Rethinking Higher Education Business Models[1]

Steps Toward a Disruptive Innovation Approach to Understanding and Improving Higher Education Outcomes

By Robert Sheets, Stephen Crawford, and Louis Soares   March 28, 2012

Introduction and Summary

The cost of college has skyrocketed during the last two decades, rising by 429 percent, a rate that's even higher than the rate for health care. To cover these costs students have borrowed ever-larger amounts resulting in an average debt at graduation now exceeding $27,000. Yet only 50 percent of students pursuing a bachelor's degree—and 21 percent of those pursuing an associate's degree—complete their college programs.

Clearly, the great challenge facing higher education today is to contain costs while at the same time improving outcomes—in short, to increase productivity.

Information technology has long been seen as a major key to meeting this challenge, but the results thus far have been disappointing. In this brief we argue that the fault is not with the technology but rather in the ways it has been deployed. Drawing on the work of eminent Harvard Business School professor Clayton Christensen and others, we explain the need for parallel innovations in higher education's business models and "value networks." We also urge policymakers to facilitate such innovations by funding more applied research in these and related areas, including higher education's regulatory and standards environments.

Concerns about college affordability have grown so serious that President Barack Obama issued a warning about the rising cost of higher education in his most recent State of the Union address. At the same time his administration is encouraging innovation in higher education through such initiatives as First in the World and Race to the Top: College Affordability. While we applaud such initiatives it is important to note that these initiatives are far more likely to succeed if they are informed by an understanding of the differences between sustaining and "disruptive" innovation and the roles that new business models and value networks play.

The theory of "disruptive innovation"—the notion that certain innovation can improve a product or service in such a way that it creates new markets that displace existing ones—was developed and advanced by Christensen in the 1990s. According to Christensen, who has studied the evolution of many industries, disruptive innovation occurs when sophisticated technologies are used to create more simplified and more accessible solutions to customers' problems—solutions that are often less high performing than previous technologies but whose price and convenience attract whole new categories of consumers. The first generations of transistor radios, desktop computers, and MP3 players are examples. These new solutions—innovations to existing technologies deployed through new business models—gradually improved to the point where they displaced the previously dominant solutions. Christensen's key point, however, is that new technologies like these cannot achieve their transformative potential without compatible changes in their industry's business models and value networks, which in turn may require shifts in the standards and regulatory environment.[2]

Innovations in business models have occurred in most sectors of our economy, from manufacturing (Nucor Corp.) to music (iTunes) and from health care (Minute Clinics) to retail (Amazon and eBay). In each, technology drove new ways of doing business to create more value for customers. Recent reports have highlighted emerging business models that may have similar potential in higher education, including those represented by Western Governors University, MITx, Carnegie Mellon's Open Learning Initiative, and the leading for-profit institutions.[3] These business models exhibit many of the features of what experts call multisided, unbundled, and open business models.[4] Some observers believe they have the potential to dramatically change how instruction and research are delivered to expand access, reduce costs, and facilitate degree completion.

Building on CAP's previous work in "Disrupting College and Guiding Innovation in Higher Education," this brief begins by explaining Christensen's analytical framework. It then focuses on one component of that framework, business models, and explains some important types of them. We then explore how new higher education business models could better harness recent advances in information technology and thereby achieve dramatic improvements in learning and credentialing, research and development, and business management.[5] Lastly, our brief examines the policy implications, especially for the federal government's applied research budget, our objective being to help policymakers understand what works well and what has the potential to be successfully replicated on a large scale—to "go to scale." Specifically, our policy recommendations include:

• Using disruptive innovation thinking as a guide for competitive grant making in higher education programs and research
• Surveying federal agencies to identify all relevant programs and classify them according to the key categories for innovation in higher education—learning and credentialing, research and development, and general business services that support the first two

- Creating a primer on disruptive innovation for grant making that will be used across federal agencies
- Creating a disruptive innovation panel to help the Obama administration evaluate new technologies and the business models they enable for scalability

Christensen's analytical framework

In the early 2000s Christensen and his colleagues developed a useful analytical framework that highlights four key "drivers" of disruptive innovation: technological enablers, business model innovations, value network adjustments, and the standards and regulatory environment. Let's examine each more closely, folding in ideas from other experts where they are helpful.

Technological enablers

According to Christensen and his co-authors, technology enables disruptive innovation when sophisticated technologies create more simplified and routinized solutions to customer problems or needs. In education the authors point to online learning technologies as well as more specific types of student-centric and adaptive online learning systems based on advances in information technology as well as learning and assessment.[6] Other examples are breakthroughs in information technology related to personalization, content management and social media, data management and analytics, and the management of business processes.[7] Gregory Jackson,[8] vice president for policy and analysis at EDUCAUSE, summarizes the recent advances in information technology that are most relevant for higher education and offers an excellent assessment of their potential to transform current practices.

