What Should New Mexico, Albuquerque and the NM Congressional Delegation Be Emphasizing?

Presented to New Mexicans for Science and Reason

August 11, 2021, 7:00 PM
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The Answer

**New Mexico Private Sector Economic Growth!!!**

**How To Do This?**
- Support Strategic Planning for NM
- Shun Important National Political Issues That Are of Low Relevance to New Mexico
- Emphasize Technology’s Role in Economic Growth
- Capitalize on Biden Administration $XT Bills
- Build on NM’s Greatest Economic Asset – Federal R&D Funding
- Discuss in More Detail, But First, Economics 101
Economics 101: The Basics
Model of Any Economy

Circular
- K-12 Education
- Health Services
- Insurance
- Food Services
- Utility Services
- Governance
- Construction
- Retail Sales
- Real Estate
- Legal Services
- Quality of Circular Impacts Growth

Growth
- Manufacturing: [10%]
- Agriculture: [2%]
- External Services
- Mining, Oil, & NG
- Tourism
- Wood Products
- College Students from Outside Economy

Net Exodus of Capital
Net Inflow of Capital

Overall growth rate of economy proportional to rate capital entering economy – rate capital exiting economy

Universities & Colleges need more focus on capital inflow sectors

Circular part of economy much larger than growth part. Focus of most public universities
What Kind of Jobs Should NM Be Creating?
Evaluation Criteria for Growth and Circular Industry Sectors

- **Job Multiplier Effect**
  - Direct Jobs + Supplier Jobs + Induced Jobs
  - Utilities - 9.6, Durable Manufacturing - 7.4, Information - 5.7

- **Average Salary**
  - Utilities $44.61/hr, Durable Manufacturing -$31.19/hr, Information - $44.53/hr

- **Growth Potential of Sector** Going Into the Fourth Industrial Revolution
Employment Multipliers per 100 Direct Jobs, by Major Private-Sector Industry Group and Average Worker Salary

<table>
<thead>
<tr>
<th>Major industry group</th>
<th>Direct jobs</th>
<th>Supplier jobs</th>
<th>Induced jobs</th>
<th>Total indirect jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture, forest, fishing, and hunting</td>
<td>100</td>
<td>93.6</td>
<td>134.8</td>
<td>228.5</td>
</tr>
<tr>
<td>Mining</td>
<td>100</td>
<td>224.0</td>
<td>166.0</td>
<td>390.0</td>
</tr>
<tr>
<td>Utilities</td>
<td>100</td>
<td>515.4</td>
<td>442.2</td>
<td>957.7</td>
</tr>
<tr>
<td>Construction</td>
<td>100</td>
<td>88.0</td>
<td>138.1</td>
<td>226.1</td>
</tr>
<tr>
<td>Durable manufacturing</td>
<td>100</td>
<td>289.1</td>
<td>454.9</td>
<td>744.1</td>
</tr>
<tr>
<td>Nondurable manufacturing</td>
<td>100</td>
<td>184.8</td>
<td>329.5</td>
<td>514.3</td>
</tr>
<tr>
<td>Wholesale trade</td>
<td>100</td>
<td>107.3</td>
<td>128.0</td>
<td>235.3</td>
</tr>
<tr>
<td>Retail trade</td>
<td>100</td>
<td>46.7</td>
<td>75.4</td>
<td>122.1</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>100</td>
<td>112.8</td>
<td>163.3</td>
<td>276.0</td>
</tr>
<tr>
<td>Information</td>
<td>100</td>
<td>252.0</td>
<td>321.1</td>
<td>573.1</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>100</td>
<td>149.7</td>
<td>214.7</td>
<td>364.4</td>
</tr>
<tr>
<td>Real estate and rental leasing</td>
<td>100</td>
<td>396.6</td>
<td>483.1</td>
<td>879.7</td>
</tr>
<tr>
<td>Professional, scientific, and technical services</td>
<td>100</td>
<td>142.1</td>
<td>276.2</td>
<td>418.3</td>
</tr>
<tr>
<td>Management of companies</td>
<td>100</td>
<td>144.4</td>
<td>255.4</td>
<td>399.9</td>
</tr>
<tr>
<td>Administrative and support services and waste management</td>
<td>100</td>
<td>45.5</td>
<td>89.1</td>
<td>134.5</td>
</tr>
<tr>
<td>Educational services</td>
<td>100</td>
<td>63.8</td>
<td>129.9</td>
<td>193.7</td>
</tr>
<tr>
<td>Health care and social assistance</td>
<td>100</td>
<td>69.4</td>
<td>136.2</td>
<td>205.6</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation</td>
<td>100</td>
<td>123.3</td>
<td>255.2</td>
<td>378.5</td>
</tr>
<tr>
<td>Accommodation and food services</td>
<td>100</td>
<td>53.8</td>
<td>107.4</td>
<td>161.2</td>
</tr>
<tr>
<td>Other services (except public administration)</td>
<td>100</td>
<td>70.7</td>
<td>139.6</td>
<td>210.3</td>
</tr>
</tbody>
</table>

