THE 2030 BRIDGE PLAN

BORDERPLEX REGIONAL INITIATIVE FOR DYNAMIC GROWTH AND EXPANSION

THE BORDERPLEX ALLIANCE

Table of Contents

Acknowledgements

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Strategic Planning Meeting Dates

- April 10, 2023 Pre-Planning Community Meeting on Emerging Industries
- April 17, 2023 Pre-Planning Community Meeting on Emerging Industries
- April 24, 2023 Pre-Planning Community Meeting on Emerging Industries
- September 29, 2023 Pre-Planning Meeting with Economic Development Partners
- January 2024 Task Force Orientation and Foundation-Building
- February 13 and 20, 2024 Task Force Meetings: Medical Device Industry
- March 19 and 21, 2024 Task Force Meetings: Semiconductor Industry
- April 16 and 18, 2024 Task Force Meetings: Automotive and Clean Energy Industries
- May 14 and 23, 2024 Task Force Meetings: Aerospace and Defense Industry
- June 18 and 20, 2024 Task Force Meetings: Advanced Logistics Industry
- July 25, 2024 Economic Development Partner Roundtable
- August 7, 2024 Buyer-Supplier Roundtable
- August 13 and 22, 2024 Task Force Meetings: Business Services Industry
- September 10 and 19, 2024 Task Force Meetings: Life Sciences Industry
- October 8 and 17, 2024 Task Force Meetings: Research, Development, and Commercialization
- May 20, 2025 Community Meeting on Final Draft

Executive Summary

The Borderplex Alliance 2030 BRIDGE Plan outlines a strategic roadmap for the El Paso-Las Cruces-Ciudad Juárez region to achieve sustained economic growth, innovation, and industry expansion, looking ahead to 2030 and beyond. The vision for the future is optimistic, building on the region's momentum and capitalizing on emerging niche opportunities supported by existing assets. Recognizing the uncertainty of changing political landscapes and policies, the plan emphasizes careful policy advocacy and dedication to growing targeted industries to position the region among the strongest of regional economies.

The strategic planning process involved reviewing industry needs with stakeholders and subject matter experts, identifying strengths, weaknesses, opportunities, and threats, and developing action items to address root causes and optimize opportunities. The final selection of projects included input from the Borderplex Alliance team and community stakeholders.

The plan continues to prioritize the target industries established in previous plans: Life Sciences, Business Services, Aerospace and Defense, Advanced Logistics, and Advanced Manufacturing. These industries were validated using a formula based on economic indicators and considering qualitative factors. The plan also acknowledges the potential growth of new industry clusters such as semiconductor, energy, automotive, and data center industries and remains flexible to adapt to systemic disruptions.

A key element of the 2030 BRIDGE Plan is the focus on potential niche areas within the target industries, aiming to strengthen the region in key areas and create high-quality jobs. This is based on an analysis of comprehensive industry asset lists. Community stakeholders also identified five priority areas to guide the implementation of the strategic plan. These are:

Business Attraction and Expansion: To create a thriving industry ecosystem and increase company presence in the region.

Supply Chain Development: To understand gaps and strengths in the supply chain to attract companies and build industry supply chains.

Strengthening the Workforce Pipeline: To build and leverage education and workforce programs to produce a robust talent pipeline in support of industry niches.

Infrastructure Development: To build or enhance critical infrastructure to promote the flow of commerce.

Research, Development, and Commercialization: To identify problems to be solved within industry and support the commercialization of new products.

The plan recognizes the interconnectedness of key industries such as energy, data centers, electric vehicles, semiconductors, medical device manufacturing, biotech, healthcare delivery, IT, financial services, logistics, and aerospace and defense, highlighting the importance of collaboration and innovation. Achieving a stronger economy requires all stakeholders, including the private and public sectors, to work in concert, with local and state government support favoring economic development through policies that prioritize taxable investment and quality jobs. The strategic priorities outlined in this document serve as a roadmap to sustained economic growth, innovation, and industry expansion through collaboration, leveraging niche opportunities, and strengthening the region's workforce and infrastructure. The Borderplex region is ready to compete globally and solidify its place as a premier destination for business, talent, and cutting-edge research, ensuring a prosperous and resilient economic future.

Final Strategic Action Items TBD

Introduction

Vision and Mission

This is the 2030 BRIDGE Plan's vision for the future of the Borderplex region.

Imagine a vibrant, interconnected region where El Paso, Las Cruces, and Cd. Juarez have transformed into a global hub of innovation, education, and community.

Economically, our region is a powerhouse. A strong investment climate fosters innovative startup companies and R&D centers as well as attracts global corporations with a community development mindset. The outcome? A robust economy with deep roots in innovation and sustainability.

In the future, our region is a center of excellence for education and training. Our universities and colleges are agile and efficiently meet the needs of industry. They offer cutting-edge courses in the latest technology and integrate specific industry knowledge into curriculum, thereby preparing our citizens to be high performing workers. School systems and businesses collaborate on apprenticeship programs, fostering real-world skills early on.

Our public infrastructure stands as a testament to our progress. Efficient transportation networks, water systems, power systems, internet fiber, and international bridges ensure seamless connectivity.

Advanced logistics, to include unmanned vehicles and automated warehouses, are powered by state-of-the-art technology infrastructure including data centers and clean energy solutions.

Many direct flights connect us globally while strong governmental and leadership institutions align with economic initiatives. The construction of effective infrastructure ensures a business-friendly, smart environment that optimizes our supply chains and creates new, high-quality jobs.

And what about our community and lifestyle? Looking ahead, our region is a vibrant destination for tourism and entertainment, enriched with local amenities that make everyday life feel like a celebration of culture and innovation. Master planned neighborhoods provide a walkable lifestyle and variety of amenities to promote health and wellness and a strong sense of community. Inclusive policies and community programs that integrate of a wide variety of cultures and backgrounds enhance our regional identity and international competitiveness.

Finally, envision a region powered by technology and innovation. From AI labs to a home-grown automotive brand, our commitment to applied technology touches every aspect of life, transforming the Borderplex into a region once defined by borders, now united by progress.

Together, through The Borderplex Alliance, as the region's premier economic development agency, with its mission to bring jobs and opportunity to the Borderplex region, we will build a future that generations will look back on with pride, knowing it was here in the border region where the future was imagined and realized.

Strategic Approach

The 2030 BRIDGE strategy will be to bridge silos to create strong industry ecosystems. The Borderplex Alliance will work to connect assets and people to build better support systems for companies. The Borderplex Alliance team will support company expansion and creation through initiatives that identify talent with transferrable skillsets and uncover education programs that can

align with a variety of industry talent needs. As new supplier opportunities arise, especially from company expansions and the emergence of new industries, the team will connect complimentary small businesses to compete for new opportunities. The Borderplex Alliance will bring together diverse stakeholders to accomplish shared goals for maximum economic impact. Overall, the region's brand will grow organically as industry ecosystems are strengthened, and specializations are identified through close analysis of regional industry assets.

As the region looks ahead to 2030 and beyond, the vision of the future is bright and optimistic, even as changing times create uncertainty and some headwinds for the economy. Considering the momentum of the regional economy over the last several years, the community can build on previous successes and capitalize on emerging niche opportunities that are supported by many assets developed over the years through various institutions. The region must address the changing political landscape and shifting policies, but with careful policy advocacy positions, and a dedication to growing targeted industries, the region is poised to take its place among the strongest of regional economies.

The change in executive branch administrations in the United States, Mexico, and Canada has brought and will continue to bring a myriad of changes that will directly impact the economy, creating new challenges and opportunities over time. These changes will need to be considered while interpreting action items during the implementation of this strategic plan. For example, any significant change to the U.S.-Mexico trade relationship could have a direct impact on the manufacturing industry, potentially creating the need to pivot or expand focus on new but complimentary industries to diversify the economy and mitigate economic downturns.

With this uncertainty, there is a need for local and state government support in favor of economic development, which translates to policies that prioritize bringing taxable investment and quality jobs to the region, supporting existing businesses, and fostering a strong entrepreneurial ecosystem. All stakeholders, including the private and public sectors, must work in concert to achieve a stronger economy. This plan provides a roadmap towards that end. While the action items are focused on activities within the scope of the Borderplex Alliance, each introduction contains proposed actions for other institutions that are supported with stakeholder testimony and background research.

The following chart demonstrates that over the last 5-6 years, the three cities in the Borderplex saw significant increases to key economic indicators, gross domestic product, employment and wages.

Notably, between the years 2018 and 2023, wages increased by 23.45% in Las Cruces, 20.59% in El Paso, and 74% in Cd. Juarez. With these increases, however, operations costs continue to remain highly competitive among peer cities. Further, employment numbers increased 6.48% in Las Cruces, 5.80% in El Paso, and 7% in Cd. Juarez. Finally, the Gross Domestic Product (GDP) increased 23.45% increase in Las Cruces, 33.60% in El Paso, and increased by 44% in Cd. Juarez. Overall, these increases demonstrate the strength and momentum of the regional economy.

Las Cruces, New Mexico

	2025	Percentage Change (over last 5 years) 2018-2023
GDP	$10,565,364,000 (2023, latest available)	38.89% increase ($2,960,000,000 added)
Employment	84,127 (2023, latest available)	6.48% increase (5,122 jobs created)
Wages	$51,680 (Annual Average for 2023)	23.45% increase ($9,817.60 increase)
***Sources** **FRED | BLS | JobsEQ**		

El Paso, Texas		
	2025	**Percentage Change (over 5 years, 2018-2023)**
Gross Domestic Product (GDP)	$48,609,163,000 (2023, latest available)	33.60% increase ($16,333,942,000 added)
Employment	354,280 (2023, latest available)	5.80% increase (20,538 jobs created)
Wages	$47,150 (Annual Average for 2023)	20.59% increase ($8,049.60 increase)
***Sources** **FRED | BLS | JobsEQ**		

Cd. Juarez, Chihuahua, Mexico		
	2025	**Percentage Change (over 5 years, 2018-2023)**
GDP	$28,575,290,868 (2024 latest available)	11% increase (2,922,333,637 added)
Employment	491,574	13% increase (59,928 jobs created)
Wages	$35.33 (daily)	69% increase ($13.78 daily increase)
***Sources: INEGI, IMSS, CIES (currency is in U.S. dollars)**		

Borderplex Sectors, Target Industries, and Specializations

The region can gain a competitive advantage by focusing on its high promise, target industries, and by specializing in various niche areas within the target industries. Establishing specializations will strengthen the region in key areas, leading to the creation and expansion of companies, the development of strong ecosystems to support company growth, and many more high-quality jobs.

Target Industries were originally established under the Borderplex 2020 Plan for optimizing the region's limited resources and supporting industries with the best infrastructure and promise for growth and were adopted into the 2025 Ascend Plan. The 2030 BRIDGE Plan will continue to follow these target industries. Those industries are: Life Sciences, Business Services, Aerospace and Defense, Advanced Logistics, and Advanced Manufacturing. The target industries were validated by using a simple formula for ranking all industries by economic indicators: (Location Quotient rank + Market Share rank + 2019-2029 Job Growth rank + Median Earnings Per Job rank + Industry GRP rank)/5. Other qualitative factors were taken into account as well, such as favorable job trends, established assets across the region, and career advancement opportunities. Further, new industry clusters were considered for their potential growth, to include the semiconductor, energy, automotive, and data center industries. The implementation of the 2030 BRIDGE Plan will remain flexible in the event that systemic disruptions diminish certain industries or create opportunities in additional industry clusters.

The 2030 BRIDGE Plan considers the interconnectedness of target industries to strategically develop its specializations. The 2030 BRIDGE Plan provides a list of potential specializations in each section based on existing assets and other rationale. To support future specialization analysis and determination, the Borderplex team included comprehensive industry asset lists for each industry in the 2030 BRIDGE Plan. When deciding on industry niches, community stakeholders should consider industry interrelatedness and the potential for collaboration and innovation to build new industry verticals.

For example, the region has a wealth of electronics companies, which can support growth in other industries such as the data center industry, the energy industry, the semiconductor industry, and the electric and hydrogen automotive industries. The Aerospace and Defense Industry also plays a role in this ecosystem, depending on energy, semiconductors, IT systems, cybersecurity, and logistics to develop and operate advanced technologies like aircraft, satellites, and defense systems. Given the increasing activity in the space industry, the region's Aerospace and Defense Industry specialization can focus on national security and commercial space, driven by successful commercial space operations by Blue Origin and Virgin Galactic, and the new space innovation hub being developed by the Borderplex Alliance in partnership with U.S. Space Systems Command.

Strategic Planning Process

To develop a strategic plan that maximizes the region's opportunities in this complex economic environment, the Borderplex Alliance's strategy team took several steps. The strategy team conducted 24 community meetings and many other one-on-one interviews to gather input for the 2030 BRIDGE Plan. Industry needs were reviewed in conjunction with hundreds of stakeholders and subject matter experts. The strategy task force was responsible for investigating the strengths, weaknesses, opportunities, and threats of a target industry. The task force brainstormed ideas on how to improve the targeted industry and select which projects would continue and become planned projects to be implemented.

Then, with their input through brainstorming sessions, additional roundtable discussions, interview with interested parties, and other research, action items were developed to address root causes of challenges and to optimize opportunities. The final selection of projects included the full Borderplex Alliance team and community stakeholders.

The potential niches and specializations provided in each section were the result of an analysis of comprehensive industry asset lists, which were compiled by The Borderplex Alliance team. While many niche opportunities are listed, these potential niche opportunities should continue to be analyzed by subject matter experts within the Borderplex region and beyond. As niche opportunities are clarified, the economic development efforts around those specializations will be intensified.

Priority Areas, Goals, and Objectives

Community stakeholders identified 5 priority areas to focus efforts around. Each priority area has its own goal and objectives, which will guide the implementation of this strategic plan.

Priority Area 1: Business Attraction and Expansion

Goal: Increase company presence in the region and create a thriving industry ecosystem.

Objectives:

- Attract 40 companies in target industries
- Increase company investment by $1.6B
- Increase number of new jobs by 11,000

Priority Area 2: Supply Chain Development

Goal: Attract companies that are critical to fill supply chain gaps and needed for building industry opportunities.

Objectives:

- Attract 10 suppliers for target industries
- Increase percentage of products and services provided by local businesses by 5%

Priority Area 3: Strengthening the Workforce Pipeline

Goal: Align education and workforce programs with industry needs and create new programs to build a more robust talent pipeline.

Objectives:

- Increase number of Borderplex Alliance-led courses, degrees, and certifications by 50%
- Increase number of hands-on training opportunities by 100%

Priority Area 4: Infrastructure Development

Goal: Build or enhance critical infrastructure to promote flow of commerce.

Objectives:

- Increase number of strategic partnerships for infrastructure policy advocacy by 5
- Attract or build 3 new infrastructure assets to support target industries

Priority Area 5: Research and Development

Goal: Attract and grow companies that are solving industry problems, support commercialization of new products, and retain those companies within the region.

Objectives:

- Attract 7 new research and development organizations (companies, government, startups)
- Increase number of individuals completing research and development education programs by 25%

As the region moves forward with the implementation of the 2030 BRIDGE Plan, the strategic priorities outlined in this document will serve as a roadmap to sustained economic growth, innovation, and industry expansion. By fostering collaboration among public and private stakeholders, leveraging emerging niche opportunities, and strengthening the region's workforce and infrastructure, the Borderplex region will be well-positioned to compete on a global scale. While economic uncertainties and policy shifts may present challenges, the region's adaptability and commitment to targeted industry growth will drive long-term success. Through strategic investment in key sectors, supply chain development, and cross-sector innovation, the Borderplex region will solidify itself as a premier destination for business, talent, and cutting-edge research, ensuring a prosperous and resilient economic future.

AEROSPACE AND DEFENSE INDUSTRY

Introduction

For the Borderplex region to become a premier aerospace hub, a strategic approach is needed to attract and expand businesses, strengthen the supply chain, foster innovation, develop a skilled workforce, and enhance infrastructure. By validating aerospace niches, targeting key industry players, and fostering collaboration, efforts will be concentrated on companies that align with the region's strengths, ensuring long-term success. A tailored marketing plan will engage commercial space and defense companies, while a regional aerospace alliance will unite universities, government, and industry leaders to drive innovation and policy improvements. Supply chain development initiatives will create networking opportunities and strengthen industry connections, which will support existing companies, while research and commercialization programs will encourage technological advancements through partnerships and funding. Talent pipeline initiatives will align education programs with industry needs, ensuring a skilled workforce for future growth. Lastly, infrastructure development—including SCIF expansion and the establishment of a space innovation center—will enhance national security and digital solutions. This comprehensive strategy ensures a thriving aerospace ecosystem that attracts investment, supports workforce development, and fuels innovation.

The growing commercialization of space, known as "NewSpace," underscores the space industry's innovation and investment appeal. Virgin Galactic's operations at Spaceport America (SPA), focusing on reusable spacecraft and frequent flights, exemplify this momentum. With global space market revenues projected to surpass $1 trillion by 2040[i], and the ramping up of organizations like the U.S. Space Force with commercial players integrated into their strategic plans, the region has a distinct opportunity to build lucrative specializations around space and national security.

The Borderplex region is emerging as a powerhouse for aerospace innovation, with specializations spanning cybersecurity, advanced manufacturing, propulsion systems, hypersonics, and space exploration. Anchored by institutions like UTEP and NMSU and facilities such as Spaceport America, the region is uniquely placed to lead in cutting-edge technologies. Collaborative partnerships with industry giants like Lockheed Martin and government partnerships like U.S. Space Systems Command and NASA, along with state-of-the-art facilities for 3D printing,

propulsion testing, and wind tunnel analysis, together provide a foundation for advancements in hypersonic missiles, unmanned aerial systems, and aerospace materials. Its 3D printing capabilities align with aerospace manufacturing trends, enabling rapid prototyping and cost efficiency, particularly when paired with digital twin modeling and future possible integration of quantum computing to accelerate algorithm generation. Additive manufacturing, projected to grow significantly due to its potential to produce lightweight, complex parts, further strengthens the region's role in the aerospace and defense supply chain.[ii] Researchers can supercharge their prototype modeling advantage by leveraging UTEP's capacity around digital twins, AI, and quantum computing, taking a page from MIT's interdisciplinary approach to quantum and AI research and its applications towards aerospace technologies.

Additionally, through the expanded presence of the U.S. Space Systems Command (SSC), the region's focus on digital engineering and cybersecurity addresses the growing integration of space in national security, ensuring robust and secure systems for both defense and commercial applications. New national security strategies emphasize a stronger integration of commercial companies with government to more quickly develop technology solutions to pressing governmental problems. With new mechanisms in development to foster greater public private partnerships with SSC, the region has a unique opportunity to attract and grow its own space and national security technology companies, particularly through the partnership and guidance of entities like the Texas Space Commission. An initial focus on digital engineering will help grow the area's IT sector, while building opportunities to integrate digital technologies with materials design and development can grow the advanced manufacturing sector. Activities such as establishing an aerospace innovation hub focused on digital engineering and cybersecurity and connecting this hub with additive manufacturing facilities would maximize the region's assets to build both the IT and manufacturing parts of the region's space industry. This activity is further supported by the region's established testing and launching capabilities, which is enhanced by minimal air traffic around Spaceport America and White Sands Missile Range. Growing existing or budding capabilities in materials design and development and rare earth element mining, extraction, and processing could strengthen the industry's supply chain and create new wealth building opportunities in the region. The energy and semiconductor industries also play a critical role in the aerospace industry, which may intersect and bolster one another if appropriate collaborations are identified and facilitated, offering the region other potential avenues to build upon.

With its proximity to Blue Origin, Spaceport America, and resources like the Bravo UAS test range, the region is also primed to support commercial spaceflight, suborbital launches, and the value chains for these activities, paving the way for groundbreaking achievements such as single-stage-to-orbit technologies and vertical landing systems. Using NASA's Langley Research Center as a model, the region could establish a propulsion testing and advanced materials research center to support developments in hypersonic vehicles and space exploration. In partnership with its neighboring cities in what is known as "Space Valley," a region currently defined as those between Albuquerque and the Rio Grande Valley, these efforts, combined with a vision for sustainable aerospace operations, create a compelling strategic advantage in aerospace and space exploration innovation. Investment in community resources and partnerships with the Chihuahua Aerospace Cluster, various government agencies, accelerator programs, private equity firms, and others can create more opportunities and expand the aerospace ecosystem and its value chains.[iii] Expanding

the Borderplex region's geographic location for the purposes of building the aerospace and defense industry would create a notable opportunity to expand its resources and industry verticals.

For example, the Borderplex Alliance and New Mexico's NewSpace Nexus' shared SBA grant for building a space entrepreneur ecosystem adds to the development of the innovation ecosystem.[iv] And NewSpace Nexus' industry-driven education programs and company-government pairing programs are potential working models that the Borderplex can emulate to supercharge the Borderplex's space innovation ecosystem. Programs like this will be successfully developed through close partnership and collaboration with established space organizations.

Despite many strengths and opportunities to push the industry forward, the region also grapples with weaknesses and threats that must be addressed. At the time of writing, the economic success of the region remains closely tied to a few anchor companies like Virgin Galactic, making it vulnerable to market fluctuations and external shocks. Most aerospace companies in the area do not manufacture vehicles locally, leading to logistical inefficiencies and missed opportunities for operational integration. The limited number of Sensitive Compartmented Information Facilities (SCIFs) presents a bottleneck in the region's capacity to accommodate defense-focused activities because secretive Department of Defense missions require contractors to maintain high levels of operational security. As an example, Huntsville, Alabama's focus on secure facilities has significantly boosted its aerospace defense sector by offering a home for companies in need of secure space to compete for government contracts. Overcoming these issues will require substantial investment in advanced manufacturing facilities and secure infrastructure.

The region will need to diversify the regional aerospace economy to create more quality jobs and improve talent retention and attraction. More experienced professionals often jump from one company to the next or leave the region for better job opportunities. Competition for high-demand roles like cybersecurity and data engineering is fierce throughout the U.S. and Mexico, further complicating talent acquisition. Education institutions can expand programs to widen the talent pool, and companies can improve their incentives for employees. Regional educational institutions are already supporting the development of the space industry by cultivating robust talent pipelines in an array of engineering disciplines, including specific aerospace degree programs at Western Tech, NMSU and UTEP. Following the lead of other space-focused cities and regions, these education programs can be adjusted to include applications for space and national security, with industry and government partners eventually guiding the programs' evolution. To attract skilled professionals in cybersecurity and aerospace engineering, community stakeholders can develop incentives such as relocation packages and family-support programs, modeling these programs after successful examples such as the Boomerang New Mexico program.

To build a stable aerospace ecosystem, the community must address regulatory inefficiencies and strengthen industry-government collaboration. Businesses and business-friendly organizations should proactively engage with policymakers through consultations and public comment opportunities to influence regulations. A series of space-related policy issues are foreseeable. Prioritizing advancements in quantum cryptography, spectrum management, and intellectual property strategies tailored to space activities will drive innovation and ensure global competitiveness. Internationally, standardizing licensing processes and resolving inconsistencies are crucial to fostering cross-border partnerships. The moratorium on human spaceflight regulation

will end, opening the development of a host of federal regulations that should be influenced by interested space companies. Additionally, the transition from research to product development for aerospace companies is a resource-intensive and complex process that could delay growth. Public and private funding will be needed for research, product development, and commercialization.

With its strategic assets, collaborative spirit, and bold vision, the Borderplex region stands on the brink of becoming a global leader in aerospace and space innovation. By aligning infrastructure investments, workforce development, and policy advocacy with the region's unique strengths, this strategy lays the groundwork for a resilient and future-ready aerospace ecosystem. The path forward will require cross-sector collaboration, persistent innovation, and strategic investments—but the opportunity is clear. As space becomes more commercial, digital, and interconnected with national security, the Borderplex has the talent, location, and drive to lead.