Business model innovation

A business model describes how an organization creates, delivers, and captures value. Most business model definitions highlight four key elements:

- **Customer value proposition,** which explains how an organization will address a customer need
- **Value chain,** which organizes processes, partners, and resources to deliver the value proposition
- **Profit formula,** which lays out how an organization will make money
- **Competitive strategy,** which describes how an organization will compete with rivals and defend its position in the value network.

We describe each of these elements in more detail later in the brief.

Value networks

In the words of Christensen and his colleagues, "a value network is the context within which a firm establishes its business model and how it works with suppliers and channel partners or distributors so that together they can respond profitably to the common needs of a class of customers."[9] The overall design of the dominant value propositions, value chains, profit formulae, and strategies must fit together within a consistent and reinforcing economic logic so that they function well as a larger organizational ecosystem. Consequently disruptive innovations are not easily plugged into existing business models and their value networks. They require new business models and the replacement or restructuring of existing value networks to truly go to scale.

We build on and extend Christensen's concept of value networks by arguing that dominant business models and value networks help establish the overall shape and competitive structure of an industry, which itself constrains or enables disruptive innovation. According to Michael Porter, a distinguished Harvard Business School expert on business strategy,[10] competitive structure involves threats not only from direct rivals and competitors, but from the bargaining power of buyers and suppliers, new entrants, and "adjacent" products and services that could be used in place of core industry ones. Therefore, business models, value networks, and the competitive structure of industries must be considered together in examining opportunities for disruptive innovation.

Standards and regulatory environment

The emergence and spread of new business models and their value networks is more likely if the standards and conformity assessment situation and the policy and regulatory environment are supportive.

Standards and conformity assessment environment

The United States and other countries promote the development and implementation of national and global standards and conformity assessment systems for a wide variety of purposes, including facilitating global trade, improving the performance of industries, increasing competition, and protecting consumers.[11] Standards are agreed-upon definitions of the fundamental characteristics and interfaces of all types of entities in the marketplace, including products, services, systems, organizations, and even people. They can be used to promote competition and collaboration by facilitating transparency and fostering "interoperability"—the ability to function effectively with other systems—thereby reducing information complexity and switching costs.

Conformity assessment systems define the approaches for certifying that an entity conforms to the standards used to describe it in the marketplace. Conformity assessment can be used to promote confidence and trust in the marketplace among consumers and

businesses. Like other industries, higher education has an active public-private standards and conformity assessment community in key areas such as competency definition; assessment and credentialing; digitized learning content and learning management systems; data infrastructure management; institutional and program accreditation; and institutional and program comparisons and ratings. The actions of this community can serve either to support or inhibit disruptive innovation in higher education.

Regulatory and public policy environment

An industry's regulatory and public policy environment reflects government's role in promoting industry performance and protecting the industry's consumers and other stakeholders as well as the general public interest. Key areas of the regulatory and policy environment for higher education's learning and credentialing services are student grants and loans, institutional and program capacity, institutional accreditation and approval, performance accountability, and consumer information and protection. Government agencies and legislative bodies work with established stakeholder and interest groups to improve the performance of the dominant business models and value networks and to protect incumbents from new and potentially disruptive entrants— basically, maintaining the status quo. A good illustration of this type of approach are student loan policies that assume that higher education services will be delivered through standardized semester-based schedules defined in terms of credit hours.

In Christensen's framework the most important drivers of disruptive innovation are not the technological innovations themselves, though they usually receive the most attention. Instead they are the innovative business models that can harness the power of these new technologies and the value networks that support them in the context of the standards and regulatory environment. For the purpose of policymakers who seek to provide access to quality and affordable higher education for all Americans, understanding the interplay of these four elements of disruptive innovation is a key to optimizing the use of public funds. Since business models play a critical yet neglected role in disruptive innovation, we examine them in greater detail.

Business models

A business model is an organization's blueprint for creating, delivering, and capturing value and for generating the revenue it needs to cover costs, reward stakeholders, and reinvest in order to remain competitive. All organizations, whether for-profit or non-profit, have a business model, whether or not it's explicit.

As mentioned above, business models involve four core elements:

- A customer value proposition, which explains how an organization will address customers' needs through a product or service it offers

- A value chain, which organizes processes, partners, and resources to deliver the value proposition
- A profit formula, which lays out how an organization will generate enough revenue to more than cover costs
- A competitive strategy, which details how an organization will compete with rivals and defend its position in the value network[12]

Given the many possible combinations of these four elements, it might be thought that any particular industry would exhibit a wide variety of business models. In practice, however, most mature industries, including higher education, feature only a few, which are normally referred to as the industry's dominant business model(s). These provide the main trajectory for business growth and development within an industry—for example, the path to becoming a top-tier research university in the higher education industry.