Industry | June 2021(P) |
--- | --- |
Total private | $30.40 |
Goods-producing | 30.98 |
Mining and logging | 35.00 |
Construction | 32.86 |
Manufacturing | 29.66 |
Durable goods | 31.19 |
Nondurable goods | 27.14 |
Private service-providing | 30.26 |
Trade, transportation, and utilities | 26.40 |
Wholesale trade | 33.63 |
Retail trade | 21.92 |
Transportation and warehousing | 26.75 |
Utilities | 44.61 |
Information | 44.53 |
Financial activities | 40.10 |
Professional and business services | 36.49 |
Education and health services | 29.54 |
Leisure and hospitality | 18.23 |
Other services | 27.29 |

*Includes jobs supported by respending of income from direct jobs and supplier jobs, as well as other jobs.*
What Are the Big Economic Disrupters Going Forward?

- Military and Economic Competition Between US and China
  - Driving US Legislation, e.g., United States Innovation and Competition Act
  - Drive Work at New Mexico National Laboratories
  - Imperative to Engage All Americans in Economic Growth
  - Reconstructed Supply Lines
  - Bringing Back Manufacturing – Buy USA Made
  - New Era of Industrial Policy
- Climate Change
- Pandemics
- Fourth Industrial Revolution
- Major Domestic Issues, e.g., Infrastructure
Cities, Not Nations Are Driving Economic Growth

• Cities, not nation states, will determine our economic future. Half of humanity currently lives in one.

• Two thirds of the world's population will be urban dwellers by 2030. Today cities power over two-thirds of global GDP; they are marvels of innovation and engines for prosperity.

• How can all cities and rural areas grow economies at the rate of cities built on high-tech business?
  • Build a high tech economy
  • Another way?

Chad Shearer, Isha Shah, Alec Friedhoff, and Alan Berube, Brookings Metropolitan Policy Program, Feb. 8, 2018.
**Sandoval County Tracked Utah County from 1998 to 2016**

Bernalillo County’s median household income was lower in 2019 than it was in 1998.

Between 1998 and 2014 Utah County’s median household income had a very small decline.
Economics 102: Technology Innovation Drives Economic Growth
High technology company valuations help fuel rapid growth in tech.

Change in market valuation, 2008–20, by industry, 1 %

1. Top two and bottom three S&P 500 sectors by member weighting; as of end 2020. 2. The real estate sector joined the S&P500 in September, 2016.

Source: Bloomberg; S&P

McKenzie and Company, the top trends in tech, executive summary, 2021
Key Focus Technologies for US – China Economic and Military Competition

1. **Artificial Intelligence** and Machine Learning;
2. High Performance **Computing, Semiconductors**, and Advanced Computer Hardware;
3. Quantum Computing and Information Systems;
4. Robotics, Automation, and Advanced Manufacturing;
5. Natural or Anthropogenic Disaster Prevention;
6. Advanced Communications Technology (5G);
7. Biotechnology, Genomics, and Synthetic Biology;
8. Cybersecurity, Data Storage, and Data Management Technologies;
9. Advanced Energy; and
10. Materials Science, Engineering, and Exploration relevant to the other key technology focus areas described in this subparagraph.

United States Innovation and Competition Act of 2021, S. 1260, p. 80.
Technology Drives the Economic Growth of Nations

Changes in GDP per capita brought about by technological investments, 1000–2000 AD, by country, indexed

1. Estimated global GDP per capita in USD, adjusted to GDP in 1000 AD = 1; not exhaustive; 2. Includes Industry 4.0 (debate exists as to whether Industry 4.0 is seen as the Fourth Industrial Revolution or simply as the second phase of the Third Industrial Revolution).

