INTRODUCTION

A Pivotal Moment in the University Credentialing Ecosystem

On any given day, a company such as Cree, Inc., a publicly traded multinational with more than 6,000 employees and $1.6 billion in annual revenue, may have more than 100 open jobs that it is looking to fill in the United States alone.[1] Cree is a developer and manufacturer of light-emitting diode (LED) lighting and semiconductor products. Headquartered in North Carolina's Research Triangle region, the company has operations ranging from research and development in its headquarters to manufacturing facilities in North Carolina, Wisconsin, and China. As a result, its talent needs span a wide educational spectrum, from roles that require no or a few years of postsecondary education, to leadership and R&D positions that rely on master's and PhD degrees. Over the course of 2015, approximately 18 percent of Cree's job openings preferred high school or vocational training, and the majority—another 82 percent—preferred a college degree at some level.

As firms such as Cree expand in the knowledge economy—seeking talent in areas such as manufacturing, software development, and engineering—they draw on the market of both experienced talent and the more than three million new college graduates annually in the United States.[2] For US firms, this talent market is increasingly

global, with hiring activity and applicants spanning multiple continents. Potential hires come to the table with a wide range of experience levels and with a variety of credentials from an extremely diverse pool of higher education institutions. Some of these individuals come from elite schools; others may have completed only part of a degree at a state university; others may have completed an online program in leadership or a vocational certificate in a leading-edge area of manufacturing.

It is within this complicated context that professionals such as Tom Mathews, senior vice president of human resources at Cree, operate. With his more than thirty years of experience in human resources at firms such as Shearson Lehman Brothers (an American Express company) and Time Warner Cable, Mathews, like other executives who are charged with finding and developing their companies' talent base, increasingly rely on colleges and universities and the credentials they issue—as indicators of skill, capability, trainability, or leadership potential. At Cree, like many companies, a job with educational qualifications at the college level may likely seek strong skills in data analysis, communication, writing, problem solving, or project management. As Mathews notes, "Degrees still matter, from a credentialing perspective, from an intellectual capacity perspective"—and as a signal showing "the ability to stick with something and get it done."[3] While the hiring processes of the future may be more driven by deep analysis and optimization based on sophisticated technological algorithms operating across a network of data on jobs and credentials, in the hiring activities of most firms today, university-issued credentials—particularly degrees—are central job qualifications, whether as a proxy for ability or as a direct measure of skill.

How did we arrive at a moment in which university credentials are the key currency and gateway to professional jobs? How meaningful is a degree, and are real alternatives to the degree emerging? Answering these and other related questions is the focus of this book.

THE PRIMACY OF UNIVERSITY CREDENTIALS

Producing degrees is one of the principal products of colleges and universities, and the foundation of the business model for most higher education institutions. University-issued credentials such as degrees possess a strong and unique market power, backed by the quality assurance of accreditation.[4] Whether one believes that degrees are pure certifications of skill and knowledge, or more pessimistically that they are simply an elaborate signaling mechanism, in either case, the degree and other types of university credentials are critical and nearly universal occupational qualifications in the modern job market.[5]

As educational researcher and sociologist David Baker argues, educational credentials are at the center of the transformation of work in modern society. According to Baker, "With its vast culture of education, a distinctive feature of postindustrial society is the primary requirement of formal educational training for access to increasingly more occupations. Over time and across many occupations, educational credentials have gone from mostly irrelevant, or at best supplemental, to now dominant."[6] University credentials are deeply ensconced in the workings of the job market and our economy, and despite prognostications to the contrary, the legitimacy of degrees is only growing.[7] Similarly, the research of MIT economist David Autor makes a convincing case that transformations in the modern economy have escalated the demand for college-educated workers—especially those with advanced degrees. According to Autor, waves of innovation are indeed automating jobs that require lower levels of manual and routine cognitive labor; however, at the same time, these dynamics are simultaneously increasing demand for higher-level jobs that require college-level skills in problem solving, critical thinking, communication, and so on.[8]

Although the movement to a knowledge economy and the transformation of professional work has been playing out over many decades, we are today at a pivotal and unique moment in the evolution

of the role of degrees and other educational credentials in the workforce. Technological innovation has been a defining characteristic of the economy in the 2000s, and technology is simultaneously enhancing the value of degrees and college credentials in the workforce, while also challenging how the entire credentialing landscape works.

