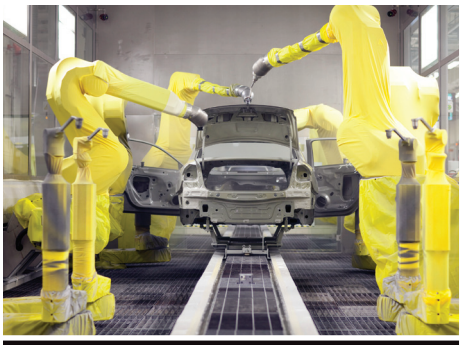

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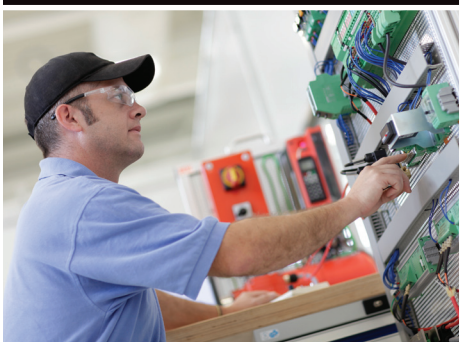

BROOKINGS ADVANCED INDUSTRIES SERIES

DRIVE!

MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

EXECUTIVE SUMMARY



BROOKINGS


DRIVE!

MOVING TENNESSEE'S AUTOMOTIVE SECTOR UP THE VALUE CHAIN

EXECUTIVE SUMMARY

More than 30 years ago, Tennessee's economy was transformed by the arrival of Japanese automaker Nissan in Smyrna. Now, $30 billion in investment later and five years after the onset of the Great Recession, an exponentially larger and more intensely competitive Tennessee auto industry has begun to grow again under new conditions. This environment presents Tennessee with both opportunities and challenges as it considers how to secure more and better jobs and prosperity in what the state has recognized as a definitive "advanced industry."

As defined by the Brookings Institution's Metropolitan Policy Program, advanced industries (AIs) like the auto sector are the high-value innovation- and STEM-worker intensive industries that drive regional and national prosperity in the United States.

AIs matter because large and small companies in the sector—including Ford and Johnson Controls in the auto industry and GE, Intel, Medtronic, and Siemens in other industries—generate 11 percent of the nation's output, 46 percent of U.S. goods exports, and over 16 million skilled direct and indirect jobs. Similarly, AIs like automotive parts, medical devices, and electronics along with aerospace and scientific research matter because they are the prime site of the nation's R&D enterprise, which has enabled a steady stream of life-transforming innovations ranging from hybrid cars, air flight, and GPS to LASIK, MRIs, and clean energy.


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However, advantage is in no way assured either in auto or the broader AI sector—for the nation or for Tennessee. In fact, Tennessee's significant AI sector—anchored by its auto industry— enters an era of continuous disruptive change in the global economy with both genuine momentum and vulnerabilities.

On the one hand, the state's increasingly dense and diverse production networks appear extremely well-positioned to expand the state's standing as one of the most competitive platforms for automotive production in the world. Favorable cost structures, a central location, and strong transportation infrastructure place Tennessee near the center of North American auto manufacturing. Meanwhile, one of the continent's most extensive and international supply chains provides the capabilities necessary to facilitate manufacturing excellence.

On the other hand, though, the state's auto sector (and other AIs) will face stiffening competition in the next five years from new entrants and new locations even as it addresses large demands for new content, quality, and innovation—all with little pricing leverage. No longer will an appeal based primarily on low-cost production be sufficient. Instead, the state and its industry will need to supplement their solid cost advantages with compelling new appeals based on productivity and operational excellence, labor force skills, and product and process innovation.

The following report, **"Drive! Moving Tennessee's Automotive Sector Up the Value Chain,"** speaks to the new moment by taking a new look at trends in the state industry and assessing the industry's strengths and weaknesses. It also outlines private- and public-sector strategies to maintain competitiveness and upgrade the industry. Overall, the report finds that:

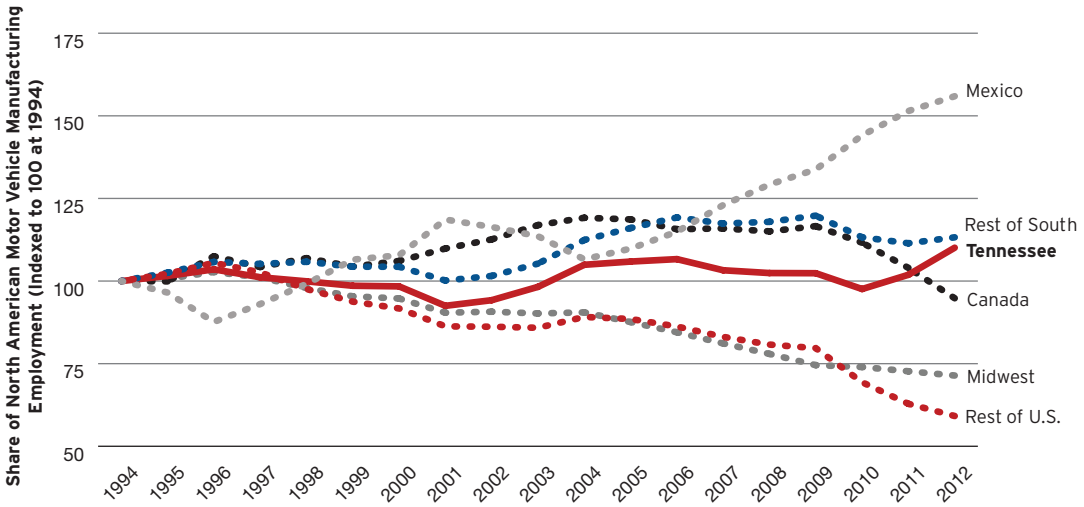
1. FOLLOWING A TUMULTUOUS DECADE, TENNESSEE'S AUTO SECTOR RETAINS SIGNIFICANT MOMENTUM

An analysis of the growth and shape of the state's automotive industry yields new evidence of both the sector's strength and the tough competitive environment it faces. In particular, the new analysis shows that:

- **NOTWITHSTANDING THE 2009 ECONOMIC CRISIS THE TENNESSEE AUTO SECTOR MANAGED TO INCREASE ITS SHARE OF NORTH AMERICA'S AUTO-PRODUCTION MARKET AND LEAD THE STATE'S ECONOMIC RECOVERY.** The state's automotive industry exited the recession and initial slow recovery with considerable momentum. From 2010 to 2012 Tennessee's share of North American motor vehicle manufacturing employment increased from 2.9 percent to 3.3 percent, an all-time high, although employment and output remain below pre-crisis levels. At the same time, employment figures also underscore the significantly faster growth of Mexico as an auto-production challenger. Over the same time period Mexico's share of the North American industry jobs grew from 36.2 percent to 39.1 percent. In any event, the state industry's post-recession momentum has affirmed the auto sector's standing as a prime driver of the Tennessee economy. In this vein, the automotive economy anchors the state's critical advanced industry sector. Currently the largest auto industry in the South in terms of employment, the sector employs one-third of all workers in the state's AI sector—more than any other industry—and generates more output than any other AI as well. The industry has also contributed significantly to the state's employment recovery. Employment in

the automotive industry increased by an average of 16.1 percent each year from 2010 to 2012, compared to 1.8 percent in the economy overall. As a result, the automotive industry has been responsible for more than 12 percent of all job creation in the state since the recession and more than half of all new jobs in the Tennessee AI sector. Similarly, in terms of output the automotive industry has generated more than one-third of the Tennessee manufacturing sector's output growth since 2010 and nearly 85 percent of output since its nadir in 2009

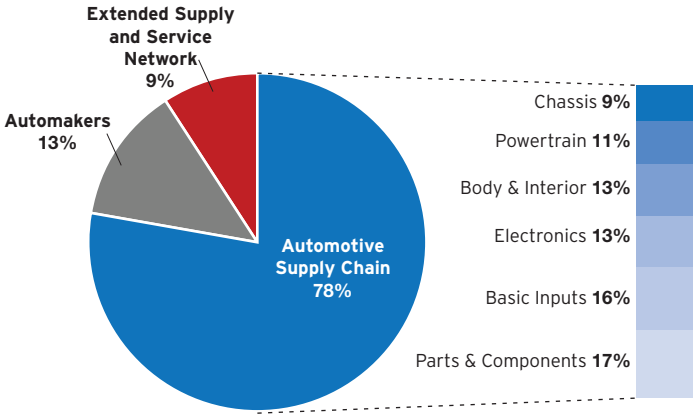
Tennessee's share of North American motor vehicle-related manufacturing employment has held firm throughout a disruptive era