Source: Angus Maddison, “Statistics on World Population, GDP & Per Capita GDP, 1-2008 AD,” Maddison Project Database; UBS Asset Management; OECD

McKenzie and Company, the top trends in tech, executive summary, 2021
Quarterly Funding for Artificial Intelligence

AI funding hits nearly $31B in H1'21—a new half-year record.

CBINSIGHTS, STATE OF VENTURE REPORT, Q2 2021.
Industry Sectors Where VCs Are Investing Q2-2021

Fintech funding sets a new quarterly record of $33.7B

E-commerce companies raise $16B, up 23% QoQ

Funding to cybersecurity companies soars to nearly $13B in H1’21

Digital health funding more than doubled in Q2’21 YoY

CBINSIGHTS, STATE OF VENTURE REPORT, Q2 2021.
# Seven Cross-Industry Technology Trends Will Disrupt Company Strategy, Organization and Operations

<table>
<thead>
<tr>
<th>Tech-trend clusters</th>
<th>Disruptions</th>
</tr>
</thead>
</table>
| **A. Next-level process automation** | Industrial IoT\(^1\)  
Robots/cobots\(^2\)/RPA\(^3\)  
Self-learning, reconfigurable robots will drive automation of physical processes beyond routine activities to include less predictable ones, leading to fewer people working in these activities and a reconfiguration of the workforce; policy makers will be challenged to address labor displacement, even as organizations will need to rethink the future of work. |
| **B. Process virtualization** | Digital twins  
3-D/4-D printing  
Advanced simulations and 3-D/4-D printing will virtualize and dematerialize processes, shortening development cycles as ever-shorter product and service life cycles continue to accelerate, further pressuring profit pools and speeding strategic and operational practices that tightly correlate with successful digital efforts. |
| **Future of connectivity**   | 5G and IoT connectivity  
With either high-band or low-to mid-band 5G reaching up to 80% of the global population by 2030, enhanced coverage and speed of connections across long and short distances will enable new services (eg, remote patient monitoring), business models (eg, connected services), and next-generation customer experiences (eg, live VR). |
| **Distributed infrastructure** | Cloud & edge computing  
Wide availability of IT infrastructure and services through cloud computing could shift demand for on-premise IT infrastructure and reduce the need for IT setup and maintenance, while the democratization of infrastructure will help shift competitive advantage away from IT to software development and talent. |

1. Internet of things. 2. Collaborative robots. 3. Robotic process automation.
Seven Cross-Industry Technology Trends Will Disrupt Company Strategy, Organization and Operations

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<th>Tech-trend clusters</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>4</strong> Next-generation computing</td>
<td>Quantum computing ASICs&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>5</strong> Applied AI</td>
<td>Computer vision, natural-language processing, and speech technology</td>
</tr>
<tr>
<td><strong>6</strong> Future of programming</td>
<td>Software 2.0</td>
</tr>
<tr>
<td><strong>7</strong> Trust architecture</td>
<td>Zero-trust security Blockchain</td>
</tr>
</tbody>
</table>

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<sup>4</sup> Application-specific integrated circuits.  
<sup>5</sup> DataOps supports and enables better data analytics; MLOps combines infrastructure, tools, and workflows to provide faster and more reliable machine-learning pipelines.  

McKenzie and Company, the top trends in tech, executive summary, 2021
Three Industry-Specific Technology Trends Can Help Solve Humanity’s Biggest Challenges

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<th>Tech-trend clusters</th>
<th>Disruptions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bio Revolution</strong></td>
<td>“-omics” enable rapid analysis of genetic materials and open up possibilities (e.g., for rapid vaccine development, personalized medicine, and gene therapy)</td>
</tr>
<tr>
<td></td>
<td>Using biological material for computing purposes can enable a vast expansion of data storage using DNA as the information medium</td>
</tr>
<tr>
<td><strong>Next-generation materials</strong></td>
<td>By changing the economics of a wide range of products and services, next-generation materials may change industry economics and reconfigure companies within them (e.g., by allowing for the integration of sustainable materials and renewable energy sources into processes), even as innovations in materials science help create smart materials with programmable properties that respond to stimuli from external factors</td>
</tr>
<tr>
<td><strong>Future of clean technologies</strong></td>
<td>As clean technologies come down the cost curve, they become increasingly disruptive to traditional business models, creating new business-building opportunities, operational-improvement programs driven by clean technologies, and new climate-change mandates that could alter the balance sheet of carbon-intensive sectors—all while providing the green energy needed to sustain exponential technology growth</td>
</tr>
</tbody>
</table>
The Combinatorial Effect of Technology Amplifies and Accelerates New Business Models and Innovation

Mutually reinforcing technology leads to exponential growth.