Beyond just degrees, colleges and universities award a wide range of credentials that educational experts place in the broader category of postsecondary awards, which includes various certificates and diplomas. A great deal of attention is currently being focused on certificates and other types of higher education credentials, as colleges and universities increasingly experiment with—and as employers demand—shorter forms of learning. However, a significant majority of university-issued credentials are degrees. Despite their shorter nature, all forms of certificates from the undergraduate to postmaster's level account for only 21 percent of postsecondary credential conferrals each year, with most of them at the sub-baccalaureate level. Of all higher education credentials issued by colleges and universities each year, bachelor's degrees account for nearly 38 percent; associate degrees, 22 percent; master's degrees, 16 percent; and doctoral degrees, less than 4 percent.[9] Historically, the US higher education system has been a degree production machine, with certificates, diplomas, and other credentials representing an important but relatively small segment.

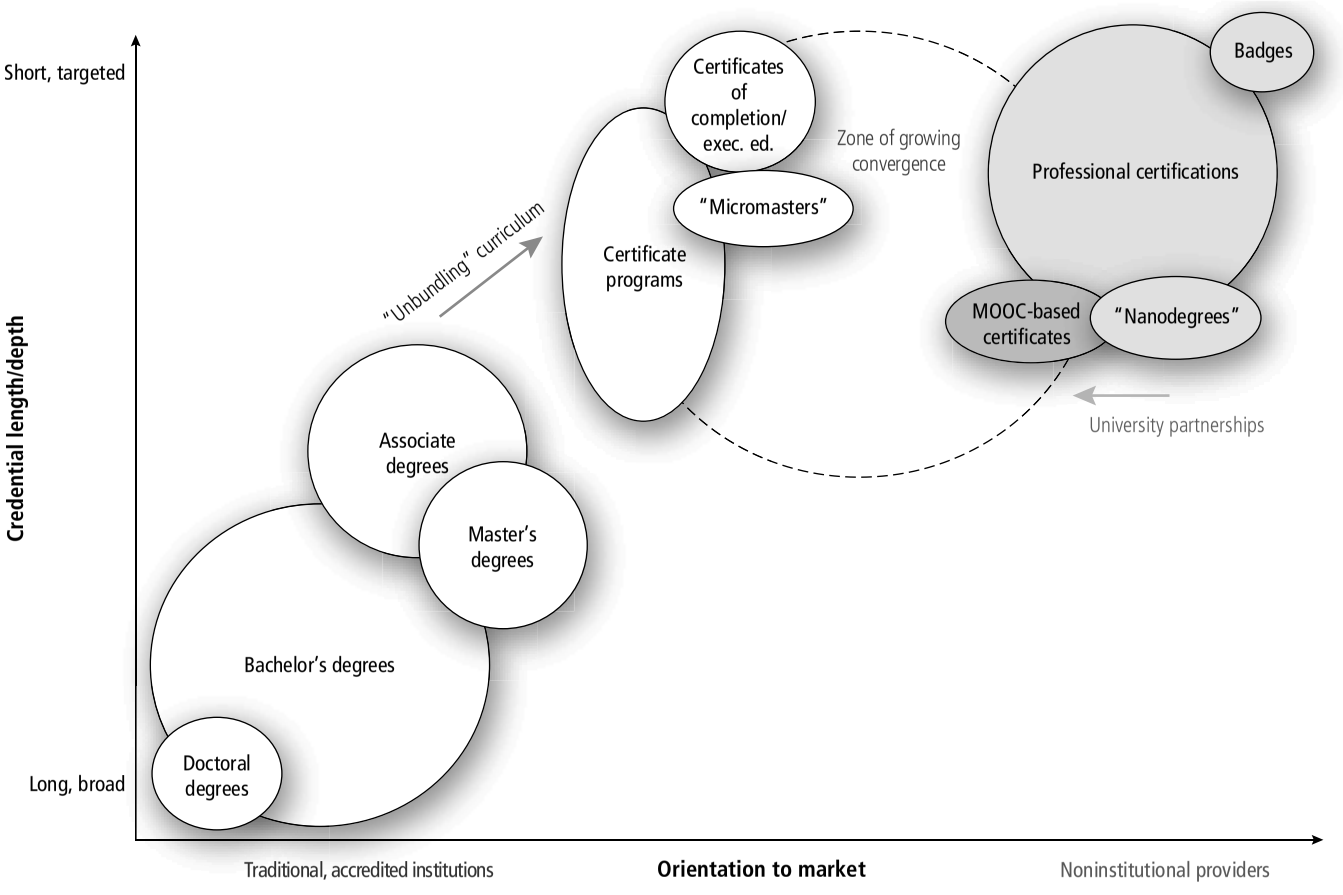
Thus, in using the term *university credential* throughout this book, it is typically in reference to degrees. Yet, the use of the broader term *credential* purposefully captures the other categories of postsecondary award, and also acknowledges that the dynamics of credentialing are changing and that the future does appear to include many new types of programs and credentials well beyond the traditional degree or certificate. Further, the term *university credential* bounds our discussion to the programs and credentials offered by or in affiliation with *universities*. This focuses our analysis on the issues for—and offerings of—the higher education sector, rather than

