REIMAGINING WORKFORCE POLICY IN THE AGE OF DISRUPTION

A STATE GUIDE FOR PREPARING THE FUTURE WORKFORCE NOW

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ABOUT FUTURE WORKFORCE NOW

Future Workforce Now: Reimagining Workforce Policy in the Age of Disruption was launched in 2018 to help states advance policy to prepare for the workforce needs of the future. The initiative is led by the National Governors Association Center for Best Practices (NGA Center) in partnership with FHI 360 and the Fab Foundation and with support from the Bill & Melinda Gates Foundation, Siegel Family Endowment and Schmidt Futures. Through a series of topical roundtables, Future Workforce Now brought leading economic, education, industry and workforce experts together with state policy leaders to share knowledge and expertise on the technological disruptions affecting current and future workers and workplaces. These leaders identified the major disruptions and global forces shaping the future of work and are pleased to present this publication as a transformative agenda for preparing the future workforce now.

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PREFACE

When Future Workforce Now: Reimagining Workforce Policy in the Age of Disruption launched in 2018, emerging technologies were rapidly shifting expectations of workers. Meanwhile, many employers struggled to retain talent amid a tight labor market fueled by a decade of economic expansion. Leaders around the globe were and still are adapting to these global forces. Future Workforce Now was launched to assess the impacts of technological disruptions on work, workers and workplaces and their implications for state policy. After more than a year of research and consultation with experts and state leaders, this guide offers governors and state policymakers a comprehensive toolkit for building a technologically resilient workforce ready to thrive in an evolving economy.

This publication was written before the COVID-19 outbreak and associated social and economic shocks. The world has since entered an entirely new state of disruption that will only accelerate the trends previously affecting the future of work and workers. This new context reinforces the findings of the Future Workforce Now initiative and underscores the urgency of the policy transformations that should be implemented as part of a systemwide, resilient education and workforce development agenda. States face unprecedented challenges, but leaders should not overlook the opportunity to use the innovations this guide identifies and those developed during the global pandemic. In addition, the authors encourage readers to consider the following:

An economic downturn will likely accelerate the adoption of technology in the workplace. Automation has historically accelerated during economic shocks as industry replaces simple tasks with technology to minimize labor expenses.[1] To avoid major displacements, states will need to close the technological skills gap for current and future workers, facilitate the redeployment of affected workers and enhance transparency on job openings.

Preexisting shortages in the workforce exposed an acute need for rapid reskilling in high-demand fields. During COVID-19, shortages of trained workers in essential fields, including health care and state government, dramatically affected quality of services. Many states and employers developed bold strategies to employ, train and transition new and existing workers to meet this surge in demand.[2] These innovations offer valuable lessons on how to rapidly train individuals for high-demand careers, including in health care.

A truly resilient workforce requires vigilant protection of vulnerable workers. Economic downturns exacerbate existing inequalities in the workforce. The economically disadvantaged, people of color, older workers, rural residents, those learning English and those with disabilities are at greater risk of falling into poverty and remaining there long after more affluent segments of the workforce recover. Communities must target innovative, accessible, high-quality education and training and comprehensive support to these populations and prioritize their protection within recovery agendas.

Stay-at-home orders exposed a lack of preparedness for 21st century teaching and learning. When educational institutions closed due to COVID-19, teachers cited major challenges in delivering high-quality virtual learning because they were unfamiliar with the required technology and had limited training in developing online curricula. Early research on the effects of this transition to distance learning suggests that some students experienced the learning loss typically associated with summer as early as March because of the pandemic.[3] The necessitation of virtual learning during COVID-19 will also contribute to poor outcomes for the millions of students without access to a computer or the internet. Unless states consider how to adapt lessons learned from this virtual learning experiment to innovate teaching methods across education and training programs, we anticipate a growing achievement gap.

Governors, in partnership with employers, educators, individuals and leaders at every level of government, are positioned to revive and rebuild a resilient American workforce that rebounds from this crisis better prepared for the future. This guide is a catalyst for action toward this future.

DEFINITIONS

Additive manufacturing/3D printing is a fabrication process whereby layers of material are laid down to build a 3D object from a computer design file. This technology is transforming industries, such as construction, health care, space exploration and supply chain management.[4]

Apprenticeship refers to a formal program that offers paid, hands-on work experience and related classroom instruction that result in postsecondary or industry-recognized credentials.[5] "Registered apprenticeship" refers to apprenticeship programs registered with the U.S. Department of Labor or state apprenticeship agencies. These must meet and report starting wage, wage progression, mentorship and coaching, workplace training hours and classroom learning hours requirements. Nonregistered apprenticeship programs also exist; to date, these programs have fewer such requirements in place. Youth apprenticeship programs offer paid, hands-on work experience and related classroom instruction that result in postsecondary or industry-recognized credentials to individuals aged 18 years or younger.

Artificial intelligence (AI) refers to automation that uses algorithms and computation to enhance human skills such as understanding human speech, predictive analytics and autonomous vehicles.[6]

Augmented reality (AR) and virtual reality (VR) use digital technologies to expand human interaction with the world by augmenting the user experience or creating a virtual, parallel experience.[7]

Automation refers to the use of technology to reduce the level of human activity needed to complete a particular task by replacing or augmenting labor. Key to this concept is that the task is still being performed but with less human input. Because automation occurs at the task level, it often changes rather than eliminates jobs, although in limited cases, technology can automate an entire job.[8]

Blockchain is a globally distributed ledger in which things of value can be stored and moved securely and privately. We tend to think of blockchain in financial transactions, but it is more widely used to record other transactions, such as inventory or education credentials.[9]

Cloud-based technology refers to the on-demand availability of computer resources, especially data storage and computing power. It is generally used to describe data centers available to many users over the internet.

Competency-based education (CBE) is a learning system that offers flexibility in the way credit can be earned or awarded. It offers students an opportunity to earn credit for more personalized learning opportunities by focusing on competency attainment and successful demonstration of knowledge, tasks or skills. These strategies minimize priority on traditional "seat time" and supplant teaching methods with online and blended learning, dual-enrollment and early college high schools, project-based and community-based learning and credit recovery, among others.[10]

Digital literacy means the skills associated with using technology to enable users to find, evaluate, organize, create and communicate information; develop digital citizenship; and promote the responsible use of technology.[11]

Digital resilience encompasses the awareness, skills, agility and confidence that enable individuals to adapt to changing digital skill demands and become empowered users and learners of new technologies. Digital resilience improves our capacity to solve problems, learn new skills using technology and navigate digital transformations.[12]

Disruption refers to major changes to work, workplaces, the role of workers and the global economy at large. This publication uses Harvard Business School professor Clayton Christensen's term "disruptive innovation" to specifically describe how new market entrants invent products and services that transform the way a market or industry functions.

Equity refers to the fair and impartial inclusion of people of color and other traditionally marginalized or underrepresented groups in the workforce. In this resource, this term is often used in discussions of expanding access to learning and employment opportunities, such as the removal of structural and institutional barriers and the proactive provision of support needed to overcome barriers to participation.

High-skill workers refers to those working in occupations that fall under the International Standard Classification of Occupations (ISCO)-88 major groups 1, 2 and 3, including legislators, senior officials, managers, professionals, technicians and associate professionals.[13]

Human skills include skills that are more difficult to automate, including empathy, curiosity, critical thinking, creativity, communication, analytical skills, collaboration and relationship building. These skills are increasingly in demand as technology disrupts the workforce. Development of these skills can help insulate workers against the risks that increasing automation poses.

Industry 4.0/smart manufacturing refers to a manufacturing system that uses advanced sensors, feedback loops, generative design, automation, the "internet of things" and many other new tools that integrate the digital, biologic and physical worlds. Industry 4.0 seamlessly connects every aspect of the process, from design to customer interface.[14]

Industry-recognized credentials are typically nondegree credentials that have value within an industry sector.

Internet of things is a system that connects electronic devices in objects on the internet. Applications can be found from medical records to manufacturing.[15]

Integrated pathways integrate instructional models in which students learn basic skills and vocational skills at the same time, often in the same course, to acquire marketable skills and credentials for specific career pathways.

Lifelong learning refers to innate curiosity and the desire to engage in continuous education, training and development throughout one's life to acquire the competencies required for changing skill demands across industries (or for a changing labor market).

Low-skilled workers refers to those working in occupations that fall under ISCO-88 major groups 5 and 9, including service workers, shop and market sales workers and elementary occupations.[16]

Middle-skilled workers refers to those working in occupations that fall under ISCO-88 major groups 4, 7 and 8, including clerks, craft and related trades workers, and plant and machine operators and assemblers.[17]

On-demand workforce (also known as the "gig economy") refers to any worker who does not receive a W-2 tax form for some or all compensated work, such as entrepreneurs and the self-employed, as well as workers whose income is reported on a W-2 form whose schedules and places of work are unpredictable and episodic.[18]

Pre-Apprenticeship refers to a program or set of services designed to prepare individuals to meet the entry requirements and succeed in an apprenticeship program.[19]

Reskilling refers to the process of retraining workers with new skills so that they can remain competitive in the workforce.

Robotics refers to the use of machines that can duplicate human actions. It is possible for robots to look human, but many types of robots are designed to improve on human actions, especially using examples from nature. Some manufacturing robots, for example, are arms with six-axis range of motion that far exceed human capability.[20]

Skills gap describes the differential between the skills required for today's jobs using new technologies and the actual skills that the workforce currently demonstrates.

Technological disruption is a radical change to a system, such as work, workforce or workplace, caused by adoption of new technologies.

Upskilling refers to the process of providing education, training or development to teaching existing employees new skills to make them competent for a current or future role in the workplace as technology affords new opportunities to help workers remain in the roles, rather than fundamentally changing their jobs.

Work-based learning is an instructional strategy that combines classroom learning with hands-on work experience aligned with industry requirements and credentials.

Workers refers to individuals who are currently in the workforce (incumbent) or who have yet to enter the labor market (future).

The Workforce Innovation and Opportunity Act (WIOA) is the primary federal workforce development legislation designed to help job seekers access employment, education, training and support services to succeed in the labor market and help employers find skilled workers.[21]

KEY INSIGHTS

The following key insights span the upcoming decade and are drawn from work throughout the initiative Future Workforce Now: Reimagining Workforce Policy in the Age of Disruption. These insights were developed through intensive research, multidisciplinary expert and policymaker roundtables and the Future Workforce Now State Policy Forum for Action with 28 states.

The future of work is here. A broad array of occupations is at risk for disruption or elimination as a result of technological change, and the risk is greatest in developed countries, such as the United States. Workers in nearly every industry and across all skill levels are already being affected. In 2020, more than one-third of job skills required for most jobs in 2016 have already been replaced by new technologies, particularly by automation.[22]

Disruptions will demand not only new skills but new concepts of work, workers and the workplace. The standard 40-hour workweek is disintegrating as 24-hour access to and demand for information, work and goods and services reshape what it means to work in many fields. Modern definitions of "work" require transformations of traditional understandings of where job training occurs, credential attainment and delivery of employee benefits.

The Age of Disruption presents opportunities for the public sector to use technology in new and unprecedented ways. States can harness the power of technology — especially data — to aid decision making and resource allocation; enable trust and transparency; balance innovation and regulation; and build a holistic, user-centered service-delivery system.

Our current policy infrastructure for education, training and supporting workers is not prepared to meet the rapidly changing needs of workers and employers. Today's policymaking climate limits our capacity to adapt policy and programs to meet the challenges that continuous technological disruptions pose and their impacts on the labor market.

In the age of technological disruption, states must respond with equally dramatic, swift transformations of their own. Policymakers must commit to three transformational objectives to prepare their future workforces. These objectives — building a statewide ecosystem to promote continuous lifelong learning; investing in an agile, technologically resilient workforce; and enabling every worker to participate in the workforce of the future through comprehensive support — offer a policy framework to benefit every worker and workplace.

Governors are particularly well positioned to drive significant and necessary progress. Because many key aspects of the definition, scope and support systems for education and workforce programs are often determined at the state level, governors are well positioned to make firm commitments to systems transformations that enable all citizens to engage in continuous and technology-rich lifelong learning.

Without policy intervention, the shift to a skills-based economy will exacerbate existing inequities. New concepts of work will have dramatic but disparate effects on workers. These disparate effects, combined with the current shortcomings of existing education and training programs, will only exacerbate the inequities that exist today between people of different races, abilities, genders, socioeconomic backgrounds and geographic origins.[23] Policymakers must put equity in terms of access to quality learning and employment opportunities at the top of their agendas across education and workforce development systems.

EXECUTIVE SUMMARY

The world of work is changing at an accelerated rate. According to the 2018 World Economic Forum Future of Jobs Report, the share of task hours performed by machines will increase by 41% from 2018 to 2022. Put another way, humans' share of task hours will decrease from 71% to 58% in only four years.[24] As advanced technologies emerge, their capabilities to conduct new and more complex tasks continue to grow exponentially, presenting new challenges for workers to remain competitive in the global economy. An array of occupations is at risk of disruption, affecting workers across most industries and geographies and at every skill level.

Amid recent global economic shocks, technology's impact on the future of work has been resurrected as a critical area of focus for national and state policymakers. Overall job elimination is unlikely to be the dominant effect, but disruption will continue to present three major economic paradigms: (1) Jobs will be both created and eliminated at an accelerated rate; (2) existing roles will continue to be redefined, requiring a dramatic shift in skills training to develop the skills needed to interact with technology and skills that are uniquely human; (3) rates of participation in the on-demand workforce will evolve, especially as people increasingly rely on entrepreneurial or self-employed work.

Leaders participating in Future Workforce Now: Reimagining Workforce Policy in the Age of Disruption acknowledge that the current policy infrastructure for educating, training and supporting workers is not prepared to meet the rapidly changing needs of employers and, by extension, employees.

State education and workforce systems lack critical alignment with the evolving needs of industry, driven in large part by continuous technological disruption. The result is poorly targeted or outdated investments that do not keep up with the changing needs of industry.

Current education and training systems often overlook the need to invest in the skills of those who remain employed but are at greatest risk of having their jobs changed or eliminated due to technological disruption. Systemic barriers exist for many of these workers, and the shift in demand for emerging skill sets will only exacerbate existing inequities unless policymakers engage in targeted interventions for lower-skilled workers. Targeted efforts are required for at-risk populations, including Black Americans, Latinos, women, those learning English, people with disabilities and others often at a disadvantage in the labor market. States must prioritize investments that increase access to labor market information, financing, credentials and comprehensive support to enable all citizens to engage in lifelong learning and high-quality employment.

Creating opportunities for meaningful economic participation for all citizens amidst these disruptions is already emerging as one of the great challenges of the 21st century. The role of governors and state leaders in ensuring equitable opportunity for all workers is important during this decade because many key aspects of education and workforce programs are determined at the state level. Governors are particularly well positioned to drive significant and necessary reforms for a prepared workforce by making commitments to bold, systemwide transformations.