Outcomes of 3 levels of combinatorial effects on cross-industry tech trends

<table>
<thead>
<tr>
<th>Infrastructure and architecture</th>
<th>Enabler</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2</strong> Future of connectivity</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>5G and IoT(^1) connectivity</td>
<td>Future of programming</td>
<td>Next-level process automation and virtualization</td>
</tr>
<tr>
<td><strong>3</strong> Distributed Infrastructure</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Cloud and edge computing</td>
<td>Next-generation computing</td>
<td>Applied AI</td>
</tr>
<tr>
<td><strong>4</strong> Trust architecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero-trust security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blockchain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

New business models and innovation

New programming modalities to achieve robust models and build applications faster (e.g., MLOps, federated learning)

Novel architecture paradigms focusing on orchestration of infrastructure, increasing resilience, flexibility, and speed (e.g., decoupled, microservice-based)

Dedicated hardware delivering increased computing power, diffused through new levels of connectivity (e.g., edge-based processing or 5G)
Economics 103: The Fourth Industrial Revolution
Disruption by Digital Economy or Fourth Industrial Revolution

• The First Industrial Revolution used water and steam power to mechanize production.
• The Second Industrial Revolution used electric power to create mass production.
• The Third Industrial Revolution used electronics and information technology to automate production.
• The Fourth Industrial Revolution is building on the Third.
  • It is characterized by a fast-changing fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

John Lodder, Linked In, The Fourth Industrial Revolution and the Education System, how to respond? (Summary of 2016 World Economic Forum Davos Meeting.)
Characteristics of the Fourth Industrial Revolution

• Evolving at an **EXPONENTIAL PACE**
  - Almost every industry in every country is being disrupted. The breadth and depth of these changes transform entire systems of production, management and governance.

• **Powered by ARTIFICIAL INTELLIGENCE**
  - It is transforming the needs of the workplace from task-based to human-centered characteristics.

• **TALENT, not Capital, will be the critical factor of production.**
  - 65% of the students in school today will work in jobs that do not currently exist.
  - 47% of today’s jobs will be automated in the next two decades.
  - More than 50% of the content in today’s graduate degrees will be outdated in 5 years.
  - With rapid disruption cycles in industry and rising automation, the end state of being educated is no longer meaningful. An individual must have learning agility, the ability to learn, adapt, and apply in quick cycles.
  - Fully 60 percent of global executives in a recent McKinsey survey expect that up to half of their organization’s workforce will need retraining or replacing within five years.

Core Skills of Fourth Industrial Revolution (4IR) Workers

- Critical Thinking
- People Management
- Judgement
- Cognitive Flexibility
- Knowledge Production
- Management
- Complex Problem Solving
- Collaboration/Communications
- Digital Literacy

Are these skills widespread in US?

- Vaccination Shunning
- Conspiracy Theories
- Climate Change Denial
- White Supremacy
- Fear of Immigrants
- Denial of LGBTQ Rights
- Disrespect for Expertise – All Opinions Are Equal
- Disrespect for Research
- Racism

- Arden Bement, Jr., Debasish (Deba) Dutta and Lalit Patil in cooperation with the National Academy of Engineering and the University of Illinois at Urbana-Champaign, *Educate to Innovate Factors That Influence Innovation Based on Input from Innovators and Stakeholders*, 2015.
4IR Education

- Interdisciplinary
- Hands-On: Projects, Laboratories, Co-Op and Internships
- Artificial Intelligence Woven Through All Disciplines
- Working in Teams
- Accessible to All
- Lifelong Learning by Certification and Retraining
- Frequent Curriculum Updating
- Use Education Technology: Gaming, Mixed Reality, Simulation, Distance Learning

How to Build a 4IR Economic Ecosystem

• Build Entrepreneurship **Education** Programs (Not a Single Course) for Students

• **Educate** the workforce in 4IR Technologies, Particularly Artificial Intelligence