the broader, highly diversified and fragmented landscape of professional credentials, certifications, and vocational licenses awarded by industry organizations, companies, and government bodies. These types of credentials are important substitutes or alternatives to college study and are held by about a quarter of the US population, but they are beyond the scope of this higher education–focused analysis, although we touch on them many times in this book.[10] Finally, in a semantic sense, the term *credential* importantly invokes the job market function of degrees, certificates, and other university program offerings. For students, university credentials certify their completion of a course of study and provide them with a portable currency of value in the job market. Employers rely on these credentials to interpret the ability, skill, potential, or other attributes of the credential holder in hiring decisions. Understanding how university credentials work in the job market is the core focus of this book. Figure I.1 is a conceptual illustration of the credentialing landscape and the area of growing convergence in short-form university-issued credentials and those from noninstitutional providers.

This book also takes the perspective that the environment in which university credentials exist and operate is a multisided market, or *ecosystem*. The ecosystem principally consists of the colleges and universities that issue university credentials; the employers that use them in making hiring decisions; the students that need them; and the government and quality assurance bodies that provide a policy and quality assurance framework for them, among other parties—which include, for example, various technology firms and investors. Understanding the value and future of university credentials requires understanding the overall environment and the components of the ecosystem, including its relationships, intersections, and momentum flows.

Before we dig into analyzing the workings of the university credentialing ecosystem, it is first important to establish context. The role played by university credentials in the job market is a central issue within a much larger higher education policy and economic

Figure I.1 The credential landscape: Market size and orientation and credential duration



dialogue concerning how university study aligns with economic outcomes and the themes of greater transparency, value, and innovation.

THE RISE OF THE CREDENTIAL AND THE JOB MARKET OUTCOMES OF HIGHER EDUCATION

Interest in how higher education relates to job market outcomes has been building over the past decade and a half, as a result of various trends that have now reached an inflection point.

After bottoming due to a demographic low in the early 1990s, US higher education saw a rising tide of demand that extended from the second half of that decade through the first decade of this century. College and university enrollment experienced fifteen consecutive years of growth, from 14.3 million students in 1995 to 21 million in 2010.[11] Although the vast majority of this growth was in domestic students, the inflow of international students to the United States has been a fairly significant contributor as well, especially in recent years. The number of international students studying in the United States grew 72 percent over fifteen years, from just over 500,000 in 1999–2000 to nearly 900,000 in 2013–2014.[12] It was around and shortly after the year 2000 that a number of long-running and newly emerging demand-related dynamics converged to both drive enrollment growth but also begin to disrupt the foundations of the traditional higher education business model.