Source: Brookings analysis of data from Statistics Canada, National Institute of Statistics and Geography, and Moody's Analytics

- **TENNESSEE'S LARGE AUTO SECTOR ENCOMPASSES AN EXTENDED PRODUCTION NETWORK AND SUPPLY CHAIN.** New establishment-level analysis conducted for this report reveals that nearly 650 discrete places of business make up Tennessee's automotive economy and together employ almost 94,000 workers. Three name-plate automakers—General Motors, Nissan, and Volkswagen—have major operations in Tennessee and represent each major global auto-producing bloc. These original equipment manufacturers (OEMs) employ more than 12,000 Tennesseans. And yet, notwithstanding the usual focus on the automakers themselves, suppliers actually constitute the bulk of establishments and employment in the industry. Some 73,500 jobs—78 percent of the sector total—reside in Tennessee's direct supplier network, while another 8,500 can be found in a more extended network of indirect suppliers and service providers, meaning that Tennessee ranks first in the South and fifth among peer states in terms of its total supply chain employment. More than half of these jobs reside in the state's approximately 600 small and medium-sized establishments (SMEs), which together employ 49,500 workers. Supply-chain jobs are distributed across companies and establishments involved in producing for every system of the car, with relative specializations in body and interior, chassis, electronics, and parts and components. What is more, the state's auto industry has a strong international cast, with majority-owned foreign businesses from 14 different countries employing 46 percent of Tennessee's auto industry workforce. Taken together, these indicators confirm that Tennessee has emerged as one of the industry's most important supplier hubs not just in the region, but nationally and globally

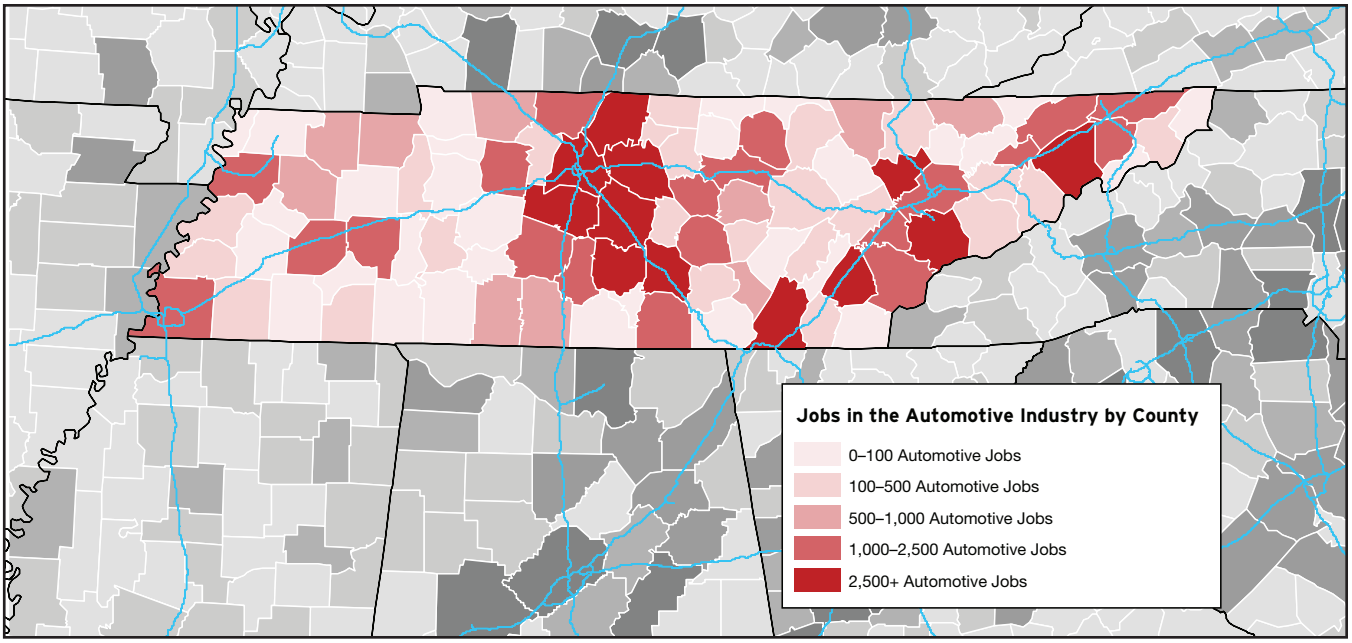
The automotive supply chain accounts for more than three-quarters of industry jobs in Tennessee, building all systems of the car



