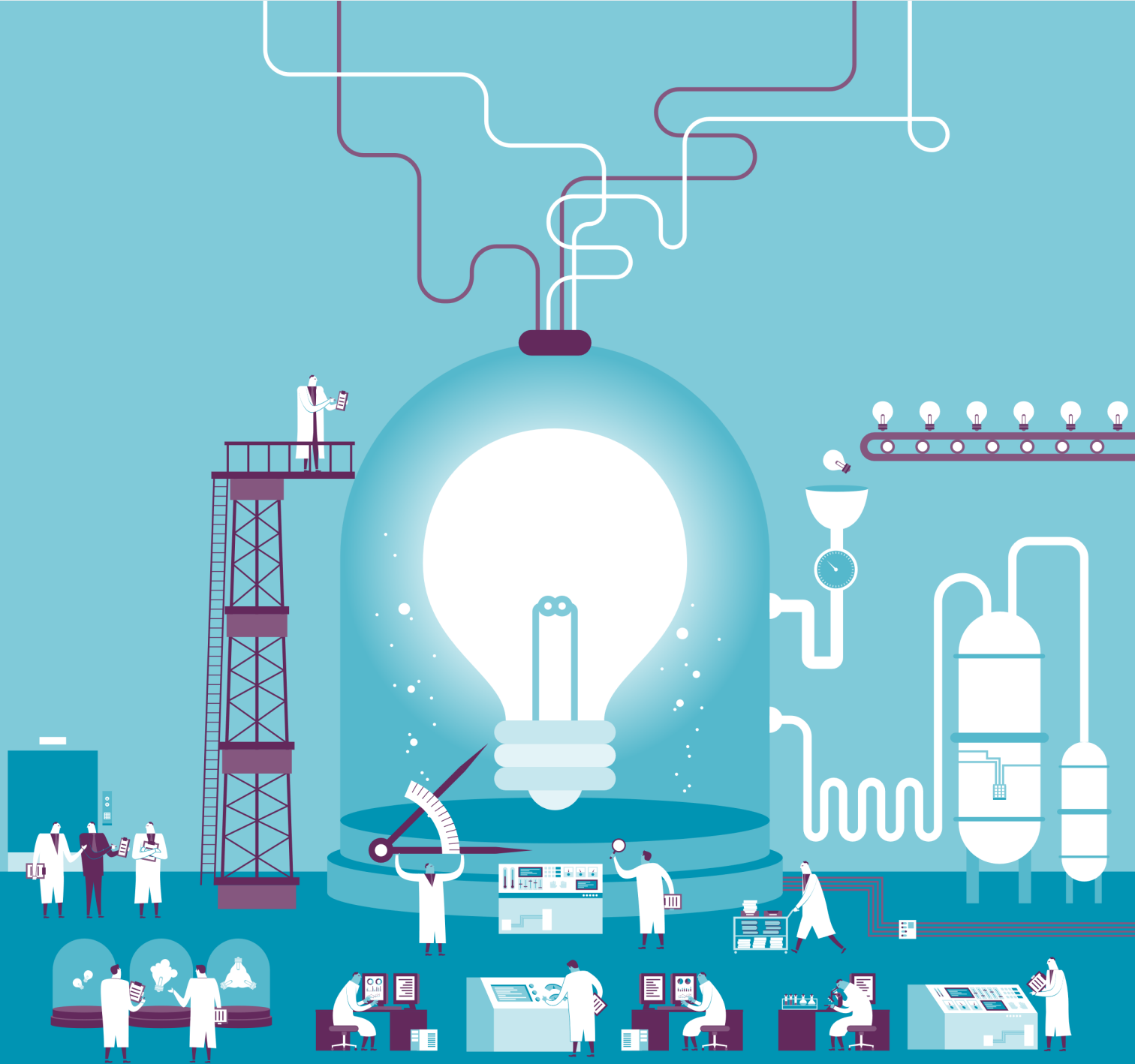


# Tulsa's Tech Niche

## Summary of Findings

June 10, 2020



Dear Reader:

Tulsa Innovation Labs was founded to bring strategic focus to Tulsa's economic development activities. We are taking a data-driven approach to establishing Tulsa's tech niche, and that begins with a clear understanding of industry trends, local assets, and opportunities for Tulsa.

This report synthesizes ten weeks of rigorous analysis of six major industries and over 100 stakeholder conversations about the future of Tulsa's economy. Our work has taken on new seriousness because of the ongoing pandemic. Tulsa Innovation Labs is working to prepare Tulsa for the jobs of the future at a time of great economic uncertainty, and this report is a key milestone in this long-term endeavor.

The primary goal of the study was to identify opportunities that show great potential for Tulsa, and I'm excited to share the results with you. The data has surfaced five specific and bold opportunities that can establish Tulsa as a tech hub and leader in the future of work. Our report outlines what Tulsa's comparative advantage could be if we work together on a suite of new programs that catalyze growth in a handful of targeted areas.

Building an inclusive tech community requires broad-based support, and we are looking forward to working with you as we refine our ideas and transform our insights into actions. We hope that you will join us in our effort to develop programs that meet local business needs, expand access to good-paying jobs, and position Tulsa for a successful future.

Thank you for your support and collaboration.

Sincerely,



**Nicholas J. Lalla**

Co-Founder & Managing Director

Tulsa Innovation Labs

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## **Context**

Industry Analyses

Top Opportunities

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Recognizing that the jobs of the future are rooted in a thriving innovation economy, **Tulsa Innovation Labs LLC (TIL)** was founded to develop a city-wide strategy that positions Tulsa as a tech hub and leader in the future of work.

Through a diverse coalition of public and private partners, led by **George Kaiser Family Foundation (GKFF)**, TIL is creating economic development programs that seek to make Tulsa the nation's most inclusive tech community.



# Guiding Principles

TIL IS SHAPED BY A CORE SET OF VALUES

## 1 Follow the Data

TIL was founded to bring strategic focus to Tulsa's economic development activities with a data-driven approach. We're working to identify specific tech clusters with high-growth opportunities.

## 2 Align with Industry

Big things require a shared vision and collective action. We involve industry leaders in each phase of our work to ensure that programs meet business needs and match entrepreneurs, students, and jobseekers with opportunities to succeed.

## 3 Target Investments

To position Tulsa as a tech hub and leader in the future of work, TIL will deploy capital through high-impact economic development programs, targeted at specific industries.

## 4 Grow Organically

To create long-term and sustainable opportunities for Tulsans, TIL focuses on growing from the inside out by building local capacity and developing local talent.

## 5 Create Economic Mobility

We make the business case for inclusivity and diversity in our tech community. TIL's programs build bridges to all of Tulsa's neighborhoods, opening up new sources of talent and innovation that will benefit the entire ecosystem.