The dot-com era that lasted from the late 1990s into the year 2000 brought the first major wave of technology-driven transformations and innovations to higher education, a period that we will explore in chapter 3. Hundreds of educational start-up companies raised a total of $5.5 billion in venture capital and private equity between 1999 and 2000 alone, with many of them targeting higher education; however, very few of these firms were able to find a sustainable business model.[13] Many of today's entrepreneurs and pundits who are champions of "disruptive innovation," massively open online courses (MOOCs), and next-generation online credentials are

unfamiliar with many of the experiments and lessons of this era. For example, in 1999, Jones International University became the first purely online university to gain regional accreditation—and indeed one of the only such institutions to ever exist, despite the preponderance of the term *online university*.[14] Stanford University, Columbia University, the University of Chicago, and a few other elite universities and their business schools came together to fund and build UNext/Cardean University, which raised more than $100 million in private capital but ultimately did not succeed in scaling its innovative online executive MBA program.[15] Meanwhile, a decade before the first MOOC, the notion of high-end online personal enrichment classes was advanced with AllLearn, a collaboration between Oxford, Stanford, and Yale (AllLearn quietly closed down in 2006; Rick Levin, president of Yale at the time, would later become the chief executive officer of Coursera).[16] Across the pond, the government in the United Kingdom established and funded UK eUniversities as a state-sponsored online learning vehicle in 2000 with £50 million of public money, but it attracted only 900 students before folding in 2004.[17] The consensus view was that the market was not yet ready for these new forms of online learning and nontraditional approaches to credentials.

This period saw a number of bold prognostications about the future of colleges and universities—often relegating higher education institutions to endangered species status. In the late 1990s, management guru Peter Drucker had suggested that traditional universities wouldn't survive the Internet era, while Cisco Systems CEO John Chambers was christening e-learning the Internet's next "killer app."[18] At this same time, a parallel postsecondary universe of information technology (IT) certifications was emerging, providing a viable alternative to traditional degree study as students pursued Cisco, Microsoft, A++, and other technology vendor–sponsored certification programs to forgo traditional college study and secure high-paying jobs.[19] Between 1997 and 2000, an estimated 2.4 million IT

certifications were issued worldwide, and this was an early and notable example of professional credentials successfully substituting for university credentials, as millions of workers found their way into high-paying IT jobs without degrees.[20]

These technology-enabled market developments were just one sliver of the much broader activity across the higher education landscape at the time, but they were a signal of what was to come in the years ahead. One of the catalytic impacts of this era was inspiring the idea that legitimate university credentials could be delivered and earned online, when in the mid-2000s traditional institutions with traditional brands moved into online delivery with full degree offerings.[21] Much like how the recent boom in Silicon Valley technology start-ups was built on the foundation of cheap bandwidth and computing power created by the overbuilding of first-generation telecom/fiber/Internet infrastructure companies, the online education experimentation of the early 2000s laid the groundwork for the leaps forward in the years ahead.[22] Indeed, because so much of the future of university credentials is associated with online education, the history and present evolution of online education and its credentials are significant characters in the chapters ahead.

The recession, stock market decline, and changing employment landscape that brought an end to the dot-com era in 2000–2001 also set the stage for the direction that the higher education market would evolve. Classically, higher education enrollment had been countercyclical—with student enrollment increasing during challenging job markets.[23] As the economy contracted, college enrollment grew at a significant rate.[24] Further, demographics—in addition to economics—were now strongly on the side of higher education enrollment growth. Enrollment in colleges and universities had bottomed out in 1995 due to the relatively low number of births in the mid-1970s. However, the baby boom echo was coming—with record numbers of high school graduates throughout the 2000s creating the strongest pipeline for college study ever.[25] The attention of policy

makers was turning to preparing for this coming demographic wave, as well as meeting the needs of a knowledge economy that was, in the postrecession recovery, demanding more college-educated workers.