Source: Brookings analysis of data from Dun & Bradstreet, ELM Analytics, and MarkLines

- **TENNESSEE'S AUTOMOTIVE INDUSTRY TOUCHES EVERY CORNER OF THE STATE.** Finally, the establishment-level analysis confirms that the automotive industry generates considerable economic activity in all of the state's large metropolitan areas, in most of its small metropolitan areas, and in many rural counties. The vast majority of places in the state participate in the auto industry via the supply chain. While automakers employ over 12,000 Tennesseans across establishments of varying sizes in five different counties, the state's extended network of suppliers employs nearly

The automotive industry touches every corner of the state



Source: Brookings analysis of data from Dun & Bradstreet, ELM Analytics, and MarkLines

82,000 Tennesseans whose work is distributed across 80 of the state's 95 counties. Most regions are home to multiple supplier establishments, and most of these establishments produce differentiated products for different systems of the car. Foreign-owned firms are highly regionalized, with over 95 percent of jobs in foreign companies located along or east of the I-65 corridor, and show a slight preference for large metropolitan areas over small ones. In addition, firms of the same nationality tend to cluster near each other. Meanwhile, almost three-quarters of active exporters reside in the state's four largest metropolitan areas

Taken together, these findings reveal that Tennessee's automotive economy is moving into its next phase as a sizable, competitive, and increasingly dense network of producers and suppliers residing in all corners of the state. More expansive, diverse, and diffused than is commonly understood, the Tennessee industry has emerged from the economic crisis with considerable momentum as it embarks on its next era of competition.

2. HOWEVER, DISRUPTIVE FORCES IN THE GLOBAL AUTO INDUSTRY POSE COMPETITIVE CHALLENGES FOR THE TENNESSEE SECTOR

Multiple trends point to continued growth in Tennessee's auto industry. The global automobile market has begun to stabilize and manufacturers are once again forecasting increases in global sales after what has been arguably the worst economic crisis in the industry's history. Growth has been particularly strong within North America. In 2012, U.S. auto sales grew by over 13 percent—the fastest rate in two decades—and created over 250,000 jobs. At the same time, though, fundamental changes in the auto industry are ratcheting up the pressure. At least three megatrends are redefining the very nature of competition in the U.S. auto sector:

- **COST PRESSURES REMAIN INTENSE.** To begin with, cost pressures have continued to ratchet up as input costs steadily rise and consumers demand greater value and content for the same price. Meanwhile, the rise of production in low-cost countries (LCCs) has expanded the field of competition and added to the pressures. At the same time, though, the reality of wage convergence across U.S. locations is at once increasing competition and making it harder for locations to distinguish themselves on low labor costs alone

- **INCREASED PRODUCTIVITY DEMANDS AND SHIFTING DEMOGRAPHICS ARE EXPOSING WORKFORCE CHALLENGES.** The sheer growth and sophistication of the North American auto industry has also increased firms' demand for appropriately skilled workers. While this change is welcome news, it also prompts worries that the current workforce is not sufficiently trained to meet industry demands. Because the productivity imperative requires a uniquely trained and agile workforce, auto industry employers are increasingly looking for workers who are competent at varied tasks, comfortable with technology, and able to remain flexible as process and product innovation proceeds. However, even now employers assert that difficulties in finding workers for skilled production jobs—machinists, operators, and technicians—are reducing firms' ability to expand and employ new technologies. These concerns will only become more acute as auto workers of the baby boom generation begin to retire

- **THE TECHNOLOGY IMPERATIVE IS SHARPENING.** Finally, cost pressures coupled with new regulatory requirements and shifting consumer demand require the implementation of new solutions throughout the entire automobile production system and product line. Of particular concern will be areas that affect fuel efficiency, specifically lightweight materials (particularly carbon fiber) and powertrain efficiency and electrification. In order to be effective, these new innovations will need to penetrate deep into the auto supply chain to firms three and four steps removed from the automaker

Overall, these trends point to a future in which competitive advantage will increasingly require a coupling of cost and efficiency factors with skills and technology factors.

