amid Austerity Protest," Bloomberg News, September 8, 2010.

30 Curtis Rising, a research associate for Christensen at the Harvard Business School, compiled this data through interviews and research on the websites of the different colleges (University of Utah, Utah State University, Weber State University, Southern Utah University, Snow College, Dixie State College, College of Eastern Utah, Utah Valley University, Salt Lake Community College, Utah College of Applied Technology.) Paul Shupe, a research analyst at the Utah System of Higher Education, furnished much of the data.

31 Bill Gates has commented several times on online learning as well. For example he has said that higher education needs to be less place based and that, "Five years from now on the web for free you'll be able to find the best lectures in the world. … It will be better than any single university." Not only will it grow then, but it will also improve, as all disruptive innovations do. MG Siegler, "Bill Gates: In Five Years The Best Education Will Come From The Web," TechCrunch, August 6, 2010, available at http://techcrunch.com/2010/08/06/bill-gates-education/.

32 Allen and Seaman, "Class Differences," p. 8. The authors note in the report that "the evidence for past years has shown little, if any, indication that this growth is slowing. Even with the very rosy enrollment numbers presented above, this year marks the first time that there is any evidence, albeit slight, that the time of unbridled growth may be ending." (p. 18). Our calculations suggest that this growth will continue, however.

33 We thank Bill Randall, the associate vice president for Learning Technology at the North Carolina Community College System, and his staff, including Wanda Barker, for bringing this to our attention. The supporting data for this can be found online here: http://oscmoodlereport.wordpress.com/supporting-documentation/ (accessed September 5, 2010).

34 In this paper we use the term "low-cost" universities to refer to institutions with business models that inherently entail less administrative and research overhead cost than traditional colleges and universities—regardless of whether the tuition they charge is similar to or less than tuition at conventional schools. Although many community colleges, for example, may be low price from the perspective of a student who is charged a certain amount in tuition, once you add in what they receive in government subsidies, they often in fact are a lot more costly than their tuition price would suggest. Similarly, prestigious universities tend to spend much more per student than what their tuition price is; contributions from alumni and the endowment make up the difference. We have concluded that categorizing institutions as for-profit and not-for-profit has salience only because of its tax implications. But all institutions need to generate from all sources a surplus of revenues over costs.

35 Even not-for-profits have business models. In their case, the last box may be more aptly titled "Revenue Formlua" rather than "Profit Formula"—as it is the funding they need to receive to support their organization in accomplishing its mission.

36 We are deeply indebted to our friend Øystein Fjeldstad of the Norwegian School of Management, who developed and taught us of this framework. Those interested in Fjeldstad's framework should also read Stabell, C.B., and Fjeldstad, Ø.D., "Configuring Value for Competitive Advantage: On Chains, Shops and Networks", *Strategic Management Journal* 19 (1998):413-437.

37 Indeed, Kevin Carey of Education Sector is quoted in Kamenetz's book as saying, "In the end, there is only one status ladder in higher education… Everyone wants to be Harvard." Kamenetz, *DIY U*, Chapter 3.

38 The real name of this company is disguised. See Michigan Manufacturing Corporation, Harvard Business School case study 9-694-051.

39 The plant is called the Pontiac plant because it is located in Pontiac, Michigan. It is not owned or operated by the Pontiac division of General Motors Corporation.

40 Toyota has become quite famous for its "mixed model" production capability – it can produce multiple product models on the same production line. While it in fact does have this flexibility, those lines cannot handle variation in the sequence of the production steps. In the language of the Michigan Manufacturing case, its production lines look like those in Mayville. If Toyota wanted to introduce variability in the sequence of manufacturing steps in order to produce a different product, it would need to pull those models off the main line when the sequence needed to vary; perform those operations on different equipment (or loop them back onto earlier pieces of equipment); and then re-insert them into the main flow. The more Toyota attempted to introduce variety in the sequence of production steps, the more its plant architecture would come to resemble that of the Pontiac Plant.

41 This range is directional and is estimated from observations of the costs and structure at Harvard University and other universities, as well as from the use of the overhead burden rate in a variety of other organizations in different industries with similar characteristics as that of universities in certain important respects.

42 Even though for-profit universities are cheaper to run, because they pass the entire cost of attending on to the student, tuition is "far higher on average than at public community colleges." Kamenetz, *DIY U*, Chapter 3. In addition, it is not uncommon for disruptive innovations in a sector to compete on the basis of convenience before the basis of competition shifts to price. Christensen, *Innovator's Dilemma*, pp. 188-198.