ACTION PLAN

BUSINESS EXPANSION AND ATTRACTION

- Create a marketing plan tailored to specific commercial space and defense space companies that have capabilities in alignment with the region's assets. Identify most common, in-demand suppliers to target for marketing efforts, such as fam tours.
    - Case Study: *Washington State Aerospace Cluster Marketing Strategy* Washington State developed a comprehensive marketing strategy to promote its aerospace cluster, emphasizing its extensive network of over 1,350 establishments and a workforce exceeding 132,500. This approach effectively attracted aerospace companies by showcasing the state's robust infrastructure and talent pool.

- Build a regional aerospace alliance that connects universities, aerospace programs and infrastructure, government, and industry to develop programming and strategic initiatives.
    - Case Study: *Colorado Springs Aerospace & Defense Coalition* Colorado Springs established a regional aerospace alliance that connects universities, aerospace programs, government, and industry. This collaboration fosters strategic initiatives and programming to enhance the aerospace sector's growth in the region.

- Target small STTR/SBIR companies that don't require a large talent pool.
    - Case Study**:** *NASA SBIR/STTR Program* NASA's SBIR/STTR (Small Business Innovation Research and Small Business Technology Transfer, respectively) program provides funding and support to small businesses developing innovative technologies. By targeting companies that don't

require large talent pools, the program stimulates technological innovation and integrates new solutions into NASA's missions.

SUPPLY CHAIN DEVELOPMENT

- Partner with others to host events that will align and strengthen the aerospace ecosystem (New Space Nexus). Leverage White Sands Missile Range and New Mexico Spaceport America, to attract people to come and focus on niche area.
    - Case Study: *Space Symposium in Colorado Springs, Colorado* The annual Space Symposium brings together global space leaders to discuss and plan the future of space exploration. By partnering with various organizations, the event strengthens the aerospace ecosystem through networking, collaboration, and knowledge sharing.

- Establish a regional aerospace alliance to connect businesses with R&D, suppliers, and investors while coordinating industry updates. Facilitate workshops and roundtables to engage policymakers, streamline regulations, and address industry needs. Include partners outside the usual geographic area, such as Chihuahua City, Mexico, Albuquerque, New Mexico, and Starbase, Texas.
    - *Case Study:* Washington State Aerospace Cluster Development Washington State's aerospace cluster, the world's first and largest, employs over 132,500 people across more than 1,350 establishments. The state's aerospace strategy includes fostering partnerships among industry stakeholders, coordinating R&D opportunities, and hosting events to streamline regulations and address industry needs.

RESEARCH AND DEVELOPMENT

- Create a program to broker collaborative relationships between larger space and national defense entities and contractors and startups. Program should work to identify real world problems and find technology solutions.
    - Case Study: *Techstars Starburst Space Accelerator* This accelerator program connects startups with leading space and defense companies, providing mentorship and resources to address real-world challenges. The

initiative fosters collaboration and accelerates the development of innovative solutions in the aerospace sector.

- Attract private and public funding for space-related R&D, product development, and commercialization.
    - Case Study: *South Kansas Aerospace Cluster Expansion* The South Kansas Coalition secured public funding for advanced manufacturing cluster initiatives, including constructing a new applied research training facility. This investment bolstered space-related R&D projects in the region.

- Connect digital aerospace research at the space innovation hub with other types of research and complimentary assets, such as materials and hypersonic development and testing at the El Paso Innovation Factory and Spaceport America.
    - Case Study: *DoD LIFT Institute in Detroit, MI* The aerospace industry is leveraging 3D printing to produce complex, lightweight engine designs more efficiently than traditional manufacturing methods. Concurrent advancements in materials development, such as the certification of high-performance metal alloys for additive manufacturing, exemplify the integration of digital aerospace research with materials innovation and hypersonic applications.

TALENT PIPELINE DEVELOPMENT

- Work with local higher education institutions to incorporate design and prototyping curricula into aerospace programs.
    - Case Study: *South Kansas Aerospace Cluster Expansion* The South Kansas Coalition secured public funding for advanced manufacturing cluster initiatives, including constructing a new applied research training facility. This investment bolstered space-related R&D projects in the region.

- Identify key industry skills and occupations, create student work opportunities to bridge the experience gap, and partner with educational institutions to build a skilled aerospace workforce in technology, compliance, and IP law.
    - Case Study: *South Kansas Aerospace Cluster Expansion* Affiliations such as the Shocker Pathway strengthen WSU's role in workforce development by allowing it to consistently enroll WSU Tech students, and strengthen WSU Tech's role in higher education by giving students of all backgrounds a straightforward way to pursue a two- or four-year degree. For each project, the implementing organizations are either based at WSU or work closely

with WSU—reflecting the tight integration and strong coordinating role that the university played in this process.

Infrastructure Development

- Expand SCIF capacities to enhance national security operations
    - Case study: *Firehawk Aerospace's Expansion in Midland, Texas* Firehawk Aerospace, specializing in hybrid rocket engines, expanded its operations in Midland through a lease agreement with the Midland Development Corporation, covering 18.69 acres for rocket engine testing and commercial space transportation. This expansion leverages Midland's existing aerospace infrastructure and aims to create local jobs, showcasing the region's commitment to supporting aerospace ventures.

- Create a space innovation center of excellence around digital solutions for national security and space. Connect with regional materials development and testing activities.
    - Case Study: *The Commercial Space Marketplace* The Commercial Space Marketplace for Innovation and Collaboration (COSMIC) is a facility established by the U.S. Space Force's Space Systems Command (SSC) in partnership with the Virginia Tech Applied Research Corporation (VT-ARC). COSMIC serves as a hub to enhance collaboration between the military, commercial industry, government agencies, and academia to facilitate the rapid integration of commercial technologies and services into military applications.

POTENTIAL AEROSPACE AND DEFENSE SPECIALIZATIONS

Cybersecurity and Digital Engineering

Rationale:
Top cybersecurity program at UTEP with immediate applications in aerospace.
Digital engineering design centers and partnerships with industry leaders.
Industry shift toward digital twins and predictive analytics in aerospace.

Focus Areas:
Cyber-physical system security in aerospace.
Digital twin modeling for aircraft and spacecraft.
AI-enhanced design and predictive maintenance systems.
Sensors and radar for data gathering and analysis.

The SSC's research and development activities emphasize the importance of digital engineering. This field is crucial for the design, simulation, and testing of aerospace systems, ensuring they meet the highest standards of performance and safety.
As space becomes increasingly integrated with national security, cybersecurity in space is paramount. The focus on digital engineering and cybersecurity research in the region, supported by institutions like the Space Systems Command (SSC), creates opportunities to take the lead in this critical area.

Advanced Manufacturing and Additive Manufacturing

Rationale:
$70M Advanced Manufacturing and Aerospace Center (opening 2025).
65+ machines for additive manufacturing at the Keck Center for 3D Innovation.
Strong partnership with Lockheed Martin and other aerospace entities for design projects.
Local research activity by U.S. Space Systems Command

Focus Areas:
3D printing of aerospace components.
Generative design and lightweight structures for aerospace applications.
Materials development and testing for aerospace-grade metals and composites.

Space Exploration and Propulsion Systems

Rationale:
Collaboration opportunities with NASA, Blue Origin, and the US Space Force.
Facilities like the Goddard Combustion and Propulsion Research Facility and Alpha Site for large-scale propulsion testing.
Satellite ground station and Spacecraft Design and Engineering Facility on campus.

Focus Areas:
Propulsion systems (liquid, solid, hybrid).
CubeSats and small satellite design.
Spacecraft structural engineering and in-orbit servicing.

Unmanned Aerial Systems (UAS) and Autonomy

Rationale:
Bravo Site (600-acre UAS test range) and UTEP Drone Program's success in regulatory compliance and innovation.
Growing demand for UAS in defense, disaster response, and logistics.
NMSU's established FAA UAS test site could serve as a collaborative partner.

Focus Areas:
BVLOS operations and detect-and-avoid systems.
Autonomous systems for aerial, maritime, and ground applications.
Cybersecurity for unmanned systems.

Hypersonic Missiles and Aerodynamics

Rationale:
Facilities like the Subsonic and Supersonic Wind Tunnel.
Alignment with defense needs for hypersonic missile and vehicle technologies.
Opportunities for collaborative R&D with military installations like White Sands Missile Range.

Focus Areas:
Aerodynamics and thermal protection systems for high-speed flight.
Hypersonic vehicle testing and validation.
CFD and experimental fluid dynamics for supersonic designs.

Aerospace Materials and Structures

Rationale:
Challenger-Columbia Structures and Materials Research Facility (UTEP) and advanced fabrication capabilities.
Strong focus on lightweight, durable materials for defense and commercial aerospace.

Focus Areas:
Composite material development for extreme environments.
Structural health monitoring and smart materials.
Crashworthiness and survivability design for aerospace structures.

Spaceport Operations and Commercial Spaceflight Support

Rationale:
Proximity to Spaceport America with Virgin Galactic and SpinLaunch operations.
Restricted airspace and infrastructure for testing and commercial operations.

Focus Areas:
Spaceport logistics and mission control.
Ground support systems for commercial spaceflight.
Launch vehicle integration and safety protocols.

Advanced Launch and Landing Systems

Rationale: The presence of Spaceport America restricted airspace, established space expertise, and many drone programs at UTEP and NMSU support the development of long-term orbital launches (10 years), suborbital launches, and high-altitude unmanned aerial systems (UAS). Developing technology for single-stage-to-orbit vehicles is a long-term goal at Spaceport America. This technology simplifies the process of reaching orbit, reducing costs and increasing efficiency.

Vertical landing systems are essential for the development of single-stage-to-orbit systems. These systems make it easier to reuse launch vehicles, enhancing sustainability and reducing costs.

Focus Areas:
Long-Term Orbital Launches (10 Years)
Suborbital Launches and UAS High Altitude Systems
Single Stage to Orbit Technology
Vertical Landing Systems

Advanced Manufacturing Industry

Introduction - Energy Industry

The Borderplex region can become an energy industry leader as power demands are skyrocketing from the rise of AI and increasing population growth, given its formidable supply chain and workforce in the power and consumer electronics manufacturing industries, and due to its various energy-focused research centers and education programs. The adoption and evolution of AI is expected to grow as this capacity not only has implications for commercial competitiveness but also cybersecurity and national security reasons. This will create a simultaneous and significant increase in demand for more energy. The adoption of electric vehicles and the expansion of other industries will also add to this growing demand for energy. The COVID-19 pandemic underscored the risks of global disruptions to supporting existing power demands, prompting companies to localize supply chains and reduce reliance on foreign suppliers. This highlights a need and an opportunity to attract more energy companies to the Borderplex region. In particular, energy companies face significant challenges in securing critical components such as transformers and breakers, making supply chain resilience a top priority. By attracting key suppliers, the region can mitigate risks from global competition and resource constraints. Additionally, the Borderplex region has the potential to emerge as a leader in energy research by focusing on specialized areas such as microgrid and renewable energy technologies, energy storage, cybersecurity, grid modernization, and emerging energy technologies. Building capacities around rare earth minerals and critical minerals mining, extraction, and processing can also support the overall energy supply chain because these elements are essential for power generation and storage.

There are many prominent employers in this sector include companies to include utility companies, oil and gas companies, solar and wind companies, and power electronics companies. Approximately 27% of the maquiladora (export-oriented assembly plants) industry in the city is dedicated to the electronics sector, and many are suppliers or are potential suppliers to the energy industry.[v] Recently, energy-related companies have made significant investments to capitalize on the region's growth. For example, by 2025, Schneider Electric added approximately 300 more

employees, bringing their total workforce to 2,000, a clear sign of the area's expanding industrial base. Regional infrastructure and initiatives, such as Schneider Electric's localized supply chain and talent development programs, have gained a foothold in the region.[vi] Furthermore, in 2023, Eaton announced 600 new jobs and $150 million in new investment into the area. Multiple expansions in this sector have made power electronics manufacturing very prominent in the region.

To purposely grow the energy industry, a number of challenges must be addressed. Local energy providers, just like providers in other regions, face significant supply chain challenges, particularly with transformers and breakers. Furthermore, local utilities are concerned about potential supplier competition from the growing demand for data centers, which could put additional strain on resources. Both utilities and growing power manufacturers would benefit from the localization of key suppliers. The region will need to mitigate risks from global competition and resource constraints for suppliers by building resilient local supply chains.[vii] The Borderplex Alliance, along with energy companies and regional partners, can work together to attract key suppliers to the area to support harmony between the region's industries.

Additionally, the power company and others are grappling with a high number of employees nearing retirement age, potentially leading to a loss of institutional knowledge and expertise. Concerns regarding retirement-age employees highlight a looming talent gap that could strain operations and continuity, though succession planning is underway. Difficulties in attracting external talent is largely due to quality-of-life issues, particularly for families, and hinders recruitment efforts. One solution is for the community to form public private partnerships that will invest in regional quality-of-life improvements, such as housing, schools, and recreational facilities. Some companies have successfully bolstered employee retention by making community investments in other regions, which demonstrates that this strategy can attract and retain external talent and their families. Ultimately, a key enabler of the region's success in the energy sector will be its focus on workforce development. With its strong educational institutions offering engineering and technical programs, the Borderplex can train a sustainable workforce for the energy industry by providing hands-on training and certification programs that equip individuals with the skills needed to support various types of energy systems. By identifying specific industry niche areas, and incorporating company feedback, education institutions can develop a more tailored set of energy programs, leading to a more knowledgeable and skilled workforce.

The region can gain a competitive edge by establishing specialized research and training programs that are built upon existing strengths and industry trends. For example, training programs in microgrid and renewable energy technologies, modeled after the NMSU IDEAL Center's programs, can build a skilled workforce ready to support cutting-edge innovations. The region's proximity to lithium projects, UTEP's new mining Bachelor of Arts, and research centers like NMSU's IDEAL Center provide an ideal foundation for advancing energy storage technologies, including lithium-ion batteries and hydrogen, and integrating renewable energy into modern grid systems. By focusing on critical minerals mining, alternative metal recovery, and processing, the Borderplex can leverage its natural and built resources to support the sustainable production of vital materials for energy technologies. The region's involvement in hydrogen energy projects, e.g., at UTEP's Mechanical Engineering Department and El Paso Electric, further strengthens its potential to diversify its energy portfolio, with opportunities for producing and storing hydrogen for use in both automobiles and industrial processes. With various power-related innovation

centers and strong engineering programs, the presence of several power electronics companies, and an engaged electricity utility, the Borderplex can establish itself as a leader in areas such as grid modernization, energy storage, and energy management systems. Further, federal and state support for the development of emerging technologies in geothermal and nuclear energy could provide funding and policy support for research and talent development. The skills needed to work in the petroleum industry are generally the same as those needed to work in geothermal energy, creating an easier path to creating new energy systems, which could make a useful intermediate step while other new industries such as nuclear energy would face multiyear infrastructure buildouts and long timelines for new education program development. Ultimately, industry alignment of local education institutions and industry-driven innovation can lead to a globally competitive energy industry.

In conclusion, the Borderplex region has a wealth of energy industry assets that support an industry that is likely to exponentially grow in the coming years due to rising energy demands. Rising energy demands from AI evolution, industry expansion, and population growth, coupled with global supply chain shifts, create a unique opportunity to attract and grow key suppliers for critical components like transformers, breakers, and rare earth and critical minerals. Pushing the growth of the local industry to greater heights may require multi-vector energy strategies. Significant investments in workforce development, renewable energy technologies, and microgrid innovations further enhance its competitive edge. However, challenges such as supply chain vulnerabilities and workforce shortages must be addressed to fully capitalize on this opportunity. By aligning industry needs with education and infrastructure development, the Borderplex can rapidly transform into a powerhouse for energy innovation and sustainability.

ACTION PLAN

Business Attraction and Expansion

- Promote the region by working with energy and power electronics companies to facilitate expansions and supply chain localization efforts. Collaborate with industry leaders to relocate critical component manufacturers to the region, e.g., transformers and breakers. Collaborate with utilities to develop supply chain resilience.
    - Case Study: *ExxonMobil's National Content Program in Papua New Guinea* In Papua New Guinea, ExxonMobil implemented a comprehensive "national content" program during its liquefied natural gas (LNG) project to develop a qualified and globally competitive local workforce and supplier base. The key pillars of the program involved collaborating with local educational institutions to train residents in skills pertinent to the energy sector; assisting local businesses in meeting international standards to become part of ExxonMobil's supply chain; and investing in health, education, and infrastructure to support long-term economic development.
- Promote the expansion of companies involved in critical materials and rare earth materials mining, extraction, and processing, and related fields.

Talent Pipeline Development

- Partner with local higher education institutions to develop certifications and degree programs in power electronics manufacturing and high promise clean energy technologies.
    - Case Study: *Creating the Next Generation of Leaders in Energy* Designed to create the next generation of leaders in energy, the Texas A&M Energy Institute's Master of Science in Energy and Certificate in Energy target both students and professionals who want to be educated on the high-impact and interdisciplinary facets of the energy research landscape through quantitative analytical methods and multi-scale systems based approaches.

- Expand K-12 and higher education initiatives in electrical engineering, energy systems, and cybersecurity.
    - Case Study: *Strengthening The Eastern NC Economy* The education initiatives aim to align K-12 and community college curricula with industry needs, equipping teachers and inspiring students through hands-on STEM learning. By fostering collaboration between schools, businesses, and communities, they support the development of a future-ready workforce for a rapidly evolving world.

Research and Development

- Support research initiatives between local universities and companies around hydrogen fuel, battery storage, smart grid technologies, and other energy alternatives.
    - Case Study: *University of California, Irvine's Advanced Power and Energy Program (APEP)* The Advanced Power and Energy Program (APEP) at the University of California, Irvine addresses the development and deployment of efficient, environmentally sensitive, sustainable power generation and energy conversion worldwide.
- Support the development of a Center for Advanced Energy Research to include a facility with vacuum chambers and nuclear facilities to build, test and generate the next generation of isotope power supplies and reactors for very high-power space vehicles.
    - Case Study: Air Force Research Lab's JETSON AFRL has contracted with Intuitive Machines to develop technical solutions for satellite positioning and maneuverability using Radioisotope Power Systems ("RPS") in support of NASA's GATEWAY – a multi-purpose outpost orbiting the Moon. The team will leverage their expertise in nuclear power systems, power generation, and space exploration to provide a safe, efficient, and scalable solution for a wide range of space missions.

Potential ***ENERGY INDUSTRY*** Specializations

Power Electronics Manufacturing

Rationale: Strong regional expertise in power electronics through NMSU's IDEAL Center and local manufacturing infrastructure.

Focus Areas:
Advanced semiconductors for grid modernization and renewable energy systems.
Locally produced components for energy-efficient power systems.

Renewable Energy Integration and Storage

Rationale: Proximity to lithium projects and initiatives like NMSU's Aggie Power make the region ideal for advancing storage solutions.

Focus Areas:
Energy storage technologies (e.g., lithium-ion batteries)
Grid modernization and renewable energy integration

Rare Earth and Critical Minerals Mining, Extraction, and Processing

Rationale: The Sonora Lithium project and other mineral assets provide resources to support clean energy manufacturing. Development of new mining Bachelor of Arts at UTEP. Existing companies focused on mining and alternative mineral recovery.

Focus Areas:
Extraction and refinement of lithium and rare earth elements
Recycling and reuse of critical minerals

Microgrid and Smart Grid Technologies

Rationale: Presence of UTEP PRES Lab, NMSU's IDEAL center, and collaborations with Sandia National Labs.

Focus Areas:
Decentralized energy solutions for remote EV charging
Cybersecure smart grid solutions

Hydrogen Energy Systems

Rationale: Regional involvement in clean hydrogen projects supports diversification in clean energy technologies. UTEP is engaged in hydrogen energy research, including production methods using renewable energy, fuel cell development, and hydrogen storage solutions. The university collaborates with national laboratories and industry partners to advance hydrogen technologies. EPE is exploring the potential of integrating hydrogen into its energy portfolio. This includes feasibility studies on hydrogen production, storage, and its use in power generation to reduce carbon emissions.

Focus Areas:
Hydrogen production and storage
Hydrogen applications in EVs and industrial processes

Introduction - Automotive Industry

To capitalize on factors like the strong presence of the automotive and power electronics industries, the region's proximity to electric vehicle (EV) battery original equipment manufacturers (OEMs), relevant educational programs, and charging infrastructure, this strategic plan aims to attract businesses and expand the existing value chains for electric vehicles alongside complimentary industries such as energy, semiconductor, and data center companies. This strategic focus aligns with the forecasted growth of the global EV market and the increasing demand for semiconductors and power electronics. To achieve this, the community can design familiarization tours and company showcases to attract energy and automotive companies and their suppliers. Furthermore, to support the expansion of existing companies and attract new ones, the region can seek to develop the supply chain in the automotive industry to include EV companies as well as other advanced automotive technology companies. This involves business attraction and business development of existing companies, such as assisting companies in identifying their value proposition and promoting digital transformation awareness. Cultivating research and development jobs is another critical action item, focusing on solving challenges in emerging automotive niches and energy value chains and supporting the commercialization of local solutions. This leverages the region's existing research partnerships and aims to foster innovation within local companies. Finally, strengthening the workforce pipeline is essential to address talent shortages and ensure a skilled workforce for the growing industries. This includes modifying engineering programs, cultivating internships, facilitating training for automated systems, and conducting skills gap analyses to align education with industry needs. These action items are crucial for the Borderplex region to fully leverage its strengths and address its challenges to become a key player in the future of mobility and electrification.

The global push for electrification is transforming automotive manufacturing, and the growth of advanced AI applications and EVs drives demand for semiconductors and power electronics. Components now produced locally for power trains, data centers, and smart power systems meet this need, creating tailwinds for a strategy around building power electronics and automotive industry value chains.[viii] Further, the region's proximity to EV battery OEMs, the presence of educational institutions focused on EV technologies, and smart charging infrastructure align with this focus. Although there are changing dynamics in the world of EVs, and differing projections for the EV industry's growth, a conservative compound annual growth rate for the global EV market from 2025-2030 is around 6%, driven by declining battery costs, government incentives, and consumer demand.[ix] The hydrogen fuel cell vehicle market is expected to grow at a CAGR of 19.78% from 2025-2030.[x]

The Borderplex's robust automotive supply chains and strong engineering workforce make it an obvious potential leader in advanced automotive technologies, while company expansions by major power electronics manufacturers is a clear sign of the area's expanding industrial base. In Cd. Juarez, the automotive and electrical products sectors are pivotal to Juárez's manufacturing landscape. According to American Industries Group, approximately 59% of the maquiladora industry in Cd. Juarez is dedicated to the automotive and auto parts sectors, followed by 27% in electric and electronics.[xi] Additionally, with the Borderplex Alliance's support, power electronics companies Schneider Electric and Eaton have expanded to become major employers and economic stakeholders.

Additionally, the region's location gives it a distinct advantage for further business expansions. The proximity to several EV battery original equipment manufacturers (OEMs) further enhances the region's appeal as a growing center for EV technology and innovation. The Borderplex region's location also enables efficient shipping across North America. The region could also capitalize on its proximity to rare earth and critical mineral deposits by attracting companies in the EV battery supply chain, with maquiladora systems available enable vertical integration and reduced logistics costs. This strategy would create efficiencies in the supply chain and increase resilience similar to Schneider Electric's localized operations in Louisville, Kentucky.[xii]

With the existence of hydrogen research and development projects and expertise in the region, along with a vested interest in innovative clean fuel solutions for heavy-duty commercial vehicles, the region could become a leader in hydrogen-powered vehicle development for heavy-duty commercial vehicles. Toyota is at the forefront of research into automotive hydrogen technologies, which some believe may prove to be more effective for heavy-duty commercial vehicles compared to electric alternatives. Therefore, hydrogen-focused companies like Toyota may be prime for business expansion in the region.