# Vision for Tulsa

TIL IS WORKING TO POSITION TULSA AS A LEADER IN THE INNOVATION ECONOMY



Build and nurture a community that fosters entrepreneurship and inspires Tulsans to dream big



Forge collaborations between startups and established companies to leverage innovation to fuel their future



Develop cutting-edge technology in world-class research institutions that defines the next horizon of global innovation



Offer education and talent training programs that provide Tulsans the skills and experiences needed to thrive in the economy of the future



Create inclusive, good-paying jobs that offer opportunities for a wide range of community members



Connect Tulsa's innovation ecosystem to tech hubs around the world through an exchange of people, services, capital, and ideas



# Innovation Flywheel

SUCCESSFUL ECOSYSTEMS REQUIRE COORDINATED ACTIVITIES ACROSS THE FLYWHEEL

## Creating an Innovation Pipeline

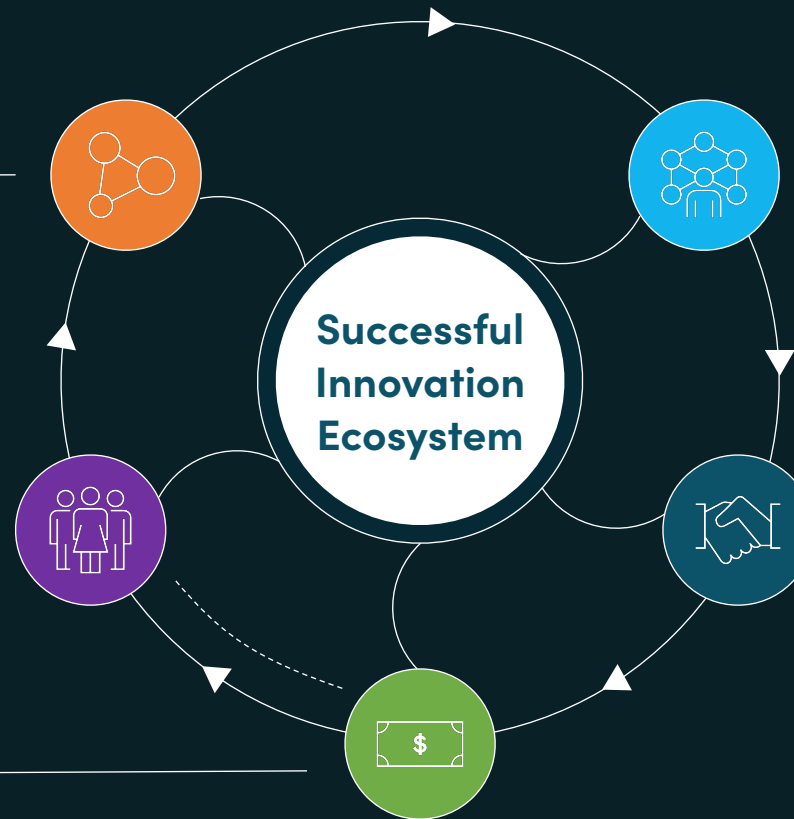
*Portfolio of research across multiple verticals, coming from universities, public sector, and private sector, allowing the ecosystem to constantly evolve*

## Building a Community

*Connected network of people working on solving problems, with access to mentorship, cross-functional meetups, and shared physical spaces*

## Attracting Capital and Funding Companies

*Portfolio of public, private, local, and national sources of capital available for research and startups*



## Developing and Attracting Workforce

*A strong pipeline of talent designed in coordination with educational institutions and employers to support the skills needed by the companies comprising the local economy*

## Engaging and Attracting Employers

*A mix of employers across industries providing a variety of jobs, acting as customers and investors for new technologies, and co-developing workforce development programs*

TIL will drive industry initiatives across the flywheel, in close collaboration with partners from across sectors

# Industry Analyses

## LAUNCHED EFFORT TO DETERMINE TULSA'S TECH NICHE

- 1 Evaluated industries to identify the highest growth and most contestable areas for Tulsa
- 2 Benchmarked assets and connected with stakeholders to determine where Tulsa has competitive assets and where stakeholders are excited to invest
- 3 Prioritized opportunities that would create inclusive, high-paying jobs in both the near-term and long-term
- 4 Built preliminary action plans with immediate next steps and execution timeline



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Context

**Industry Analyses**

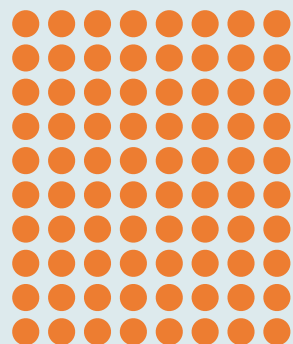
Top Opportunities

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# Methodology

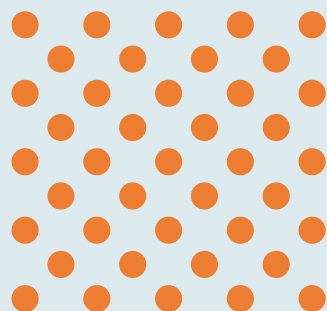
IDENTIFIED 5 FOCUS AREAS BASED ON INDUSTRY ANALYSES AND PRIORITIZATION OF OPPORTUNITIES

**Broad List of Industries**



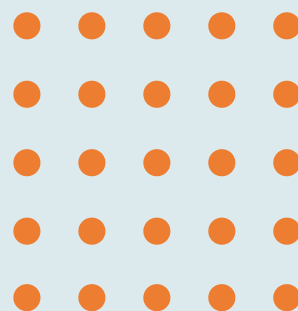
**1 High-level scan of industries**, looking at growth, innovation, contestability, and fit with Tulsa

**6 Deep Dive Sectors**



**2 Opportunity assessment** of 100+ opportunities in six sectors, analyzing macro trends, investment data, and Tulsa assets

**25 Sub-Sector Opportunity Areas**



**3 Prioritization** based on impact, feasibility, and inclusivity of each opportunity area

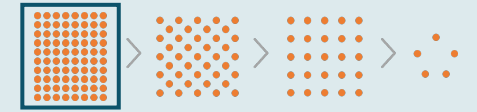
**5 Focus Areas for TIL**



**Informed by Various Sources**

- Market growth and projections data
- Venture funding flows for each sector
- Automation risk and growth projections for jobs in each sector
- Input from industry experts around the world
- Interviews with key business, government, and educational leaders in Tulsa

# 1 High-Level Scan



## SELECTED 6 AREAS FOR INNOVATION

### Evaluation Vector

### Key Insights

#### Sector Growth

- From a job growth perspective, healthcare and education top the list with projected growth of 15–20% and 10–15% over 10 years, respectively; energy and aviation are also attractive at ~7–12% growth over 10 years.
- Cyber and agriculture have the highest projected GDP growth, with 10-year growth rates of 30–35%.

#### Future of Work

- Jobs in cyber and healthcare are significantly more resilient to automation than jobs in other sectors (e.g., energy, agriculture, and transport).
- Tulsa is projected to see slightly below national average job growth through 2030, partly driven by automation in its core industries (e.g., energy).
- Jobs in STEM-based industries are more resilient to automation; Tulsa has a low share of STEM degree holders compared to peer cities – it will need to produce and retain higher levels of STEM talent (e.g., data scientists) to capture future growth.