Research conducted by the National Governors Association Center for Best Practices (NGA Center), Fab Foundation and FHI 360, in partnership with more than 150 national and international experts and leaders from 28 states, found that to prepare their future workforces, governors and state leaders must develop a comprehensive agenda made up of three transformational objectives. Each objective can be achieved by implementing policy actions from across 10 policy pathways, which together offer a policy framework to prepare every worker for the 21st century workplace.

Governors recognize the value of these transformations and are leading key strategies to strengthen their economies and prepare their workforce for the future. The State Policy Toolkit for Preparing the Future Workforce Now provides details of how governors are leading public and private partners across all pathways to transform their education and workforce systems.

TRANSFORMATION 1

Build a statewide ecosystem to promote continuous lifelong learning

1. Orient state agencies and external partners toward a shared, future-ready vision that builds continuous on- and off-ramps for education and training.
2. Create a statewide data infrastructure that unites existing, fragmented systems and improves tracking outcomes to inform data-driven decision making.
3. Build a bridge between education and industry by investing in a transparent, portable, and stackable credential infrastructure.
4. Increase the accountability of state education and training programs by by tying state funding to outcomes that meet the evolving needs of workers and employers.

TRANSFORMATION 2

Invest in an agile, technologically resilient workforce

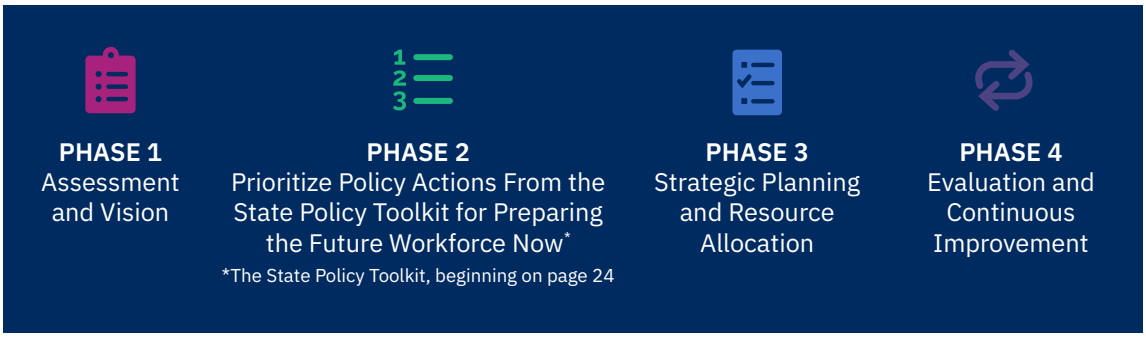
5. Innovate teaching and learning models to close the technological and digital literacy gap and develop uniquely human skill sets.
6. Engage employers in the development of demand-driven training programs and integrated learning pathways for workers of all ages.
7. Become a model employer.

TRANSFORMATION 3

Enable every worker to participate in the workforce of the future through comprehensive support

8. Develop innovative financing mechanisms to make lifelong learning an affordable investment.
9. Increase access to lifelong learning to ensure that all current and future workers can fully participate in the labor market.
10. Grant workers the flexibility they need to thrive in an increasingly dynamic labor market.

To enact these transformations, governors and state leaders will need to carry out tested best practices in assessment, vision alignment, strategy development and evaluation to maximize worker readiness. Drawing on lessons learned from working with states on systems alignment, particularly in workforce development and education, the NGA Center, in partnership with FHI 360 and the Fab Foundation, provides a systems change road map for states to follow. This road map guides governors through a leadership and implementation process consisting of four essential phases to achieve the three transformational objectives outlined in the toolkit.



The necessary scope of response to and preparation for technological disruption are not met by a change in any one policy or practice but by bold, systemic transformation at the state, local and institutional levels. Governors and states, regardless of governance structure, political leadership or geography, must assess their readiness for the future of work and, in partnership with all stakeholders, implement transformational policies to prepare the future workforce now.

INTRODUCTION

In the age of swift and dramatic technological disruption, workforce development and education systems must respond just as swiftly and dramatically to ensure that all incumbent and future workers have access to quality employment throughout their careers. Technology will continue to change the way that we work, requiring workers to continuously learn new skills, adapt to new workplace technologies, and even new work environments. However, today's infrastructure for training and supporting current and future workers is not prepared to meet the rapidly changing needs of workers and employers that this technological change brings about. Meanwhile, today's policymaking climate limits the capacity for agility in adapting policy and programs to meet the challenges posed by these changes in the labor market.

Governors are in a unique position to address this set of challenges by leading collaborative transformations of their workforce development and education systems. In partnership with other key stakeholders, they must begin by assessing their readiness for the future of work, including identifying which industries, communities and populations are at greatest risk of being adversely affected by technology. Importantly, this collaborative planning and policy development must represent the interests and expertise of all relevant stakeholders, including employers, employees and those working in alternative work environments.

States must also prioritize limited resources by using high-quality data to determine which policies and programs are most effective and phase out or improve programs that are not aligned with a futuristic vision for the workforce. While our future is unknown, it is certain that all states will be called on to develop funding mechanisms that offer their citizens lifelong learning, digital resilience and the services they need to remain successful in the labor market. Undoubtedly, a major component of a future-ready agenda must include the creation of innovative financing mechanisms to develop, pilot and sustain these new education and training strategies.

The most important transformations resulting from technological disruption will not be in the work itself but rather in the systems, policies and institutions built on a traditional — and increasingly outdated — understanding of work and of how and where learning takes place.

The State Guide for Preparing the Future Workforce Now responds to today's challenges with an interactive toolkit that helps governors and states take definitive action to reimagine workforce development and education policy. This guide is the culminating product of the Future Workforce Now: Reimagining Workforce Policy in the Age of Disruption initiative. It is a comprehensive suite of actionable policy and programmatic transformations to support and guide leaders at the highest level of state government, with tools and resources that can be used by local leaders, industry and institutions to pursue the most promising approaches across the education and workforce systems.

The proposals described herein offer options for action based on the opportunities and challenges that technological disruptions pose for the modern-day workforce, but they are not comprehensive. Other innovative policies and programs must be developed and implemented. More importantly, as states aim to reimagine their workforce development and education systems, they should consider each proposal not only on its own merit but also as part of a comprehensive agenda for systems transformation.

To create a workforce development and education ecosystem that prepares all current and future workers to learn and thrive in a technology-rich economy, experts and state leaders who have participated in the Future Workforce Now initiative have identified the following three transformations required for a future-ready workforce:

Transformation 1: Build a statewide ecosystem to promote continuous lifelong learning

Governors must make a firm commitment to developing and aligning statewide systems that enable all individuals, including today's students and dislocated and older workers, to engage in learning throughout their lifetimes. This work requires that governors collaborate with key stakeholders, including industry, to develop a statewide vision and plan for systems transformation, and to guide their state agency leadership in collaborative planning and policy development. This advanced ecosystem will require new investments in data infrastructure to drive progress toward achieving this vision and can be better leveraged to track outcomes and inform data-driven decision making that ensures inclusivity in the future workforce. Data can be further leveraged to help accomplish sate education and workforce goals by investing in a portable, stackable credentials infrastructure that conveys the skills and competencies of every worker. To lay the groundwork for a sustainable ecosystem, states should also consider new ways to align state funding with the needs of the future workforce and invest in systems change as a strategic long-term investment.

Transformation 2: Invest in an agile, technologically resilient workforce

Key to developing technological and digital resilience is investing in education and training models that develop the uniquely human skill sets that are in high demand, alongside the skill sets that support human interaction with emerging technologies. It is critical that states modernize traditional K-12 and higher education to not only offer but prioritize technological literacy for all students. These learning models must also employ new strategies that improve technology-oriented training and instructional capacity for teachers who are often left without the skills they need for teaching with technology. States can then build on this capacity to develop partnerships between educators and employers that offer learning opportunities to fuel technological skill development. In modernizing these teaching and learning models, states will also need to explore how to implement accountability measures to ensure that training programs are industry driven and produce positive outcomes for learners at all ages, including the incumbent workforce.[a]

Transformation 3: Enable every worker to participate in the workforce of the future through comprehensive support

A true reimagining of workforce development and education policy would not be complete if it did not address the barriers that face millions of Americans who seek access to learning opportunities. As a result, reimagining workforce policy in the age of technological disruption requires a fundamental shift in how states design policy and programs to open the door for all current and future workers. Many Americans struggle to address fundamental needs such as food, housing, child care, transportation and financial security. An inability to address these needs often prevents them from accessing the training they need to fully participate in the workforce. Incumbent and future workers, particularly those facing these significant barriers, need better access to resources, information and comprehensive support that enable meaningful engagement in learning and employment.

As these three critical transformations suggest, the most important transformations resulting from technological disruption will not be in the work itself but rather in the systems, policies and institutions built on a traditional — and increasingly outdated — understanding of work and of how and where learning takes place. If successful, this reimagined workforce policy will foster equitable opportunities for people to engage in lifelong learning, technological literacy development and high-quality employment so that they can thrive throughout their careers regardless of technological disruption.

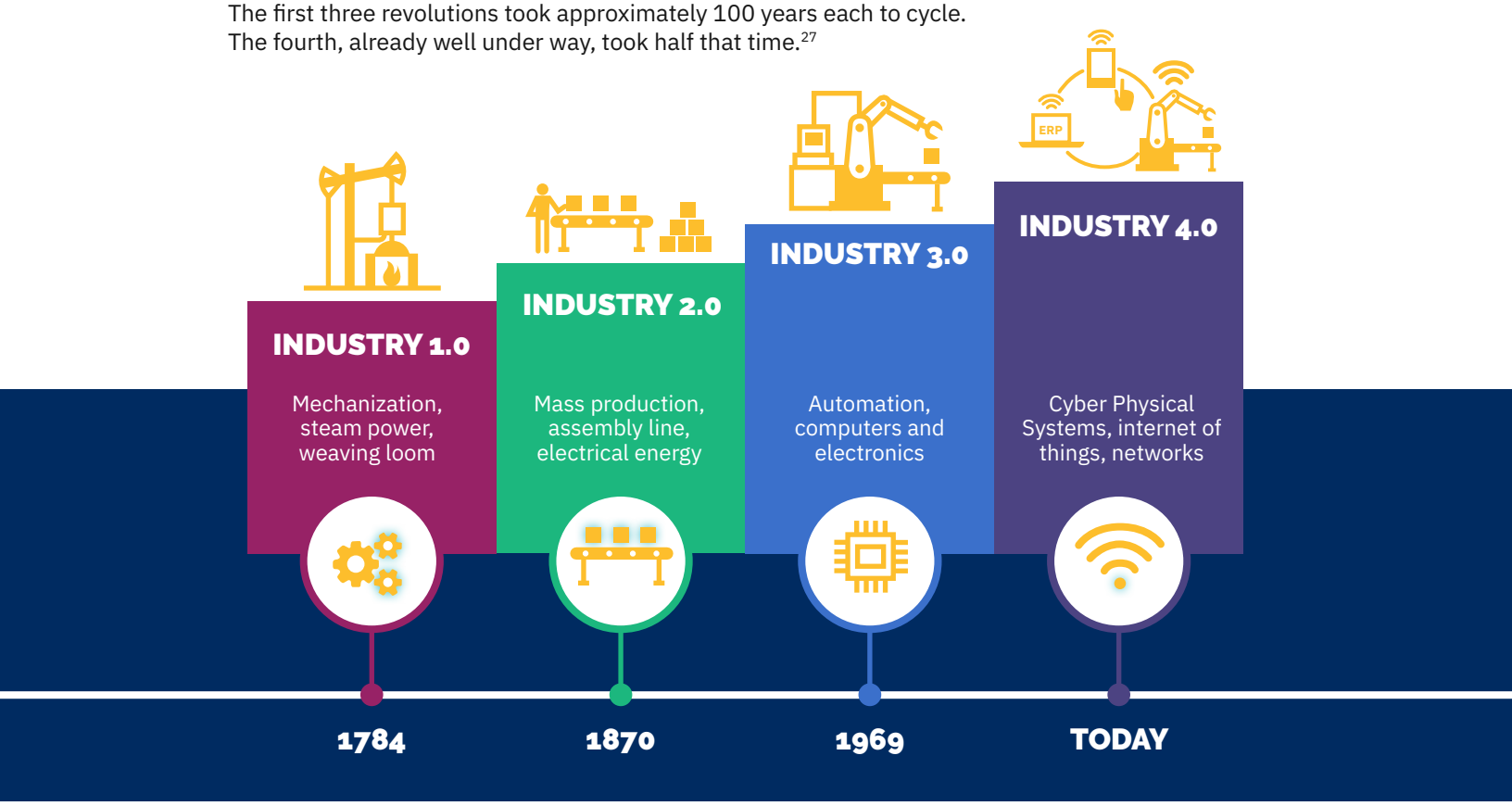
To carry out these policy transformations, states must understand how technology affects their local economy. The section that follows introduces disruptions that have already been seen at the national, state and local levels. It offers additional context for how these disruptions are affecting industries and their anticipated effects on workers across skill levels.

[a] The term "industry driven" refers to programs developed by the private sector that are relevant to multiple industries.

IMPACTS OF TECHNOLOGICAL DISRUPTION

Today's fears about the future of jobs in manufacturing and other industry sectors are fueled by the large-scale commitments industries are making to develop and deploy new technologies, such as artificial intelligence (AI) and robotics, as well as the general conversion to automation. World Economic Forum founder Klaus Schaub coined the term "Fourth Industrial Revolution" to describe this fast-paced global upheaval the world is experiencing, largely driven by new digital technologies.[25] The technologies of the Fourth Industrial Revolution are radically and rapidly disrupting the world of work, using advanced sensors, feedback loops, generative design, automation, robots, the "internet of things" (IoT) and many other exciting new tools that integrate the digital, biologic and physical worlds.[26]

The Four Industrial Revolutions:
The first three revolutions took approximately 100 years each to cycle.
The fourth, already well under way, took half that time.[27]



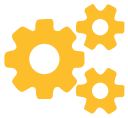
Technologies continue to develop new capabilities at an exponential rate; meanwhile, policies and institutions are evolving to meet changing demands and train to new technologies at a much slower rate. This means that states will not have many of the skilled workers they need for Industry 4.0 jobs. Between economic shocks, demographic changes, urbanization and the impact of new technologies, creating opportunities for meaningful economic participation for all citizens is one of the great challenges of the 21st century for governors and other leaders.

Research for this toolkit identified the five technologies most significantly disrupting the American workforce today. These technologies reinforce and build on each other, accelerating cross-industry change:

1. Automation, including robotics, robotic automation in fintech and autonomous vehicles (AVs)
2. Additive manufacturing and 3D printing
3. AI and machine learning (ML)
4. The IoT
5. Cloud-based technology

For the purposes of this report, the term "disruption" describes broad changes to work, workplaces, the role of workers and the global economy. It uses Harvard Business School professor Clayton Christensen's term "disruptive innovation" specifically to describe how market entrants invent new products and services that transform the way a market or industry functions. One example of such a disruptive innovation is how Uber and Lyft combined global positioning system, smartphones, and an on-demand workforce to disrupt the taxi and car rental industries in a mere three years.

