
ECONOMIC IMPACT OF THE ARKANSAS RESEARCH AND TECHNOLOGY PARK

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Executive Summary

Construction of the Arkansas Research and Technology Park (ARTP) began in 2003 and operations commenced in 2004. For ten years, the ARTP has been impacting the economy of the state of Arkansas in two primary ways. First, the operation of the ARTP enabled the business expenditures of its tenants. Second, there were direct expenditures on one-time construction activities in building the infrastructure of the ARTP. This report considers the overall impact of the ARTP from the beginning of construction to 2014. Over that period, the ARTP impact has been **more than a half billion dollars** in the Arkansas economy.

Tenant Impacts

- The direct expenditures of ARTP tenant operations from 2005 to 2014 had a total economic output impact of \$470.4 million in Arkansas.
- From 2005 to 2014, ARTP tenant company employment averaged 224. The jobs multiplier was 1.74, yielding an average total employment impact of 387.8.
- Labor income from the employment impacts associated with ARTP tenant companies totaled \$189.5 million from 2005 to 2014.
- Arkansas state and local taxes on production, employment and wages associated with ARTP tenant companies totaled \$16.5 million for the period from 2005 to 2014.

Construction Impacts

- ARTP construction generated direct expenditures of \$29.9 million from 2003 to 2014. These direct effects had total economic output impacts of \$52.6 million in Arkansas.
- In 2009, during the construction of the Enterprise Center, ARTP related construction employment reached a maximum of 102.3. The jobs multiplier was 1.63, yielding a total employment impact of 166.9.
- Labor income from the employment impacts associated with ARTP construction was \$17.0 million from 2003 to 2014.
- Arkansas state and local taxes on production, employment and wages associated with ARTP construction totaled \$1.6 million for the period from 2003 to 2014.

Overall Economic of Impact of ARTP	
Total Direct Expenditures	\$179,372,226
Total Output Impacts	\$522,976,087
Average Operation Employment Impact	387.8
Maximum Construction Employment Impact (2009)	166.9
Total Labor Income Impacts	\$206,483,326
Total State and Local Taxes in Arkansas	\$18,034,200

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Introduction

The Arkansas Research and Technology Park (hereafter referred to as the Park or ARTP), situated in the city of Fayetteville, has been operated by the University of Arkansas Technology Development Foundation since 2004. The mission of the foundation is to stimulate the knowledge-based economy in Arkansas through partnerships that lead to new opportunities for learning and discovery, that build and retain a knowledge-based workforce and that spawns the development of new technologies to enrich the economic base in Arkansas. The Park assists technology-based companies to be more efficient and have higher quality products by applying knowledge and techniques developed at the University. The Park has several facilities: the Innovation Center, the Engineering Research Center, the GENESIS Technology Incubator, the HiDEC facilities, the National Center for Reliable Electronic Power Transmission, and the Enterprise Center.

This study quantifies the economic activities that have occurred at the Arkansas Research and Technology Park in the ten years since their opening in 2004. Two main economic activities are highlighted in this study: the economic activities of the various tenants in the Park and the construction related activities undertaken by the Park. In 2014, 38 tenants from various industries occupied spaces at the Park. Annual information about business expenditures and employment from these tenants from 2008 to 2014, where available, were used in the economic analysis. The business operations of the tenants generate ongoing economic impacts for the state of Arkansas. Additionally, the impact of constructing the buildings and related infrastructure at the Park were also estimated in this study. These one-time impacts from construction activities are also important to consider when looking at the overall economic effect of the Park.

This study first presents the methodology used for the economic impact estimation of both tenant business expenditures and construction activity. In the next section detailed results of the economic impact analysis are described first for the tenant business expenditures and then for the construction activity at the Park. The results discussed include economic output, employment, labor income, and state and local taxes in the state of Arkansas. Finally, a summary of the combined results of economic activities at the Park concludes the paper.