New business models arise and even displace the currently dominant ones when innovative organizations develop different value propositions, value chains, profit formulas, and/or competitive strategies that enable them to provide greater value to more customers—often by taking better advantage of new technologies. Of special interest here are business models that are "open," "multisided," and "unbundled" and that involve "facilitated networks."

Open business models

As defined by Henry Chesbrough, a leading expert on open innovation, open business models involve the use of external as well as internal ideas and resources, along with external as well as internal pathways for deploying them to create and capture value for an organization. "Outside-in" strategies exploit external ideas and resources within an organization, whereas "inside-out" strategies create additional value from internal ideas and resources by moving them through external pathways. In Chesbrough's view the most advanced type of open business model is the open "platform" model. This model leverages customer co-creation and interdependencies between customer groups and attracts other businesses to invest ideas, time, and money in ways that increase the value of the platform for the organization. The use of such platforms by Amazon and Apple are prime examples.[13]

Multisided models

Many open business models, especially open platform models, involve some features of what Alexander Osterwalder and Yves Pigneur, co-authors of the 2010 bestseller *Business Model Generation*, call "multisided" models. These create value by facilitating interactions between interdependent groups of customers, such as applications developers and users on the platforms.[14] Higher education institutions have a multisided business model to the extent that they leverage the interdependencies between employers and students in

providing learning and credentialing services. Some also leverage the interdependencies between businesses interested in commercializing university research and government funders interested in accelerating technology and economic development.

Unbundled models

Many open business models, especially open platform models, also include key features of what Osterwalder and Pigneur call "unbundled" business models. Unbundled models separate three core business functions that require different types of organizational expertise: customer-relationship management, product innovation, and infrastructure management.

Customer-relationship management businesses focus on customer acquisition and retention and seek to be a one-stop connection for customers. The hope is to realize significant economies of scope by offering a comprehensive set of competitive products and services that can be provided in cooperation with internal or external product innovation units.

In contrast, product innovation businesses focus on the constant development of products and services that can be promoted, distributed, and supported through customer-relationship management businesses. They seek to harness economies of scale by distributing their products and services through large internal or external distribution channels managed by customer-relationship management partners.

Finally, infrastructure management businesses also seek economies of scale, but do so by providing both internal and external customer-relationship management and product innovation businesses with an infrastructure platform that can support large volumes of transactions. The most widely cited examples of unbundled business models are in telecommunications. Wireless providers build platforms supporting products and services that are offered by hardware and software product innovators and are delivered through customer-relationship management businesses—either the wireless providers themselves or external retail partners.

Facilitated network models

Christensen and his colleagues identify an additional type of business model that could prove highly relevant to higher education—the "facilitated network" model.[15] Facilitated network models can be used to enable customers to better access and use the most appropriate mixture of products and services offered by multiple organizations. In the health care industry, for example, patient-centered networks provide support to patients in accessing and managing the services of multiple health care providers. Similarly, in higher education there are now organizations that provide career and educational planning services directly to students who are searching for and applying to higher education programs. These models

change the competitive structure of the industry by increasing "buyer power"[16] as a result of reducing informational complexity and asymmetry. To put it more simply, students gain some consumer leverage with higher education institutions that traditionally have had more information about the students than the students have had about them.

The promise

Business model frameworks have become a cornerstone of business strategy development and analysis across a wide variety of industries and sectors, and have more recently entered the discussion related to higher education. Multisided and unbundled open business models—especially when combined with facilitated network models—hold great promise for improving the performance of higher education. That promise flows from their potential to achieve enormous economies of scale and scope, and in the process, enable genuine personalization in learning and credentialing along with comparable improvements in research and development and in business management. The following sections examine that potential in each of these three areas.

Learning and credentialing

Christensen and his colleagues argue that higher education institutions incur major costs and inefficiencies by administering two different types of business under one roof—research, which operates as a "solutions shop," and learning and credentialing, which is a "value-adding process."[17] Yet learning and credentialing can itself be unbundled to unlock even greater economies of scale and scope.

