FUTURE

OF

How Will University Innovation Hubs Shape the Future of Work?

BEST PRACTICES REPORT

WORK

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EXECUTIVE SUMMARY

University-affiliated innovation hubs play a pivotal role in shaping the future of work by fostering economic growth; bridging academia, industry, government, and community; and equipping workers with skills to navigate rapid technological and workplace transformations. Against a backdrop of evolving technologies such as AI, robotics, virtual reality, and collaboration tools, these hubs are critical for addressing workforce needs and creating ecosystems of innovation that drive regional and national economic vibrancy.

With these trends in mind, UNC-Chapel Hill's Innovate Carolina team created this report with support from UIDP and UI Collab to provide insights and lessons about our research into how university-affiliated innovation hubs are approaching the future of work. The goal is to provide you and other hub stakeholders with best practices you can build upon as you help people learn to use emerging technologies, prepare students and professionals to thrive in tomorrow's jobs or their own entrepreneurial ventures, create work environments that are conducive to future modes of work, and build productive partnerships that advance future-of-work initiatives. Throughout this report, you'll find model examples and strategies to consider as you seek to connect your own future-of-work activities to the larger economic and societal impact you aim to make. Below is a summary of what we learned during in-depth interviews with the leaders of 11 hubs across the United States.

HUB CHARACTERISTICS

Innovation hubs vary in structure, from university-managed centers to research parks to dual university-nonprofit hybrids, but they all share a commitment to fostering economic growth. They align with regional economic priorities and industry needs while serving various constituents, including students, faculty, entrepreneurs, and corporations. Hub leaders most commonly describe the future of work as involving interconnected topics, including technology-driven shifts, evolving skill requirements, new workplace models, educational transformation, multidisciplinarity, and academic-industry alignment.

ECONOMIC IMPACT

Hub leaders indicated they see their future-of-work efforts making an economic impact in a multitude of ways. The most frequently cited were expanding the capacity to conduct research, building entrepreneurial skills, and commercializing research. They measure future-of-work impact through quantitative metrics like numbers of patents, startups, and jobs created. Hubs are increasingly exploring long-term qualitative impacts, such as skill translation and regional economic resilience.

TECHNOLOGY

Innovation hubs most commonly integrate virtual collaboration tools and cloud technologies into their internal business operations, with a growing trend toward using AI. Externally, they talked more about upskilling and reskilling people in more advanced technologies, such as artificial intelligence (AI), data science tools, augmented and virtual reality (AR/VR), and robotics. Some hubs cite policy and infrastructure challenges to testing and adopting new tools.

TALENT

Entrepreneurial skills are the most common type of skillset hub leaders say they have developed programs to address — and they are heavily embedding ways to build human skills (also known as soft or professional skills) into these programs. Technical skills are the second most frequently cited. Mentorship and access to experts are the two most common modes of skill-building support hubs said they offer.

WORKSPACES AND WORK MODES

Innovation hubs are reimagining workspaces to support in-person, hybrid, and remote work. Many feature co-working areas and flexible, tech-enabled environments like makerspaces and prototyping labs to encourage collaboration. Hubs also navigate the challenge of balancing physical infrastructure with the growing demand for remote and hybrid work options.

PARTNERSHIPS

University hubs are not just expanding the capacity for research or training. They serve as strategic conveners of academic, corporate, and government organizations around regional, state, and national economic priorities. Hubs frequently partner with tech companies on workforce training initiatives and real estate developers on physical spaces.

FUTURE PLANS

Most of the hubs' interviewees expect to expand their future-of-work efforts over the next 12 months. Most of their plans for the future align with characteristics that they defined as being core to the future of work.

A student from the University of Tennessee-Knoxville (left) works with a Volkswagen employee at the Volkswagen Innovation Hub Knoxville, which was established through a partnership between the university and Volkswagen Group of America, Inc. The hub, located on the UT Research Park, focuses on advanced research in automotive lightweight structures, sustainable materials and electric mobility, while allowing doctoral students to engage in workforce-based learning while completing their dissertations. Photo credit: University of Tennessee-Knoxville.

Element Labs, a 142,000 square-foot space located at University Research Park in Madison, Wisconsin, is designed for the needs of scaling lab companies. The project's first floor includes space for a restaurant as well as a multi-function hall for meetings, presentations, talks, and other gatherings. Element Labs is the focal point of the research park's new Element Collective District, which includes plans for mixed-use offerings such as apartments, fitness facilities, food-and-beverage locations, and a hotel. Photo credit: University Research Park.

A group of academic and innovation hub leaders participate in a design thinking session focused on hubs and the future of work at UNC-Chapel Hill's Innovate Carolina Junction. Pictured clockwise, left to right: Marc Gibson, Associate Vice Chancellor, Partnerships & Economic Development at the University of Tennessee-Knoxville; Katie Stember, Director of Experiential Learning at UNC-Chapel Hill's Graduate School; Amy Kircher, PhD, Associate Vice President for Strategic Initiatives at the University of Minnesota; Chris Heivly, Serial Entrepreneur and Consultant with UI Collab. Photo credit: UNC-Chapel Hill.

ACKNOWLEDGMENTS

Innovate Carolina at UNC-Chapel Hill, UIDP, and UI Collab thank the innovation hub leaders who took the time to participate in our interview sessions and share their perspectives about the future of work. We listened to and absorbed the insights you provided regarding ideas, successes, challenges, and future plans you described. We appreciate your willingness to share how your hub is approaching the future of work so that others leading hubs around the country might apply this knowledge to make an impact through their own hubs — both on their campuses and in their communities. We are deeply grateful for your time, transparency, and willingness to share your own experiences for the benefit of others.

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INTRODUCTION: INNOVATION HUBS AND THE FUTURE OF WORK

You can sense the shift: the way the world works is changing — and it's changing fast. Every day seems to introduce you to a new technology to master, while burying a soon-to-be obsolete tool you're accustomed to using. You may be an in-demand worker today who's replaced by a machine tomorrow. Gone are the days of graduating from college with the degree and skills you need to last a professional lifetime.

Rather, continual learning, upskilling, and reskilling are now essential — not for getting a leg up, but just to keep up. New modes of working together — and apart — open new possibilities for connecting with the wider world, while complicating decisions about how and when to collaborate online and in-person. Are you remote? Hybrid? Back to the office? The top jobs of today will morph into jobs not yet imagined. And your closest work colleague may soon be a generative AI tool or robot that works side-by-side with you to augment what you do.

These experiences encapsulate what's commonly called the "future of work." Definitions vary, but the future of work generally involves the rapid and major shifts taking place in how people find and perform their jobs and how organizations engage with the current workforce while preparing for emerging demands. The future of work involves shifts in technology, talent, work arrangements, gig economies, automation, physical work environments, economic impact, cross-sector partnerships, and other activities designed to help the world work smarter, faster, and more efficiently and effectively.

As the future of work speeds forward, technology sits in the driver's seat — and it's a young driver, indeed. In human terms, the Internet is in its early adulthood, going mainstream just 30 years ago. Smartphones and cloud computing technologies are only inching past their teenage years, with Amazon AWS and the Apple iPhone born in 2006 and 2007. Today's popular video conferencing tools, now used daily by millions of workers across practically every industry, are the age of mere elementary school students — with Zoom only about 10 years old and Microsoft Teams an eight-year-old. And while the concept of AI dates back to the 1950s, today's AI tools are still in their infancy. Blink, and the next technological disruptor is born.

Where will this technological blitz take the future of work? No one knows for sure, but in today's workplace, we see indicators of what tomorrow will look like. The National Academies of Sciences, Engineering, and Medicine's 2024 report "Artificial Intelligence and the Future of Work" notes that while AI remains an emerging and imperfect technology, significant and rapid advancements in its sophistication are likely. Such advancements could make productivity

skyrocket as "some estimates suggest as much as a doubling of the rate of growth in the U.S. gross domestic product from about 1.4 percent currently to 3 percent." As the report notes, the effects on the nature of jobs may be profound, as "AI tools may soon equal or exceed human capabilities in a variety of tasks requiring elite expertise" and that, in these cases of knowledge-based work, "AI is likely to substitute for human expertise, eroding the value of such expertise." The report predicts that robotics will also have a notable effect on physical work.

The future of work isn't confined to the effect of rapid technological advancements on the nature of jobs. It also involves a shift in the skills needed to do those jobs. In its research report "Skill Shift: Automation and the Future of the Workforce," McKinsey & Company says that research indicates the time spent using advanced IT and programming skills will grow by as much as 90 percent in the U.S. by 2030, with the need for basic digital skills growing by 69 percent. But honing technical skills won't be enough, the report says. By the end of the decade, the demand for social and emotional skills that can't be easily duplicated by machines — empathy, communication, entrepreneurship, leadership, initiative, and management — will increase by 26 percent in the U.S.

Where and how we work is changing, too. COVID-19 expedited a trend that was already afoot pre-pandemic: a shift toward remote and hybrid work. Based on Gallup indicators, in 2024, among employees who work in remote-capable jobs, 80% of people work in fully remote or hybrid modes, with 27% working in exclusively remote roles and over half (53%) working in hybrid positions. Gallup's data also

reveals the conundrum many organizations face: striking the right remote/in-person balance. "As organizations adapt to various hybrid work policies and employees settle into these new practices, it seems that there is no perfect one-size-fits-all hybrid work model," the report says, noting that spending three days in the office or working exclusively remotely was associated with nearly 40% higher levels of employee engagement. Meanwhile, despite data from the U.S. Bureau of Labor Statistics and the U.S. Census Bureau's American Community Survey indicating that remote work increased worker productivity from 2019 to 2022, the support for remote work among c-level leaders is waning. The KPMG 2024 CEO Outlook Report says that 83% of CEOs predict a full return to the office within three years, which is up significantly from 64% in 2023.

As emerging technological and virtual work trends have taken hold, innovation hubs have grown in number and prominence. The term "innovation hub" can mean different things to different audiences. It often brings to mind a defined physical space located on a university campus or within a larger "innovation district" of a city downtown. UNC-Chapel Hill's Innovate Carolina team regularly benchmarks more than 70 such hubs nationally, tracking characteristics such as their target industries, buildings and spaces, programs and amenities, partnerships, funding and revenue sources, and community engagement efforts. Consistent with this benchmarking and for the purposes of this report, we use the term innovation hub to broadly refer to a variety of innovation-oriented environments that serve as anchor entities of innovation activity in their communities. Hubs vary in scope, size, and configuration — ranging from virtual

At the 5th Street intersection of Tech Square in downtown Atlanta, a variety of community members — including Georgia Tech students and staff, large companies, and startups — move from place to place. Photo credit: Georgia Institute of Technology.

teams and single-building physical spaces to multi-building downtown districts to expansive research parks. Despite significant differences in their location, physical footprint, governance, and industries served, the hubs we interviewed share several characteristics: they bring different types of people together, focus heavily on entrepreneurship, and strive to create economic and human impact in their communities.

One way to assess the growth of innovation hubs is to look at the growth of "innovation districts," generally recognized as the larger cousins of innovation hubs. While a few dozen innovation districts — mostly in large urban centers — began to emerge 10 to 15 years ago, a new 2024 report "The Next Wave of Innovation Districts" from the Global Institute on Innovation Districts notes that it has identified 150 innovation districts emerging worldwide. It points to several intersecting forces, including the need to expand talent, which will make such hubs of innovation increasingly relevant in the future. A 2024 report

by the George W. Bush Institute-SMU Economic Growth Initiative found that university-affiliated hubs create significant economic impact, a clear driver for their growth in number and popularity. Findings from the report underscore these districts' ability to generate jobs, attract talent, and enhance quality of life.

Looking forward, organizations of all types will continue to wrestle with pressing questions: How do we prepare for shifting technological, generational, and social dynamics? What strategies will align labor markets and ec onomic policies with these changes? How might we adapt our curricula, training programs, and lifelong learning opportunities to meet emerging workforce demands? Innovation hubs — natural convergence points for academic, corporate, and public-sector collaboration — are uniquely positioned to help answer these questions, fostering the creation of new businesses and technologies to meet tomorrow's challenges.

GLOSSARY AT A GLANCE

The following terms appear frequently in the report. Their definitions vary slightly among people and organizations. For common understanding while reading this report, please refer to the brief glossary below.

- **Innovation.** When economic, strategic, or societal value are found in fundamental knowledge.*

- **Innovation Hub.** A centralized program or facility — either physical or virtual — designed to foster innovation, entrepreneurship, and industry collaboration by providing resources such as mentorship, funding, research support, and networking opportunities. Innovation hubs can exist within a university or corporate environment, but all hubs described in the report are university affiliated. These hubs typically serve as catalysts for startups, commercialization, and workforce development.

- **Innovation District.** Geographic areas where leading-edge anchor institutions and companies cluster and connect with startups, business incubators, and accelerators. These are usually located within a city or university campus. Innovation hubs are often located within a larger innovation district.

- **Research Park.** Physical environments that can generate, attract and retain science and technology companies and talent in alignment with sponsoring research institutions that include universities, as well as public, private, and federal research laboratories.**

- **Commercialization.** The process of bringing new technologies, research discoveries, or innovations to market, transforming ideas into viable products, services, or businesses.

- **Economic Impact.** The influence that an innovation hub, research park, or startup ecosystem has on activities such as job creation, investment attraction, business growth, and regional economic development.

- **Future of Work.** The rapid and major shifts taking place in how people find and perform their jobs, and how organizations engage with the current workforce while preparing for emerging demands.

- **Future-of-Work Program.** An initiative designed to prepare workers and students for emerging job trends by providing training, upskilling, industry partnerships, and experiential learning opportunities.

- **Upskilling/Reskilling.** The process of enhancing existing skills (upskilling) or training individuals in new skills (reskilling) to adapt to changing job requirements and workforce needs.

- **Partnership.** A formal collaboration between universities, innovation hubs, and businesses to drive research, workforce development, and technology commercialization.

- **Sticky Real Estate.** A type of real estate development strategy designed to retain tenants and foster long-term economic activity by integrating amenities, collaboration spaces, and strategic industry partnerships.
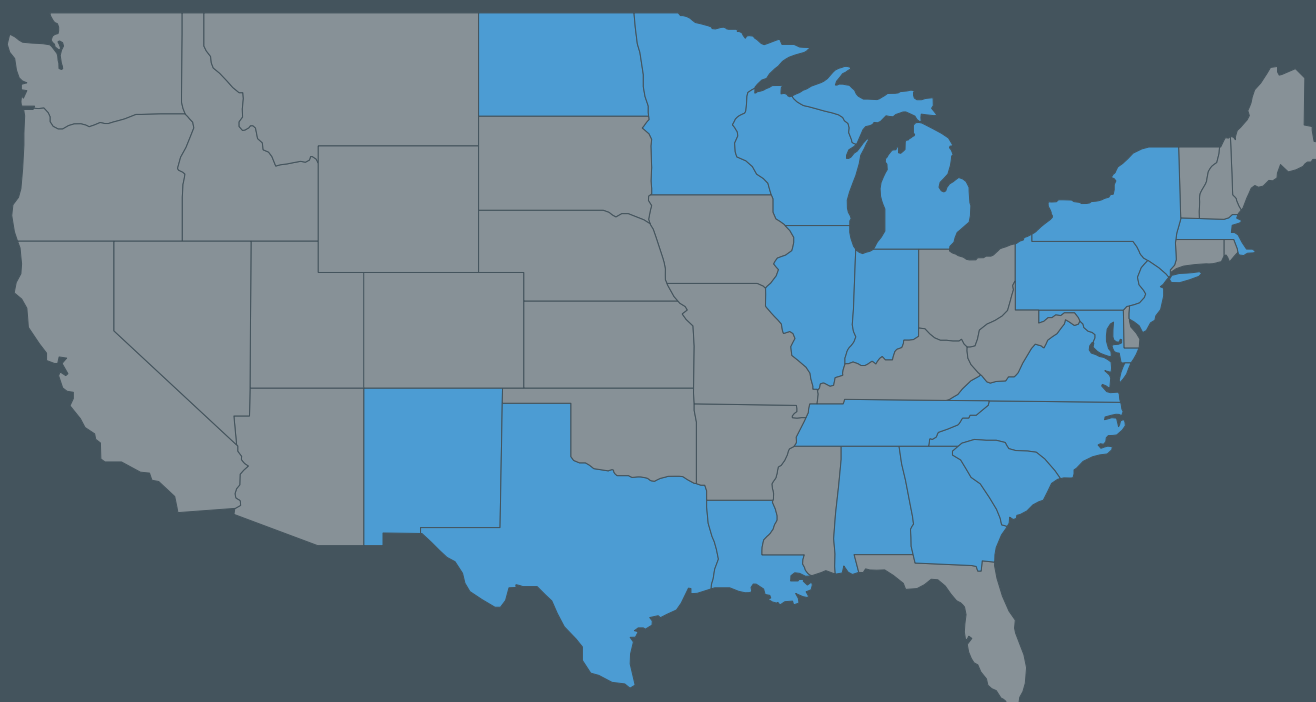
* Definition introduced by Dr. Dedric Carter to Innovate Carolina in 2023.

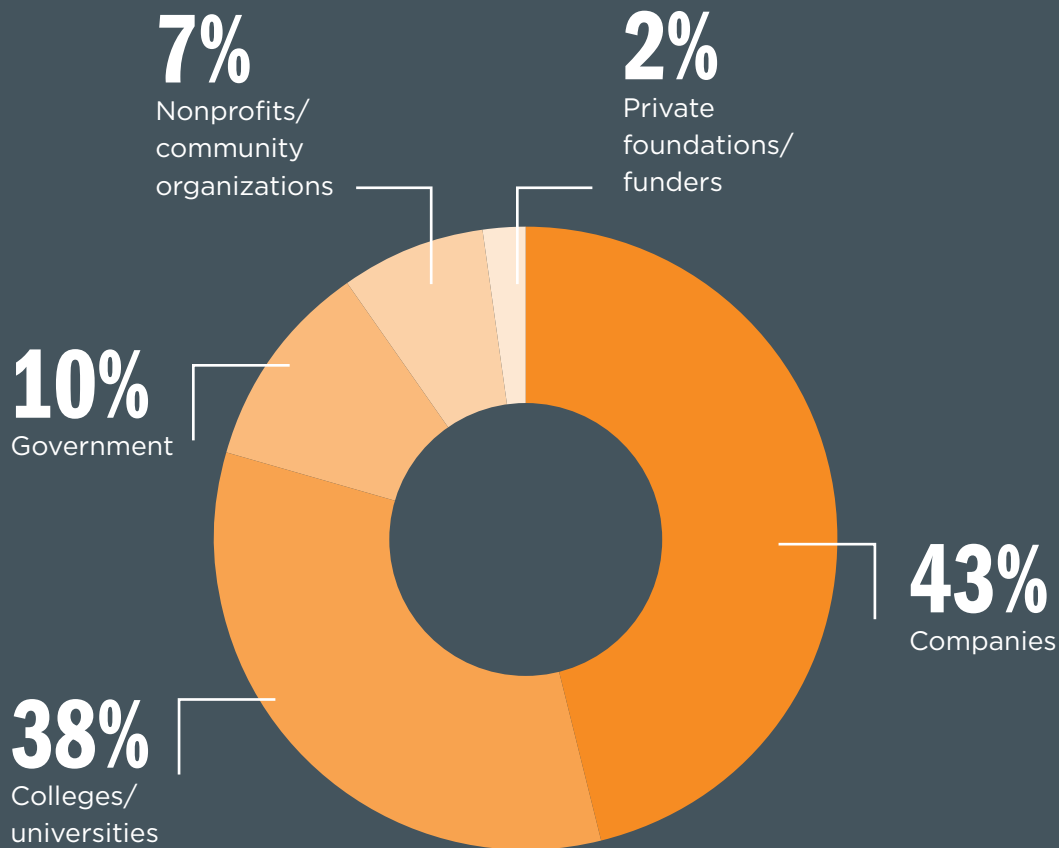** Definition courtesy of Association of University Research Parks

2024 SIGNATURE INNOVATION SUMMIT

Recognizing the opportunity to create impact, the University of North Carolina at Chapel Hill opened an innovation hub — the Innovate Carolina Junction — in its downtown district in September 2023. In May 2024, UNC-Chapel Hill's Innovate Carolina team convened a group of innovation hub leaders at the Junction for the Signature Innovation Summit: Innovation Hubs and the Future of Work. The summit, which was hosted by Innovate Carolina, UIDP, and UI Collab, brought together 50 leaders from more than 20 states representing a mix of established and emerging hubs. Attendees shared their expertise, learned from one another, and started to build hub-to-hub partnerships. As described in the summit summary report, the event helped participants develop a deeper understanding of the programs and principles that colleagues at hubs across the U.S. use to shape the technology, talent, and work environments of the future. During the summit, we used live polling to capture insights from academic, government, and corporate hub leaders who responded to three questions.

Figure 1: May 2024 Summit: 50 university, industry and government hub leaders from 22 states

7%
Nonprofits/
community
organizations

2%
Private
foundations/
funders

10%
Government

43%
Companies

38%
Colleges/
universities

WHO HOLDS THE GREATEST RESPONSIBILITY FOR SHAPING THE FUTURE OF WORK?

Of the 42 hub leaders who responded to the poll, the vast majority (81%) said that either companies or colleges/universities are most responsible for shaping the future of work (43% companies, 38% colleges/universities). This result underscores the importance of academic-industry partnerships in co-developing future-of-work initiatives around technology applications, curricular and skills-based training development for workforce preparedness, and

co-located and co-designed academic-corporate workspaces that hub leaders subsequently described in the in-depth interviews analyzed for this report. In fact, colleges/universities and companies were the two categories most frequently cited by hubs as organizations with which they have existing or planned partnerships to shape the future of work. (See Partnerships section for examples of such collaborations).

24%
Business function/
role-based skills

48%
Human skills

29%
Technical skills
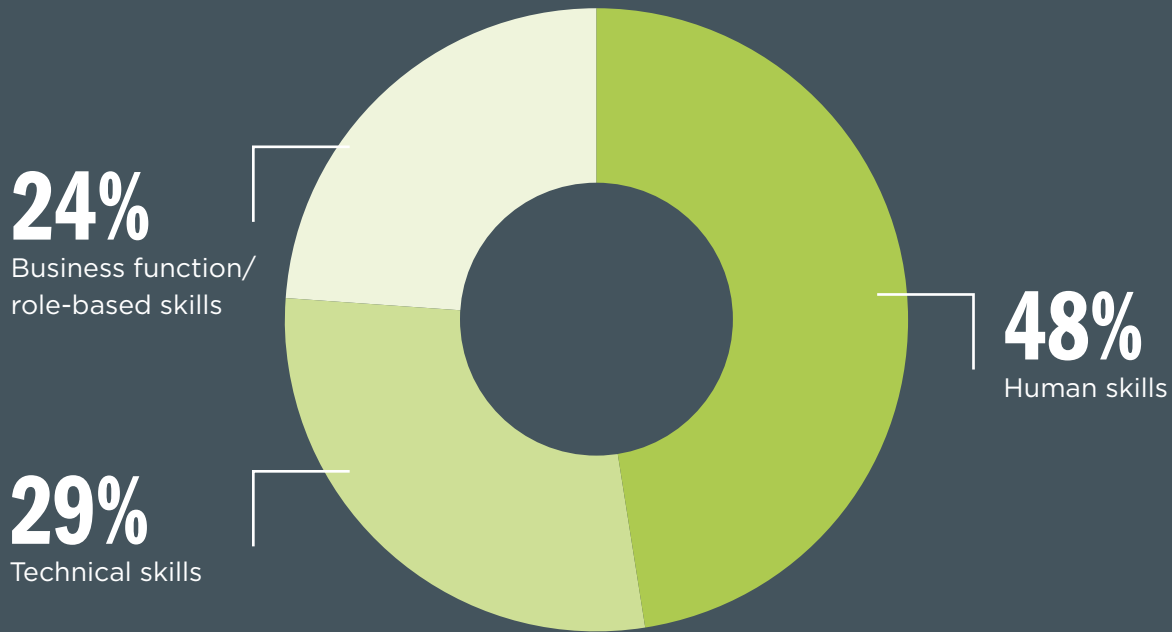
WHICH TYPES OF SKILLS ARE MOST IMPORTANT FOR PEOPLE TO DEVELOP FOR THE FUTURE OF WORK?