The region's strengths in precision manufacturing and research partnerships support advanced specializations. A focus on developing advanced powertrains and battery technologies is possible, utilizing local expertise and collaborations with higher education institutions. Similarly, cybersecurity solutions for connected EVs and autonomous vehicles is another potential niche, aligning with the region's software engineering capabilities and addressing the increasing demand for secure, connected systems.[xiii] Supporting this development, educational institutions host dedicated centers such as the IDEAL Center at NMSU and the Power and Renewable Energy Systems Lab at UTEP, which focus on power electronics research. UTEP is a co-leader in the national EV research organization ASPIRE. UACJ has developed a collaboration with the University of Michigan to develop EV curriculum. These programs have already yielded positive results as many graduates who participated in them have gone to work for EV companies. The region's unique centers and collaborations, coupled with the presence of 85 smart charging stations across the region, underscores the area's commitment to advancing EV technologies and sustainable infrastructure. The local universities also collaborate on hydrogen research projects with the Department of Energy and national research labs, and the local electric utility is exploring the inclusion of hydrogen into its portfolio, making the region prime for hydrogen vehicle R&D and business expansion. Furthermore, the Texas Manufacturing Assistance Center (TMAC) offers a product development certification program, which includes two engineering master's courses at UTEP, ensuring a steady flow of skilled professionals to support research and development efforts.

The area's growing cybersecurity programs can provide cybersecurity expertise for automotive systems research and development efforts. Notably, both El Paso Community College and UTEP boast national centers of excellence in cybersecurity.

Despite the region's many strengths and opportunities, it also faces several challenges that hinder its full potential. The region lacks higher education programs specifically tailored to meet the needs of EV battery manufacturing companies, such as chemical engineering with a focus on emerging automotive technology applications. As a result, there is a shortage of experts who can teach specialized subjects related to EV-specific curricula, limiting the development of a highly skilled workforce. Bosch, a key player in the EV sector, has integrated automation and collaborative robots (co-bots) into their operations to offset rising labor costs and lack of labor availability. That said, upskilling the workforce for advanced automotive technology-related jobs and automated operations will be critical.[xiv] Following Bosch's automation strategy in Mexico by creating small business programs for advanced technology adoption can address talent shortages and lead to operational efficiencies.[xv] Establishing joint ventures between local firms and global companies is a way to further enhance production capabilities and competitiveness in the global market. Incorporating advanced automotive technology into coursework with specific applications can help studets commect what they are learning to emerging job opportunities. Internships can give hands-on experience, such as through Toyota's FAME Institute. Expanding the design and prototyping program and coursework to all engineers will ensure they are ready to support research and development operations at new and expanding automotive companies.

In conclusion, the Borderplex region can attract businesses and expand the existing value chains for electric vehicles and related industries by leveraging its current strengths in automotive production, developing research partnerships, and striving for supply chain integration through a holistic approach. By fostering business attraction, enhancing workforce development, and promoting emerging technologies like hydrogen-powered vehicles and cybersecurity for connected EVs, the region can drive long-term economic growth. Addressing challenges in specialized talent and industry-specific education will be critical to sustaining momentum. With strategic investment and collaboration, the Borderplex can solidify its role in the mobility and electrification landscape.

ACTION PLAN

BUSINESS ATTRACTION AND EXPANSION

- Standardize familiarization tours and company showcases. Bring more suppliers of raw materials. Co-host familiarization tours with key automotive companies to demonstrate customer base and supply chain.
    - Case Study: *Kentucky Automotive Industry Association's (KAIA) SPARK Conference*
      The Kentucky Automotive Industry Association's (KAIA) SPARK Conference

connects automotive suppliers with major manufacturers through panel discussions and one-on-one matchmaking sessions with companies like Ford, Bosch, and Toyota.

RESEARCH AND DEVELOPMENT

- Help existing companies start conducting research and development in this region by facilitating partnerships between established automotive companies and small innovative companies. Identify and work through challenges with potential technology solutions.
  - Case Study: *Factors Affecting R&D Collaboration of MNEs with their Local Partner Firms: Case Study of Ford Motor Company and Otosan* Ford Motor Co. and Otosan's long-standing manufacturing partnership evolved into a successful R&D collaboration as Otosan's capabilities grew. Key factors driving Ford's R&D investment in Turkey included low labor costs, government incentives, strong infrastructure, and a highly skilled workforce.

STRENGTHENING THE WORKFORCE PIPELINE

- Examine and modify engineering programs to include design and prototyping subject matter.
  - Case Study: *Principles of Integrated Engineering (PIE) at Olin College of Engineering* In Principles of Integrated Engineering, second-year students conceive, design, and implement a mechatronic system that includes mechanical design, electronics, and software – keeping in mind real-world constraints of materials, process and budget.

- Cultivate internships and other opportunities to students that will help employers attract and hire talent.
  - Case Study: *Creating A New Model For Accelerated Career Pathways* BlueSky Tennessee Institute, a workforce-education partnership between ETSU and BlueCross, enables students to earn a bachelor's degree in computing and earn a job offer from BlueCross in two years.

- Facilitate training programs to prepare to operate automated systems and working with co-bots.
  - Case Study: *Automation technical training | smart factory - robotics – mechatronics* Amatrol's extensive line of automation training systems focuses on advanced smart factory, robotics, and mechatronics technologies. These training systems build automation skills methodically, beginning with basic topics like robot operation and component adjustment before moving to advanced topics, such as serial device applications and multiple station control.

- Conduct skills gap analyses to ensure that programs contain specific knowledge and skills training for automotive and energy
    - Case Study: *Vocational Skills Gap Assessment and Workforce Development Plan by the Future Battery Industries Cooperative Research Centre (FBICRC)* The FBICRC conducted a comprehensive skills gap assessment to evaluate how well national training qualifications align with the needs of Australia's future battery industries. This analysis informed the development of targeted workforce training programs, ensuring that the emerging energy sector has access to a skilled and competent workforce.

Potential Automotive Industry Specializations

Power Electronics Manufacturing

Rationale: Existing infrastructure and industry presence (e.g., Eaton, Schneider Electric) support specialization in this area.

Focus Areas:
Development of powertrain components.
Energy-efficient converters and inverters

Electric Vehicle (EV) Research and Development

Rationale: Existence of major automotive companies such as APTIV and Bosch. UACJ, UTEP and NMSU's strong R&D initiatives. Collaborations with national programs can enhance competitiveness.

Focus Areas:
Wireless charging infrastructure
Integration of smart grids with EVs
Advanced battery technologies and fast-charging systems

EV Component Manufacturing

Rationale: The existing presence of manufacturers like Eaton and Schneider Electric and proximity to lithium and rare earth deposits support vertical integration.

Focus Areas:
Electrical circuit protection (e.g., Eaton products)
Low and medium-voltage products for EV infrastructure (e.g., Schneider Electric)
Rare earth element and critical minerals mining, extraction and processing to support manufacturing of automotive components

Automotive Supply Chain Management

Rationale: The region's maquiladora ecosystem and strategic location near transportation hubs facilitate efficient supply chain operations.

Focus Areas:
Cross-border logistics for automotive components
Integration of U.S. and Mexico supply chains for just-in-time manufacturing

Cybersecurity and Software for Automotive

Rationale: UTEP and EPCC's strong pipeline in cybersecurity and software development aligns with global trends in automotive innovation.

Focus Areas:
Development of secure energy management systems for automobiles
Autonomous vehicle software and diagnostics

Introduction – Semiconductor Industry

The rapidly evolving semiconductor industry and the onshoring of semiconductor companies to north America has presented a new opportunity for growing the economy in the Borderplex region, particularly because of its existing strength in electronics. The presence of consumer electronics companies that already manufacture parts for this sector creates an advantageous situation, which is further supported by strong engineering programs and research capabilities at UTEP and UACJ, and the Surface Mount Technology (SMT) Association in Cd. Juarez. The existing workforce from the many consumer and power electronics manufacturing companies ensures the availability of seasoned technical talent in related fields. As experts in the industry have noted, to successfully build the region's semiconductor industry, the community must first agree on the specific areas of the semiconductor value chain that it will focus its energy and resources towards. This will enable the region to develop clear expertise in particular areas, with the ability to attract and build companies through the support of highly capable talent and well-developed suppliers. That said, many assets exist already such as SMT expertise, and areas of strength are emerging through university research, such as expertise around advanced materials R&D for packaging and advanced packaging manufacturing. This is a significant advantage to build upon because advanced packaging is transforming the semiconductor industry.[xvi] Other specializations could be developed in the long term, especially those that support the region's top industries like Aerospace and Defense and Energy.

To capitalize on these strengths and foster this potential, the region has outlined several key action items. These include strengthening the workforce pipeline through apprenticeships, train-the-trainer programs, and expanding university programs with a semiconductor focus. Efforts will also

be directed towards business attraction by analyzing niche opportunities, conducting targeted marketing, building relationships with companies. With a significant portion of the world's chips being manufactured in Taiwan, the community can leverage resources like the State of Texas Taiwan Office to connect with semiconductor companies that may seek business expansion advantages offered by the Borderplex region. Furthermore, the region aims to enhance its research and development capabilities by connecting semiconductor companies with local researchers and encouraging specialized programs in areas like power electronics and semiconductor packaging materials. To support the growth of the industry, there will be a focus on supply chain development by working with large semiconductor companies to identify and attract key suppliers. Finally, the establishment of an integrated semiconductor innovation hub combining academic and industry expertise is seen as crucial infrastructure. The overarching reason for these actions is to leverage the region's inherent advantages to attract investment, advance innovation, and establish the Borderplex as a thriving environment for technological advancements and economic development in the semiconductor industry.

The region has a talent pipeline supported by electrical engineering programs at three major universities, including specialized classes and research strength at UACJ and UTEP. Despite these strengths, higher education programs in the region currently lack a strong, concentrated focus on the semiconductor industry and there are few experts available to teach specialized curricula. The region is not alone in this weakness, however; the U.S. and Mexico perform a small percentage of global semiconductor manufacturing, and both the U.S. and Mexico are not producing enough specialized talent to support major semiconductor company expansions.[xvii] The key to overcoming this challenge will be to leverage local strengths and an integrated semiconductor hub with specialized training programs and enabled suppliers focused on specific areas of manufacturing and research, design, and development. Albany Nanotech Complex in New York exemplifies the success of aligning academia with industry for regional economic growth. Intel's collaboration with Arizona State University demonstrates the effectiveness of tailored workforce upskilling programs. The engagement of semiconductor companies will be critical to talent and research initiatives.

Regarding supply chains, cities such as Phoenix and Austin are carrying a heavy resource burden to support semiconductor OEMs like TSMC and Samsung, where talent and power constraints are growing, making them less attractive locations for many OEM suppliers. With the close proximity of the Borderplex region to cities with OEMs, there is an opportunity to pitch the region to suppliers of semiconductor OEMs. To ensure the region can see steady but sustainable growth in the semiconductor industry, it can focus its efforts on parts of the supply chain that are less power-intensive, and institutions that support small businesses can take proactive steps by developing semiconductor-specific certification programs and forging partnerships with utilities to enhance supply chain resilience.

Additionally, many semiconductor OEMs and suppliers have expanded to the United States and Mexico from Taiwan, and so developing strong relationships with these companies can help identify win-win solutions. Developing a Taiwan-specific strategy with the local Taiwanese Chamber of Commerce to attract semiconductor companies and suppliers is one such strategy, which would emulate Austin's focused strategy on Asian investments successfully attracted

semiconductor companies. A more in-depth foreign direct investment strategy with a clear supply chain focus can help achieve success.

The region's advanced infrastructure and centers, such as the NanoFabrication Facility with state-of-the-art cleanroom capabilities, and the UTEP Center for Advanced Materials Research, support research and development in semiconductor packaging and devices, as well as advanced packaging and device manufacturing. Expertise in materials for extreme environments and advanced circuit design aligns the region with critical needs in aerospace, defense, AI-driven applications, and IoT devices. This ecosystem is further bolstered by robust educational programs, such as UTEP's Artificial Intelligence Bachelor of Science, and PhD programs in AI and quantum computing, which prepare a skilled workforce for emerging fields like quantum electronics, autonomous systems, and smart electronics. Building out centers focused on collaborative additive manufacturing to integrate aerospace and semiconductor applications for nanoscale device fabrication can leverage multiple assets and help boost several industries. An example of success for this project is Oak Ridge National Laboratory's Manufacturing Demonstration Facility with multi-industry R&D centers.

Although there are many strengths and opportunities to build upon, there are a few challenges that will need to be addressed. An adequate pool of talent with the right technical expertise may be hard to find, and it will be necessary to recruit and retain talent from outside the area, which has been difficult for some other industries. Targeted talent attraction incentives, such as Greenville, SC's "Move Up" initiative, offer valuable strategies for drawing and retaining skilled professionals. Another looming concern is the uncertainty of whether federal subsidies like the Inflation Reduction Act of 2022 and the Infrastructure Investment and Jobs Act of 2021 will be defunded or phased out, resulting in the slowdown of semiconductor manufacturing and related industries such as EV and clean energy. Consumer demand will need to remain strong enough to sustain growth. Compounding these risks is a general lack of industry awareness within the region, which could hinder progress in workforce development and infrastructure planning. Having informed and engaged policy makers will be required to overcome these hurdles. A useful model for ensuring long-term stability in the industry is Germany's proactive policies for sustaining market resilience.[xviii]

The Borderplex region can grow its semiconductor industry by leveraging its strong electronics manufacturing base, engineering talent, and research capabilities. To establish itself as a key player, the region must focus on specific areas of the semiconductor value chain, strengthen its workforce pipeline, and attract key suppliers through strategic business development, particularly with Taiwanese companies. Investing in R&D, creating an integrated semiconductor innovation hub, and aligning academia with industry needs will further enhance competitiveness. While challenges such as talent shortages and policy uncertainties exist, targeted recruitment efforts, proactive supply chain development, and strategic partnerships can drive semiconductor innovation and economic growth.

ACTION PLAN

STRENGTHENING THE WORKFORCE PIPELINE

- Create apprenticeships to support the industry. Develop relationships with companies both inside and outside the region who can support apprentices.
  - Case Study: *Insight Global Launches Semiconductor Apprenticeship Program to Address Talent Shortages* Insight Global launched the Semiconductor Apprenticeship Acceleration Program (SAAP), a U.S. Department of Labor-approved initiative designed to address semiconductor labor shortages by providing hands-on training and creating a highly skilled workforce. In partnership with the National Institute for Industry and Career Advancement, the 18–24-month program offers scalable solutions, improves retention rates, and supports veterans with enhanced benefits and GI Bill eligibility.

- Foster train the trainer program between established semiconductor programs, who have already developed curriculum for this industry, and local community colleges and technical schools.
  - Case Study: *Semiconductor Manufacturing at ACC* Austin Community College (ACC) offers a Semiconductor Manufacturing Program that provides students with hands-on training in cleanroom environments, preparing them for careers in the semiconductor industry. The program includes certificates and associate degrees, with opportunities for internships and direct pathways to employment with industry partners.

- Expand UTEP's AI and quantum computing programs to include semiconductor-focused modules.
  - Case Study: *CITRIS and Intel collaborate to enhance semiconductor training opportunities for UC undergraduates* CITRIS and Intel have partnered to enhance semiconductor training opportunities for UC undergraduates by providing hands-on experience and exposure to cutting-edge semiconductor technologies. This collaboration aims to develop a skilled workforce ready to address the growing demands of the semiconductor industry through educational programs and research initiatives.

BUSINESS ATTRACTION AND EXPANSION

- Conduct an in-depth analysis of assets to determine all niche opportunities and focus marketing efforts on the region's strengths.
  - Case Study: *Greater Phoenix Economic Council (GPEC)* The Greater Phoenix Economic Council conducted an in-depth analysis of the region's assets to identify niche opportunities in the semiconductor industry.

- Visit companies in their cities to build relationships. Focus on companies that can fill supply chain demands or leverage specific regional assets.

- Case Study: *Team Texas* Team Texas and Texas Economic Development Corporation, both economic development organizations, regularly conduct outbound business missions to visit companies in their headquarters cities. During these visits, they meet with executives, tour facilities, and discuss expansion or relocation opportunities.

- Build relationship with Industrial Technology Research Institute (ITRI), which has been instrumental in pioneering Taiwan's integrated circuit (IC) development and has played a crucial role in the growth of the nation's semiconductor industry.
  - Case Study: *Arizona commerce authority and Taiwan sign MOU to promote economic and trade cooperation* Arizona and Taiwan signed a Memorandum of Understanding (MOU) to promote economic and trade cooperation, focusing on the semiconductor, technology, and renewable energy sectors. The agreement aims to strengthen business ties, foster innovation, and encourage investment between the two regions.

RESEARCH AND DEVELOPMENT

- Identify semiconductor companies interested in R&D and connect with local researchers. Encourage the development of specialized R&D programs in power electronics and semiconductor packaging materials.
  - Case Study: *ASU selected as home and partner for CHIPS and Science Act-funded national facility for semiconductor advanced packaging* Arizona State University (ASU) was selected to lead a CHIPS Act-funded national facility focused on semiconductor advanced packaging, aimed at boosting U.S. innovation and manufacturing capabilities. The initiative will enhance ASU's research infrastructure, support workforce development, and strengthen partnerships with industry leaders.

Supply Chain Development

- Work with large semiconductor companies in Texas and Arizona to identify suppliers that would be advantageous to have close by and conduct a targeted marketing campaign towards those suppliers.
  - Case Study: *National Semiconductor Economic Roadmap* The National Semiconductor Economic Roadmap (NSER) is an industry-led initiative aimed at enhancing semiconductor competitiveness and establishing a framework to strengthen semiconductor manufacturing in the United States. Developed through collaboration among over 80 industry leaders, educational institutions, and public sector representatives from various states, the roadmap outlines goals and objectives across four key areas: infrastructure, supply chain, workforce, and entrepreneurship.

Infrastructure

- Support the establishment of an integrated semiconductor innovation hub combining academic and industry expertise.
    - Case Study: *Albany nanotech complex* Albany NanoTech is a high-tech facility that integrates industry leaders, academic institutions, and international partners to advance next-generation chips and chip fabrication processes. Over the past two decades, the facility has contributed to significant progress and innovations in chip technology.

Potential Semiconductor Industry Specializations

Semiconductor Device Manufacturing and Fabrication

Rationale: Regional infrastructure includes a 2,500-square-foot cleanroom within a total 6,000-square-foot NanoFabrication Facility, featuring advanced equipment such as Kurt J. Lesker depositors, Oxford Plasmalab 80+ RIE, and Thermco and MTI tube furnaces. These facilities enable precision in thin-film deposition, reactive ion etching, and other essential fabrication processes. These capabilities make the community ideal for prototyping and manufacturing advanced semiconductor technologies that cater to a range of industries, including consumer electronics, automotive, and telecommunications.

Focus Areas:
Advanced semiconductor device fabrication to meet industry standards.
Process engineering for nanoscale and MEMS devices, which are critical for next-generation applications.
Innovations in heterogeneous integration and electronics packaging to improve performance and efficiency.

Materials for Extreme Conditions

Rationale: With expertise in materials designed for extreme environments, the community can lead the development of semiconductors that operate reliably under harsh conditions. This specialization is bolstered by faculty research in advanced materials, sensors, and circuits for extreme temperatures, radiation, and other challenging environments. The community's focus on extreme-condition materials aligns with growing demands in sectors such as space exploration, defense, and renewable energy, where durability and reliability are paramount.

Focus Areas:
Developing semiconductor materials for aerospace, defense, and industrial applications.
Creating sensors and circuits capable of functioning in extreme environments.
Advancing semiconductor crystal growth techniques for high-performance applications.

Electronic Circuit Design and Integration

Rationale: The community boasts strong expertise in VLSI (Very Large-Scale Integration) design, 3D volumetric circuits, and electronic circuit optimization. Educational programs and faculty research in this area provide a foundation for innovation in circuit design and integration. As demand for AI/ML and IoT devices continues to grow, the community's focus on circuit design ensures relevance in cutting-edge semiconductor technologies.

Focus Areas:
Optimizing VLSI designs for speed, efficiency, and cost-effectiveness.
Developing electronic circuits tailored for AI and machine learning (AI/ML) applications.
Designing low-power and high-efficiency circuits for IoT and portable electronics.

AI/ML and Big Data Analytics for Semiconductors

Rationale: The availability of research expertise in artificial intelligence, machine learning, computer vision, and big data analytics. The intersection of AI/ML with semiconductor technologies provides a competitive edge in creating adaptive, efficient, and intelligent systems for a variety of markets. Creation of new UTEP AI Bachelor of Science degree.

Focus Areas:
Employing AI-driven process control to optimize semiconductor fabrication.
Utilizing predictive analytics to improve device reliability and performance.
Integrating AI/ML functionalities into semiconductor devices for smarter applications.

Advanced Sensor Technology

Rationale: The community's specialization in MEMS (Micro-Electro-Mechanical Systems) sensor design and nondestructive testing (NDT) makes it a strong candidate for leadership in advanced sensor technology. Advanced sensor technologies are crucial for emerging trends in smart cities, autonomous systems, and healthcare, aligning the community with global innovation needs.

Focus Areas:
Manufacturing MEMS and NEMS (Nano-Electro-Mechanical Systems) sensors.
Developing sensors for IoT, autonomous vehicles, and environmental monitoring.
Creating health-related sensors for medical and fitness applications.

Quantum and Nanoscale Electronics

Rationale: With the rise of quantum computing and nanoscale technologies, this specialization ensures that the community stays at the forefront of groundbreaking developments. The community's educational programs emphasize applied quantum mechanics and nanoscale electronics, supported by research in semiconductor device physics and quantum materials. Various programs in the region, to include UTEP's PhD in Physics with a focus on quantum

computing and its Nanomaterials Integration Lab, create a competitive edge in projects in these focus areas.

Focus Areas:
Developing quantum devices and nanoscale transistors for advanced applications.
Exploring quantum computing applications within the semiconductor industry.
Innovating in quantum materials for enhanced performance and efficiency.

Autonomous and Smart Electronics

Rationale: Faculty expertise in autonomous circuit development and augmented reality provides a platform for advancing autonomous and smart electronics. The following focus areas address critical needs and market demand in automotive, robotics, and consumer electronics, ensuring the community's relevance in future markets.

Focus Areas:
Designing autonomous, self-healing circuits for increased reliability.
Developing augmented reality systems integrated with semiconductor devices.
Creating electronics for autonomous vehicles and drones.

Additive Manufacturing in Semiconductors

Rationale: The community's expertise in additive manufacturing presents opportunities to explore innovative production techniques for semiconductors. Additive manufacturing can reduce costs and accelerate innovation, giving the community a competitive advantage in semiconductor production.

Focus Areas:
Developing 3D-printed semiconductor components for rapid prototyping.
Applying additive manufacturing techniques to packaging and integration processes.
Experimenting with novel materials to enhance device performance.