#### Contestability

- Ag tech, energy tech, and healthcare are highly contestable areas with low industry consolidation / geographic concentration, indicating that Tulsa has a chance to compete.
- Both agriculture and healthcare have low levels of digitization, indicating room for further disruption.

#### Tulsa Fit

- Tulsa's economy is highly specialized in the energy sector, with particular specialization in mid-stream oil & gas and HVAC.
- Tulsa also has some specialization in a few other sub-industries, such as support for air transport, psychiatric medicine, and flight training.



Ag Tech



Aviation



Cyber



Ed Tech



Energy Tech



Health Innovation

# 2 Ag Tech Insights

## Insights on Ag Tech Sector

Ag tech is a **rapidly growing area**:

- Global ag tech funding is growing at 21% p.a. with new opportunities to apply technology in drones, smart farm equipment, biotech, animal health, and more.
- The global market size of smart agriculture is expected to grow from approximately \$9.58 B in 2017 to **\$23.14 B by 2022**.
- **Fastest-growing segments** include data analytics, drones, and plant-based meats (all with investment CAGRs over 20%)

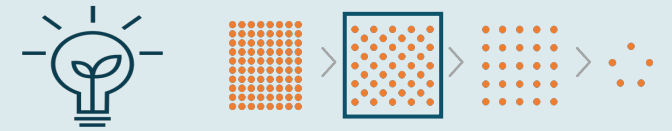
As **global consumption rises** (70% expected growth from 2000–2050), investments in new technology and in **sustainability initiatives** will be required to feed the world:

- Yield improvements, land expansion, loss reduction, and technology could help expand **supply of arable land**.
- Climate change will further constrain supply – adopting sustainable ag practices could mitigate the impact and also create a **\$510–900 B opportunity** by 2030.

**Significant consolidation** in the ag industry, especially among inputs players (top 5 players have 80% of market share), can make it difficult for smaller players to enter.

However, there is **limited geographic concentration** – with 72% of the companies located outside of tech hubs – potentially giving Tulsa an opportunity to compete in certain areas (e.g., data analytics, animal health, plant biotech).

In Tulsa, agriculture and ag tech are not major industries, but nearby **OSU** has a **large ag research / degree program** that can be leveraged to build an ag cluster in Tulsa.



## Top Opportunity Areas

- ▶ Establish Tulsa as a hub for drone testing and operations in ag

- ▶ Data analytics to support innovation in agriculture

- ▶ Build a plant-based materials and foods (e.g., plastics, meat, industrial hemp) ecosystem in Tulsa

- ▶ Leverage research in plant biotech (e.g., wheat, turf) at OSU to bring seed innovation jobs to Tulsa

## Key Facts for Each Opportunity

- Venture capital activity in ag drone companies has been growing steadily at 27% YoY.
- 93% of ag drone companies are located outside tech hubs, indicating potential contestability.
- There are a number of organizations in Tulsa, like Skyway36, already making investments in this area.
- Startup funding in analytics companies has been growing significantly at 53% YoY.
- 57% of ag analytics companies are outside tech hubs, indicating potential contestability.
- There are few ag analytics degree programs in the US – a program in Tulsa would be cutting-edge.
- Growth capital in plant-based meat companies has been growing steadily at 22% YoY.
- Emerging research interest at OSU in plant-based plastics and industrial hemp.
- There aren't yet any dominant "hubs" in the US focused on plant-based industrial materials/plastics.
- OSU's ag program already conducts research and licensing tech in seed biotech (esp. wheat and turf).
- Inputs players are large companies – attracting a player could quickly create a large number of jobs.

# 2 Aviation Insights

## Insights on Aviation Sector

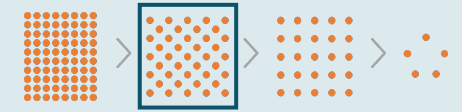
Within the **aviation and aerospace industry**, commercial aviation and aircraft and parts manufacturing stand out as the **largest employers** with 450K and 240K employees in the US, respectively.

- In commercial aviation, US revenue passenger miles is expected to grow at a **~2% CAGR** over the next 20 years, with the global commercial fleet growing with demand at **3.6% from 2019-29**.
- MRO (maintenance, repair, overhaul) revenues have been reaching records with highs of \$458 B in 2018 and **continued growth expected** into the future.

4 main themes shape the aviation tech sector:

- **Future of mobility** – There is a **fast growing** (12% YoY) **drone market** expected to reach market size of **\$23 B by 2024**. Increasing commercial applications (e.g., surveillance, delivery, photography) imply plays in **testing** and **infrastructure**.
- **Sustainability** – Stricter environmental regulations are catalyzing demand for innovation in **new materials and alternative energy sources**.
- **Digital and Analytics** – There are opportunities for digital transformation throughout the aviation / aerospace industries, but aerospace is **investing in digital manufacturing operations 5x less** than automotive, indicating **room to innovate**.
- **Workforce** – There is a significant **shortage of air traffic controllers** and a projected **shortage of pilots** in the near future, indicating a need to scale training. In the future, **77%** of maintenance and **60%** of production activities in aerospace & defense could be **automated**, paving the way for **opportunities in skilling/re-skilling**.

**Tulsa** has a **variety of assets in aerospace** that can be leveraged to spur economic development (e.g., American Airlines maintenance base, Spirit Aerosystems, Bizjet, Nordam, Flight Safety International, Tulsa Tech, Skyway36, a variety of drone startups).



## Top Opportunity Areas



Scale volume of and spur innovation (e.g., digital, new materials) within Tulsa's maintenance, repair, overhaul (MRO) ecosystem



Establish Tulsa as a hub in drone testing and operations in energy and ag



Develop best-in-class Air Traffic Control (ATC) and pilot training capabilities for both manned and unmanned aircrafts



Develop Tulsa's drone production capabilities for fit-for-purpose applications in energy and ag



## Key Facts for Each Opportunity

- Investment capital in maintenance/repair/overhaul (MRO) has been growing at **~35% YoY**.
- MRO is largely contestable with **64%** of the companies in the space located outside tech hubs.
- Tulsa's existing assets (American Airlines MRO base, Spirit Aerosystems, etc.) and capabilities can be leveraged to build a new digital MRO center of excellence in Tulsa.
- The Unmanned Aerial Vehicles (UAVs) market is expected to grow at a **17% CAGR**, dramatically increasing the need for testing & operations services.
- Tulsa has unique assets in both drone testing/ operations (e.g., Skyway36) and energy/ag (e.g., Williams, OSU) that make this a very attractive play.
- Energy and ag applications of drones are both growing quickly (**>25% YoY**).
- There is a shortage of **2K Air Traffic Controllers (ATCs)** and an expected shortage of **~4.5K pilots** by 2026.
- **82%** of companies related to flight training are located outside tech hubs, indicating potential contestability.
- Tulsa's existing assets (e.g., Spartan, TCC, and Flight Safety International) can be leveraged for training.
- **71%** of companies related to aircraft manufacturing are located outside tech hubs, indicating potential contestability.
- Tulsa has a high LQ of **9.98** for aircraft manufacturing (incl. maintenance), indicating natural fit and right to play in drone production.