In light of these trends, a systematic assessment of the strengths, weaknesses, opportunities, and threats (a SWOT analysis) of the Tennessee auto industry reveals both sizable assets as well as a number of vulnerabilities. In terms of its assets, the industry seems well situated to flourish. A strategic location, outstanding highway linkages, and a competitive cost structure for heavy manufacturing continue to keep the state competitive. Emergent efforts to bolster the state's global engagement and regional economic development system, paired with pieces of a robust, industry-relevant workforce and educational training system and sizable innovation assets, also bode well for the state.

At the same time, though, ongoing trends expose a number of deficiencies that could imperil the market position of the Tennessee auto industry. At least three challenges raise questions about the near- to medium-term competitive position of the industry:

- **ELEMENTS OF PRIVATE- AND PUBLIC-SECTOR STRATEGY REPRESENT MISSED OPPORTUNITIES FOR INDUSTRY GROWTH.** By and large Tennessee maintains an extremely competitive environment for private-sector firms. However, establishing and maintaining a business-friendly environment for advanced industries such as the auto industry requires industry and government to work together to promote a lean but also strategic development framework. Today, the state is surely lean but on a number of points lacks a truly strategic approach. For example, despite the state's overall favorable ranking on tax competitiveness, Tennessee resides in the bottom fifth of states, according to the Tax Foundation, in terms of its tax competitiveness for new R&D firms and labor-intensive manufacturing. In addition, neither industry nor government fully values the importance of collaboration and exchange among groups of interrelated firms. Instead, the state's development ethos tends to overemphasize the needs of large automakers and underemphasize the supply chain and regional industry clusters. And while the state has made important strides on international engagement, the state could do more to promote exporting and seek foreign direct investment

- **MARQUEE TRAINING PARTNERSHIPS WITH LARGE EMPLOYERS MASK UNEVEN ATTENTION TO THE NEEDS OF SMES AND GAPS IN THE WORKFORCE PIPELINE.** Although Tennessee has begun to construct a comprehensive workforce development system for advanced industries, much work remains. To begin with, Tennessee lags on literacy, numeracy, and educational attainment, which complicates the state's efforts to ensure the availability of a sufficient and appropriately trained workforce for the auto industry. Meanwhile, a careful review of employment and skills demand in auto-specialized occupations reveals a labor market stressed by employers' rising skill requirements and their growing difficulty in finding and keeping appropriately trained workers. This "upskilling" is creating new challenges for the state's workforce training system, which despite recent advances, such as the creation of the Labor Education Alignment Program (LEAP), has yet to debut a cohesive, statewide workforce development system capable of meeting the changing needs of AI employers now and in the years ahead. In this regard, the sector's competitiveness is likely undercut by the variable quality of the education and training programs available to respond to workforce needs of auto and other AI employers. The unfortunate fact: Rather than possessing a fully intentional and AI-focused workforce system, the state instead has a set of cutting-edge, often state-supported one-off programs superimposed on top of a disparate patchwork of regional initiatives

- **LIMITED TECHNOLOGY TRANSFER AND PRIVATE R&D ACTIVITY CONSTRAIN THE STATE'S INNOVATION SYSTEM.** The Tennessee innovation system is anchored by substantial publicly supported R&D activity, led by robust and growing federal and university investments in Oak Ridge National Laboratory, the University of Tennessee, Vanderbilt University, and other research institutions. This provides the state an important base for cultivating a technology edge over the long term. However, a number of deficiencies in the state's innovation and technology

development enterprise limit tech-oriented commercial activity in the auto sector. To begin with, the state's public R&D activity—while robust in general—appears weaker and more nascent when it comes to auto industry-related technology development. At the same time, a paucity of private-sector R&D works to undermine the auto industry's innovation potential. Also of concern is a shortage of strong efforts to facilitate collaborative technology development throughout the Tennessee auto supply chain. The state, in this regard, lacks both rich technology networks and exchanges and a supportive technology development and commercialization process for auto-sector suppliers, particularly those of medium size

3. TENNESSEE INDUSTRY AND GOVERNMENT SHOULD COLLABORATE TO EXPAND AND ENHANCE THE AUTO SECTOR

Despite the noted challenges and growing domestic and international competition the state's prospects are in fact bright. The state's original strengths as a strategic low-cost location equipped with excellent transport links have been enhanced in recent years and now position Tennessee quite well—if it moves with insight and urgency to complement the state's cost appeal with a more skill- and technology-based model of development.