Introduction – Supply Chain Development

The Borderplex region stands at a pivotal moment in advancing its manufacturing sector through supply chain development. Many initiatives have been attempted with some producing successful results. Companies have successfully expanded their visibility through industry expos, digital platforms like LinkedIn, and networking events. Obstacles to growing local suppliers remain, however. Addressing financial barriers—such as cash flow constraints and extended payment terms—could empower smaller suppliers to compete in larger projects. Suppliers have noted that innovative events such as reverse trade shows could help facilitate meaningful connections between buyers and local suppliers, thereby helping to expand their customer opportunities. Manufacturers increasingly rely on out-of-region suppliers, yet a more connected local supply chain would benefit both buyers and suppliers. Regional marketing campaigns can attract suppliers who can fill supply chain gaps while promoting the region's import-export and nearshoring advantages. Further,

aligning land-use planning with business expansion efforts will ensure sustainable industrial growth. Strengthening collaboration with policymakers to enhance supplier certification processes can further improve competitiveness. Furthermore, bridging the gap between businesses and educational institutions is essential to cultivating a skilled workforce that meets industry demands. Embracing automation grants and funding opportunities can accelerate productivity levels and address skilled worker shortages.

The region's supply chain strengths are its talent pipelines and logistical interconnectivity. Companies also benefit from collaboration with other companies within the Borderplex area, forming successful partnerships with local contractors that keep investment within the community. The region's capabilities in import and export processes are considered superior to other markets. Macroeconomic trends such as nearshoring and an increase in manufacturing business expansion projects present unique opportunities for the region. Nearshoring has driven significant business expansion in the region, which could provide local suppliers with new partnerships and contracts.[xix] The region has seen strong interest in foreign direct investment from various countries. Taiwan, for example, has recently had several companies that have expanded in the area in industries such as electric vehicle and electronics. With political challenges motivating such movement, forming stronger Taiwanese partnerships may lead to more business expansions from Taiwan. An in-depth and culturally sensitive foreign direct investment plan can support the expansion of both original equipment manufacturers and suppliers.

The frequency of the selection of local suppliers needs improvement. Only two percent of local suppliers contribute to the region's $39 billion manufacturing supply chain.[xx] This mismatch stems from outside competition and inefficient supplier-buyer relationships. Buyers' project timelines are hindered by long lead times and capacity issues with local suppliers. For example, buyers experience delays in supplier quotation reviews and pricing discussions have caused missed opportunities. Meanwhile, smaller suppliers are reluctant to commit resources to large-scale projects. Cash flow issues and extended payment terms often create financial stress for smaller suppliers, reducing their ability to compete for and complete larger projects. And federal policies restricting or taxing imported materials is burdensome.

Local suppliers often do not have the required certifications or capacity to bids. For example, large manufacturers have voiced the need for certifications like International Automotive Task Force (IATF) 16949, Aerospace – AS9100 (or related standards), and Air Force-related certifications, which are often missing among local suppliers. Closing this gap will create more opportunities with major buyers. Also, regional training programs do not fully meet specialized industry demands. For example, a lack of CNC training programs and certification courses for trades is a significant barrier for some, forcing companies to recruit skilled workers from Cd. Juárez. Also, there is a need for better communication between businesses and educational institutions to align training programs with industry needs. Without this alignment, suppliers often struggle to find qualified local talent, which hampers their ability to expand. Investing in workforce development is critical. Partnerships between local educational institutions and local businesses can help develop specialized training programs around required industrial certifications.

Suppliers rarely have insight into which companies are moving to the region and how to access supplier opportunities with these new entrants. Many smaller companies struggle with marketing

their services effectively. Buyers often do not know what local suppliers exist. Organizing targeted industry networking events, such as supplier expos and reverse trade shows, can help businesses build connections with buyers and suppliers entering the region. Programs like the Borderplex Buyer-Supplier Program can be expanded. The absence of critical services for suppliers, such as heat treatment and industrial plating, forces suppliers to outsource to other regions, thereby increasing logistics costs and delays. Regional marketing campaigns can attract these missing suppliers, which will help ease long wait times as supplies are acquired more quickly. In addition to supply chain limitations, land for development is quickly disappearing, and utility infrastructure and natural resources needed for suppliers' business growth are also limited. Another weakness is a lack of sufficient conference infrastructure, which prevents the cities in the region from bringing many companies to the area all at once. This is a missed opportunity in terms of business attraction, talent attraction, and tourism. The community can form partnerships to advocate for a space, emphasizing its potential economic impact and current opportunity loss.

There are various ways to help suppliers overcome these barriers. Supplier networking events can promote supplier collaboration for larger contracts. Helping regional suppliers automate their processes through automation grants and digital transformation funding and programming can help exponentially increase capacity and improve the quality of their products. Supplier financial literacy training focused on payment and financing strategies can empower suppliers to get the payment structures and financing they need to sustain and grow the company. While efforts for business expansion exist sometimes independently of land use planning efforts, the community would benefit from a coordinated effort to develop land that is prime for commercial expansion.

On a broader scale, uncertainty around national policies impacting the United States, Mexico, and Canada have created caution amongst suppliers. At the time of writing, uncertainties about tariffs and questions about the future of the USMCA are creating unpredictability. Collaboration with policymakers to ease materials restriction policies and improve supplier certification processes can further strengthen supplier capacity. Organizing strong coalitions in support of trade agreements like the USMCA, with specific ideas for improvement, can ensure that trade opportunities continue to drive the regional economy forward.

By addressing existing barriers and capitalizing on its strengths in trade, collaboration, and innovation, the region can unlock a more resilient and integrated manufacturing supply chain. With strategic investments in workforce development, supplier certification, digital transformation, and infrastructure, the region is ready to reduce its reliance on out-of-region suppliers and increase local participation in high-value manufacturing. Stronger ties between businesses, educators, and policymakers will drive meaningful change—ensuring that local companies not only meet industry standards but become the standard. Through intentional collaboration and a shared vision for regional prosperity, the Borderplex can become a national model for supply chain innovation, supplier empowerment, and sustainable industrial growth.

ACTION PLAN

Business Attraction and Expansion

- Launch marketing campaigns tailored to specific industries and promote the Borderplex region's competitive strengths in import/export and nearshoring opportunities. Attract and incentivize investment to fill critical supply chain gaps in the region. Work with companies to address supply chain localization efforts.
    - Case Study: *Hall of Fame: 15 of the Best Place Branding Campaigns* Exemplary strategies employed by cities and regions worldwide to enhance their identities and attract tourism, investment, and talent.

- Conduct social media campaign with Taiwanese focus; ask Taiwanese representatives to follow and share content. Ask local Taiwanese businesses what they like about doing business in the region and create social media content.
- Case Study: *Taiwan's award-winning video strategy to attract tech businesses* BBC StoryWorks APAC and the Taiwan External Trade Development Council launched an award-winning video campaign to attract tech businesses by showcasing the country's innovation-friendly environment and robust technological infrastructure. The strategy effectively highlighted Taiwan's strengths in the tech sector, resulting in increased interest and investment from global technology companies.

- Leverage State of Texas Taiwan Office, e.g. take trips to Taiwan to visit their office.
- Case Study: *Canadian trade office in Taipei, Taiwan* The Canadian Trade Office in Taipei represents Canadian interests in Taiwan. The Commercial section helps Canadian companies expand and succeed in Taiwan and offers information and services to help Taiwanese companies do business and invest in Canada.

- Attract an Asian supermarket to support Taiwanese community culture.
- Case Study: *America's largest Asian supermarket chain to add store in Fort Worth suburb* H Mart, an Asian supermarket chain, will open a new store in Haltom City, Texas, as part of a 50-acre mixed-use development. The expansion reflects the rapidly growing Asian population in North Texas, which now makes up 5.5% of the state's population.

Infrastructure Development

- Work with municipal land use planning organizations to align Borderplex Alliance's economic development goals with city priorities.
- Case Study: *Hughson, California: Agricultural Sustainability and Economic Prosperity* The City of Hughson undertook significant steps to secure sustainable economic prosperity by building upon its agricultural foundation. Hughson's municipal planners collaborated with economic development organizations to promote agricultural sustainability, aligning land use policies with economic goals. This partnership led to the development of initiatives that bolstered the local economy while preserving the region's agricultural heritage. This case demonstrates the

effectiveness of aligning land use planning with economic development strategies to achieve sustainable growth.

- Advocate for the modification of the United States' policy regarding double taxation with Taiwan.
  - Case Study: *Canada-Taiwan relations* On January 15, 2016, the Canadian Trade Office in Taipei and the Taipei Economic and Cultural Office in Canada signed an Arrangement on the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income.

- Collaborate with policymakers to ease cross-border material restrictions.
  - Case Study: *Improving the Cross Border Trade Environment through Improved Research and Advocacy on Cross Border Trade Issues* Funded by Trade Mark East Africa (TMEA) and implemented by Search for Common Ground (SFCG), this project focused on improving the cross-border trade environment between Rwanda and the Democratic Republic of Congo (DRC). By conducting research and advocacy on cross-border trade issues, the project aimed to foster better relations and policies, ultimately benefiting small traders and enhancing economic cooperation.

- Develop a policy advocacy plan for addressing specific supplier needs to include developing a coalition in support of a renewed and improved USMCA.
  - Case Study: U.S. Chamber of Commerce: Coalition Letter on the USMCA In July 2019, the U.S. Chamber of Commerce spearheaded a coalition comprising over 600 business associations and companies across various sectors. This coalition actively advocated for the ratification of the United States-Mexico-Canada Agreement (USMCA), emphasizing its significance in preserving and strengthening trade ties with Canada and Mexico.

  - Partner with the Chambers to advocate for a 40-50 thousand square foot convention space with higher end facilities.
  - Case Study: *McAllen Convention Center Expansion* The McAllen Chamber of Commerce led the expansion of its convention center to 50,000 sq. ft., attracting larger business conferences and industry events. The project boosted economic activity, increased regional visibility, and positioned McAllen as a key business destination.

Supply Chain Development

- Conduct supply chain gap analyses for key industries to better understand supplier attraction and development opportunities.
  - Case Study: *Hydropower Supply Chain Gap Analysis by the National Renewable Energy Laboratory (NREL).* NREL conducted a comprehensive assessment of the domestic hydropower supply chain, evaluating current assets at the component level and forecasting future demands for refurbishments. This analysis led to actionable recommendations aimed at closing identified gaps, thereby strengthening the supply chain and supporting industry growth.

- Host reverse trade shows customized to buyers to connect local suppliers with buyers.

- Case Study: *22nd Annual Southeast Florida NIGP Reverse Trade Show* Provided an opportunity for vendors to market their products and services directly to public sector clients, enhancing visibility and fostering connections.

Talent Development

- Partner with local educational institutions and workforce boards to develop specialized training programs in high demand manufacturing areas.
  - Case Study: *Massachusetts Advanced Manufacturing Collaborative (AMC)* The AMC is a public-private partnership aimed at strengthening the advanced manufacturing sector in Massachusetts. Key initiatives include workforce development programs, collaborating with community colleges and vocational schools to create curricula that meet the evolving needs of manufacturers, focusing on skills such as precision machining and robotics. It also involves industry engagement, establishing industry consortiums to provide input on training programs, ensuring alignment with current technological advancements and labor market demands. This collaborative approach has enhanced the state's manufacturing competitiveness by producing a workforce equipped with relevant skills.

- Launch supplier workshop on payment structures and financing strategies.
  Case Study: Faster Capital FasterCapital is a global venture builder and online incubator based in Dubai that offers training in supplier credit strategies.

- Help train companies on how to automate their operations to increase production capacity and address rising costs of labor and labor shortages.
  - Case Study: *Implementing Automation to Address Labor Shortages in Manufacturing* A manufacturing company faced significant labor shortages and rising labor costs. By adopting automation technologies, including robotics and advanced manufacturing systems, they improved efficiency and reduced dependency on manual labor. This transition led to increased production capacity and cost savings.

Research and Development

- Identify major employers within manufacturing to work with local accelerators to identify and develop intellectual property that can be commercialized and used to grow the industry. Prioritize local startups and suppliers for R&D opportunities.
  - Case Study: *Cooperation between large companies and start-ups: An overview of the current state of research* This study systematically reviews research on collaborations between start-ups and large companies, highlighting their complementary strengths and challenges. It provides a framework to understand key variables, governance mechanisms, and success factors, offering insights for both researchers and business leaders.

ADVANCED LOGISTICS INDUSTRY

Introduction

The Borderplex region is a cornerstone of trade, logistics, and economic growth, spanning the U.S.-Mexico border. This tri-city area forms a dynamic economic hub that plays a central role in North American commerce, supported by a robust network of Ports of Entry (POEs), Free Trade Zones (FTZs), airports, and logistics infrastructure. Therefore, maintaining and building upon logistics infrastructure will be paramount for maintaining and accelerating economic growth. To enhance cross-border trade, workforce development, supply chain efficiency, and air connectivity, a series of targeted infrastructure improvements and economic initiatives are essential. Modernizing ports of entry (POEs), including Tornillo and Santa Teresa, will improve trade capacity by upgrading facilities, addressing staffing shortages, and attracting medical-grade cold storage to support key industries. Workforce development efforts will bridge skills gaps in logistics, automation, and trade compliance by expanding supply chain workforce programs and increasing funding for robotics, AI, and logistics training. Strengthening the local supply chain through targeted marketing campaigns will enhance commercial activity by aligning suppliers and customers with regional business needs. Finally, boosting regional air connectivity through feasibility studies and direct flight negotiations with strategically aligned cities will expand access to key markets. These initiatives are designed to create a more efficient trade environment, support industry growth, and strengthen the region's economic competitiveness.

The logistics industry benefits from its strategic location centered between Long Beach, California, and Houston, Texas. Companies like EP Logistics leverage Union Pacific rail operations, FTZ benefits, and geographic proximity to serve U.S., Mexican, and international clients. The region's air connectivity strengthens economic ties. El Paso International Airport (ELP) offers direct flights to 17 U.S. destinations and serves travelers from Cd. Juárez and Las Cruces. Cd. Juárez International Airport (CJS) connects to 12 domestic destinations, reinforcing cross-border travel. On the other hand, regulatory and infrastructure challenges are hindering explosive growth. Tariffs, new certification requirements and changes to Mexican labor laws disrupt and discourage cross-border operations and increase costs for businesses. The need for more direct flights to strategic locations hinders growth. The fate of the USMCA is also in question as the deadline for renegotiation approaches, and this uncertainty poses a threat to logistics companies as well as manufacturers in the region. Flexibility in operations and the ability of local and state governments to support changes for logistics companies will be crucial.

The regional airports should expand to support additional trade and passenger needs because this is a common request among companies in the area and important for business retention and attraction. The lack of these direct flights hinders efforts to attract and retain companies. The continuation of flight service feasibility studies and the exploration of special incentives to support more direct flights would ensure the region is well-connected with other cities with specific importance for business attraction and policy advocacy initiatives. Expanding El Paso International

Airport's route offerings and introducing international flights at Cd. Juárez Airport could boost regional connectivity.[xxi]

Modernization and connectivity efforts bolster the region's economic strengths. A $600 million investment at the Bridge of the Americas POE (BOTA) in El Paso signals a commitment to improving cross-border trade efficiency. As BOTA permanently closes its northbound commercial traffic lane, the other ports of entry will become more important for trade.[xxii] The Santa Teresa POE, handling 63% of New Mexico's exports and moving over $31 billion in goods annually, is expanding its transportation network flowing from the POE. In 2024, a feasibility study was completed by the U.S. General Services Administration to expand POE commercial and passenger lanes to five times its current capacity. In the long run, this expansion will be a significant and welcome boost to the logistics industry as its proximity to Cd. Juarez, Las Cruces, and El Paso supports commuter traffic and trade integration; however, there may be significant difficulties managing any closures and delays associated with the construction. Further, the Santa Teresa POE operates below capacity due to staffing shortages. The Tornillo POE benefits from political decisions to maintain operations, creating an opportunity to mitigate trade bottlenecks. Infrastructure investments in the Tornillo POE could transform it into a major logistics hub, but it suffers from infrastructure deficiencies that reduce its attractiveness for trucking companies. Complaints about safety also create a concern. Modernizing and adequately securing the Tornillo POE and addressing staffing shortages at Santa Teresa POE can improve general trade capacity. Balancing trade facilitation and migrant processing at key POEs, as seen at San Ysidro, can enhance efficiency.[xxiii] Other basic infrastructure is also needed at the POE, to include cold storage. Attracting medical and food grade cold storage companies at the ports of entry is needed to sustain the growth of the life sciences industry.

The El Paso Foreign Trade Zone presents a logistics advantage. It is used so frequently that it is being doubled in size to 6,000 acres, strengthening warehousing capabilities and supporting increased commercial activity. Warehousing capacity and access to the FTZ will ensure the infrastructure is in place to support the growth of the manufacturing industry. This infrastructure continues to create a competitive edge for the region.

The trucking industry, supported by 3,110 companies across the region, plays a crucial role in freight movement; however, the trucking industry has long had a shortage of truck drivers, which must be addressed through strategies such as career promotion and competitive wages. Autonomous heavy trucks have been discussed as a long-term solution to the trucking labor shortage; however, technology, infrastructure, and public policies are far from being developed and ready for deployment in the near term.

Technological integration is transforming logistics in the region through automated warehousing, Unmanned Autonomous Systems (UAS), and AI-driven logistics. These innovations streamline operations, reduce costs, address workforce shortages, and enhance competitiveness. The surge in e-commerce fuels demand for automation and advanced logistics infrastructure, making efficiency and speed critical priorities, and triggering the need to support the adoption of advancing logistics technologies.[xxiv] Also, workforce shortages in trucking challenge operations create an opportunity for unmanned autonomous vehicles to take their place. This could be in the form of aerial drones or autonomous commercial trucks, though Federal Aviation Administration regulations will need

to evolve to support aerial drone activity, and leaders in the trucking industry believe autonomous trucks will take several more years to mature. In the field of unmanned aircraft systems (like a drone), the region is very competitive for business creation and attraction due to assets like the UTEP Unmanned Systems Research Center, the NMSU Flight Test Center, and the Tornillo UAS Flight Test Range. Infrastructure, research expertise, and pilots are available to attract and grow UAS companies. However, UAS companies face cybersecurity risks, regulatory barriers, and competition from major players like Amazon and UPS.[xxv] Local support and advocacy will be key to ensuring successful business attraction and creation efforts around these types of companies, to include advocacy for unmanned autonomous vehicle infrastructure.

Automated warehousing is revolutionizing logistics, improving efficiency, reducing costs, and optimizing operations. Innovations in robotics, AI, and IoT sensors enhance picking, packing, and inventory management, while predictive analytics improve demand forecasting. Automation reduces labor dependency, addressing workforce shortages and improving workplace safety. High-density racking systems optimize storage space, further increasing efficiency. However, small businesses may struggle with the high initial investment required for automation, creating competitive disadvantages against larger companies.[xxvi] The transition to automated warehousing also requires re-training workers, and integrating automation with existing systems can be costly and time-consuming. Small businesses would benefit from having digital transformation services and favorable government policies to optimize technology trends while minimizing costs to the business. Education institutions should be prepared to upskill workers in emerging logistics technologies. Policies at education institutions and government should pave the way for these changes to occur and support more globally competitive companies.

The region is also an ideal place for the development and attraction of supply chain-related IT startups and major companies. Digital freight forwarding companies such as Makios and AizenFlow have successfully grown in the region while supporting more transparent and efficient supply chains. As noted in other parts of this strategic plan, IT companies will need advisors and mentors with specific knowledge of the supply chain technology, among other resources, to be successful.

By fostering innovation, strengthening supply chains, and capitalizing on its trade advantages, the region can drive long-term economic growth and resilience in the logistics industry. Key initiatives, such as modernizing ports of entry, addressing workforce shortages, integrating automation, and expanding air connectivity, will enhance efficiency and economic competitiveness. While challenges such as regulatory barriers, staffing shortages, and environmental concerns persist, proactive policy support and investment in digital transformation can grow the region's leadership in North American logistics.

ACTION PLAN

Business Attraction

- Target logistics companies utilizing advanced technologies that will generate more advanced technology specializations and high skilled, high paying jobs.
    - Case Study: Chattanooga's "Gig City" Strategy (Brookings Case Study) Chattanooga, Tennessee, successfully attracted IT startups by leveraging its citywide gigabit-speed internet**,** financial incentives, and strong university partnerships. Through initiatives like the GIGTANK accelerator and Innovation Districts**,** the city fostered a thriving tech ecosystem, leading to $2 billion in economic growth and the establishment of 1,500+ startups.

- Attract medical grade cold storage facilities within the Customs and Border Protection ports, especially at emerging areas such as Tornillo and Santa Teresa, to support the growth of the biomedical and value-added agriculture industries and international trade.
    - Case Study: *Port of Houston: Cold Storage Expansion (*Expansion of Cold Storage) The Port of Houston expanded its cold storage facilities to accommodate the growing demand for temperature-sensitive cargo, including pharmaceuticals. This expansion enhanced the port's capability to handle medical-grade products, supporting the regional healthcare industry and international trade.

Infrastructure

- Intensify participation in continuous lobbying campaigns for the improvement of all ports of entry, to include both traditional bridges and roadways as well as IT and human resources improvements. Advocate for the modernization of Tornillo POE and address staffing shortages at Santa Teresa POE.
    - *Case Study: The Texas Border Coalition (TBC)* (Texas Border Coalition: Advocacy for Border Infrastructure) TBC's continuous lobbying efforts have focused on modernizing ports of entry, upgrading technology, and increasing personnel to facilitate smoother cross-border trade and travel.

- Negotiate more direct flights by updating the areas' flight service feasibility study. Develop list of cities with similar industries and economic drivers to target as sister cities for direct flights, including medium-sized international destinations that cannot support direct service from cities (leveraging the hub-and-spoke model).
    - Case Study: *Istanbul Airport's Hub and Spoke System* (Top Airports) The hub-and-spoke system, pioneered by Delta Air Lines in 1955, is a transport topology where traffic planners organize routes as a series of "spokes" connecting outlying points to a central "hub." This model contrasts with point-to-point transit systems and has been widely adopted in the aviation industry to optimize route efficiency and connectivity.

Talent Development

- Support the expansion of supply chain workforce programs to build expertise around importing and exporting regulations for both U.S. and Mexico to improve ease of doing business on both sides of the border. Integrate existing programs into other universities, colleges, and departments for cross-training.
    - Case Study*: UTEP Supply Chain Management Program (* UTEP Supply Chain Management Program)The University of Texas at El Paso (UTEP) offers specialized programs in supply chain management, focusing on U.S.-Mexico trade regulations to enhance cross-border business operations.
- Support the development of robotics, AI, and logistics education programs to build a pipeline of workers that are prepared for more automated logistics operations.
    - Case Study*: The University of South Florida (USF) AI Programs* (wsj.com)USF received a $40 million donation to establish the Bellini College of Artificial Intelligence, Cybersecurity, and Computing. This new institution will offer eight undergraduate and advanced degrees, including master's and doctoral programs, aiming to enroll 5,000 students by its third year. The college emphasizes hands-on learning with local companies to address the cybersecurity talent gap.

Supply Chain Development

- Create marketing campaign targeting direct suppliers of major businesses in the region; use an inventory of local exporters' top suppliers and importers' top customers.
    - Case Study: *Walmart's Reverse Marketing Strategy* (Walmart's Reverse Marketing Strategy) Walmart, a multinational retail corporation, employs a reverse marketing approach by actively seeking out suppliers capable of producing specific products at lower costs. This strategy involves Walmart initiating contact with potential suppliers to meet its supply objectives, thereby reducing redundancies and decreasing costs within its supply chain.
- Encourage local companies to enroll in the U.S. Customs and Border Patrol's C-TPAT program to facilitate faster, easier cross-border trade.
    - *Case Study: CBP Customs and Trade Program (* Customs-Trade Partnership Against Terrorism (C-TPAT)**)** The C-TPAT program is a voluntary initiative led by U.S. Customs and Border Protection (CBP). Companies that achieve C-TPAT certification must have documented processes for identifying and mitigating risks throughout their international supply chains, which allows them to be considered low risk and benefit from expedited cargo processing, including fewer customs examinations.