Today, advanced technologies disrupt markets quickly, affecting entire industries and their supporting infrastructures simultaneously. In addition, the technologies build on one another such that one disruption fuels another. The following examples show how a few industry sectors are already experiencing disruptive innovation:



Advanced manufacturing: Technologies such as safer robotics, sensor-enabled IoT devices, software to predict machine failure, additive manufacturing and ML are restructuring the entire supply chain into a comprehensive system that requires integrated collaboration with workers. Additive manufacturing is reducing time to market through functional prototypes and lightweight part design, offering mass customization and creating complex geometries unheard of in traditional manufacturing.

Agriculture: Traditional agriculture processes, including harvesting, fertilizing and milking, have become increasingly automated, while AVs (e.g., tractors, mapping drones) are replacing the need for human labor in some areas.

Health care: Current 3D printing of personal protective equipment, prosthetics, surgical models and dental devices combined with future 3D printing of human organs for transplant, surgical robots, bioengineering and microfluidic devices for quick diagnostics and big data collection are changing the relationship between patient and health care provider. Automation is replacing traditional health care administrative roles, while the growing availability of e-health tools is changing health care delivery in rural communities and across the globe.

Financial services and information technology (IT): Cryptocurrencies such as bitcoin get most of the media attention, but other disruptive technologies, such as robotic process automation, blockchain and cybersecurity software, are changing the way digital processes are used in banking, accounting and corporate IT functions.

So, will robots replace humans altogether? The majority of Americans think that AI will eliminate many more jobs than it creates.[28] These fears may be grounded in visible changes in people's everyday work, but today's best evidence suggests otherwise. According to the McKinsey Global Institute, today's technology threatens only 5% of occupations with complete obsolescence.[29] Although job elimination is unlikely to be the dominant effect, significant new paradigms will require action from governors and state leaders. Disruption is most likely to affect the future of work in three primary ways: (1) Jobs will be both created and eliminated; (2) existing jobs will change, requiring a dramatic shift in skills development to interact with technology and promote uniquely human skills; and (3) participation in on-demand work, including more entrepreneurial or self-employed work, will increase.

In many situations, technologies such as AI and robotics will replace humans, but it is equally likely that many new jobs will be created to facilitate human-machine interaction.[30] Historically, automation has resulted in a net gain of jobs because of increased productivity across the labor market.[31] Today's experts estimate that modern disruption will follow a similar pattern. According to Dell Technologies and the Institute for the Future, losses will be seen across industries, especially at the low- and middle-skill levels. It is also estimated, however, that roughly 85% of the jobs that will likely exist in 2030 have not even been invented yet.[b,32] This level of job creation is anticipated to offset the losses it causes, lifting the overall economy — as long as policies are in place to help displaced, at-risk workers become reemployed and ensure that all members of the workforce have access to quality learning opportunities.

[b] This statistic was cited from a panel of 20 technology, business and academic experts from around the world.

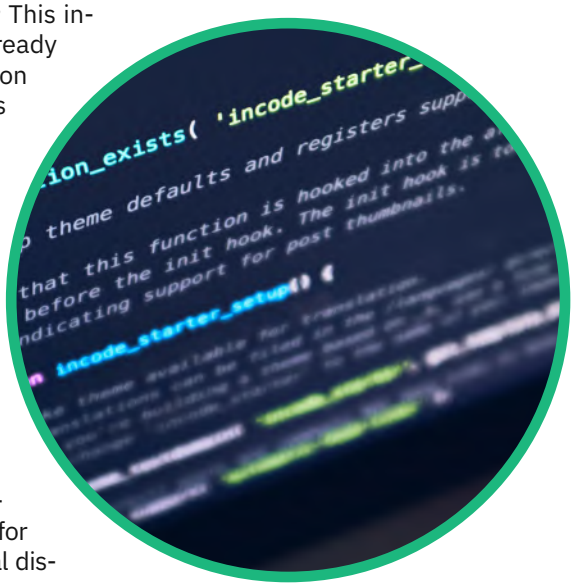
Overall, the dominant effect of technological disruption is that jobs are changing faster than our education, workforce and safety-net systems can accommodate.

These effects will be across the entire workforce. Before the economic shocks of 2020, it was estimated that up one-third of daily work activities would be automated across up to 60% of jobs by 2030.[33] This shift to increased automation and complementary technologies will require some (if not all) workers to learn new and different skills so that they can interact with these technologies and perform new tasks.

In contrast to historic notions of automation (e.g. robotics in manufacturing), automation today goes well beyond the factory floor, from customer service chatbots to AI-assisted disease diagnosis. Emerging technologies will therefore affect a much broader spectrum of jobs and skills, ranging from food preparation and clerical work to customer service and accounting. The skills most vulnerable to automation are the routine physical and repetitive tasks often found in manufacturing and clerical work. Jobs that require more cognitive, social and difficult-to-automate skills, such as critical thinking, empathy, decision making, collaboration and planning, are less likely to be disrupted by automation. (See Appendix A for a more detailed overview of skills predicted to be in demand.) Home nursing care is an example of one job that will be less easy to automate because the skills are heavily biased toward social, empathetic, human-to-human interaction.

In the age of disruption, the priority on skills development presents new opportunities for states to take advantage of technologies to innovate, create and remain competitive in the global economy. For example, skills and aptitudes that have traditionally been considered relevant for entrepreneurs, such as vision, perseverance, creative problem solving and adapting to new technological processes, are becoming increasingly important across every industry.[34]

In addition to changing the skills required of workers across the labor market, the shift toward digital and other technologies will redistribute when, where and how we work. Most workers earn much of their income from place-based, nine-to-five employment and other, traditional forms of work. But the proportion of workers engaged in nontraditional arrangements is growing in large part because of access to the internet and the development of related digital technologies and applications. Tracking work and worker needs in the on-demand economy is difficult, making it challenging for governors and state policymakers to determine the appropriate mix of policies and programs needed to support this segment of the economy. Some analysts estimate that as many as 20% of individuals are engaged in this sector, while others predict that the majority of the U.S. workforce will be engaged in on-demand work by 2027.[35] In June 2018, the U.S. Bureau of Labor Statistics released findings from a 2017 survey indicating that more than 13% of workers rely on contingent or alternative work as their main form of employment.[36] This increased dependence on nontraditional working arrangements is already causing reconsideration of policies in economic security; education and training; workforce system performance; work-related injuries and disabilities; worker safety laws; laws related to hours and wages; regulation of the digital labor market; and the roles of labor market intermediaries, credentialing bodies and state licensing agencies. As economic crises have proved, states cannot afford to delay efforts to find new solutions and develop strategies to support this essential segment of the workforce.[37]



Without intervention, technological disruption is likely to exacerbate current inequalities in workforce participation and quality of employment. Access to reskilling opportunities and higher-skilled jobs will become increasingly difficult for current workers as demand for advanced skills grows while the resources to educate, train and support them in this transition remain scarce. Some educational institutions and employers are beginning to target these at-risk workers for skills-based training, but the opportunities and risks that technological dis-

ruption poses are not distributed evenly. Systemic inequalities, such as geographical location, access to the internet, limited educational and training opportunities, lack of paid time-off or scheduling flexibility to allow for professional development and family responsibilities, limit worker access to learning opportunities and exacerbate the employment risks some populations face in the age of disruption.

New America found, for example, that women make up 54% of workers currently employed in occupations at high risk of automation, despite making up less than half of the U.S. workforce.[38] In parallel, a McKinsey Global Institute report found that Black Americans are especially vulnerable as automation reshapes jobs and activities throughout the United States.[39] This is because Black workers are overrepresented in both at-risk roles, such as in the service sector, and within US regions that are more likely to see job declines because of automation in the next decade.[40] Rural workers are also more susceptible to the negative impacts of robotics and automation because they perform routine, task-driven jobs, such as in mining, manufacturing and agriculture. Without targeted interventions, states face a real risk of leaving these workers isolated and unable to participate in the workforce because of lack of skills, technical resilience and credential attainment.

In response, policymakers must prioritize and sustain systemic transformations in the design and delivery of education and training programs to prioritize the skills needed to succeed in the evolving labor market and target those workers at greatest risk. Creating this system requires developing and promoting a culture of lifelong learning for all current and future workers. Already, employers are requiring a record level of skills and credential attainment for new hires across a growing number of industries. Key to ensuring that current workers can obtain these skills is incentivizing businesses to participate in the education and reskilling of their existing workforce by forming new partnerships with institutions to co-deliver education and training.

In an economy that requires such rapid and continuous skills development, traditional pedagogy in which workers complete the majority of their learning by young adulthood can no longer be the norm. States must take bold steps to modernize the delivery of education to meet the rapidly evolving needs of lifelong learners. A survey of global learners conducted by Pearson found, for example, that an increasing number of learners yearn for a "do-it-yourself" approach to learning, including access to online and microcredentials.[41]

Therefore, to meet the demand for a modern set of skills, leaders must redefine traditional pedagogy and look beyond current educational practices to embrace technology and new modes of learning.

The opportunity for governors is thus in aligning education and workforce systems with the evolving needs of learners and industries. Together, these systems can help a whole new generation of workers emerge and succeed in the workforce.

The future of work also depends heavily on global economic factors beyond what has been imagined, including changing demand for skilled workers, changes in global consumption patterns, the scale of economic growth and economic shocks. Demographics will also play a key role as workers' health and well-being evolve, societies age and the availability of skilled labor transitions in developing nations. Perhaps the greatest factors, however, are the choices policymakers and other stakeholders make in preparing the future workforce and how to repurpose the current workforce in response to and in anticipation of major disruptions.

At this critical moment, governors and states must lead the way in developing the policies, systems alignment and public-private partnerships and investments needed to prepare a future-ready workforce. Developing an inclusive workforce that remains well educated, technologically agile and competitive is not a new conversation. What is new is the urgency behind this imperative in light of our new economic paradigm and the anticipated and unprecedented changes to our world of work. The time is now for governors and states to reimagine workforce policy and systemically transform how we prepare and support our current and future workforce.

PREPARING A FUTURE-READY WORKFORCE

A ROADMAP FOR SYSTEMS CHANGE

Strategies developed in light of evolving technological disruptions will vary from state to state. Regardless of the policies governors and states focus on, they can employ tested best practices in strategy development, planning and implementation to maximize worker readiness in the age of disruption.

Drawing on lessons learned from working with states on systems alignment, particularly in workforce development and education, the National Governors Association Center for Best Practices (NGA Center), in partnership with FHI 360 and the Fab Foundation, has developed an updated road map for systems change.[42] This road map supports current and future workers, including those currently employed or unemployed, as well as the future workforce currently in the kindergarten through grade 12 (K-12), higher education and the training pipeline. This road map is complex and crosses multiple federal, state and local systems. As such, it requires dedicated state leadership to align governmental and nongovernment institutions toward a shared vision of success. Each state can choose to develop its own process for implementing policy to build a future-ready state workforce system, but evidence from NGA Center's extensive body of work with states suggests that all processes should include the following four key phases:

The agencies and stakeholder groups involved will vary from state to state, but all four phases should include representation from those state agency and stakeholder groups that will ultimately need to be involved in implementing change. These include governors' offices, state legislators, state agency representatives, mayors and city government leaders, tribal governments, employers, leaders of educational institutions and training organizations, organized labor, community-based organizations, community members and students.

Executive Authority

To implement this road map for systems change, vision and leadership are essential. As the chief executive of state government, governors are uniquely positioned to create a collaborative governance structure that aligns with a statewide vision for preparing and supporting their workforce. For example, governors can take a critical leadership role in convening key stakeholders within and outside of state government, issue an executive order to state agencies or create a state-level committee or office to carry out their vision for a prepared future workforce. Governors can include future-of-work and related initiatives in their strategic planning processes and convene stakeholders to implement a lifelong learning agenda across the education and workforce ecosystem. Governors are already using their executive authority in actions like these through independent initiatives and multistate initiatives with organizations such as NGA Center. Such initiatives span topics such as the future of work, work-based learning and apprenticeship, adult connections to postsecondary education, occupational licensing reform, business regulations and two-generation approaches to serving low-income families.

The Importance of Equity and Diversity in Preparing the Future Workforce

As states develop and implement new strategies for reskilling the current workforce and preparing the future workforce, building equitable access to quality learning and employment opportunities must be a top priority. As has been discussed in the previous section, people of color, as well as women and people with disabilities, are more likely to be employed in jobs at higher risk of automation, placing them at greater risk of being displaced from high-growth fields. McKinsey found, for example, that Black Americans are disproportionately overrepresented in food services and production work – two of the occupations with the highest rates of automation-driven displacement.[43] This statistic is compounded by the fact that nearly one-third of American workers lack foundational digital skills, including nearly half of Black Americans.[44] Without intervention, enduring systemic barriers to high quality education, training, and inequities in wealth and income will only widen the current opportunity and skills gap between communities of color and their white peers.

To address race, gender, and ability educational and economic disparities head on, states must proactively consider ways to embed equity throughout every stage of policy development. An equity-centric policy development process should include setting equity-driven goals, targeting policies and programs to support disenfranchised populations and the systematic collection of data by demographic to measure progress towards equitable outcomes.

