

A REPORT BY THE HOOVER INSTITUTION

INNOVATIVE ALABAMA

Prepared for the Alabama Innovation Commission



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Introduction

Alabama's leaders recognize that the state holds unlocked potential to grow and spread innovative industries across the state. Governor Kay Ivey convened the Alabama Innovation Commission to stimulate economic growth with a focus on entrepreneurship, innovation, and technology. The commission has made progress toward that goal with the signing of the Alabama Innovation Corporation into state law and the establishment of a federal grant–matching program for small businesses. These measures constitute an important step in creating the legal and financial infrastructure necessary to support an innovation ecosystem within Alabama.

A team from the Hoover Institution has written this report to build upon these efforts by conducting data-driven research to assess Alabama's infrastructure in its educational, legal, financial, governance, and physical aspects—all of which are necessary components to transform the state into an innovation hub. The goal of this report is to provide pragmatic, actionable policy recommendations to guide Alabama's leaders as they work to realize their state's full economic potential.

Crucially, Alabama already possesses two key assets. First, it already has important innovation hubs around Birmingham, which has distinguished itself as a thriving center for biomedical technology research and development, and around Huntsville, which boasts the Redstone Arsenal, Cummings Research Park, and NASA's Marshall Space Flight Center. Second, it has passionate, dedicated, and hardworking people in public service, universities, K–12 education, nonprofit organizations, and the private sector who are determined to build a more prosperous future for Alabamians. In our experience, this is an exceedingly rare asset—one which has no market price.

Innovation as the Basis for a Prosperous Society

Innovation is the creative act of seeing a demand curve for a product that may not yet exist, and then putting together the components necessary to bring that product or service to market. A canonical example is the iPhone. Introduced by Apple in 2007, it took the creative leap of combining a cellular telephone, a personal computer, a camera, and a music player into a single handheld device. The result was a completely new product. The global market for such devices, now generically known as smartphones and produced by dozens of firms, is roughly \$400 billion per year.

Innovation is also the creative act of seeing how to produce an existing product or service more efficiently, and then realizing the results of that vision such that the price falls and the market expands. A quintessential example is the Swedish firm Spotify, which transformed



the way consumers purchase recorded music: instead of buying and owning audio content (e.g., records, tapes, compact discs, downloads), consumers access music by streaming it on demand for a flat fee. The product—recorded music—is the same. What Spotify changed was the unit cost; and in so doing it earned roughly \$9 billion in revenues in 2020.

Successful innovations generate what economists call “Ricardian rents”—the ability to produce more revenue per dollar of input than the least productive producer in that same market. Some of those rents are captured by firms in the form of higher profits than those of their competitors. Some of the rents are captured by government in the form of higher tax revenues than it would have received otherwise, allowing it to finance more public goods, such as roads and schools. Some of the rents are captured by the firm’s employees in the form of higher wages than they would have earned otherwise. Those rents are then shared more broadly, as those workers consume housing, food, entertainment, and other services produced by construction firms, restaurants, movie theaters, and the like. Innovation and the Ricardian rents it generates are, in short, the basis for a prosperous society.

Innovation Is People

If innovation is such a good thing, then why don’t we see it happening everywhere? The short answer is that innovation is the outcome of cooperation and competition among people with complementary skill sets who have access to investable funds. Some of those people know how to invent new technologies. Others know how to combine technologies that already exist in novel ways. Still others know how to secure financing, write contracts, navigate regulatory mazes, build prototypes, set up manufacturing facilities, and market consumer products. Yet other people, who have saved more than they consume, invest their savings in the people with specialized skills.

Innovation therefore happens in environments in which the educational, financial, legal, governance, and physical infrastructure incentivizes a pool of people with complementary assets—whether those assets be human capital or financial wealth—to come together to take calculated risks. Getting them to do that—to collocate, cooperate, and compete—requires that it be common knowledge that calculated risk taking will be rewarded. Those rewards come in three forms: 1) a share of the Ricardian rents earned by the people who took the risk of investing in their human capital; 2) a share of the Ricardian rents earned by the people who took the risk of investing their savings; and 3) a share of the Ricardian rents allocated to the public goods—the non-rival and non-excludable goods that are essential to the functioning of a society—necessary to sustain life, liberty, and the pursuit of happiness.

The Crucial Role of Government

Government, as the principal producer of educational, legal, financial, governance, and physical infrastructure, plays a crucial role in innovation. Without that infrastructure, people with specialized knowledge and skill sets, and people with investable savings, move elsewhere.