43 An important argument against this counterpoint is that it is not clear that many of the low-cost universities have nailed this job. Recall that when a company has a product offering that gets an important job done, its customers will "pull" that product into their lives with minimal marketing by the company, whenever the job arises. When a company's product offerings are not structured around a job that customers are trying to do, the company typically must spend marketing dollars mightily in order to persuade customers to buy its products. A good metric of whether a company's products are doing an important job for customers is whether its customer acquisition costs are falling or rising over time. Many of the for-profit low-cost universities spend lots of money on marketing and customer acquisition—and in many cases these costs have risen over time.

44 eCampus News, "Indiana forms state branch of private online college," June 15, 2010.

45 A recent proposed Department of Education regulation, for example, proposes to define a credit in one of three ways, all derivative around the amount of time that a student spends sitting in a classroom and working at home, and disregards that one activity may take one student 10 minutes to complete whereas it may take another student 20 minutes to complete. For a brief discussion of the flawed nature of this regulation and its origins in asking the wrong question see Julie Margetta Morgan, "What's in a College Credit? Credits Should Measure More Than Just Learning Time" (Washington: Center for American Progress, 2010) available http://www.americanprogress.org/issues/2010/08/college_credit.html.

46 This is quoted from Deborah Seligsohn, a China-based principle adviser to the World Resources Institute China Climate and Energy Program. "Changing, Challenging China," *Harvard Magazine*, March-April 2010, p. 32.

47 We thank Gunnar Counselman, an adjunct fellow at Innosight Institute, for this phrasing and insight in a manner that this paper does not allow us to explore fully.

48 For certain professions for example networking might be a highly valuable skill. Some programs in fact do a good job of helping students build a robust network that is helpful to them in their work, but this is not traditionally thought of as something that higher education provides and yet it is quite important for the job that students are in fact hiring it to do.

49 In his latest book, Peter Smith discusses how much talent the country wastes because, among other things, it does not recognize learning from informal circumstances, and therefore prevents people from gaining access to jobs of higher value. Peter Smith, *Harnessing America's Wasted Talent: A New Ecology of Learning* (San Francisco: Jossey-Bass, 2010).

50 For a history of Concord Law School, see http://info.concordlawschool.edu/Pages/School_History.aspx (accessed September 7, 2010)

51 Daniel Golden, "Your Taxes Support For-Profits as They Buy Colleges," Bloomberg.com, March 22, 2010; Iason Dalavagas, "How Colleges Are Buying Respect by Purchasing Credentialed Not-For-Profit Colleges," ValueLine, July 23, 2010, available at http://www.valueline.com/collegeaccreditation072310.aspx.

52 Gunnar Counselman is the primary architect of the QV Index.

53 StraighterLine is one such company that represents an intriguing attempt to disrupt the traditional classroom model by at first offering the remedial and basic classes that are the least attractive for universities to offer and then moving up from there. They have altered the labor model so that they can offer access to their courses for $99 a month plus $39 for every course started. Several companies have made inroads at offering remedial courses online as well with very different business models.

54 Christensen, *Disrupting Class*, Chapter 5.

About the authors

Clayton M. Christensen is the architect of and the world's foremost authority on disruptive innovation, a framework which describes the process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves "up-market," eventually displacing established competitors. Consistently acknowledged in rankings and surveys as one of the world's leading thinkers on innovation, Christensen is widely sought after as a speaker, advisor, and board member. His research has been applied to national economies, startup and Fortune 50 companies, as well as to early and late stage investing.

His seminal book *The Innovator's Dilemma* (1997), which first outlined his disruptive innovation frameworks, received the Global Business Book Award for the Best Business Book of the Year in 1997, was a *New York Times* bestseller, has been translated into over 10 languages, and is sold in over 25 countries. He is also a four-time recipient of the McKinsey Award for the Harvard Business Reviews's best article and received a Lifetime Achievement Award from the Tribeca Film Festival in 2010.

Christensen has recently focused his innovation lens on two of our most vexing social issues, education and health care. *Disrupting Class*, which looks at the root causes of why schools struggle and offers solutions was named one of the "10 Best Innovation and Design Books in 2008" by BusinessWeek and the best Human Capital book of the year in the Strategy + Business Best Books of 2008. *The Innovator's Prescription* (2009) examines how to fix the problems facing healthcare. So as to further examine and apply his frameworks to the social sector, Christensen founded Innosight Institute, a nonprofit think tank, in 2008.

An advisor to numerous countries and companies, including the government of Singapore, he is currently a board member at India's Tata Consultancy Services (NYSE: TCS), Franklin Covey (NYSE: FC), W.R. Hambrecht, and Vanu. Christensen also applies his frameworks via management consultancy Innosight which he co-founded in 2000, and Rose Park Advisors, an investment firm he founded in 2007.