• Apply **4IR** Technologies to Existing Local Companies

• Promote/Nourish/Grow High-Tech Start-Ups:
  • Attract Successful High-Tech Entrepreneurs
  • Attract Entrepreneurial High-Tech Immigrants Directly and Through Education Programs
  • Support Local Entrepreneurs

• **Attract** High-Tech Firms
  • CART VS. HORSE: As Workforce Competence Grows, Companies Will Relocate to Take Advantage of Workforce Skills

• Result Is Economic Ecosystem

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ran out of cash/failed to raise new capital</td>
<td>38%</td>
</tr>
<tr>
<td>No market need</td>
<td>35%</td>
</tr>
<tr>
<td>Got outcompeted</td>
<td>20%</td>
</tr>
<tr>
<td>Flawed business model</td>
<td>19%</td>
</tr>
<tr>
<td>Regulatory/legal challenges</td>
<td>18%</td>
</tr>
<tr>
<td>Pricing/cost issues</td>
<td>15%</td>
</tr>
<tr>
<td>Not the right team</td>
<td>14%</td>
</tr>
<tr>
<td>Product mistimed</td>
<td>10%</td>
</tr>
<tr>
<td>Poor product</td>
<td>8%</td>
</tr>
<tr>
<td>Disharmony among team/investors</td>
<td>7%</td>
</tr>
<tr>
<td>Pivot gone bad</td>
<td>6%</td>
</tr>
<tr>
<td>Burned out/lacked passion</td>
<td>5%</td>
</tr>
</tbody>
</table>

Note: Based on an analysis of 114 startup outcome studies since 2008.

CBINSIGHTS Study of Reasons Start-Ups Fail: What Should Entrepreneurship Education Emphasize?

- **Inadequate Management!**
- **Inadequate Technical Capabilities Not on List!**
Evolution of High-Tech Economic Ecosystem

- Develop High-Tech Education Programs
- Develop High-Tech Faculty Research Programs
- Develop Interdisciplinary Entrepreneurship Education Program
- Get Assistance from FAANG Companies
- Apply High Tech Education and Research to Existing Local Companies
- Establish High-Tech Co-Op Jobs for Students
- Build Bridges to Financial Sources for Start-Ups
- Recruit High-Tech Companies to Relocate To Gain Access to Educated Workforce
- Create High-Tech Start-Up Companies
- Grow Economic Ecosystem

Build Local Culture that Embraces Innovation and Entrepreneurship
Why Are Economics 101, Economics 102 and Economics 103 Important to the Bernalillo County and New Mexico Economies.
SWOT Analysis: Albuquerque’s Strengths

- OUTSTANDING QUALITY OF LIFE AND CLIMATE
- CULTURAL AND ETHNIC DIVERSITY
- CENTRAL US LOCATION
- TRANSPORTATION INFRASTRUCTURE
- ECONOMY: FEDERAL AND MILITARY LABS AND THE INTELLECTUAL CAPITAL AND INNOVATION THEY BRING
- HUMAN CAPITAL/WORKFORCE: HIGH CONCENTRATION OF PH.D.S AND STEM BASED PROFESSIONALS
- LOWEST COST RENEWABLE ENERGY
- HIGHER EDUCATION INSTITUTIONS: CENTRAL NM, NMTECH, UNM
- ABSENCE OF NATURAL DISASTERS
- WELCOMING TO NEWCOMERS

IF THESE CAN BE CONVERTED INTO MAJOR SOURCE OF LOCAL HIGH-TECH START-UPS, THESE CAN BECOME SUPER STRENGTHS; OTHERWISE, NO HOME-RUNS ON LIST!

KRQE said, “Boulder, Colorado tops U.S. News & World Report’s List of best of places to live for the second consecutive year. ..U.S. News and World Report put Albuquerque 120/150 on the list. ... The publication noted Albuquerque’s rich culture, access to art galleries and it’s unique culinary and brewery scene. It also says the cost of living in New Mexico is slightly below the national average. ... Meanwhile, Albuquerque was ranked 133rd for best places to retire.”
2021-2022 US NEWS and WORLD REPORT
Best Places to Live Methodology, July 2021