Potential Specializations for Advanced Logistics Industry

Foreign Trade Zone (FTZ) Operations

Rationale: The benefits and incentives of FTZ 68, such as duty elimination and tax exemptions, make it attractive for companies handling high-value goods or imports/exports. Training in FTZ regulations and operations could create niche opportunities for businesses to serve as FTZ operators or consultants.

Focus Areas: FTZ management, customs compliance, and bonded warehousing services.

Cross-Border Trade Facilitation

Rationale: The presence of multiple ports and proximity to Mexico's maquiladoras and U.S-based foreign trade zones. Expertise in navigating cross-border regulations and expediting shipments is critical for businesses here.

Focus Areas: Customs brokerage, cross-border freight forwarding, and trade compliance consulting.

Rail Logistics and Intermodal Freight

Rationale: The Union Pacific Santa Teresa Intermodal Facility provides state-of-the-art infrastructure for rail logistics. This specialization leverages the facility's capacity for growth, AGS technology, and refrigerated container capabilities.

Focus Areas: Rail freight operations, intermodal logistics management, and refrigerated logistics.

Ground Transportation and Trucking Services

Rationale: With over 30 ground transit companies and central access to major U.S. interstates, trucking services can capitalize on the region's strategic location to support just-in-time and time-sensitive deliveries.

Focus Areas: Multimodal ground logistics, expedited trucking, and last-mile delivery.

Warehousing and Distribution

Rationale: The region's FTZ and intermodal facilities support large-scale warehousing. Advanced technologies like automated systems can improve efficiency and attract global brands.

Focus Areas: Automated warehousing, inventory management, and reverse logistics.

Third-Party Logistics (3PL) Services

Rationale: The presence of 100+ 3PL providers indicates strong demand. Entrepreneurs can establish specialized 3PL services tailored to industries such as automotive, electronics, or medical devices.

Focus Areas: Full-service logistics, including inventory management, freight brokerage, and value-added services.

Air Cargo Logistics

Rationale: The region's air cargo facilities and expanding passenger and cargo flights present opportunities for expedited delivery services, especially for perishable goods and e-commerce.

Focus Areas: Time-critical logistics, cold chain solutions, and high-value cargo handling.

Advanced Manufacturing Support

Rationale: The proximity to maquiladora plants and investment in advanced manufacturing districts creates synergies between manufacturing and logistics.

Focus Areas: Logistics solutions tailored for advanced manufacturing sectors, such as assembly-line sequencing and supply chain optimization.

Technology-Driven Logistics Solutions

Rationale: The need for efficient supply chain management across various modes of transport calls for tech solutions that enhance visibility, efficiency, and predictive capabilities.

Focus Areas: Logistics tech development, including software for supply chain optimization, GPS tracking, and IoT applications.

Environmental and Sustainable Logistics

Rationale: With global focus on sustainability, and difficulties with local air quality, leveraging rail (a greener transport mode) and investing in energy-efficient infrastructure.

Focus Areas: Green logistics, including energy-efficient transportation and carbon-neutral supply chains.

BUSINESS SERVICES INDUSTRY

Introduction – Finance Industry

To solidify its position as a thriving financial hub, the Borderplex region must implement targeted strategies that address key challenges and leverage emerging opportunities. A competitive supply chain and financial infrastructure are crucial to sustaining business expansion. Partnering with local banks and credit unions to improve financial literacy outreach will help suppliers secure funding, improve financial planning, and scale effectively. Financial infrastructure modernization can be driven by multi-sector roundtables focused on developing cross-border banking solutions tailored to manufacturing and logistics, streamlining trade finance and reducing transactional barriers between the U.S. and Mexico. To support long-term research and innovation, attracting FinTech-focused venture capital firms will help startups secure growth capital and drive financial technology advancements. Additionally, advocating for the creation or expansion of incubators and accelerators will provide entrepreneurs with the resources needed to launch and scale FinTech solutions, establishing the Borderplex region as a leader in financial innovation.

The Borderplex region possesses several key strengths that establish its potential as a financial and industrial hub. A diverse array of financial institutions, including credit unions, community banks, and national banks, provides services catering to varied financial needs. For instance, WestStar Bank supports cross-border industrial projects in northern Chihuahua, while Nusenda Credit Union promotes financial literacy and services, fostering a welcoming business environment.[xxvii]

The region's strategic location on the U.S.-Mexico border enhances its ability to leverage cross-border business opportunities, aligning with global trends like nearshoring. The Borderplex region has benefitted from nearshoring trends since the COVID-19 pandemic, and research underscores how nearshoring minimizes supply chain disruptions and increases efficiency, making the Borderplex region highly attractive for manufacturing and logistics investments.[xxviii] Policy advocacy and cross-border initiatives, such as those led by the Borderplex Alliance, further strengthen the region's connectivity. These trends and efforts have effectively pushed the economy forward, with the Borderplex Alliance and its partners seeing a spike in the investment amounts of companies moving to the region.

On the other hand, the Borderplex region faces weaknesses and external threats that must be mitigated to ensure sustainable growth. Many finance executives still flag a lack of financial literacy as a common hindrance to small business success, preventing mutually beneficial agreements from being formed. Continued financial literacy training for both brick and mortar and startup companies will be critical for ensuring successful participation and growth of locally owned small businesses. Economic uncertainty, tariffs, inflation, and global market volatility create challenges for financial hubs, particularly in regions reliant on cross-border transactions. Regulatory hurdles in Texas add complexity to loan accessibility, while the border's perceived geographic and cultural isolation undermines its visibility on a national scale.[xxix] Regulatory

friction and disparities in Mexico's financial infrastructure further complicate cross-border collaborations, with reliance on relationship-driven transactions often slowing economic progress.[xxx] The region also faces reputational risks, including perceptions about violence and heightened cybersecurity threats. The Borderplex Alliance and its partners should continue to prioritize policy advocacy and enhanced regional messaging to reshape perceptions and highlight its safety, stability, and business potential.[xxxi]

Given the complexity of cross-border transactions, local financial institutions' adoption of technologies such as fintech, AI, and blockchain can offer a pathway to modernize the regional industry's ecosystem by improving fraud detection, streamlining operations, and enabling real-time analytics. Deloitte notes that embracing such technologies enhances operational efficiency and customer satisfaction while extending market reach.[xxxii] Further, technology-driven advancements are transforming financial services globally, presenting an opportunity for the region to act quickly and take a leading role in shaping the industry through technology adoption and innovation, while strong cybersecurity talent pipelines are available to help enable safe adoption of new technology. Knowledge gaps and workforce shortages around advancing technologies must be addressed, however, to enable this modernization. Close collaborations with local educational institutions, and programs like the Binational Technology Council, would provide opportunities to address knowledge gaps and talent shortages. According to Gartner, workforce upskilling and partnerships with academia are critical to achieving sustainable growth in the digital economy.[xxxiii] The region is primed for launching successful research initiatives and research centers focused around specific cross-border problems and solutions.

By leveraging its financial diversity, strategic location, and adoption of emerging technologies, the Borderplex region can firmly become a thriving financial hub. Addressing weaknesses such as financial literacy gaps, technology skills gaps, and operational inefficiencies will enhance regional competitiveness. Meanwhile, capitalizing on opportunities in nearshoring, digital transformation, and educational collaborations can drive growth. Finally, mitigating threats through robust cybersecurity, policy advocacy, and economic diversification will ensure long-term resilience.

ACTION PLAN

Business Attraction and Expansion

- Target fintech-focused venture capital firms for expansion to the region
    - Case Study: *Bessemer Venture Partners' Expansion into India* In March 2025, Bessemer Venture Partners announced a $350 million fund dedicated to investing in early-stage startups in India, focusing on AI-enabled businesses, fintechs, and direct-to-consumer brands. This move underscores the firm's commitment to expanding its presence in emerging markets with significant growth potential in the fintech sector.

Strengthening the Workforce Pipeline

- Work with universities to strengthen alignment with industry, using tools like the Borderplex Business Services Skills Gap Analysis (2025) as a guide. Execute new programs, certifications, and internships, or make strategic adjustments to existing courses.
    - Case Study: *University of South Florida's Bellini College of AI, Cybersecurity, and Computing* In 2025, the University of South Florida (USF) launched the Bellini College of AI, Cybersecurity, and Computing, funded by a $40 million donation. The college integrates AI and cybersecurity education, offering eight undergraduate and advanced degrees. Its curriculum includes practical industry placements, ensuring graduates meet workforce demands.
- Launch workforce upskilling programs focused on FinTech, data analytics, anything as a service (XaaS), and cybersecurity tailored for financial professionals.
    - Case Study: *PNC Bank's Tuition-Free Education Initiative* In 2022, PNC Bank partnered with Guild Education to offer tuition-free degree programs for employees in areas like FinTech, data analytics, cybersecurity, and AI. This initiative enhances employee expertise in a rapidly evolving financial landscape.

Supply Chain Development

- Partner with local credit unions and banks to expand financial literacy outreach to local companies. Provide short-term and long-term financial literacy education and planning services; work with local financial institutions to provide workshops on financial products and services available locally.
    - Case Study: *Inclusiv and New York Credit Union Association (NYCUA) Partnership* In April 2021, Inclusiv and NYCUA formed a partnership to provide training, guidance, and assistance to credit unions. This collaboration aims to increase participation in Community Development Financial Institution (CDFI), Minority Depository Institution (MDI), and low-income programs, thereby expanding financial services and literacy outreach to underserved communities.

Infrastructure Development

- Organize multi-sector roundtables to discuss creating cross-border banking products tailored to manufacturing and logistics industries.
    - Case Study: *Flywire's Partnership with MSSC to Enhance Cross-Border B2B Receivables* Marsh Shipping Supply Company (MSSC), a global manufacturer of shipping solutions, faced challenges with high intermediary bank fees and delays in cross-border payments. To address these issues, MSSC partnered with Flywire to streamline its international receivables process. This collaboration led to reduced bank fees, faster payment

processing, and improved customer satisfaction, demonstrating the benefits of tailored financial solutions in the manufacturing and logistics sectors.

- Establish a banking and financing initiative addressing how to guarantee and manage risk for financing.
    - Case Study: *Financial Innovations Roundtable (FIR)* The Financial Innovations Roundtable (FIR) connects banks, community development organizations, and nonprofits to create financial solutions for underserved markets. The initiative has led to improved risk management, expanded access to capital, and innovative financial products for businesses struggling with funding.

Research and Development

- Advocate for the creation of incubators and accelerators dedicated to cross-border FinTech innovation.
    - Case Study: *Founders Factory's Support for Fintech Startups* Founders Factory, a prominent startup hub, has facilitated growth for over 300 startups by providing comprehensive support, including technology, marketing, and legal assistance. Their partnerships with corporate giants like Aviva and L'Oréal have been instrumental in co-developing successful fintech ventures, demonstrating the value of incubators in fostering innovation.

Potential Business Service Industry Specializations

Cross-Border Finance and International Business

Rationale: The region's proximity to the U.S.-Mexico border makes it a prime location for international trade, investment, and commerce.

Focus Areas:
Customs, tariffs, and global supply chain finance.
Cross-border risk assessment and investment strategies.
Financing for nearshoring and industrial projects.
Supporting SMEs with cross-border operations.

Financial Technology (FinTech)

Rationale: FinTech advancements like blockchain, AI, and IoT offer transformative potential for the financial services industry.

Focus Areas:
Digital payment systems and blockchain solutions for secure transactions.

AI-driven fraud detection and financial analytics.
Development of FinTech startups aligned with regional industries.

Cybersecurity and Risk Management

Rationale: As financial institutions digitize, securing systems and data becomes critical to building trust and ensuring stability.

Focus Areas:
Cybersecurity frameworks for financial institutions.
Risk management for digital cross-border transactions.
Regulatory compliance in U.S. and Mexican financial systems.

Data Analytics and Financial Modeling

Rationale: Big data is essential for strategic decision-making in a rapidly evolving financial landscape.

Focus Areas:
Predictive analytics and econometrics for market forecasting.
Financial modeling for investment and risk evaluation.

Introduction – IT Industry, Startups

Building upon the evolving IT industry in the Borderplex region, which benefits from a collaborative environment, strategic location, and emerging opportunities in digital transformation, several key action items have been identified to accelerate industry growth and address existing challenges. To create a thriving industry ecosystem and increase company presence, targeted business attraction and expansion efforts are essential. This includes familiarization tours to introduce external IT startups to the region, hosting technology forums to highlight the benefits of operating in the Borderplex and leveraging connections with larger companies to identify complementary IT firms that could expand into the area. Additionally, integration into supply chain development marketing initiatives will ensure IT startups are promoted alongside broader marketing efforts and promote them as essential partners for manufacturing and other non-IT sectors.

To address the persistent challenge of talent attraction and retention, strengthening the workforce pipeline is critical. This involves expanding micro-credential programs in AI and cybersecurity in partnership with higher education institutions, integrating Industry 4.0 concepts beyond robotics into high school curricula, and creating forums dedicated to startup talent strategies to help founders attract and retain skilled professionals. To foster innovation and long-term growth, the region must cultivate research and development jobs by establishing structured programs focused on IT, AI, and cybersecurity, aligning with target industries and leveraging accelerator models like Plug and Play and Gener8tor. Additionally, strengthening EdTech innovation by connecting programs such as Tech Teach with local Colleges of Education and K-12 schools will enhance

technology adoption in education. Lastly, identifying technology experts—both locally and beyond—who can train teachers and businesses, alongside developing a network of education-friendly corporate partners, will ensure the region has the right talent and resources to sustain IT industry expansion.

The community must also address other critical challenges for startup founders such as limited access to startup financing, lack of specialized mentorship, and the need for a stronger entrepreneurial culture.

The region's strengths and opportunities include a highly collaborative environment with company expansions and growing opportunities for industry-driven research, development, and commercialization. Various startup support organizations and programs have been developed in recent years as well. Weaknesses and threats must be addressed, however, as IT startups indicated the need for access to startup talent attraction and retention strategies, nontraditional financing, and specialized mentorship.

While in previous years the region has struggled to grow its IT sector, more recently the region has seen more growth. There has been an increase in startups in the area, as some have been launched locally and other startups have expanded to the area, such as Finhabits and SuperCity.AI.[xxxiv] Two startups who had a presence in the area were acquired, demonstrating the ability of a startup with a local presence to successfully exit. Further, the recent expansion by a hyperscale data center and the growing presence of IT-focused R&D by the U.S. Space Systems Command present new opportunities for growing the IT startup sector. As digital transformation accelerates, and cybersecurity becomes a critical priority to protect data and maintain trust, local cybersecurity companies will have more opportunities to start and scale. The Cybersecurity & Infrastructure Security Agency (CISA) emphasizes that robust cybersecurity frameworks are essential for safeguarding innovation-driven economies, giving cybersecurity companies a path to collaborate with IT startups.[xxxv]

The region's collaborative environment is heralded as a strength by community members, which is further enriched by the community-oriented ethos seen in startups like Jack Rabbit and New Discovery, and through initiatives like UTEP's support for FundMiner's market entry. Due to limited resources, regional startups and community stakeholders might capitalize on this collaborative environment by focusing problem-solving efforts around the regional target industries. The region's strategic location and manufacturing base provide fertile ground for startups to forge partnerships with major corporations. Cd. Juarez provides access to global players like Johnson & Johnson, Bosch, and BRP, potentially providing business opportunities for IT companies. This access has already been leveraged by some IT companies in the area. Organizing structured cross-border meetups between El Paso, Las Cruces, and Cd. Juarez could foster collaboration and strengthen the local startup ecosystem. By leveraging established industry assets and expertise, startups can more clearly identify problems and market demand before pushing certain technology solutions while using limited resources more efficiently. This is the approach startup programs such as Plug and Play and Gener8tor use when working with communities to develop their startup ecosystems. Expert-led programming, such as facilitating problem-solving between industry, government, and startup companies, can foster innovation that can be commercialized and scaled. The expansion or creation of design thinking education programs for

startups, such as the design thinking curriculum integrated into NMSU's Arrowhead programs, can further accelerate this strategy. Working with state and federal agencies and private entities to access funding and build robust innovation centers that specifically support targeted industry innovation could accelerate the success of startups and the incubator programs that support them.

IT talent pools are steadily growing, and the availability of talent is improving as educational institutions like UTEP, EPCC, and UACJ are actively working to align their programs with industry needs, such as the expanding computer science programs and UTEP's new AI Bachelor of Science degree. The Borderplex region also benefits from proximity to Latin America, offering cost-effective access to skilled labor. The globalization of talent pools is reshaping workforce dynamics, enabling startups and other IT companies to tap into skilled professionals across borders.[xxxvi] This trend is amplified by the rise of remote work and cross-border collaboration. Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI) are now available to utilize when there are gaps in training programs. For example, companies like New Discovery are using AR/VR to access training from Germany that is not available within the region. Other companies are becoming experts in providing AR/VR on the job training, such as the local company Boost Human. The World Economic Forum identifies immersive technologies such as AR/VR as critical for shaping the future of work and learning, and so continued utilization of this technology can not only help overcome the absence of certain training but also capitalize on a more in-depth learning experience.[xxxvii]

The evolution of education systems to meet the demands of a digital economy is critical for addressing global skills gaps. Universities in the region, including UTEP and UACJ, are working to modernize curricula to match industry needs. Given that startups face limited funding for salaries and benefits, making talent attraction and retention extremely difficult, startup founders need support with human resources strategies and even incentives to support their ability to hire and retain the right talent. A global shift toward knowledge-based industries underscores the importance of upskilling and retaining talent.[xxxviii] Further, access to funding is directly related to startups building strong teams.

Despite the region's strengths and opportunities, startups struggle to find talent with specific skillsets, and talent is often pulled away to companies and markets that pay higher salaries. There is also a pressing need for more support in areas such as financial literacy, business development, marketing, and scaling strategies.

Local startups also often struggle with limited access to local venture capital. Their reliance on external investors highlights the need for a stronger local funding ecosystem. The growth of the region's venture capital ecosystem is critical for enabling startups to scale and innovate because regions with strong local funding channels better prepare startups for sustained growth.[xxxix] Local startups have had difficulty in finding local investors and have had to identify investors from outside the region. This is especially true for startups in Cd. Juarez, despite having many Fortune 500 companies in the area since local maquiladoras rely on external funding. Not only can this hinder the growth and survival of local startups, but it can also jeopardize the community's ability to keep its homegrown startups in the area.

Developing a robust local funding ecosystem could empower startups to stay and grow in the region while creating coveted IT jobs. Existing venture and angel funds such as No Border Ventures, Sun Cruces Angels, and Joseph Advisory are examples of ventures that could be grown to support the local ecosystem. (See Startup Financing section.) This would enable technology transfer, localized R&D, and product innovation tailored to regional needs. Tailoring marketing efforts towards additional venture capital firms that focus on the region's target industries and emerging IT niches may help attract needed capital.

Further, although technical skills are abundant, local entrepreneurs often lack business acumen and an entrepreneurial mindset needed to scale their businesses. Fostering a culture of grit, accountability, and hustle is another opportunity for local startups to thrive. As emphasized in discussions with Plug and Play, investors are more likely to support startups that demonstrate resilience and the ability to tackle significant problems. Encouraging this mindset in local startups will help ensure long-term success.

Additionally, the region's absence of mentors with specific expertise that matches startups' business models leaves entrepreneurs without critical education and guidance needed to be competitive with similar businesses. While local expertise may be unavailable for some business types, creating access to mentors outside the region through digital means could be a solution. Mentorship programs aimed at building confidence and entrepreneurial skills are also essential. These programs will help local entrepreneurs refine their skills and create the mental framework needed to grow successful companies. Moreover, bringing outside success stories into the region through accelerators and collaborations can inspire local entrepreneurs and demonstrate the qualities of successful ventures. This exchange of ideas and experiences will foster innovation and encourage local entrepreneurs to adopt best practices from successful companies. By providing entrepreneurs with access to seasoned mentors, along with tailored education and events for startups, the region can help more founders prepare for scaling their businesses.

The Borderplex region has strong potential for IT industry growth, supported by its strategic location, collaborative ecosystem, and expanding digital transformation opportunities. To fully leverage these strengths, efforts must focus on attracting and creating IT startups, strengthening the talent pipeline, expanding funding opportunities, cultivating an entrepreneurial mindset, and fostering industry collaborations will create an environment where startups can scale successfully, and the region can thrive as a competitive hub for technology and innovation. Talent retention, limited local venture capital, and a lack of specialized mentorship must be addressed by enhancing startup support systems. Integrating IT startups into supply chain initiatives, fostering education-industry partnerships, and driving R&D-focused innovation will help accelerate progress. With strategic investment in talent, funding, and collaboration, the Borderplex region can become a thriving center for innovation, where IT startups grow, industries transform, and new opportunities drive long-term economic success.

ACTION PLAN

Business Attraction and Expansion

- Work with larger companies to identify complimentary IT companies and startups from outside the region that the community can invite for familiarization tours. Host technology forum to open dialogue about the benefits for startups in the Borderplex region.
    - Case Study: *Vienna Business Agency's Strategy to Attract Foreign Startups* The Vienna Business Agency has successfully positioned Vienna as a hub for international startups by implementing strategic initiatives. One key approach is organizing events like ViennaUP, which fosters a collaborative ecosystem by bringing together startups, investors, and other stakeholders. This strategy not only showcases Vienna's unique value proposition but also facilitates networking and integration for foreign startups considering relocation. By hosting targeted events and fostering a supportive ecosystem, Vienna effectively attracts foreign IT startups, demonstrating the potential benefits of similar initiatives in the Borderplex region.

Supply Chain Development

- Market IT startup projects and IT companies by including within indirect industry marketing documents and promotional events, especially manufacturing and other non-IT target industry audiences. Utilize various mediums, such as the Borderplex Supplier Brief and national publications.
    - Case Study: *Siemens' Integration of AI in Supply Chain Management* Siemens has effectively integrated Artificial Intelligence (AI) into its supply chain operations, enhancing efficiency and resilience. By collaborating with partners like Supplyframe and Microsoft, Siemens developed AI-driven solutions that provide a comprehensive view of its supply chain, enabling better risk assessment and decision-making. This integration not only improved operational efficiency but also demonstrated Siemens' commitment to innovation, making it an attractive partner for IT startups and companies. Siemens' successful incorporation of AI into its supply chain highlights the benefits of showcasing IT projects within manufacturing contexts. By promoting such integrations through targeted marketing materials, regions can attract IT companies and startups, fostering a thriving industry ecosystem.

Strengthening the Workforce Pipeline

- Work with institutions of higher learning to provide micro credentials around AI.
    - Case Study: *University of South Florida's Free AI Micro-Course* The University of South Florida (USF) launched a redesigned micro-course on

generative AI, free and open to the public. The initial course, introduced in 2023, attracted over 4,500 participants, indicating strong interest and the potential impact of such programs on community engagement and workforce development. USF's initiative demonstrates how universities can effectively offer accessible AI education to a broad audience, enhancing community skills and contributing to a more robust workforce pipeline.