Human skills (48%) are the type of skills that hub leaders polled at the summit indicated are most important for workers to develop. Nearly one-third (28%) indicated technical skills and approximately one-fourth (24%) rated functional/ role-based skills as the ones workers will need to hone most. Hubs participating in the interviews described creating skills-building programs that align with the skills event attendees ranked highest. More than half of the hub leaders we interviewed said they have already established programs that address human skills, although these skills are most commonly embedded in entrepreneurial skills programs (10 of 11 hubs said they already offer entrepreneurial skills programs). In alignment with the emphasis on technology skills we saw in the event polling, a large majority of hub leaders we interviewed (7 out of 11) said they have existing technical skills programs. It appears that the skills-building programs offered by hubs align with the skills most needed by their constituents.
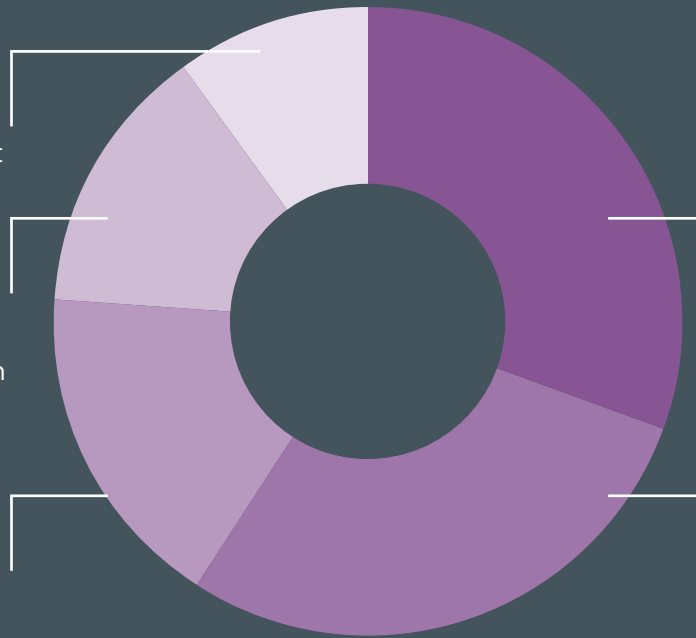
10%
Lacked
shared interest

14%
Not sure who
to partner with

17%
Unclear about
potential
impact

31%
Not enough
funding

29%
Not enough
time

WHAT'S MOST CHALLENGING ABOUT COLLABORATING WITH OTHERS ON THE FUTURE OF WORK?

When it comes to collaborating with others on the future of work, a lack of funding (31%) and time (29%) were the obstacles cited by the greatest percentage of live event poll respondents. A lack of clarity — on the potential impact of collaboration (17%) and whom to partner with (14%) — also represents notable challenges. During the in-depth interviews for this report, hubs most frequently cited partnering with other universities, with many of these partnerships involving inter-institutional collaborations aimed at making the universities more competitive in their applications for government grants. Hubs cited industry/corporations and government (both funders of hub activities) as the second and third most common types of partners they work with. This may be an indicator that the types of partnerships hubs seek to form aim at solving the top challenge (lack of funding) that polling respondents indicated as the obstacle for not pursuing future-of-work partnerships to begin with. With a lack of time also viewed as a major challenge, the fact that the other universities/colleges were the most common type of partners that hubs mentioned in the interviews may indicate that they find it somewhat more expedient to partner with those in their own industry (higher education) versus others (private industry, government, nonprofit, etc.).

BEST PRACTICES

ECONOMIC IMPACT

Adopt a balanced approach to metrics. Integrate qualitative metrics (e.g., stakeholder feedback, alumni surveys) with quantitative measures to capture the full spectrum of economic impact. This balance will provide a more holistic view of the contributions university innovation hubs make to the future of work.

Incorporate long-term and indirect impact measures. Extending evaluation frameworks to include long-term and indirect impacts, such as the ongoing growth of startups, indirect and induced jobs, the long-term effects of skill- and business-building programs, and ecosystem development. Tracking these factors over time will provide insights into the enduring effects of hub initiatives on the future of work. The use of emerging technologies such as AI may make it more feasible to analyze data for hard-to-assess metrics. Designing and implementing a data platform early in the hub formation process is essential.

Focus on measuring regional alignment. Prioritize assessing how hub activities address specific regional needs, such as industry skill gaps, job retention rates, and the resilience of local economies. Incorporating these metrics can improve alignment with external stakeholders and demonstrate relevance to the broader community. Alignment will amplify economic impact and growth.

Invest in and measure the impact of infrastructure. To address infrastructure as a critical factor, develop metrics to measure the impact of investments in technology, facilities, and human capital. Metrics could include usage rates of specialized labs, economic activity generated by infrastructure-enabled projects, and ROI of upskilling programs, etc.

Adopt a resource-leverage model. To amplify their economic impact, implement models that focus on leveraging external resources such as venture capital, alumni networks, and grant funding. Metrics like "leverage factors" (e.g., additional dollars raised per seed dollar) and "opportunity analysis" can demonstrate the scalability of hub activities.

TECHNOLOGY

Create two-way feedback loops. Implement formal mechanisms to gather insights into technology challenges and offerings from university innovation hub team members and clients. This process can help refine both internal operations and external offerings.

Bridge internal-external tech use. Align internal tech adoption with external tech training efforts. For instance, if a hub is working to advance AI training externally, it can take steps to ensure its team grows its knowledge of AI tools internally. This will allow hubs to deliver more informed learning experiences.

Develop partnerships to fill resource gaps. Seek partnerships with external entities — such as tech companies, community colleges, or funding organizations — to overcome limitations in funding, expertise, or space. These partnerships can scale the ability to impact the future of work.

Enhance cybersecurity protocols without stifling innovation. Advocate for a balanced cybersecurity approach that protects sensitive information while allowing the flexible adoption of new technologies. Secure sandbox environments can help hubs test new tools without compromising compliance.

Cultivate tech mentors and communities. Build mentorship programs and communities of practice that connect students, entrepreneurs, and industry professionals. These networks may focus on fostering practical technology skills and continuous learning.

TALENT

Invest in scalable, hybrid skill-building models and AR/VR tech. Expand virtual mentorship, online boot camps, and digital collaboration platforms to complement in-person programs. Opportunities include expanded uses of AR/VR for immersive learning, training simulations, and employee onboarding.

Develop targeted human-skills programs. Offer standalone programs dedicated to human skills (e.g. adaptability, leadership, collaborative problem-solving) rather than embedding them solely within entrepreneurial training. For instance, hubs could develop leadership development cohorts or workshops focused on resiliency.

Ensure mentorship is structured and scalable. Provide a variety of mentors whose areas of expertise align with the workforce needs of a hub's region. Convenient ways (such as online appointment schedulers) to connect with mentors are paramount. Hubs can also supplement mentorship with structured learning, such as modular courses, certifications, or digital learning platforms to scale access.

Bridge tech skill development within and across institutions. Many technical skills are taught within university academic units and at community colleges rather than at innovation hubs. Establishing deeper partnerships among hubs, university units, and technical colleges can help hubs complement, not duplicate, efforts.

Use data-driven decision making to create future-proof training. To avoid investing in skills that may become obsolete due to AI and automation, explore ways to leverage workforce analytics tools — such as Carnegie Mellon University's Workforce Supply Chains Initiative — to identify and prioritize future-proof skills.

WORKSPACES AND WORK MODES

Seek input on hub design. Actively seek input from key stakeholders — including corporate tenants, startups, researchers, university faculty and students, individual entrepreneurs, and the broader community — to shape physical spaces that support the community's evolving needs. Engaging stakeholders early in the planning, design, and iteration of workspaces ensures that hubs create functional, adaptable environments.

Design for flexibility. Design multi-use spaces that accommodate different types of work — from collaborative coworking and networking areas to private labs, offices, and virtual programming. Incorporating modular, reconfigurable layouts (e.g., furniture on wheels, adjustable partitions) ensures adaptability as work modes evolve.

Use "sticky" placemaking tactics. To encourage in-person work and deepen community connections, invest in amenities that make physical spaces more attractive. This includes building collision zones, integrating retail and dining, offering events that foster networking, and creating vibrant "third spaces" (e.g., coffee shops, event spaces) that drive engagement beyond traditional office environments.

Maximize digital reach without eroding in-person work. Invest in hybrid-friendly infrastructure — such as high-quality video conferencing and digital collaboration tools — to ensure hubs remain easy and convenient connection points for hybrid teams that combine remote and in-person work.

Build real-estate strategies around space-driven industries. Focus on real estate strategies that support industries, such as life sciences, biotech, clean energy, robotics, and advanced manufacturing, that have long-term physical space needs. By prioritizing companies and sectors that require physical space — and contribute to local job creation and regional tax bases — hubs ensure they remain economic engines for their surrounding communities.

PARTNERSHIPS

Build multi-faceted partnerships tech firms. Given that emerging technologies (e.g. AI, robotics, cloud computing) drive transformation across industries, explore opportunities to actively engage with tech firms as both research collaborators and workforce development partners.

Create experiential learning partnerships. Form structured partnerships with corporations, K-12 schools, and community colleges to create experiential learning pathways that align directly with industry needs. Such partnerships could facilitate onsite internships and apprenticeships at corporate facilities while engaging students in industry-aligned courses and research, combining institutional-based discovery and learning with industry exposure.

Align with development partners on "clustering" and "wrap-around" strategies. Align with private developers to create purpose-built spaces founded on industry- and service-based strategies. A clustering approach — co-locating startups, corporate partners, and research institutions in a sector-specific hub — enhances regional economic strengths and attracts key industry players. Hubs can also integrate wrap-around services such as venture funding, regulatory support, incubators, and R&D assets to support company growth and a steady pipeline of innovation.

Establish industry-government-academic consortia for workforce resilience. Proactively form multi-sector consortia to track workforce demand signals, anticipate automation trends, and design future-proof training programs. Example: Carnegie Mellon's Workforce Supply Chains Initiative uses AI-driven labor market analytics to help hubs predict workforce needs before industry shifts occur. Cross-sector groups with shared interests could apply insights from such tools more speedily and effectively if they work in unison.

Strengthen workforce pipelines by engaging community colleges and K-12 schools. Build partnerships with educational institutions that serve as feeders into high-demand industries. Establishing stackable credentials with community colleges (as seen at the University of Tennessee-Knoxville) or hands-on STEM experiences (as seen at Georgia Tech) can create a structured talent pipeline that benefits regional economies.

HUB CHARACTERISTICS: TALKING WITH DIFFERENT TYPES OF HUBS

Following the Signature Innovation Summit on May 16, 2024, our Innovate Carolina team conducted 11 structured interviews with the leaders of university-affiliated innovation hubs from across the U.S. Interview sessions occurred virtually via Zoom from May through August 2024 and lasted 60 minutes each. Innovate Carolina worked closely with our UI Collab and UIDP partners to identify participants for the interviews, nine of whom also attended the summit in May. We also worked with UI Collab and UIDP to create a standard set of interview questions, which provided a consistent framework for conducting each of the interview sessions. We sought representative participation from hubs across several factors: various regions of the U.S., physical footprint, size, governance and structure, and types of constituents served. Additionally, the hubs varied widely in their maturity: a mix of established, long-tenured innovation hubs and others that are in the early or developmental stages of programming and/or physical space construction.

Figure 2: Innovation Hubs Participating in Interviews for Report
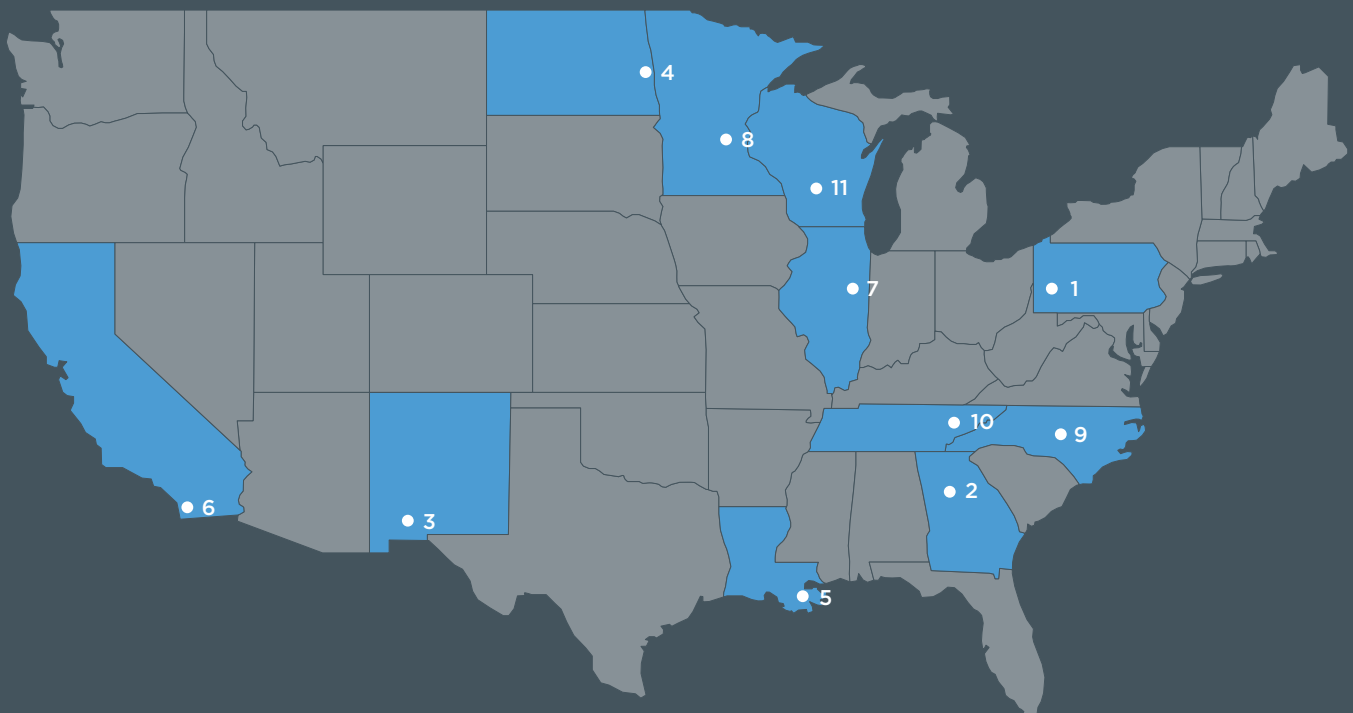
1. Carnegie Mellon University
Pittsburgh

Block Center for Technology and Society
- Northeast
- Virtual
- Virtual/Regional
- Established (5-10 years)
- Tech Sector: AI, analytics, robotics
- University-Managed

2. Georgia Institute of Technology
Atlanta

Technology Square
- South
- Innovation District
- Campus Adjacent
- 8 acres, 2.25 million square feet
- Mature (20+ years)
- Multi-Sector: software/hardware, AI, cybersecurity, data science, fintech, energy, transportation
- Hybrid: University, Affiliated Entity, and University Foundation-Managed

3. New Mexico State University
Las Cruces

Arrowhead Center/Arrowhead Park
- West
- Innovation Center, Research Park
- On Campus
- 200 acres, 20,000 square feet
- Mature (20+ years)
- Multi-Sector: aerospace, agriculture, life sciences, digital health, digital media, energy, entrepreneurship
- Dual: University-Managed (Center) and Affiliated Entity (Research Park)

4. North Dakota State University
Fargo

No Formal Hub Name
- Midwest
- Virtual
- Virtual/Regional
- Early (1-5 years)
- Multi-Sector: ag-tech, data science, manufacturing
- University-Managed

5. Tulane University
New Orleans

Tulane Innovation Institute
- South
- Innovation Center
- Downtown Campus
- 30,000 square feet (phase 1 in development)
- Early (1-5 years)
- Multi-Sector: health care, biotech, life sciences, energy, environment, AI/machine learning
- University-Managed

6. University of California at San Diego
San Diego

Design & Innovation Building
- West
- Innovation Center
- On Campus
- 74,000 square feet
- Early (1-5 years)
- Multi-Sector: health care, life sciences, engineering, robotics, energy, transportation, environment, oceanography
- University-Managed

7. University of Illinois Research Park
Urbana-Champaign

The Research Park at the University of Illinois Urbana-Champaign
- Midwest
- Research Park
- On Campus
- 125 acres, 700,000+ square feet
- Mature (10+ years)
- Multi-Sector: engineering, data science, manufacturing, financial, ag-tech
- Affiliated Entity

8. University of Minnesota
Minneapolis

Minnesota Innovation Exchange (MIX)
- Midwest
- Innovation District
- Campus Adjacent
- 12 acres, 3 million square feet (in development and planned)
- Emerging (pre-launch)
- Multi-Sector: health care, med-tech, biotech, life sciences, engineering, ag-tech
- University Foundation-Managed

9. University of North Carolina at Chapel Hill
Chapel Hill

Innovate Carolina Junction
- South
- Innovation Center
- Campus Adjacent
- 20,000 square feet
- Early (1-5 years)
- Multi-Sector: life sciences, tech, health care
- University-Managed

10. University of Tennessee-Knoxville
Knoxville

UT Research Department, TN-MADE, Innovation South (Multiple Sites)
- South
- Innovation Center(s)
- On Campus, Off Campus
- Virtual/Regional
- Early (1-5 years)
- Multi-Sector: AI, human health/wellness, energy/environment, advanced mobility, advanced materials and manufacturing
- University-Managed

11. University of Wisconsin-Madison (University Research Park)
Madison

University Research Park
- Midwest
- Research Park
- Off Campus
- 260 acres, 2.3 million square feet
- Mature (10+ years)
- Multi-Sector: life sciences, health care, energy, chemical engineering
- University-Managed

HOW DO UNIVERSITY-AFFILIATED INNOVATION HUBS DEFINE THE FUTURE OF WORK?

Hub leaders discussed a blend of perspectives when asked, "How do you define the future of work?" While many interviewees focused on the impact of technology and the need for workforce adaptability, others highlighted the importance of collaboration across disciplines, the transformation of education, and the evolving expectations of both workers and employers. They emphasized the following six core attributes as defining characteristics of the future of work.

TALENT DEVELOPMENT AND SKILL BUILDING

Lifelong learning and continuous upskilling were seen as essential to thriving in an ever-changing work environment, with emphasis on developing talent and retraining workers to adapt to technological advancements.

▶ "Work is changing, and the workforce is changing. In our state, I think of ag-tech as a microcosm for all of the pieces — HR, accounting, connectivity, the Internet — that will be needed to run these kinds of businesses. So, the future of work is making sure that we have the ability to retool people."

— Colleen Fitzgerald, North Dakota State University

TECHNOLOGY AS A DRIVING FORCE

Many hub leaders viewed technology as central to the definition of the future of work. They called attention to the role of automation, AI, and digital tools in transforming industries and jobs.

▶ "The future of work is the relationship between new and developing technologies and the skills requirements for using those technologies."

— Steve Wray, Carnegie Mellon University

▶ "The future of work is consistently transforming itself. Technologies and the information we have access to shortens the time to build and develop innovations."

— Kimberly Gramm, Tulane University

MULTIDISCIPLINARITY AND COLLABORATION

Several leaders highlighted the importance of cross-disciplinary collaboration in the future of work, where workers will need to navigate and integrate multiple fields to innovate.

▶ "Work has changed from 30 to 40 years ago when you had stovepipes, and you employed four engineers and put them in a room to solve a problem. That's not the way it's going to happen. Workers are going to have to be competent in a number of different disciplines. And they're going to have to become comfortable working in environments where you have people from a mix of disciplines coming together to solve problems."

— Paul Roben, UC San Diego

HYBRID/REMOTE WORKPLACE DYNAMICS

Leaders often mentioned the transition to hybrid and remote work environments, with hubs exploring how this shift impacts organizational culture, talent retention, and the future design of physical workplaces.

▶ "It's very hard to put the genie back in the bottle when you're talking about software engineers and data scientists who don't have to work in labs. Many of them became comfortable with working at home, and companies and employers realized that they could have a distributed workforce or a partial hybrid workforce. From an economic development perspective, that puts a lot of pressure on the building of a physical place."
— Laura Appenzeller, University of Illinois Research Park

EDUCATIONAL TRANSFORMATION

Hub leaders also indicated that traditional higher education models no longer suffice. Instead, their organizations are pursuing more flexible and shorter-term credential programs, partnerships with community colleges, and experiential learning collaborations with industry partners to meet future workforce needs.

▶ "The traditional curriculum across four-year institutions hasn't changed in 200 years, and it's our responsibility to look at ways that we are accomplishing the mission of the modern land-grant institution. As we see the workforce environment evolving and consider what that's going to look like over the next several decades, we have to change our operation and approach.

We have to think about the workforce of the future and what will be needed for our graduates to be marketable."
— Marc Gibson, University of Tennessee-Knoxville

ALIGNMENT WITH INDUSTRY NEEDS

Several leaders commented on the importance of aligning educational programs with the specific skill demands of industries, particularly in regions where certain sectors (e.g., health care, manufacturing) dominate.

▶ "In the past, there has been a misalignment between higher ed systems and the needs of industry in the state. The future of work involves a great deal more in the way of engagement and partnering with industry. Previously, we've been focused on the idea that everybody has to go to college, everybody has to get a four-year degree. And now I think we're beginning to adjust to the idea of giving people the opportunity to get only what they need and what industry is calling for in our region and state. We have to be much closer aligned with the needs of industry."
— Wayne Savage, New Mexico State University

▶ "The future of work serves as a demand signal of where job opportunities exist for our students and where significant skill gaps and labor shortages persist. Aligning educational programs with these industry demands — particularly in dominant sectors such as data science, health care and manufacturing — ensures that graduates are well prepared to meet workforce needs and drive regional economic growth."
— Amy Kircher, University of Minnesota

HOW DO UNIVERSITY-AFFILIATED INNOVATION HUBS DESCRIBE THEMSELVES?

MISSION AND PURPOSE

When we asked leaders to describe their own hubs — including their missions, the internal and external constituents they serve, and the industries they engage with — common threads emerged. When talking about why their hubs exist, leaders touched on similar themes: their missions to cultivate entrepreneurs and startups, provide collaborative spaces for multi-disciplinary collaboration, build cross-sector partnerships, support workforce development, and drive economic growth. Many hub leaders emphasized their roles as conduits for innovation, which they generally talked about as creating products, services, and companies that deliver economic and societal impact. They also frequently described their hubs as catalysts for translating research into practical solutions and community engagement.

INDUSTRIES AND SECTORS

All of the hubs described working across numerous industries and sectors — and none were singularly focused on only one industry. However, while the hubs were generally supportive of a range of industries, each described a natural gravitation toward a core set of industries that reflect current or emerging strengths of their universities and regions. Many hubs have a strong focus on technology-related sectors, including AI, machine learning, data science, and robotics. These industries are closely connected to other technological domains, such as advanced manufacturing, autonomy, and digital health, reflecting the growing importance of technology in all sectors. Additionally, industries such as life sciences, biotech, and health care are prominent, especially in hubs associated with universities that have strong research programs in medical sciences or partnerships with health care institutions. Aerospace and defense-related industries are significant for some hubs, particularly in those regions with strong ties to federal research programs, labs, or military installations. Energy sectors appear frequently, particularly in regions focused on addressing environmental challenges and the future of energy. There is also a notable presence of sectors like agriculture and manufacturing that have increasingly integrated technology, particularly in ag-tech and advanced materials manufacturing.

Alignment with state-level priority industries. Hubs like the Arrowhead Center at New Mexico State University align closely with state-level economic priorities such as strongly established industries like agriculture, areas of university research strength like aerospace, and growth areas like life sciences, energy, and water.

Reflection of regional corporate composition. Other hubs reflect the composition of companies in their regions. For instance, the new Minnesota Innovation Exchange (The MIX) hub under development in Minneapolis will provide real-estate infrastructure to support a variety of industries. Its first building will focus on serving the deeply established med-tech and life sciences firms that operate across the state, a region touted as the top health-tech cluster in the world.

City-level industry cores. Sometimes hubs capitalize on strengths rooted in city-level industry cores, such as urban blocks, neighborhoods, or districts where industry clusters form around corporate, academic, and government catalysts. For example, a robotics and autonomous industry boom in the Lawrenceville neighborhood of Pittsburgh — anchored by Carnegie Mellon University and its National Robotics Engineering Center — has given rise to "Robotics Row," a network of robotics startups and companies locating in former industrial buildings. The city's Ohio Riverfront is emerging as an aerospace cluster. Meanwhile, a district branded "AI Avenue" is growing up around Bakery Square, an office and retail development corridor in Pittsburgh's Larimer neighborhood that is home to Google's third-largest U.S. location and a growing number of AI companies. An innovation hub at Carnegie Mellon University — the Block Center for Technology & Society — uses applied research and community-driven programs to expand the impact of these industrial cores locally and regionally. Similarly, the Tulane University Innovation Institute prioritizes health sciences, biotech, and climate/energy, spurred by the hub's location within New Orleans' BioDistrict, which was established and approved recently by the city council in the downtown and mid-city area to drive biosciences sector growth and economic development in the city.

GOVERNANCE AND STRUCTURE

Hubs we interviewed described operating under a variety of different governance models.

University-Operated Hubs. Several hub leaders said their organizations are fully operated and governed by the university itself, integrating closely with the institution's administrative and academic structures. These hubs often leverage university resources and leadership and are responsible for spurring innovation and fostering collaboration among faculty, students, and external partners. An example is the Tulane Innovation Institute, which is being developed at the university's medical center on the downtown campus and is responsible for supporting faculty, staff, students, and the community.

Dual Structure: University-Nonprofit Combination. The Arrowhead Center at New Mexico State University operates through a dual structure, with both a university unit and a nonprofit. The university unit focuses on entrepreneurship coaching for students and a broad range of programs that support external entrepreneurs. The nonprofit arm of the center manages the research park facility, infrastructure, operations, the development of the park, and tenant leases. The nonprofit entity is also responsible for the university's technology transfer.

Research Park Model. Some of the interviewed hubs operate as research parks, often functioning as semi-independent entities that primarily focus on real estate development. These hubs typically support startups, established companies, and university research by offering specialized facilities like labs and offices and varying levels of programming support for entrepreneurs. There are various models of research park-based innovation hubs, including affiliated nonprofits (University Research Park at the University of Wisconsin-Maidson) and limited-liability corporations (University of Illinois Research Park).