# 2 Cyber Insights

## Insights on Cyber Sector

The cyber market is **growing rapidly at ~10% p.a.**, with 2 sub-segments - **managed security service providers (MSSPs) and operational technology (OT) security** - growing fastest at >12% p.a.

There is **a large talent gap across the country**, with a high number of job openings in almost every state (more than **500k job openings across the US with nearly 800 just in Tulsa**) - supply cannot be easily acquired or will be **costly to attract to Tulsa**.

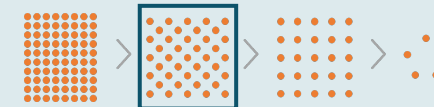
Although there are many mature cyber companies, they are largely cross-industry, software-focused companies. There is still heavy innovation and growth happening in **niche, industry-aligned areas**, such as **OT for energy**.

Industries differ on cyber maturity with **industrials/energy lagging behind financial services/banking** - cyber for energy and other industrial sectors (e.g., manufacturing, aerospace) could be contestable areas.

**Healthcare is spending less on cyber** than other industries; however, compliance and regulations will **require greater spending** over time - this poses an opportunity for **potential cyber plays related to Regulatory Tech**.

**Federal research and spending** in cyber is an important piece for Tulsa to concentrate on capturing, especially given that **23% of the cyber-related spend** in the US in 2019 was driven by the federal government.

Multiple Tulsa executives identified **cybersecurity as a top priority** and shared that finding talent in the field was incredibly difficult - indicating an opportunity for Tulsa to fill these needs and grow capabilities in cyber, **leading to many high-paying jobs**.



## Top Opportunity Areas

- ▶ Operational technology (OT) security for energy
- ▶ Managed security service providers (MSSPs)
- ▶ Cyber education
- ▶ Research facility, possibly federally funded research and development center (FFRDC)
- ▶ Healthcare and aviation security
- ▶ Security and vulnerability management

## Key Facts for Each Opportunity

- OT security contestable with no dominant players (top 3 players representing <10% share)
- Tulsa has a distinct right to play, given the large number of energy companies citing cyber as a priority.
- MSSPs contestable with top 3 players representing only ~20% share of market
- Tulsa's low cost of living offers an opportunity for companies looking to near-shore cyber operations.
- High number of open cyber jobs in Tulsa and large discrepancy between job postings vs. applicants skills, education level, and years of experience
- Employer-led workforce development could fill gaps
- Existing cyber research at TU can be expanded and scaled through large research grants and can be leveraged to attract additional researchers.
- FFRDCs could bring contracts of up to \$100+ M / year and could spark significant economic development
- Both aviation and healthcare are at significant risk of cyber attacks and require specialized cyber support for both IT and OT (e.g., security for medical devices).
- Tulsa has multiple assets in both healthcare (e.g., tribal clinics, St. Francis, OSU, OU) and in aviation (e.g., AA, Spirit, Nordam) who would be natural customers and partners.
- Significant funding flows directed towards vulnerability management - 38% CAGR 2014-2019
- High median transaction value of \$5.1 M per deal

# 2 Ed Tech Insights

## Insights on Ed Tech Sector

Education is a **large (\$6 trillion) and fast-growing industry (~5% annually)**. Costs have increased significantly over the past two decades, signaling inefficiencies in the market (52%, more than any other category).

There are **3 primary challenges** facing the education sector:

- Rising costs leading to **declining ROI in education**
- **Limited preparation for the workforce**; skills not meeting employer needs
- Increasing pace of **shifts in skills mix** / need for regular **refresh of skills**

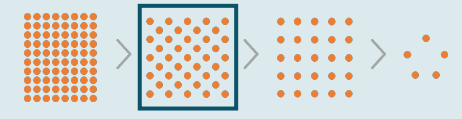
**Technology and other innovations** can address these challenges:

- **New delivery platforms and methods** (e.g., digital, VR/AR, interactive learning) and curricula on skills for the future economy (e.g., technical, socioemotional)
- Increasing **involvement of employers** with educational institutions (e.g., proliferation of public-private partnership models)
- Supports to **enable administrative productivity** and allow teachers to focus on teaching mission (e.g., learning management systems, AI grading tools)

Areas growing quickly in ed tech include **e-learning, social networks, and interactive & adaptive learning** (all with investment CAGRS above 15%). But ed tech is less contestable than other sectors, with only 42% of companies outside tech hubs.

Oklahoma has **significant challenges in education** (e.g., ranked 43<sup>rd</sup> / 50 states in K-12 education and ranked 44<sup>th</sup> in educational attainment).

Tulsa has specialization in niche areas, like **flight training, technical / trade schools, and apprenticeship training** – Tulsa can leverage these to **position Tulsa as a leader in the “Future of Work” and to prepare Tulsans for new economy jobs.**



## Top Opportunity Areas



Labor market observatory team to provide intelligence on supply and demand of skills



Partnerships between existing institutions and employers to drive alignment with needs



Delivery innovations outside of existing institutions to reach target populations (e.g., at-risk of automation)



New learning platforms / delivery methods to reskill / upskill workforce into tech and sustainable jobs, starting with Tulsa's workforce



Attraction of players doing e-learning at scale to move a second location to Tulsa



## Key Facts for Each Opportunity

- Limited visibility and offering of available education opportunities, training programs, and jobs in Tulsa
- Similar efforts in other states / cities (e.g., Louisiana FastStart) have created millions of matches between job seekers and employers.
- Stakeholder interviews and cyber / data analytics job posting data revealed a misalignment between skills graduates possess vs. employers' desired skills.
- Similar coalitions (e.g., SkillsFuture) boosted employment and training rates.
- Traditional higher ed is not accessible to large portions of the population (e.g. working adults).
- Offering new modes (e.g., credential programs, paid apprenticeships) and additional support services (e.g., career coaching, childcare) can help Tulsans access more promising careers.
- Formal education often ends when entering the workforce, despite technological advancement requiring adaptation and new skillsets.
- Digital tools (e.g., e-learning, virtual reality) can be leveraged by employers to retrain employees into new economy jobs (e.g., AT&T retraining 270k employees into software experts).
- E-learning platforms can deliver high-quality education at a fraction of the cost.
- Attracting a large player in the space (e.g., Coursera) could bring immediate jobs to Tulsa and facilitate partnerships for other delivery innovations.

# 2 Energy Tech Insights

## Insights on Energy Tech Sector

There will be a continued push to **transition to a cleaner energy mix**, with timing dependent on economics, consumer preferences, and policies.

**Decarbonizing existing infrastructure** will become increasingly important for existing O&G companies to thrive in the future.