Our recommendation to the Alabama Innovation Commission (AIC) is, therefore, that the state government move simultaneously on a range of infrastructural investments. We provide summary statements about each of these components in the paragraphs below, with more complete discussions in the chapters that follow. We underline, however, that while we discuss these investments individually, we consider them to be mutually reinforcing and mutually dependent.

The Role of Universities in Fostering Innovation and Growth

Universities play a vital role in the development of their local economies and in the innovation ecosystem. In the short run, university students boost their local economies. In the long run, universities can provide skilled human capital. Their graduates can become the leaders in an innovative economy for years to come. In order to accomplish that goal, however, universities must succeed in producing this pool of talented people and in providing a framework that retains them. In chapter 1, “The Role of Alabama Universities in Fostering Innovation and Growth,” Joshua Rauh, Natalie Millar, and Gregory Kearney argue that Alabama needs to strengthen the link between its universities and innovation. Various indicators and rankings of innovative practices and behavior show consistently that Alabama finds itself in the middle to bottom third of the country. Rauh, Millar, and Kearney argue that Alabama has an opportunity to develop curricula and academic environments within its universities to attract and keep talented students who are focused on innovation.

To strengthen innovation within universities, Rauh, Millar, and Kearney suggest that Alabama replicate Wisconsin’s Alumni Research Foundation (WARF). WARF is an independent, nonprofit corporation run by alumni trustees of the University of Wisconsin that manages the university’s patented technologies and invests the revenue to support future university research. While WARF receives substantial funding from investment returns, the bulk of its revenues stems from contributions. The Alabama Innovation Corporation, which was established in May 2021, provides an entity that could potentially emulate WARF.

In addition to creating an entity that provides financial support for innovation, Rauh, Millar, and Kearney suggest that Alabama’s universities would benefit from having offices of technology licensing (OTLs) that assist in the commercialization of technology developed at the universities and ensure that some returns from the innovations accrue to the universities. This requires that the individuals who staff the OTLs understand the long-term processes and potential benefits from innovation. It also requires that they are able to connect academics with market opportunities.

Rauh, Millar, and Kearney also suggest that Alabama’s universities may want to create new programs that focus on entrepreneurship within MBA programs. In addition, they suggest



that universities use these programs to connect students with successful entrepreneurs, thus improving entrepreneurial quality and impact.

Finally, Rauh, Millar, and Kearney stress the need to invest in amenities that promote strong quality of life in cities and areas surrounding universities, to create an environment in which potential faculty and alumni entrepreneurs will remain and locate their innovative activities.

Outdoor Recreation Infrastructure

In chapter 2, “If You Build It, They Will Come: High-Skill Workers and Alabama’s Outdoor Recreation Infrastructure,” Alexander Galetovic, Stephen Haber, Jordan Horrillo, and Isabel Lopez develop the idea of quality of life further by arguing that a crucial component to establishing an innovation ecosystem within a state is retaining and attracting human capital. They show that Alabama is exceptionally well endowed with a vast array of natural assets that can be leveraged to expand its outdoor recreation industry, enhancing the state’s attractiveness for high-skilled individuals, as well as yielding substantial returns for both rural and urban communities.

Galetovic, Haber, Horrillo, and Lopez also show, however, that Alabama has not invested in its outdoor recreation infrastructure at the same scale as neighboring states. To convert its endowments into assets, the state should ramp up spending on outdoor recreation infrastructure. Funding may come from combining private philanthropy, state funds, federal funds, and revenues from user fees. Because projects will generate externalities and incremental economic activity, over time they will also generate higher tax revenues for the state.

The primary recommendation of Galetovic, Haber, Horrillo, and Lopez is the creation of a joint commission for outdoor recreation infrastructure, named by the governor, that includes broad representation across the public, private, and nonprofit sectors to expand the supply of outdoor infrastructure throughout the state. The joint commission is not a replacement for any state agency, higher education center, nonprofit organization, or private initiative. Quite the contrary, its purpose is to reinforce them. The joint commission might include: the commissioner of the Alabama Department of Conservation and Natural Resources; the director (or a program director) of the University of Alabama Center for Economic Development; the leaders of nonprofit organizations with long-standing interests in promoting outdoor recreation and conservation, or with interests in promoting an innovative Alabama economy, such as the Freshwater Land Trust, Alabama Audubon, the Nature Conservancy, Ducks Unlimited, the Alabama Trails Foundation, and the Economic Development Partnership of Alabama; the mayors of three or four cities; a number of outdoor recreation entrepreneurs operating small-scale firms; and representatives from Alabama-based firms and foundations with demonstrated philanthropic track records.