Methodology

Researchers from the Center for Business and Economic Research estimated the economic impact of the Park using data provided by the administration of the ARTP. Data provided to researchers included the annual business expenditures of tenants of the Park and the yearly construction expenditures made for the Park. The business expenditures of the Park tenants were aggregated and subtotaled based on industry descriptions provided by the NAICS code. For the one time impacts, researchers only used expenditures related directly to the construction in the analysis. Thus, contingency, reserves, costs of services related to acquiring loans, and other such construction related expenses were not included. Because there is no economic activity associated with pure asset transfer, the cost of land was also not included in the analysis. Values of construction spending and business expenditures of tenants were used as inputs to the IMPLAN input/output model, which were then used to estimate the indirect and induced effects associated with direct industry spending.

IMPLAN is a regional impact model that enables the evaluation of the economic impact of specific activities such as construction or operation of public works projects, as well as retail, wholesale, manufacturing, and service sales within an economy. IMPLAN was originally developed by the U.S. Department of Agriculture, the Forest Service in cooperation with the Federal Emergency Management Agency (FEMA), the U.S. Department of Interior Bureau of Land Management, and the University of Minnesota to assist the Forest Service in land and resource management planning.

The basic data sources for the current edition of the IMPLAN database and the models used in this study are the Input-Output Accounts of the United States, developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), and county income and employment data published by BEA and the Bureau of Labor Statistics (BLS). The model reflects 2013 industrial structure and technology, and 2013 prices. Trade flows and the results of this analysis were adjusted to reflect prices of the respective years from 2003 to 2014. Economic output values and state and local tax revenues are presented in 2014 dollars.

IMPLAN uses a 525-sector input-output model to measure the effects of three types of impacts: direct, indirect, and induced. Direct impacts consist of employment and purchases of goods and services in the region resulting from the activity being evaluated, in this case, construction and services related to it and scientific research and development. Indirect (inter-industry) impacts consist of goods and services purchased by the firms, which supply inputs consumed in the direct activity. Induced impacts consist of increased household purchases of goods and services in the region by employees of direct and indirect employers. The model generates multipliers, which summarize the magnitude of the indirect and induced effects generated by a given direct change, to

estimate changes in output, income, and employment. In other words, the multiplier is the ratio of total impact to direct impact.

In the IMPLAN model, inter-industry relationships (use and make coefficients) are quantified based on data on the production functions of the different industries in the region. The IMPLAN model was used to estimate multipliers based on those coefficients in the state of Arkansas. Direct spending, total economic activity, total labor income, total employment, and total property income were generated by this model.

For this study, the geographic area considered was the entire state of Arkansas. Economic output, employment, and state and local tax effects were generated by the IMPLAN model. The next section provides these detailed impacts for the business expenditures of tenants and the construction activity at the Arkansas Research and Technology Park.

Economic Impact Analysis

The economic impact of the Arkansas Research and Technology Park is estimated by separately measuring the effects of the activities of the tenants housed at the ARTP and the effects of the construction activities providing the park's much needed buildings and infrastructure. A summary of their combined impacts is provided at the end of this section.

Tenant Economic Impacts

The Arkansas Research and Technology Park provided information to researchers from the Center for Business and Economic Research about the expenditures of the tenants of the various facilities at the Park. The information included business expenditures of the Park tenants for the years 2005 to 2014 along with the number of full-time or part-time employees working for the tenants. Total business expenditure information from tenants was not available for the years between 2005 and 2009, so employment and payroll expenditure information was used for those years instead. Tenants at the ARTP made business expenditures totaling \$23.6 million in 2010, and this number rose 36.2 percent to \$32.1 million for the most recent data available from 2014. From 2005 to 2014, ARTP tenant company employment averaged 224.

Table 1: ARTP Tenant Expenditures and Employment by Year

ARTP Tenant Expenditures and Employment		
Year	Expenditures	Employment
2005	-	254
2006	-	283
2007	\$6,475,919*	191
2008	\$7,478,070*	239
2009	\$7,552,266*	182
2010	\$23,551,917	202
2011	\$21,423,611	235
2012	\$26,472,672	222
2013	\$30,894,022	233
2014	\$32,055,100	196
Total	\$149,427,658	
*Annual Payroll is listed instead of expenditures		

The business expenditures of the tenants at the ARTP created additional economic activity within the state of Arkansas through indirect and induced impacts. For the state of Arkansas, the output multiplier for economic activities carried out by the tenants of

the ARTP averages out to 1.70 over the period from 2005 to 2014. This means for every dollar of business expenditures by tenants at the Park, the total economic impact generated within the state was \$1.70. In 2006, the total economic impact from tenants' business expenditures amounted to \$56.2 million before decreasing to \$54.8 million in 2014. Over the period from 2005 to 2014, the total economic impact generated by tenants of the Arkansas Research and Technology Park was \$470.4 million.