There will be an increasing trend towards **electrification of primary energy loads** to enable greener sources of energy.

While energy demand is growing globally, we expect that domestic demand will be impacted by **continuing investment in energy efficiency** (e.g., waste heat).

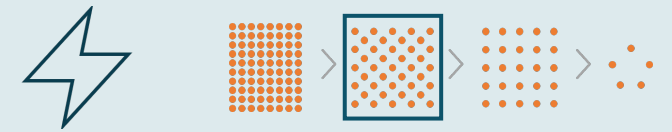
“Fossil-based” energy companies are starting to invest in **enhancing their operations through technology and data analytics** in order to reduce risk, free up room to invest more capital (in regulated businesses), and increase efficiency.

The shifting nature of work will require investments to **reskill and transition people to new-economy jobs** that are in higher demand and less susceptible to automation (e.g., data science).

We find that energy tech (outside for a few specific areas, e.g. solar materials innovation) is **largely contestable**, with >50% of companies being located outside of tech hubs.

High-growth areas for investment include: **monitoring and automation, biofuels, electrification tech, energy efficiency, wind, and solar**

Tulsa has **strengths in several areas that can be scaled** (e.g., heat exchangers), with most related to pipelines (e.g. pipelines, generators).



## Top Opportunity Areas

▶ Using automation, operational technology (OT), and analytics in energy

▶ Producing, processing and transporting alternative fuels

▶ Leveraging cyber in OT/energy

▶ Supporting electrification transition

▶ Reducing emissions from the existing value chain

▶ Reskilling and workforce management

## Key Facts for Each Opportunity

- Monitoring & automation is growing quickly at ~34% p.a. and 71% of companies are outside tech hubs.
- Stakeholder interviews with execs in energy revealed consistent support for increased data analytics.
- Most promising opportunities for Tulsa include drone surveillance, predictive maintenance, and more
- Investments in alternative fuels (e.g., hydrogen, biofuels, renewable natural gas) could offer an opportunity for current midstream players to diversify.
- Biofuels show signs of potential contestability with 51% of companies outside tech hubs.
- OT security contestable with no dominant players (top 3 players representing <10% share)
- Tulsa has a distinct right to play, given the large number of energy companies citing cyber as a priority.
- Post-2030, electrification investments in heat pumps could lower gas demand by 55-60% in some regions.
- Tulsa has an extremely high location quotient (specialization) for heat exchangers of 62.7.
- Carbon management has a \$50-900 B potential market size – early action could position Tulsa to win
- Regulatory trends are likely to push energy companies, like those in Tulsa, to reduce emissions.
- Jobs requiring “physical and manual skills” are expected to decrease in hours by 2030 by 11-33% (depending on job).
- High automation risk in energy and mining sectors and increased need for technologists.



# 2 Health Innovation Insights

## Insights on Health Innovation Sector

The US healthcare industry – comprised of **4 major segments** (Provider, Payor, Services and tech, Manufacturers, distributors & pharmacies) – is a **\$6T industry** earning **~\$600 B in EBITDA** and **growing at ~5.4% p.a.**

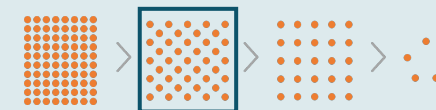
The healthcare sector is the **second-largest sector in the US by employment** (with 90% of jobs in the provider segment) and the **fastest-growing sector**, with jobs expected to grow by **16% from 2019-29.**

Within healthcare, the **fastest-growing jobs are also the least susceptible to automation** (e.g., home health aides, nursing assistants, registered nurses).

Healthcare is expected to grow at **~6% through 2023**, driven by the following:

- **Aging world** – By 2030, 20.2mm more people will be older than 65 in the United States. 87% of this population would **prefer to age in place**, supported by digital personal assistants, virtual health, passive diagnostic devices, etc.
- **Shift in disease burden** – The percent of the population with a **chronic condition** will **raise to 49.2%** by 2030. This will sharply increase the **need for predictive epidemiology models/screening diagnostic tools and chronic disease management solutions** to contain costs and improve patient outcomes.
- **Cost of care reaching breaking point** – HC spend expected to **grow 6%** a year through 2027, outpacing annual 4% GDP growth. There will be an **increasing use of predictive models for risk stratification** and population health management.
- **Shift in healthcare workforce dynamics** – By 2025, there will be a **70K physicians shortage** in the US, increasing **reliance on technology to support/replace specialized physician care.**

In health technology, **virtual health and data analytics** are the most attractive sub-segments, with high investment growth (over 35% CAGR in the last 5 years) and high contestability (over 60% of companies located outside tech hubs) in both.



## Top Opportunity Areas

▶ Virtual health and care delivery innovation

▶ Mental health, substance use and brain research

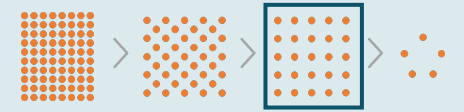
▶ Health informatics to improve outcomes

▶ Social determinants of health

## Key Facts for Each Opportunity

- The virtual health cluster has low concentration in tech hubs, indicating a possible opportunity for Tulsa to win.
- virtual health VC is growing quickly at a 36% CAGR
- The COVID-19 pandemic has dramatically increased the need for virtual health and has also opened up grant funding through the CARES Act.
- Multiple organizations in Tulsa are conducting research and innovating in virtual health (e.g., Project Echo).
- Mental health needs and associated costs are expected to grow significantly over the next decade.
- Tulsa has a high specialization (LQ of 2.6) in psychiatric and substance use research centers and hospitals, including the Laureate Institute for Brain Research.
- Recent opioid settlements in Oklahoma (e.g., Purdue IP at OSU) can be used for mental health innovation.
- The data & analytics cluster is among the least concentrated in tech hubs, indicating contestability.
- OU-Tulsa has a health informatics program that could be scaled to produce top research and talent.
- Recent evidence has demonstrated the impacts of social determinants of health – Tulsa's poor health outcomes could be improved by addressing these issues.
- OU-TU School of Community Medicine and Social Work programs can be leveraged to address Tulsa's health needs.