The economic expansion of the 1990s had been characterized by growing tax receipts and higher government funding levels for higher education, but in the early 2000s that funding, including state appropriations, peaked and began to significantly decline—a particularly significant fact as the vast majority of students in the US postsecondary education system attend public institutions.[26] As a result, tuition began to escalate at rates above the historical norm, as costs shifted to students and families. Increasingly, higher education was being seen as a private good—generating a return for the individual who invested in it—as much as a public good.[27]

Just as higher education demand was increasing and costs were escalating in the early 2000s, the "college wage premium" (the economic value of college education versus just a high school diploma) was flattening. According to education and workforce expert Anthony Carnevale at Georgetown University, the value of college education over a high school diploma reached a premium of 73 percent by 1999 (and the value of an advanced degree reached 124 percent).[28] The college wage premium had grown relatively steadily throughout much of the 1980s and 1990s, but as Jonathan James, an economist at the Federal Reserve Bank of Cleveland, pointed out, the rate of growth for the college wage premium has been much slower since the late 1990s.[29] In fact, while the wage advantage of a college degree "persists at historically high levels," rather than growing, the premium of a four-year degree alone has remained flat over the last decade.[30] Bachelor's degrees have maintained a very strong economic premium over the alternatives, but advanced degrees have accounted for virtually all of the recent growth in the wage premium. Since the most common credential produced by universities is bachelor's degrees, this trend could be considered a significant driver of the recent attention given to the return on investment of college education and the importance of credentials.[31]

Amid all of these aforementioned market dynamics—recession and recovery, the emergent online delivery of credentials, pressures on financing, and shifts in the economic value of degrees—Congress was due to reauthorize the Higher Education Act in 2003, a process that would ultimately take until 2008. The Higher Education Act is the federal regulatory foundation for colleges and universities, including the framework for billions of dollars in student and institutional aid. At the time, key issues associated with the reauthorization process included expanding access, managing tuition price increases, encouraging accountability and standards, and responding to growth in distance education.[32]

In 2005, these prominent policy themes tied closely to the creation of "The Secretary of Education's Commission on the Future of Higher Education," colloquially referred to as the Spellings Commission, after US Secretary of Education Margaret Spellings. The commission's work consisted of studying the state of higher education and its intersection with the economy as well as making recommendations for reform. It was envisioned as having a watershed impact similar to the publication of *A Nation at Risk* in 1983. The founding charter was particularly focused on meeting the needs of developing a more educated American workforce, as well as the themes of access, affordability, accountability, and quality.[33] This focus was driven by the fear that higher education was failing to adequately prepare students for the workforce and that reforms were needed. Appointed by the Secretary of Education, the commissioners consisted of a mix of college presidents, policy and thought leaders, CEOs, and others. The commission issued its final report in September 2006, using the term *credential* on the first page, within the first point of the report's findings:

> The transformation of the world economy increasingly demands a more highly educated workforce with postsecondary skills and credentials. Ninety percent of the fastest-growing jobs in the new information and service economy will require some postsecondary

> education. Job categories that require only on-the-job training are expected to see the greatest decline. In high-demand fields, the value of postsecondary credentials and skills is likely to rise. The Department of Labor projects, for instance, that by 2014 there will be close to four million new job openings combined in health care, education, and computer and mathematical sciences.[34]

In addition to setting the tone regarding the value of postsecondary credentials in the workforce, the Spellings Commission's making the case for broader educational access and scaling up the US system of higher education would shape much of the dialogue in the years ahead, even as the commission's process and the report's reform-oriented tone were criticized within some higher education circles. The commission did appear to achieve its goal of generating a national dialogue about the future of higher education, and its conclusions suggested a future in which credentials were the ticket to workforce success and American economic competitiveness.

By 2008, citing the same job market and competitive imperatives as the Spellings Commission, the Bill & Melinda Gates and Lumina Foundations were defining their higher education missions as focused on higher education attainment, and specifically, using the language of credentials. As the Gates Foundation began to move beyond innovation in K–12 education and was ramping up its Postsecondary Success program in 2008, it defined its goal as "to help double the number of low-income adults who earn postsecondary degrees or credentials—meaningful credentials with value in the workplace and labor market."[35] In the Lumina Foundation's first four-year strategic plan in 2009, the foundation defined its mission around what it now refers to as "Goal 2025"—which aims to "increase the proportion of Americans with high-quality degrees, certificates and other credentials to 60 percent by 2025."[36] Again, the term *credential* and the focus on the job market were central because thought leaders and policy makers were defining success as not exclusively being based on college *degrees*—which were increasingly

seen as an expensive multiyear proposition—but rather, being built on other forms of educational credentials.