University Foundation-Led Developments. Several leaders said their hubs are real estate-centric developments managed by the university foundation rather than by the university itself. Universities often establish foundations as separately incorporated and independently operated nonprofit charities governed by independent boards. The foundations facilitate private donations, manage endowment and gift funds, and support the institutions in other ways. For instance, the University of Minnesota Foundation is the master developer of the Minnesota Innovation Exchange (MIX), a 3-million-square-foot innovation district.

University/Nonprofit/Foundation Hybrid. Technology Square (Tech Square) at Georgia Tech operates under a governance model established by the university in which the Georgia Tech Real Estate Development Office, Georgia Advanced Technology Ventures (an affiliated nonprofit corporation) and the Georgia Tech Foundation play pivotal roles in the hub's development and expansion. These entities collaborate to spearhead programming, real estate acquisitions, and development projects within Tech Square, ensuring alignment with the university's strategic objectives.

CONSTITUENTS SERVED

Faculty, Students, and Staff. Almost all hubs said they serve their internal university communities, including faculty, students, and staff. Tulane University's Innovation Institute, for instance, is chartered to support these groups as they develop new innovations and determine if there is potential for partnering or creating a university spinout. Similarly, hubs at UC San Diego, UNC-Chapel Hill, New Mexico State University, Georgia Tech, North Dakota State University, and the University of Tennessee-Knoxville all focus on fostering innovation among students and faculty through resources designed to help them grow as entrepreneurs.

Entrepreneurs and Startups. Supporting external entrepreneurs and startups is a core mission described by many hubs. New Mexico State University's Arrowhead Center runs accelerators, innovation sprints, and entrepreneurship programs for both students and external community members. Georgia Tech's Tech Square serves as a hub for startups, providing incubation spaces and opportunities for a range of corporate engagement with campus and investment in the region. Generally, corporate engagement activities involve broad, ongoing interaction between university innovation hubs and companies that encompass all types of involvement and communication, whether formal or informal. For instance, activities might include participation in networking events or student-related competitions or challenges, advisory boards, or regular conversations about industry needs and talent development. Such activities are opportunities to connect startups and entrepreneurs with larger companies. UNC-Chapel Hill's hub, the Innovate Carolina Junction, regularly engages with corporations and has collaborated with companies like Fidelity, KPMG, Deloitte, Infosys, Volvo, SAS, and others to engage them in events and other activations that create campus-to-company connections.

Industry Partners and Corporations. Industry partners are key constituents mentioned by many hubs. These partners help drive innovation and collaboration. Partnerships typically go a step further than corporate engagement activities and involve more formal and strategic collaborations focused on specific goals or projects, such as sponsored research projects, co-created talent programs, co-developing new products, or launching corporate-sponsored accelerators. Georgia Tech's Tech Square and the Midtown corridor, for example, are home to operations of major corporations like Cisco, Norfolk Southern, Microsoft, Google, and Delta Air Lines, which collaborate with the university around talent, research, and innovation. Several area companies partner with Tech Square's startup incubator to support entrepreneurs through industry and technology specialization areas.

Community and Regional Stakeholders. Several hubs emphasized their role in serving broader community and regional stakeholders. Leaders at New Mexico State University and North Dakota State University described engaging with community organizations and external entrepreneurs across the state. In addition, the Block Center for Technology and Society at Carnegie Mellon University is deeply involved in regional economic development, particularly in upskilling local residents. Steve Wray described the center's role in serving regional stakeholders: "We serve as an action arm for the university in some of the regional economic development activities."

Students from UNC-Chapel Hill talk with startup founders during the Carolina Innovators Connect event at the Innovate Carolina Junction, the university's innovation and coworking hub located in downtown Chapel Hill. The annual event brings students together with local companies and nonprofits that are eager to work with talented students through internship and job opportunities. Photo credit: UNC-Chapel Hill.

ECONOMIC IMPACT

WHAT WE DISCOVERED

Mapping common impact measures to the future of work

Hubs view efforts to strengthen research capacity, commercialization, entrepreneurship, and skill development as part of their future-of-work efforts. Data used by hubs to measure impact in these areas — such as job placements, new businesses created, and patents — focus on short-term, quantifiable outcomes that university research and innovation departments commonly track as industry benchmarks.

Qualitative, long-term impact measures lag quantitative, short-term metrics

While hubs cite the relative ease and prevalence of using short-term, quantitative metrics to assess impact, they also describe the value of qualitative feedback from partners and the long-term translation of skills by alumni into economic impact. Such qualitative and longitudinal data, which are not commonly tracked industry benchmarks, can be challenging to assess.

Impact stems from workforce and industry alignment

Hubs view their ability to align their programming offerings and activities with current and future workforce needs, particularly through skills development, internships, and job placements, as essential to driving impact. Hubs that actively align with regional industries (e.g., health care, technology) and track demand signals may have greater success in making an economic impact.

Infrastructure as a critical enabler

Hubs highlight the importance of physical and technological infrastructure (e.g., specialized labs, robust Wi-Fi, and coworking spaces) as a means to enable impact on the future of work. Hubs that prioritize and measure the impact of infrastructure investments may demonstrate stronger outcomes.

Impact amplifiers: capital and partnerships

Many hubs measure their ability — and the startups and founders they serve — to leverage resources such as venture capital, grant funding, and external partnerships. This proactive approach to amplifying impact by connecting funding to workforce and commercialization efforts is a model of success.

Figure 3: How Does Your Innovation Hub Make an Economic Impact Through the Future of Work?
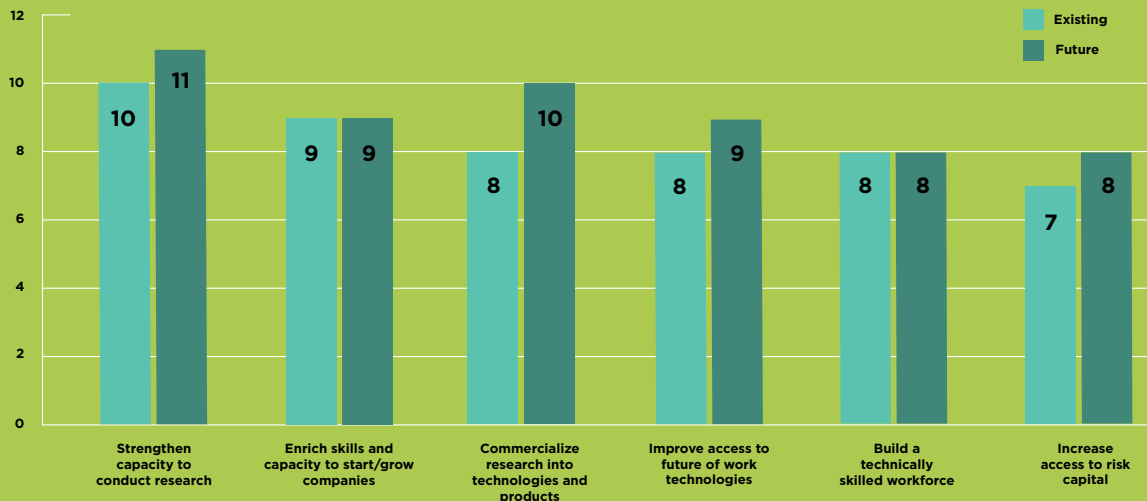
University innovation hubs are critical drivers of economic development through their future-of-work initiatives. What stands out in their responses is the breadth of their ambitions — expanding research capacity, commercializing discoveries, fostering entrepreneurship, and building a technically skilled workforce — yet the way they measure impact varies.

While hubs frequently cite tangible metrics such as job placements, startup creation, and capital investment, there is a striking tension between immediate, quantifiable results and longer-term, systemic economic contributions. Many hubs acknowledge that some of their most transformative impacts — such as fostering entrepreneurial mindsets, strengthening industry-academic ties, or shifting regional economic dynamics — are difficult to measure with traditional indicators. This raises critical questions for hub leaders: How can they capture the full value of their activities? What new frameworks or benchmarks could better reflect the holistic impact of their work? And how can they ensure their measures of success align not only with their missions but also with the needs of regional economies and industries? As hubs shape the future of work, developing more nuanced and comprehensive ways to assess their contributions will be key to extending and scaling their influence.

HOW DO HUBS MAKE AN ECONOMIC IMPACT THROUGH FUTURE-OF-WORK INITIATIVES?

We asked hub leaders to indicate if their hubs are currently creating — or expect to make — economic impact across six areas related to the future of work. Their responses reveal both present achievements and future aspirations.

EXPANDING RESEARCH CAPACITY

Ten of the 11 hubs we interviewed said they currently make an economic impact by expanding the capacity of academic, government, and private industry organizations to conduct research, with all 11 reporting that they expect to make an impact in this area in the future. Hubs focus on expanding research capabilities through collaboration and infrastructure investments, and strengthening ties between academia, government, and private sectors.

Carnegie Mellon University. Strengthening research capacity is a core focus, supported by grants and partnerships that focus on advancements in technology, workforce development, and regional economic impact.

▶ "We're an applied research center that focuses in on three big areas: responsible use of artificial intelligence, and all the associated applications that go along with that. The future of work, which is really how to advance it and how does the implementation and use of new and advanced technologies impact how and where and what people do at work. And then the third is we get involved in regional economic development and regional economic growth initiatives."

— Steve Wray, *Carnegie Mellon University*

University Research Park (University of Wisconsin-Madison). Provides specialized facilities, such as a cGMP manufacturing facility, which enables both academic and private research efforts.

▶ "We do a lot in strengthening academic, government, or private capacity to conduct research. Because this research, whether it's university or private, requires scientific facilities, especially specialized scientific facilities, we do quite a lot to help make sure Madison has enough of the specialized lab facilities to grow and commercialize research."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

Georgia Tech. Hosts interdisciplinary research institutes to pilot research activities and scale innovations through partnerships with government and private sectors.

▶ "Georgia Tech has several interdisciplinary research institutes (IRI's), with more being considered. These IRI's combine different areas of expertise to better respond to research challenges and advance new technologies. In addition, through external partnerships and our translational facilities, we are better able to pilot new technologies and scale."

— Greg King, Georgia Tech

BUILDING ENTREPRENEURIAL SKILLS AND STARTUPS

The second most common way hubs said they make an impact is fostering entrepreneurship by training entrepreneurs and supporting startups through incubators and mentorship programs. Nine of 11 say they currently make an impact in this way, with an equal number indicating plans to do so in the future.

Georgia Tech (Tech Square). Supports student entrepreneurs via the CREATE-X incubator, Quadrant-i program for faculty and their research, and the Advanced Technology Development Center (ATDC) for the broader community.

▸ "We offer a range entrepreneurship programs from CREATE-X tailored mostly for students, Quadrant-i for faculty, and the ATDC for the broader region and statewide community. ATDC has a range of specialty areas and mentors on staff to educate, coach, and advise entrepreneurs across all major technology areas and industrial sectors. This support is available both at the Tech Square-based incubator and through a variety of initiatives statewide to grow technology startups.
— Greg King, Georgia Tech

University of Illinois Research Park. Provides entrepreneurial support through incubator programs and skills-based entrepreneurial training.

▸ "Enriching the skills of entrepreneurs is a lot of what our incubator activities involve. How do we take a technology out of campus that has entrepreneurial potential and turn that into an actual company that has customers? We're also developing entrepreneurs through a lot of training activities."
— Laura Appenzeller, University of Illinois Research Park

Tulane University. With an innovation incubation space in development as an integral component to Tulane University's Charity Hospital redevelopment project — a total of 1 million square feet of space within the downtown New Orleans' Bio District — the Tulane Innovation Institute focuses on developing entrepreneurial skills through program support for developing new entrepreneurs and ventures while also offering competitive venture seed funding.

▸ "We have plans to have industry co-located with us to help support our startups. This is being planned and intentionally thought about in terms of how much space we need, the programming we're offering, and the budget needed to support funding to make investments in these early-stage technologies and startups."
— Kimberly Gramm, Tulane University

COMMERCIALIZING RESEARCH

Eight of 11 hubs said they currently make an economic impact by helping move innovations from the lab to the market, focusing on technology transfer, commercialization, and new venture creation. Ten of the 11 plan to do so in the future.

Georgia Tech. Tech Square is active in commercialization with initiatives like Quadrant-i, which represents an evolution in Georgia Tech's commercialization strategy, providing a more structured and supportive environment for translating high-impact research into market-ready products. Focus areas of Quadrant-i include advocacy for related policy changes and incentives for added impact, conflict-of-interest navigation, support for securing non-dilutive funding, mentorship, and access to investors.

▸ "Quadrant-i is a comprehensive resource for the research community across central campus and Tech Square, with programs and services to accelerate commercialization. More than just educating on new venture creation, it comes alongside faculty with extensive mentorship and interaction with customers and investors to encourage successful commercialization. We also have specialists who work inside some of our high-demand, interdisciplinary research institutes and bridge both research and the commercialization activity."
— Greg King, Georgia Tech

New Mexico State University. The Arrowhead Center has a university unit focused on entrepreneurship and a corresponding nonprofit unit that is responsible for the university's tech transfer functions. The center also reports ongoing efforts to commercialize research outcomes and helps prepare startups for capital investment opportunities.

▶ "The nonprofit side of Arrowhead Center is responsible for licensing, patenting, and commercializing the university's technology transfer efforts. As a nonprofit, we're able to write a contract and do things differently than you can as a university."

— Wayne Savage, New Mexico State University

EXPANDING ACCESS TO TECHNOLOGIES

Most of the hubs we talked to said that one of the ways they make an impact is by providing the people and organizations they serve easier access to critical tech tools while engaging in initiatives that use technologies to improve collaboration and efficiency across industries. One limiting factor that surfaced in the hub interviews (see Technology section below) is a lack of infrastructure — such as robust Wi-Fi — to adequately support some bandwidth-intensive technologies such as VR. Leaders also noted being constrained by policies that restrict testing of new tools or limit access when collaborating externally. This issue illustrates a wider point that expands beyond technology: the impact of future-of-work activities can be greatly enhanced or inhibited based on the level of investment in related critical infrastructures, whether those are technological, physical, or human.

University of Tennessee-Knoxville. Created the UT Verse AI Assistant, which is a chat-based tool designed specifically for University of Tennessee-Knoxville faculty, staff, and students. It powers AI conversations geared toward internal audiences, business, and research.

▶ "We have UT Verse, which is our own ChatGPT. It's a platform for students and others at the university, and we encourage students to use generative AI in their studies. By creating our own generative AI platform and letting students work with us in creation, we communicate that there's a level of responsibility with this: 'It's okay to use it, but just tell us you're using it. And this is how you can use it, and how we can make it better.' We're past the point of pretending it's not going to be used. We want to encourage the responsible use, because it needs to be used."

— Brad Day, University of Tennessee-Knoxville

BUILDING A TECHNICALLY SKILLED WORKFORCE

The majority of hubs said that they not only expand access to technologies but are also involved in activities that create a more technically skilled workforce. Efforts include building workforce skills to meet industry demands through educational programs, grants, and partnerships with employers. It's notable that building technical skills in the workforce is one of the primary ways that innovation hubs said they make an impact as it mirrors their programmatic efforts. When asked what types of skills they are working to build in the constituents they serve, hub leaders cited technical skills as the second-most common area in which they are training the current and future workforce. This was second only to entrepreneurial skills, which hub leaders described as an overarching, multi-faceted category of skill development which, in fact, includes a combination of human and technical skills. As such, it's clear that some of the most prevalent actions innovation hubs are taking — creating skills-based programs focused on technology — align with areas in which they believe they can create economic impact.

Carnegie Mellon University. Focuses on building a technically skilled workforce through grants and research initiatives, while analyzing the skills needed for jobs of the future.

▸ "We analyze the skills-needs gaps and requirements for changing and emerging jobs. We are also looking at industries that may be impacted by technology that eliminates jobs and how to help people who may have been in those fields move into other areas. Whether that's decarbonization or jobs that may be impacted negatively by AI, we are trying to understand the skill sets that people might have in their current jobs and also the types of jobs the region should try to attract, develop, and grow. We want to help provide opportunities for those people to take advantage of the skill sets they already have."

— Steve Wray, Carnegie Mellon University

Georgia Tech. In addition to the university's technology-rich curriculum and robust internship and co-op programs for students, Tech Square features the College of Lifetime Learning, which offers a range of bootcamps and programs to help people and organizations beyond the university with workforce upskilling.

▸ "Our College of Lifetime Learning (CLL) was one of the original Georgia Tech units at Tech Square and has spent over 20 years collaborating with industry leaders to offer a wide range of coursework across high-demand sectors for both individual learners and corporate cohorts. CLL provides professional education aligned with current and emerging technology trends, while also guiding individuals as they pivot toward future career opportunities. Examples include coursework in areas such as AI, supply chain, manufacturing, defense, and analytics."

— Greg King, Georgia Tech

INCREASING ACCESS TO RISK CAPITAL

Over half of the hubs interviewed said they help attract and facilitate venture capital, angel investments, and seed funding, enabling startups to scale. Fundraising is an area that hub leaders described as a skills gap among the entrepreneurs they work with — and one that they try to fill via coaching and mentorship, which was

the most common mode of support hub leaders named when asked how they build future-of-work skills among those they serve.

University of Illinois Research Park. Uses the research park's venture capital arm and angel investor network to connect startups with capital and mentoring.

▸ "We're trying to attract capital by inviting venture capitalists to visit and showcasing our companies to them. And we have Illinois Ventures, which is our venture capital arm that has its own funds to support Illinois entrepreneurs. We also have Alumni Angels, which is our angel investor network specific to the University of Illinois. These programs help get more alumni engaged with companies, both from a funding and mentoring perspective."

— Laura Appenzeller, University of Illinois Research Park

University Research Park (University of Wisconsin-Madison). Through leasing of office and lab space, co-locates startups and venture capitalists.

▸ "We have the oldest and most important venture capital firm as a resident in our park. So, you can literally bump into them in the hallways, which is a big bonus to getting capital."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

Georgia Tech. Atlanta's ecosystem is increasingly successful at retaining startups. The city has seen significant growth in its startup community, advanced by regional venture funds combined with a supportive network of incubators and accelerators.

▸ "The Advanced Technology Development Center (ATDC) has worked with technology-focused startups statewide for decades through coaching, mentorship, and access to investment opportunities — venture, angel and corporate

connections — to support growth. ATDC had dedicated full-time resources to connect founders with all three to help them grow and thrive and be retained to grow here in the region."

— Greg King, Georgia Tech

North Dakota State University. Seeks to reduce the region's investment hesitation by leveraging legislative funding to shift attitudes toward risk capital.

▶ "Trying to de-risk capital investments came up a lot during the NSF engine site visit. There's so much money in North Dakota, and yet people want external validation before they sink into something. Legislative money offers us an opportunity to change the culture at the university so that people are thinking more about commercialization and we're helping faculty and their students think about where their entrepreneurial skills could be."

— Colleen Fitzgerald, North Dakota State University

The annual Demo Day event at UC San Diego's Design & Innovation Building gives student entrepreneurs opportunities to present their businesses and social impact startups along with chances to win funding they can use to continue their entrepreneurial pursuits.

HOW DO INNOVATION HUBS MEASURE THEIR IMPACT ON THE FUTURE OF WORK?

When queried about how their hubs measure and demonstrate impact in advancing the future of work, hub leaders described common and distinct approaches.

Multiple hubs mentioned job placements and skill development as core indicators of success. Many hubs prioritize tracking employment outcomes, such as internships, job placements, and the establishment of new businesses by graduates. These quantitative measures are seen as tangible proof that the hub is preparing individuals for the evolving workforce. Several leaders also mentioned a broader role in supporting industry-specific workforce demands, such as health care or technology, and the importance of aligning with regional or state needs.

A complementing element is how hubs measure more qualitative aspects of success. Some hubs focus on long-term impacts that may be harder to quantify, like the creation of new companies by alumni many years after they graduate, the development of cutting-edge technologies, or fostering an entrepreneurial mindset among students and faculty. The responses of hub leaders indicate the need for a wide set of metrics, blending quantitative measures like job placement and business creation with qualitative insights from stakeholders, to paint a fuller picture of success in advancing the future of work.

A student at the University of Tennessee-Knoxville, participates in the Southeastern Conference (SEC) Machining Competition, which welcomed four teams of students from SEC universities. The competition was held at the Tennessee Manufacturing and Design Enterprise Building (TN-MADE) hub, a facility in Hardin Valley, Tennessee that drives manufacturing-focused innovation. Photo credit: University of Tennessee-Knoxville.

JOB PLACEMENT AND INDUSTRY ALIGNMENT

Many hubs measure success based on the number of students who secure internships or jobs post-graduation, how well the skills developed align with industry needs, and the university's own ability to swiftly innovate and adapt its own education programs to meet quickly evolving industry needs.

▶ "We measure success by looking at the number of people who are trained and upgrade their skills — and then the number of placements into actual jobs."

— Steve Wray, Carnegie Mellon University

▶ "A measure of our success is going to be how quickly we can pivot to deliver new offerings. Our College of Emerging Collaborative Studies can launch degree programs in about six months. So, we said, 'Let's do a data science program.' Six months later, we have a minor in data science. That's going to be the future. Universities are notoriously slow in pivoting and innovating, so that's going to be how we measure success: creating those mechanisms to accelerate the engagement we need with communities across the state."

— Brad Day, University of Tennessee-Knoxville

NEW BUSINESS CREATION

Some hubs said they gauge success by the number of startups founded by students, faculty, and alumni, along with the growth of these businesses, heavily emphasizing the role of job creation and entrepreneurship.

▶ "In some ways, impact can be hard to measure because sometimes the skills students learn are not translated until much later. If you take things like entrepreneurship, a lot of our students have student debt they have to pay off, so they need to go and get a job as opposed to starting companies. So, it can be difficult to measure how they translate those skills immediately. And, while it's difficult, what we're measuring is whether our programs translate into quality, high-potential internships and jobs and opportunities for our students. On the other hand, a lot of students do actually start companies, and they go off and raise money, hire people, and become employers themselves. So that's incredible success, and it represents the kind of hard metrics you can measure."

— Paul Roben, UC San Diego

▶ "Our Innovate Carolina team has created a data hub that has been tracking and reporting a variety of quantitative impact metrics related to UNC startups created by students, faculty, staff, and alumni. We've been tracking this type of information — number of companies, jobs created, funding raised, revenue generated, etc. — for over a decade and have records running back to the late 1950's. We now have cumulative and individual records of the impact created by startups associated with the university — whether founded on UNC intellectual property or not — and we can provide annual and snapshot reports of economic and social impact."

— Sheryl Waddel, UNC-Chapel Hill

▶ "In terms of hard metrics and data, when you begin to think about numbers of companies that we're incubating, the numbers of disclosures, the numbers of startups, those things are all very indicative of the programs that we're putting in place."

— Marc Gibson, University of Tennessee-Knoxville

INNOVATION OUTPUTS AND INTELLECTUAL PROPERTY

Success is often measured by tracking innovation outputs such as patents, licenses, research publications, and collaborations with industry.

▶ "If it moves an innovation, we're trying to measure it. My team tries to have early notice about what and when things are occurring to figure out how to work with those individuals and the technologies being developed to maximize conversion. We have a scorecard, and we measure innovation outputs that are very common to the Association of University Technology Managers data. But we're also measuring a whole host of other metrics that are nuanced to help us understand how to anticipate our faculty's and students' needs to provide interventions in their development while also giving them an opportunity to make decisions with us as partners in innovation. We have identified leading indicators on programmatic activities as we fill the top of the funnel."

— Kimberly Gramm, Tulane University

Regional Economic Impact

Several hubs said they focus intently on how they contribute to job creation (direct, indirect, and induced jobs), revenue generated, and funding raised by startups, and the economic output for their local regions and states. Often, this means assessing alignment with local industry needs to ensure the hubs contribute effectively to regional economies.

▶ "At the research park, every time we turn parcels into commercial property on university land, they become taxable, so that is an important story to be able to tell in our community about how we impact our school districts, park districts, and other taxing bodies."

— Laura Appenzeller, University of Illinois Research Park

▶ "Measuring impact is pretty easy from the research park standpoint, and we create economic impact studies that look at investment capital put into the system, jobs created, and secondary tertiary jobs. We do these kinds of impact studies pretty regularly."

— Wayne Savage, New Mexico State University

Qualitative Metrics: Industry Demand Signals and Stakeholder Feedback

Some hubs indicated that they gather qualitative feedback from students, alumni, and industry partners to gauge the long-term impact of their programs. This can involve input from alumni and industry partners about how their education and experiences shaped career paths. Hubs that provide seed grant funding for future-of-work programs also evaluate how the programs they fund can amplify the economic impact they make by leveraging additional funding sources beyond their own.

▶ "By collaborating with the Governor's Workforce Development Board and industry partners, we analyze workforce demand signals and identify critical skill gaps across the state. This data-driven approach enables the University to align its academic programs with industry needs, ensuring that graduates are equipped to meet the evolving demands of the workforce."

— Amy Kircher, University of Minnesota

▶ "One way we measure impact is through the partners who are engaged, whether those are foundations, federal funding agencies, or others that want to support and expand the work we're doing — as well as engage to allow us to deepen the research behind the tools. Because we're providing seed funding, and often add-on funding, we look at the leverage factor: does the program we're funding leverage other dollars?

Does it leverage grants? Does it leverage federal, state, or city programs, or others? So, the leverage factor is a really important piece of measuring impact."