# 3 Prioritization Exercise



EVALUATED EACH AREA BASED ON IMPACT AND FEASIBILITY<sup>1</sup>

Impact

We evaluated the **impact** of each opportunity area through:

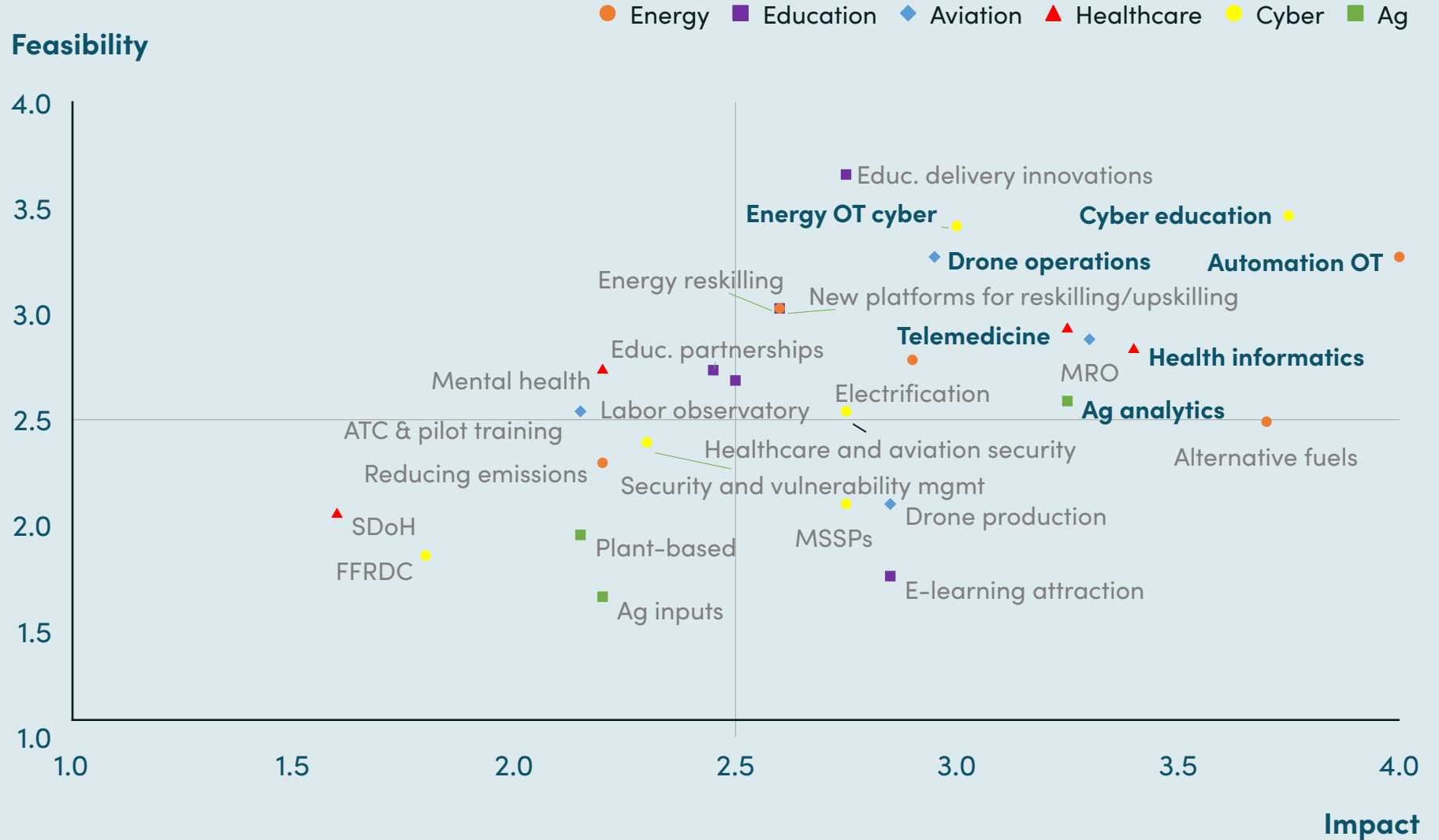
- Job growth potential
- Quality and inclusivity of jobs
- Enablement of other initiatives

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Feasibility

We assessed **feasibility** based on:

- Investment required
- Effort and complexity of the initiatives
- Uncertainty in capturing opportunity
- Fit with Tulsa's assets and stakeholder interests



1. Note that 7 categories are bolded for the 5 focus areas – to assure focus, we have grouped ag analytics and health informatics into 1 “analytics” category and energy OT cyber and cyber education into 1 “cyber” category

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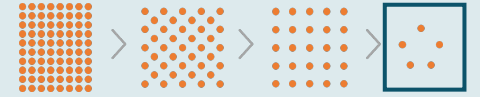
Context

Industry Analyses

**Top Opportunities**

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# Tulsa's Tech Niche



IDENTIFIED 5 CORE AREAS OF FOCUS

1



**Virtual Health**

Virtual health and remote care solutions

2



**Energy Tech**

Automation, analytics, and operational technology (OT) in energy

3



**Drones**

Drone operations and testing in agriculture and energy



4

**Cyber**

Cyber enablement across industries with an emphasis on applied research and workforce development



5

**Analytics**

Broad workforce capabilities in advanced analytics across industries

# 1 Virtual Health and Remote Care Solutions

## DEVELOP AND SCALE CUTTING-EDGE, LOW-COST VIRTUAL HEALTH AND REMOTE CARE SOLUTIONS



### Vision:

Tulsa is transformed into a virtual health hub for the South with best-in-class tools developed in local research centers and a vibrant business community (including startups, providers, and outposts for 1-2 national businesses) testing and scaling tools; health access and outcomes dramatically improve in Tulsa and OK.



### Description:

Accelerate research in cutting edge tools (e.g., remote glucose monitoring) and operationalize and commercialize that research through investment in a startup incubator, partnerships with healthcare providers (e.g., QuikTrip, St. Francis), and by attracting a large virtual health provider to Tulsa.



### Examples of Existing Assets:



### Why virtual health in Tulsa?

- Virtual health is fast-growing, with a 10-15% projected CAGR for 2017-21 and 39% investment CAGR from 2014-19.
- It is also a contestable opportunity, with 72% of companies located outside “tech hub” states.
- Tulsa is ranked 283 out of 306 MSAs based overall health system performance - access to care is a critical issue for Tulsans.
- There are multiple players already investing in research and care in Tulsa (e.g., OSU, St. Francis, QuikTrip).
- The COVID-19 pandemic has dramatically increased the need for virtual health and has also opened up grant funding for access and research through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, including:
  - FCC’s \$200 M COVID-19 virtual health program through which providers can apply for full funding for broadband connectivity and devices (e.g., routers)
  - \$27 B for the HHS’ Public Health and Social Services Emergency Fund for COVID-19 activities, including virtual health access and infrastructure

“ Virtual health has a ton of upside with the amount of capital investment flowing in. Moreover, it really helps solve the access issue - most of the patients getting care through our virtual health network live in rural and underserved areas.

Jeff Stroup, Interim Provost and VP of Strategy  
OSU Center for Health Sciences



# 2 Automation, Analytics, and OT in Energy

## DRIVE INNOVATION IN AUTOMATION, ANALYTICS AND OT IN ENERGY



### Vision:

Tulsa is a center of excellence in the US energy industry for analytics, automation, and operational technology (OT). The city has 2-3 large companies innovating internally and an energy innovation fund supporting a network of startups and smaller players focusing on a variety of topics (e.g., cyber, electrification).



### Recommended Actions:

Fund university research in energy technology and analytics and build an innovation fund to provide capital to new energy tech companies. Encourage existing oil & gas companies to adopt the latest technologies in predictive maintenance, data analytics, and more to increase productivity, be competitive, and maintain employment.