• Job Market Index 21.2%
  • Unemployment Rate (50%)
  • Average Salary (50%)
• Value Index 23.7%
  • Blended Median Annual Household Income (50%)
  • Blended Annual Housing Cost (50%)
• Quality of Life Index 26.0%
  • Crime Rates (30%)
  • Quality and Availability of Health Care (10%)
  • Quality of Education (25%)
  • Well-being (15%)
  • Commuter Index (20%)
• Desirability Index 16.3%
• Net Migration 12.8%

1. Boulder, CO
2. Raleigh and Durham, NC
3. Huntsville, AL
4. Fayetteville, AK
5. Austin, TX
6. Colorado Springs, CO
7. Naples, FL
8. Portland, ME
9. Sarasota, FL
10. Portland, OR
11. Boise, ID
12. Ann Arbor, MI
13. Des Moines, IA
14. Denver, CO
15. San Francisco, CA
16. Madison, WI
17. Fort Collins, CO
18. Melbourne, FL
19. Seattle, WA
20. Charlotte, NC
SWOT Analysis: Albuquerque’s Weaknesses

- QUALITY OF LIFE: CRIME, POVERTY AND HOMELESSNESS
- “SCARCITY” MENTALITY AND FAILURE TO ”THINK BIG”
- HOSTILE BUSINESS CLIMATE ON THE PART OF INDIVIDUAL CITIES AND THE STATE GOVERNMENT
- RELATIVE ISOLATION FROM MAJOR US MARKETS?
- INNEFFECTIVE EDUCATION, TRAINING AND PREPARING THE LOCAL WORKFORCE
- ABSENCE OF A MAJOR INTERNATIONAL AIRPORT AND DIRECT, NONSTOP ROUTES?
- ABSENCE OF COLLABORATION BETWEEN AND AMONG MOST POST SECONDARY INSTITUTIONS
- DETERIORATED DOWNTOWN ABQ?
- FEW NATIONAL AND MAJOR PUBLICLY-TRADED COMPANIES?

ALBUQUERQUE SWOT ANALYSIS: Opportunities and Threats

OPPORTUNITIES

• Improving K-12 Education
• Growing and Diversifying the Region’s Economy to Be Less Dependent on Oil/NG/Govt.
• Increasing the Focus on Existing Business
• Attracting Firms and Enterprises in Key Economic Sectors
• Improving the Human Capital/Workforce Assets of the Region
• Elevating the Identify and Brand Awareness of the Albuquerque Region
• Improving Competitiveness and Business Climate
• Creating a More Cohesive, Effective and Efficient Economic Development Ecosystem

THREATS

• Continued Negative Business Climate
• Failure to Become Less Dependent on Oil/NG/Govt. (Labs and Military)
• Failure to Adopt a Systemic, Focused and Performance-Based Approach to Economic Development
• Failure to “Level the Playing Field” vis-à-vis Competition From Other States, Especially Taxation of Business and Lack of Incentives
• Failure to Address Crime, Poverty and Homelessness
• Failure to Improve the Traditional Public K-12 Education
  • Failure to Prepare for The Fourth Industrial Revolution

Greater Albuquerque Metro Should Focus on Six Industries

In **Aerospace**, Capitalize on The Exceptional Research & Development Capabilities in The Region
- Trips to Space
- Space Mining/Colonization
- Satellite Launch
- Space Militarization

In **Biosciences**, Convert Research & Development Technologies into The Development of Local Businesses
- Medical Devices
- High Productivity Services
- Digital Healthcare

In **Renewable Energy**, Become the Green Energy Capital of the United States and the Model for Other Markets in the Future
- Low Cost Electricity for Data Centers
- Accelerated Path to Carbon Neutrality

In **Digital Media & Film**, Market the Albuquerque Region’s Tremendous Advantages Versus Traditional Filming Locations & Become the HQs of Digital Media & Film
- Digital Media Technology
- Digital Media Services

In **Corporate & Professional Services**, Capitalize on Current Trend and Attract Middle Office (professional jobs) to the Region
- SaaS
- IT

In **Manufacturing**, Focus on Reshoring and Onshoring Opportunities
- Semiconductor Chips
- Green Energy Technology
- Incentives to Relocate from Off-Shore

需制定每个工业部门的战略计划!!!
NM Strategic Planning Targeting Nine Industries

- Outdoor Recreation
- Value-added Agriculture
- Global Trade
- Advanced Manufacturing (Albuquerque List + Senate List)
- Bioscience (Albuquerque List + Senate List)
- Film and Television (Albuquerque List)
- Cybersecurity (Senate List)
- Aerospace (Albuquerque List)
- Renewable Energy (Albuquerque List + Senate List)
  - Most Start-Ups are Software Based

Felicia F. DePaula, FELICIAF.DEPAULA@STATE.NM.US, New Mexico Economic Development Department
What Is Missing from Albuquerque and NM Strategic Planning?