- Create a forum around startup talent attraction and retention strategies.
    - Case Study: *European Tech Founders' Initiative to Invest in Young Entrepreneurs* In 2023, over 120 European tech founders, including leaders from companies like Shopify and Klarna, collaborated to mentor and invest in young entrepreneurs aged 18 to 25 through "Project Europe," a €10 million fund led by venture capitalist Harry Stebbings. This initiative aims to combat the brain drain to the U.S. and foster innovation within Europe by providing €200,000 per project and mentorship from seasoned entrepreneurs. By supporting young talent, the project seeks to strengthen Europe's competitiveness in the global tech landscape. The European Tech Founders' collaborative approach in mentoring and investing in young entrepreneurs demonstrates the effectiveness of experienced leaders actively engaging in talent development.
- Integrate basic knowledge of Industry 4.0 technology (beyond robotics) in high school curricula.
    - Case Study: *Connecticut's Pilot AI Education Program* In 2025, the Connecticut State Department of Education launched a pilot program across seven school districts—East Hartford, Rocky Hill, Lebanon, Waterford, Westport, Seymour, and the Odyssey Community School in Manchester—to integrate artificial intelligence (AI) into the curriculum for students in grades 7-12. This initiative provides hands-on experience with AI tools, including feedback systems and one-on-one tutoring, aiming to enhance students' critical analysis skills and their ability to interact effectively with AI technologies. The program also offers professional development for educators to ensure effective implementation and aims to serve as a model for statewide AI integration in education.
- Identify experts in technology who can teach the region's teachers and businesses. May look outside region for expertise. Create a list of education-friendly corporate partners.
    - Case Study: *AT&T's Collaboration with Texas A&M for Digital Literacy* AT&T partnered with the Texas A&M Foundation to enhance digital literacy in rural Webb County, Texas. The collaboration provided computer skills training for residents aged 19-49, demonstrating AT&T's commitment to supporting educational initiatives. This partnership highlights how

corporations can play a pivotal role in community education by offering resources and expertise.

Research and Development

- Create programs that facilitate research and development programs related to IT, AI, and cybersecurity that also align with target industries, such as Plug and Play and Gener8tor.
    - Case Study: *Texas Cyber Command Initiative* In 2024, Governor Greg Abbott announced the establishment of the Texas Cyber Command in San Antonio, aiming to bolster the state's defenses against escalating cyber threats. This initiative leverages San Antonio's robust cybersecurity ecosystem, which includes over 17,000 professionals and numerous tech companies. The command plans to collaborate with the University of Texas at San Antonio (UTSA) and other state universities to enhance research and development in cybersecurity and related fields.

- Connect organizations such as Tech Teach by the STTE Foundation and Microsoft with the region's Colleges of Education and K-12 school systems to expand EdTech innovation.
    - Case Study: *Microsoft's Collaboration with Khan Academy to Enhance K-12 Education* In May 2024, Microsoft partnered with Khan Academy to integrate artificial intelligence into K-12 education. This collaboration introduced 'Khanmigo,' an AI-powered teaching assistant, providing teachers with free access to advanced educational tools. The initiative aimed to support educators in delivering personalized learning experiences and enhancing student engagement through innovative technology.

POTENTIAL IT INDUSTRY SPECIALIZATIONS

Cybersecurity and Data Protection

Rationale: A strong foundation of cybersecurity education programs and companies offering cybersecurity services.

Focus Areas:
Network security and ethical hacking.
Cryptography and information assurance.
Cyber threat intelligence and risk management.

Artificial Intelligence and Machine Learning

Rationale: The AI programs at UTEP and NMSU along with many other engineering programs that integrate AI and ML education.

Focus Areas:
Machine learning for predictive analytics and automation.
AI-driven cybersecurity solutions.
AI applications in healthcare, manufacturing, logistics, and education.

Big Data and Data Science

Rationale: Regional initiatives and programs in data analytics align with the growing importance of big data in decision-making.

Focus Areas:
Real-time analytics for supply chain and trade optimization.
Data mining and statistical analysis.
Business intelligence and visualization.

Cross-Border IT Solutions

Rationale: The region's proximity to Mexico enables unique opportunities for cross-border IT solutions tailored for trade and compliance.

Focus Areas:
IT support for cross-border trade.
Compliance systems for international cybersecurity standards.
Logistics and supply chain management IT systems.

IT for Target Industries

Rationale: Tailoring IT solutions for healthcare, manufacturing, and logistics industries can address local needs.

Focus Areas:
IT systems for advanced manufacturing (Industry 4.0).
Logistics optimization with IoT and real-time analytics.
Health IT solutions for medical data management and telehealth.

Digital Transformation for Businesses

Rationale: Helping businesses modernize IT systems and integrate advanced technologies aligns with regional economic development goals.

Focus Areas:
Legacy system modernization.
IT project management and strategy.
Digital literacy and workforce upskilling.

Introduction - Data Center Industry

The increasing demand for AI services has created vast opportunities for data centers and data center suppliers. The global AI data center market size was estimated at $13.62 billion in 2024 and is projected to grow at a CAGR of 28.3% from 2025 to 2030.[xl] In the Borderplex region, the recent expansions of hyperscale and mid-point data centers, along with the expansion of several data center suppliers, together have built a foundation on which to build a new data center industry. These expansions can attract more companies in the data center supply chain, connect local suppliers with major customer opportunities, and ignite R&D opportunities in the data center industry. To build and maintain a competitive edge in the global market, the Borderplex region must proactively support the emerging data center industry by leveraging strategic partnerships and targeted initiatives. A comprehensive business attraction strategy will promote the region as a premier data center hub through a marketing campaign aimed at data center suppliers. The Borderplex's electronics manufacturers, along with strong cybersecurity ecosystem, cross-border logistics capabilities and strong talent pipelines will serve as key differentiators in attracting these companies.

Further, small businesses can be integrated into the industry by leveraging programs that foster connections with major companies in the data center supply chain. Developing a strong talent pipeline is essential to sustaining this growth. Advocating for workforce development programs tailored to data center firms will ensure that curricula align with industry needs, and launching workforce attraction initiatives modeled after successful programs will help draw skilled IT professionals to the region to sustain and growth the industry. Research and development initiatives can drive advancements in areas such as high-performance computing, AI applications, and cybersecurity. Identifying specializations and establishing the region as a leader in specific areas will further cement its role as a powerhouse in the data center industry.

The Borderplex region's expertise in energy efficiency and green data center initiatives offers a significant advantage. For example, companies like Eaton and Schneider Electric, who supply the data center industry, specialize in energy-efficient power solutions. Data center suppliers such as Wistron and Inventec further enhance the area's attractiveness for data centers and data center suppliers. The region's IT and cybersecurity suppliers and education programs will enable the development of various IT-related specializations. Cybersecurity will be fundamental within the data center supply chain, and several local cybersecurity companies already play a role in securing digital assets. Additionally, the growing demand for cloud computing and virtualization presents a major opportunity for data center expansion. Companies like Varay Managed IT and Novatech Systems provide scalable IT solutions that can integrate seamlessly with data center operations. UTEP's Cybersecurity Boot Camp and EPCC's cybersecurity and IT certification programs can be expanded to include specialized training for data center technicians, vendor-specific certifications,

and upskilling programs focused on emerging technologies. Education institutions can further develop certification programs in cloud technologies, ensuring a steady supply of skilled professionals ready to support cloud infrastructure, hybrid-cloud architecture, and disaster recovery solutions.

As artificial intelligence and machine learning become increasingly critical in optimizing data center efficiency, a talent pipeline in AI will become more essential. The UTEP and NMSU specialized AI and machine learning programs will provide access to graduates who can enhance data center operations through predictive analytics, resource allocation, and cybersecurity enhancements. This technological advantage can help data centers in the region operate more efficiently, reducing energy consumption and improving overall performance. High-performance computing (HPC) is another specialization that aligns with the region's existing education strengths in computational research.[xli] Strengthening collaboration between academic institutions and data center operators can support data-intensive applications, scientific research, and AI-driven innovations.

More aspirational specializations could be developed by leverage the region's unique binational location and target industries. Cross-border data compliance is an area where the region could excel, given its strategic location along the U.S.-Mexico border.[xlii] Expanding expertise in cross-border data management, regulatory compliance, and secure IT solutions tailored to binational industries can attract more multinational companies to establish data center operations in the region. Finally, adoption of edge computing and IoT infrastructure support would further enhance the region's competitive advantage by improving operational efficiency, reducing latency, and enabling real-time data processing.[xliii] With logistics and manufacturing industries relying on real-time data processing, developing edge data center infrastructure can improve efficiency and responsiveness. By laying the groundwork for IoT applications in healthcare, automotive, and manufacturing sectors, the region can become a hub for next-generation data solutions.

By leveraging its strong manufacturing base, skilled workforce, and growing expertise in AI, cybersecurity, and cloud computing, the Borderplex region can emerge as a leading data center hub. Strategic partnerships, workforce development programs, and specialization in high-performance computing and cross-border data compliance will enhance its competitive advantage. With a focus on sustainability and next-generation technologies like edge computing, the region can attract investment, drive innovation, and establish itself as a powerhouse in the global data center industry.

ACTION PLAN

Business Attraction

- Conduct marketing campaign towards data center suppliers in concert with existing data centers and suppliers, using a data center supply chain gap analysis to target companies to

fill gaps. Promote the Borderplex region as a data center hub by showcasing existing companies like Schneider Electric, Eaton, and Pegatron while leveraging recent expansions in power electronics manufacturing. Focus particularly on region's strong cybersecurity ecosystem and cross-border logistics capabilities to grow those industries.

- Case Study: *Comprehensive Gap Analysis in the Greater Lima Region, Ohio* In August 2016, the Greater Lima Region in Ohio undertook a comprehensive gap analysis to examine its regional supply chains. This initiative aimed to develop a Collaborative Growth Plan by identifying gaps and opportunities within the local supply chain infrastructure. The analysis facilitated a deeper understanding of the region's economic landscape, enabling stakeholders to strategize effectively for sustainable growth.

Talent Pipeline Development

- Advocate for the creation of workforce development programs in support of data center firms to upskill workers in adjacent industries.
  - Case Study: *Blackstone's Data Center Academy* In response to a projected labor shortfall in the data center industry, Blackstone launched the Data Center Academy through its QTS data centers. This program aims to identify and train candidates for specialized technical roles within data centers. Since its inception, the initiative has successfully onboarded over 100 new hires, with a significant percentage transitioning to full-time positions and receiving promotions. This effort is part of Blackstone's broader Career Pathways program, established in 2020, which has employed over 10,500 underrepresented individuals across its portfolio companies.
- Strengthen collaboration between data center industry leaders and academic institutions to align curriculum with industry needs, focusing on AI integration, high-performance computing, and edge computing, and other necessary data center-related education programs at regional colleges and universities. Support the development of certification and training programs in data center operations.
  - Case study: *Penguin Solutions' AI and HPC Infrastructure for Higher Education* Penguin Solutions collaborates with academic institutions to design, build, deploy, and manage AI and HPC implementations tailored to specific performance and budgetary needs. These partnerships address challenges such as data collection complexities and regulatory requirements, ensuring that educational programs remain aligned with industry standards. This collaboration supports the development of certification and training programs in data center operations, equipping students with practical skills applicable to the evolving demands of the data center industry.

- Work with partners to launch workforce attraction initiatives to bring skilled IT professionals to the region.
  - Case Study: *Upstate South Carolina's "Move Up" Initiative* To address the growing demand for IT talent, Upstate South Carolina launched the "Move

Up" initiative, aiming to showcase the region's job opportunities and quality of life. The initiative introduced a dedicated brand and website, MoveUpstateSC.com, highlighting available positions and the region's lifestyle benefits. Spearheaded by Upstate SC Alliance, the program received support from local chambers of commerce and organizations, reflecting a unified regional approach. The initiative effectively attracted talent by promoting the region's vibrant and innovative environment, contributing to economic growth and community development.

Supply Chain Development

- Connect a variety of local suppliers with the data center industry to expand the data center supply chain while creating customer opportunities for local companies.
    - Case Study: *Expo Equipment Sales* Expo Equipment Sales specializes in connecting buyers with specialized machinery by leveraging their extensive industry contacts and in-depth knowledge of manufacturers, operating without the use of online platforms.

Infrastructure Development

- Work with local power manufacturers and other local stakeholders to develop micro mobile data centers to strengthen the data center supply chain.
    - Case Study: *Eaton's Micro Mobile Data Centers* Eaton, among other tech giants, has been instrumental in developing micro mobile data centers to meet the growing demand for scalable and efficient data center solutions.

Research and Development

- Support collaboration between regional universities and industry partners to drive advancements in high-performance computing and AI applications for data centers.
    - Case Study: *Hartree Centre's Partnership with IBM* The Hartree Centre, part of the UK's Science and Technology Facilities Council, has established a long-term partnership with IBM to enhance its HPC capabilities. This collaboration provides the center with access to IBM's data-centric and cognitive computing technologies, including IBM Watson. The partnership aims to accelerate research and development across various sectors, enabling businesses to leverage advanced computing resources for innovation.
- Encourage the development of cybersecurity and threat intelligence solutions to establish a clear niche in data protection and managed security services.
    - Case Study: *Texas Cyber Command in San Antonio (*expressnews.com) In a move to bolster state cybersecurity defenses, Governor Greg Abbott announced the establishment of the Texas Cyber Command in San Antonio. This initiative leverages San Antonio's robust cybersecurity industry, which

includes over 17,000 professionals and numerous tech companies. The command aims to shield the state against rising cyber threats and will partner with the University of Texas at San Antonio (UTSA) and other state universities and agencies. This collaboration underscores the importance of integrating academic expertise with practical cybersecurity operations to enhance regional security infrastructure.

Potential Specializations for the Data Center Industry

Cybersecurity and Data Protection

Rationale: Strong regional emphasis on cybersecurity services with companies like Masser Technologies, GamwellTech, and Makios Technology. A competitive talent pool supported by educational programs in cybersecurity at UTEP, NMSU, and EPCC. Proximity to major cybersecurity firms hiring local talent. High regional salaries for cybersecurity professionals indicate strong demand.

Focus Areas:
Managed security services.
Data breach response and threat intelligence.
Network and cloud security integration for data centers.

Cloud Computing and Virtualization

Rationale: Companies like Varay Managed IT and Novatech Systems already provide scalable IT solutions and cloud services. Growing demand for cloud computing expertise, supported by EPCC and UTEP's certification programs in cloud technologies. Cloud computing services are integral to modern data center operations, aligning with regional IT training and business needs.

Focus Areas:
Virtualized infrastructure deployment and maintenance.
Multi-cloud and hybrid-cloud architecture.
Disaster recovery and data replication.

Artificial Intelligence (AI) and Machine Learning (ML) Integration

Rationale: UTEP and NMSU offer specialized programs in AI and ML, producing graduates capable of implementing data-driven decision-making technologies. AI is critical for optimizing data center operations, including energy management, predictive maintenance, and performance analytics.

Focus Areas:
AI for resource allocation and cooling optimization.
Predictive analytics for hardware lifecycle management.
Machine learning algorithms for cybersecurity enhancements.

Energy Efficiency and Green Data Centers

Rationale: The region's expertise in clean energy and microgrid solutions supports innovation in sustainable data center operations. Companies like Eaton and Schneider Electric provide resources for energy-efficient technologies. UTEP and NMSU research initiatives in energy and grid modernization align with green data center development.

Focus Areas:
Development of energy-efficient cooling systems.
Power electronics for sustainable operations.
Integration of renewable energy sources.

Cross-Border Data Compliance and IT Solutions
Rationale: The Borderplex region's proximity to U.S.-Mexico trade routes demands compliance with cross-border data regulations. Regional IT companies already cater to manufacturing, logistics, and healthcare industries with specific data compliance needs.

Focus Areas:
Cross-border data management and compliance systems.
IT solutions tailored to binational manufacturing and logistics firms.
GDPR and CCPA compliance for international data centers.

High-Performance Computing (HPC)

Rationale:
UTEP and NMSU focus on advanced computational research, which can support high-performance computing systems for data-intensive applications.
HPC is essential for industries like AI, scientific research, and big data analytics.

Focus Areas:
Design and management of HPC clusters.
Application of HPC in AI research and analytics.
Collaboration with regional research centers like UTEP's Cyber-ShARE Center.

Edge Computing and IoT Support

Rationale:
Borderplex's logistics and manufacturing industries benefit from real-time data processing enabled by edge computing.
IoT applications in healthcare, automotive, and manufacturing align with data center needs.

Focus Areas:
Edge data center design and deployment.
Support for IoT infrastructure and applications.
Latency optimization for real-time data processing.

LIFE SCIENCES

Introduction – Healthcare Delivery Industry

The healthcare delivery industry in the Borderplex region faces a mix of strengths and challenges, requiring a strategic approach to ensure long-term sustainability. Key initiatives focus on business attraction and expansion, supply chain development, and strengthening the workforce pipeline. Addressing issues like labor shortages, financial pressures from reimbursement rates, and supply chain vulnerabilities will be essential to enhance healthcare infrastructure and improve access to high-quality care. By leveraging existing strengths, such as expanding medical education and technological advancements, the region aims to align with global healthcare trends and create a more resilient system.

To achieve these goals, targeted actions include advocating for reimbursement policy changes, improving hospital efficiency, and strengthening local supply chains by connecting healthcare providers with certified suppliers. Workforce development efforts will prioritize expanding training programs, increasing residency slots, and marketing the region to healthcare professionals. Collaboration between educational institutions, workforce boards, and industry leaders will help bridge skills gaps and improve retention. These strategic steps will not only support healthcare providers but also foster economic growth and innovation in the region's healthcare delivery industry.

The region's growing population and the shift to Affordable Care Act (ACA) marketplace coverage present opportunities for healthcare providers to expand their services and meet the increasing demand for healthcare. Economic growth in the region has also led to the construction of new hospitals, which are often located in developing areas, such as planned neighborhoods and new industrial parks. This expansion supports the increasing demand for healthcare services, creates quality jobs, and drives economic growth. A hindrance to continued infrastructure and operational expansion is the lingering effects of the pandemic that continue to disrupt the healthcare supply chain. Further, local suppliers struggle to meet the demands of large healthcare systems, and the reliance on national suppliers for large-scale equipment and medical supplies adds complexity to the supply chain and introduces potential delays and costs in meeting healthcare demand. This can be addressed in part by working with healthcare providers to identify qualified local suppliers and to attract suppliers that can fill supply chain gaps.

The adoption of advanced healthcare technologies such as electronic health records (EHRs), telemedicine, and AI-driven diagnostics is revolutionizing care delivery and operational efficiency. Investments by providers like Del Sol Medical Center in healthcare technology create opportunities to enhance patient care, improve efficiency, and attract tech-savvy professionals. Deloitte emphasizes that digital health advancements are pivotal in addressing global healthcare

challenges and improving accessibility.[xliv] Their research highlights how technologies like virtual care and artificial intelligence (AI) are transforming healthcare delivery, shifting from reactive acute care to proactive, personalized approaches. These innovations facilitate specialized care in 'smart' hospitals and enable cost-effective home care through AI-powered contact centers and wearable biosensors, thereby enhancing patient access and outcomes.[xlv] Healthcare providers like Del Sol Medical Center are making significant investments in technology and service lines. These continuous improvements will enhance the overall quality of care and ensure that the region can meet the healthcare needs of its population.

The growth and technology enhancements in the healthcare delivery industry are supported by various medical education programs. In recent years, many new healthcare-related schools have been stood up, and programs across healthcare occupations have expanded. Medical training programs at Burrel College, UACJ, UTEP, and Texas Tech have been fundamental to ensuring the growth and sustainability the healthcare delivery industry, while initiatives like the expansion of residency programs at Texas Tech help retain high demand graduates.

However, staffing shortages remain a persistent problem, exacerbated by the lingering effects of the COVID-19 pandemic. High burnout rates and generational shifts in expectations make it difficult to recruit and retain healthcare professionals. Younger workers tend to prioritize work-life balance, but steady hours for work-life balance are challenging to get in healthcare roles that require availability at various times. The Borderplex region faces critical shortages in nurses and technical medical occupations, amplified by high turnover and generational shifts in workforce expectations around salaries. These shortages put added pressure on healthcare providers' budgets. This issue can be tackled by taking concerted steps towards further expanding education programs around high demand nursing and healthcare technical programs, which can be done in concert with establishing K-12 programs aimed at encouraging students to pursue high demand medical professions. To address college professor shortages, supplemental financial incentives may be offered to healthcare professionals for teaching healthcare college courses.

Attracting and retaining physicians remains a complicated challenge for the region, requiring multi-part solutions. Factors like high patient loads and the associated burnout, inadequate compensation that is exacerbated by reimbursement problems, and quality of life concerns deter healthcare professionals and their spouses from relocating to or remaining in the region. Without a holistic solution to this multipronged issue, the physician shortage is likely to persist. On the bright side, the region has been diligently addressing this issue, with new and expanded medical schools and a steady increase in residency slots. One example of success was in March 2025, when 21 Texas Tech medical students selected to stay in El Paso for their residency program, improving the number of graduates retained from 0% of their graduating class in 2015 to 20% of the graduating class in 2025. Research from the Association of American Medical Colleges (AAMC) highlights that physicians are 57% more likely to stay in the regions where they complete their training.[xlvi] Therefore, continuing to expand residency slots could lead to higher physician retention, which can also ease the burnout of physicians and reduce the need to attract physicians and their spouses from outside the region.

Additionally, to better manage physician burnout and improve business sustainability, the financial strain from reimbursement issues should be addressed. The gap between rising healthcare costs

and stagnant reimbursement rates, particularly from government programs, is putting pressure on healthcare providers' profit margins. This is especially problematic in El Paso and Las Cruces, where a high percentage of patients are government-insured or uninsured, further straining the financial stability of healthcare institutions. Globally, rising healthcare costs are outpacing reimbursement rates from government programs, creating financial strain for providers. Local reliance on Medicare, Medicaid, and uninsured patients exacerbates financial pressures. Providers must navigate this gap to ensure sustainability. PwC notes that addressing reimbursement challenges is critical for maintaining healthcare system stability, particularly because healthcare provider costs are expected to rise as much as 8% in 2025.[xlvii]

In conclusion, the healthcare delivery industry in the Borderplex region is experiencing significant growth, driven by population increases, economic expansion, and advancements in medical education and technology. However, challenges such as staffing shortages, supply chain vulnerabilities, and financial pressures from reimbursement issues must be addressed to ensure long-term sustainability. Strategic efforts to expand residency slots, strengthen local supply chains, and advocate for reimbursement policy changes will be crucial in overcoming these barriers. By fostering collaboration between healthcare providers, educational institutions, and industry leaders, the region can build a more resilient healthcare system that meets the needs of its growing population while driving economic development and innovation.

ACTION PLAN

Business Attraction and Expansion

Healthcare Delivery

- Advocate for policy changes to reimbursement formulas by researching decision-makers, review timelines, and exceptions, while pushing for a border-city exception to address mismatches between expenditures and reimbursement rates.
    - Case Study: *Texas Medicaid Reimbursement Challenges in Border Regions* A study examining Texas hospitals revealed that those located in border counties experience higher 30-day readmission rates for conditions like heart failure and pneumonia compared to non-border hospitals. Factors such as lower registered nurse staffing levels and unique demographic characteristics contribute to these disparities, highlighting the financial and operational challenges faced by border hospitals under current Medicaid reimbursement structures. The elevated readmission rates and associated challenges in Texas border hospitals underscore the need for tailored Medicaid reimbursement policies that consider the unique circumstances of border regions, aiming to improve healthcare outcomes and financial viability.
- Connect efficiency programs for hospitals to help streamline processes for higher quality healthcare delivery.

- Case Study: *Denver Health's Adoption of Lean Management Principles* Denver Health became one of the first U.S. health systems to implement lean management principles, originally developed by Toyota to minimize waste and optimize processes. This initiative led to significant improvements, including an 80% immunization rate among low-income children and the lowest observed-to-expected mortality rate among 117 academic health centers nationwide. Financially, Denver Health achieved stability while providing over $4.7 billion in care to the uninsured without increased financial support from the City of Denver. The successful implementation of lean principles transformed Denver Health into a national model for high-quality, cost-efficient healthcare.