### Examples of Existing Assets:



### Why Analytics and OT for Energy in Tulsa?

- Growth in renewables and in energy efficiency initiatives will create an imperative for energy companies to enhance their operations through technology and data analytics (e.g., predictive maintenance, advanced sensors).
- Digital and new technologies are being adopted across every part of the energy value chain, from generation to distribution to consumption.
- The energy tech industry is highly contestable, with 71% of companies located outside of major tech hubs.
- Early-stage investment into monitoring and automation companies has grown by 33.5% over the last 5 years.
- In conversations with energy executives in Tulsa, multiple identified data and analytics as their biggest gap at the moment.

“ Figuring out where energy is going to go in the next decade is hard... but what we definitely need now are cybersecurity and data analytics. We have lots of data and no analysis.

- Sid McAnnally, SVP Operations  
ONE Gas



# 3 Drone Operations and Testing

## PIONEER DRONE OPERATIONS AND TESTING FOR AGRICULTURE AND ENERGY



### Vision:

Tulsa has built a powerful value proposition in drone operations and testing, with 1-2 large drone companies headquartered in Tulsa, an expanded association of ag and energy companies building outposts in Tulsa for their UAV divisions, and a large research center at OSU-Tulsa in drone applications.



### Recommended Actions:

Leverage Tulsa's unique assets (e.g., strong aviation presence) to spur research into next-gen drone applications technology and attract both startups and established companies looking to test drones.



### Examples of Existing Assets:



### Why Drone Operations in Tulsa?

- The drone market is expected to see healthy growth going forward, with a projected 12% CAGR over the next few years and a projected market size of \$23 B by 2024, of which ~50% would be commercial and consumer applications.
- The sector is also seeing sizeable investment activity – the UAV cluster has driven the majority of venture capital investment in the aviation / aerospace sector since 2013 and has an average number of transactions by company of 1.9, the highest among the aviation and aerospace clusters.
- Many use cases for commercial UAVs are decades away from viability (e.g., passenger travel), but others (e.g., surveillance, emission monitoring) are already mature – there are opportunities to scale adoption and tailor technology for specific industries (e.g., energy, agriculture).
- Tulsa has unique assets (e.g., Skyway36) in the UAV sector that make it an attractive location for innovation in testing and operations.

“Tulsa is already well-known in the aviation industry for our expertise in MRO operations. Looking to the future, we see the opportunity to leverage our historical knowledge and labor strengths to explore areas like drone-technology, thus creating new opportunities for Tulsans and helping to preserve and grow our expertise in a rapidly changing industry.”

Kian Kamas, Chief of Economic Development  
City of Tulsa- Office of the Mayor



# 4 Cyber Enablement

## EXPAND CYBER CAPACITY ACROSS INDUSTRIES WITH AN EMPHASIS ON APPLIED RESEARCH AND WORKFORCE



### Vision:

Tulsa has developed into a regional leader in cyber, with ~5 strong cyber companies and a large, nationally-known research facility, premier capabilities in several industries (e.g., energy, critical infrastructure, aviation, healthcare, manufacturing) and world-class expertise in operational tech (OT).



### Recommended Actions:

Attract cyber startups, launch a cyber incubator, and accelerate applied research at universities to spur commercial innovation; additionally, co-create higher ed degree programs and bootcamps with employers to develop a strong workforce in the space.



### Examples of Existing Assets:



### Why Cyber in Tulsa?

- Cybersecurity is a rapidly-growing field with applications across industries. Although there are many mature cyber companies, there is still heavy innovation and growth happening in niche areas (e.g., cyber for operational tech).
- Cybersecurity for Internet of Thing (IoT) and operational technology (OT) security is a large segment with high growth, high investment, and limited consolidation – it could represent a contestable opportunity in cyber for a city to build distinctive capabilities.
- Tulsa’s energy and aviation / aerospace sectors and research-related assets in cyber (e.g., TU) give the city a distinct “right to play” in cyber for OT and energy.
- Building a cyber competency in Tulsa will require a robust community and a variety of employment opportunities (e.g., research centers, start-ups, large corporations, managed security service providers) for cyber professionals to choose from.
- Multiple Tulsa executives identified cybersecurity as a top priority and shared that finding talent in the field was incredibly difficult – building a cyber workforce development program will boost existing companies’ operations while rapidly creating new jobs for Tulsans.



*Our top challenge is cyber - we have new attacks every day and we need to start building up talent fast.*

-

Gina Hitz, CIO  
QuikTrip





# 5 Analytics Workforce Capabilities

## INCREASE WORKFORCE CAPABILITIES IN ADVANCED ANALYTICS ACROSS INDUSTRIES



### Vision:

Tulsa has 1-2 nationally-recognized data science educational programs (e.g., health informatics) and a network of 5-6 analytics-forward companies that supercharge the city's industries, companies, and workforce.



### Recommended Actions:

Develop a coordinated, city-wide analytics strategy to build an analytics-enabled workforce, attract and fund startups and established companies building cutting-edge analytics products, and encourage existing companies to adopt data-driven decision-making.



### Examples of Existing Assets:



### Why Analytics in Tulsa?

- Data and analytics is a rapidly-growing sector in almost every industry. For example, VC investments in healthcare data & analytics platforms have grown by ~68% in the last 5 years and investments in data analytics for agriculture have grown by 52.5%.
- Given the growing importance of analytics, building capabilities in advanced analytics (e.g., Artificial Intelligence, machine learning) can be a catalyst to improve Tulsa's positioning in both its existing industries and in emerging sectors (e.g., drones, cyber, virtual health).
- Multiple Tulsa executives mentioned that data analytics was a huge gap in their businesses and that their was a shortage of data & analytics talent in Tulsa and in their companies.
- As automation displaces blue-collar jobs; roughly 14.7 million workers under age 34 could be displaced by automation - upskilling talent in Tulsa to jobs in data analytics and data science could help transition workers to the new economy.

“ A data tsunami is upon us. In healthcare, for example, helping providers, payers, and administrators get a handle on a massive amount of rich (but unfortunately siloed and dirty data) is critically important...and more broadly, we're seeing every industry invest more in analytics because of the potential value to their businesses.