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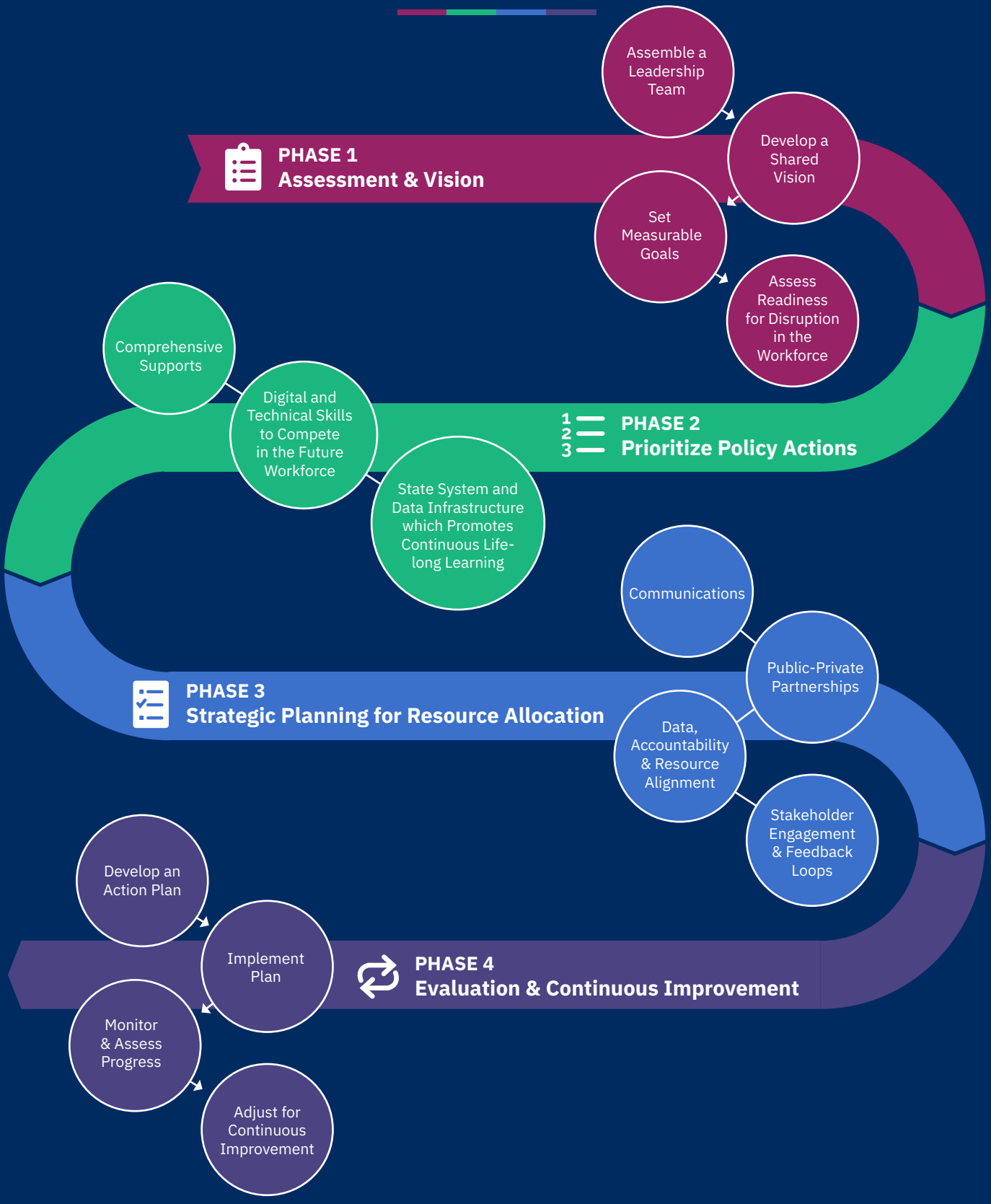
STATE ROADMAP FOR PREPARING THE FUTURE WORKFORCE NOW



EQUITY ICON

This icon offers actionable steps that states may take to integrate equity and diversity into strategic planning.

PHASE 1

Assessment & Vision

Assemble a Leadership Team

During Phase I, state leaders assemble a diverse **leadership team** that includes stakeholders to motivate collaborative planning and action across governmental and nongovernmental agencies. In addition to cabinet-level state leadership and executive-level industry leadership, core partners should include education (K-12, career and technical education; postsecondary education; students), economic development, workforce development, human services, community organization and local labor representatives, chambers of commerce and state legislators. Participants with decision-making authority, who can effectively lead change in their organization, must also be included. A single cross-agency entity, preferably the governor's office, should lead coordination and alignment of state plans with education, economic and workforce development partners.

This team should include representatives from organizations that advocate for or serve diverse groups of future and current workers. It should carefully consider its makeup and prioritize equal representation across race, age, geography, gender and ethnicity.

Develop a Shared Vision

An **inclusive and catalytic vision** is essential for aligning such diverse stakeholders toward common goals for the future. This vision elevates and communicates a message of commitment from state leadership to prepare the current and future workforce for technological disruption, including to industry and business leaders, who need the workforce to remain competitive. This vision should serve as a rallying cry for state agencies, educational institutions, industry leaders, communities and individuals to align across programs and services. This vision requires political transparency because it communicates to the public the direction resources are being (re)directed.

In 2015, the **Alabama** Workforce Council undertook a statewide effort to understand the structure, function, organization and perceptions of the Alabama workforce system. The results demonstrated that although Alabama is endowed with plentiful resources, the state could better serve business, industry and the public if these resources were organized in a more effective network and unified under a common vision, mission and brand. With input from workforce and educational professionals, industry leadership, families and students, leadership developed a new vision for its workforce system: to build a better future for Alabama in which communities, business and industry are supported collaboratively to build prosperity through opportunities for meaningful work and a growing economy.

Assess Readiness for Workforce Disruption

The leadership team should, whenever possible, use data to **assess how well prepared the education and workforce system is to meet the evolving needs of the workforce.** Today, notable gaps exist in state- and microlevel data, including the classification of skills, task performance and the adoption of new technologies. Better data on the impact of technology as well as on the outcomes of education and training interventions on the labor market is critical for understanding the state's preparedness to meet industry demand. When gathering this data, states should consider how to improve reliable data related to those workers and industries experiencing the greatest economic threat, including those with lower levels of education or whose occupations involve largely routine tasks. States should also consider how to address anticipated demographic changes because employers may shift to labor-saving technologies and engage new segments of the workforce to meet their staffing needs. This information can inform systemwide strategic planning to meet the state vision. To conduct this assessment, states should:

- Gather and assess the availability and quality of geographic-, industry- and population-level labor market data, with a specific focus on:

- The diffusion of new technology, such as digitization, automation and artificial intelligence (AI), which is key to understanding how fast and to what extent technology affects the labor market and the broader economy.
- Real-time labor demand across occupations, skill levels and task profiles.
- Barriers that those entering or exiting the workforce experience in accessing high-quality employment.

- Identify programs, policies and interventions already in place to address anticipated impacts and their outcomes.
- Assess areas of unmet need or gaps in program and service delivery to inform strategic planning.

For example, the **Kentucky** Center for Statistics (KYSTATS) produces accessible, comprehensive information about in-demand skills across the commonwealth. The Kentucky Future Skills Report, produced by KYSTATS, provides real-time data on future job needs by local area, education level, industry and specific occupation. This resource helps workers, students, educators and others understand which occupations are growing in their own community, projected wages for those occupations and the credentials or skills needed to enter those occupations.[45] Other states are using online resources such as the Center on Rural Innovation's Rural Opportunity Map to learn how industry and employment are changing and understand the demographic trends that affect their states.[46]

It will become increasingly important for states to assess the impacts of disruption regularly by developing advanced data sets on populations at greatest risk. In addition to disaggregating data by race, gender, socioeconomic status, and geography, states should consider soliciting feedback from worker groups such as unions to gather additional information not included in traditional data sets.

Set Measurable Goals

When state leaders understand the state's readiness to meet its labor market's future needs, they can develop measurable goals for closing gaps in education, training and service-related programs to achieve the shared vision. These goals must be specific in terms of populations, industries and communities served so that states can prioritize those most likely to require targeted policies and programs. These goals must also rely on results and data acquired not only by state agencies but by organizations that receive state and federal funding as well as educational institutions and the private sector. Finally, leaders should develop goals that can be achieved in a few months goals that may require several years to achieve. Each goal should also include specific outputs measured over time to determine whether interventions are meeting their defined objectives and to inform adjustments in strategic planning.

In **Iowa,** to address the state's anticipated workforce needs of the future, Gov. Kim Reynolds developed Future Ready Iowa, a collaboration among existing state education and workforce initiatives.[47] After assessing anticipated changes in industry in the coming decade and the credential attainment of people throughout the state, the team developed a statewide postsecondary attainment goal to focus state resources toward the industries and individuals most in need of additional education and training — namely, to ensure that 70% of Iowans have some postsecondary credential by 2020. Future Ready Iowa has since been a catalyst for action between state government and the private sector in nearly every industry in the state.

States can take further action to address credential attainment disparities among people in various geographic regions, people of color and new Americans by embedding subpopulation postsecondary attainment goals within state and local workforce development plans.

Alabama Gov. Kay Ivey established the Governor's Office of Education and Workforce Transformation to develop and implement a strategy to surpass the statewide goal of adding 500,000 credentialed workers to the workforce by 2025. As part of this goal development, the leadership team identified specific attainment goals for each special population experiencing barriers to entering the workforce and by geographic region.[48]

PHASE 2
Prioritize Policy Actions

During Phase II, the leadership team should develop a resilient workforce agenda**, prioritizing policy pathways and actions to address gaps identified during the assessment phase.** States can use the State Policy Toolkit[c] to identify the policy strategies mostly likely to help them redesign education and workforce systems, invest in a technologically resilient workforce and enable every individual to participate in lifelong learning. The State Policy Toolkit is intended to help states take action across many different parts of their education and training systems, but the list in the toolkit is far from comprehensive, and more policies and programs will need to be developed and implemented. More importantly, as states work to reimagine their workforce system, they should consider each toolkit proposal on its own merit and as part of a systemic agenda to be carried out.

PHASE 3
Strategic Planning and Resource Allocation

During Phase III, the leadership team develops strategies for carrying out each policy action. Evidence from multiple NGA Center initiatives demonstrates the essential components states must consider when developing strategies to prepare and support a future-ready workforce[49]:

- Communications
- Public-private partnerships (PPPs)
- Data, accountability and resource alignment
- Stakeholder engagement and feedback loops[d]

Communications

One of the greatest powers a governor has is the ability to establish priorities for his or her administration. Regardless of how governors communicate these priorities — through formal or informal mechanisms — a consistent message is crucial. Internally, the governor's call to action must be communicated to agency leadership and staff across agencies to help employees at all levels understand actions they may take to achieve the statewide vision. State officials must develop a collaborative talent pipeline strategy to align state agencies' existing activities into a more cohesive framework rather than a new, discrete initiative. Common strategies for engaging state government staff include assembling working groups that report to a state leadership team and encouraging experts within state agencies to engage with their peers. Communicating these priorities to the public is equally important. Officials can serve as effective champions by weaving these issues into public remarks and by using data to inform progress toward state goals and outcomes. Governors may choose to hold summits or other events to elevate the importance of a cohesive education and training system to gain buy-in from employers and educators.

In communicating workforce priorities to the public, the state should target outreach plans at those at greatest risk of disruption and at populations traditionally underrepresented in the workforce.

Public-Private Partnerships

In the age of disruption, engagement of the private sector will become increasingly important as states target investments to meet the evolving demands of the workforce. Beyond equipping individuals with postsecondary credentials, states have a role to play in engaging the private sector in the development, financing, implementation and evaluation of workforce training strategies. In particular, states play an important role in seeding and supporting local and regional PPPs that sustain the emerging talent pipeline, including developing financial incentives or brokering new partnerships with business and educational institutions. Such collaborations present new opportunities for diversifying capital, reducing public risk and sustaining financial investments in lifelong learning.

[c] For the State Policy Toolkit for Preparing the Future Workforce Now, see page 24 of this guide.
[d] In 2014, the NGA Center competitively selected 13 states to participate in the Talent Pipeline Policy Academy, an intensive, multiyear technical assistance initiative to strengthen the connection between states' education and training systems and the needs of states' economies.

In prior work with the NGA Center, states have noted the importance of research and outreach in determining the existence of private sector engagement strategies. For example, **North Carolina** researched state agencies' existing business and industry engagement efforts and learned that many agencies had separate business engagement committees. Rather than create a new business engagement committee, the state's workforce leaders used an existing committee for broader talent pipeline discussions.[50]

State approaches to building and supporting effective PPPs vary across sectors and geography, but the following best practices can help states develop and scale these partnerships:

- Make a single entity accountable for supporting and scaling effective PPPs.
- Develop and use rigorous criteria to identify high-quality partnerships and expand them, as needed.
- Provide resources, including training, to local and regional partnerships.
- Use the governor's leadership and convening authority to initiate partnerships with industry and to promote, reward and recognize industry leaders who have successfully partnered with the public sector.
- Enact legislation to encourage PPPs and demonstrate commitment to collaborating with indsutry.

Data, Accountability and Resource Alignment

One of the greatest opportunities for states in an age of rapid technological advancement is the **development of new data sets and analytical tools.** When integrated and used properly, data can reveal sharp variations in how industries, communities and even populations are exposed to technology, especially automation-driven shifts in the economy. To gather evidence of how on-the-job training, career training and talent pipeline programs meet the needs of their evolving workforce, states must collect and analyze relevant data. They can then use this data to drive rapid investment toward their goals, such as by using data to establish incentives and penalties for industries that do not meet state education or workforce standards.[e] With respect to data, states should:

- Establish a standard for which type of data must be collected, from whom and how frequently.
- Gather feedback from governmental agencies, employers and educational institutions about which data sets could be expanded to help the state accomplish its vision.
- Assess data-sharing regulations to determine whether opportunities exist for information sharing through administrative procedures.
- Track participation and outcomes throughout state government programs to develop a more accurate return on investment.
- Make data transparent to the public so that the public can hold state and local officials accountable.

States can also develop key policy questions to help policymakers understand the types of data that will be most useful in evaluating outcomes. Key questions can help policymakers define outcomes by building a comprehensive view of the workforce system, including skills needs related to advancing technologies. For example, when **Oklahoma** began to evaluate its state workforce needs, it used this model to inform the creation of a comprehensive data dashboard. The dashboard was informed by key policy questions the data should answer and enabled a state focus on priority metrics.[51]

As states consider the application of data to better inform alignment of resources, they should also consider filtering data by a variety of variables rather than viewing it only in aggregate. For example, states could evaluate data related to technological disruption by subpopulation, including race, geography and socioeconomic status. Mapping anticipated geographic impacts of automation, for example, can help state leaders identify key regions in need of increased education and training investment. As part of its broader economic development strategy, **Pennsylvania** aimed to address the gaps in postsecondary learning opportunities for students by gathering regional data on participation in online learning programs. Geographic data revealed that a significant percentage of **Pennsylvania's** rural communities lacked the necessary broadband capacity to take advantage of online learning tools. Using this finding, leaders demonstrated the need for increased investments in broadband as part of the state's broader economic and workforce development strategies.[52]

[e] For example, some state leaders have used this strategy to establish emission standards — quantitative limits on the permissible level of air pollution companies can release — that meet state environmental goals.

Stakeholder Engagement and Feedback Loops

To prepare for technological disruption, states must engage local leaders and employers to better understand and amplify the experiences of the people education and workforce programs affect. The systematic collection of quantitative and qualitative data from clients and customers — called "feedback loops" — can benefit states as they rapidly innovate their workforce. Feedback from recipients often helps nonprofit service providers and agencies at all levels of government ensure that their work addresses the needs of the people they serve. It is equally important to close the loop by letting those who provided feedback know that their input was put to good use.

Helping individuals and groups participate in the feedback process is crucial. For many individuals, soliciting information is not enough. Instead, states should consider feedback strategies that include outreach to underrepresented groups and design feedback tools that are accessible to all workers.

States can employ four strategies for developing feedback loops:

- Pilot new processes in which the state gathers feedback from citizens about their experience with education and training programs.
- Solicit direct feedback from the staff who interact most frequently with individuals participating in the workforce development system.
- Solicit feedback from industry and business representatives, including those who are appointed to participate in policy planning.
- Build greater flexibility into state programs, to the extent possible within federal regulatory frameworks, to adapt policies and practices based on collected feedback.