Christensen graduated with highest honors in economics from Brigham Young University in 1975. Later, he received an M.Phil. in applied econometrics and the economics of less-developed countries from Oxford University in 1977, where he studied as a Rhodes Scholar. He received an MBA with High Distinction from the Harvard Business School in 1979, graduating as a George F. Baker Scholar. In 1982-

1983 he was a White House fellow, serving as an assistant to U.S. Transportation Secretaries Drew Lewis and Elizabeth Dole. In 1992, he was awarded a DBA from the Harvard Business School, receiving the Best Dissertation Award from the Institute of Management Sciences for his doctoral thesis on technology development in the disk drive industry. He is currently the Robert and Jane Cizik Professor of Business Administration at the Harvard Business School.

Michael B. Horn is the co-founder and executive director of Education of Innosight Institute, a not-for-profit think tank devoted to applying the theories of disruptive innovation to problems in the social sector. He is the coauthor of *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns* (McGraw-Hill: June 2008) with Harvard Business School Professor and bestselling author Clayton M. Christensen and Curtis W. Johnson, president of the Citistates Group. BusinessWeek named the book one of the 10 Best Innovation & Design Books of 2008, Strategy + Business awarded it the best human capital book of 2008, Newsweek named it as the 14th book on its list of "Fifty Books for Our Times," and the National Chamber Foundation named it first among its 10 "Books that Drive the Debate 2009."

Disrupting Class uses the theories of disruptive innovation to identify the root causes of schools' struggles and suggests a path forward to customize an education for every child in the way she learns. Horn has been a featured keynote speaker at many conferences including the Virtual School Symposium and Microsoft's School of the Future World Summit. Tech&Learning magazine also named him to its list of the 100 most important people in the creation and advancement of the use of technology in education.

Prior to this, Horn worked at America Online during its aol.com re-launch, and before that he served as David Gergen's research assistant, where he tracked and wrote about politics and public policy. Horn has written articles for numerous publications, including Education Week, Forbes, the Boston Globe, and U.S. News & World Report. In addition, he has contributed research for Charles Ellis' book, *Joe Wilson and the Creation of Xerox* (Wiley, 2006) and Barbara Kellerman's *Bad Leadership: What It Is, How It Happens, Why It Matters* (Harvard Business School Press, 2004).

Horn earned his MBA from Harvard Business School and an A.B. from Yale University, where he graduated with distinction in history.

Louis Soares is the Director of the Postsecondary Education Program at the Center for American Progress. Louis brings more than 15 years of private, nonprofit, and public sector experience, and expertise in state strategy and incentives for economic development, adult literacy, and workforce development. He has worked as a nonprofit director, educator, policy analyst, volunteer, and advocate across the fields of workforce, education, and economic development. A leader in workforce development and human capital issues, Louis has published articles and op-eds on workforce and innovation.

Prior to joining American Progress, he served as director of business development at the Rhode Island Economic Development Corporation where he managed Rhode Island's business attraction, export assistance, government contracting, and small business initiatives from 2003 to 2006. As director of education and training for the Rhode Island Technology Council from 2000 to 2002, Louis developed and managed a workforce training strategy for a 240-member trade association, which included implementing education-business partnerships at the high school, college, and corporate levels to align with relevant workplace skills. He also was a small business consultant with the U.S. Peace Corps in Romania in 1995 and 1996.

Soares holds a master's degree in public administration from Harvard University and a bachelor's degree in business economics from Brown University. He lives with his wife, Elizabeth, in Alexandria, VA and enjoys travel books.

Louis Caldera is the vice president of Programs at the John Kent Cooke Foundation. Caldera leads the foundation's scholarship and grant programs, and is responsible for the foundation's communications, information systems, and program development and evaluation functions. Mr. Caldera has a distinguished public service career that includes service as an officer in the U.S. Army, as a California legislator, as secretary of the army in the Clinton administration, and as president of the University of New Mexico. He also served in the Clinton administration as managing director and chief operating officer of the Corporation for National and Community Service. Prior to joining the Jack Kent Cooke Foundation, Mr. Caldera was a Senior Fellow at the Center for American Progress, a progressive think tank, where he focused on higher education, immigration, and other public policy matters affecting poor and ethnically and racially diverse communities in the US. He served on the President-elect Obama Department of Defense Transition Team and was an assistant to the president and director of the White House Military Office in the early months of the Obama administration.

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About Innosight Institute

Innosight Institute's Education Practice's mission is to apply Harvard Business School Professor Clayton Christensen's theories of disruptive innovation to develop and promote solutions to the problems of education. The primary focus currently is the U.S. K-12 public education system, although the Practice also works on the problems confronting higher education and education outside the U.S.

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