1. Recognition that **Federal R&D Funding** is Most Important Driver of NM and Albuquerque Economies; Must Develop a Plan to Massively Increase Its Role in Local and NM Economic Growth

2. Disruptive Impact of **Fourth Industrial Revolution**
   Role of Advanced, Interdisciplinary Technology in Job and Business Disruption

3. Necessity to Accelerate **Entrepreneurship** from NM Universities and Government Labs

4. **Role of Colleges and Universities** in Economic Development Through Advanced Technology Education and Linkage to Targeted Industry Sectors

5. **Learning from Successful Neighboring Cities and States**
   1. Utah: High Economic Growth + Low Income Inequality + Unicorns
   2. Arizona: Chip Manufacturing Cluster + ASU (150,000 Students, Public-Focused Programs)
   3. Colorado: High Economic Growth + Diversified Economy

6. **Too Many Targeted Industries**: Reduces Chance of Building Industry Cluster

7. Failure to Recognize that **Bernalillo County Must Lead** Economic Resurgence of New Mexico - Can’t Fix State’s Economy Without Fixing Bernalillo County Economy
Recommended Short Term Actions
Federal/State Action

• The U.S. Innovation and Competition Act, a Bipartisan $250B Package Aimed at Countering China’s Technological Ambitions, Has passed in the US Senate by a Vote of 68-32.
  • Make CNM in Sandoval County and Northern New Mexico College in Espanola the Site of Regional Technology Centers that Serve NM, especially the Native and Hispanic Communities.

• Attract US Companies Manufacturing Off-Shore to Relocate to Slow Growth Economies by Offering Federal Tax Incentives
  • NM Supplement with Incentives Similar to Movie Sector

• Incentivize High-Tech FAANG Companies, e.g., by Reducing Regulatory Pressure on Anti-Trust and Data Privacy to
  • Break-Up by Expanding Their R&D Facilities into Slow-Growth States Like NM
  • Assist Local Universities with High-Tech Curriculum Development
Federal/State Action

• $1.2T Federal Infrastructure/Climate Bill Has Passed
  • Make New Mexico Test Site for Reaching Carbon Neutrality in 10-15 Years
  • Create Manhattan Project for Carbon Neutrality Headquartered at LANL
• The Defense Authorization Act Has Approved Spending $52B to Build Semiconductor Chip Fabs
  • Spend $10B on New Fab Construction in Rio Rancho by Chip Foundry Company
• Increase Economic Return from Federal R&D Investment
  • Create a New, Temporary Employment Category to Bring Entrepreneurs to Government-Owned Laboratories
  • Make 20% of NSF R&D Awards to Universities Focus on Projects with Economic Potential.
    • If Work Conducted by Graduate Student on Student Visa, Fast-Track Student to Green Card If They Start Local Company
$1.2 T Infrastructure Bill Contents

- **Physical Infrastructure Repairs**
  - $110 billion in new federal funding is set aside for physical infrastructure, with a focus on climate change mitigation and safety measures, including cyclist and pedestrian protections.
  - $1 billion over five years to reconnect communities divided by transportation infrastructure.
  - $2 billion grant program will expand roads, bridges and other surface transportation projects in rural areas.

- **Clean Energy Makeover**
  - $73 billion to expand clean energy sources and modernize the nation’s aging electricity grid with new transmission lines.
  - Creates a new Grid Deployment Authority within the Department of Energy to finance and encourage the development of high-voltage transmission lines and transport renewable energy to rural communities.
  - Includes $7.5 billion to develop electric vehicle charging stations across the country.
  - $7.5 billion goes toward upgrading school buses and ferries to use electric power.

- **Closing the ‘Digital Divide’**
  - $65 billion to connect rural areas and low-income communities to high-speed internet.
  - Funding for digital inclusion programs, such as Internet education and skills training for low-income populations.

- **Lead Pipe Replacement**
  - $15 billion for lead pipe replacement.