Table 2: Output Impacts of ARTP Tenants by Year

Output Impacts of ARTP Tenants				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2005	\$29,812,430	\$8,799,590	\$10,550,505	\$49,162,525
2006	\$34,006,964	\$10,164,894	\$12,051,820	\$56,223,677
2007	\$28,653,523	\$9,448,388	\$10,107,332	\$48,209,242
2008	\$24,106,835	\$8,847,012	\$8,651,642	\$41,605,489
2009	\$23,919,006	\$8,623,010	\$8,666,617	\$41,208,634
2010	\$25,860,941	\$8,447,688	\$9,731,171	\$44,039,800
2011	\$22,947,660	\$7,398,540	\$9,305,965	\$39,652,165
2012	\$24,106,835	\$8,847,012	\$8,651,642	\$41,605,489
2013	\$31,661,353	\$10,489,179	\$ 11,809,712	\$53,960,244
2014	\$32,055,100	\$10,623,433	\$ 12,078,541	\$54,757,074
Total Impacts	\$277,130,648	\$91,688,746	\$101,604,946	\$470,424,340

Tenants of the ARTP Park directly employed 254 people in 2005 and 233 people in 2013. The economic activity generated by the tenants indirectly supported a total of 417.8 jobs in 2005 and 419.8 jobs in 2013 within the state of Arkansas. The jobs multiplier averaged 1.74, yielding an average yearly employment impact of 387.8.

Table 3: Employment Impacts of ARTP Tenants by Year

Employment Impacts of ARTP Tenants				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2005	254.0	76.0	87.9	417.8
2006	284.0	87.9	100.4	472.2
2007	191.0	82.0	84.2	357.2
2008	239.0	74.2	72.1	385.2
2009	182.0	73.3	72.2	327.5
2010	202.0	74.6	81.0	357.6
2011	235.0	64.2	77.5	376.7
2012	222.0	73.1	83.8	378.9
2013	233.0	88.4	98.3	419.8
2014	196.0	88.5	100.6	385.1

The employment supported by the tenants of the park generated labor income in the form of wages and proprietor income within the state totaling \$19.4 million in 2005 before increasing to \$22.2 million in 2014. Over the time period from 2005 to 2014, the tenants were responsible for \$125.1 million in direct labor income and the total labor income generated by the economic activities of these tenants was \$189.5 million.

Table 4: Labor Income Impacts of ARTP Tenants by Year

Labor Income Impacts of ARTP Tenants				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2005	\$12,983,103	\$3,062,958	\$3,359,824	\$19,405,884
2006	\$14,787,253	\$3,541,763	\$3,837,925	\$22,166,942
2007	\$12,052,831	\$3,312,775	\$3,218,733	\$8,584,339
2008	\$10,092,998	\$3,034,062	\$2,755,143	\$15,882,204
2009	\$10,174,931	\$2,977,665	\$2,759,917	\$15,912,513
2010	\$11,819,113	\$2,989,222	\$3,098,921	\$17,907,256
2011	\$11,584,113	\$2,572,920	\$2,963,515	\$17,120,548
2012	\$12,415,403	\$2,918,250	\$3,204,996	\$18,538,650
2013	\$14,384,123	\$3,590,761	\$3,760,800	\$21,735,684
2014	\$14,818,778	\$3,567,467	\$3,846,404	\$22,232,649
Total Impacts	\$125,112,647	\$31,567,844	\$32,806,178	\$189,486,669

The economic activity of the tenants at the ARTP generated state and local tax revenues that were assessed on various levels of economic activity like production, employment, and wages. Total state and local taxes due to the ARTP and its impacts in Arkansas amounted \$16.5 million between 2005 and 2014.