— Steve Wray, Carnegie Mellon University

▶ "We measure impact and get demand signals from several places. Through our work with state and regional economic development organizations and industry partners, we are able to better understand demand, trends, and potential gaps. Feedback from companies of all sizes in Tech Square also offers a unique perspective. We are always encouraged by stories of opportunities that the district has provided students and graduates as well as helping companies launch initiatives with regional impact."

— Greg King, Georgia Tech

From left to right, Kimberly Gramm, Ph.D., David & Marion Mussafer Chief Innovation & Entrepreneurship Officer at the Tulane Innovation Institute, is pictured with Quincy Brown, Ph.D., Associate Professor of Biomedical Engineering at Tulane University and principal investigator of MAGIC-SCAN. MAGIC-SCAN uses machine learning to improve the accuracy of cancerous tumor removal procedures. This project was among eight selected for funding under the Biden Cancer Moonshot initiative, a $150 million federal investment in cancer research.

TECHNOLOGY
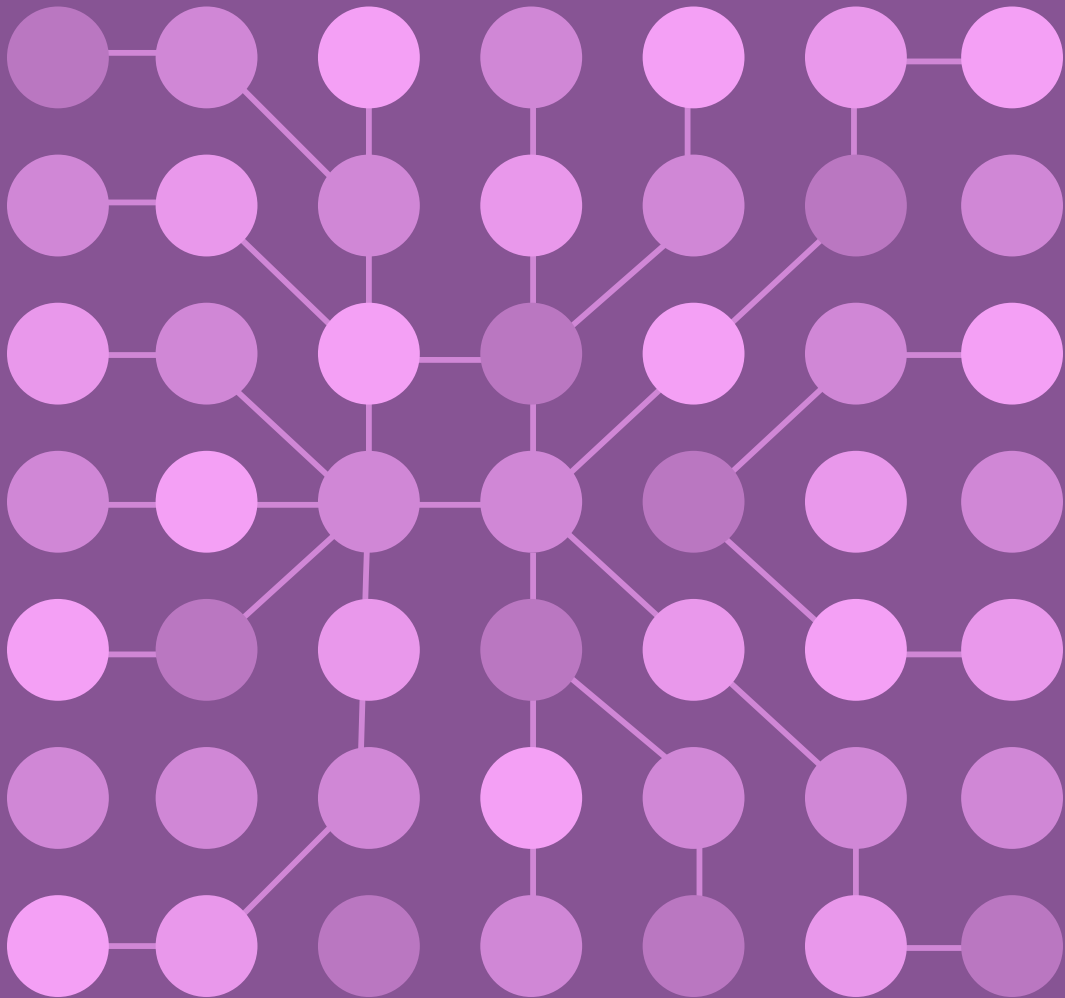
WHAT WE DISCOVERED

Many tech approaches, common goals

The variety of strategies hubs use to encourage the adoption of technologies in support of the future of work—ranging from mentorship to tech bootcamps to seed grants—demonstrates flexibility and adaptability. Despite these differences, the shared goal is clear: equip individuals and organizations to thrive in the evolving tech landscape.

Tech dissonance: internal vs. external focus

While innovation hubs report frequent use of collaboration tools and cloud computing internally among their own teams, there's less focus on these when helping others adopt technology. Instead, external efforts emphasize more advanced and emerging tools: AI, data science, robotics, etc. This reveals a potential opportunity to share practical, everyday tech tools that could boost productivity.

Barriers and necessities: infrastructure, security, and compliance

Issues related to cybersecurity, inconsistent bandwidth/networking, and policy compliance create hurdles for innovation hubs in adopting and promoting new technologies. This may limit the agility of hubs in experimenting with and deploying new tools like AR/VR and IoT, affecting hub operations, skill-building, and external collaborations.

Mentorship and community building catalyze tech adoption

Programs like Tulane's entrepreneur-in-residence and UNC-Chapel Hill's AI community showcase the importance of mentorship and peer networks in technology adoption. These initiatives not only foster skill development but also create environments that encourage experimentation and cross-disciplinary collaboration.

External support reflects regional needs

Innovation hubs tailor their external support based on regional economic demands—such as focusing on robotics in Pittsburgh and ag-tech in North Dakota. This approach enhances the relevance and impact of their programs.
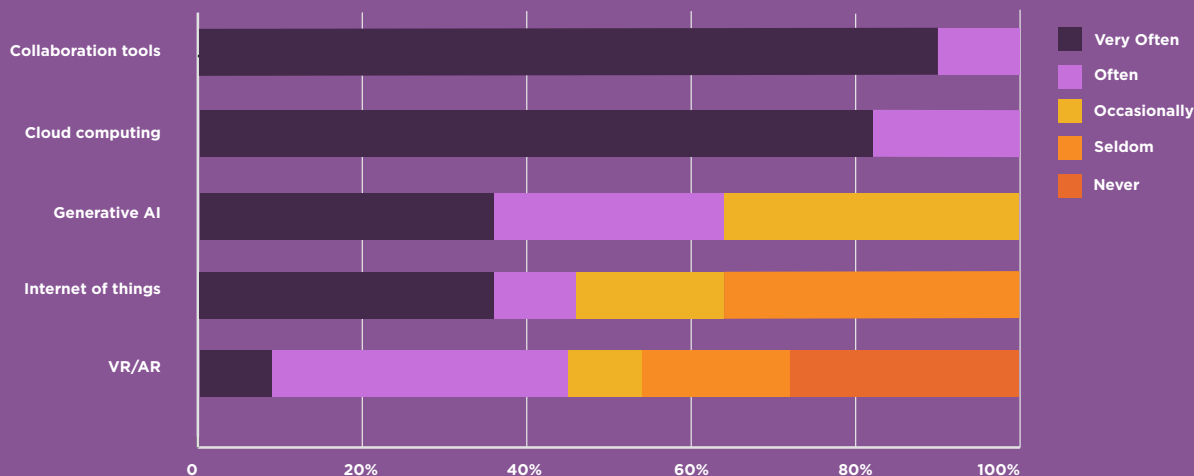
Figure 4: How Frequently Do Your Hub's Employees Use Future of Work Technologies?

Technological advances, particularly those taking place with AI, machine learning, AR/VR, connectivity tools, and collaboration platforms, are significantly shaping and accelerating the future of work.

These advances alter the fundamentals of work: the types of jobs that will exist (or become extinct), who (or what) does them, where they are performed, and the skills (or automated functionality) required. The World Economic Forum's "Future of Jobs Report 2023" indicates that 75% of organizations plan to adopt AI technologies within the next five years. Notably, knowledge workers and office-based roles, especially in middle-skill clerical jobs, are at higher risk, potentially impacting nearly 20 million positions. While this adoption is expected to create 69 million new jobs, it may also displace 83 million existing roles, leading to a net reduction of 14 million jobs globally. Research by the Brookings Institute estimates that 30% of workers could see at least half of their tasks affected by generative AI, with over 85% experiencing at least a 10% impact. Evidence on the heavy use of collaboration tools is also mounting. A 2021 survey by Gartner revealed that 80% of workers use collaboration tools for work-related tasks, a significant increase from 55% in 2019. The potential for increased productivity is vast. According to a McKinsey report, effective use of collaboration tools can enhance productivity by up to 25%, primarily by reducing time spent on emails and improving information sharing. According to the PwC 2022 Metaverse Survey, over half of companies have integrated VR into their strategy or plan to do so, compelled by indicators that show VR tools can help train employees four times faster and increase their confidence in applying skills after training by 200%.

Innovation hubs said they play a significant role in shaping how technologies are used for the future of work — including how people develop the necessary tech skills to compete and thrive in tomorrow's professional landscape and how organizations can use modern tools to boost productivity and impact. We explored the intersection of innovation hubs and future-of-work technologies from two perspectives. First,

from an internal perspective, how are innovation hubs and their own team members using technology as part of their own operations? And second, from an external perspective, how are hubs working with constituents or external customers to adopt and activate new technologies effectively for the future of work?

HOW FREQUENTLY DO INNOVATION HUBS USE FUTURE-OF-WORK TECHNOLOGIES?

When we asked hub leaders which future-of-work technologies their organizations use, they most frequently cited collaboration platforms like Microsoft Teams and Zoom (11 of 11 often/very often), cloud computing (11 of 11 often/very often), and, increasingly, generative AI tools like ChatGPT and Microsoft Copilot (7 of 11 often/very often).

For example, hubs cited frequent use of collaboration tools for meetings and for enabling their teams to work with partners and constituents in a variety of locations. While the hubs' extensive use of collaboration tools is, in part, indicative of the continued use of these tools by the wider professional world in the post-pandemic period, their use is especially vital to hubs operating in virtual modes (e.g. Carnegie Mellon University's Block Center) or in less dense regions where nodes of interaction occur across areas with geographically remote or dispersed constituents and partners (e.g. North Dakota State University, New Mexico State University's Arrowhead Center). Similarly, hubs also consistently pointed to cloud computing for document collaboration and storage as being essential to their operations. Hubs said they

use AI tools, particularly generative AI, regularly, although with varying degrees of integration. For instance, while some hub teams said they are already using generative AI tools heavily, others are using them in exploratory modes, with plans to adopt ChatGPT-like systems more broadly in the near future.

On the other hand, hubs use technologies like the Internet of Things (IoT), wearables, and AR/VR are less frequently (5 of 11 often/very often). Although AR/VR has potential in educational settings and innovation spaces, hubs cited infrastructure challenges, specifically low-bandwidth Wi-Fi and restrictive university policies on adopting new technologies.

WHAT TECHNOLOGY CHALLENGES DO INNOVATION HUBS EXPERIENCE?

Across the hubs, leaders highlighted several challenges related to integrating future-of-work technologies into their operations. Many hubs reported challenges with collaboration tools, particularly when trying to work with external partners.

Issues included restricted access for non-university affiliates and performance degradation. Leaders also mentioned struggling with bandwidth while implementing VR technologies, highlighting infrastructure constraints within university Wi-Fi systems.

Another common challenge was related to cybersecurity and compliance. Academic hubs often face stringent research security requirements, which complicates the adoption of certain digital tools, particularly those that store sensitive information or require secure environments. As a result, multiple hubs cited research security as a significant barrier when adopting new tools. Requirements of federal R&D funding and industry partnerships can be vastly different as well. Likewise, several hubs noted that the integration of generative AI is still in nascent stages, and they are determining what specific challenges might arise as they more fully implement these technologies. Other hubs see technologies that enable remote or hybrid work and change workforce expectations as complicating forces for hubs that focus heavily on real estate and physical innovation spaces.

Leaders of early-stage companies participate in programming at Georgia Tech's Advanced Technology Development Center (ATDC) located at Tech Square. Photo credit: Georgia Institute of Technology.

HOW DO INNOVATION HUBS HELP CUSTOMERS AND CONSTITUENTS USE TECHNOLOGY?

Beyond using various technologies themselves, how do innovation hubs help other people and organizations apply technology to prepare for and thrive in the future of work?

Whether they're supporting non-hub colleagues at the university or external customers, community members, and constituents, many of the innovation hubs interviewed described programs or initiatives they lead to help others adopt and use new technologies for the future of work.

Multiple hubs said they focus on bridging technology with practical workforce development, particularly in high-demand fields such as AI, data science, and advanced manufacturing. For example, hubs like Carnegie Mellon's Block Center emphasize initiatives to advance skills in AI and robotics to fill gaps in emerging industries. Similarly, credentialing programs in software development, cybersecurity, and data analytics, as well as professional development education in AI at Georgia Tech's Tech Square help workers with upskilling. The commitment to building workforce capacity and organizational productivity in these technological areas echoes across multiple hubs. And while all hubs aim to align technological innovation with workforce needs, the methods of engagement differ significantly. Some hubs, such as the Arrowhead Center at New Mexico State University, take a broad, entrepreneurial approach, running business accelerators and incubators across various sectors. In contrast, Tulane University's Innovation Institute hired an entrepreneur-in-residence with deep expertise in AI and machine learning to provide direct mentorship to faculty and students. This range of approaches highlights the flexibility and breadth of strategies needed to develop future-ready talent and create more effective organizations. While specific implementations vary, the programs innovation hubs offer to encourage new technology adoption and use most commonly fell into several categories.

TECHNOLOGY UPSKILLING AND RESKILLING PROGRAMS

Upskilling and reskilling programs focus on building skills in fields like AI, robotics, data science, cybersecurity, and software development, which are in high demand across industries. By offering both beginner and advanced courses, hubs enable individuals to transition into new careers or strengthen their current skill sets. For example, located within Tech Square, Georgia Tech's College of Lifetime Learning runs a "FlexStack" portfolio of courses that evolved from traditional bootcamps focused on cutting-edge technologies such as software development, analytics, cybersecurity, and digital marketing, among other topics of industry focus. These programs are offered in both in-person and online formats, ensuring accessibility for learners of all backgrounds. The credential attracts all kinds of participants, including individual professionals looking to change careers as well as companies seeking to upskill their teams.

▶ "Our professional education team rebooted the traditional bootcamp into modular certificates that can be bundled together called the Georgia Tech FlexStack. It still provides training in high-demand areas for learners who want to gain or refresh skills. The program leaders did this based on student feedback to be more agile and affordable."

— Greg King, Georgia Tech

TECH MENTORSHIP AND GUIDANCE

Mentorship programs connect experienced professionals with students, entrepreneurs, and employees to guide them through the process of adopting and implementing new technologies. These programs often target specific technologies or industries. Some hubs are hiring tech-specific entrepreneurs-in-residence to mentor faculty and students, providing one-on-one support.

▸ "We've hired an entrepreneur-in-residence who is an expert in AI and machine learning…to bring people together to help further their ideas and build a proof of concept."

— Kimberly Gramm, Tulane University

TECH-FOCUSED COLLABORATION SPACES

Innovation hubs describe developing physical spaces that provide access to cutting-edge technologies, labs, and research facilities. For instance, the layout of the Design & Innovation Building at UC San Diego encourages interaction across disciplines, bringing together students, researchers, and external partners in a shared space to use new technologies.

▸ "One thing we offer in our building is a bunch of prototyping labs and makerspaces, which are very attractive to students. We bring them in and show them how to use 3D printers, laser cutters, and other prototyping technologies."

— Paul Roben, UC San Diego

COMMUNITIES OF PRACTICE

Beyond connecting people in a one-on-one fashion with tech mentors or offering spaces that expand access to tech tools, some hubs are creating tech-focused communities. For example, UNC-Chapel Hill's hub is working with university leaders to coordinate a new campus-wide AI community. The new community brings together students, faculty, researchers, and industry partners to help them unite efforts and collaborate on projects involving the use of AI for teaching, learning, research, and university operations. The goal is to foster collaboration

and skill building for people at the university who are using AI for professional, academic, or personal purposes.

▸ "Our Innovate Carolina Junction hub is the space where we convene and facilitate a campus community that's growing around AI technology and how it influences the way we teach, conduct research, run the university — while building AI skills that students and others need for the future. We're introducing people to the AI technologies Microsoft makes available across the university, and we're holding workshops, panel discussions, networking sessions, and a 'prompt-a-thon' event that will help people learn how to create better prompts for any of the AI projects they're working on. We're also celebrating AI applications through AI demo day events and a series of stories and communications that build awareness, understanding, and synergy around the many AI activities happening at Carolina."

— Sheryl Waddell, UNC-Chapel Hill

TECHNOLOGY SEED GRANTS

Some hubs administer grants and funding initiatives to incentivize technology adoption and workforce development. These programs help local organizations, startups, and academic institutions fund the implementation of new technologies, address skills gaps, and enhance regional competitiveness.

▸ "We funded our technology council nonprofit to develop a pre-apprenticeship program for robotics, so they're preparing people to go into apprenticeship programs for robotics jobs. We also funded a Carnegie Mellon faculty member who's running a robotics academy in partnership with some of our community colleges, taking robotics into high schools to expose students to the technology and then link them to robotics entry courses at community colleges. Another example is that we funded faculty members who are developing a curriculum to use AI in community college training programs."

— Steve Wray, Carnegie Mellon University

TECH TRAININGS ALIGNED WITH INDUSTRY DEMAND SIGNALS

Innovation hubs are increasingly using data from industry, such as job postings, to tailor their technology education offerings to meet emerging technology needs expressed by employers. By analyzing these demand signals, hubs can create specific courses or training modules that prepare students and professionals for high-demand roles. By monitoring industry job postings and responding with tailored training programs, University of Illinois Research Park has sought to stay ahead of the curve with the technology programs it offers students and research park community members.

▶ "We get early insights on what's changing in industry based on job postings that we see. We run the job board for our research park, and we started to see people talk about use cases of early digital and software prototypes that they're doing. We find revealing trends over time. For instance, we noticed the early adoption of mobile applications, so we put together mobile courses focused on topics like how we train for iOS. We then started to see a trend in data sciences, so we trained around using those different tools, whether that's knowing linear regression up through more complicated technologies like Python, SQL, and data visualization. Today, we're seeing more generative AI interests."

— Laura Appenzeller, University of Illinois Research Park

TAILORING TECH TO REGIONAL NEEDS

The innovation hubs described tailoring their technological initiatives to meet the predominant economic, industrial, and workforce needs of their geographic areas. Carnegie Mellon's Block Center emphasizes AI, robotics, and advanced manufacturing as part of its regional economic development mission. The center's technology programs play a key role in supporting the Pittsburgh region's transformation from a steel-based economy into a technology-driven one. Similarly, the hubs at the University of Illinois Research Park and North Dakota State University

promote applications of technology that can provide targeted benefits to their strong agrarian economies. North Dakota State has partnered with heavy machinery companies like John Deere and Bobcat to align its workforce development with the region's manufacturing needs. Crucial to these efforts are short-term coding academies.

▶ "Something that popped up through one of our nonprofit partners is a short-term coding academy that focuses on projects that are topic based for particular companies. Each cohort has a project they're working on together. It's had a great small group of people who attend any given cohort, and everyone has found jobs. As different industries are thinking, 'How do I get my agronomists to become data savvy?' the academy now exists as a go-to resource."

— Colleen Fitzgerald, North Dakota State University

There are also opportunities for multiple hubs with a similar mix of industries, technologies, and workforce needs in their regions to connect and collaborate. These hubs might lean into their common expertise to work together as force multipliers. Similarly, hubs with different regional industry and workforce compositions might work with one another to manage gaps. In this way, hubs can build on their respective regional strengths, commonalities, and differences — leading to greater returns on economic impact.

TALENT
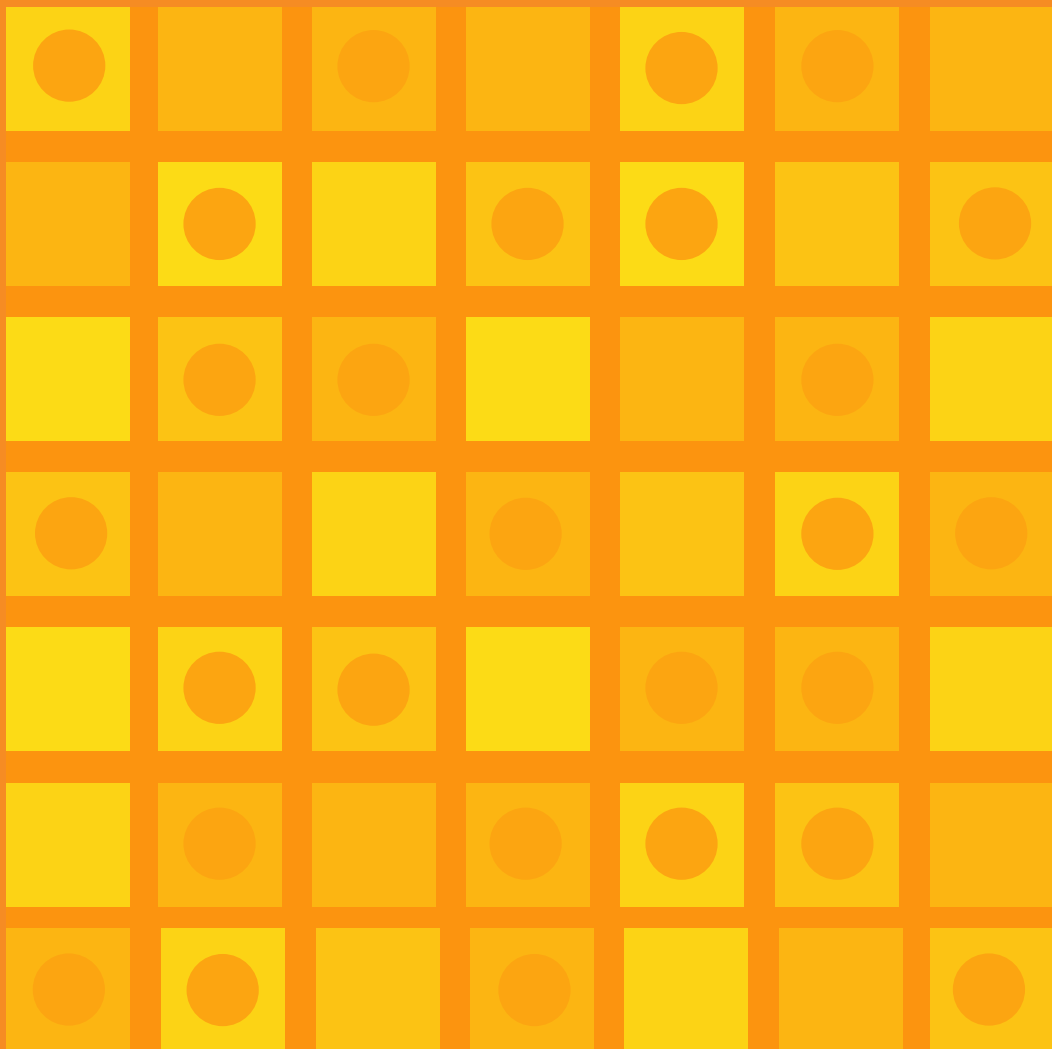
WHAT WE DISCOVERED

Entrepreneurship as a skill-building umbrella
Innovation hubs prioritize entrepreneurial skills, not just as functional training for starting businesses but as an overarching framework incorporating technical, human, and role-based skills — all essential to the future of work.

Integration of human skills
While human skills were identified by summit attendees as the most important for the future of work, innovation hubs appear to primarily integrate them into broader entrepreneurial programs rather than developing standalone programs. This suggests a potential gap.

Discerning which skills AI can't (easily) replace
Technical skills training is a major area of investment for innovation hubs, yet there is growing concern about which skills will remain relevant in the face of automation and AI. Some hubs are considering whether to continue offering training in tech skills that AI can easily automate.

Mentorship and expert access are top skill drivers
Mentorship and access to expert coaches are the most frequently cited modes of skill-building support across innovation hubs, underscoring their importance in the development of a range of skills, particularly entrepreneurial, technical, and functional competencies.

Beyond in-person skill building
Virtual modes of skill building — such as New Mexico State University's virtual accelerators, Carnegie Mellon's AI-driven workforce analytics tool, and the technology- and industry-focused Georgia Tech FlexStack program — expand access to talent development beyond traditional geographic limitations.
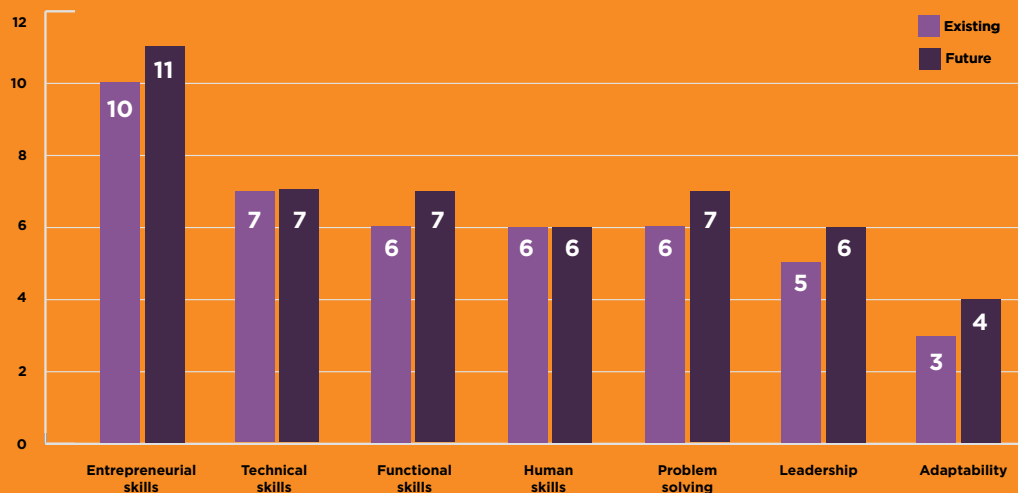
Figure 5: What Skills Do Innovation Hubs Hope to Address with Their Programs?