- **Public Transit**
  - $66 billion to eliminate the Amtrak maintenance backlog, modernize the Northeast Corridor and expand rail service outside the northeast and mid-Atlantic.
  - DOT identify technologies to prevent drunk driving, such as passive in-car breathalyzers, eye scans and motion sensors.

- **Republican Amendments**
  - Seventeen Republicans agreed for debate to begin provided they could add amendments to the package for their own pet projects.
Recommendations for NM Colleges and Universities

• Organize Around Local Community Outcomes as Arizona State University Has Done.

• Help NM Strengthen its Culture of Innovation, Entrepreneurship and Life-Long Learning by Partnering with Local Institutions, e.g., Churches, that Most Impact the Local Culture.

• Build an Entrepreneurial, Innovative Mindset Throughout Universities.

• Focus Curriculum and Research on Interdisciplinary Topics that Drive Fast-Growth, STEM-Based Businesses that Bring Money into the Local Economy.

• Develop Life-Long Learning and Interdisciplinary Faculty Research Programs that Emphasize:
  • Artificial Intelligence
  • Entrepreneurship
  • information Sciences
  • Synthetic Biology
  • Renewable Energy
  • Carbon Neutral Agriculture
  • Aerospace Science
  • Corporate and Professional Services (SaS)
  • Biosciences
  • Renewable Energy
  • Digital Media and Film
  • Manufacturing
Recommendations for New Mexico MOCs and Governor

- Make College of Northern New Mexico and CNM, Sandoval County Principals in a National Pilot Study on How to Bring Accelerated Economic Growth to Minority Communities.  
  - 2-NM, 3-SE US, 2-Appalachia, 1-SE MI, 2-MidW
- Build High-Speed Internet Access throughout New Mexico.
- Recruit High-Tech, Work-From-Home Employees on the Coasts to Relocate to New Mexico.
- Sponsor High-Tech Immigrants Who Will Start High-Tech Companies in New Mexico, for U.S. H1B visas.
- Improve the Quality of Healthcare Throughout Bernalillo and Sandoval Counties: Make More Attractive to Companies and individuals Seeking Relocation Sites.
- Assure that New Mexico Benefits from the Biden Climate/Infrastructure Plan.
Where Are the High-Tech Jobs and Workers?
Ranking of the Leading 25 Metropolitan Areas for High-Tech Jobs

<table>
<thead>
<tr>
<th>Rank</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>San Jose, CA (Silicon Valley)</td>
</tr>
<tr>
<td>2</td>
<td>San Francisco / San Mateo, CA</td>
</tr>
<tr>
<td>3</td>
<td>Washington, DC Region</td>
</tr>
<tr>
<td>4</td>
<td>Boston / Cambridge, MA</td>
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<tr>
<td>5</td>
<td>Raleigh / Durham / Chapel Hill, NC</td>
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<tr>
<td>6</td>
<td>Seattle, WA</td>
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<td>7</td>
<td>Austin, TX</td>
</tr>
<tr>
<td>8</td>
<td>Denver / Boulder, CO</td>
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<td>9</td>
<td>San Diego, CA</td>
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<td>Madison, WI</td>
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<td>Minneapolis / St. Paul, MN</td>
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<td>13</td>
<td>Oakland / East Bay, CA</td>
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<td>Portland, OR</td>
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<td>15</td>
<td>New York City, NY</td>
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<td>Orange County, CA</td>
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<td>Dallas / Ft. Worth, TX</td>
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<td>23</td>
<td>Indianapolis, IN</td>
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<td>24</td>
<td>Salt Lake City, UT</td>
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<tr>
<td>25</td>
<td>Nashville, TN</td>
</tr>
</tbody>
</table>

The Bay Area and southern California markets were separated due to the diversification of market metrics.

Richard Florida, Bloomberg City Lab, Where's the Real 'Next Silicon Valley'? June 20, 2017
Where Are the Tech Workers?

MARKETS BY PERCENTAGE OF TECH WORKERS
Source: BLS, Moody's Analytics

Richard Florida, Bloomberg City Lab, Where's the Real 'Next Silicon Valley'? June 20, 2017
Where Are Entrepreneurs Growing the Fastest?

Richard Florida, Bloomberg City Lab, Where's the Real 'Next Silicon Valley'? June 20, 2017
Where Are the Venture Capitalists?

Richard Florida, Bloomberg City Lab, Where's the Real 'Next Silicon Valley'? June 20, 2017