The state's present standing licenses Tennessee to articulate an aggressive goal for expanding and enhancing its auto sector. Specifically, the state should commit itself to a bold vision for the next five to 10 years that declares: **Tennessee will emerge as a premier global destination for high-value automotive production.**

To get there, Tennessee's industry and government leaders need to break with traditional and largely reactive economic development strategies and instead focus more assertively and strategically on targeted interventions aimed at addressing specific industry and policy weaknesses. These strategies should aim to get ahead of the many disruptive changes beginning to roil the global auto industry and to anticipate the coming era in which skills and technology will matter as much as low costs in the auto sector.

Three major strategies for advancing the Tennessee automotive economy—as well as other AIs—suggest themselves. Working together, the state's private sector and public and nonprofit communities should:

- **DRIVE CONTINUOUS INDUSTRY DEVELOPMENT:** Establishing and maintaining the state's competitive edge for advanced industries like the auto industry will require urgent moves to increase firms' operational prowess, foster the broad health of the supply chain, and tap new market opportunities. Along these lines, private- and public-sector efforts to drive increased competitiveness should include, along with continued vigilance on cost structures, new moves to promote the vibrancy of the overall cluster (and not just its automakers), develop forums for information exchange, and promote both exports and strategic foreign direct investment (FDI)

- **DEVELOP THE WORKFORCE PIPELINE TO STRENGTHEN TENNESSEE'S AI SKILLS BASE:** Tennessee faces a skilled worker shortage that threatens to be a pinch point in the industry's growth. A long-term commitment, starting now, that brings together industry and public-sector educational institutions to train, retrain, and attract the workers necessary for the automotive and AI sectors to flourish will be critical in the years to come

- **COMMIT TO INNOVATION AT ALL LEVELS OF THE SUPPLY CHAIN:** With a number of technologically disruptive forces affecting the global automotive industry, the bottom lines of automakers and their suppliers in Tennessee will depend on how well the state's innovation system functions. As such, the state should aggressively support efforts to increase commercialization, incentivize private-sector research, and expand suppliers' access to technology

* * *

Looking to the future, both industry and government should organize an array of actions along the lines of these three strategies. This report recommends the following division of labor among industry and government actors to move the Tennessee automotive industry up the value chain:

- **THE PRIVATE SECTOR MUST LEAD THE WAY IN EXPANDING THE FOOTPRINT OF THE TENNESSEE AUTO ECONOMY AND ADVANCED INDUSTRIES IN GENERAL.** Auto-sector preeminence will hinge above all on the success of the private sector. More than any other stakeholder, Tennessee auto firms possess the drive and know-how that will allow this advanced industry to thrive. And yet, while individual excellence will be imperative, companies will not be able to go it alone. More and more, the firms that excel will be those that most adeptly engage with supply chain partners, engineering and service companies, industry networks, the public sector, and local institutions to drive down costs, cultivate a top-flight workforce, and add superior value through innovation. Along these lines, the state's auto companies should consider a number of strategic options arrayed across the three strategic priorities identified by this report

  To drive continuous industry development, firms should: continue to **increase competitiveness through operational excellence** and make that a hallmark of Tennessee auto manufacturing. Tennessee auto industry companies should also step up their engagement in industry-wide networking and, more specifically, **play a lead role in developing a more robust industry association** in the state. Meanwhile, Tennessee auto firms should look beyond operational strength and improved cluster dynamics to maximize their present competitive position by **exploring opportunities for expansion into foreign markets and adjacent industries**

  To develop the workforce pipeline to strengthen Tennessee's AI skills base, firms should: **seek collaborative solutions to workforce training needs** that build on their existing associations, partnerships, and self-interest to formally identify and respond to existing and projected industry-wide labor demands. More concretely, firms in the Tennessee auto sector should **lead in developing improved regional skills partnerships** that bring together key stakeholders for the purpose of strengthening the regional workforce pipeline. At the same time, auto and other AI firms should move to develop or expand their relationships with area educational institutions to increase the number of work-based learning opportunities