If talent is the currency of innovation, university innovation hubs must make sure industry sees the value that students and lifelong learners bring to the modern job market, even as the future of work ushers in an era of persistent skills disruption.

The World Economic Forum's "Future of Jobs Report 2023" indicates that 44% of workers' core skills are expected to change by 2027. This highlights the need for universities to update curricula and post-graduation learning models to equip students and professionals with relevant competencies. At the same time, skepticism of higher education is on the rise. Gallup reports a decline in public confidence in higher education, with only 36% of Americans expressing high confidence, down from 57% a decade ago. This trend challenges universities to demonstrate the tangible value they offer. Research by the Burning Glass Institute and Strada Education Foundation reveals that "among workers who have earned a bachelor's degree, only about half secure employment in a college-level job within a year of graduation, and the other half are underemployed—that is, working in jobs that do not require a degree or make meaningful use of college-level skills." As such, there is a clear and present need for hubs to help their universities align curricular and co-curricular programs more closely with labor market demands.

WHAT SKILLS DO INNOVATION HUBS HOPE TO ADDRESS WITH THEIR PROGRAMS?

During the innovation summit in Chapel Hill, we polled event attendees about which skills categories they think are most important for people to develop for the future of work: human skills, technical skills, or business function/role-based skills.

Leaders at Deloitte's Future of Work Institute describe these three skills as overarching categories that combine to comprise every job. Viewing these three sets of skills as foundational, we used the in-depth interviews with innovation hub leaders to dig deeper. In our interviews, we asked leaders if their innovation hubs had developed or planned programs designed to help people build future-of-work skills in the three foundational categories, plus several potentially related categories. For instance, since many innovation hubs share a core mission of helping people turn ideas and research into products, services, and companies, we also asked about entrepreneurial skills. We wanted to understand: Do innovation hub leaders describe entrepreneurial skills as a targeted functional/role-based competency or as a broader, cross-cutting set of skills? Further, because 48% of summit attendees — by far the highest response — cited human skills as the most important skills area to develop, we drilled down to ask about specific sub-categories of human skills: adaptability and resilience, problem-solving and creativity, and leadership/managerial skills. Our intent was to understand how innovation hubs view these skills in relation to one another and which skills areas they are building specific programs to address. Interestingly, when describing skills programs, the responses of the leaders we interviewed were evenly distributed between previous/current programs and those in the pipeline or planning stages for the future. In most instances, this reflected the existence

of a current skills program that a hub plans to continue, extend, or enhance in some way in the future.

ENTREPRENEURIAL SKILLS

Across the hubs, the strongest focus was on building entrepreneurial skills, with 10 of 11 hubs indicating they already run specific programs aimed at building these skills — and all 11 hubs saying they plan to do so in the future. Among the hubs we interviewed, leaders described entrepreneurial skills as the predominant category — even beyond core skills of human, technical, and functional/role-based skills — for which they are designing programs. Interestingly, in their responses, rather than describing entrepreneurial skills as a function/role-based set of skills — for instance skills that prepare one to become a startup founder — most of the hubs described entrepreneurship skills as a kind of overarching, all-encompassing skills program category that includes and combines a variety of categories we asked them about. For instance, as hub leaders described entrepreneurship skills programs, they often referenced technical skills — such as those developed through building product prototypes, the analytical research skills needed for customer discovery, or technical skill and prowess developed during the commercialization process — as core elements of their entrepreneurial programs. This was also true of human skills broadly as well as the various subsets of human skills we asked about: problem-solving and creativity, leadership/

managerial, and adaptability and resilience. Hub leaders described their entrepreneurship skill-building programs as a cross-hatching endeavor that incorporates all such human-related skills as necessary for either starting their own ventures or working as an agent of innovation in other organizations. Georgia Tech's CREATE-X program is a key example, emphasizing experiential learning and project-based activities to instill entrepreneurial confidence and prepare student participants to think like entrepreneurs regardless of their career paths.

▶ "CREATE-X offers a variety of co-curricular activities to help students develop entrepreneurial confidence and give them the opportunity to experience entrepreneurship through the best experiential learning — working through launching their own startups. The broader goal of CREATE-X is to give graduates the confidence to innovate their own future regardless if this is with their own startups or as part of teams in large corporations."

— Greg King, Georgia Tech

▶ "The entrepreneurial mindset is the core of what we teach, and we define that very broadly. Entrepreneurs don't have to start companies. The entrepreneurial mindset is being okay with leaning into risk, being able to form these teams, being able to lead them, and being okay with being uncomfortable."

— Paul Roben, UC San Diego

▶ "Most entrepreneurs we work with don't yet have a clear idea or any data to support how their product really serves the customer's need. They've come in with this idea that they're going to change the world. But the reality is that there may not actually be a customer for their idea. So, we help them, from an entrepreneur standpoint, recognize what they're offering, whether they have a product fit or not, and what they need to do to bring their product online."

— Wayne Savage, New Mexico State University

TECHNICAL SKILLS

Technical skills also stood out as a top area of programmatic focus, with seven out of 11 hubs saying they have current and future programs focused on building technical and digital literacy. With the rapid rise of technology in almost every industry, digital literacy ensures workers can navigate complex tools and contribute to innovation in data-heavy or tech-driven fields. These programs often align closely with industry demands and enable individuals to apply cutting-edge technologies in real-world scenarios. While several hubs noted that digital literacy was a competency emphasized at an institution-wide level for students and not singularly emphasized by their hubs, other hub leaders also described developing their own targeted, hub-led programs aimed at developing technical skills in students and external learners alike. This is particularly the case at hubs like Carnegie Mellon University's Block Center, which leads grants-based initiatives to help local residents transition into roles in AI, robotics, and advanced manufacturing, and at Georgia Tech, whose extensive coursework in AI, machine learning, and cybersecurity are highly sought after, attracting professionals looking to enhance or refresh their skills in these areas.

Knowing which tech skills not to develop — particularly those that are most apt to be overtaken by emerging AI and automation technologies — will also be critical. Laura Appenzeller at the University of Illinois Research Park described previous demand from industry to create short-term bootcamps for SQL and other basic data science functionalities, an effort that was successful in prepping people for high-demand, entry-level tech roles. With the emergence of AI, however, she said that hubs need to pause and think more intentionally than ever about the long-term value of the training they provide.

▸ "We will need to be cautious that, although those positions and that type of work in that type of industry (SQL and fundamental data science functions) was a quick win to get people into it, those jobs also might be migrating away from people and turning into machines. If it's easy enough to learn in a boot camp, you might be able to train the computer to do it also. And that's a harsh reality that may be upon us as industry changes."

— Laura Appenzeller, University of Illinois Research Park

FUNCTIONAL/ROLE-BASED SKILLS

When asked about business function and role-based skills, most hub leaders described these dually as offerings provided to students through the core curricula established in their universities' academic departments and professional schools, while also noting specific instances in which their hubs have created targeted programming. Such skills allow individuals to contribute to specialized vertical sectors, such as biotechnology and advanced manufacturing, most of which require cross-cutting business knowledge in human resources, finance, marketing, IT, or other technical disciplines. In many cases, functional skills and technical skills overlap as multiple hubs cited providing core training in technologies that target specific industry and/or horizontal job functions. Georgia Tech's FlexStack program in digital marketing and cybersecurity focus on building credentials and skills in business domains that are in demand in growing industries across the Atlanta region, including fintech, aerospace, automotive, transportation, and logistics. UC San Diego's hub offers programs that teach business function and role-based skills in finance and marketing as well as company formation and intellectual property strategy, but not scientific skills, which are taught in other university departments. North Dakota State University noted the significance of digital

academies that build tech literacy in people serving in core functional roles that are vital to the operations of many types of companies.

▸ "Work is changing and the workforce is changing. In our state, I think of ag-tech as a microcosm for all of the functions — the HR, the accounting, the connectivity, and the Internet of Things — that are going to be needed to run these kinds of businesses. And it's then making sure that you've got the ability to retool people to work in these areas."

— Colleen Fitzgerald, North Dakota State University

HUMAN SKILLS

Human skills — also called people, professional, or soft skills — is also an area where hubs are focusing. Recall from the chart on page 14 that human skills were the most frequently cited skill category that polled summit attendees identified as most important for people to develop in the future. Hub leader responses during our subsequent interviews reinforced that they view human skills as important, with six of 11 hubs interviewed saying they had already developed programs to help people build skills in interpersonal communication, emotional intelligence, and teamwork. Interestingly, however, programs focused specifically on human skills were not the most frequently cited type of program described during the interviews, as hub leaders mentioned developing entrepreneurial skill-building programs twice as frequently as programs focused solely on human skills. This is largely due to the fact that hubs appear to embed or package the development of human skills within broader entrepreneurial skills programs. Beyond their connection to entrepreneurial skill programs, human skills programs described by hubs focus on team-based and multi-disciplinary innovation. One example includes a digital academy program that has emerged via a nonprofit partner of

North Dakota State University. The academy offers cohort-based programs and team projects that help participants build collaboration and communication skills, while working on real-world, tech-based problems defined by corporate partners. UC San Diego uses collaborative, cross-disciplinary spaces and labs to create environments that are conducive to people practicing human-focused skills.

▶ "The way we train students in an academic institution is not the same as the industrial environment. So, we're looking at how to address that and better prepare students for what currently exists in the industrial sector — and also what's going to exist in the future. It gets back to soft skills, multidisciplinary teams, and failure not being a bad thing, so long as you learn from it. Creativity, how to build the right team around a problem of different perspectives, and how to lead those teams: All of these types of skills are not necessarily always taught as optimally as they could be in an academic setting, and that's part of what we're trying to address. So, all of our programs are set up to address those kinds of soft skills, and to help these students become more successful once they graduate and go on to do other things."

— Paul Roben, UC San Diego

PROBLEM-SOLVING AND CREATIVITY SKILLS

More than half of hub leaders interviewed said they currently offer skill-building programs focused on problem-solving and creativity skills. Hub leaders highlighted these skills — punctuated by the ability to think critically — as a crucial yet underdeveloped skillset for the future workforce. As industries rapidly evolve with advanced technologies and interdisciplinary challenges, the ability to analyze complex problems, evaluate solutions, and make informed decisions has become increasingly vital. The hub leaders we

Situated on the first floor of UC San Diego's Design & Innovation Building, The Basement serves as an incubation space for students, where they can participate in startup programs, design and innovation initiatives, leadership development, and entrepreneurship workshops.

talked with saw their programs filling a gap in this area among current and emerging workers, particularly as traditional educational pathways often emphasize technical knowledge over analytical agility and creative problem solving. Most leaders described problem-solving and creativity skills as part of larger entrepreneurial skills programs they provide rather than stand-alone offerings because these skills are particularly suited to entrepreneurs who must frequently navigate ambiguity, analyze and incorporate feedback during product development cycles, and respond proactively to customer demands.

▶ "Students too often don't recognize all the steps a technology performs as a user, so they don't necessarily understand root cause, which is a really important element in developing an innovation to solve a problem. Students are trained early on using different technology applications, but they aren't learning the critical thinking skills. Being a proficient user of technologies and understanding the algorithms are very different skills. That's why customer discovery and I-Corps training help focus innovators on the value proposition the user needs. This evidence helps to inform how to iterate their technology and build something that will be impactful."

— Kimberly Gramm, Tulane University

LEADERSHIP AND MANAGERIAL SKILLS

While most hubs did not mention current programs specifically focused on leadership and managerial skills — with many describing them as more broadly acquired via the hub's entrepreneurship programs or university-wide curricula — a majority did discuss planning leadership programs for the future. Peer

leadership groups organized by the University of Illinois Research Park help CEO founders of startups and site directors of larger corporations to build their managerial skills and share insights.

▶ "Our peer leadership groups share what's happening across industry with one another, both from a tech standpoint — which helps them to see early trends — but also helping them navigate their own leadership or deal with reorganizations or management issues."

— Laura Appenzeller, University of Illinois Research Park

ADAPTABILITY AND RESILIENCY SKILLS

In a fast-evolving job market, people lean on adaptability and resiliency skills to navigate changes in technology, industries, and work environments. Three of the 11 hubs mentioned programs specifically focused on building such skills, with several hub leaders commenting that these capacities are embedded in other programs focused on building entrepreneurial or tech skills. For instance, Carnegie Mellon University's Block Center emphasizes upskilling and cross-training for workers transitioning from traditional manufacturing to advanced tech roles like robotics and AI, helping them build resilience in a changing job market. The center also conducts research to inform decisions and policies on workplace resiliency.

▶ "Our research is looking at some of these questions to understand workplace mobility and resilience. So, might people not move because they get flexible work arrangements at one location while not getting them in another? We're trying to understand what that means."

— Steve Wray, Carnegie Mellon University

Figure 6: How Does Your Innovation Hub Help People or Organizations Build Skills for the Future of Work?
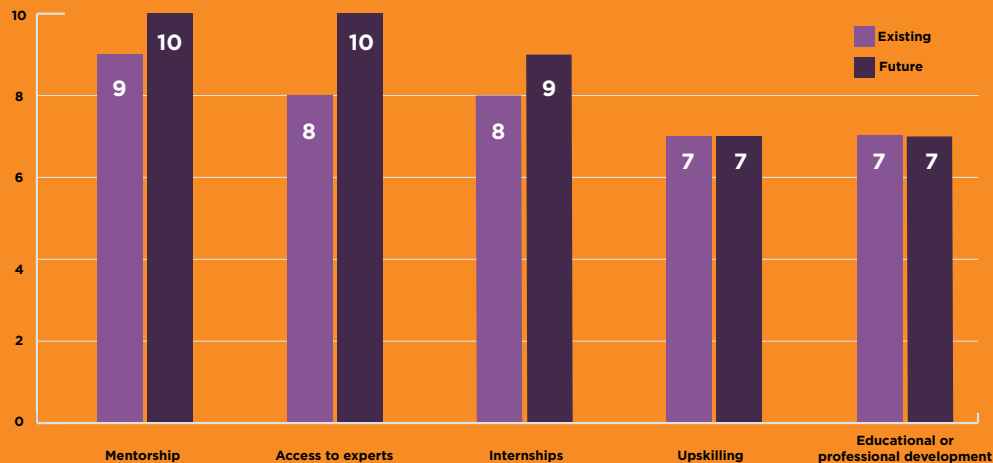
HOW DO INNOVATION HUBS HELP PEOPLE BUILD SKILLS FOR THE FUTURE OF WORK?

In addition to understanding the types of skills hub leaders are building programs to shore up, we also wanted to know what modes of support their programs are built on. In other words, beyond the purpose or "why" of their programs, could hub leaders describe the functional "how and what" of their skill-building programs?

COACHING AND MENTORSHIP

Coaching and mentorship was the most frequently mentioned mode of support mentioned by innovation hub leaders. This emphasis on coaching and mentorship aligns with what we heard from leaders who reported that entrepreneurship skills represent their top area of programmatic focus. Leaders described offering individualized support and guidance for personal and professional development, particularly pertaining to building entrepreneurial ventures. Leaders at nine of 11 hubs said they offer formal mentorship structures that connect entrepreneurs and workers with experienced professionals. These mentorship offerings help people build a range of entrepreneurial skills that cross all three core skills categories: human, technical, and functional/role-based. For example, the Merlin Mentor program offered by University Research Park at the University of Wisconsin-Madison pairs entrepreneurs with seasoned mentors to help them navigate startup challenges, offering both technical and strategic business advice. New Mexico

State University's Arrowhead Center offers entrepreneurial coaching that supports both students and external businesses, helping them with human skills such as pitching their ventures and fundraising as well as more analytical/technical skills such as customer discovery and navigating the research-and-development pathway for their products and technologies. A mix of mentorship offerings at UNC-Chapel Hill reflects a range of programs that offer broad and targeted skills development opportunities for entrepreneurs. For instance, Launch Chapel Hill — a startup accelerator created by UNC-Chapel Hill, the city, and county which operates out of the Innovate Carolina Junction hub — pairs founders from campus and the community with personal entrepreneurial mentors. These mentors provide broad-based guidance on a variety of topics that founders encounter on their startup paths. The hub's Carolina Angel Network (CAN), which is comprised of accredited angel investors who often serve as mentors, advisors, or portfolio company board members, offers more targeted guidance. Such mentors are particularly well suited to offer insight on business strategy and validation, fundraising, financial guidance, and other topics that are most useful to ventures that are ready to raise early-stage angel funding or would like to soon pursue venture capital. Other mentors offer industry-specific guidance. The hub's KickStart advisory board program brings together experienced life sciences industry professionals, regulatory and development specialists, and seasoned research-based entrepreneurs who serve as mentors and provide advice to emerging life sciences startups. A key insight is that, as hubs use mentorship as a platform for helping people develop a wide range of skills, they are developing networks of mentors who can serve different roles — some who can serve as generalists and others who can serve as specialists — to help startup founders build skills across various venture stages and industries.

▶ "We see mentorship as a skill-building activity that needs to flex to meet the needs of entrepreneurs who are learning and finding their way. Entrepreneurs are developing expansive sets of skills, which continually evolve over time as their ventures mature or plans change. So, we focus on building a network of mentors that spans numerous industries and areas of professional expertise to pair founders with mentors who are best suited to the skills and knowledge they need to build to get to their next step."

— Sheryl Waddell, UNC-Chapel Hill

ACCESS TO EXPERTS

In addition to formalized mentorship, eight of 11 hubs interviewed said they provide access to experts in less structured ways. These programs include bringing in key opinion leaders and subject matter experts to offer strategic insights, helping constituents stay abreast of industry trends and technological advancements. UC San Diego's innovation hub brings in experts from various fields to help guide participants through technology development processes, creating a deeper understanding of future market demands. This blend of expert access and more formal one-on-one mentorship ensures that workers and entrepreneurs receive support in their professional growth and ability to adapt to the shifting demands and technological advancements of the future of work. UNC-Chapel Hill's innovation hub offers office hours, which are free one-on-one consultations and are available for anyone in the local hub ecosystem who wants to meet with entrepreneurs-in-residence or industry professionals. These consultations are not formal, long-term mentorship arrangements but are, instead, chances for community members to schedule appointments for brief meetings with experts in areas of specialization: legal issues, branding/creative, business plans/strategy, value propositions, intellectual property, and AI and other emerging technologies.

The hub also offers access to experts who can provide consulting and specialized services such as market research and patent landscaping.

▶ "Our technology development programs are about transitioning technologies from the research environment to a development environment in the private sector. Much of what we do is about bringing companies with market expertise together with professors who are developing technologies and facilitating a two-way dialog to help people understand what is actually needed to transition a technology to market."

— Paul Roben, UC San Diego

INTERNSHIPS/CO-OPS

Internships and professional co-op programs represent another common mode of support, with eight of 11 hubs saying they currently offer such programs — and nine of 11 planning to provide intern or co-op programs in the future. Hub leaders described internship and co-op programs as providing practical experience in real-world settings. Carolina Innovators Connect, which was created by UNC-Chapel Hill's innovation hub, is a program featuring an event in the fall: a panel discussion with entrepreneurs from the Research Triangle region followed by a meet-and-greet session that allows regional startup companies to network with Carolina students interested in startups, internships, and job opportunities. In the spring, the program offers stipends to cover the cost for a select number of student program participants to complete summer internships at regional startups, giving them an immersive professional learning experience in the startup world. Another model example occurs at University of Illinois Research Park, where 700 to 800 university student interns — most in computing or data disciplines — are routinely employed by companies located in the park.

▶ "We're constantly recruiting and cultivating student talent, so that talent pipeline is very intentional. The students are experiencing financial outcomes that are immediately beneficial to them, while getting experiential learning inside industry. For the companies, they're using the internship as both an apprenticeship function and a talent pipeline for recruitment. This increases their conversions to full-time talent with a higher caliber student than they would otherwise attract."

— Laura Appenzeller, University of Illinois Research Park

UPSKILLING AND RESKILLING PROGRAMS

More than half of hub leaders reported offering upskilling and/or reskilling programs. Upskilling programs help workers stay relevant in their current roles by learning new technologies and methodologies. Akin to upskilling offerings, reskilling programs focus on transitioning current workers into new roles by teaching them entirely new skill sets, helping them avoid job displacement. Some such efforts occur through in-house upskilling/reskilling programs. For instance, Georgia Tech's FlexStack program and other coursework cater to individual learners and corporate teams seeking to stay competitive by mastering the latest skills in software development, AI, data analytics, cybersecurity, and other technologies. Beyond targeted programs that provide training in focused business or technical topics — often centered around innovation and entrepreneurship at innovation hubs — most hub leaders described broader upskilling/reskilling programs as belonging to university-wide professional development programs rather than a specific offering developed by their individual hub. However, Georgia Tech is an example of the exception: a university that has co-located and infused university-wide professional development programs within its innovation hub. Georgia Tech's College of Lifetime Learning is embedded

within the Tech Square hub footprint and offers continuous learning programs that support both students and professionals, helping them build on their existing knowledge in emerging fields like AI and data science.

Beyond in-house hub-driven or university-wide programs, some hubs are forming upskilling/reskilling partnerships. For example, the University of Tennessee-Knoxville partners with community colleges to offer stackable certificate programs that are built into its four-year degree programs and help make students more competitive when they graduate. The university is also working with external partners across the country to begin developing more online educational opportunities for individuals outside the institution. Through a commissioned research report, the university identified more than 1 million people in Tennessee who started their education at four-year institutions but never graduated. Its strategy is to create a professional education pathway for these individuals to finish earning their degrees.

▶ "We want to provide opportunities that are flexible for working-class Tennesseans who may have families, serve as caregivers, or stopped their education for other reasons. Giving that portion of the workforce an on-ramp to finish their degrees is really important."
— Marc Gibson, University of Tennessee-Knoxville

Steve Wray at Carnegie Mellon University specifically highlighted the need for innovation hubs to focus on upskilling and reskilling soft skills, such as collaboration and workplace preparedness. Wray suggested that innovation hubs could take an active role in organizing and managing internship or professional exposure programs, especially for students or individuals unfamiliar with the dynamics of working at an innovation company. Wray also emphasized the opportunity to create programs that help senior-level workers transition from large corporations to startups by offering boot camps or workshops to prepare them for the cultural and operational differences in smaller innovation-driven companies.

New technology applications are informing better workforce upskilling and reskilling decisions in regions across the country. For example, Carnegie Mellon's Block Center's Workforce Supply Chains Initiative offers data-driven tools and guidance to help companies, employees, and policymakers identify skills gaps and the most opportune paths to train workers, reskill them, and offer them ways to transition to new roles. This decision-support capability is backed by a virtual, web-based tool and analytics platform that analyzes the supply of different skills in the U.S. labor market, the readiness of workers in specific occupations to transition to new roles, and the availability of workers in specific regions to meet potential industry or technology growth cluster demands in those regions.