In addressing students' concern with launching a successful career, colleges. and universities usually offer a value proposition that involves the following elements:

- Determining what a student needs to know and be able to do for a successful career launch in a chosen field
- Developing a sequence of learning experiences and related services for achieving these skills through a curriculum, including learning units such as courses, modules, and objects, with the necessary learning and assessment resources
- Providing learning services based on the design and curriculum
- Assessing students' skills and providing various types of credentialing, including grades, portfolios, certificates, and degrees that have market value
- Connecting students with employers, for example, through internships, and helping students find and transition to employment and advance in their careers

Most higher education institutions take a decentralized and bundled approach to instruction, meaning that faculty departments, committees, and/or individual faculty

members develop the curriculum—product innovation—and deliver the instruction—customer-relationship management—through their own processes. Most faculty members are content experts who have no formal training in curriculum development and instruction. Yet they are expected to select or develop most of the learning and assessment materials used in their courses. Complicating matters, these processes may be different for different delivery channels, such as credit versus noncredit programs. The traditional models also give great latitude to faculty in how they incorporate learning technologies, resulting in very uneven use in learning and credentialing.[18]

Further, many higher education institutions are under considerable pressure to offer a large menu of programs and courses. Yet these institutions find it difficult to acquire the faculty expertise and organizational resources needed to ensure high quality across such a broad range of specialties. One result of this shortcoming is a combination of strong and weak programs. Given their current business models, these institutions face a real dilemma—they can achieve greater economies of scale only by sacrificing economies of scope. That is, they find it almost impossible to offer as wide an array of programs as desired by students (and sometimes employers) and still maintain high quality across the institution at affordable costs.

Institutions using more innovative business models are achieving greater economies of scale by increasing the centralization of the product innovation function, including the design, development, assessment, and credentialing components of the value proposition—that is to say, the curriculum development. These institutions also administer fewer programs and minimize the number of pathways through these programs with fewer electives.[19]

Western Governors University in Salt Lake City, Utah and many for-profit institutions have gone even further, achieving significant economies of scale by centralizing more of the curriculum development function, often in partnership with outside experts and organizations in their value networks. They organize the delivery of instruction separately, through standardized processes using specially trained instructors and mentors. They support both functions through centralized infrastructure management systems that provide additional economies of scale.

These innovative business models can be expanded even more by further outsourcing curriculum development through partnerships with other universities and colleges, content aggregators, and academic and professional publishers who are moving to provide "curriculum as a service." This outsourcing could draw from public and private learning exchanges similar to the Learning Registry, launched by the U.S. Departments of Education and Defense in November 2011. Outsourcing could provide institutions with nationally branded curricula (using the brand of a leading university) or institutionally branded curriculum (using a "private label") that could be delivered through the institution's own delivery channels.

The partners providing instructional delivery services could work with internal or external curriculum developers—outside-in models—to provide a wide array of personalized programs and courses, including ones customized to meet the needs of specific employers. Students could also start and progress at their own pace, choose the learning formats that best address their learning styles and preferences, and select and use mentors and tutors as well as other resources in their learner-centered networks.[20] Many of the instructional delivery services, such as mentoring and tutoring, could be provided by outside partners. All of these options provide new opportunities for higher education institutions to achieve greater economies of scope by offering more students a multitude of high-quality options at competitive prices.

Under this unbundled model, infrastructure-management services could also be out-sourced to provide a multisided open platform for institutions to work cooperatively with both internal and external curriculum developers and a wide variety of learning-delivery partners. These infrastructure-management services could provide authoring software containing learning-design templates and guidelines including universal design for accommodating multiple learning styles, as well as learning object repositories and registries for both free open-source and proprietary-content resources. In addition, they could provide learning management systems that resemble more flexible and open "virtual learning environments,"[21] which in turn could support fully bundled traditional courses or more unbundled self-study and mentor-support services. These shared infrastructure-management services could be supported by global and national eLearning standards.[22]

Facilitated networks could empower and support learners faced with the added complexity of these new learning and credentialing systems. They would do so by providing students with career and learning management services and group- purchasing options that help students select, access, and optimize the use of these systems. The facilitated network could be supported by existing career and educational planning system providers or by new market entrants. These players could change the competitive structure of higher education through the increased buyer power created by reducing informational complexity and asymmetry and by providing opportunities to secure higher-quality services, with more convenience, at better prices.

Such multisided, unbundled, and facilitated network business models offer promising options for providing low-cost and effective learning and credentialing systems, ones that can be personalized to meet the needs of individual learners. These systems can also be customized for employers seeking different types and combinations of employee competencies and/or different levels of assurance that employees have these competencies—assurances ranging from self-evaluated learning portfolios to instructor assessments and grades to third-party assessment and certification.