Supply Chain Development

- Leverage Borderplex Buyer Supplier Program to collect and communicate all hospital supplier opportunities from different healthcare companies to assist both buyers and local suppliers.
  - Case Study: *Associated Equipment Distributors* Organizations like the Associated Equipment Distributors (AED) have long facilitated connections between buyers and suppliers through established industry relationships and networking events, underscoring the importance of personal interactions in the procurement process.
- Work directly with healthcare providers to identify supply chain gaps and conduct marketing and familiarization tours for key suppliers.
  - Case Study: *AdventHealth's Supply Chain Excellence* AdventHealth achieved the top position in Gartner's 2024 Healthcare Supply Chain Top 25 ranking, reflecting its commitment to supply chain innovation and collaboration. The organization focused on supporting clinical teams by ensuring they have the necessary tools and resources to provide exceptional patient care. This recognition underscores AdventHealth's dedication to supply chain excellence and its role in enhancing overall healthcare delivery.
- Collaborate with hospitals to identify necessary supplier certifications, such as ISO 13485 and Current Good Manufacturing Practices (CGMP) and assist local suppliers in obtaining these certifications.
  - Case Study: *STANLEY Healthcare's Supplier Quality and Excellence Handbook* STANLEY Healthcare developed a handbook to guide suppliers in meeting quality and regulatory requirements, including ISO 13485 and CGMP. The Handbook outlined the necessity for suppliers to comply with FDA regulatory requirements codified in 21 CFR Part 820 or embodied in ISO 13485/ISO 9001. It also provided guidance on change management and the importance of notifying STANLEY Healthcare of changes made to materials. The impact was enhanced supplier compliance with regulatory standards, ensuring the quality and safety of medical devices.

Strengthening the Workforce Pipeline

Healthcare Delivery

- Partner with workforce boards, higher education institutions, and other nonprofits to identify skills gaps for the highest demand occupations, and to modify existing programs, create new training programs, and develop high-quality internship programs.
    - Case Study: *Craven Community College and CarolinaEast Health System Partnership* Craven Community College collaborated with CarolinaEast Health System to address local healthcare workforce challenges. This partnership involved aligning educational programs with the specific needs of the health system, leading to the development of tailored training and internship opportunities. As a result, the initiative successfully bridged skills gaps and enhanced employment prospects for graduates in the local healthcare sector.
- Create a marketing plan that promotes the quality of life for individuals such as physicians who provide a critical service to the community; share among healthcare delivery partners.
    - Case Study: Kaiser Permanente's Recruitment Strategy Kaiser Permanente's Southern California Permanente Medical Group (SCPMG) collaborated with Rhythm Agency to enhance their physician recruitment efforts through a comprehensive digital marketing strategy. The initiative involved migrating and optimizing their website, implementing lead generation campaigns, and conducting user journey analyses to better understand physician candidates. This targeted approach resulted in a 157% increase in organic website traffic within three months, effectively attracting physicians by showcasing the organization's commitment to innovation, work-life balance, and community impact.

Potential healthcare delivery Specializations

Advanced Healthcare Technologies

Rationale: Technological advancements such as electronic health records (EHRs), telemedicine, and AI-driven diagnostics can enhance operational efficiency and patient care. Investments by providers like Del Sol Medical Center highlight the potential for technology to address accessibility and quality gaps.

Focus Areas:
Implementing AI-driven diagnostics and predictive analytics to optimize care delivery
Expanding telemedicine capabilities to reach underserved and remote populations

Leveraging digital health tools to improve operational efficiency and reduce costs

Pandemic-Resilient Supply Chains

Rationale: The COVID-19 pandemic exposed vulnerabilities in global and national supply chains, underscoring the importance of local resilience. Strengthening the local healthcare supply chain will improve responsiveness to future crises.

Focus Areas:
Building local manufacturing and distribution capacity for essential medical supplies
Establishing partnerships to ensure consistent supply chain operations
Implementing technologies to track and optimize supply chain logistics

Introduction - Medical Device Manufacturing Industry

The medical device industry in the Borderplex region stands at a critical juncture, driven by the global realignment of supply chains and the increasing reshoring of manufacturing from China to North America. Cd. Juarez's established manufacturing expertise and proximity to U.S. markets create a unique opportunity for the region to grow into a premier hub for medical device production. However, several barriers must be addressed to fully capitalize on this opportunity, including tariffs and uncertain trade agreements, talent retention challenges, supply chain gaps, limited R&D infrastructure, and inadequate access to capital. Many startups struggle to secure funding, while manufacturers face supply chain inefficiencies in securing plastics, chemicals, and sterilization capabilities. Additionally, the high cost and limited availability of lab space hinder innovation and commercialization, making it difficult for startups and research institutions to scale new medical technologies.

To address these challenges and strengthen the Borderplex's competitive advantage, targeted actions must focus on workforce development, supply chain enhancement, innovation support, and infrastructure expansion. Developing a strong talent pipeline through industry-driven training programs and workforce partnerships will help retain skilled workers and meet industry demand. Strengthening local supply chains through supplier development programs, regional collaborations, and incentives for material production (plastics and chemicals) will ensure a resilient manufacturing base. Expanding R&D support for MedTech startups via accelerators, funding initiatives, and university-industry partnerships will fuel innovation and commercialization. Finally, conducting a gap analysis of clean room facilities and critical infrastructure needs will ensure the region has the necessary resources to support advanced medical device manufacturing. By implementing these strategies, the Borderplex region can emerge as a global force in medical device innovation, manufacturing, and economic growth.

Overall, the Borderplex's medical device industry faces significant opportunities for innovation and economic growth as well as many challenges. A major global trend is the realignment of supply chains, driven by geopolitical tensions and economic factors. Manufacturing is increasingly

moving from China to the United States and Mexico. With Cd. Juarez's manufacturing expertise and proximity to U.S. markets, the region is well-situated to capitalize on this trend.[xlviii] Global regulatory landscapes, including FDA processes, are evolving to ensure patient safety and device efficacy. These changes present challenges and opportunities for companies in the Borderplex to navigate stringent requirements and innovate more effectively within compliant frameworks.[xlix]

The Borderplex benefits from robust training programs tailored to local industry needs, particularly in engineering and FDA regulatory knowledge. These programs create a talent pipeline equipped to meet the industry's growing demands.[l] There is also a strong emphasis on engineering and technical fields tailored to local processes and products. This focus on skill development, particularly in patent law and FDA regulations, is key to supporting the growing medical device industry, which has seen increasing demand for specialized knowledge. Developing clear specializations and communicating those specializations with education institutions will help create an even more focused and robust talent pipeline to strengthen the industry. Alignment of curriculum to industry needs can be achieved by bringing companies and universities together to identify top occupations, skillsets, certifications needed. Conversely, one of the primary hindrances to growth in the medical device manufacturing industry is talent retention. Many highly skilled individuals leave the region in search of better opportunities, creating a brain drain that hampers the long-term growth of the sector.[li] To combat this trend, employers should work towards being competitive with medical device manufacturers outside the region regarding employee benefits.

The region has a shortage of clean rooms, which are essential for the medical device industry because they ensure a controlled environment that minimizes contamination risks during manufacturing and assembly. Medical devices, especially those used in surgeries, implants, and diagnostics, must meet strict sterility and quality standards to ensure patient safety and regulatory compliance. Another significant weakness is the shortage of lab space. Lab space is crucial for the medical device manufacturing industry because it provides a controlled environment for research, development, testing, and quality assurance, ensuring that products meet stringent safety and regulatory standards. Also, the cost of acquiring lab space has risen dramatically, with prices nearly doubling, making it difficult for both startups and established companies to find affordable space for research and development. Further, the fluctuating customer demand in the sterilization industry further disrupts the sector and poses a risk to the stability of the medical device and sterilization industries in the region.

There is a lack of incentives for companies in Cd. Juarez to establish supply chain and talent development initiatives, which could help strengthen the region's medical device industry. Establishing these company incentives could catalyze a stronger, locally driven supply chain. Encouraging private companies to invest in local suppliers on both sides of the border could further strengthen the ecosystem.[lii]

The binational border location provides direct access to U.S. and Mexican markets and facilitates efficient distribution and supply chain operations for medical devices. The shift of manufacturing from China to North America presents an opening for suppliers in El Paso, Las Cruces, and Cd. Juarez to become key players in manufacturing for the medical device sector. Local suppliers could benefit from support to help them identify customers beyond the region, while large companies could be encouraged to invest in smaller suppliers, strengthening the overall supply

chain. Critical shortages in the plastics and chemical supply chain must be addressed through coordinated business attraction efforts. Supply chain gaps present an opportunity for local entrepreneurs to fill them, which will require continued supplier development efforts. Supplier certification programs and orchestrated collaborations between suppliers for increased capacity can increase local supplier participation in the industry. Building strategic partnerships with organizations within a different, strong medical device hub can lead to business opportunities for both locations.

By focusing on growing a workforce with skills in design and prototyping, the Borderplex could attract and grow more R&D operations, further bolstering the local medical device ecosystem. This talent pipeline could also support new and existing medical device technology startup companies. The medical device startup scene in the Borderplex region is burgeoning, with companies focusing on health management, remote monitoring, and the development of user-friendly medical devices designed for home-based care. This shift aligns with global efforts to enhance patient independence and convenience.[liii] These startups drive local economic growth while addressing global healthcare challenges. The medical device industry increasingly incorporates emerging technologies like AI, machine learning, and cybersecurity. Generative AI is revolutionizing medical device design, while robust cybersecurity is becoming critical as devices integrate with broader healthcare systems. This evolution in the medical device industry along with strong computer science programs in the region presents a unique advantage for the Borderplex, which it can leverage to continue growing hybrid medical device startups and to attract more R&D from established medical device companies.

However, innovators in the region face challenges barriers to scaling their businesses. They lack critical access to key decision-makers within hospitals and medical device companies. Also, there are unique costs to medical device startups that must be addressed. For example, the high financial barriers associated with FDA regulatory approval present a significant challenge for startups looking to bring new products to market. These barriers are compounded by insufficient funding for tech startups and the need for more research dollars and support for intellectual property (IP) filing. The cost and availability of lab space have become critical barriers, particularly for startups and universities engaged in R&D. Many medical device startups struggle to secure adequate funding, limiting their ability to scale operations and bring innovative devices to market. Accelerator programs are underutilized, leaving many startups without the critical support they need to advance their innovations. This trend threatens the region's ability to support innovation. A deeper strategy around finance and tech commercialization is needed. (See section on Research, Development, and Commercialization.)

By strategically addressing workforce development, supply chain resilience, infrastructure gaps, and innovation support, the Borderplex region can become a premier hub for medical device manufacturing. Leveraging its proximity to U.S. markets, established manufacturing expertise, and emerging technology ecosystem, the region has the potential to attract investment, drive research and development, and support high-growth medical device startups. However, overcoming regulatory, financial, and logistical barriers will require coordinated efforts between industry, academia, and government.

ACTION PLAN

STRENGTHENING THE WORKFORCE PIPELINE

Action items

- Meet with general directors of medical device companies and universities to identify top occupations, skillsets, certifications needed. Create agreements with universities and companies to develop a menu of expectations and certifications.
    - Case Study: *Massachusetts Medical Device Development Center* The Massachusetts Medical Device Development Center (M2D2) is a collaborative initiative between the University of Massachusetts Lowell (UML) and the University of Massachusetts Medical School (UMMS). M2D2 functions as a business and technology incubator, helping medical device companies with business planning, product prototyping, laboratory access, and clinical testing. This partnership shows how universities can align their curricula with industry demands by actively working with companies to develop specialized programs and certifications.

- Create trend report on what jobs will change and the new skills needed.
    - Case Study: *EY's Pulse of the MedTech Industry Report 2024* Ernst & Young's 2024 Pulse of the MedTech Industry report highlights the increasing integration of artificial intelligence (AI) in medical devices, leading to a growing demand for professionals proficient in AI technologies. The report also notes a shift towards consumer health products, indicating a need for skills in direct-to-consumer marketing and product development.

Developing the supply chain

- **Action Item:** Develop a strategy around the plastics supply chain by collaborating with manufacturers to identify top suppliers and organize familiarization tours.
    - Case Study: *Meridian Medical & Anaesthetic Medical Systems* Meridian Medical partnered with Anaesthetic Medical Systems (AMS) to address manufacturing challenges and establish a trusted UK-based production facility for their Total Intravenous Anaesthesia (TIVA) sets. This strategic collaboration not only resolved quality and supply chain issues but also set the foundation for AMS's growth and innovation. By working closely with AMS, Meridian Medical was able to

streamline the supply chain, enhance product quality, and ensure compliance with industry standards.

- Develop strategy around chemical supply chain.
    - Case Study*: DuPont's Digital Supply Chain Transformation* DuPont, a global leader in the chemical industry, faced challenges in supply chain planning due to market volatility and unforeseen disruptions. To address these issues, DuPont collaborated with Ernst & Young (EY) to develop a digital platform known as the "Supply Chain Cockpit." This platform integrates demand, supply, and financial data, enabling planners to run multiple "what-if" scenarios and make informed decisions. By enhancing visibility and proactive planning, DuPont improved its ability to produce and distribute over 1,000 products more effectively.

- Develop programs to enable large companies to develop suppliers. Include programs for financing and specific certifications.
    - Case Study: *Southern Company's Supplier Development Program* Southern Company has implemented a comprehensive Supplier Development Program aimed at enhancing the capabilities of its suppliers. The program focuses on key areas such as safety, the development of strong capability statements, obtaining third-party certifications, understanding the company's operational footprint, navigating the registration process, responding to bids, and efficient invoicing. By providing targeted support in these areas, Southern Company ensures that its suppliers are well-equipped to meet industry standards and contribute effectively to the supply chain.

- Identify strong regions in this industry to collaborate with based on complementary strengths, establish a buy/sell market process, leverage government incentives like Texas tax exemptions, and assess regional supply and demand dynamics.
    - Case Study: *Collaboration Between Minnesota and Massachusetts Medical Device Clusters* Minnesota and Massachusetts are recognized as leading hubs for medical device innovation in the United States. Minnesota boasts the highest concentration of medical device jobs, while Massachusetts has a rich ecosystem of medtech firms and research institutions. Collaborations between companies and research institutions in these states have led to advancements in medical technologies, leveraging each region's strengths to drive innovation and commercialization.

INFRASTRUCTURE

- Conduct gap analysis needed to examine the difference between clean room demand and supply (level of clean room, ISO 1- 9, depends on the type, sterility, and criticality), collaborating with industry-specific organizations like the Biomedical Technology Cluster.
    - Case Study: *Innovation in Clean-Room Construction: A Case Study of Co-operation Between Firms* This study examined the collaboration between a

large client, multinational contractors, specialist suppliers, and local subcontractors in constructing cleanroom facilities. An ethnographic approach revealed changing attitudes, values, and new working arrangements that emerged during the project. The social bond of a 'construction challenge' served as the basis for trust and risk-sharing in a 'quasi-fixed network.'

RESEARCH AND DEVELOPMENT

- Identify medical device manufacturing companies to provide problems to be solved by local engineers and entrepreneurs, leveraging local accelerators and technology sprints.
    - Case Study: *MedTech Innovator Accelerator* MedTech Innovator is the world's largest accelerator for medical device, digital health, and diagnostic companies. It connects startups with industry leaders to address pressing healthcare challenges. For instance, participating companies have collaborated with local engineers to refine product designs, navigate regulatory pathways, and enhance manufacturing processes, leading to successful market entries.

Potential Medical Device Manufacturing Specializations

Minimally Invasive Devices and Catheter-Based Technologies

Rationale: Established manufacturing base for catheter-based devices in Cd. Juarez. Proximity to healthcare institutions for clinical trials and testing. Expertise in precision manufacturing techniques like injection molding and laser welding.

Focus Areas:
Development and production of advanced catheter systems (drug delivery, diagnostics, surgical)
Interventional cardiology and neurology devices
Integration of sensors and IoT technologies for real-time monitoring

Orthopedic and Wearable Medical Devices

Rationale: Existing production capabilities for orthopedic supports. Strong R&D presence at UTEP and collaboration with biomedical tech clusters. Bilingual workforce facilitates usability testing for diverse patient populations.

Focus Areas:
Wearable devices for rehabilitation and mobility assistance
Advanced prosthetics and orthotics using 3D printing
Implantable devices with biocompatible materials

Surgical Instruments and Robotics

Rationale: Manufacturing capabilities for surgical equipment. High-precision machining expertise and access to trained workforce. Access to nearby medical facilities for testing and deployment.

Focus Areas:

Development of robot-assisted surgical tools
Single-use and sterilizable surgical instruments
Customizable instrumentation via additive manufacturing

Diagnostic and Imaging Devices

Rationale: R&D infrastructure supports innovation in diagnostics. Potential to integrate software engineering expertise for imaging AI solutions. Proximity to clinical trial facilities ensures rapid validation.

Focus Areas:

Portable diagnostic tools for underserved areas
Advanced imaging technologies (AI-powered ultrasound, MRI enhancements)
Point-of-care testing devices for chronic diseases

Packaging and Sterilization Technologies

Rationale: Existing infrastructure for thermoforming, blow molding, and packaging. Sterilization services already established in the region. Proximity to international logistics routes.

Focus Areas:
Sustainable and biodegradable packaging solutions
Advanced sterilization techniques for complex devices
Development of tamper-proof and intelligent packaging systems

Smart Medical Devices and IoT Integration

Rationale: Bilingual, tech-savvy workforce to develop user-friendly interfaces. Engineering talent pool for Internet of Things (IoT) and sensor technology. Growing demand for connected healthcare solutions.

Focus Areas:
Remote patient monitoring devices
IoT-enabled wearable health monitors
Smart implants for real-time data transmission

Advanced Wound Care and Biologics

Rationale: Expertise in laminated vinyl production and advanced sewing. Collaboration opportunities with healthcare providers for testing.

Focus Areas:
Biodegradable wound dressings with antimicrobial properties
Advanced negative-pressure wound therapy devices
Bioengineered skin substitutes and tissue scaffolds

Cybersecurity for Medical Devices

Rationale: Region's top-tier cybersecurity programs and focus on software engineering. Increasing need for secure, connected medical devices.

Focus Areas:
Security solutions for IoT medical devices
Compliance with Federal Drug Administration cybersecurity guidelines
Real-time threat detection and prevention systems

Introduction – Biotech Industry

The Borderplex region is at a critical juncture where it may establish itself as a biotech, pharmaceutical, and sustainable manufacturing hub by capitalizing on global trends in automation, AI-driven research, and supply chain resilience. However, to fully harness these opportunities, the region must first overcome workforce shortages, supply chain vulnerabilities, and infrastructure limitations that hinder long-term growth. Addressing these challenges requires a targeted strategy that strengthens regional assets while mitigating critical gaps. To attract and expand biotech businesses, the region must first take an inventory of the local translational research strengths and define strategic focus areas to align with national trends and investor priorities. Similarly, supply chain development efforts should include a marketing campaign targeting venture capital firms, ensuring that biotech startups have the necessary funding to scale.

A stronger workforce pipeline is essential to meet industry demand, requiring university partnerships, student exchanges, and internship programs to equip local talent with critical biotech skills. In parallel, launching human resources workshops for biotech startups can help them develop effective internship programs. Additionally, infrastructure development is crucial to help small biomedical firms transition to automated labs, ensuring that local research institutions and businesses remain competitive. With these strategies in place, the Borderplex region can optimize its strengths and opportunities while mitigating weaknesses and threats to become a major biotech cluster.

One of the key strengths of the Borderplex region is its talent capacity for automation. Automation and digital transformation are revolutionizing pharmaceutical processes, clinical research, and manufacturing. Advancements in regional capabilities in areas like high throughput screening technology and AI have the power to revolutionize sample analysis for local researchers, increasing screening capabilities by tenfold. Technologies like high-throughput screening,

robotics, and artificial intelligence (AI) are becoming industry standards, and so by leveraging automation technologies, the region could enhance efficiency and attract global pharmaceutical players. According to McKinsey and Company, automation could drive a 20–30% productivity increase in pharmaceutical manufacturing.[liv] The region's assets, to include AI bachelor degree programs, a PhD in physics with a focus on quantum computing, and institutions like the UTEP Border Biomedical Research Center and the NMSU IDeA Networks of Biomedical Research Excellence, lay a foundation to support a myriad of automated pharmaceutical research and manufacturing operations.

There is significant bench strength for commercial biomedical research in the Borderplex region. The Medical Center of the Americas' Clinical Trial Network is a notable strength, improving coordination between healthcare providers and clinical researchers across the region. This initiative makes clinical trials more accessible to patients and strengthens the regional clinical research supply chain in support of pharmaceutical company expansion. Expanding local trial sites would expand the region's leadership in the clinical research industry. According to Pharma Intelligence, decentralized clinical trials are expected to have a CAGR of 12.25% through 2030.[lv]

The region also benefits from the collaboration between institutions in El Paso, Las Cruces, and Cd. Juarez as local researchers frequently partner with regional institutions, focusing on targeted research areas to maximize resources and amplify their impact. This collaborative spirit helps overcome resource limitations and drives innovation in the sector. Such ecosystems accelerate research, develop talent, and improve healthcare outcomes.[lvi] Research projects around cancer receive special benefits for collaboration through the Cancer Prevention and Research Institute of Texas, which offers substantial cancer research grants that can include collaborators from other states.

Despite these strengths, the Borderplex faces several weaknesses. A skills gap in the pharmaceutical and biotech sectors is one of the most significant challenges. With minimal pharmaceutical research and manufacturing activity, and a workforce still heavily centered around traditional manufacturing, there is a shortage of professionals with specific expertise pharmaceutical research and biotechnology. The World Economic Forum has emphasized the urgency of reskilling to adapt to Industry 4.0 technologies, warning that a quarter of all jobs may change by 2029.[lvii] By focusing on high-demand skills like automation, liquid handling, and programming, and investing in advanced equipment, local universities can help bridge the skills gap and fill critical roles in pharmaceutical research and technology. However, local universities face significant challenges in providing high-tech training due to limited funding and the lack of advanced equipment necessary for automation and specialized research technologies like liquid handling automation. This limits the region's educational opportunities in these critical fields. Creating partnerships with other universities to leverage their equipment may be a path to addressing the absence of advanced equipment. Collaborations like Aurum Tech's partnership with German companies to train technicians using VR and AR technologies demonstrates a way to expand companies' expertise in the short term. Creating PhD-internship programs will help companies build company capacity while introducing new perspectives.

Moreover, the Borderplex faces difficulties in retaining skilled workers. While the Clinical Trial Network has improved coordination, the region's lack of local clinical trial sites could lead to a talent drain, with trained professionals seeking employment elsewhere in search of better opportunities. Without providing job opportunities, the Borderplex risks losing trained professionals to other regions, undermining the region's capacity for sustained research and clinical trials. Expanding the Clinical Trial Network will be critical for talent retention and further clinical trial research.

Building advanced sample processing infrastructure is important for education and industry development. The high costs of advanced equipment, such as liquid handling automation systems, could prevent local educational institutions from providing the necessary training to meet industry demands. Furthermore, the region's dependence on external supply chains for pharmaceutical equipment and materials poses a significant risk. Disruptions in these supply chains, particularly during times of crisis, could severely impact local pharmaceutical and biotech operations. By creating infrastructure to handle large-scale sample processing, the region could reduce delays, increase efficiency, and keep more clinical research within the Borderplex.

Local programs could also be developed to help local companies with the adoption of advanced technology. Many assets exist to support aspects of the pharmaceutical industry, such as the region's established medical device manufacturing supply chain, its many hospitals and healthcare schools, UTEP's master's programs in Industrial Engineering and Materials Science and Engineering, the Texas Manufacturing Assistance Center's Certifications in Product Design and Development, and the State of Texas' cancer research grants and tax rebates for medical device equipment. Given the region's significant resources, the region is well-suited to attract pharmaceutical companies, with early movers taking advantage of the best talent.