▶ "Workforce Supply Chains is a data-driven approach to understanding skills requirements for growing and emerging fields. As an innovation hub, if you're successful, you may be creating new opportunities that have never existed in your region. And if a company hits, you have the challenge of trying to fill many more jobs than you might have anticipated. Or if you're successful, you may attract a company to locate in your region, because they want to access the research and knowledge in your area. And all of a sudden, the company may say they need 1,000 employees in a specific field, and you've never had them. So, we're building online and cloud-based and AI-driven tools that can help regional economic development officials or federal economic development officials who are trying to develop a cluster in a region."
— Steve Wray, Carnegie Mellon University

WORKSPACES & WORK MODES
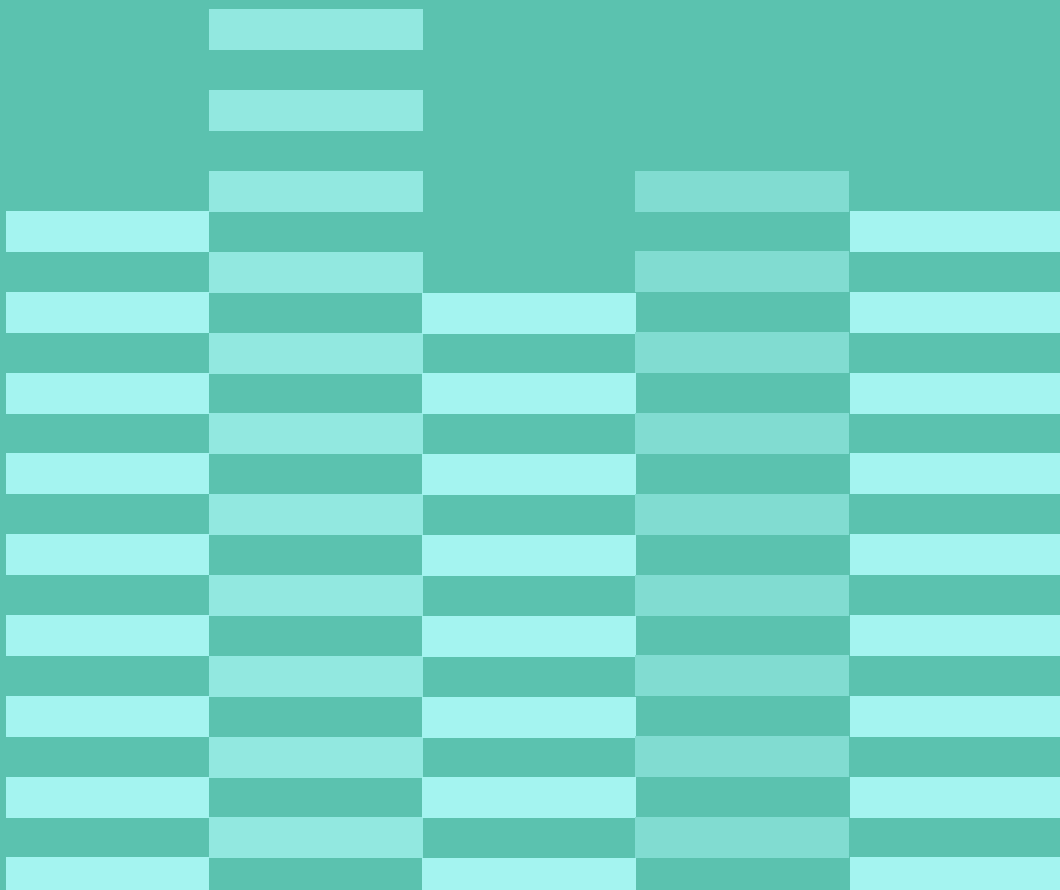
WHAT WE DISCOVERED

Workspaces as catalysts for economic impact

Innovation hubs recognize that well-designed physical and digital workspaces are not just enablers but drivers of economic impact. Infrastructure investments in collaborative coworking spaces, specialized labs, and incubators directly correlate with measurable workforce and commercialization outcomes. Hubs that track the ROI of physical infrastructure investments — such as job creation, startup formation, and venture funding associated with hub workspaces — are better positioned to demonstrate long-term impact.

Alignment of spaces with industries and work modes

Hybrid work trends have placed new pressures on innovation hubs to reconsider their real estate strategies, particularly in industries that remain reliant on physical infrastructure. Life sciences, biotech, quantum computing, robotics, and microelectronics hubs continue to see strong demand for physical lab and manufacturing space, whereas software and digital-centric industries are shifting toward remote or hybrid-first approaches.

Focus on industry spaces that drive local economies

Not all remote or hybrid jobs contribute equally to local economies. Some innovation hubs, particularly those tied to state universities, are prioritizing industries that generate local employment, taxable revenue, and enduring regional economic growth. As hubs evaluate their tenant mix, many are giving more weight to companies that establish a local physical presence rather than purely digital firms that may employ workers from anywhere.

The value of placemaking

To counteract the pull of remote work and declining demand for traditional office space, hubs are designing workspaces that are intentionally "sticky." These placemaking approaches enhance workforce engagement and create environments where serendipitous interactions occur.

Balancing collaboration and privacy in multi-use hub spaces

Many hubs prioritize open, collaborative workspaces, but there is a tension between fostering spontaneous collaboration and providing the privacy necessary for deep, focused work. For example, coworking spaces and incubators emphasize open layouts and collision zones, but startups and researchers often need their own dedicated workspaces. Some hubs resolve this by incorporating focused work zones — such as segmented incubators with built-in communal engagement areas or leasing arrangements where multiple companies share lab infrastructure while maintaining proprietary spaces.

Value of the hub coworking model for ideation teams and startups

Hubs with coworking spaces provide a necessary bridge from the university laboratory to leased office spaces through supportive communities, month-to-month rent options, and proximity to campus jobs and connections.

Element Hall, located on the first floor of the new Element Labs building at University Research Park in Madison, Wisconsin, will provide a dramatic multi-function space for all-hands meetings, shareholder presentations, scientific talks, company movie nights, holiday parties, or other gatherings. Element Labs is the research park's newest speculative lab project aimed at serving local startups and UW-Madison. Photo credits: Design: Perkins & Will; Photography copyright: Mark Herboth.

The innovation hubs we interviewed described using an assortment of physical and virtual workspaces to support various activities such as research, entrepreneurship, industry partnerships, and skill development.

Several hubs provided the perspective of real estate-centric research parks, large campuses and complexes that offer several to dozens of buildings with physical footprints exceeding a million square feet — while serving as homes to a mix of academic researchers and hundreds of companies that employ thousands of private sector workers across numerous industries onsite. Others are singular hub facilities that offer a mix of workspaces within one focused footprint. Some of the interviewed hubs are located in dense urban environments, while others are spread out across university campuses or suburban parks covering hundreds of acres. Certain hubs combine these approaches, offering a centralized hub building in larger multi-building innovation districts or multi-hundred-acre research parks. Proximity to university campuses also varied. Some hubs are located on university campuses, while others are campus-adjacent — with some located only a few steps across the street from campus and others situated miles away in another part of the city. While many of the hubs provide mixed-use commercial and academic spaces, others operate predominantly in virtual or regionally dispersed environments with a limited or no physical footprint. The design of hub spaces is often influenced by the hubs' specific focus areas, ranging from biotechnology and life sciences to artificial intelligence and agriculture.

A recurring theme in the descriptions of these workspaces is the integration of coworking spaces, labs, and incubators, often designed to accommodate a mix of corporate partners, startups, academic researchers, and students. Many of the hubs described prioritizing collaborative and multidisciplinary work environments to foster innovation and connectivity between different sectors. Hub leaders said they see this collaboration as crucial for driving technological advancement and creating a fertile environment for next-generation ventures and industry growth. At the same time, some hubs indicated facing challenges in balancing remote work preferences with the need for physical presence, particularly for lab-based research.

WHAT TYPES OF WORKSPACES AND ENVIRONMENTS DO HUBS OFFER?

When we asked innovation hub leaders to describe their workspaces, they discussed a mix of environments designed with a high degree of intention and flexibility to simultaneously serve a range of academic, entrepreneurial, and corporate audiences.

COWORKING SPACES

The overwhelming majority (10 of 11) hubs said they offer some type of coworking space — shared workspaces often used by startups, freelancers, and small teams. These spaces are designed to foster collaboration and networking and may include private offices, open desks, and shared meeting rooms. These offerings provide flexibility and a low-cost entry point for startups, while encouraging cross-pollination of ideas. Interestingly, coworking spaces are far from a one-size-fits-all hub offering, with hubs offering different types of spaces and tailoring such spaces to significantly different audiences. Some hubs provide an open-space desk setup, in which people work side-by-side in unwalled environments, in either open/hot desk (unassigned, first-come/first-serve), designated desk (assigned to a specific person), or hotel desk (specific desk reserved in advance). Several hubs described offering the open/hot desk model. These include the "Basement" in UC San Diego's Design & Innovation Building and "Studio G" at New Mexico State University's Arrowhead Center, both of which are open-desk environments where student innovators collaborate and work on their ideas and ventures.

Another coworking model is found in Tech Square at Georgia Tech, which offers a full range of coworking memberships and spaces to the business community outside the university. This hub's coworking space is located in Tech Square's Coda Building, a 750,000-square foot research-focused facility in downtown Atlanta that houses a combination of corporate partners and tenants along with university researchers focused on sectors like AI, machine learning, data science, and cybersecurity. Within the building, WeWork operates a variety of coworking spaces, which offers a range of options such as day passes, monthly memberships for open desks, dedicated desks, private offices, and event and meeting spaces.

For some hubs, coworking spaces take the form of central collision zones designed to spark collaboration and a feeling of community among professionals working in more traditional office and lab spaces located in the same larger building. At UNC-Chapel Hill, whose Innovate Carolina Junction hub also offers open-desk and a variety of coworking membership models, coworking space is surrounded by private offices. This gives tenants opportunities to find the right balance between individual focused work and collaborative community.

▶ "Members of our hub find that what they need from their work environment changes, which can happen over the course of months or in a moment's notice. Their ability to take phone calls or participate in one-to-one meetings in a private office and then jump to a scrum, brainstorm, or other group session in a central coworking space just steps away provides flexibility. Teams can choose to mix and match their setup based their work. For instance, a single team might designate a private office for one employee whose work

requires more inward focus, while choosing an open coworking desk setup for a small group of others. In these instances, the coworking space becomes a central collision zone where members from multiple companies can step in and out of offices, sync up professionally, and bond as a community."

— Sheryl Waddell, UNC-Chapel Hill

INCUBATORS AND ACCELERATORS

Startup incubators and spaces that host accelerators are also prevalent offerings, with nine of the 11 hubs saying they provide different varieties of these to ventures in their academic and local communities. Hub leaders described these environments as structured spaces within their existing hubs that include coworking elements alongside affordable offices, creativity labs, and programming. Incubators provide resources and guidance to early-stage companies and pre-venture teams, helping them transition from idea to market-ready product.

Some hubs described outward-facing campus-community incubators and accelerators designed to support both entrepreneurs from within the university and the external community. One example is Launch Chapel Hill, an accelerator hosted inside UNC-Chapel Hill's hub that was created through a university-city-county partnership and serves people at the university and beyond, including locals and also business founders interested in relocating to the area. Another is located at University of Illinois Research Park, whose technology business incubator EnterpriseWorks offers different office spaces sized to accommodate one-to-eight-person teams, 23 wet labs, a shared equipment lab, makerspace, coworking area, and shared amenities such as a community kitchen and conference rooms. The incubator space serves as a crossroads where university researchers commercializing technology and external entrepreneurs convene and collaborate. Similarly, the Advanced Technology Development Center (ATDC) at Tech Square in Atlanta is

Georgia Tech's technology startup incubator with more than four decades of experience providing entrepreneurs across the state the tools, resources, and spaces needed to launch and grow their ventures. The incubator's home base — a 48,000-square-foot facility in Tech Square — gives an edge to startups focusing on physical products through an advanced manufacturing and design studio equipped with makerspace tools. The ATDC is also an example of a university incubator extending its reach throughout the state, offering modern offices, lab space, and entrepreneurial services at seven incubator hub locations across Georgia. In terms of the future of work, such incubators that serve both the external local community and the university campus create environments well suited for cross-sector collaboration, fostering solutions that combine academic research with practical industry insights. This dual focus enhances workforce development by exposing university students and researchers to real-world challenges while equipping community entrepreneurs with access to cutting-edge resources, ultimately preparing a more versatile and future-ready workforce. Alignment of businesses and technologies across the region accelerates economic growth.

Other hubs operate incubators focused on university-affiliated ventures. For instance, UC San Diego's Triton Startup Incubator, located in the university's Design & Innovation Building, offers recently graduated student ventures a combination of premium coworking space, resources, and services to help young companies launch and scale ideas they may have initially formed an interest in at the university's entrepreneurship center. Because it is located within the university's larger innovation hub building — but on its own floor — the incubator is designed to provide a balance of focused workspace and connectivity to other ventures. Incubators that focus on university-affiliated ventures also contribute to the future of work by creating concentrated environments where

faculty, students, and recent alumni can build on their academic foundations while benefiting from close proximity to university resources and networks. This targeted approach accelerates the transition from academic innovation to commercial success, fostering an entrepreneurial workforce that is deeply connected to cutting-edge research, technologies, and networks of other entrepreneurs and founders within the university ecosystem. Although company leaders may no longer be taking courses or working full-time at the university, entrepreneurial skill building continues to occur through a series of natural, everyday collisions that take place among founders in a low-risk, quasi-academic environment.

▶ "Our incubator areas are a little bit more segmented off from other parts of the building because companies need to have their own spaces, but they still force companies to coexist with a bunch of other companies. And there's still a lot of collision space between the incubator spaces to encourage engagement."

— Paul Roben at UC San Diego.

LEASED CORPORATE OFFICES AND RESEARCH LABS

Beyond providing coworking spaces and incubators/accelerators that cater to individual entrepreneurs or smaller-scale startups, some hubs — primarily research parks and large-scale urban innovation districts — offer office and lab space to private corporations and R&D organizations that view proximity to universities as an aid to academic-corporate research collaborations. University Research Park at University of Wisconsin-Madison leases a combination of business office and research lab space to more than 125 companies, primarily those that partner with the university and/or engage in commercializing its research. Similarly, the University of Illinois Research Park leases lab and office space to over 120 companies looking to collaborate with university researchers. Office spaces at these hubs allow corporations to set up offices and innovation centers close to research university campuses, while laboratories are equipped with specialized equipment, often

tailored to specific industries like biotech, AI, engineering, and advanced manufacturing. These labs support both research and development, as well as product testing, and give corporate and academic researchers space to innovate faster and more effectively together. Several hubs described the magnetizing effect of hub offices and labs on corporations. University-adjacent office and lab spaces attract companies that may otherwise be unlikely to open an office in the region. For instance, the influence of University of Illinois Research Park, which is located in Champaign-Urbana — a city that is not immediately contiguous with a larger metro area — is significant. The park sits roughly two hours from the next major metro areas in Chicago, Indianapolis, and St. Louis.

▶ "We are a relatively small community that stands in and of itself, and there's not a lot of industry that surrounds us. We're attracting companies to set up innovation centers or engineering sites adjacent to the university and on university property — and these are not necessarily industries that would have naturally occurred or have been located within the community otherwise, or that are trying to locate here for a bigger population employment opportunity. The connections to the university are quite important because companies are interested in employing students coming out of the university or aspects of our research that are collaborative with their aims."

— Laura Appenzeller, University of Illinois Research Park

Hubs with sizeable portfolios of leasable office and lab space in large urban districts served by anchor universities — such as Tech Square in Atlanta and the emerging MIX in Minneapolis — have similar magnetizing effects. In the case of Tech Square, the ability to lease large parcels of office and lab space attracts companies headquartered outside Georgia to open offices in Atlanta. In Minnesota, the MIX is an attractive option for Fortune 500 companies looking for field office space or locations for corporate innovation centers.

▶ "We have a variety of commercial office lease options through various landlords as well as through our partnership with the university's real estate affiliate. Over the last 15 years, we've seen a range of new corporate operations established here, from innovation labs to regional tech hubs and corporate headquarters. This comes from active collaboration between public sector, private sector, and higher education partners that are leveraging their capabilities to create new opportunities."

— Greg King, Georgia Tech

▶ "Minnesota is home to several Fortune 500 companies that play a critical role in both the state and national economy. Having a company footprint in the MIX next to campus is an advantage for joint research, technology translation, and access to future talent."

— Amy Kircher, University of Minnesota

Hub leaders at University Research Park at the University of Wisconsin Madison view multi-tenant leasing arrangements within a single building as opportunities to incorporate workspaces that foster a sense of community among companies that occupy traditional office and lab space. They also report that when multiple science-based firms lease space in the same facility, shared labs and equipment can create cost efficiencies.

▶ "As a general rule, if we know a building is aimed at more than one tenant, we try to program in spaces that promote community in some way, whether that's shared conference rooms or event spaces. Our newest building has a space where we're working to open a restaurant or coffee shop. It has a big 200-person event space for presentations or all-hands meetings. We took an older building that had three sides, and we built what we call the "pocket park" in the middle of the courtyard. So, we're trying to think about placemaking as a lever for creating

community and sticky places where people are inclined to gather, especially among different organizations. And because we have science buildings, we think about things like shared equipment, rooms, and particularly autoclaves or equipment that is expensive and easily shared between companies. We have a coworking lab incubator that has a couple million dollars of equipment that is shared between companies. We're thinking about relocating it and possibly making that even more broadly available so that more of that equipment can be used by others."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

CREATIVITY LABS AND MULTIDISCIPLINARY COLLABORATION SPACES

Hub leaders frequently emphasized the importance of spaces designed for interdisciplinary collaboration and creativity-focused activities, highlighting their value in fostering innovation and solving complex problems. For instance, leaders at the University of Tennessee-Knoxville described creating flipped classroom-style spaces — "no more lecterns with PowerPoint" — that encourage hands-on, experiential learning for next-generation engineering students and future manufacturing professionals. The vision for spaces that facilitate hands-on experiences for innovation development and cross-pollination of expertise extends beyond the classroom into other workspaces. Leaders recounted the excitement expressed by music department faculty who were eager to collaborate with advanced materials engineers to explore new ways to develop instruments that will shape the future of music.

Similarly, UC San Diego provides spaces within its Design & Innovation Building, including a design lab focused on cross-disciplinary design thinking methods, fully engaged with faculty researchers and a makerspace outfitted with

a metal shop, wood and plastics shop, CNC machining, laser cutters, and 3D printers. These enable collaboration among disciplines, blending engineering with fields like policy, theater, and dance to spur creative problem-solving.

▶ "When we think about jobs of the future and the future of work, we need to start with education. And when it comes to work environments, we're creating non-denominational environments, where you can have artists and humanities and engineers and chemists all in the same building, all sharing expertise."

— Brad Day, University of Tennessee-Knoxville

▶ "This whole building is designed to engineer collisions and serendipity, so there are a lot of spaces that are common to different programs. The whole goal is to try and increase engagements, collisions, and people talking to one another. Our spaces are very open. They're very configurable. Everything's on wheels. We have power from the ceilings and huge doors that open into public spaces. The design of the building is very deliberate in encouraging collision, both within the programs and externally with the public."

— Paul Roben, UC San Diego

INDUSTRY-DRIVEN SPACES

Wet lab spaces were the most common industry-specific spaces mentioned by hubs — particularly by the leaders of research-driven hubs and parks focused on life sciences and biotech industries. Some of the demand for wet lab space is driven by universities whose research portfolios lean heavily into the life sciences and biotech sectors, while other demand factors are market driven. Leaders at University Research Park at the University of Wisconsin Madison said that most of the research park's wet lab space is aimed at the broad life science market — therapeutics, diagnostics, research tools, etc. — but noted that such space is often

quite useful for energy-related or chemical engineering companies, too. Hub leaders also described creating more niche physical spaces that align to emerging industries within their regions. For example, Arrowhead Research Park at New Mexico State University plans to build a specialized facility to grow the film and digital media economy in the state.

▶ "Although we are industry agnostic, in practice, we wind up doing a lot of lab-based work — and I think there are a couple of reasons for that. First, at the University of Wisconsin, about half the research is in the life sciences or health care area. And second, there's a market failure, which is that, historically, the private sector market doesn't really like the capital-intensive lab business very much. Left to its own devices, the private sector would under supply the wet lab market in Madison. So, it's a good niche for a university, non-affiliated nonprofit to fill. The combination of market niche and market need led us to develop a portfolio such that most of our buildings include at least some wet lab space."

— Aaron Olver, University Research Park (University of
   Wisconsin-Madison)

▶ "In southern New Mexico, we've lacked a full-fledged film soundstage, which means we've not been able to attract large productions. As a result, all of the students who graduate in our film, digital media, and special effects programs all go elsewhere. We're excited about an agreement with the state to build a film and soundstage complex at the research park that will bring more films to southern New Mexico along with quite a bit of economic impact. We'll be able to provide a work environment for student internships, and then for graduates who want to go into that field, we believe the complex will create in the order of 200 to 300 new permanent jobs here."

— Wayne Savage, New Mexico State University

DISTRIBUTED, CO-LOCATED PARTNER HUBS

While some universities focus on building hubs next to their campuses to attract corporate partners closer to their academic research and student talent, others are adopting complementary strategies that involve a distributed innovation campus model: looking beyond the university to create and co-locate innovation hub spaces near industry partners. One such example is the University of Tennessee-Knoxville, which opened the Tennessee Manufacturing and Design Enterprise (TN-MADE) hub, a facility in Hardin Valley, Tennessee that is strategically located near Oak Ridge National Laboratory and supports manufacturing-focused innovation. TN-MADE is a 48,000-square-foot facility that offers research space, office space, a lecture location, and a foyer for events. It also offers access to cutting-edge machines and tools, providing resources such as CNC machines and robotic additive manufacturing. By co-locating TN-MADE with industry partner Oak Ridge National Laboratory within the Hardin Valley Innovation District that features community assets like high schools, restaurants, and housing, the university contributes to a live-work-play ecosystem that encourages interaction among students, faculty, and professionals.

▶ "We're thinking about the distributed campus model and ways we can provide more opportunities for co-located space with industry partners and others to work with our faculty and students and going into the places where we can plant a pin on a map within an innovation district. We're trying to meet people where they are. The Hardin Valley area has been designated an innovation district, and Oak Ridge National Laboratory has secured space there outside the main campus fence that provides easier access for industry to work there, so you're beginning to see more industry move into that area. You're seeing high schools and academies pop up there. It's pedestrian friendly, and you're seeing restaurants open, so it's an example of the live-work-play idea."

— Marc Gibson, University of Tennessee-Knoxville

This distributed campus model leverages the strategic position of the district between Knoxville and Oak Ridge, enhancing opportunities for knowledge exchange, workforce development, and practical applications of research in manufacturing and other fields.

▶ "The university saw an opportunity and seized it: leasing a 50,000-square-foot building that now houses some of our hybrid manufacturing and machining capabilities and strengths. The purpose is to build opportunities with the community college, which is located right across the street, and for us to work with the Manufacturing Demonstration Facility at Oak Ridge National Laboratory. It's an opportunity for us to be housed literally right next to a daycare, right across the street from restaurants, and close to 1,500 housing units within a six-mile radius of us. The whole district is important to us. It's halfway between the university's main campus and Oak Ridge National Laboratory, which is about 20 miles away. We're looking at how we distribute our capabilities and strengths to go meet industry and communities, leverage our university's strengths in those spaces, and build more capacity and density in those areas."

— Marc Gibson, University of Tennessee-Knoxville.

HOW ARE HUBS OPTIMIZING MODES OF WORK: IN-PERSON, REMOTE, AND HYBRID?

Like many organizations across the country, innovation hubs are seeking to strike the right post-pandemic balance in how they approach different modes of work: in-person, remote, and hybrid.

In doing so, they are taking strategic approaches to technology, organizational culture, and physical spaces to help their own hubs — and the constituents they support — work as effectively as possible. Of the 11 hubs interviewed, eight indicated that they and their constituents operate in some degree of hybrid work mode (partially in-person work and partially virtual work). Two described their modes of work as being heavily skewed toward in-person work, while one described operating in an almost entirely virtual or remote mode.

Hub leaders said they use a variety of technologies to support collaboration, communication, and productivity across in-person, remote and hybrid work modes. The hubs interviewed frequently cited the use of tools like Zoom and Microsoft Teams to foster collaboration. These technologies help ensure broader accessibility and participation, especially in geographically dispersed or rural areas. Some hubs also emphasized the integration of digital resources to scale their reach, while others balance digital and in-person interactions.

Beyond technology, innovation hubs are also evaluating how their strategies surrounding physical spaces and organizational culture can help their own teams and customers thrive in the midst of multiple shifting work modes. Hub strategies often vary based on the industries they support. For instance, hybrid work changed the dynamics for software engineers and data scientists, who do not require lab space and can work remotely more easily. The challenge for some hubs and research parks is that many tech companies and employees became accustomed to working from home during the pandemic, which exerts pressure on real estate, as companies question whether maintaining remote innovation sites is in their best interest. And while hubs that support life science and biotech-based ventures remain more immune to the real estate pressures felt by more high-tech or digital-centric hubs — with lab-based work requiring physical presence and collaboration — they too are taking steps to improve physical environments to foster interaction. Hubs of all types recognize the need to thoughtfully integrate more hybrid and connected modes of work into their environments — whether more digital or physical in nature — to maintain the collaborative and innovative culture central to their missions.

Hub leaders described several strategies that their innovation hubs are pursuing to operate most effectively across different modes of work.

STRATEGY 1:
OFFERING FLEXIBLE WORK ARRANGEMENTS

Though less emphasized in the interviews as a benefit offered by hubs themselves, flexible work arrangements remain important. Most hubs described flexible work arrangements as an offering provided by their wider universities that have been infused into the operations of the hubs. Flexibility in work arrangements is increasingly useful in a digital-first, post-pandemic world, and was a mode of support described as critical by several hub leaders. It is essential to hubs that operate virtually, such as Carnegie Mellon

University's Block Center, or hubs like those at North Dakota State University and the Arrowhead Center at New Mexico State University, whose programming reach must extend over expansive geographic areas. Such hubs rely on online meeting technologies and the flexibility for staff to be located and work in a dispersed fashion, allowing them to engage with one another and customers/constituents whom they might not otherwise reach.

STRATEGY 2:
MATCHING WORK TYPE WITH WORK MODE

Like most organizations in the post-pandemic work world, innovation hubs are working to determine which types of work are best served via in-person, remote, or hybrid interactions.

Virtual or hybrid work. Hub leaders described four primary types of work programs or activities that their hubs see working effectively in virtual or remote work modes: 1) meetings; 2) professional education and training; 3) digital libraries and tools; and 4) entrepreneurial outreach and accelerators.

Hub leaders cited online meetings as being helpful in enabling broader participation, particularly for hubs in regions affected by weather or geographic constraints. An example is North Dakota State University, where remote modes of work — aided by online collaboration technologies — allow its innovation hub activities to thrive in ways they might not otherwise.