Gateway learning and credentialing

The potential of such business models to capitalize on both economies of scale and economies of scope and to transform the competitive structure of higher education is especially high in the case of "gateway" learning and credentialing. Gateway courses are the major general education and prerequisite courses required for two-year and four-year degree and certificate programs. They represent a large share of the postsecondary credits awarded by high schools, community colleges, and universities. This market space has been the focus of many of the most widely cited reform efforts, including those of the National Center for Academic Transformation, or NCAT, and of national and state attempts to simplify credit transfer in order to reduce costs and accelerate time to degree.

A secondary school initiative—the Shared Learning Collaborative, or SLC, coordinated through the Council of Chief State School Officers, or CCSSO, and funded by the Bill & Melinda Gates Foundation and the Carnegie Corporation of New York—provides an example. The SLC is working with a consortium of states to test a new, shared learning environment that provides fully open and transparent "learning maps" for the national "common core" academic standards. These maps can be linked to national, state, or local summative and formative assessment data, as well as to curriculum materials, through national metadata tagging standards. This shared learning environment will create an open marketplace for distributed content development and aggregation through infrastructure management systems. This will include learning management and repository and registry systems that have the potential for integration with state and local student data systems and learner-managed accounts to support personalized learning and the use of intelligent agents and smart learning-ware.

If the SLC is successful, these learning standards, maps, and related learning and assessment resources could easily be extended into a shared marketplace for postsecondary gateway courses, especially in general education and the lower-level prerequisite subjects related to the national common core standards in language arts, mathematics, and science. The maps and assessment resources could provide the basis for new economies of scale for specialized global curriculum developers in the more "commoditized" content areas, for example, math. Developers could produce and distribute high-quality and low-cost curricula that can be customized for multiple channels and personalized to the needs of learners. This could also result in significant economies of scope for smaller regional or local "channel partners," such as community colleges, which could provide high-quality, low-cost, and personalized learning services for their students and eventually offer even more gateway courses. They could also afford to make use of what Osterwalder and Pigneur call "long-tail" business models—for example, low-enrollment programs and course options—to meet specialized employer and student needs.

Barriers

Although innovative business models of the kind discussed above promise enormous productivity gains, they also face several barriers to widespread adoption. One barrier is the implication of a fundamental shift in the role of faculty in curriculum development and delivery, and in the shared governance arrangements that exist on many campuses. Second, these models threaten higher education's traditional profit formula, which depends on low-cost gateway courses taught by part-time faculty to generate enough revenues to cover the unmet costs of the institution's more expensive courses and activities. Third, these models are inconsistent with accreditation systems that assume that core learning and credentialing services will be managed within the institution through traditional business models. A shift toward more "open architecture" accreditation and related accreditation reforms would allow the accreditation of all internal and external partners in the institution's value chain.[23]

In addition, the gateway marketplace still faces a significant problem with credit transfer, due to the high switching costs both within the traditional education sector and between the traditional and nontraditional sectors, including for-profit institutions and specialized service providers like StraighterLine offering online college courses. Further, federal and state student loan policies have many legacy assumptions that impede the use of more flexible student financing options.

Lastly, these open models, especially facilitated network models, require full data integration within the higher education value network or ecosystem, similar to what is now being done through electronic health care data exchanges. This would require efforts by federal and state agencies to work with national standards bodies and higher education stakeholders to establish shared data infrastructures that go well beyond current state data infrastructures.

Research and development

The United States has the largest public-private research and development sector in the world. Higher education's share of this sector, although small—approximately 15 percent—is nonetheless critical since research universities conduct the bulk of government-funded basic research. That research is of special interest because entrepreneurs use it to develop innovative products and services that in turn spur economic development.[24] As a result, federal and state governments promote a wide variety of strategies to improve technology transfer between universities and their industry counterparts, including the creation of technology-transfer offices supported through university patents and licensing. The most effective approach to technology transfer, however, remains the traditional practice of "open science," in which technology is transferred through publications, conferences and meetings, consulting, personnel exchanges, informal

interactions among bench scientists and engineers, and the movement of graduate students into private employment.[25] This is most evident in the catalyst roles played by many leading universities in state and regional economic development through open public-private innovation networks.[26]

Chesbrough first developed the concept of open innovation as a new way to improve industrial research and development through the leveraging of outside ideas and market opportunities. His book Open Innovation, published in 2003, showcases several open business approaches.[27] It also highlights the role of innovation intermediaries, such as InnoCentive, an organization that provides a platform for companies to solve key problems by connecting them to diverse sources of solutions, including employees, customers, and outside parties, in creating global value networks through both inside-out and outside-in strategies. As Chesbrough notes, this open approach to research and development is even more important now, as these innovation activities are becoming widely dispersed throughout the world and a growing share is being carried out by more agile mid-sized and small businesses. Increasingly, large research and development enterprises will have to build more open global platforms that support a larger public-private value network or ecosystem of partners if they are to succeed. This applies to institutions of higher education as well as to private firms that depend on research and development.[28]

Over the last few decades, many universities and their funders in the United States and Europe have taken major steps to harness the power of open innovation through public-private research partnerships, research parks, and shared research infrastructures. These efforts can be extended by further unbundling research and development activities—product innovation businesses—from the infrastructure services—infrastructure-management businesses—that support them. This would allow the development of global infrastructure-management organizations that are able to provide greater economies of scale and scope and make fuller use of research facilities, research support teams, and related information technology tools and resources.