For example, in **Montana,** Gov. Steve Bullock, through his Main Street Montana initiative, engaged more than 200 CEOs and company presidents in statewide partnerships called "key industry networks" in 13 target industries to develop a workforce that meets the demands of the state's growing industries, including health care, advanced manufacturing and technology.[53]

PHASE 4
Evaluation and Continuous Improvement

Develop an Action Plan. During this final phase, the leadership team develops an action plan for implementing policy and strategic priorities, including:

- Defined outcomes for each strategy and action
- Agencies or individuals accountable for each action
- A timeline of activities
- A plan for monitoring and assessing progress toward outcomes aligned with the overall vision

Implement, Monitor and Adjust for Continuous Improvement. Clearly defined measures and a process for tracking progress are important components of each state's action plan. In some cases, these elements will be measures of progress, such as **Colorado's** goal to "increase the number of variables, data sets and users of the state longitudinal data system." Both progress and outcome measures are important, and many states generally include both measures in their action plans.[54]

All states will need to adjust their action plans as their work progresses and they encounter roadblocks and discover new information. By embedding their overall vision and goals across and throughout agencies' efforts, states create momentum for progress in the face of change. This phase is also an opportunity to build on "quick wins" and generate momentum for longer-term efforts and more complex goals. Seeing results builds momentum for the leadership team and demonstrates capacity for building political capital and greater buy-in across stakeholder groups to participate in preparing a future-ready workforce.

While no state can perfectly predict what the future holds, this road map offers a path forward for governors and other state leaders across the breadth of education and workforce policy areas. To aid leaders in carrying out these plans, the proceeding section offers a suite of policy proposals that states can consider as part of their future-ready workforce agenda.

STATE POLICY TOOLKIT

FOR PREPARING FOR THE FUTURE WORKFORCE NOW

The current infrastructure for educating, training and supporting individuals is not prepared to meet the rapidly evolving needs of the workforce. In the age of continuous, swift and dramatic technological disruption, states must respond with equally swift and dramatic transformations. To ensure that all incumbent and future workers can participate in high-quality employment opportunities, states can prioritize three transformational objectives as part of their economic agendas:

These objectives are subdivided into 10 unique pathways for state action, making up the State Policy Toolkit for Preparing the Future Workforce Now. Together, these pathways offer a unique framework for designing ambitious policy that can ultimately redesign education and workforce systems, invest in a technologically resilient workforce and enable every individual to participate in lifelong learning through comprehensive support. States can explore these pathways individually, but we encourage them to adopt policies from across the toolkit to achieve the three transformational objectives.

These innovations represent promising practices in program delivery and emerging tools to leverage advanced technological capabilities. Innovations can be found in each pathway, marked by a bottom text bar.

Each pathway in the State Policy Toolkit offers policy options that states can implement and build on to advance their current and future workforces. Policy options range from specific programs targeted at institutions to large-scale transformations within and across systems. They also range in application across systems, including kindergarten through grade 12 (K-12), higher education, economic and workforce development, and health and human services. The proposed policies serve as a baseline for what transformational public policy could look like in all states. They may vary in their applicability and ease of implementation depending on a state's current context, including governance structure, financial capacity or political environment.

Many of these policies are foundational and may be familiar to state and community leaders. In addition, throughout this toolkit are examples of breakthroughs or innovative ideas for reimagining current state education and workforce systems. When possible, we encourage states to evaluate how they can employ these innovations throughout communities.

The State Policy Toolkit features nearly 100 policy examples from across the nation, all of which represent steps for innovating across systems to prepare and support current and future workforces. While the State Policy Toolkit is intended to help states take action across their workforce and education systems, the transformations it presents are far from comprehensive. Many other proposals, policies and programs must be developed and implemented at the state, regional and even national levels to transform our workforce. To truly reimagine workforce policy in the age of disruption, states should consider each option on its own merits as well as part of a transformative, systemic agenda.

TRANSFORMATION 1

BUILD A STATEWIDE ECOSYSTEM TO PROMOTE CONTINUOUS LIFELONG LEARNING

To prepare the workforce and support current workers amid increasing disruptions, state leaders must evaluate and restructure statewide education and training systems, resources and infrastructure to better serve workers today and in the future. This restructuring includes focusing state agencies on shared goals; investing in data governance; and developing portable, stackable credentials to ease individuals' transition from education to industry. The result is a statewide ecosystem of programs that promote lifelong learning and a truly future-ready workforce.

Orient state agencies and external partners toward a shared, future-ready vision that builds continuous on- and offramps for education and training. A key step toward preparing the future workforce is developing a shared understanding of current and future workers' needs and a shared vision of the transformations needed to address gaps in service. Although not a new concept, this starting point for success tackles the challenges that technological disruption presents. A comprehensive and catalytic vision must account for new and changing realities for work, workers and workplaces across every sector.

Determine which industries and workers in the state are at greatest risk of disruption. The state collaborates across relevant entities, including local workforce boards, to determine which industry sectors — and by extension, workers — will be most affected by disruptions such as automation.[55]

Establish a bold, collaborative vision for credential attainment. The state develops a bold vision for the number of adults who must hold a credential of value to meet the state's talents needs. To date, 43 states have established postsecondary attainment goals.

- **Iowa** Gov. Kim Reynolds signed Executive Order 88, which created the Future Ready Iowa Alliance to develop a statewide postsecondary credential attainment goal. Iowa also enacted Senate File (SF) 2353, which requires local workforce boards to develop and implement career pathways aligned with statewide workforce goals.[56]

Build on state credential attainment goals by developing specific goals to close equity gaps. The state embeds a bold vision for credential attainment with specific goals to close gaps in equity throughout state and local workforce development plans.

- **Alabama** Gov. Kay Ivey established the Governor's Office of Education and Workforce Transformation (GEOWT) to surpass the statewide goal of adding 500,000 credentialed workers to the workforce by 2025. GEOWT identified specific attainment goals for each special population, with barriers to entering the workforce and by geographic region.

Reinforce the use of industry-recognized credentials in K-12 education. The state sets clear incentives for attainment of industry-recognized credentials, particularly those in increasingly in-demand fields at lower risk of disruption.

Allocate funds for systems improvement to ensure implementation of workforce goals across administrations. The state allocates new public resources for systems improvement to sustain long-term state planning capacity and the development and implementation of high-quality reporting and metrics toward shared goals.

- **Virginia** allocated in 2018 a portion of its Workforce Innovation and Opportunity Act (WIOA) Governors Reserve Funds to the state community college system to aid in career pathway planning across the state, including aligning outcomes measurement toward job placement.[57]

Establish a multi-stakeholder collaborative, such as a state office, task force or commission, with representatives from state agencies, labor, education, technology and industry, to explore key issues related the future of work and align state activities. As of January 2020, at least eight states had initiated task forces or other organized efforts to address the future of work.

- **Colorado** Gov. Jared Polis signed Executive Order B 2019 009, which established the Office of the Future of Work within the state Department of Labor and Employment.[58]
- In 2018, **Washington** became the first state to mandate creation and funding of a Future of Work Task Force. Substitute Senate Bill 6544 charged the 16-member task force with creating a statewide policy framework that supports a talent development pipeline and lifelong learning. To increase the task force's capacity, the Workforce Board was also allocated funding for two full-time equivalents to oversee the Future of Work Project.[59]

Design and implement a combined planning process across key federal workforce development, education and employment programs. In 2020, states are required to submit WIOA two-year plans for 2021-23. States can elect to develop a combined plan that aligns plans, activities and use of funds for the six core WIOA programs with other key federal programs. In the current WIOA planning year, at least 15 states are submitting combined plans. When submitting these plans, states should consider prioritizing technological and digital skills resilience.

Louisiana has prepared a comprehensive WIOA 2021-23 combined plan that aligns WIOA, Perkins V, Temporary Assistance for Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP) Employment and Training (E&T), Jobs for Veterans State Grants, Community Services Block Grant, Senior Community Service Employment Program, and work programs under Section 6(d)(4) of the Food and Nutrition Act of 2008.

Create a statewide data infrastructure that unites existing, fragmented systems and improves tracking outcomes to inform data-driven decision making. As tools for predictive analytics and data parsing improve, states must learn from and share with stakeholders the underlying data definitions and quality measures. Governors should promote the use of high-quality, accessible data to inform state decision making, help employers invest in training, help educators adapt to a changing economic climate and help workers identify job opportunities. Many states have already taken significant action, particularly through the Workforce Data Quality Initiative program, but the continued integration and accessibility of high-quality data remain a political imperative.

Collect more comprehensive labor market information. The state invests in the production, dissemination and analysis of qualitative and quantitative labor force data to understand how the changing world of work affects individuals across populations. This effort may involve partnering with private entities to add data sources, such as information about job openings and wage rates, which public data sources do not typically collect.

- **Missouri's** Economic Research Information Center, the research division of the Department of Economic Development, partnered with Burning Glass to supplement publicly available labor market data, which was often two years or more out of date. This partnership now uses real-time data to improve alignment between education and training initiatives and employer demand.[60]

Develop a sustainable preschool through workforce data governance structure. The state invests in building a sustainable data governance structure that identifies gaps in data, oversees data quality and security, facilitates data sharing, tracks individual mobility through education and workforce systems and serves as a clearinghouse for state data requests.

- **Kentucky** established the Office for Education and Workforce Statistics, now known as KYSTATS, to collect and integrate its education and workforce data.
- **Connecticut** Gov. Ned Lamont signed an executive order to create the chief data officer position and data coordinators in each executive-branch agency.

Build data systems capable of tracking education and workforce program accessibility and outcomes across race, gender and ethnicity. The state measures progress toward closing equity gaps in postsecondary education, workforce training, employment, adult education and English language proficiency by collecting disaggregated demographic information on nondegree credential attainment and certifications, including badges, licenses and registered and nonregistered apprenticeship certificates.

Build capacity in the state workforce to interpret data and create useful products. The state recognizes that data is necessary but insufficient on its own and invests in its workforce by developing a state employee training program to teach skills to interpret data, identify the potential and limitations of data and create new products that can be deployed to serve constituents.

- **Illinois, Indiana, Missouri** have partnered with the Coleridge Initiative to create and deliver applied data analytics classes to government agency staff. These classes train participants to work with confidential data from multiple agencies to solve high-priority problems that agency senior management identifies.

Pilot enhancements of unemployment insurance (UI) wage records. The state considers ways to collect more data from employers to improve outcomes tracking for those participating in the UI system. Additional data points may include hours worked, occupational codes and position titles.

- **Illinois** requires employers with more than 25 employees to report wage records monthly rather than quarterly for more timely economic analysis and follow-up with people participating in federal and state workforce training programs.[61]

Communicate education and workforce data to stakeholders in an accessible way. The state makes available labor market information, including anticipated effects of disruption and associated skills gaps, to employers, regional workforce entities, education institutions and the general public. In addition to high-level summary reports, states should consider making available state data machine readable so that data scientists and analysts can develop innovative, predictive data tools.

- **Colorado** and **Iowa** enacted legislation that requires annual progress reports on state postsecondary attainment goals. These reports include information about the states' top jobs and industries, trends in labor market supply and state strategies to address gaps in education and training.[62, 63]

Develop predictive data tools to forecast labor market displacement resulting from disruptive technologies. The state uses technology to develop new models for forecasting changes in the state labor market resulting from adoption of automation and related technologies. States can partner with research institutions or industry to adjust existing models that use state and federal labor data (such as data derived from the U.S. Bureau of Labor Statistics). States can also focus targeted training and support on the sectors and geographies that data show are most likely to adopt advanced technologies.

Build a bridge between education and industry by investing in a transparent, portable, and stackable credential infrastructure. More than 738,000 credentials saturate the U.S. credential marketplace.[64] The sheer volume and diversity of credentials make it difficult for employers and individuals to understand credentials' value and for policymakers to invest in the skills training needed for the future. The creation of a transparent credential infrastructure that communicates skill acquisition to employers, learners and training providers is a critical step in preparing the workforce of the future.

Collect and report data on credentials and their value in the marketplace. The state collects information about credentials and their value, such as through an assessment of credentialing options, and their alignment with industry demands to ensure that programs are ready to expand and evolve to meet future needs. Currently, only about half of states collect information about many credentials.

- **Connecticut** Gov. Ned Lamont signed an executive order requiring the state to "bring transparency to credential by… translating credentials into skills and competencies."
- **Indiana,** under Gov. Eric Holcomb's leadership, has emerged as a leading state in the Credential Engine initiative to build a public registry of credentials in a linked, open-data format. To date, the state has published information from its public two- and four-year institutions and is expanding to include private institutions and noncredit providers.

Facilitate the use of in-demand, industry-recognized credentials in training programs. The state identifies credentials in high demand through dialogue with employers — a process in which many states are currently engaged — and then ensures that state investments target programs that lead to these credentials.

- **Minnesota** has issued policy guidance for provider eligibility on its WIOA-mandated Eligible Training Provider List (ETPL) that requires that programs listed lead to industry-recognized credentials.
- **Alabama's** ETPL includes a description of each eligible program, designation of industry-recognized certificate and program performance.

Create accelerated credential pathways for returning veterans by recognizing equivalent military training. The state supports returning veterans and their spouses transitioning to the civilian labor market by identifying, and then removing barriers to recognition of occupation-specific training completed as part of military service.[65]

- **Rhode Island** requires licensing boards to accept education, training or service completed by a member of the armed forces or National Guard.

Reinforce the use of industry-recognized credentials in K-12 education. The state sets clear incentives for attainment of industry-recognized credentials, particularly those in increasingly in-demand fields at lower risk of disruption.

- Twenty-four states use student attainment of industry-recognized credentials as indicators of college/career readiness in their Every Student Succeeds Act (ESSA) plans.[66]
- **Kansas** allocates a $500 bonus to school districts for each student trained in a field with industry-recognized credentials.[67]
- **Kentucky** enacted a school accountability measure to determine which industry certifications are recommended for the statewide list of recognized credentials, and applies a policy to weigh industry-recognized credentials more favorably.[68]

Empower individuals to document, secure and share evidence of lifelong learning through a digital profile. The state offers a digital portfolio platform for individuals to access a shared lexicon and store their credentials to communicate them to employers and compare credit programs.

- **Alabama** Gov. Kay Ivey is leading an initiative with Credential Engine to develop a one-stop platform to house longitudinal credential data. This platform will operate as a "student backpack" and digital resume that signals to employers the credentials job applicants carry.[69]
- The **New Mexico** Departments of Economic Development, Workforce Solutions and Education collaborated with Fab Lab Hub to create a statewide digital badging program offered throughout K-12 and higher education institutions.[70]
- The **California** Community Colleges system uses LaunchPath, an online platform for assessing skills and displaying "skill badges." It is designed to facilitate work-based learning matches between students and employers and to empower students to retain ownership of the records of their competencies.

