Higher education is under enormous pressure to improve outcomes and reduce costs. Information technology can help achieve these goals, but only if it is properly harnessed. This article argues that one key to that harnessing is business model innovation that results in more “open” and “unbundled” operations in learning and credentialing, research and development, and business management.
Disruptive Innovation

A good starting point is Clayton M. Christensen’s theory of “disruptive innovation” and the framework he and his colleagues have developed for analyzing disruptive innovation in industries. A Harvard Business School professor, Christensen distinguishes disruptive, industry-transforming innovation from what he calls “sustaining,” or incremental, innovation. The former occurs when entrepreneurs use sophisticated technologies to create more simplified and routinized solutions to customers’ problems—solutions that often are less high-performing than previous ones but whose price and convenience attract whole new categories of consumers. Good examples are the early desktop computers and MP3 players. These new solutions gradually improve to the point where they are in a position to displace the previously dominant solutions.

In education, Christensen and his colleagues point to online learning, in particular the disruptive potential of student-centric and adaptive online learning systems based on advances in information technology and in learning sciences. Other examples are breakthroughs in information technology related to content management and social media, data management and analytics, and the management of business processes.

However, these new technologies are unlikely to achieve their transformational potential without parallel changes in their industry’s business models and value networks, which in turn may require shifts in the standards and regulatory environment. This article focuses on the role of business models in higher education, especially open, unbundled business models. It begins by explaining various kinds of business models and proceeds to show how these models can better harness recent advances in information technology and thereby achieve dramatic improvements in learning and credentialing, research and development, and business management.

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 enough money to remain competitive. All organizations, whether for-profit or nonprofit, have a business model, whether or not it’s explicit.

Business models involve four core elements: (1) a “customer value proposition,”
which explains how an organization will address customers’ needs through a product or service it offers; (2) a “value chain,” which organizes processes, partners, and resources to deliver the value proposition; (3) a “profit formula,” which lays out how an organization will generate enough revenue to more than cover costs; and (4) a “competitive strategy,” which details how an organization will compete with rivals and defend its position in the value network.5

Given the many possible variations in 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 in the 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,” “multi-sided,” and “unbundled” and that involve “facilitated networks.”

Open Business Models
Open business models involve the organizational use of external as well as internal ideas and resources, and of external as well as internal pathways for deploying them to create and capture value. “Outside-in” strategies exploit external ideas and resources within an organization, whereas “inside-out” strategies create additional value from inside ideas and resources by moving them through external pathways. In the view of Henry Chesbrough, a leading expert on open innovation, the most advanced type of open business model is the open “platform” model. It 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. Examples are the use of platforms by Amazon and Apple.6

Multi-Sided Models
Many open business models, especially open platform models, involve some features of what Alexander Osterwalder and Yves Pigneur call “multi-sided” models. These create value by facilitating interactions between interdependent groups of customers, such as applications developers and users on the platforms.7 Higher education institutions
have a multi-sided 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. These separate three core business functions that require different types of organizational expertise: (1) customer relationship management, (2) product innovation, and (3) 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, care, examples are patient-centered networks that 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” as a result of reducing informational complexity and asymmetry (i.e., higher education institutions have and can use more information about students than students have and can use about them).

**The Promise**  
Multi-sided 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 and comparable improvements in research and development and in business management.

**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: (1) research, which operates as a “solutions shop,” and (2) learning and credentialing, which is a “value-adding process.” 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:

- **Design:** Determine what a student needs to know and be able to do for a successful career launch in a chosen field.
- **Develop:** Develop a sequence of learning experiences and related services for achieving these skills through a curriculum including learning units (e.g., courses, modules, objects) with the necessary learning and assessment resources.
- **Deliver:** Provide learning services based on the design and curriculum.
- **Assess and Credential:** Assess students’ skills and provide various types of credentialing (e.g., grades, portfolios, certificates, degrees) that have market value.
- **Connect and Transition:** Connect students with employers (e.g., through internships) and help them find...
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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 (i.e., product innovation) and deliver the instruction (i.e., 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 non-credit 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.11

Many higher education institutions are under considerable pressure to offer a large menu of programs and courses. Yet they 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 is a mix 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, the curriculum development. They also administer fewer programs and minimize the number of pathways through these programs with fewer electives.12

Western Governors University 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 opened up 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. 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 outsourced to provide a multi-sided 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 (e.g., 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,” which could be used to 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 e-learning standards.

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 multi-sided, 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 (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 (SLC), coordinated through the Council of Chief State School Officers (CCSSO) and funded by the Bill & Melinda Gates Foundation and 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 learningware.

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 (e.g., 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 (e.g., low-enrollment programs and course options) to meet more-specialized employer and student needs.

**Barriers**

Although innovative business models of the kind discussed above promise enormous productivity gains, they face several barriers to widespread adoption. One is that they call for 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 less profitable 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.

Fourth, 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 non-traditional sectors, including for-profit institutions and specialized service providers like StraighterLine. Fifth, federal and state student loan policies have many legacy assumptions that impede the use of more flexible student financing options. Finally, 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 healthcare 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 it is small (approximately 15 percent) but critical because 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 and to spur economic development. 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...
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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 non-research 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 dramatically improve the performance of higher education as well as empower customers by removing the information asymmetry and complexity in the marketplace—a major aspect of the competitive structure of the higher education industry, as described above.

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 (e.g., SAS), career and education guidance and counseling services (e.g., Career Cruising), and credential management services (e.g., Parchment) supported by multi-sided infrastructure management services. These infrastructure management services could provide full data integration with state 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.

**Implications**

Information technology’s potential to dramatically improve the performance of 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, to create shared multi-sided platforms that provide tools and information to university admissions officers and enrollment managers, as well as to high school guidance counselors and students and parents. 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 described above.

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.
of higher education will be realized only when new business models arise to harness it. Especially promising are open, multi-sided, and unbundled models that involve facilitated networks. Applied to learning and credentialing services, these new models have the potential to improve performance by achieving greater economies of scale and scope and providing the basis for greater personalization, access, and choice at affordable prices. They could also improve research and development, by improving access to and utilization of shared research infrastructures. Finally, they offer new potential benefits to institutions, students, and federal and state funders in the area of enrollment management and P-20 transitions.

The challenge is to further develop and evaluate these potentially disruptive business models and take the best of them to scale. Going to scale will require compatible changes in higher education value networks and the larger standards and regulatory environment, issues we will be addressing elsewhere. IT professionals can play a major role in helping all this to happen.

Notes
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6. Chesbrough, Open Business Models; Chesbrough, Open Service Innovation.


13. NETP, Transforming American Education.


15. Ferrer and Alfonso, Content Management for E-Learning.


18. Ibid.


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