The joint commission would have three primary goals. First, it would draw on Alabama’s Statewide Comprehensive Outdoor Recreation Plan (to be released in 2022) to identify projects that would generate significant positive externalities for the state, and then estimate the scale of the necessary investment. Second, the joint commission would be a vehicle through which funding sources, beyond those already in place, would be identified and pursued. One such source might be the Infrastructure Investment and Jobs Act (H.R. 3684) that is winding its way through Washington, DC. Third, the joint commission would work with state agencies, municipalities, nonprofit organizations, and the private sector to plan outdoor recreation infrastructure projects, select developers, distribute funds, and ensure delivery of projects and services.

Supporting Advanced Manufacturing in Alabama

Since 2010, Alabama has seen a robust rebound of manufacturing, both in its larger cities and nonmetro areas. Much of this manufacturing activity involves new investments and sophisticated techniques, and a sizable share is linked to firms with links to Germany, a country that is at the technological frontier of advanced manufacturing.

In chapter 3, “Supporting Advanced Manufacturing in Alabama,” Jonathan Rodden argues that Alabama can solidify its position as one of the most dynamic manufacturing areas in the United States if it continues to build an infrastructure to support advanced manufacturing along the lines of the German model of collaboration between government, educational institutions, and the private sector.

Rodden stresses that Alabama has already made impressive investments in workforce training. The next step is to build robust institutions that help bridge what he calls the “valley of death”—the gap between abstract or academic innovations and their commercial application in the marketplace. The German model is of particular interest to Alabama because it links research on the one hand to application on the other.

Rodden explains that the Fraunhofer institutes, a set of seventy-four public-private applied research institutions organized around specific scientific fields and areas of research, are at the center of the German model. Private and public entities—universities, large corporations, small- and medium-sized enterprises, research organizations, and trade associations—can enter into research contracts with Fraunhofer and gain access to vast collaborative networks and a wealth of focused expertise. The institutes employ permanent staffs of scientists and technicians, along with a rotating group of experts from universities and other institutions. Each institute focuses on applied research in a specific area that often corresponds to a cluster of regional private-sector firms in areas such as optics, lasers, wind energy, and automotive research. Funding combines direct government support, contracts with government entities, and private-sector contracts.



Rodden's proposal is to mobilize existing links with German firms, researchers, and officials to study the German system of institutional support for advanced manufacturing, paying special attention to Fraunhofer and the network of related institutions in the Stuttgart region. He suggests that the Alabama Innovation Commission consider the creation of a delegation that is tasked with exploring whether there are specific aspects of what might be called the "Stuttgart model" that can be applied in Alabama.

Tax Policy, Subsidies, and Innovative Business Investment in Alabama

Innovation and economic growth emerge from a combination of factors and policies, and one of them is tax policy. In recent years Alabama has updated its business tax code and established new incentives for innovative business investment. That legislation includes the Alabama Jobs Act of 2015, the Alabama Incentives Modernization (AIM) Act of 2019, and H.B. 540 and H.B. 609 in 2021. The latter two bills establish the Alabama Innovation Corporation and grant-matching programs for small businesses.

In chapter 4, "Tax Policy, Subsidies, and Innovative Business Investment in Alabama: Past and Prospect," Joshua Rauh and Gregory Kearney provide an initial analysis of the effects of these legislative measures. Overall, they find no statistically robust evidence that the Jobs Act caused Alabama counties to outperform the counties in neighboring states in terms of job growth. They also find no evidence consistent with the hypothesis that targeted Alabama counties outperformed nontargeted Alabama counties. Based on this initial evidence, they argue that these results call into question how useful any new or additional jobs credit programs might be. More generally, they argue that the rules that govern tax relief are often cumbersome and costly for small- to medium-sized businesses to navigate. Instead, they recommend simplifying the tax code by replacing some of the existing, specific tax incentives with broader cuts in the corporate and sales tax rates. They also recommend that the remaining incentives be simpler, of shorter duration, and highly targeted.