  To commit to innovation at all levels of the supply chain, firms should: **concentrate on innovation** as a primary tool for value creation, whether to deliver process gains, unique capabilities, or new product offerings. The most concrete way that firms can respond to the innovation imperative is by taking steps to **increase R&D investment**. Meanwhile, Tennessee firms should **prioritize engagement in the innovation commons** and work wherever possible to foster the emergence in Tennessee of a dynamic, multi-channel technology ecosystem in which OEMs, suppliers, business associations, universities, labs, economic development groups, and government interact to deliver innovation gains faster and cheaper than otherwise possible

- **AT THE SAME TIME, THE PUBLIC SECTOR MUST CREATE A SUPPORTIVE ENVIRONMENT IN WHICH AUTO OEMS AND THEIR SUPPLIERS CAN FLOURISH.** The public sector—and especially state government—has its own critical role to play as Tennessee auto companies seek to move up the value chain. A new stance is required—one that is catalytic and facilitating (rather than all-determining) at the state level and supportive and empowering at the federal level. As such, the state—in collaboration with industry and in close partnership with Tennessee's congressional delegation—should organize its next automotive efforts around the three strategic themes described in this report

  To drive continuous industry development, the state should: update its general approach to industry development so as to **focus on groups of firms, SMEs, and the supply chain** much more than it does now. In terms of implementing

THE FEDERAL GOVERNMENT MUST DO ITS PART

The State of Tennessee is recommitting itself to advancing the state's automotive industry (and other AIs) through partnerships and initiatives that catalyze industry development, enlarge the AI skills workforce, and upgrade the state's innovation assets. For its part, the state's congressional delegation should push for federal policies that set a platform for growth and support the goals of the renewed industry-state partnership.

- To drive continuous industry development, the federal government should **reform the U.S. corporate income tax rate** to bring the effective rate in line with competitors while at the same time moving to **institute an investment tax credit for new capital equipment and software**. At the same time, the federal government should **fund and expand programs that catalyze regional AI cluster initiatives**. Likewise, steps to **better support and align export promotion programs** and to **promote trade liberalization and expanded market access** will help bolster U.S. firms' competitiveness in the global marketplace, while efforts to **seek program harmonization** will help encourage AI supply chain strength

- To develop the workforce pipeline to strengthen Tennessee's AI skills base, the federal government should **align education and workforce policy reforms** to develop a more coherent education and training pipeline and **create a "Race to the Shop" competition** to reward bottom-up, business-led creativity in modernizing the regional delivery of federally funded AI workforce education and skills training. At the same time, the federal government should **support employer acceptance and use of industry-recognized certifications** as well as **STEM and career and technical education initiatives** that bridge high school and postsecondary education. Lastly, the federal government should move to **expand and coordinate initiatives to inspire and excite elementary and high school students about STEM** subjects, both in school and outside the classroom

- To commit to innovation at all levels of the supply chain, the federal government should **invest in R&D for cross-cutting AI technologies** by moving to double the research budgets of three key science agencies over the next decade. In addition, the federal government should **scale up the National Network for Manufacturing Innovation (NNMI) and create similar translational research consortiums on engineering topics**. Meanwhile, the federal government should **increase funding for the Manufacturing Extension Partnership (MEP) and reorganize MEP as a one-stop shop for all federal SME support programs** while at the same time taking steps to **facilitate and incentivize national labs' interactions with regional industry clusters and SMEs**. Finally, the federal government should make permanent and expand the R&E tax credit to stimulate more private-sector R&D activity in Tennessee and to reflect the intensified, increasingly collaborative nature of the AI innovation game

the new approach, the state should **name a sector lead in state government** to spearhead automotive industry development. Additionally, the state should consider moving to **catalyze the creation of a robust automotive industry association** to market and advocate for the industry and facilitate networking, learning, and supply chain activities. Finally, the state should "go global" and **emphasize international engagement, both by "doubling down" on export promotion and linking export and FDI promotion**

To develop the workforce pipeline to strengthen Tennessee's AI skills base, the state should: **create an AI skills champion** in state government who would be tasked by the governor with promoting a new vision of workforce development for

the state. Tennessee should also **establish an AI skills challenge grant program** to award funds on a competitive basis to strong initiatives in those regions working most creatively to align skills training to industry demand in the state's key industries. Lastly, the state should work with the private sector and educational institutions to **expand access to work-based learning opportunities** within the AI sector