Leaders also told us that professional education and training programs are highly conducive to virtual engagement — and extremely popular and valuable among students and corporations alike. For instance, Georgia Tech offers a range of professional education and technology-focused coursework virtually. In addition, the convenience of its online master's degrees in computing analytics and cybersecurity is proving popular with corporate clients looking to sharpen their employees' technical skills.

Other hubs are curating digital libraries of workshops and courses and publishing online tools, increasing access to resources and expanding their reach. The Workforce Insight Tool provided by Carnegie Mellon's Block Center for Technology and Society through its Workforce Supply Chains Initiative is an example of the type of entrepreneurial resource that hubs can successfully deliver in an online mode. The Workforce Insights Tool is a web-based and local analytics platform that analyzes the U.S. labor market to assess the skill readiness of workers for transitioning among more than 1,000 occupations, providing detailed insights into workforce supply, demographics, and wages across regions. At UC San Diego, entrepreneurial learning resources created at the university's Design & Innovation Building are availalbe via an online library, which allows the hub to reach a growing number of students it might otherwise miss.

Some hubs also said they've found success in offering online entrepreneurial outreach programs and accelerators. Similar to hubs that benefit from online meetings, hubs whose entrepreneurial programs must extend their reach across wide geographic areas tended to cite the value of online accelerators. The Arrowhead Center at New Mexico State University, for example, uses virtual programming — in combination with hybrid and in-person programs — to effectively deliver its entrepreneurial outreach and accelerator initiatives across the state. The center's virtual accelerators, sprints, and coaching programs cater to a geographically dispersed audience, including K-12 students, community colleges, business owners, and entrepreneurs in rural areas. This format is particularly necessary given New Mexico's vast, predominantly rural landscape and the center's mandate to serve constituents statewide. By adopting virtual offerings, the Arrowhead Center overcomes the logistical challenges of physical distance, ensuring that entrepreneurs and students throughout New Mexico can access high-quality resources, mentorship, and training without needing to travel.

▶ "We have a number of different activities that rely on hybrid and streaming options, which has been really helpful in our state because we have acute winters, a lot of distance, and a lot of rural roads."

— Colleen Fitzgerald, North Dakota State University

▶ "We have digital libraries and librarians. Every course that we do and every program is put online so that people can access it in different ways."

— Paul Roben, UC San Diego

▶ "I was impressed with how quickly we shifted our programming virtually when the pandemic hit — and for the last few years, our accelerators have been almost entirely virtual. We found that our programming was well received and continues to grow primarily virtually."

— Wayne Savage, New Mexico State University

In-person/physical work. Despite success performing a variety of work activities and programs virtually, hub leaders also noted that certain work programs or activities require an in-person physical presence. They noted three primary types of work their hubs are engaged in that need to occur in person: 1) intensive, in-depth venture creation; 2) lab-based research; 3) prototyping, design, and creative work.

Hub leaders felt that work activities associated with in-depth, intensive venture creation are typically best performed in person because these rely heavily on collaboration, creativity, and the iterative exchange of ideas. In similar fashion, hub leaders consistently pointed out that lab-based research work must be conducted in person due to the hands-on nature of the tasks and the required access to specialized equipment and controlled environments. Facilities like wet labs, clean rooms, and prototyping labs are equipped with tools and infrastructure that cannot be replicated virtually, making physical presence essential. During our interviews, we learned that many employees and lab-based tenants at university research parks largely continued working onsite during the pandemic because

their work required in-person experimentation and direct interaction with materials and machinery. Additionally, in-person collaboration in lab settings allows for real-time problem-solving and iterative testing, which are critical to advancing research and development.

Hub leaders also talked about prototyping, design, and creativity work being performed in person due to the hands-on, iterative nature of these processes and the need for access to specialized tools and spaces. Facilities such as makerspaces, prototyping labs, and design studios are equipped with advanced technologies like 3D printers, robotics equipment, and AR/VR tools, which require physical interaction to test and refine ideas. This kind of in-person, hands-on work also comes alive through outreach efforts such as UC San Diego's K-12 entrepreneurial programs, which bring students to the university's Design & Innovation Building each summer to give them a hands-on introduction to makerspace tools. Prototyping and testing facilities are also useful for hubs working with industries associated with more physical attributes. As part of its expanding work in the clean energy sector, the Arrowhead Center at New Mexico State University is exploring the potential to develop a test lab facility for energy and water technologies, beyond existing spaces on campus, where external companies can work to develop, experiment with, and deploy technologies. Hubs can also bridge industry and startup stakeholder with knowledge of and access to university core facilities that provide specialized laboratory and prototyping services.

▶ "Entrepreneurial work is a contact sport. There are some things that work remotely and some things that don't. And a lot of this actually doesn't, in many ways. I think it depends upon the stage at which people are and the needs that they have. If they have a very specific need — to understand IP strategy, for example — they can go and have a look at that workshop online and learn from it. But if they're getting into more

heavy-duty stuff, where they need to build a company, for example, that type of work requires face time, and they need to be here in person. It's trying to find the right balance between technology and good old-fashioned coffee makers."

— Paul Roben, UC San Diego

STRATEGY 3:
CREATING "STICKY" REAL ESTATE

Some hubs are focused on creating work environments that encourage employees and companies to stay engaged and connected with the physical location. This involves making physical offices or innovation parks more appealing and essential for employees through a variety of means. Amenities and spaces that promote collaboration, community, and innovation and provide value beyond what employees can get from working remotely. The goal is to make the location so valuable — or "sticky" — to the companies and workers that they prefer to be there, rather than working from home or in other locations. One example of sticky real estate is the Minnesota Innovation Exchange (MIX), which will operate as a mixed-use hub that features an active ground floor with retail, dining, and entertainment spaces.

The MIX has plans to offer housing, plus a hotel with conference space. Such amenities will create a real-estate environment that makes onsite work attractive to corporate tenant employees and the hub a destination spot for workers, campus departments, and the larger community. In addition, University Research Park at the University of Wisconsin-Madison combines office amenities and community-building activities to enhance stickiness.

▶ "We're working to make our real estate stickier for the long run. When I think about the future of work, I'm thinking about how we can support our tenants … helping them get their employees back in the office by providing a great work environment and making the park more interesting and stickier and more interactive, and just a better place to have your career. We have all these great companies that sometimes don't talk or interact with one another as much as they could or want to. So, part of the goal in our evolution is trying to get companies to interact more, because we think more innovation will come out of a stronger community."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

Coda Plaza connects two blocks of Tech Square in downtown Atlanta, creating a convening site that is anchored by private sector, public sector and Georgia Tech research community members. Photo credit: Georgia Institute of Technology.

STRATEGY 4:
ALIGNING REAL ESTATE WITH INDUSTRY

Hybrid work has introduced new pressures for research parks to align with and invest in real estate development for industries whose work requires a physical presence, even when such spaces may be more expensive to initially develop. As more companies in digital-centric industries adopt remote or hybrid work models, the demand for physical office and lab spaces has tilted toward industries that rely most on science-driven facilities, labs, hands-on prototyping, or specialized equipment required by the nature of their work. Such "space-dependent" industries named by hub leaders include life sciences, robotics, material sciences, quantum computing, energy and water, aerospace, agriculture, microelectronics, precision fermentation, and bioprocessing.

▶ "Virtual work changes who needs to work in the office versus the office being a convening location where you have occasional people coming together there for special purposes or team building activities. Physical sciences and life sciences have the benefit of needing to be physically in a space, so the endurance and resiliency of those industries are important. And to the extent that we're creating startup companies around those industries, they're more solid. And then there are also certain sectors — like quantum computing, semiconductors, robotics, and material science — where they're working on physical prototyping or they're building things that still need a physical place. So, we have the opportunity to build on those things, perhaps in a way that we were more reluctant to in the past because they're expensive. Now, we find ourselves with an imperative to lean into those sectors, even if they're expensive, because otherwise, we don't have a sticky workforce to build physical real estate around."

— Laura Appenzeller, University of Illinois Research Park

STRATEGY 5:
## USING SPACE TO PRIORITIZE LOCAL JOB CREATION

The innovation hubs and parks widely viewed the ability to demonstrate economic impact as important to their various stakeholders and governing bodies. And as some industries become more virtual and rely more on a hybrid workforce that may not create local jobs, questions about how hubs and their stakeholders define economic development — and what activities create economic impact for the state — become paramount. Some hubs are giving more acute discernment to industries and companies that will establish a more physical presence in the region — thereby creating higher-wage local jobs and expanding the property tax base in support of regional and state revenue generation.

▶ "If the things we're doing to advance an innovation community or industry relationships with the university don't have an economic output for the community or state, how does that play into the mission of the organization? As a university or innovation community, we can create a lot of digital jobs where people are working from other states…but that may not create any economic output for your state or your community. We are considering how we serve the desire for economic output and for Illinois to attract business and be an economic generator."

— Laura Appenzeller, University of Illinois Research Park

PARTNERSHIPS
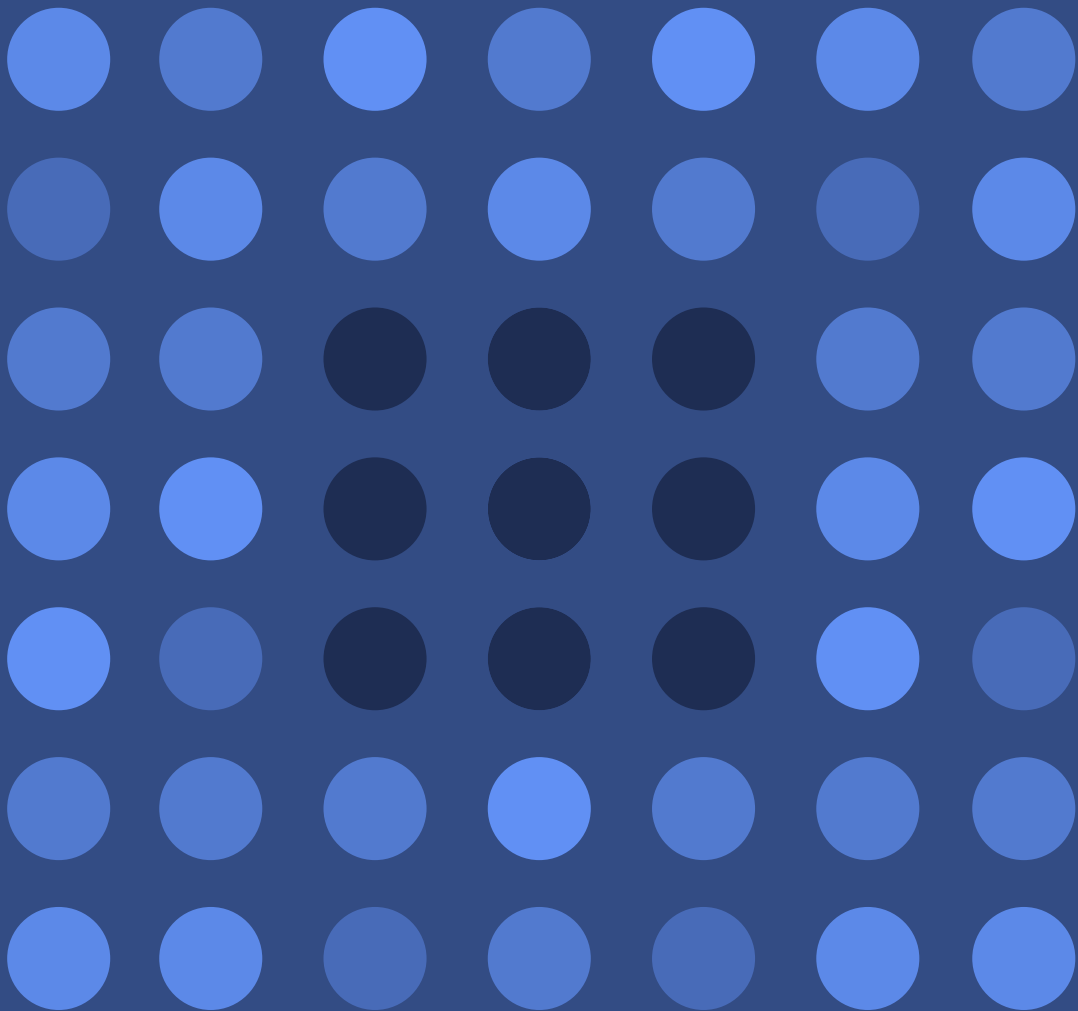
WHAT WE DISCOVERED

Innovation hubs as regional economic conveners

Hubs that act as conveners and ecosystem builders show how universities can bring together disparate stakeholders for large-scale impact. These hubs are not just conducting research or training workers; they are strategically aligning regional economic strengths with national and state priorities (e.g., aerospace in New Mexico, robotics in Pittsburgh, and med-tech in Minnesota) that are critical to the future of work. This illustrates how hubs can be effective when they serve as neutral conveners, orchestrating multi-stakeholder collaborations for broader economic development.

Tech partnerships drive workforce transformation

The hubs we talked to leverage corporate tech partnerships (e.g., Microsoft, Google, NVIDIA) to integrate AI, data science, and automation training across industries. These partnerships go beyond funding; these collaborations provide hands-on learning, real-world applications, and workforce upskilling. Hubs should view tech partnerships as catalysts for broad workforce transformation.

Industry-specific partnerships optimize regional workforces

The hubs we interviewed described partnerships with industry-leading firms in robotics, mobility, ag-tech, aerospace, biotechnology, and advanced manufacturing. Such collaborations help them align educational and entrepreneurial programs with emerging industry needs. These hubs recognize that workforce preparedness must go beyond generic skills development — instead, focusing on stackable credentials, targeted upskilling, and work-based learning partnerships that address specific job market demands.

Partners vital to physical infrastructure development

A recurring challenge for innovation hubs is securing physical space to support startups, research initiatives, and workforce training. Partnerships with real estate developers and funders emerge as a critical strategy to address this issue.

Hub partnerships with community colleges, K-12 carve educational pathways

University innovation hubs collaborate with community colleges, and to a lesser degree K-12 systems, to address workforce gaps. This is evident in partnerships like UNC-Chapel Hill's collaboration with Durham Technical Community College for clinical trials workforce development and Carnegie Mellon University's granting efforts to bring AI and robotics education into community college high school programs. These initiatives ensure that innovation hubs are not just training future workers but actively shaping educational pathways to meet evolving labor market needs.
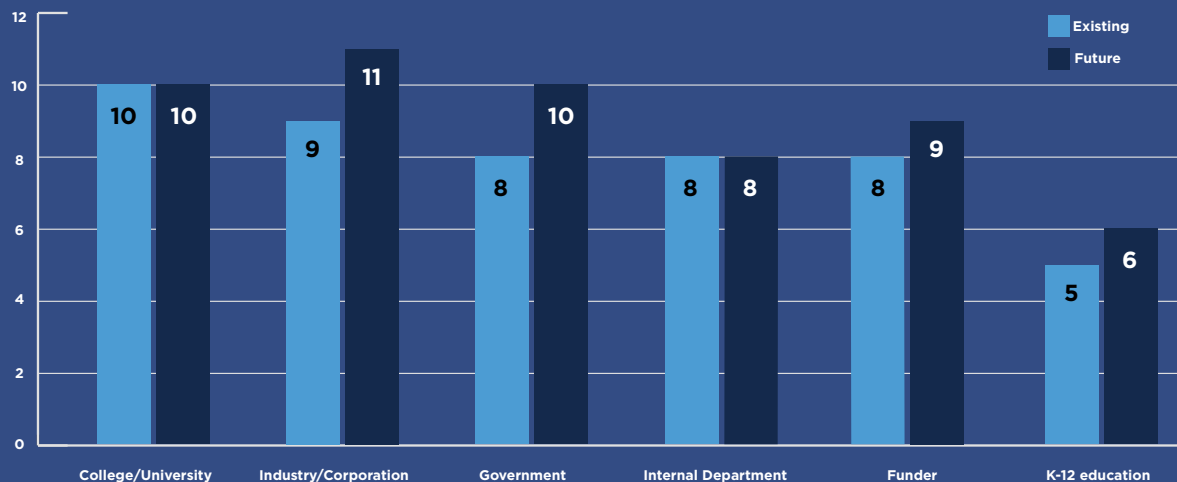
Figure 7: Who Does Your Innovation Hub Partner With?

Advancing the future of work isn't a solo endeavor. Innovation hubs have formed a range of partnerships to drive their missions generally and to support their future-of-work efforts.

These collaborations are critical for hubs seeking to translate academic research into market-ready technologies. Similarly, partnerships with government agencies and national labs emphasize regional and national economic development goals, focusing on long-term job creation and innovation aligned with public interests. Educational partnerships, particularly with K-12 schools and community colleges, play a foundational role in developing future talent. K-12 partnerships engage students early with STEM workshops and boot camps, fostering interest in emerging fields like AI, robotics, and coding. These initiatives create a direct pipeline of skilled students into higher education and the workforce. Meanwhile, partnerships with community colleges address immediate workforce needs through short-term

certifications and bridge programs, providing accessible pathways into high-demand fields. This dual focus on early and continuing education ensures a steady flow of qualified workers for the industries driving economic growth.

Partnerships with real estate developers and funders provide essential infrastructure and financial resources, without which future-of-work initiatives would struggle to scale. Such collaborations often result in the development of physical spaces needed for innovation and collaboration to thrive. Individual donors also provide financial resources that enable hubs to invest in entrepreneurship and workforce development, ensuring that long-term funding models back innovation.

WHAT TYPES OF PARTNERSHIPS ARE UNIVERSITY-AFFILIATED INNOVATION HUBS BUILDING?

When we asked university innovation hub leaders to describe their partnerships, a large majority (8 or more) cited existing partnerships with other colleges and universities, corporations, government agencies, internal departments within their own institutions, and funders. However, when asked about future partnership plans, hubs most frequently cited the first three of these categories: other colleges/universities, corporations, and government organizations.

COLLEGE/UNIVERSITY PARTNERSHIPS

Hub leaders frequently reported benefiting from academic partnerships, with 10 of 11 hubs saying they partner externally with other four-year universities and/or community and technical colleges.

Hub leaders pointed to government initiatives and programs as catalysts for inter-institutional academic collaborations. Such government initiatives provide frameworks around which research universities build partnerships founded on individual strengths for creating greater impact. One such example is the Center for Bioplastics and Biocomposites, which is an NSF Industry & University Cooperative Research Center (I/UCRC) headquartered at North Dakota State University. As the lead institution on the center, North Dakota State University partners with Iowa State University, the University of Georgia, and Washington State University to combine their respective research strengths — feedstock logistics, synthesis and compounding, natural fibers, composites, etc. — in concert with private-sector members to benefit the U.S. plastics industry. The NSF I-Corps program is another federal program that sparked partnership among regional universities in this region.

▶ "We saw opportunities for our business faculty to contribute to NSF I-Corps in terms of the scholarship of entrepreneurship, and we also saw potential and excitement in our engineering department. We're part of the Mountains and Plains University Innovation Alliance, which is a five-state consortium with Montana, Idaho, South Dakota, North Dakota, and Montana. So, I reached out to all the vice presidents of research at the 13 institutions in that alliance to see if any were interested in partnering on the I-Corps submission. We got almost all of our partners from that alliance group. And then the University of Nebraska at Omaha, which is not in that region, was also interested in partnering."

— Colleen Fitzgerald, North Dakota State University

Hub leaders at the University of Tennessee-Knoxville pointed to federal initiatives like the NSF Engines, EDA Tech Hubs, and Build Back Better as programs that have sparked greater synergy among research institutions in the state. Such initiatives created a framework for collaboration with the University of Memphis and Vanderbilt University as strategic R1 institutional partners that span the state east to west.

▶ "We've all been involved in NSF Engines, Build Back Better, and EDA Tech Hubs, and they've all really sparked economic interest in creating collaboration or consortia with collaborative groups. We've pulled together close to 200 partners across the state of Tennessee, and some beyond the state, including four-year institutions. It's really simple for a company to

come in and say they want to be associated with the density of four-year institutions across the state of Tennessee, but up until several years ago when we came together around the Build Back Better initiative, we were not very closely aligned. Build Back Better helped us look at it in a very different way. We understand that, if we're going to be successful at winning these large awards, we need to work closely with Vanderbilt and Memphis. Rising tides lifts all boats, so we're building those relationships."

— Marc Gibson, University of Tennessee-Knoxville

Partnerships among university-affiliated research parks and university units help to create physical space collaborations and fill gaps for complementary commercialization and startup services.

▶ "Our research park is collaborating more with the university, and that's a growing partnership. For instance, we finished a lab building at the end of 2023, and we were planning to leave it as a speculative lab building. But the university asked to take most of the rest of the building, which we weren't planning on, and it turned out well for everybody. We also work with the other direct entities of the university and our Wisconsin Alumni Research Foundation on things like corporate engagement, entrepreneurship, technology transfer, and IP."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

Partnerships between university innovation hubs and community colleges are critical for developing accessible education pathways that meet the immediate workforce needs of regional industries. These collaborations often focus on upskilling and providing stackable certifications in high-demand sectors, allowing students to transition smoothly into the workforce or further academic pursuits. Programs include creating bridge programs between two-year institutions and four-year universities, as well as offering short-term certifications in emerging fields like logistics, health care, and technology. Through

seed grants offered through its Build Back Better program, Carnegie Mellon University's Block Center worked with community organizations to help students and residents transition into fields like advanced manufacturing, robotics, and AI through upskilling programs. The center worked with a local community college to buy a robotic arm to take into high schools. This partnership gives high school students taking pre-community college courses the ability to work with a robotic arm in a classroom environment. The center has also worked with community colleges to build AI into their curriculum and training environments. UNC-Chapel Hill's innovation hub partners with nearby Durham Technical Community College, which offers a clinical trials research associate program and has opened an office within the hub to expand regional workforce development initiatives. The partnership develops a talent pipeline for Durham Tech clinical trials research students to work as interns in UNC-Chapel Hill labs and then fill critical jobs at the university and across the state after graduation. The University of Tennessee-Knoxville partners with community colleges across the state to create stackable credentials, bridging the gap between technical certifications and four-year degrees.

▶ "We're teaming with community colleges and looking at the skilled and technical colleges across the state of Tennessee and ways that we can help stack certificate programs, build them into the four-year model, and create more bridge programs. The goal is to think about the workforce of the future and what's going to be needed for our graduates to be marketable once they graduate."

— Marc Gibson, University of Tennessee-Knoxville

INDUSTRY/CORPORATE PARTNERSHIPS

A consistent theme among the hubs is that they all espouse the importance of — and tend to engage in — partnerships with major technology companies that offer expertise and resources in cutting-edge technologies like AI, data science, robotics, and cloud computing. What surfaces from these discussions is the understanding

that hubs use partnerships with technology firms to make a cross-cutting impact across industries due to the reality that mastering the use of the emerging technologies provided by these corporations will be essential to preparing a future-ready workforce and driving innovation across all industries — life sciences, engineering, transportation, health care, aerospace, finance, energy, and beyond. In this sense, tech company partnerships are a foothold into cross-industry impact. These partnerships with tech corporations are also focused on translating academic research into real-world applications in fields like data science and advanced manufacturing. Initiatives ranged from upskilling local workforces in digital technologies to creating innovation labs that test prototypes and develop emerging technologies.

Hubs described partnering with companies traditionally considered tech firms based on their work in software, hardware, and the digital world as well as firms centered in other industries that also deem themselves tech firms based on their broad and deep integration of technology across their operations. For instance, Tech Square in Atlanta collaborates with a wide array of corporate partners spanning multiple industries, with a strong emphasis on technology and innovation. These partners include tech giants like Microsoft, Google, and Cisco in addition to Honeywell Connected Enterprise that uses AI tools and hardware-software integration to address business and technology goals. There is also significant representation from transportation and logistics firms, with Delta Air Lines' innovation lab and Norfolk Southern's headquarters applying AI and a variety of technologies to support innovation and optimized operations. Financial technology companies like NCR and Visa also operate in the district. Additionally, Tech Square attracts emerging sectors such as semiconductor development, highlighted by the opening of Micron Technology's Atlanta Design Center, which serves as one of the company's key memory design and engineering locations.

Opportunities for experiential education and joint academic-corporate research also drive hub partnerships with industry. Over the past several years, hub leaders at the University of Tennessee-Knoxville have built a strong partnership with Volkswagen, which has established a corporate innovation hub in Knoxville as well as a North American electric vehicle assembly plant in Chattanooga, just an hour from campus. Joint research projects include developments in mobility; vehicle electrification; and lighter, stronger composite materials for car parts. Beyond research, the partnership involves workforce-based experiential learning, including a fellowship program that gives doctoral students at the university the chance to gain industry-specific experience working on projects onsite at Volkswagen while completing their degrees. One reason the partnership thrives is because the university plays the role of a connective hub that unites industry and government collaborators like Volkswagen and TVA to expand their collective impact.

▶ "When universities think about working with industry partners, you're the catalyst to bring them together and build the partnership. Our fellowship program and partnership are going to benefit the entire Tennessee Valley, and they're being sparked by a project at Volkswagen Innovation out of Wolfsburg, Germany, along with our university faculty and PhD and undergraduate students. We think about taking a holistic approach to partnerships, so we build and tether industry partners, tying them together and creating something larger scale."