- Mike Noshay, Co-Founder  
Verinovum




# Other Seeds to Plant

## IN ADDITION TO THE 5 FOCUS AREAS, WE CAN PLANT SEEDS FOR LONGER-TERM OPPORTUNITIES

### Other Innovation Areas

### Potential Actions

<p><b>Build a best-in-class mental health and substance use research and treatment center</b></p> 	<ul style="list-style-type: none"><li>• Partner with leading mental health research facility (e.g., Grayken Center for Addiction at Boston Medical Center, NIH National Institute on Drug Abuse) to open a location in Tulsa</li><li>• Convene Tulsa players (e.g., LIBR, St. Francis, OU, OSU) to create research partnerships in mental health and provide funding to attract 10 new top researchers to Tulsa</li></ul>
<p><b>Build a plant-based materials and foods (e.g., biofuels, plastics, meat, industrial hemp) ecosystem in Tulsa</b></p> 	<ul style="list-style-type: none"><li>• Endow 5 chairs at local universities to conduct research into biofuels, bioplastics, and other industrial plant-based materials</li><li>• Invest in and attract startups and larger companies in plant-based materials to Tulsa</li></ul>
<p><b>Research and develop best-in-class alternative fuels (e.g., biofuels, renewable natural gas)</b></p> 	<ul style="list-style-type: none"><li>• Endow 5 chairs at local universities to conduct research into biofuels</li><li>• Work with midstream companies to build a pilot RNG facility</li></ul>
<p><b>Set up Tulsa for the electrification revolution as the leading manufacturer of heat pumps</b></p> 	<ul style="list-style-type: none"><li>• Facilitate discussions between local HVAC companies (e.g., AAON, Greenheck) and Daikin to create partnerships to build heat pumps in Tulsa</li></ul>
<p><b>Develop capabilities in manufacturing drones for agriculture and energy</b></p> 	<ul style="list-style-type: none"><li>• Partner with large drone company to build a manufacturing outpost in Tulsa</li><li>• Fund expansion of mechanical engineering degree programs to include drone design</li></ul>
<p><b>Spur innovation and growth in Tulsa's aviation MRO (maintenance, repair, and overhaul) industry</b></p> 	<ul style="list-style-type: none"><li>• Work with the city to encourage American Airlines and other large MRO players to invest in internal R&amp;D into cutting-edge digital capabilities and new material innovation</li></ul>
<p><b>Position Tulsa as a "Future of work" leader through robust workforce analytics and matching programs</b></p> 	<ul style="list-style-type: none"><li>• Build a "labor market observatory" team to analyze data on projected supply and demand of jobs / skills in Tulsa, share intelligence with local stakeholders (including employers, universities, and workforce), and facilitate job matching in Tulsa</li></ul>

# Potential Programs

TIL IS WORKING WITH PARTNERS ON SEVERAL BIG IDEAS



## Energy Innovation Fund

Create an energy innovation fund with co-investment from local energy companies to fund startups and kickstart Tulsa as the focal point for energy innovation



## Startup Incubator for Virtual Health Innovation

Develop startup incubator to commercialize local R&D in virtual health and attract virtual health startups to Tulsa



## Facility for Drone Testing and Operations

Build facility for research and development in drones and to attract energy and ag companies looking to test UAVs, complete with energy and agriculture equipment and test environments



## Data Science Bootcamp / Certificate Programs

Create data science bootcamp / certificate programs with employers to align curriculum with needed skills



## Applied Research Center for Cyber

Build applied research center for OT security in energy in partnership with local companies and with funding from federal research grants

# Aspirational Impact

ESTABLISHING TULSA'S TECH NICHE HAS SIGNIFICANT POTENTIAL IMPACT



**>3-7 K Jobs  
Created**

**~\$4-6 B in Public  
& Private Capital  
Investment**

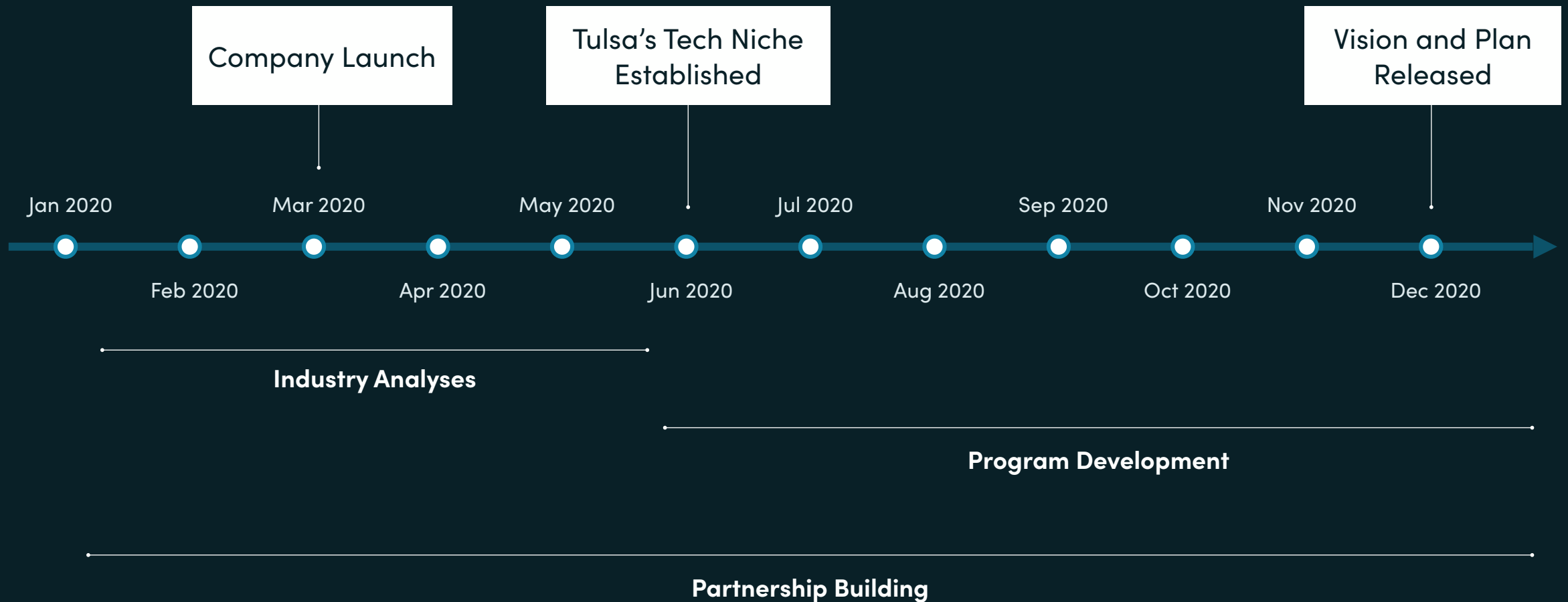
**>1/3 of Jobs Created  
Accessible with  
Associate's  
or Certification**

**~\$60-80 K Average  
Annual Wage in Jobs  
Created**

**>1-3% Increase in  
Population Between  
25-34**

# Next Steps

TIL IS WORKING WITH STAKEHOLDERS TO BUILD NEW PROGRAMS AND PARTNERSHIPS



# Join Us

## TULSA IS A BLUE SKY OF OPPORTUNITY

Building an inclusive tech community requires broad-based support, and we want to work with all who are interested in our mission. There will be many ways for both individuals and companies to benefit and contribute.

### Gain Value



- Access high-quality talent, promising startups, and potential investments
- Network with prospective clients and partners
- Raise your visibility across the ecosystem

### Contribute



- Provide capital to fund scholarships or research
- Hire interns or full-time employees
- Support startups through mentorship, proofs of concept, data-sharing, or investments



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## Coalition Partners:



**Atento Capital**



**tulsa**  
remote