These infrastructure-management services could also improve the use of the underutilized instructional assets and resources of nonresearch universities and community colleges and make them available for use by public and private researchers and entrepreneurs—similar to community-based design centers and innovation hubs. This unbundling of research and development activities from infrastructure management could also provide advantages to large research universities by lowering costs and enabling scientists to focus on their research and development. This in turn could provide a more level playing field for the small and mid-sized businesses competing on innovation in the global economy.

Business management

The concept of multisided and unbundled open business models can also be applied to some instructional and research support functions that are not currently being outsourced by higher education institutions. Enrollment management is one example. Enrollment management involves the outreach, recruitment, selection, enrollment, and "on-boarding" of students so that higher education institutions have the appropriate numbers and types of qualified students to ensure high levels of financial and operational performance and to maintain the institutional brand.

Many institutions of higher education and their suppliers, including secondary schools, have partnered with intermediaries, such as ConnectEDU, a firm that provides web-based information and education search and social media tools for connecting students, colleges, and employers. Such intermediaries create shared multisided platforms that provide tools and information to university admissions officers and enrollment managers, as well as to high school guidance counselors, students, and parents.[29] These platforms show great promise for improving the performance of higher education as well as empowering customers by removing the information asymmetry and complexity in the marketplace—a major aspect of the competitive structure of the higher education industry, as discussed earlier.

Such innovation could be extended further by unbundling the applications, tools, and resources and the infrastructure management services of intermediaries, thereby creating an applications marketplace for enrollment management, including analytical services. These analytical services include firms such as SAS, the global research and analytics giant; Career Cruising, which provides career and education guidance and counseling services; and Parchment, a web-based provider of credential warehousing and distribution services, supported by multisided infrastructure-management services. These infrastructure-management services could provide full data integration with state preschool through college (P-20) data infrastructures to maximize the effectiveness of applications services in offering value to both institutions and learners and improving P-20 transitions, which are critical to federal and state government funders.

Policy recommendations

Disruptive innovation offers an analytical framework that can greatly help policymakers do their part in improving higher education. In this section we briefly discuss the implications for the federal government's role and recommend some specific federal policy initiatives.

The federal government already encourages innovation in education, as evidenced by the Obama administration's Race to the Top program and the portion of its 2013 budget aptly titled "Promoting Innovation in Education." The administration also funds a consider-

able amount of applied research on education through the Department of Education, the National Science Foundation, or NSF, and other agencies. The NSF sponsors relevant research not only through its Directorate for Education and Human Resources but also through its Directorate for Computer and Information Science and Engineering.

The latter includes a "Cyberlearning: Transforming Education" program that "seeks to integrate advances in technology with advances in what is known about how people learn." This program gives special attention to "technological advances that allow more personalized learning experiences, draw in and promote learning among those in populations not served well by current educational practices, allow access to learning resources anytime and anywhere, and provide new ways of assessing capabilities." Yet the focus is entirely on the technology and its impact on individual learning. Neither here nor elsewhere is federally sponsored research focusing on the business models, value networks, or standards and policy environments that may be needed to harness technological advances and apply them broadly.

To correct for this neglect, we recommend the following:

First, the Obama administration should adopt a disruptive innovation framework in awarding grants through its innovation-promoting programs, including Race to the Top, i3, First in the World, and Race to the Top – College Affordability. This would allow grant applications to be evaluated according to their potential for, among other things, shedding light on the business models and value networks that are best suited to deploy productivity-enhancing improvements in technology.

Second, the Obama administration should conduct a cross-agency census to identify all competitive grant initiatives that fund programs or research that can expand our understanding of productivity and innovation in higher education. These initiatives should be classified as follows:

- Learning and credentialing
- Research and development
- General business services that support learning and research

This classification will facilitate the aligning of funding with the major educational functions in which disruptive innovation could improve productivity. It should be applied across the board, from signature initiatives such as the proposed $55 million "First in the World" grant program to National Science Foundation grants to individual researchers studying effects of technology in higher education. It will be important that this census take in all relevant programs. Some NSF-funded programs in neuroscience research and even U.S. Department of Labor grants to community colleges may seem obvious. Yet others are not, a good example being the NSF Office of Cyber Infrastructure, which has an interest in how technology changes the way organizations operate.