— Marc Gibson, University of Tennessee-Knoxville

GOVERNMENT/NATIONAL LABORATORY PARTNERSHIPS

University hubs often partner with national labs and government agencies to support economic development, research, and public policy initiatives. These collaborations help align academic goals with broader national interests in technology, defense, and health. Beyond

leveraging government-backed grants, these collaborations drive entrepreneurship, regional workforce development, and technology innovation. For example, the Arrowhead Center at New Mexico State University sees aerospace as a regional strength built around relationships with national government labs, such as Sandia National Laboratories (SNL), and commercial partners located in New Mexico. The center has partnered with SNL to launch a program called Scale Up NM, which supports technology startups and commercialization programs. The Arrowhead Center is also a contracting site for the New Mexico Small Business Assistance program, which is administered by SNL and Los Alamos National Laboratory to assist for-profit small businesses in New Mexico with technical and business challenges.

The University of Tennessee-Knoxville has established a multi-pronged partnership among government agencies like Oak Ridge National Laboratory and Tennessee Valley Authority and corporate partners aimed at research, innovation, and workforce development. Hub leaders in Knoxville also discussed building cross-discipline curricular partnerships with government laboratories that advance the future of work, integrating the humanities with engineering.

▶ "We have a history of strong aerospace programs at the university — and based on our relationships with Sandia National Laboratories (SNL) in New Mexico, and with Spaceport America and Virgin Galactic now located here — we're seeing a lot of activity in the aerospace sector."
— Wayne Savage, New Mexico State University

▶ "We're getting humanities engaged in the future of work. For example, one of the most successful classes released a couple of years ago was a course on the history of lithium batteries, which was co-taught by an engineer, a staff scientist at Oak Ridge National Laboratory, and a professor who is the director of our humanities center. The engineers came out of that course with a different perspective on what the future of work looks like, and that there is room for the humanities — English, history, and music — in the future of work. We're trying to tailor these opportunities and illuminate to students that they still need to be able to carry on an intelligent conversation about Hemingway, so we're integrating learning experiences that capture those aspects of the future of work."
— Brad Day, University of Tennessee-Knoxville

Another partnership structure — university hubs working as organizing arms amidst other regional innovation hub partners — is taking shape in Pittsburgh. Carnegie Mellon University's Block Center works and partners with a network of three "quasi-innovation hubs" that have formed in the city, all with major government and corporate collaborators:

• **"Robotics Row,"** an area in the city's Lawrenceville neighborhood anchored around CMU's National Robotics Enterprise Center, which partners heavily with U.S. military agencies and other government and private sector organizations.

• **"AI Avenue,"** at Bakery Square (former Nabisco plant) is home to a growing number of AI companies and startups, which are attracted by corporate anchor Google (the third largest Google site in the U.S.) and a U.S. Army AI unit.

• **Hazelwood Green**, a former steel mill site that a group of foundations (Richard King Mellon Foundation, Heinz Endowments, and Worthington Benedum Foundation) are developing into an innovation hub that now features Mill 19, a revitalized 265,000-square-foot complex. Occupants include two CMU institutes: the Manufacturing Futures Institute and the Advanced Robotics for Manufacturing Institute, an innovation center funded by the U.S. Office of the Secretary of Defense to create the future of U.S. manufacturing using robotics and AI.

▶ "The Block Center is involved with all of these hubs, and what you're seeing are efforts by Carnegie Mellon, the University of Pittsburgh, and the foundations to knit these together in a network. We're not located in them, and we're not employees of them, but Carnegie Mellon is a major player, and the Block Center is involved through our leadership at the university trying to bring these things together."

— Steve Wray, Carnegie Mellon University

INTERNAL UNIVERSITY PARTNERSHIPS

Within universities, hubs frequently spark collaborations across different academic disciplines and among university departments, merging fields to create new educational and innovation opportunities. These internal partnerships are aimed at producing a workforce adept at navigating multiple emerging fields that blend disciplines. Programs focus on multidisciplinary innovation, such as combining AI with life sciences to develop health care solutions or blending engineering with the arts to solve complex societal problems. Such is the mission of the Design & Innovation Building at UC San Diego whose physical design — with floors dedicated to collaborative spaces like coworking areas, makerspaces, design labs — is premised on facilitating multidisciplinary projects, entrepreneurship, and creativity. In such cases, space design can spark the formation of cross-departmental partnerships among hub members.

K-12 EDUCATION PARTNERSHIPS

University innovation hubs — often in partnership with corporations and/or community colleges and other community organizations — work with K-12 educational systems to introduce students to STEM fields, entrepreneurship, and the future of work, creating a pipeline of talent for emerging industries. Hub leaders described forming partnerships to inspire early interest in innovation and provide foundational skills that prepare students for the demands of a rapidly evolving job market. Hub initiatives in this area include hands-on STEM workshops, coding boot camps, and collaboration with educators to create curricula that align with future workforce needs. These programs not only engage students but also provide professional development for teachers.

For example, Georgia Tech has a robust K-12 education program through its Center for Education Integrating Science, Mathematics, and Computing (CEISMC), which has partnered with several members of the corporate community in Midtown and Tech Square. CEISMC offers Science Technology, Engineering, Arts, and Math (STEAM) experiences in traditional classrooms and out-of-school environments. In addition, the university increasingly partners with corporations that want to create targeted educational and experiential programming for students in the region. For example, each year the CEISMC-run K-12 InVenture Prize brings together students, educators, community members, and industry leaders to identify real-world problems and design novel solutions through analysis, creativity, and the scientific method. Likewise, the Arrowhead Center at New Mexico State University has partnered with schools in the state to establish Innoventure, an extensive, statewide entrepreneurial outreach program for K-12 that introduces students to core human and professional skills needed for entrepreneurship, including communication, public speaking, teamwork, problem-solving, and financial literacy. The hub engages thousands of New Mexico elementary, middle, and high school students through classroom activities, team-based prototyping challenge competitions, and week-long entrepreneurship camps that immerse students in entrepreneurial experiences.

FUNDER AND REAL-ESTATE DEVELOPER PARTNERSHIPS

Funders and real-estate developers represent another set of partners that innovation hub leaders said are critical to achieving key future-of-work goals: expanding physical infrastructure, building tech- and entrepreneurship-focused programs, fostering innovation ecosystems, and aligning their efforts with broader economic development priorities. A common theme among the hubs is leveraging these partnerships to secure resources for building innovation districts, labs, and facilities that serve numerous stakeholders, including startups, researchers, and community members. The University of Illinois Research Park partnered with government funders — local, state, and federal — and a mix of others to drive strategic physical infrastructure projects focused on growth industries and new ventures.

▸ "It's hard to fund space for startup companies in a way that is a good outcome for private landlords and industry in terms of what the market would be able to bear on its own. So, we've pursued state and federal funding to try to build more incubator space because the market basically doesn't support it. We also built out a life sciences space where we were able to attract state and city funding as part of the capital mix, and then we matched that through the research park using ground-lease income and the landlord contributing funding, too. We look at how to put together various income streams to make a project that would not otherwise be financially viable, possible and attractive."

— Laura Appenzeller, University of Illinois Research Park

Other hubs described building relationships with a combination of philanthropic partners and government funders to support the development of physical hub spaces and programs. One example is the Tulane Innovation Institute, which received a lead donor gift to launch a new innovation lab as well as another leading donor gift to create innovation funds that will support a wide range of entrepreneurial programming

and staff support. The Arrowhead Center at New Mexico State University is another hub that described combining private donor support and partnering with government for funds. The center collaborates with an array of federal agency funders to support industry-focused incubators and initiatives, while also creating targeted programs that align with donor interests. Through such donor partnerships, hubs can grow and adapt based on how donors prefer to make an impact.

▸ "We have a couple of sustaining donors who made multiple million-dollar donations in a five-to-ten-year period, which gives you the ability to develop, build, and operate over time. Some donors come with specific areas of interest, such as focusing on opportunities for youth, or logistics and manufacturing, or cross-border operations. We've worked with the funders to make sure we can provide what they're interested in."

— Wayne Savage, New Mexico State University

Several hubs described strategic alignment with private developers to create purpose-built spaces for innovation. For instance, the University of Minnesota Foundation selected and hired a developer to transform a university-adjacent site into the Minnesota Innovation Exchange (MIX), a 3-million-square-foot innovation district that will integrate commercial, med-tech, housing, and hotel spaces to attract industry tenants and foster multidisciplinary collaboration. Through their partnership, the university foundation and private developer collaborate to determine the optimal blend of assets to locate in the hub's various buildings and spaces.

Clustering strategy. One strategy that university foundation and developer leaders of the MIX project have used is a clustering approach focused on an industry sector that stands as a core strength of the university and region. The University of Minnesota is a national leader in med-tech research and development, and the Minneapolis region has been selected as a U.S.

EDA med-tech hub. By co-locating university med-tech spinouts, the city's economic development team, and companies like Medtronic and Boston Scientific, the MIX can pull together major players and serve as the anchor of a robust med-tech cluster.

▸ "The initial phase of development at the MIX will focus on med-tech and life sciences, leveraging our core strengths rather than adopting a broad, unfocused approach. Instead of trying to accommodate all types of innovation, we are strategically creating an ecosystem that positions the MIX as a premier hub for the med-tech and life science domain. This targeted approach ensures long-term sustainability by attracting top talent, startups, and industry leaders who see it as the central nexus for advancements in selected industries."

— Amy Kircher, University of Minnesota

Wrap-around services strategy. A second strategic lens illustrated through the university foundation's partnership with the developer is a wrap-around services strategy. Centralizing the kinds of services that cater to startups and professionals in targeted industries helps startups grow and serves as an attractive offering that can help cultivate an ongoing pipeline of ventures for the hub.

▸ "A second key strategy is embedding essential services within the hub to support startups and life science companies. This includes access to R&D assets, venture capital, coaching and mentorship, incubators and accelerators, and regulatory expertise to navigate the patenting process. By integrating these critical resources at the heart of innovation, we create a dynamic, self-sustaining ecosystem that remains vibrant and adaptable. The goal is to foster growth, enabling companies to scale and transition into their next phase, while continuously infusing the hub with new ventures and fresh ideas."

— Amy Kircher, University of Minnesota

NONPROFIT AND COMMUNITY PARTNERSHIPS

Multiple hubs mentioned partnering with nonprofit and other community-focused organizations in their regions to advance future-of-work initiatives. Leaders described such partnerships as involving hub-facilitated grants, physical spaces, and expertise. For instance, through its Build Back Better grants program, Carnegie Mellon University's Block Center collaborates with community organizations in Pittsburgh to help residents transition to advanced manufacturing and robotics careers. University Research Park at the University of Wisconsin-Madison has also built community-driven partnerships that involve future-of-work initiatives, namely the support of coworking entities, which often struggle with making shared work and lab space available at the prices that are affordable for resource-strapped startups. The research park also partners with a variety of nonprofit and professional associations to jointly drive economic impact opportunities in the region.

▸ "We're granting about $2 million over three years to a combination of research and curriculum development projects … as well as applied upskilling efforts from community organizations. For example, we funded the Pittsburgh Technology Council, which is a nonprofit, to develop a pre-apprenticeship program for robotics, so they're preparing people to go into apprenticeship programs for robotics jobs."

— Steve Wray, Carnegie Mellon University

▸ "We have a very close partnership with a coworking laboratory that is located in one of our buildings. We donate lab space to them and serve on their board, so that's a close nonprofit partnership. We also work a lot with our chamber of commerce, biohealth trade association, our statewide technology association, and our regional economic development group to promote the community together."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

FUTURE PLANS

WHAT WE DISCOVERED

A future focus on the future of work

A strong majority (nine of 11) of university innovation hub leaders plan to increase their focus on the future of work in the next year. This aligns with their perception that universities are key stakeholders in shaping the future workforce, second only to corporations.

University-operated hubs more likely to prioritize the future of work

Innovation hubs directly operated by universities indicated that they are more likely to prioritize future-of-work initiatives compared to hubs affiliated with, but not run by, universities. The latter group tends to focus more on providing physical spaces for innovation rather than actively leading workforce-readiness development programs. Although all hubs interviewed are engaged in future-of-work activities, this outlook suggests that governance structures and mission influence the degree of focus hubs pay to the future of work.

Key areas of influence on the future of work

Hub leaders identified six major areas they can influence: (1) talent development and upskilling/reskilling, (2) technological impact, (3) physical vs. virtual workspaces, (4) industry access and experiential learning, (5) entrepreneurship and commercialization infrastructure, and (6) energy and pandemic preparedness. These categories closely align with how hubs said they define the future of work, reinforcing that hubs are acting on their foundational priorities.

Collaboration as a scaling mechanism

Despite challenges such as time constraints, funding, and lack of clarity on partnership opportunities, innovation hubs recognize shared interests in collaborating on future-of-work initiatives. Cross-hub partnerships could amplify impact.
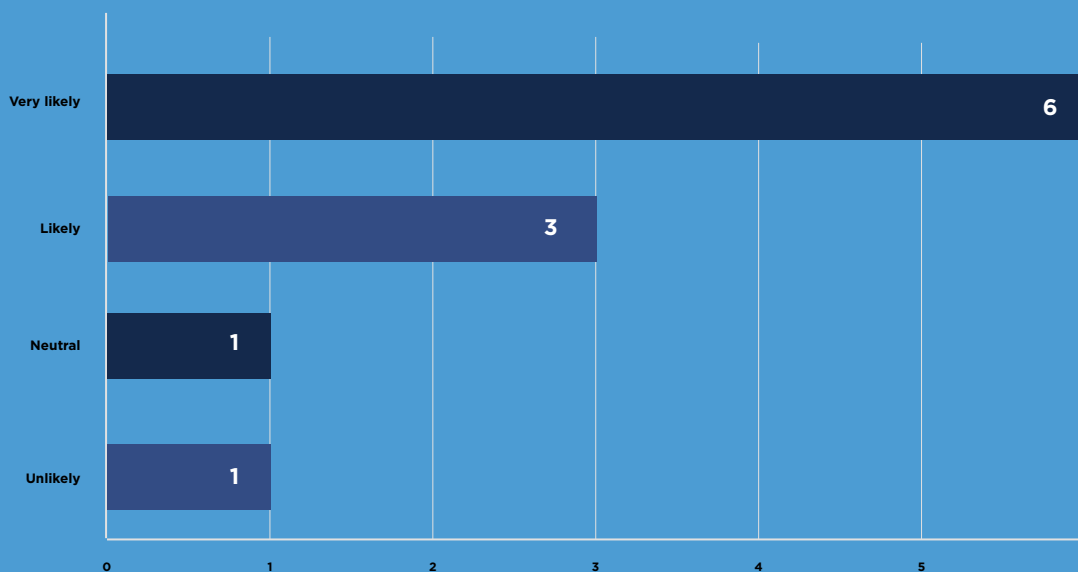
Figure 8: How Likely Is Your Hub to Increase Its Focus on the Future of Work in the Next 12 Months?

Response	Count
Very likely	6
Likely	3
Neutral	1
Unlikely	1

HOW LIKELY ARE HUBS TO INCREASE THEIR FOCUS ON THE FUTURE OF WORK?

The majority of hubs interviewed—nine of 11 hub leaders—said they were either likely or very likely to increase their focus on the future of work in the next 12 months.

These results are significant in light of the polling results of hubs at the innovation summit in May 2024 (Innovation Summit section of this report). When we polled innovation hub leaders at the event and asked them who holds the greatest responsibility for advancing the future of work, colleges/universities was the second most frequently mentioned stakeholder (named by 38% of attendees), second only to corporations (43%). The fact that nine of 11 hubs said they are likely to increase their efforts related to the future of work is perhaps reflective of this reality: that university hub leaders view their organizations as integral to shaping the future of work. Within our in-depth interviews, all ten university hub leaders also said they plan to partner with corporations in the future, perhaps an indicator that university hubs view the success of their future-of-work initiatives as being tightly intertwined with the organizations our summit polling results said held the greatest responsibility for the future of work: corporations. In this sense, it appears that university hubs and private industry believe there is value in partnering on future-of-work projects, at least in the near term.

A closer look at the details of these responses shows a greater propensity among hubs directly operated by universities to say they plan to increase their focus on the future of work. In contrast, hubs not directly operated by universities said they were less likely to focus on the future of work. Reponses from leaders of hubs that are affiliated with — but not fully operated by — universities, indicate that they view their roles as being more squarely focused on providing real estate and physical spaces for innovation, not programs targeting specific initiatives like the future of work. While they view activities related to the future of work — such as internships, skill building, workforce development, and mentorship — as valuable initiatives that may occur in their hubs, some leaders of these hubs noted that they are a step removed from leading such activities and that tenants of the hub will determine whether or not to focus on the future of work.

Hub-to-hub collaborations may also amplify and influence the efforts innovation hubs pay toward future-of-work initiatives. In our snap polling of innovation summit attendees in Chapel Hill (May 2024), only 9% of innovation hub leaders indicated a "lack of shared interests" as the primary hurdle to collaborating with other innovation hubs on the future of work. Other factors — a lack of time, funding, and clarity on who to collaborate with and the prospective impact — were the predominant challenges. This indicates that hub leaders may see common interests and value in collaborating with others on future-of-work issues, if they can overcome other restraining factors. As a result, there may be value in low-cost, time-efficient convenings or structured intersections among hub leaders that help them identify who they can work with on future-of-work activities and the potential impact.

▶ "University innovation hubs are relatively new, and we're all growing up together and learning how to serve our constituents. That means we have a lot to learn from one another. What best practices are working? What unexpected things are happening at one hub that another hub might avoid? Which funding models work? How are we approaching the future of work? A lot of hubs are anchors to larger innovation districts that influence the economic impact of their regions, so there is a real need for hubs to learn from others how to serve as economic anchors that help bring in other innovation companies and build out their districts. How our districts are created, what they consist of, and how they create impact are things we're all stepping into at the same time, so sharing and building on one another's experiences helps us all work better."

— Sheryl Waddell, UNC-Chapel Hill

Minnesota Innovation Exchange (MIX) has a phased, mixed-use concept plan through three phases, each taking approximately five years (themixmn.com). Photo credit: University of Minnesota Foundation Real Estate Advisors.

WHAT IS THE MOST IMPORTANT ASPECT OF THE FUTURE OF WORK THAT HUBS CAN ADDRESS?

We asked hub leaders: "What is the single most important aspect of the future of work that your organization could help address in the future?" In response, leaders described six areas — outlined below — that they see as the most significant issues or priorities related to the future of work that their hubs can influence.

1. TALENT DEVELOPMENT AND UPSKILLING/ RESKILLING

Prioritizing talent development over technology as an enduring approach to creating resilient ecosystems, including an emphasis on continuous education, upskilling, and reskilling as critical avenues for meeting the evolving demands of the workforce.

▶ "Everything is based on talent. If I had to choose between talent and technology, I would choose talent every time. With talent, you're building an entire sector that will continue to develop stuff on their own. If you focus on technologies one at a time, sure it has impact, but once it's done, it's done. The sustainable way to build an ecosystem is through talent."

— Paul Roben, UC San Diego

▶ "All investments and economic growth are driven by talent. As new technologies emerge and evolve, new demands are created in the workplace that require updated skill sets. So continuous talent development, informed by industry trends and needs, is essential for fostering a thriving ecosystem."

— Greg King, Georgia Tech

2. TECHNOLOGICAL IMPACT

Emphasizing the need to understand how technology transforms the workplace and ensuring both employees and employers can succeed during this shift.

▶ "The digital transformation that is occurring in every single industry ... this is important and something that we have found ourselves historically continuing to pivot around: what are the trends? And as every company becomes more driven by AI, computing, and data, we have an opportunity to impact many industries by building up those skill sets, while also realizing the economic impacts may not be all positive."

— Laura Appenzeller, University of Illinois Research Park

▶ "Technology allows us to work smarter, faster — and to create new things altogether. It's changing how we innovate, think, and do our jobs. Innovation hubs don't have to be the ones developing new technologies, but it is our job to help people understand and collaborate around these new platforms and tools. We can play a more significant role in exposing people to technologies, learning how to use them to become more personally and professionally resilient, and then applying them in ways to accomplish new things that they perhaps never imagined."

— Sheryl Waddell, UNC-Chapel Hill

▶ "The most important thing will be broadening the understanding of how technology will change the workplace and what that means for both employers and employees. And — going along with that, then — is helping to develop the programs that allow both to succeed."

— Steve Wray, Carnegie Mellon University

3. PHYSICAL VS. VIRTUAL WORKSPACES

Balancing technological advancements with the need for physical interaction and collaboration in innovation hubs.

▶ "We're trying to create a physical environment for work, and we're trying to make it as sticky and interactive as possible. So, to the extent that people want to move their work into the cloud and online, we're resisting that. But, in part, we're resisting that because we think lab work isn't likely to be displaced as quickly or as readily. There are questions about whether AI and computing power will displace lab work because you'll be able to simulate things with chips without having to actually work in a science lab. Or perhaps these technologies will increase the demand for physical space, because there will be so many more possibilities you can look at that you'll want more and more lab space to actually access all of the frontiers of science that are now available to you."

— Aaron Olver, University Research Park (University of Wisconsin-Madison)

4. INDUSTRY ACCESS AND EXPERIENTIAL LEARNING

Increasing student exposure to industry and promoting experiential learning and stackable education programs to prepare them for dynamic work environments.

▶ "The MIX is going to allow students access to industry and innovation near campus without having to drive to company headquarter locations twenty miles away. This is going to let them experience the discovery-to-product process and a different part of the innovation timeline."

— Amy Kircher, University of Minnesota

5. ENTREPRENEURSHIP AND COMMERCIALIZATION INFRASTRUCTURE

Fostering entrepreneurial ecosystems by creating infrastructure and spaces for startups to develop new technologies and services.

▶ "If we could strengthen the infrastructure for commercialization and entrepreneurship within the university and across the region, that would be a game changer. We have a lot of people being incredibly successful on their own — so we've clearly got the drive and human capital to do it. So, imagine if we were able to provide better infrastructure and resources to make it an easier journey."

— Colleen Fitzgerald, North Dakota State University

▶ "From the future-of-work standpoint, everything we do is focused on creating an environment and ecosystem for entrepreneurs who can be successful to either develop new technologies or new services of the future. Southern New Mexico has not had much of a manufacturing capability, so we're trying to create spaces where technologies can be developed and fully rationalized and implemented — and we believe that then there's opportunity for them to set up shop, have a home, and begin employing people."

— Wayne Savage, New Mexico State University

6. ENERGY AND PANDEMIC PREPAREDNESS

Developing technologies and a workforce prepared to address global challenges, particularly decarbonization and infectious disease control.

▶ "Our innovation thrusts are going to be in energy transition and being able to fight the next pandemic. We really want to inform our decisions about the way our labs and spaces will be built based on how we can support our region's citizens and what we have expertise in at Tulane. Both are so important for the future."

— Kimberly Gramm, Tulane University

WHAT'S NEXT?

During and after the Signature Innovation Summit in Chapel Hill, where innovation hub leaders came together to discuss and learn from one another about how hubs are involved in the future of work, we heard a common theme from hub leaders who participated: let's keep talking and working together.

The next questions was, "How?" This report is a next step in continuing the collaboration and sharing of insights that hub leaders sparked during the summit.

By their nature, innovation hubs are conveners of others, helping people and organizations on their campuses and in their communities create impact in ways they may be unlikely to achieve on their own. In a similar manner, hubs also have an opportunity to convene themselves. By coalescing around best practices for the future of work, sharing knowledge, aligning strategies, and co-developing new approaches, hubs can work smarter and faster together. Collaboration enables hubs to scale their impact beyond individual campuses and cities — helping one another navigate rapid workforce transformations

while ensuring that regional and national economies remain competitive. There are many potential avenues for collaboration, ranging from informal to formal: identifying hubs that have similar industry or technology clusters in their regions; reaching out to talk with hub leaders or visit their hub, campus, and city; connecting one-on-one or in small groups with other hub leaders during industry events; forming small inter-hub working groups to exchange insights, best practices, and emerging trends related to the future of work; forming wider collaborative networks that meet virtually or in person; and jointly applying for funding and/or co-developing programs that build on respective hub strengths and experiences. Stemming from this report, here are a few best practice areas that hub leaders could consider for collaborations:

CROSS-HUB SKILLS TRAINING AND CERTIFICATION PROGRAMS

Develop joint workforce training initiatives in high-demand areas like AI, cybersecurity, and digital manufacturing.

COORDINATED INDUSTRY ENGAGEMENT

Jointly engage industry leaders to develop a more well-rounded and shared understanding of evolving workforce needs, ensuring that training programs and research efforts remain relevant and responsive.

REPLICATE SUCCESS WITH MODULAR PROGRAMS

Identify and share replicable elements of a hub's most successful future-of-work programs, such as boot camps or technology incubators, and consider creating modular versions that can be adapted to other regions or industries.

INTER-HUB ENTREPRENEURSHIP NETWORKS

Create shared incubators, mentor networks, or accelerator programs that allow startups and entrepreneurs to access support, funding, and expertise across multiple hubs.

SHARE BEST PRACTICES ON DATA AND IMPACT

Share with other hubs the types of metrics you track related to the future of work to create a more common approach for assessing impact. This is particularly useful for less common measures that involve qualitative or long-term indicators that are not already widely established commercialization or entrepreneurship benchmarks.

COLLECTIVE GRANT AND FUNDING PROPOSALS

Pursue joint funding opportunities from federal, state, and private sources to increase access to resources.

Thank you for reading this report and for your commitment to shaping the future of work, which is one of many issues innovation hubs can work together to advance. Your leadership and dedication in finding innovative ways to activate technology, talent, workspaces, and partnerships contribute to meaningful human and economic impact across industries and communities.

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