Based on existing research on innovation-specific financial incentives, Rauh and Kearney also recommend that the AIC establish venture capital funds that match private investments in companies seeking to move to Alabama. They suggest structuring AIC's programs with guidance and rules similar to those used by Launch Tennessee in its INCITE Co-Investment Fund and Impact Fund, which match private investment in companies seeking to move to Tennessee. One key aspect of their proposal is that for a business to qualify for some amount of co-investment, investment fund dollars must be matched by private dollars, thus providing a market test for fund allocation.

Finally, Rauh and Kearney recommend an amendment to the AIM Act that would remove the requirement to include state funds from the qualified opportunity zone fund designation and replace the "state funds" guarantee of downside losses with some degree

of co-investment to be applied from the future Alabama Innovation Fund (AIF) specified in HB 540, with the AIF having some input to the process. This would eliminate a blanket state guarantee and improve governance around investment decisions.

Establishing the Foundation for Economic Growth:

The Alabama Education Laboratory

In chapter 5, “Establishing the Foundation for Economic Growth: The Alabama Education Laboratory,” Eric A. Hanushek proposes an independent education laboratory to conduct systematic research and evaluation of Alabama’s schools. Hanushek notes that the performance of Alabama’s students is currently not comparable to that of students in other US states or other countries that are in direct economic competition. Improving the K–12 schools in Alabama is not a onetime event but a protracted process that must continue over decades. However, long-run growth and development is unlikely to be possible without improvement of the labor force in Alabama.

Hanushek also notes that the state currently lacks the institutional capacity to evaluate new and ongoing education programs and policies so that successes can be expanded and failures curtailed. He also notes that this is an opportune time to develop such a laboratory: there is the COVID-induced critical need for improving Alabama’s schools; and there is funding available from the federal American Rescue Plan.

According to Hanushek, the work plans of the education lab would be developed in consultation with existing educational institutions, relevant state departments, and individual school districts. The education lab would also be charged with providing a biennial report on the state of Alabama education, assessing the achievement of Alabama students, their high school graduation rates, and their entry into college and careers. It would provide detailed analysis of the progress of students toward meeting the overall goals of Alabama’s plan under the Every Student Succeeds Act, along with an update on the results of its various evaluations and research activities. Finally, the education lab would work with the legislature and with the Department of Education to design appropriate evaluations of new programs before they are implemented. By working with programs before they begin, it is possible to get baseline information and to establish appropriate control groups for evaluations, thus obtaining the most useful information about the effectiveness of new initiatives.

To ensure the education lab’s credibility, Hanushek suggests that the results of any analysis would be made public in order to insulate the work from political manipulation. More generally, the education lab would produce its own work and facilitate work by outside researchers. Hanushek argues that the nature of the evaluation and policy issues surrounding schools means that other states can both gain from the insights that would be generated by an Alabama education lab and can provide their own insights to Alabama.



Broadband Infrastructure for Education

In chapter 6, “Alabama Broadband for Education,” Sofoklis Goulas, Chunping Han, and Margaret E. Raymond examine the state’s commitment to expanding broadband coverage throughout Alabama through the lens of public K–12 education. Current broadband expansion plans can be strengthened if they are grounded in specific needs and uses. They propose that ensuring access to broadband for all Alabama schools and extending broadband coverage to all households with K–12 students could provide critical infrastructure for rapid improvements in school quality. Making broadband for education a priority would open other ways to leverage the investment in health, employment, civics, and public safety.

Goulas, Han, and Raymond argue that universal classroom access to broadband is necessary because it allows coteaching, professional development, and support of student learning in more efficient ways. Moreover, Alabama can realize substantial returns on future broadband investment if it makes coverage of households with K–12 students a priority. Students would have access to digital resources to support their learning regardless of location.

Goulas, Han, and Raymond estimate that by ensuring access for all students, each future graduating cohort will add 2,483 students to the set of college-educated adults. They estimate cumulative gains in personal income over the twenty-year useful life of the fiber equipment at roughly \$5.5 billion. After deducting the state’s investment, the estimated social welfare return on investment would be 214 percent.

Final Remarks

One of the central themes of the six chapters is that remarkable developments are already taking place in Alabama. These have been pushed forward by talented, dedicated, and passionate individuals in public service, universities, K–12 education, nonprofit organizations, and private enterprise. Investments by the state in educational, legal, financial, governance, and physical infrastructure would not be starting from scratch but would constitute enhancements to an already existing asset: Alabama’s people.