Help individuals communicate the skills they have learned by adopting prior learning policies. The state adopts policies that enable more workers to receive credit for and clearly communicate their skills by awarding credentials for existing knowledge and competencies. Since 2016, at least 19 states have passed legislation relating to credit for prior learning.[71]

Illinois requires each public university to submit a policy and procedure for students to earn credit for prior learning to its Board of Higher Education for review and approval.[72]

Increase the accountability of state education and training programs by tying state funding to outcomes that meet the evolving needs of workers and employers. One of the greatest obstacles to transformational policy across state education and training systems is financing cross-agency planning, alignment and application of state policy and program outcomes. Meanwhile, federal and state education and workforce programs are often designed to meet outdated metrics of labor market success. States can lay the groundwork for aligning program funding to the needs of the future workforce by using advanced technologies to track advanced labor market outcomes and by funding systems change as a necessary long-term investment.

Build the infrastructure necessary to track performance and align resources to meet labor market demand. The state invests in infrastructure, including human capital, to track data capable of determining and rewarding program performance.

- **Maryland** Gov. Larry Hogan signed Executive Order 01.01.2015.26 establishing the Office of Performance Improvement to oversee outcomes-based funding toward strategic state goals, including workforce outcomes.
- **Rhode Island** Gov. Gina Raimondo issued Executive Order 15-09 in 2015, directing state agencies to use LeanRI tools to track and improve state agency performance toward better outcomes. Departments are now required to submit data and performance measures as part of the annual budget process.

Collect qualitative and quantitative data on how education and training programs are meeting the needs of employers and individuals. The state facilitates data collection at the state and local levels to close the delta between program performance and workforce needs. Essential metrics include completion rates, employment, wages and retention among workforce participants.

- **Washington's** Workforce Board developed Workforce Core Measures, a framework for measuring workforce system progress. The system tracks the results and the taxpayer return on investment (ROI) for 12 of the state's largest workforce programs, accounting for more than 98% of the federal and state dollars spent within the state workforce development system.[73]

Customize accountability metrics to address gaps in state industry-recognized career pathways needed for the future. The state includes in its federal education and workforce plans accountability metrics that communicate the value of multiple career pathways.

- **Delaware's** ESSA plan places equal value on college and career readiness and includes career pathway completion as well as attainment of state-approved, industry-recognized credentials; dual enrollment (in a career and technical education pathway); or work-based learning as accountability measures.[74]

Promote transparency for the employment outcomes of postsecondary programs, including wage data of graduates. The state makes available for data sharing in cross-state wage data exchanges such as the State Wage Interchange System information that employers report quarterly to measure the outcomes of postsecondary education and training programs. States can also use this data to regularly evaluate whether schools should be included on their ETPLs.

- **Maryland** enacted House Bill (HB) 1206, which allows the Maryland Longitudinal Data System Center, the state's education and workforce data hub, to receive aggregate wage data about students from the comptroller.
- **Montana's** Department of Revenue initiated a memorandum of understanding with the state Department of Labor & Industry to capture more accurate, comprehensive wage data on students and track students who remain in Montana after graduation.[75]

Design state funding mechanisms that improve to meet state workforce needs. The state responds to rapid changes in the workforce by designing dynamic funding mechanisms that scale up success by default, maximizing the impact of state dollars.

- **Tennessee** enacted the Complete College Tennessee Act, implementing an outcomes-based financing model for public higher education institutions. Between 2013 and 2017, the state's credential attainment rate increased by 8.9%.[76]
- **Virginia** passed HB 66, establishing the New Economy Workforce Grant Program. This program is the first of its kind and provides a pay-for-performance model for funding noncredit workforce training that leads to a credential in a high demand field.

Use predictive data to develop future-oriented accountability measures that encourage alignment between education and industry. The state uses the power of technology to develop new data tools that predict which skill sets and competencies will be needed in the future, and then aligns state learning goals across K-12 and higher education to meet them.

TRANSFORMATION 2

INVEST IN AN AGILE, TECHNOLOGICALLY RESILIENT WORKFORCE

States develop technological and digital resilience in their workforce by investing in education and training programs that help learners develop the uniquely human skills anticipated to be in high demand as work is automated. State reforms to traditional K-12 and higher education should seek to build digital and technical skills. States can foster partnerships between educators and employers and improve technology-oriented training and instructional capacity among educators. To complete this transformation, states must work within federal regulatory frameworks to ensure that training programs are industry driven and contribute to positive employment outcomes for learners of all ages.

Innovate teaching and learning models to close the technological and digital literacy gap and develop uniquely human skill sets. States should develop strategies to introduce and use emerging technologies (e.g., robotics, artificial intelligence) into K-12, higher education and adult education classrooms. Curricula must also offer — and in some cases, mandate — course offerings so that all students obtain the uniquely human skills that will remain in high demand. Such courses can no longer be electives for gifted or mature students but rather prerequisites for all learners.

Promote skills-based teaching and learning models that deliver and measure uniquely human skill development. To the extent possible within the limitations set by federal funding programs, the state offers multiple pathways for students to earn credit based on demonstration of knowledge and mastery of skills deemed valuable by industry.

- **Vermont** passed Act 77, the Flexible Pathways Initiative, which encourages and supports the creativity of school districts as they develop and expand the high-quality educational experiences integral to secondary education in the 21st century classroom through educational experiences that acknowledge individual goals, learning styles and abilities.
- **Kansas** City Kansas Community College created an alternative system for documenting student achievement that includes proficiency in technology and digital tools, problem-solving skills, creativity and socioemotional awareness at the center of curriculum development.[77]

Build capacity for educators to teach digital skills. The state allocates funding for rigorous professional development to prepare teachers from diverse backgrounds to integrate technology into their teaching.

- **Utah** created the Computing Partnerships Grant program to grow the state computer science and technology talent pipeline, including shared investments in teacher professional development.
- **Virginia** passed Senate Bill (SB) 1419, which authorizes the state Department of Education to allow teachers to earn microcredentials in science, technology, engineering and mathematics (STEM) endorsement areas, including computer science.

Prioritize equitable skill development by directing investments toward under-resourced schools. The state targets teaching and learning resources to schools with students at greatest risk of low performance outcomes to increase participation and persistence in education and the workplace.

- **Washington** enacted computer science education policies, including language "to introduce and engage students from historically underrepresented groups, including girls, low-income students, and minority students."[78]

Ensure that all students have access to high-quality computer science courses. The state sets a minimum learning requirement to ensure that all students have access to baseline digital skills, such as those outlined by Governors for K-12 Computer Science.

- **Wyoming** passed SF 0029, which requires a K-12 computer science/computational thinking skill requirement, and launched Boot Up Wyoming 2022, a statewide teacher training initiative.
- **Hawaii** enacted SB 2384, which requires the state Department of Education to deliver a report to the Legislature on ways to integrate design thinking and coding into middle and high school curricula, including low-capacity districts.

Expand access to work-based learning. The state removes regulatory barriers to experiential learning and creates incentives for students to earn credentials in nonclassroom settings through apprenticeship and dual enrollment in technology-intensive fields.

- **Idaho** allows students to apply work-based learning for graduation credit.
- **Iowa** Gov. Kim Reynolds signed Executive Order No. 1 to create a virtual clearinghouse and expand access to K-12 work-based learning.[79]
- The **Texas** Workforce Commission uses Pell Ability to Benefit (ATB) provision funds to offer adult education participants concurrent on-the-job digital skills training in high-demand industries.

Develop onramps to technological resilience by offering all citizens access to technology training. The state democratizes access to 21st century skills training by designing and scaling training models outside traditional classroom settings.

- The **Washington** Office of the Secretary of State funds a statewide subscription to LinkedIn Learning to expand access to technological skills development. The State Library, in partnership with institutional and correctional center libraries, public and tribal libraries, and community and technical colleges, make courses and credential testing free of charge for all residents.

Integrate advanced technologies into K-12 and higher education teaching and learning. The state prepares all students to use advanced technologies by adapting curricula, investing in innovative learning spaces and credentialing students with the technology skills in greatest demand.

Tennessee's Hamilton County School District has, with support from the state Department of Education, added Fab Labs in all 17 schools, offering students digital badges in industry-recognized digital skills and competencies.[80]

Engage employers in the development of demand-driven training programs and integrated learning pathways for workers of all ages. Engaging employers of all sizes in the planning, development and implementation of workforce policy is essential for the creation of a technologically resilient workforce. States should identify which industries are at greatest risk of disruption, including shifting demand for skills, and then build demand-driven training programs and learning pathways to help workers excel in those industries. States should also consider strategies to remove existing barriers that may discourage employer participation in fueling the talent pipeline.

Identify priority industries and promote partnerships between employers and training programs that help workers gain skills that are directly applicable to high-demand occupations. The state uses labor market data to determine industries at greatest risk of disruption, and then conducts outreach to employers to determine priority areas for workforce development programs.

- **Idaho** former Gov. Butch Otter shifted responsibility for the state's Workforce Development Training Fund (WDTF) to the Idaho Workforce Development Council to more effectively meet industry needs. The WDTF has been expanded to encourage industry innovation through funds to local partner consortia to collectively solve local workforce challenges.
- **Colorado** is home to 30 sector "NextGen" partnerships that engage employers of all sizes across 79% of the state to increase local alignment between secondary, postsecondary and workforce programs. As of 2019, the Workforce Council reported an 83% increase in alignment and joint decision making.

Communicate to employers the ROI of training current and future workers as an evidence-based method for workforce development. The state proactively communicates the value of (re)training workers as a business investment, using state-of-the-art data analytics and estimates of industry outputs.

- **Oregon** built an Apprenticeship ROI Calculator to help employers estimate the potential benefit of registered apprenticeship.

Create incentives for employers to invest in training for current workers, including training for skill sets that will be increasingly in demand. Through tax credits, partnerships and other mechanisms, the state encourages private sector investment in training current workers, including for tasks less likely to be automated.

- **Ohio's** Office of Workforce Transformation launched TechCred, a reimbursement program that offers employers $2,000 for each employee that earns a short-term, industry-recognized, and technology-focused credential.

Help employers develop integrated talent pipelines for current and future workers. The state develops in-demand career pathways for students and adult workers by facilitating education-employer partnerships in the form of dual enrollment, work-based learning and apprenticeship programs.

- **Colorado** launched CareerWise Colorado, a youth apprenticeship system that combines high school classes, college classes and on-the-job training (OJT) over three years. Students can earn a high school diploma, a year of college credit and an industry credential simultaneously.
- The **Minnesota** legislature created the Minnesota Dual-Training Pipeline to help employers create or enhance a competency-based dual training program and put employer voices at the center of program development.
- **Nevada** Gov. Steve Sisolak appropriated $4 million for educational institutions that facilitate education-employer work-based learning partnerships, modeled on the Truckee Meadows Community College-Tesla partnership.

Build the capacity state and local workforce investment boards to adequately represent and meet the evolving needs of industry. The state evaluates the effectiveness of state and local workforce boards, and then implements a plan to ensure that at-risk industries are represented and that boards have capacity to meet the evolving needs of the labor market.

- **Connecticut** Gov. Ned Lamont signed Executive Order No. 4 in 2019 to replace the state workforce investment board with the Governor's Workforce Council to improve state coordination among business, education and labor leaders and better represent the evolving needs of industry in policy development.
- **Indiana** passed SB 50 and obtained a waiver from the U.S. Department of Labor (DOL) to modify its workforce board to establish the Governor's Workforce Cabinet. This body examines state economic drivers, addresses the education and employment needs of individuals and employers, and integrates and aligns state and federal resources to build a talent-driven education and workforce system.

Consider alternative financing models that encourage employers to invest in human capital and worker training as a capital investment. The state studies and develops alternative strategies to assess a company's performance and encourage training and retention of the current workforce. For example, the state may collaborate with industry to encourage the adoption of new accounting principles and key performance indicators that communicate training as a strategic long-term investment.

Become a model employer. To build a truly resilient workforce, states should consider ways to become model employers, preparing state workers with the skills and comprehensive support they need for the future. States as Model Employer (SAME) policies also demonstrate to private sector employers the commitment, viability and effectiveness of educating, training and providing comprehensive support to the current and future workforce.

Collect data on the career pathways of the state workforce to inform the creation of a state workforce preparedness plan. The state collects department-level data on the wage and employment trajectories of state employees, future skills needs across state government and the diffusion of technology to determine which departments and employees technological innovation is most likely affect. The state then uses this data to inform program design, location and investment decisions for building a resilient state workforce.

Solidify state leadership's commitment to embedding management and professional development best practices throughout state government. The state establishes staff positions and internal processes dedicated to enhancing and supporting the state workforce.

- **Missouri** established the state chief operating officer (COO) position in 2017. Under Gov. Mike Parson, the responsibilities of the position have been expanded. The COO is tasked with improving performance and efficiencies across state government, including operating many key professional development programs for state employees.[81]

Invest in the uniquely human skill sets, including problem-solving skills, creativity and socioemotional awareness, of the state workforce. The state invests in the human capital of each state worker, including the skills uniquely necessary in the state workforce, to help them remain competitive.

- **Washington** Gov. Jay Inslee called for a transformation of leadership skills in state government. The Washington Department of Enterprise Services' Workplace Learning & Performance team responded by designing new leadership development training for state employees.[82]
- **Missouri's** ENGAGE 2.0 provides a common growth model for the professional development of all state employees, including training materials and feedback mechanisms. The state also operates the Missouri Leadership Academy, a six-month intensive training program for "emerging leaders" in state government, as well as a three-day leadership program called The Missouri Way.

Model the value of equity by removing barriers to equitable workforce outcomes for people of color in state government. The state initiates and implements pipeline development programs to further workforce equity in government, with opportunities for advancement and strong retention and promotion rates for underrepresented populations.[83]

- In **Oregon,** the Metro Regional Government convened stakeholders to develop a collaborative Strategic Plan to Advance Racial Equity, Diversity and Inclusion to advance equity throughout the Portland metropolitan region, including city workforce training and hiring.[84]

Expand work-based learning, including apprenticeship, for individuals to gain experience in the state workforce. The state invests in learning opportunities for youth and adult workers interested in the state workforce, in order to reduce education and training costs of future employees.

- Former **Kentucky** Gov. Matt Bevin's secretary of education and workforce launched civil service apprenticeships in 2018 to develop workers who had the skills that state agencies need.[85]

Model strategies to promote job quality and retention, such as paid leave for family care. The state provides leadership by offering family leave policies that do not require individuals to choose between familial duties and participation in the labor market.

- **Indiana** Gov. Eric Holcomb signed Executive Order 17-31, which offers full-time state employees who have been employed for at least six months 150 hours of paid family leave and part-time employees up to 75 hours.

Help state employees gain access to the information they need to inform their career pathways. The state measures employment outcomes of state workers, including credentials acquired, so that managers and their employees have information about how state employment can help them achieve their career goals.