If the Spellings Commission was the spark that began to kindle the vision for scaling up educational attainment levels and encouraging stronger job market alignment, it was the Great Recession of 2007–2009 that poured fuel on the fire. By the start of 2009, bold educational attainment goals related to credentialing were ensconced in national policy when in the State of the Union address—amid a growing recession and the national unemployment rate at 8.1 percent—President Obama called for every American to have at least one year of postsecondary education, with the goal of America becoming the most educated country in the world again by 2020.[37] By 2010, the National Governor's Association had announced its Complete to Compete initiative, heavily framed around the language of credentialing.[38] In the years since these developments, this college completion agenda has been the primary focus of most national-level education policy, driving substantial new investments and funding; calls for innovation; and support for new models such as competency-based education, all in service of the educational attainment goals.[39]

Independent of the policy undercurrents that had been brewing for years, the financial crisis and recession were certainly the tipping point that brought the employability of college graduates to the fore as an especially urgent issue. Suddenly, college graduates were having difficulty finding jobs in a time that was regarded as the worst in many decades to begin a career, with the unemployment rate for recent graduates in their twenties reaching nearly 20 percent.[40] Colleges and universities—even the most prestigious ones—found that they were underprepared to place their students in jobs in such a turbulent environment, and many—from the University of Southern California to Brown University—began to invest heavily in career services.[41]

Today it is well accepted that one of the primary purposes of higher education is to prepare students for and connect them to jobs, in service of both the student and the broader economy. Among incoming

college freshmen, 88 percent cite "to get a better job" as a very important reason for attending college—up from 68 percent in 1976, according to long-running national surveys by the Higher Education Research Institute at UCLA.[42] At the same time, however, nearly 90 percent of business executives believe that college graduates lack the skills to succeed.[43] A widely cited McKinsey report in 2012 characterized the global "education to employment" system as in great distress, with graduates who can't find jobs and employers who can't find skills—and suggested that this disconnect escalated the risk of global unrest.[44] As Peter Stokes documents in his recent book *Higher Education and Employability: New Models for Integrating Study and Work*, the perception of a skills gap and needing to align higher education with job outcomes has become a central theme in today's higher education dialogue.[45] In particular, the prompt for higher education to play a stronger and better role in workforce development has inspired a particular focus on innovation and new business models, including new approaches to credentialing.

As the economic forces of the last decade brought an elevated focus and intensity to the intersection of higher education and the job market, the government, media, and consumers have been focused more than ever on jobs—and key to jobs are university credentials.

UNIVERSITY CREDENTIALS IN FOCUS

Market forces, the college completion movement, and the drive for innovation in higher education are resulting in new approaches to the development and delivery of university credentials. The credential is emerging as a key character in the evolving story of American higher education.

The opportunity associated with new forms of university credentials is increasingly front and center among senior institutional leaders. The American Council on Education's Presidential Innovation Lab recently acknowledged the emergence of new types of credentials as a significant trend, and the Association of Governing Boards

has similarly pointed out that the emphasis on new forms of online learning such as MOOCs is catalyzing new approaches to credentials and bears monitoring by those who govern institutions.[46] Many universities—even the most elite institutions—have begun to aggressively experiment with developing and issuing new forms of credentials. Harvard Business School has launched HBX CORe, which stands for Credential of Readiness, and is a short, intensive, MOOC-inspired online program that now translates into credit at Harvard Extension School.[47] Universities such as Johns Hopkins are offering specialization certificates through online platform company Coursera.[48] And, as another example, leaders at the Georgia Institute of Technology, Northwestern University, the University of Wisconsin, the University of Washington, and two University of California campuses have partnered to develop a joint project focused on new forms of online credentials and digital badges.[49]

In the higher education trade press and general media, it seems not a week goes by without some discussion of the future of university credentials. The *Chronicle of Higher Education*'s September 2015 special report kicking off the new academic year was titled "The Credentials Craze," and featured a package of thoughtful articles on trends and issues associated with new forms of credentials.[50] In that same month, an article in the *New Yorker* discussing the return on investment of college covered some of the finer points of human capital theory in discussing how degrees work as signals or measures of skill.[51] One month later, an October 2015 symposium convened by the *Economist* in New York City featured panel sessions of policy, academic, and business leaders discussing topics such as the value of traditional degrees and nanodegrees, while the influential magazine's pages were exploring the credentials offered by technology start-up Udacity in partnership with major employers.[52]