Third, ARPA-ED, the research agency for education proposed by the administration, should be fully funded and should include an advisory panel on disruptive innovation in higher education. This panel's form and function should be a hybrid of existing Department of Education advisory committees (student success, financial aid) and the committees that advise the Federal Drug Administration on clinical trial results and drug readiness for the market.

The panel should include members of the Committee on Measures of Student Success and The Fund for the Improvement of Postsecondary Education as well as experts in disruptive innovation. The panel would advise ARPA-ED on how to target investments made through signature programs to areas that show potential for disruptive innovation. It would also provide guidance on how to evaluate the emerging business models for scalability.

Fourth, the White House Office of Science and Technology Policy should work with disruptive innovation experts to create a primer on how to integrate disruptive innovation theory as an analytical framework and evaluation tool into federal grantmaking. The primer must include:

- An overview of disruptive innovation theory
- A description of its core elements—technology enablers, business models, value networks, standards, and regulatory environment
- Examples of industries in which technological innovations achieved their potential only after creative leaders developed new business models to harness and deploy them

This primer would be used by federal agencies to incorporate appropriate evaluation language into grants they make going forward with regards analyzing the impact cost and effectiveness.

Conclusion

In this paper we have argued that information technology's potential to dramatically improve the performance of higher education will be realized only when new business models arise to harness it. Especially promising are open, multisided, and unbundled models that involve facilitated networks. Applied to learning and credentialing services, these approaches could improve performance by achieving greater economies of scale and scope and providing the basis for increasing personalization, access, and choice at affordable prices. They could also enhance research and development by improving access to and utilization of shared research infrastructures. Finally, they could assist institutions, students, and federal and state funders in the area of enrollment management and P-20 transitions. There are probably many actions policymakers could take to encourage the emergence and adoption of effective new business models, but a good starting point would be to embrace the recommendations we advance in this report.

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Center for American Progress and EDUCAUSE share a common interest in the advancement of higher education for the greater social good. We agree that innovation in higher education is necessary for future progress. Therefore, we bring together our organizational strengths to better understand the issues and opportunities at the intersection of public policy, information technology, and potential new models for education delivery. We promote public policy innovation by collaboratively convening thought leaders to create interdisciplinary dialogue on innovation in higher education, producing white papers to set the stage for policy action, and producing issue briefs that promote policies conducive to innovation in higher education.

Endnotes

1   This policy brief was developed from a convening paper prepared for the Center for American Progress and EDU-CAUSE; convening held in January 2012.

2   See Erik Brynjolfsson and Adam Saunders, Wired for Innovation: How Information Technology Is Reshaping the Economy (Cambridge: MIT Press, 2010); Andrew McAfee and Erik Brynjolfsson, "Investing in the IT That Makes a Competitive Difference," Harvard Business Review July-August 2008; Howard Smith and Peter Fingar, IT Doesn't Matter—Business Processes Do: A Critical Analysis of Nicholas Carr's I.T. Article in the Harvard Business Review (Tampa: Meghan-Kiffer Press, 2003); Núria Ferran Ferrer and Julià Minguillón Alfonso, eds., Content Management for E-Learning (New York: Springer, 2011); Software and Information Industry Association, "SIIA Trends Report for Education Technology" (2010); and U.S. Department of Education, "National Education Technology Plan: Transforming American Education" (2010). Gregory A. Jackson summarizes the recent advances in information technology that are most relevant for higher education and offers an excellent assessment of their potential to transform current practices: Gregory A. Jackson, "IT-Based Transformation in Higher Education: Possibilities and Prospects" unpublished convening paper, workshop hosted by EDUCAUSE and the Center for American Progress, (Washington: 2012).

3 Clayton M. Christensen and others, "Disrupting College: How Disruptive Innovation Can Deliver Quality and Affordability to Postsecondary Education" (Washington: Center for American Progress and Innosight Institute, 2011); Ben Widavsky, Andrew Kelly, and Kevin Carey, Reinventing Higher Education: The Promise of Innovation (Cambridge: Harvard Education Press, 2011).

    Institute for Competitive Workforce, "College 2.0: Transforming Higher Education through Greater Innovation and Smarter Regulation" (2010).

    Clayton M. Christensen and Henry Eyring, The Innovative University: Changing the DNA of Higher Education (San Francisco: Jossey-Bass, 2011).