Create opportunities and provide incentives for state employees to gain technological and digital skills. The state invests in and makes available to all state workers the no-cost advanced training they need for the work of the future.

The **New Jersey** Office of Innovation launched the Innovation Skills Accelerator, an online digital microcredentialing lab for public sector employees to learn about blockchain, human-centered design, data analytics and more.

TRANSFORMATION 3

ENABLE EVERY WORKER TO PARTICIPATE IN THE WORKFORCE OF THE FUTURE THROUGH COMPREHENSIVE SUPPORT

Transforming workforce policy in the age of technological disruption requires a fundamental shift in policy and program design to open the door for all members of the workforce. Current and future workers, particularly low-income and lower-skilled workers, need better access to financial resources, career advice and information, portable credentials and comprehensive support that facilitate continuous engagement in learning and employment opportunities. To thrive in an increasingly dynamic labor market, individuals also need access to new benefit delivery models and expanded worker protections that support those participating in the growing on-demand economy.

Develop innovative financing mechanisms to make lifelong learning an affordable investment. Recent studies conducted by the Urban Institute and Gallup found that the greatest barrier to participating in continuous training and education is funding. In fact, a 2019 report found that 65% of Americans would participate in additional training if not for cost burden.[86] The cost burden has exacerbated disparities in access to education and training programs, especially for Black, Latino, Pacific Islander, Native American and certain Asian American workers, who face inequities as a result of historical policies. To help all learners access lifelong learning, states must look beyond financing tools that require overreliance on borrowing and proactively develop accessible financing options for all.

Evaluate opportunities for the state to adopt new and innovative financing mechanism that reduce the cost of lifelong learning to the individual. The state gathers data on the potential impacts of programs that reduce costs for learners, and then uses this information to create new programs that better meet learners' needs.

- At least 17 states have implemented at least one "free college" program that helps students access lifelong learning. Like many of these programs, **Tennessee** Promise is a last-dollar model that covers tuition and fees not covered by federal grants and other financial aid for eligible students at an approved program of study for two years.
- **Maine** established the Competitive Skills Scholarship Program (CSSP) in 2007 for students to cover the cost of education, training and other related expenses. The program is funded through assessments on employers that contribute to the state unemployment trust fund.

Develop a regulatory framework to ensure that new financing tools, such as income sharing agreements (ISAs), do not further predatory student debt-collection practices. The state explores ways to reduce risks associated with emerging financing models by limiting stacked ISAs, shifting risk from students to funders and banning discriminatory and predatory practices.

- In **California,** the San Diego Workforce Partnership, the county's workforce development board, established an ISA program with the University of California San Diego. Requirements for repayment are successful completion of a certificate and a job that pays at least $40,000 per year, after which students contribute no more than 8% of their income per year.

Establish incentives that promote saving for educational expenses. The state encourages individuals and families to invest in 529 plans and allows families that invest in these programs to use the funds for any high-quality training or education program and related expenses.

- **Colorado** CollegeInvest is a 529 account that matches investments that low- to middle-income residents contribute to an account and provides a $2,000 scholarship for any full-time student who is a Colorado resident and meets certain need-based income requirements.
- **Utah** encourages saving for education by allowing individuals to send their state tax refund directly to a 529 account. The amount allocated to the account is eligible for a 5% tax credit.

Create and encourage the use of individual training accounts. The state helps individuals finance lifelong learning by creating training co-investment strategies between employer and employee. This model ensures that funding stays with the individual, regardless employer or employment status.

- **Washington** former Governor Gregoire signed into law Senate Bill 6141 in 2012, establishing Washington as the first state to legislate lifelong learning accounts (LiLAs). This model addresses the unique training needs of lower-wage workers, which are less often sponsored by professional development programs.

Create a training trust bond (TTB). The state explores ways to model education and training funding after other successful public financing measures, such as a tax bond. A TTB could be used to pay for training up front, funded by future resulting tax revenue increases.

Create a 529c Continuous Learning Household Account that combines public, employer and individual funding for lifelong learning. The state pilots an adaptation of existing payment mechanisms, such as the 529 education account, so that individuals, employers and public programs can jointly invest in household training. This type of co-investment in training between employer and employee has been attempted in many countries and states. Potential sources of funds include public funds (e.g., WIOA, SNAP E&T support, TANF support, UI), employer funds (e.g., WIOA credits, education benefits such as 529 contributions, employer-paid tuition assistance), and individual funds (e.g., zero- or low-interest loans, ATB funds). With this option, policymakers must guard against fraud and target communications toward lower-wage workers.

Increase access to lifelong learning to ensure that all current and future workers can fully participate in the labor market. Many workers will need comprehensive support to overcome barriers to available time; career advice and information; and lack of affordable health care, family care and transportation they need to participate in learning and work opportunities. In developing these offerings, policymakers and service providers must prioritize equitable delivery of these opportunities to ensure that the workforce, education, housing and criminal justice systems do not further disadvantage people of color and individuals with disabilities.

Develop tools that help individuals gain access to labor market information, education and training programs and career advice. The state helps individuals navigate the evolving job market by building public career information tools with the data necessary to help individuals transition into high-growth jobs.

- **Indiana** collaborated with Markle Foundation's Skillful to build a Coaching Corps to help workers of all ages transition to high-demand career paths.
- **North Dakota** operates Job Service, which enables users to access personalized labor market information based on factors such as geography, industry and educational requirements.

Encourage employers to offer flexible work arrangements or paid leave so that workers have time to participate in lifelong learning. The state incentivizes employers to offer flexible scheduling arrangements or employer-supported leave to employees (permanent, probationary or trainee) to participate in job- or career-related study for in-demand skills (see page 43 for examples).

Offer those who are incarcerated opportunities to learn technology skills they need to successfully transition back into the labor market. The state annually solicits input from trade committees so that prison OJT and classroom-based related technical instruction keep pace with changing industry needs.

- The Last Mile trains incarcerated youth and adults in coding and entrepreneurial skills in **California, Kansas, Indiana, Michigan** and **Oklahoma.** The recidivism rate for graduates thus far is zero.
- **North Carolina** allows eligible inmates at minimum-security prisons to pursue OJT through work release at local businesses. Participants can use their wages to pay restitution and fines, family support and release transportation costs or save for release.[87]

Mitigate permanent displacement from the workforce for those with family obligations. The state enacts policies that offer all workers, including those with caregiving roles, the opportunity to pursue learning and work opportunities.

- **Oregon** enacted HB 2005, creating the Family and Medical Leave Insurance (FAMLI) program and requiring employers to provide 12 weeks of paid leave, including 100% wage replacement for minimum-wage workers. FAMLI is funded by a payroll tax.
- **Washington** Gov. Jay Inslee signed the CAN Act, a comprehensive state vision for state-level child care reform that addresses child care affordability, quality and workforce compensation.[88]

Remove obstacles to participating in work and learning by closing gaps in access to medical and mental health care, including for those recovering from substance use disorders. The state builds an ecosystem so that all workers, including those with disabilities, can participate in work and learning opportunities.

- **Montana** Gov. Steve Bullock secured bipartisan support from the Republican-controlled legislature to expand Medicaid in 2019, extending critical health services to nearly 100,000 Montanans.[89]
- **New Hampshire** Gov. Chris Sununu led the Recovery Friendly Workplace Initiative, allocating $1 million to educate employers in evidence-based practices that reduce substance misuse in the workplace, offer specialized training for human resources staff and promote hiring those in treatment.[90]

Encourage postsecondary providers to offer wraparound support for students at greatest risk of dropping out. The state and higher education system develops and delivers services to ensure that all learners have pathways to credential attainment.

- **Georgia** uses student data as part of an early warning system to help learning institutions identify when a student might need support in advising, course scheduling, financial stability and wellness.

Mitigate the displacement of vulnerable workers by encouraging employers to offer wraparound services that promote retention and job quality. The state explores ways to use the workplace as a platform for services that help workers get, keep and grow stable employment.

Vermont's United Way of Northwestern Vermont convened the Working Bridges Employer Collaborative to build capacity for employers to provide essential services within the workplace, including transportation, child care and financial literacy.[91]

Iowa Gov. Kim Reynolds announced the Employer Innovation Fund, a $400,000 matching grant designed to help employers deploy solutions to help their employees achieve training and education outcomes, including wraparound services.[92]

Grant workers the flexibility they need to thrive in an increasingly dynamic labor market. Advances in technology present promising new flexibilities for workers. They also present policymakers with new challenges in meeting the training and labor needs of the on-demand workforce. According to McKinsey, as many as one-third of Americans participate in on-demand work, but only about one in 10 accounts for it as a primary source of income.[93] For this segment of the workforce to thrive, states must prioritize transparency of gig economy data, invest in entrepreneurial skills development and expand worker protections to ensure that a more flexible labor market does not leave workers without essential benefits.

Promote transparency in the on-demand workforce and consider new regulations to accurately classify these workers. The state proactively conducts outreach to gather data on changes in the on-demand labor market, including demographic shifts, to inform the enforcement of workforce classification.[94]

- **New Jersey** Gov. Phil Murphy established a Taskforce on Employee Misclassification in 2019. An audit of just 1% of employers found 12,315 instances of misclassification, totaling more than $13 million in lost revenue for the state.[95]
- **Vermont** lowered the threshold for receiving a Form 1099-K from $20,000 to $600. This policy is intended to reduce underreporting and clarify tax obligations for workers.[96]

Remove barriers for people seeking new work opportunities. The state enables all workers to take advantage of new opportunities created by technology by removing obstacles to changing jobs and becoming self-employed.

- **Arizona** Gov. Doug Ducey signed an executive order requiring regulatory boards to justify any license not required by at least 25 other states. The state enacted HB 2569, a reciprocity policy that allows workers to practice their profession with out-of-state licenses.
- **Illinois'** Freedom to Work Act prohibits noncompete agreements for workers making less than $13 an hour, enabling on-demand workers greater flexibility in their income sources.
- The **New York** Department of Labor's Self Employment Assistance Program (SEA) provides aspiring entrepreneurs with tools and resources to start their own small businesses. SEA offers those seeking to become self employed financial support via weekly Unemployment Insurance (UI) benefits. **Delaware, Mississippi** and **Oregon** operate similar programs.

Expand worker protections and rights for on-demand workers. The state ensures that all workers have access to the same protections and rights awarded to many workers under federal regulations such as the Fair Labor Standards Act and the Occupational Safety and Health Act.

- **New Mexico** enacted the Domestic Service in Minimum Wage Act to expand the state minimum wage and overtime laws to domestic and home care workers, who were previously exempt.

Expand learning and work opportunities for all workers by investing in broadband and entrepreneurship hubs. The state invests in a comprehensive approach to fostering innovation, using local institutions and infrastructure and accessing investment capital to help the entrepreneurial economy thrive in all communities, including rural areas.

- Red Wing, **Minnesota,** partnered with the Center on Rural Innovation to raise local funds to match a U.S. Economic Development Administration i6 Challenge grant to fund a $1.7 million regional effort to support entrepreneurs and talent development across an 11-county region in rural southeastern Minnesota. This project expects to advance 30 emerging entrepreneurs, meet the talent needs of 15 employers and prepare 75 students for the future workforce.
- In 2015, **West Virginia** Gov. Earl Tomblin and West Virginia University partnered to create the Governor's School of Entrepreneurship, a free three-week summer boot camp that invites high school students to learn business basics and participate in pitch and startup competitions.
- **Pennsylvania** Gov. Wolf launched the PA Business One-Stop Shop to consolidate several difficult-to-navigate programs into one program to guide entrepreneurs and small businesses through planning and startup to operation and expansion.

Expand access to portable benefits to all workers, including those in the on-demand workforce. The state promotes labor market dynamism by supplementing the current workplace-sponsored benefits model with portable benefit models that enable workers to control and keep benefits as they move from job to job or become self-employed. States can draw on local or occupation-specific examples to develop portable benefits systems.

STATE CASE STUDIES

As states look for ways to use technology to spur innovation and prepare their future workforces, they are exploring innovative approaches for aligning state agencies, designing and financing service delivery and improving accountability across the education and workforce systems. Through public investments, states have focused significantly on improving access to lifelong learning and closing the digital literacy gap. They also have a growing interest in encouraging private investment in training current workers and providing the services they need to remain successful in the evolving labor market. This section includes select case studies from three states that have demonstrated leadership in developing a cohesive agenda for reimagining workforce policy in the age of disruption.

ALABAMA

Aligning Leaders and Systems Under a Shared Strategic Vision to Expand Career Pathways

In 2017, Gov. Kay Ivey launched the Strong Start, Strong Finish (SSSF) initiative with the vision of creating an education-to-workforce talent pipeline that leads to employment in an occupation that pays a family-sustaining wage regardless of demography or geography. Gov. Ivey observed the silos between governmental and nongovernmental entities with a stake in education and workforce development as a significant barrier to accomplishing progress toward this vision.

In response, she established the Governor's Office of Education and Workforce Transformation (GOEWT) in 2019 and an accompanying advisory council. The GOEWT Advisory Council is made up of representatives from 22 state agencies who provide the GOEWT with policy recommendations that align with the governor's education and workforce development strategic plans. The GOEWT was tasked with three goals:

- Increase labor force participation and decrease underemployment
- Surpass the Alabama postsecondary attainment goal
- Create pathways across 16 career clusters

For each of these goals, specific subgoals have been set for populations that face skills and postsecondary attainment gaps, including racial minorities and those in rural communities. To achieve these goals, the GOEWT has identified and begun work toward policy priorities including targeting braided federal education and workforce funds for high-need students; expanded work-based learning opportunities in key sectors and; developed a data system to track program effectiveness and progress toward the governor's goals.

"In order to meet the current and future demands of business and industry, more must be done to develop a workforce development system that offers a seamless educational journey for individuals to enter in-demand career pathways at every stage of life." Gov. Kay Ivey, July 2019

The GOEWT also oversees the collaborative development of state plans for the Every Student Succeeds Act, Perkins V (career and technical education) and the Workforce Innovation and Opportunity Act (WIOA). This coordination enables the state to align programs and resources across education and workforce systems toward the state's broader objectives. As a result, Alabama submitted its first WIOA Combined Plan, including Perkins, in 2020. Within this plan are specific, measurable steps to further align Alabama's public workforce system to offer in-demand career pathways and supportive services for those who experience barriers to employment.

As a key step in achieving its objectives, the GOEWT is working to strengthen apprenticeship programs across the state. In 2019, with strong support from the GOEWT, the state Legislature passed the Alabama Industry Recognized and Registered Apprenticeship Program Act, a bill that established the Alabama Office of Apprenticeship. This office is responsible for expanding registered apprenticeships and developing industry-recognized apprenticeships that provide high-quality, demand-driven career training. This new centralized office institutionalizes and centralizes career pathway planning and offers a one-stop-shop for employers engaging in state workforce development. To encourage more active employer engagement in this process, the previously mentioned bill also expanded incentives and flexibility for employers engaging in apprenticeship, including doubling the apprenticeship tax credit.