In addition, substantial funding streams are both following the alternative credentialing trend and driving it. Arguably one of the more significant developments in this area in years occurred in mid-2015 when the US Department of Education announced the development

of a pilot program to create experimental sites that would through new quality assurance mechanisms and partnerships open up access to noninstitutional educational providers such as technology boot camps and MOOC providers.[53] If this effort progresses beyond an experimental pilot stage, it could be a game changer not only because federal financial aid for higher education in the United States is a $150 billion funding stream, but because it would begin to break the monopoly that universities have on producing accredited credentials and access to federal financial aid.[54] As President Obama noted in his remarks launching an initiative called TechHire, the desire of policy makers is to leverage faster, cheaper alternative methods to teach skills and link individuals with jobs, rather than rely only on traditional qualifications such as a degrees.[55]

Significant private capital is also flowing to innovations in university credentialing and the adjacent professional credentialing space. The education sector set records in 2014 with $1.4 billion in venture capital and private equity raised by US educational technology firms, a pace that continued through 2015.[56] Some of the largest funding rounds of 2015 went to higher education and professional skills-focused firms, such Pluralsight (an online training provider) and Udacity, which coined the term *nanodegree*.[57] Parchment, a company that describes itself as offering a credentials management system in service of students, institutions, and employers, raised $40 million over the course of 2014 and 2015; while Degreed, another learning tracking and credentialing system, raised $28 million over the course of 2015 and 2016.[58] Meanwhile, publicly traded behemoth LinkedIn, which has been busy disrupting the hiring and recruiting space for years, is increasingly defining its business strategy as developing and owning the economic graph that connects job seekers, employers, and institutions.[59] LinkedIn has been creating an interesting set of tools and databases for potential college students and professionals. In 2015, the firm turned heads when it spent $1.5 billion to acquire Lynda.com, an online professional

skills provider, as part of a strategy to link training and skills development with credentials and jobs.[60]

Employers are last but certainly not least in the cresting wave of momentum. Human resources/hiring expert Peter Cappelli, a professor at the University of Pennsylvania's Wharton School, has studied the intersection of higher education and hiring for many years and suggests in his recent book *Will College Pay Off* that the "burgeoning world of skill-based credentials" is important to monitor.[61] There is a great deal of opportunity for improvement in how employers assess their workforce and make hiring choices, and HR/talent analytics is emerging as a top area of focus in corporate strategy given the strengthening economy and the more than $125 billion annually that US companies spend on hiring and recruiting, according to Deloitte.[62] Further, in a growing number of cases—while they remain the exception—major employers are transforming how they consider university credentials in their hiring process. For example, professional services firm Ernst & Young's United Kingdom operation announced in August 2015 that it was scrapping traditional academic credentials as a qualification and moving toward online testing, following an eighteen-month-long analysis of its hiring process.[63] In the academic world that studies how corporations hire and manage their workforce, there has been for many years a call for deeper and more descriptive analysis of how managers and human resources professionals actually make hiring decisions: much of the hiring process, as critical as it is, is a "black box."[64] Particularly in today's global market for talent, employers need an appropriately prepared workforce and also need to better understand how to assess and use new forms of university credentials in an increasingly fragmented landscape. Moreover, to ensure that programs and student outcomes are aligned with market needs, universities—many of which have historically viewed a focus on workforce issues as vocational and below them—must do more to align with the changing employment landscape.

THE IMPERATIVE FOR A DEEPER UNDERSTANDING IN AN INEFFICIENT AND RAPIDLY EVOLVING ECOSYSTEM

This book is built on the recognition that the higher education market and critical aspects of the economy revolve around university credentials. However, given how important this topic is, it is quite surprising that our understanding of how employers use university credentials in hiring is not well understood. Analyzing the role of university credentials in hiring sits at the intersection of multiple academic domains—including sociology, education, economics, and business. Expert researchers who have focused on hiring and credentialing, such as Lauren Rivera, David Brown, and David Bills, note that the empirical research on how employers use credentials is very limited and that much more research is needed.[65] Moreover, most of the limited academic research on this topic dates to the 1980s and 1990s and often focuses on hiring processes in sectors and at levels below the professional roles that prefer or require university credentials. The economists who study the issue tend to focus on quantitative analyses and formulas related to years of schooling and human capital, whereas sociologists are often more interested in how credentials relate to occupational status or class.