To commit to innovation at all levels of the supply chain, the state should: adopt a new resolve to **prioritize technology development and diffusion** across the auto and AI supply chains. To that end, the state should move to **encourage private-sector innovative activity**, perhaps through the implementation of a state R&D tax credit or an innovation vouchers program to foster R&D among Tennessee's SMEs. The state should also make sure that it leverages the commercial potential of the sizable public R&D activity now ongoing in Tennessee to the fullest by embracing a renewed bid to **encourage technology transfer from the University of Tennessee and Oak Ridge National Laboratory**. Finally, in the moderate to long terms, the state should **continue building its AI knowledge base**, in part by seeking strategic engagements with neighboring states that support regional AI capabilities

* * *

Mastering the current moment will require new thinking and urgent action—and it will challenge all stakeholders to act differently. The state that did pioneering business with Japan to change its future has done this before. It can do it again. ■

INDUSTRY AGENDA

$ = Little to no cost	**$$** = Low cost	**$$$** = Moderate cost	**$$$$** = High cost

Drive Continuous Industry Development

Increase competitiveness through operational excellence	**$-$$$**
Play a lead role in developing a more robust industry association	**$$-$$$**
Explore opportunities for expansion into foreign and non-automotive markets	**$**

Develop the Workforce Pipeline to Strengthen Tennessee's AI Skills Base

Seek collaborative solutions to workforce training needs	**$-$$**
Lead in developing improved regional skills partnerships	**$$-$$**
Increase the number of work-based learning opportunities	**$$-$$$**
Support the use of industry-recognized certifications	**$$**

Commit to Innovation at All Levels of the Supply Chain

Concentrate on innovation	**$-$$**
Increase R&D investment	**$$$$**
Prioritize engagement in the innovation commons	**$-$$**

STATE AGENDA

$** = Little to no cost | **$$** = Low cost | **$$$** = Moderate cost | **$$$$ = High cost

Drive Continuous Industry Development

Focus on groups of firms, SMEs, and the supply chain	**$**
Name a sector lead in state government to spearhead automotive industry development	**$$**
Catalyze the creation of a robust automotive industry association	**$$$**
Emphasize international engagement, both by "doubling down" on export promotion and linking export and FDI promotion	**$**

Develop the Workforce Pipeline to Strengthen Tennessee's AI Skills Base

Create an AI skills champion	**$$**
Establish an AI skills challenge grant program	**$$$**
Expand access to work-based learning opportunities	**$$**

Commit to Innovation at All Levels of the Supply Chain

Prioritize technology development and diffusion	**$**
Encourage private-sector innovative activity	**$$-$$$$**
Encourage technology transfer from UT and ORNL	**$$-$$$**
Continue building the advanced industry knowledge base	**$$$$**

FEDERAL AGENDA

$** = Little to no cost | **$$** = Low cost | **$$$** = Moderate cost | **$$$$ = High cost

Drive Continuous Industry Development

Reform the U.S. corporate income tax rate	**$$$-$$$$**
Institute an investment tax credit for new capital equipment	**$$-$$$$**
Fund an expand programs that catalyze regional AI cluster initiatives	**$$**
Better support and align export promotion programs	**$$**
Promote trade liberalization and expanded market access	**$$**
Seek program harmonization	**$**

Develop the Workforce Pipeline to Strengthen Tennessee's AI Skills Base

Align education and workforce policy reforms	**$**
Create a "Race to the Shop" competition	**$$**
Support employer acceptance and use of industry-recognized certifications	**$$**
Support STEM and career and technical education initiatives	**$$$**
Expand and coordinate initiatives to inspire and excite elementary and high school students about STEM	**$**

Commit to Innovation at All Levels of the Supply Chain

Invest in R&D for cross-cutting AI technologies	**$$$$**
Scale up the National Network for Manufacturing Innovation (NNMI) and create similar translational research consortia on engineering topics	**$$$**
Increase funding for the Manufacturing Extension Partnership (MEP) and reorganize MEP as a one-stop-shop for all federal SME support programs	**$$-$$$**
Facilitate and incentivize national labs' interactions with regional industry clusters and SMEs	**$$**
Make permanent and expand the R&E tax credit	**$$$$**

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