Additionally, there is a growing entrepreneurial interest in sustainability, biotech, and biomanufacturing, which aligns with global trends. The OECD projects that bio-based industries could contribute $4 trillion to the global economy by 2030.[lviii] The rising global demand for bio-based products and sustainable manufacturing systems aligns with the Borderplex's potential as a hub for green technology. Local companies like Aurum Tech and academic institutions could explore cutting-edge sustainable solutions through partnerships and pilot programs, while UTEP's engineering programs in sustainable manufacturing presents opportunities to explore this area for R&D. With a strong agriculture sector, R&D in bio-based feedstocks, circular manufacturing systems, and energy-efficient processes could drive the region's leadership in advanced agriculture technology. Developing a local workforce skilled in maintaining sustainable systems could position the Borderplex as a hub for green technology and sustainable manufacturing. The region can also leverage the role of nonprofits in building the necessary infrastructure and networks to accelerate growth in the biotech sector. By emphasizing pharmaceutical research and manufacturing, HealthTech, AgriTech, and technology that promotes environmental sustainability, the Borderplex region can establish itself as a leader in multidisciplinary innovation and economic growth. Building a consensus of research strengths will help focus the community's efforts and resources on high promise areas for maximum impact. Dedicated funding sources for everything from research to scaling local companies will be needed for the success of all biotech research and startup ventures.

The Borderplex region stands at the forefront of an emerging biotech and sustainable manufacturing revolution, with a surprising wealth of assets to support this industry transformation. By aligning academic, industry, and nonprofit efforts, the Borderplex can emerge as a globally competitive biotech hub, fostering innovation and economic growth in a rapidly evolving industry.

ACTION PLAN

Business Attraction and Expansion

- Create an inventory of the region's translational research strengths and form a consensus of what the region's research themes should be for economic development purposes. Focus on two or three key segments within the bioeconomy that align with national trends and local strengths, e.g., within healthcare, Bio IT, bioengineering manufacturing, and personalized medicine.
    - Case Study: ***Regional Bioeconomy Strategies in Europe*** Several European regions have successfully developed bioeconomy strategies by leveraging local strengths. For instance, Scotland, South-West Netherlands, Saxony-Anhalt, and Veneto have each tailored their approaches to their unique assets, focusing on areas like sustainable agriculture and industrial biotechnology. These strategies emphasize the importance of aligning regional capabilities with broader economic trends to stimulate innovation and growth.

Supply Chain Development

- Create a marketing campaign targeting venture capital firms and similar entities focused on the biomedical research field.
    - Case Study: *Central and Eastern European (CEE) Startups' B2B Marketing Strategies* A study of 20 top VC-backed startups in the CEE region revealed effective B2B marketing strategies that appealed to investors, including: 1) Content Marketing: Producing industry-specific content to showcase expertise and thought leadership; 2) Networking Events: Participating in industry conferences and workshops to connect with potential investors; and 3) Digital Advertising: Leveraging targeted online campaigns to reach VC audiences. These tactics enhanced visibility and credibility, making them attractive to venture capitalists.

Strengthening the Workforce Pipeline

- Partner with other universities to establish student exchange programs so they can work on machines alongside experts who know how to use the technology.

        - Case Study: *MIT and German University Exchange Program* (https://misti.mit.edu/germany) MIT's International Science and Technology Initiatives (MISTI) program collaborates with leading German institutions, including RWTH Aachen University, to offer students hands-on experience in advanced manufacturing, robotics, and Industry 4.0 technologies. Through this partnership, students engage in research projects alongside faculty and industry experts, gaining practical skills that enhance their readiness for high-tech industries.

- Connect startups with universities and financial resources to hire PhD-interns to take load off PhD-staff members and build capacity.
    - Case Study: *University of California's PhD Internship Program* (Development and Assessment of a Sustainable PhD Internship Program)
      The University of California implemented an experiential education program where PhD students engaged in internships to explore diverse career paths. These internships not only enhanced the students' competitiveness in various fields but also benefited research advisors by introducing new techniques and revitalizing lab culture. Notably, 96% of research advisors observed a positive impact on interns' competitiveness, and labs reported improvements when interns applied new skills acquired during their internships.

Infrastructure

- Create program to help small biomedical research businesses transition to automated labs, including money for software, equipment and employee training.
    - Case Study: *National Institutes of Health (NIH) Small Business Innovation Research (SBIR) Program* (Miniaturization and Automation of Tissue Chip Systems (MATCH) Funding Opportunity.) The NIH's SBIR program offers funding to small businesses aiming to advance research and development in biomedical technologies. This includes support for projects focused on lab automation, enabling small firms to enhance their research capabilities through technological innovation.

POTENTIAL BIOTECH INDUSTRY SPECIALIZATIONS

HealthTech Innovation

Rationale: Combining Biotech and IT expertise can lead to transformative healthcare solutions.

Focus Areas:
Developing wearable devices and AI-based health monitoring systems.

Building applications for disease prediction and patient management.
Supporting startups focused on HealthTech innovation.

Environmental Sustainability in Agriculture and Healthcare

Rationale: Sustainability-focused technologies can address environmental challenges across sectors.

Focus Areas:
Advancing eco-friendly farming techniques and hospital waste management.
Leveraging local environmental science programs for cross-disciplinary solutions.

Cybersecurity and Data Protection for Healthcare and Agriculture

Rationale: UTEP's Cyber-ShARE Center and the EPPC national center of excellence for cybersecurity, along with deep industry expertise in healthcare and agriculture, can form the foundation for a specialization in addressing threats to healthcare and agricultural systems.

Focus Areas:
Training in ethical hacking, cryptography, and AI-driven threat detection.
Establishing regional certifications and workforce development initiatives.
Collaborating with public and private sectors for enhanced data protection solutions.

Artificial Intelligence and Machine Learning Applications for Health, Agriculture, and Manufacturing

Rationale: AI applications in health, agriculture, and manufacturing can drive innovation and efficiency across sectors. New degree program in AI at UTEP will support this effort.

Focus Areas:
Researching robotics and human-computer interaction for medical and agricultural use cases.
Developing AI algorithms for disease prediction, crop resilience, and manufacturing automation.
Creating AI-driven entrepreneurship programs.

Smart Systems and Internet of Things (IoT) Development

Rationale: IoT technologies and regional education programs can enable advancements in healthcare monitoring, precision farming, and sustainable infrastructure.

Focus Areas:
Designing smart healthcare devices and city infrastructure systems.
Leveraging UTEP's environmental science expertise for IoT-enabled agricultural tools.
Building regional expertise in IoT integration for manufacturing.

Cloud Computing and Data Analytics

Rationale: Big data management supports decision-making in agriculture, healthcare, and public policy.

Focus Areas:
Specialization certifications in cloud-based data management.
Utilizing analytics for optimizing health systems and farm operations.
Supporting cross-sector applications of machine learning and data analytics.

Software Development and Automation in Life Sciences

Rationale: Advanced software is critical to the region's growing IT and biotech ecosystems. Presence of robust computer science programs across the region.

Focus Areas:
Developing software solutions for AgTech and medical devices.
Partnering with startups and academic programs to support automation technologies.
Establishing regional coding bootcamps to build a skilled workforce.

RESEARCH, DEVELOPMENT, AND COMMERCIALIZATION

Introduction - Startup Financing

The Borderplex region has a unique opportunity to build a thriving research commercialization environment by strengthening its financing infrastructure. With growing strengths in manufacturing, cross-border commerce, and emerging tech sectors, the region is favorably situated to attract and retain high-potential startups to leverage and support this growth. However, for startups to scale, they need better access to capital, stronger investor networks, and more connections to national and global markets. Addressing these needs is not only about filling funding gaps, but also about building a lasting foundation for economic growth and innovation. To achieve this, the region must focus on four strategic actions. First, attracting a diverse mix of funding sources, including venture capital firms, crowdfunding platforms, and federal grant programs, will expand opportunities for startups at every stage. Second, building a stronger local angel investor network will ensure early-stage companies have access to the capital and guidance they need to grow. Third, creating a localized funding ecosystem will reduce dependence on external markets and reinforce a culture of reinvestment in regional innovation. Lastly, developing strategic partnerships with global organizations like Plug and Play can bring in mentorship, customers, and industry partners—giving local startups a path to scale without relocating. These efforts together will enable the Borderplex to support innovation-driven startups and grow a more competitive economy.

There are several weaknesses that the region needs to address to develop its startup financing ecosystem. Without sufficient angel investors, local startups face difficulty scaling and attracting additional investments. One of the primary challenges is the limited presence of local angel

investors, which can be attributed to a general reluctance to transition from traditional business investments to startup investments. That said, local startups' dependence on external investment poses a risk. With limited local angel investors, startups may struggle to secure the necessary capital to scale, making them vulnerable to being pulled away by competing innovation ecosystems. Creating a localized funding ecosystem in the El Paso-Las Cruces-Cd. Juárez area would not only empower startups but also could support the target industries by proactively aligning startups and established companies for maximum impact. By encouraging more local individuals to invest in startups, the region can provide crucial early-stage funding, which will help local founders secure their first customers - often the most difficult hurdle to overcome.

Various locations have successfully grown their local funding ecosystems and can be useful models for the region. For example, over time, Austin has become a hub for startups, thanks in large part to a well-developed funding ecosystem that includes angel investors, venture capital firms, and public-private partnerships.[lix] Local firms like Austin Ventures and Capital Factory have provided critical funding to startups in tech and other industries. As a result, the city has seen significant economic growth and the emergence of unicorn companies like Bumble and WP Engine. A similar approach in the region could stimulate local innovation and entrepreneurship.

The region could also take note of Silicon Valley and its renowned funding ecosystem, which supports innovation across industries. Venture capital firms like Sequoia Capital and Andreessen Horowitz have fueled the growth of tech giants such as Google and Facebook. While replicating this scale may not be feasible immediately, creating local investment networks and partnering with national firms to fund startups could similarly foster innovation in the Borderplex region. To create diversified funding streams, crowdfunding mechanisms can also be built. Regions with emerging economies, such as parts of India and Southeast Asia, have used localized crowdfunding platforms to support startups and small businesses. By developing similar platforms for the Borderplex, local investors and community members could contribute directly to businesses in key industries, strengthening community ties and fostering innovation.[lx]

A potential model for boosting startup financing availability is Plug and Play, a global organization that invests across various sectors. Plug and Play supports over 2,200 portfolio companies, including 35 unicorns, and partners with over 585 corporate entities like Baylor Scott & White, the Dallas Cowboys, Nike, and the Dallas Mavericks.[lxi] These collaborations help startups access valuable business opportunities, pilots, and commercial deals, offering resources necessary for growth. Plug and Play's global network also facilitates expansion into new markets, allowing local startups to scale without the need to relocate. Additionally, Plug and Play can play a critical role in bridging local communities in the Borderplex region with major innovation hubs like Silicon Valley. This connection ensures that local entrepreneurs can access the resources and expertise typically found in other cities, thereby potentially creating a supportive and sustainable environment in the Borderplex region. Other accelerators exist, such as Gener8tor and TechStars, that operate similarly but have different models.

Another significant challenge is the absence of a highly successful local startup that can be showcased as a local success story, which would encourage potential investors and startups alike. The region lacks visible role models to inspire investors and aspiring entrepreneurs, which hampers momentum in the local startup ecosystem. Additionally, the need for seasoned

entrepreneurs is prominent, as many individuals possess technical skills but lack the entrepreneurial mindset and experience required to scale their businesses. Without mentorship and guidance, these entrepreneurs often struggle to grow into CEOs capable of managing successful, scalable companies. Competition from established innovation ecosystems like Silicon Valley and Austin is a major challenge. These regions provide better access to venture capital, resources, and infrastructure, making it more difficult to create, attract, and retain startups in the Borderplex region.

To build a thriving startup ecosystem, the Borderplex region must overcome its limited local investment infrastructure by fostering a culture of nontraditional investment, attracting diverse funding sources, and strengthening mentorship networks. By developing localized funding mechanisms, such as angel investment networks and crowdfunding platforms, the region can reduce reliance on external capital and provide startups with the necessary financial support to scale. Collaboration with global accelerators like Plug and Play will also help connect local entrepreneurs with valuable resources, industry partners, and new markets. By taking these steps, the Borderplex can cross the bridge towards becoming a major startup hub.

ACTION PLAN

Business Expansion and Attraction

- Leverage organizations like Plug and Play identify the strongest industry verticals and to attract global companies and startups into the Borderplex region.
    - Case Study: *The Takeoff Accelerator by Plug and Play* Focused on aerospace and advanced hardware startups, the accelerator has supported 27 promising startups, collectively securing over €13 million in funding. This initiative has facilitated more than 10 successful collaborations with esteemed partners like Leonardo and Avio, boosting regional economic development and enhancing international recognition.
- Attract venture capital firms that focus on the region's technology startup strengths.
    - Case Study: *INNOVA Venture* The Lazio Region in Italy launched INNOVA Venture, a venture capital fund aimed at attracting innovative startups and private VC investors to the area. By investing in 33 enterprises—mainly innovative startups—the fund generated nine successful exits and had a positive long-term impact on employment within the region.

Supply Chain Development

- Develop partnerships with local manufacturers to provide mentorship, piloting opportunities, and pathways for innovation-driven startups to enter the supply chain.
    - Case Study: *Prologis Partnership with Plug and Play* Prologis's collaboration with Plug and Play exemplifies how partnerships between established companies and startups can drive supply chain innovation. By offering mentorship and real-world

piloting opportunities, such collaborations enable startups to refine their solutions and integrate into existing supply chains, fostering mutual growth and technological advancement.

Talent Pipeline Development

- Create programs to teach different types of business models and the support requirements for each type to create innovation-driven and scalable enterprises.
    - Case Study: *Founders Factory Business Model Education* Founders Factory, a prominent start-up hub, has facilitated growth for over 300 start-ups by providing comprehensive support in technology, marketing, and legal matters. Through corporate partnerships with giants like Aviva and L'Oréal, Founders Factory offers tailored programs that educate entrepreneurs on various business models and the necessary support structures for scaling their ventures. This approach has enabled start-ups to innovate effectively and achieve scalability.

- Work with local universities and technical colleges to adjust curricula to include entrepreneurship skills and innovation.
    - Case Study: *Babson College's Entrepreneurial Thought and Action (ET&A) Methodology* Babson College has pioneered the integration of entrepreneurship education across its curriculum through its Entrepreneurial Thought and Action® (ET&A) methodology. Babson College's comprehensive integration of entrepreneurship into its curriculum serves as a model for how educational institutions can cultivate innovation and entrepreneurial skills among students, preparing them to contribute effectively to industry niches and drive economic development.

Introduction - University Startup Support

The Borderplex region has the building blocks for a thriving innovation economy: strong research institutions, growing entrepreneurial interest, and cross-border opportunities. Yet gaps remain in the process of turning research into real-world solutions, securing early-stage funding, and aligning talent development with the needs of fast-growing industries. Universities can help close these gaps by taking practical steps, starting with hosting a regional SBIR/STTR conference to improve access to federal R&D funding and aligning academic programs with emerging specializations like advanced manufacturing, AI, and health tech. These actions ensure startups have both the capital and talent they need to grow locally. Strengthening the startup ecosystem also requires stronger connections between universities and the broader community. Regular discussions that include

faculty, students, alumni, and local entrepreneurs can surface new ideas, identify barriers, and guide resource allocation. Flexible policies, like university leave programs, can support faculty who want to commercialize research without stepping away from their academic roles. By expanding mentor-matching platforms, like those already used at NMSU's Arrowhead Center, the region can give startups the experienced support they need to scale. These actions will elevate local universities beyond centers of learning, establishing them as key drivers of innovation, entrepreneurship, and regional economic growth.

The region has already witnessed successful examples of commercialization within the realm of universities. One such success is FundMiner. FundMiner's ability to license non-patented innovations demonstrates the potential for startups in the Borderplex region to identify markets for new technologies and successfully navigate the commercialization process. Further, at NMSU, educational software such as Math Snacks has been successfully licensed, showcasing the region's potential for commercializing intellectual property like software through copyright protection.

In addition to these successes, local universities provide important support in the form of access to patent paralegals and legal experts specializing in patent law. This is crucial for startups navigating the complexities of intellectual property and technology commercialization. With these resources, the region is well-positioned to continue supporting technology transfer and commercialization efforts.

One primary challenge for more commercialization of startups beginning in universities is the difficulty of aligning research with market needs, which can depend greatly on the creation of academic-industry collaborations towards translating research into practical applications. Many universities collaborate with medical and agricultural industries to advance research, development, and commercialization of intellectual property. For example, the University of California has engaged in partnerships such as Calgene at UC Davis, Ceres, Inc. at UCLA, and the Novartis alliance at UC Berkeley, aiming to bring useful products to market and promote technological leadership.[lxii] Additionally, North Carolina State University's College of Agriculture and Life Sciences has partnered with companies like Novozymes to develop biofiltration systems for aquaculture.[lxiii] These company relationships are critical for identifying real-world problems and customer acquisition for traction, scale, and fundability.

A significant portion of the research conducted at local universities remains fundamental or basic, which does not always align with specific market needs. Without a stronger emphasis on applied research that addresses real-world problems, the region faces challenges in creating industries that can be built around university-driven innovations. Further, university departments not directly related to target industries may have trouble linking education programs to target industries, which may prevent them from identifying industry research partners. Therefore, education among researchers about how various programs support industries will illuminate industry collaboration opportunities.

One promising strategy is clustering interdisciplinary university research around specific problem sets. This approach would focus faculty efforts on targeted, market-driven research, fostering stronger connections between universities and industries in need of innovative solutions. The Borderplex region must adapt to global competition for innovation by emphasizing applied

research over basic science, mirroring successful models like Arizona State University's focus on technology transfer. Further, by providing more resources for research faculty, including patent protection, lab equipment, and dedicated time for research, universities in the region could strengthen their commercialization efforts and help foster the growth of new technologies.[lxiv] Design thinking initiatives at NMSU, which begin by identifying specific problems before developing solutions, could be expanded to other departments and universities in the region to create a more market-driven approach to research.

Additionally, limited commercialization incentives for faculty and researchers at local universities weaken efforts to bring research to market. The long timelines, limited resources, and lack of immediate financial rewards make commercialization a less attractive pursuit for many academics, compounded by tenure and promotion systems that do not prioritize such efforts. The time-intensive nature of the commercialization process requires significant dedication from faculty and researchers, which can be difficult when balanced with academic responsibilities. Without immediate financial rewards or institutional support, many researchers may be discouraged from pursuing commercialization efforts. They may also leave to universities that provide more support for commercialization efforts.

Faculty and researcher retention is one of the most pressing challenges for universities. When researchers leave universities for positions at other institutions, it can disrupt ongoing projects and prevent the advancement of technology commercialization. The lack of continuity in faculty research can impede long-term commercialization efforts, making it difficult to bring new technologies to market.

Many younger faculty members are more inclined toward entrepreneurship and commercialization, presenting a potential source of innovation and new ventures. Encouraging these faculty members to pursue commercialization could lead to the development of new startups and the growth of industries in the region. The global rise of entrepreneurial culture, especially among younger professionals and academics, aligns with the Borderplex's youthful faculty and burgeoning support networks. As a policy, encouraging entrepreneurial mindsets in academia could transform universities into engines of innovation.[lxv] Furthermore, to address the typical gap in funding that startups face at the beginning, which is critical for the final step of commercialization, universities along with partner-stakeholders could leverage federal and internal grants and other funding sources to support the early stages of commercialization.

To successfully drive innovation and economic growth, the Borderplex region must bridge the gap between university research and market needs. By fostering stronger academic-industry partnerships, expanding commercialization incentives, and providing researchers with the necessary resources, local universities can become engines of entrepreneurship. Encouraging interdisciplinary collaboration and emphasizing applied research will further align academic output with regional economic priorities. With strategic investments in funding, mentorship, and technology transfer, the Borderplex can transform its research institutions into key drivers of innovation, helping to build a competitive and sustainable economy.

ACTION PLAN

Infrastructure

- Conduct a conference to educate businesses on available SBIR & STTR and how to apply successfully.
    - Case Study: *University of California, Riverside's SBIR/STTR Con 2024*
      The University of California, Riverside hosted the SBIR/STTR Con 2024, a two-day conference designed to assist small businesses in securing federal funding. The event featured workshops on crafting competitive research projects, understanding customer needs, and building strategic partnerships. Representatives from agencies like the USDA, EPA, and NSF provided insights into their respective SBIR/STTR programs. This comprehensive approach equipped attendees with the knowledge and resources necessary to navigate the application process successfully.

- Conduct community discussions with universities to encourage more resources and focus on entrepreneurship and technology commercialization. Encourage various paths to research and commercialization, including faculty, staff, students, alumni, and community.
    - Case Study: *University at Albany's Collaborative Efforts in Economic Development*
      The University at Albany (UAlbany) has played a pivotal role in fostering regional economic growth through strategic collaborations. By investing in research, teaching, and community partnerships, UAlbany has set the stage for Albany to emerge as a leader in technology and innovation. Notably, the university's renovation of the historic Albany High School into a state-of-the-art hub for nanotechnology and engineering exemplifies its commitment to aligning academic resources with community development.

Strengthening the Workforce Pipeline

- Align educational programs with emerging R&D specializations to ensure a steady pipeline of skilled talent.

    - Case Study: *RMIT University's Enabling Impact Platforms* RMIT University implemented a strategic approach to research by identifying eight "Enabling Impact Platforms" that align with emerging R&D specializations. These platforms, including advanced manufacturing, biomedical innovations, and sustainability technologies, foster cross-disciplinary collaboration among academics. By integrating these focus areas into their educational programs, RMIT ensures that graduates are equipped with skills relevant to current industry needs, thereby maintaining a steady pipeline of skilled talent

Conclusion

As the region moves forward with the implementation of the 2030 BRIDGE Plan, the strategic priorities outlined in this document will serve as a roadmap to sustained economic growth, innovation, and industry expansion. While the region may face challenges and uncertainties, its adaptability, resilience, and commitment to working together will drive long-term success. By collaborating on shared goals with public and private stakeholders, leveraging emerging niche opportunities, and strengthening the region's workforce and infrastructure, the Borderplex region will grow to compete on a global scale.

IMPLEMENTATION PLAN

The following priority areas, goals, and objectives will form the guidelines for project implementation:

Priority Areas, Goals, and Objectives

Priority Area 1: Business Attraction and Expansion

Goal: Increase company presence in the region and create a thriving industry ecosystem.

Objectives:

- Attract 55 companies in target industries
- Increase company investment by $1.6B
- Increase number of new and retained jobs by 15,500

Priority Area 2: Supply Chain Development

Goal: Attract companies that are critical to fill supply chain gaps and needed for building industry opportunities.

Objectives:

- Attract 10 suppliers for target industries
- Increase percentage of products and services provided by local businesses by 5%

Priority Area 3: Strengthening the Workforce Pipeline

Goal: Align education and workforce programs with industry needs and create new programs to build a more robust talent pipeline.

Objectives:

- Increase number of Borderplex Alliance-led courses, degrees, and certifications by 50%
- Increase number of hands-on training opportunities by 100%

Priority Area 4: Infrastructure Development

Goal: Build or enhance critical infrastructure to promote flow of commerce.

Objectives:

- Increase number of strategic partnerships for infrastructure policy advocacy by 5
- Attract or build 3 new infrastructure assets to support target industries

Priority Area 5: Research, Development, and Commercialization

Goal: Attract and grow companies that are solving industry problems, support commercialization of new products, and retain those companies within the region.

Objectives:

- Attract 7 new research and development organizations (companies, government, startups)
- Add 40 new research and development jobs
- Increase number of individuals completing research and development education programs by 25%

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