Further, although there appears to be consensus among key parties that the future higher education landscape will include a proliferation of new options and university credentials beyond the monolithic degree, frequent prognostications about the "death of the degree" and the brave new world of digital credentialing are very often not built on empirical evidence or data, but rather on anecdotes and speculation.[66]

It is this problem that this book aims to solve, by analyzing the future of university credentials in an evidence-based fashion. As this introduction has established, understanding the future of university credentials is crucial for a wide range of parties who must plan and adapt to the changing environment. Academic leaders within universities are tasked with designing, delivering, managing, and assessing

credential programs. As a result, they must think strategically about the design and delivery of academic programs based on a strong understanding of how credentials and their curriculum intersect with the job market. In addition, university administrators, boards, and government leaders have a major role and interest in the oversight and production of university credentials, and they can benefit from a systematic view for better-informed administration, oversight, and strategic planning. Policy makers and regulators also have a special need to understand the future of university credentials, as they seek to optimize the structure and financing of higher education and workforce development, and also provide appropriate frameworks for quality assurance and innovation.

Additionally, business leaders and major employers rely on university credentials as the backbone of millions of critical hiring decisions and billions of dollars in learning and development investments made each year. They also need an understanding of future directions in the market for talent, and how their actions and voices as key stakeholders can have an impact on universities and higher education policy. Finally, other parties—such as the growing number of start-ups, established education companies and publishers, and investors—view the credentialing ecosystem as a major and growing market opportunity. As they shape their business strategies, they too can also benefit from a timely and comprehensive review of trends in the environment to influence their business ideas and strategy.

THIS BOOK AS A SOLUTION

As a range of leaders in higher education, government, and industry encourage innovation in higher education, many are claiming that higher education—in the United States, if not worldwide as well—is broken or in crisis. It follows then that insofar as credentialing is a central feature of higher education, perhaps it is the credentialing mechanism that is in need of innovation and key to understanding and generating new models and greater value. This is precisely

why MOOCs, digital badges, $10,000 bachelor's degrees, and the like are often positioned as harbingers of healthy disruption and potential saviors of higher education and workforce development in the twenty-first century: evolving the credential ecosystem is key to optimizing higher education.

To have the modern credentialing ecosystem that so many seem to desire—one that is high quality, is more efficient and transparent, enables greater access, and is relevant globally—the US system as it works today needs to adapt to change. This will require the various parties ranging from educational institutions and government agencies to employers themselves to work more closely together.

In the pages ahead, we will explore how the university credentialing ecosystem is evolving—with an eye to the future that is grounded in an analysis of current market trends and an understanding of history. We will do so based on evidence and hard data: the academic and industry research literature, various surveys and other data sources, the voice of employers themselves based on extensive qualitative interviews, and a behind-the-scenes examination of how the academic and quality assurance worlds have approached and are approaching innovation in the development and delivery of university credentials.

Chapter 1 sets the analytical foundation with a brief history of university credentials and the demand for and value of them in the job market, tracing the growth of mass higher education and the rise of college degrees as a key occupational qualifications. Chapter 2 deeply explores what we know about how employers actually make hiring decisions and how and why they use university credentials as key occupational qualifications. With those critical dynamics established, chapter 3 establishes the lessons learned from the rise of IT certifications and early efforts in online education. Next, chapter 4 evaluates the maturation of the online credential market. Chapter 5 profiles the technology solutions and innovations that are shaping both university-side credentialing and employers' hiring

strategies. Chapter 6 focuses on examples of how the higher education system—universities, quality assurance entities, and so on—are responding to changes in credentialing via various new forms of university credentials. Finally, chapter 7 synthesizes the findings and analytical themes and focuses on implications and recommendations for the future.