4   Henry Chesbrough, Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era (San Francisco: Jossey-Bass, 2011).

    Alexander Osterwalder,and Yves Pigneur, Business Model Generation: A Handbook for Visionaries, Game Changers and Challengers (New York: John Wiley and Sons, Inc., 2010)

5   Christensen, Horn, Caldera, and Soares, "Disrupting College"; Ben Wildavsky, Andrew Kelly, and Kevin Carey, Reinventing Higher Education: The Promise of Innovation (Cambridge: Harvard Education Press, 2011); Institute for a Competitive Workforce, "College 2.0: Transforming Higher Education through Greater Innovation and Smarter Regulation"; Christensen and Eyring, The Innovative University.

6   See also Christensen and others, Disrupting Class (2008) and Disrupting College (2011), and the U.S. Department of Education's 2010 National Education Technology Plan, which emphasizes the power of personalization and learner-centered, open collaborative networks.

7   Ferrer and Alfonso eds., Content Management for E-Learning; SIIA, "SIIA Trends Report for Education Technology"; U.S. Department of Education, "National Education Technology Plan: Transforming American Education."; Brynjolfsson and Saunders, Wired for Innovation: How Information Technology Is Reshaping the Economy.;McAfee and Brynjolfsson, "Investing in the IT that Makes a Competitive Difference."; Howard and Fingar, IT Doesn't Matter: Business Processes Do; Software and Information Industry Association, "SIIA Trends Report for Education Technology."

8   Gregory Jackson, "IT Based Transformation of Higher Education: Possibilities and Prospects."

9   Clayton M. Christensen, Jerome H. Grossman, Jason Hwang, The Innovator's Prescription: A Disruptive Solution for Health Care (New York: McGraw-Hill, 2009), p. 184.

10   Michael Porter, Competitive Advantage: Creating and Sustaining Superior Performance (New York: The Free Press, 1985); Michael Porter, On Competition, Updated and Expanded Edition (Boston, MA: Harvard Business School Publishing, 2008)

11   National Research Council, "Standards, Conformity Assessment and Trade into the 21st Century" (Washington: National Academy Press, 1995)

12   These core elements reflect the authors' synthesis of the work of leading experts on business models: Christensen, The Innovator's Dilemma; Mark W. Johnson, Seizing the White Space: Business Model Innovation for Growth and Renewal (Boston: Harvard Business Press, 2010); Alexander Osterwalder and Yves Pigneur, Business Model Generation: A Handbook for Visionaries, Game Changers and Challengers (New York: John Wiley and Sons, 2010); Michael Porter, On Competition, updated and expanded ed. (Boston: Harvard Business School Publishing, 2008); Henry Chesbrough, Open Business Models: How to Thrive in the New Innovation Landscape (Boston: Harvard Business Press, 2006); and Henry Chesbrough, Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era (San Francisco: Jossey-Bass, 2011). This integrated framework contains more fundamental elements—or what Osterwalder and Pigneur call "building blocks"—but that level of detail is beyond the scope of this article.

13   Chesbrough, Open Business Models; Chesbrough, Open Services Innovation.

14   Osterwalder and Pigneur, Business Model Generation.

15   Clayton M. Christensen, Jerome H. Grossman, and Jason Hwang, The Innovator's Prescription: A Disruptive Solution for Health Care (New York: McGraw-Hill, 2009).

16   Porter, On Competition.

17 Christensen and others, "Disrupting College."

18   Software and Information Industry Association, "SIIA Trends Report."

19   Christensen and Eyring, The Innovative University.

20   U.S. Department of Education, "National Education Technology Plan: Transforming American Education."

21   Software and Information Industry Association, "SIIA Trends Report."

22   Ferrer and Alfonso eds., Content Management for E-Learning.

23   Robert Sheets, "Meeting Global Competitiveness Challenges: The Next Generation of Workforce Policy" (Washington: National Governors Association, Center for Best Practices, 2003); Institute for a Competitive Workforce, College 2.0.

24   David D. Dill, "The United States," in David D. Dill and Frans A. van Vught, eds., National Innovation and the Academic Research Enterprise: Public Policy in Global Perspective (Baltimore: Johns Hopkins University Press, 2010).

25   Ibid.

26   Richard K. Lester, "Universities, Innovation, and the Competitiveness of Local Economies," Working Paper 05-010, (MIT Industrial Performance Center, 2005).

27   Henry W. Chesbrough, Open Innovation: The New Imperative for Creating and Profiting from Technology (Boston: Harvard Business School Press, 2003).

28   Chesbrough, Open Business Models; Chesbrough, Open Services Innovation.

29   Kevin Carey, "The End of College Admissions As We Know It," Washington Monthly 43 (9/10) (2011): 22–32.