To improve workforce and education data collection, coordination, reporting and analysis, the GOEWT has initiated development of the Alabama Terminal for Linking and Analyzing Statistics on Career Pathways. Meanwhile, the state has taken steps to improve data collection and strengthen connections, illustrating how states can work within existing systems in the short term to build or improve data collection and connections across systems. These efforts enable the GOEWT to track progress toward the governor's goals in real time and build capacity to collect and use information for continuous improvement of programs over time.

ARKANSAS
Investing in an Agile, Technologically Resilient Workforce

In his 2014 campaign, Arkansas Gov. Asa Hutchinson made expanding kindergarten through grade 12 (K-12) computer science education a key component of his platform. Soon after taking office, he set a goal to increase the number of students enrolled in computer science courses from 1,104 in the 2013-14 school year to 7,500 by the 2019-20 school year to meet state computer science and technology workforce needs.

Gov. Hutchinson's policy agenda was supported by the Arkansas Legislature, which passed a law in 2015 declaring the lack of digital skills in Arkansas a state of emergency. The bill allocated $5 million over two years to rehabilitate school facilities and train teachers to implement computer science curricula and $2.5 million annually thereafter for teacher training. Through this bill, Arkansas became the first state in the nation to mandate and fund a computer science curriculum in high schools and count computer science courses as a math or science course required for graduation. To help all districts, including those that could not hire a face-to-face teacher, meet this requirement, Virtual Arkansas, an online learning platform implemented through a partnership between the Arkansas Department of Education and the Arkansas Education Service Cooperative, offers the state's computer science curriculum online.

At the 2016 National Governors Association Winter Governors Meeting, Gov. Hutchinson and Gov. Jay Inslee of Washington announced the Governors for K-12 Computer Science initiative. This initiative established a partnership among governors committed to promoting computer science education in their state. Today, Arkansas is one of 10 states that have met the initiative's three key standards:

- Enable all high schools to offer at least one rigorous computer science course
- Fund professional learning opportunities to prepare teachers to lead these courses
- Create high-quality K-12 computer science standards to guide local implementation of these courses

As a result of these efforts, Arkansas now has the second-highest percentage of high schools teaching computer science and one of the most rapid growth rates in computer science education in the nation. The governor's initial goal of 7,500 students was far surpassed, with more than 9,800 students enrolled in computer science courses in the 2019-20 school year. Female students, who have historically been underrepresented in computer science education, represent the largest gains in enrollment.

Technology moves quickly. If we are going to give our students the best computer science education possible we must constantly assess our progress and implement the programs that will attract and inspire our students and educators." Gov. Asa Hutchison, Dec. 2019

In December 2019, Gov. Hutchinson issued an executive order to build on the progress the state has made in K-12 computer science education since 2015. This executive order established the State Computer Science and Cybersecurity Task Force and proclaimed Dec. 9-15 Computer Science Education Week in Arkansas. The task force consists of industry leaders responsible for assessing the state's computer science and cybersecurity education programs and for making recommendations to carry out strategic priorities including: improve postsecondary alignment; provide relevant work-based learning opportunities for students; establish meaningful credentials for teachers; better incorporate data sciences and cybersecurity into computer science curricula and; ensure sustainable funding to support these efforts.

Through Gov. Hutchinson's leadership, Arkansas is demonstrating bold, transformational leadership to ensure that every learner has access to a baseline of technological and digital skills required for the future. Today, the state is working with employers to identify the future skill needs; develop training programs to meet demonstrated demand; expand work-based learning (including apprenticeship) for learners of all ages; and align postsecondary curricula across fields, including cybersecurity.

WASHINGTON
Engaging Employers to Build Learning Pathways Under a Strategic Statewide Vision

In May 2017, Gov. Inslee established the Career Connect Washington Task Force to address a growing skills gap. At the time, 70% of jobs in the state required a credential, but only 40% of Washingtonians had completed any education past high school. Gov. Inslee charged the task force with making policy recommendations to lead the state toward the ambitious goal of placing 100,000 students in career-connected learning (CCL) opportunities by 2021. The task force consisted of 21 representatives from major employers, state legislators, relevant state agencies and labor organizations.

The following month, several members of the task force joined Gov. Inslee on a trip to examine the nationwide apprenticeship model in Switzerland. Participants were struck by the country's systematic approach to workforce development and were convinced that industry-informed work-based learning opportunities should be scaled not incrementally but systematically and statewide. Following the trip, the task force called for a strategic planning effort to drive a statewide system of CCL. Funded by philanthropy, a small advisory team was assembled to conduct outreach to all stakeholders in the CCL landscape, including conducting extensive research with parents and students and discussing a framework and implementation approach with more than 3,000 individuals in business, labor and education. Buy-in from policymakers and industry leaders was paired with evolving public sentiment. Statewide polling indicated that students and families were increasingly open to postsecondary opportunities other than four-year bachelor's degrees.

> ***There are examples of programs developed by educators and employers across Washington that give students on-the-job learning opportunities. What is needed is a way to turn these excellent local programs into a broader set of opportunities for students and employers."*** ***Gov. Jay Inslee, 2019***

In October 2018, this group presented Gov. Inslee with the Career Connect Washington strategy. This strategy informed a bill that the Legislature passed in April 2019 to allocate $25 million for fiscal years 2019-21 to support Career Connect Washington and create the Career Connect Washington Advisory Team. That team established the infrastructure to support the vision that "Every young adult in Washington will have multiple pathways to economic self-sufficiency and fulfillment, strengthened by a comprehensive statewide system for career connected learning." Career Connect Washington works toward that vision by providing exposure opportunities to careers and career options, career-specific instruction at a worksite or in a classroom for academic credit and paid work-based programs with aligned classroom learning that culminate in a postsecondary credential.

Career Connect Washington was built by creating lines of communication between and increasing the capacity of existing institutions, including employers, community colleges, K-12 institutions, local workforce boards and community organizations. Career Connect Washington funds nine regional network coordinators, which are community-based organizations selected by a competitive process to coordinate with school districts, colleges and employers to match pathway opportunities with real jobs in the local economy. The pathways offered are in coordination with prominent regional employers, including in the building trades, health care and information technology. Through the regional network, those employers work with intermediaries, funded by state grants, to collaborate with educational institutions and develop a curriculum that includes on-the job training that the employer pays for. Once a curriculum has been established, the regional network coordinators work with coordinators in other regions to identify opportunities to scale the curriculum across the state. Industry leaders engaged in Career Connect Washington use their networks to engage new employers in this process. These intentional lines of communication create a system that rapidly scales the capacity for Career Connect Washington to serve students across the state with educational experiences that employers value.

Since 2019, more than 75,000 students have participated in Career Connect Washington programs, including 10,000 who have enrolled in paid work-based learning that culminates in a postsecondary credential. Career Connect Washington is working with employers and educational institutions to expand this work, ensure opportunities for lifelong learning throughout participants' careers and give workers confidence that they will continue to meet the rapidly changing needs of employers in the state.

INITIATIVES FROM AROUND THE WORLD

Preparing the future workforce has emerged as a priority throughout the world. This section presents reflections on how other economies are capitalizing on the opportunities technology presents to promote lifelong learning, train and accredit an evolving workforce and spur innovation.

CANADA
Quebec-France Agreement on the Mutual Recognition of Professional Qualifications

In 2008, France and the Canadian province of Quebec entered into a bilateral agreement to develop a common qualification framework for more than 70 middle- and high-skill occupations. The accord expedites the credential assessment of French citizens in Quebec, enabling them to enter the workforce more quickly. To achieve this, the nations engaged senior leadership to overcome resistance from state regulatory bodies and labor unions. State policymakers collaborated with local policymakers to make public commitments to deadlines, including benchmarks of success.[97]

FRANCE
A "Time Bank" for Lifelong Learning

France recently amended its labor code to offer all workers an entitlement that acts like a "time bank" for participating in vocational training throughout their careers. The law mandates that all employees have a personal training account from age 16 until retirement through which mandatory training benefits are delivered. This entitlement offers up to 150 hours of free tuition with paid leave from work, accumulated over an eight-year period. Training funds remain registered in the individual's occupational personal account for his or her entire working life and secure the individual's career by strengthening freedom of action and removing obstacles to professional mobility. Individuals are required to apply their funds to participating in the more than 3,500 training programs approved by a central state body. If the individual meets the qualification criteria, employers are required to let them attend and pay a percentage of their training cost. A report on the success of the program found that information technology certificates were top of the list among those already employed and that jobseekers most commonly used funds to gain key competency certificates to aid their job search. To finance this system, the law also requires employers to finance the state's vocational training system through a 1% tax on payroll.[98]

SINGAPORE
A SkillsFuture Movement to Encourage Continuous, Lifelong Learning

The SkillsFuture movement in Singapore has developed an ecosystem of helping working people continually train and retrain throughout their careers.[99] In addition to instilling this mindset of lifelong learning in students, SkillsFuture Singapore, a statutory board under the Singapore Ministry of Education (MOE), partnered with the Singapore Institute of Technology to develop a one-stop education, training and career guidance online portal. Each resident is entitled to an individualized My SkillsFuture account, which offers labor market information and a suite of online training programs in which users can earn industry-relevant credentials in fields such as cybersecurity, advanced manufacturing and data analytics. Once residents turn 25 years of age, they are eligible for an automatic $500 learning credit, issued through the account portal. To encourage use by employers, SkillsFuture offers enhanced training support schemes; employers that sponsor their workers aged 40 years and older are eligible to receive a subsidy for up to 90%.[100]

INDIA
Transforming an Economy through Fab Labs

Despite having the lowest per per capita income rate in India, the state of Kerala has the highest literacy rate. With support from the government of Kerala, state leaders have decided to transform the economy by becoming an innovation society. To that end, the government is embedding Massachusetts Institute of Technology Fab Labs (digital fabrication labs) into each of its 150 technical schools. To produce the fabrication labs at scale, students reproduce existing fab labs.[101]

CHINA
Ten Thousand Types of Entrepreneurship and Innovation (万众创新)

For the past three decades, China has fundamentally revised its educational system to prioritize an ecosystem (生态) of creativity, critical thought and entrepreneurial spirit. China's centralized system disburses funds to even the smallest districts to build maker spaces, fab labs, coworking spaces, incubators and accelerators. In addition to funding infrastructure for accessible learning, the Ministry of Education has issued specific policies to support innovation and entrepreneurship. Students are encouraged to take one year off to pursue an entrepreneurial venture, and all universities are encouraged to provide eligible courses in entrepreneurship for credit. By 2016, 82% of Chinese universities had introduced compulsory courses in innovation and entrepreneurship. The MOE also plays a major role in brokering Sino-foreign joint ventures between universities to constantly update pedagogy in the postsecondary environment.[102]

ESTONIA
Student Companies to Promote Entrepreneurship

A tiny country on the border of Russia with a language related to Finnish, Estonia gained its independence from Communist rule in 1990. With a population of just over 1 million people, the country aims to be an innovation society. To encourage startup thinking, the country's leaders are implementing programs to promote student-led and managed startups in high schools, known as "student companies."[103] Approximately 50% of high schools feature "school companies," which must compete before an international jury of business people to bring their product or service to market.[104]

CONCLUSION

Governors and states recognize that the future of work is here and the time to commit to reimagining education and workforce policy is now. This publication features more than 40 states that have taken important steps toward reimagining policy to improve their workforces' agility, inclusivity and technological resilience. The challenge now is embracing a more comprehensive approach that integrates the three transformations this guide proposes into a seamless whole. Without swift, dramatic and transformative action across education and workforce systems, states risk exacerbating inequities that exist between races, ages, genders, socioeconomic backgrounds and geographies. Policymakers must put equity in access to quality learning and employment opportunities at the top of their agendas for education and workforce development. They must transform policy to put the individual at the center of program design. States must also expand partnerships to facilitate agility in adapting policy and programs to meet the challenges technological disruptions pose and their impacts on the labor market. This guide is an important tool that all states can use, regardless of governance structure, political leadership or geography, to implement transformational policies and prepare the future workforce now.

APPENDIX

Table A-1: Research on Current and Predicted Future Skill Needs[105]

SKILLS IN DEMAND TODAY		
LinkedIn: 2018 U.S. Emerging Jobs Report[106]		
Oral communication	Social media	Leadership
People management	Business management	Graphic design
Development tools	Time management	Data science
SKILLS PREDICTED TO BE IN DEMAND IN THE FUTURE		
Burning Glass: "The New Foundational Skills of the Digital Economy"[107]	Accenture: "Bridging the Skills Gap in the Future Workforce"[108]	Pearson: "The Future of Skills: Employment in 2030"[109]
Analytical skills	Active learning	Active learning
Business process	Active listening	Coordination
Collaboration	Complex reasoning	Education and training
Communicating data	Creativity	Fluency of ideas
Communication	Critical thinking	Instructing
Computer programming	Deductive reasoning	Learning strategies
Creativity	Negotiation	Originality
Critical thinking	Persuasion	Psychology
Digital design	Service orientation	Sociology and anthropology
Digital security and privacy	Socioemotional intelligence	Social perceptiveness
Managing data	Social perceptiveness	
Project management		

APPENDIX B

RESOURCES FOR BUILDING RACIAL EQUITY

- **Education Commission of the States –** The Equity in Education Assessment
- **FHI 360 –** From Surviving to Thriving: Supporting Transformation, Reentry and Connections to Employment for Young Adults
- **McKinsey & Company –** The Future of Work in Black America
- **National Science Foundation –** Understanding Emerging Technologies, Racial Equity, and the Future of Work
- **National Skills Coalition –** The Roadmap for Racial Equity: An Imperative for Workforce Development Advocates
- **Race Forward –** The Racial Equity Assessment for Workforce Development
- **The University of Texas at Austin –** Ray Marshall Center for the Study of Human Resources: Partnering for Equity: How Sector Partnerships Are Tackling Workforce Disparities

RESOURCES FOR BUILDING GENDER EQUITY

- **BSR –** How Business Can Build a Future of Work that Works for Women
- **Institute for Women's Policy Research –** Women, Automation and the Future of Work
- **McKinsey & Company –** The Future of Women at Work: Transitions in the Age of Automation
- **New America –** The Future of Work for Women
- **U.S. Chamber of Commerce Foundation –** Reaching the Full Potential of STEM for Women and the U.S. Economy

RESOURCES FOR BUILDING ABILITY EQUITY

- **Accenture –** Getting to Equal: The Disability Inclusion Advantage
- **International Labour Organization –** Making the Future of Work Inclusive of People with Disabilities
- **National Collaborative on Workforce and Disability –** Policies for Increasing Employment Among Opportunity Youth with Disabilities
- **Source America –** The Future of Work & Inclusion of People with Disabilities
- **CSG –** Work Matters
- **National Governors Association –** States Expand Employment and Training Opportunities for People with Disabilities

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