Table 5: State and Local Tax Impacts of ARTP Tenants by Year

State and Local Tax Impacts of ARTP Tenants					
Year	Employee Compensation	Tax on Production and Imports	Households	Corporations	Total Taxes
2005	\$39,509	\$1,713,610	\$482,765	\$76,817	\$2,312,701
2006	\$44,981	\$1,844,616	\$551,591	\$87,137	\$2,528,325
2005	\$47,903	\$1,147,230	\$602,808	\$90,668	\$1,888,609
2008	\$32,150	\$820,983	\$395,277	\$51,569	\$1,299,979
2009	\$32,087	\$799,463	\$396,145	\$51,766	\$1,279,461
2010	\$36,006	\$824,944	\$445,899	\$56,867	\$1,363,716
2011	\$34,414	\$805,254	\$426,319	\$45,733	\$1,311,720
2012	\$37,965	\$887,950	\$460,987	\$56,976	\$1,443,878
2013	\$44,666	\$1,022,460	\$540,344	\$69,401	\$1,676,871
2014	\$45,767	\$1,135,369	\$552,625	\$68,349	\$1,802,110
Total Taxes	\$384,461	\$10,747,698	\$4,715,127	\$635,401	\$16,482,687

Construction Economic Impacts

The Arkansas Research and Technology Park has undergone several construction projects as it seeks to create, improve and update buildings and associated infrastructure that is needed to maintain a dynamic research park. Estimates provided to the Center for Business and Economic Research by the ARTP administration shows that the organization has spent nearly \$30 million dollars in construction of building and related infrastructure since 2004. These construction estimates by year provided by the ARTP were used to estimate the one-time economic impacts of the activity.

Table 6: ARTP Construction Expenditures and Employment by Year

ARTP Construction Expenditures	
Year	Expenditures
2003	\$1,614,381
2004	\$4,326,481
2005	\$150,000
2006	\$1,373,266
2007	\$914,247
2008	\$1,234,239
2009	\$14,353,127
2010	\$1,384,010
2013	\$3,815,172
2014	\$779,645
Total	\$29,944,568

The construction expenditures for the ARTP created additional economic activity within the state of Arkansas through indirect and induced impacts. For the state of Arkansas, the output multiplier for economic activities associated with construction of the ARTP averages out to 1.61 over the period from 2003 to 2014. This means for every dollar of construction expenditures for the ARTP, the total economic impact generated within the state was \$1.61. In 2003, the total economic impact from tenant's business expenditures amounted to \$3.8 million. As major construction activities associated with the building of the Enterprise Center occurred in 2009, the economic impacts increased to \$23.5 million in 2014. Over the period from 2003 to 2014, the total economic impact generated by construction activities of the Arkansas Research and Technology Park was \$52.6 million.

Table 7: Output Impacts of ARTP Construction by Year

Output Impacts of ARTP Construction				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2003	\$2,300,830	\$728,573	\$644,052	\$3,673,454
2004	\$5,803,980	\$1,837,869	\$1,624,658	\$9,266,507
2005	\$183,843	\$58,215	\$51,462	\$293,520
2006	\$1,551,807	\$491,390	\$434,384	\$2,477,581
2007	\$976,098	\$309,088	\$273,231	\$1,558,417
2008	\$1,269,394	\$401,962	\$355,330	\$2,026,686
2009	\$14,717,731	\$4,660,466	\$4,119,808	\$23,498,005
2010	\$1,384,010	\$438,256	\$387,414	\$2,209,680
2013	\$3,815,172	\$1,357,045	\$1,094,957	\$6,267,174
2014	\$779,645	\$277,317	\$223,759	\$1,280,721
Total Impact	\$32,782,511	\$10,560,181	\$9,209,054	\$52,551,746

Construction at the ARTP directly supported 16 jobs in 2003 and increased to 102.3 jobs in 2009 during the construction of the Enterprise Center. The economic activity generated by the construction indirectly supported a total of 26.1 jobs in 2003 and 166.9 jobs in 2009. In 2014, the construction of the new trail infrastructure supported 9 jobs.

Table 8: Employment Impacts of ARTP Construction by Year

Employment Impacts of ARTP Construction				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2003	16.0	4.7	5.4	26.1
2004	40.3	12.0	13.5	65.8
2005	1.3	0.4	0.4	2.1
2006	10.8	3.2	3.6	17.6
2007	6.8	2.0	2.3	11.1
2008	8.8	2.6	3.0	14.4
2009	102.3	30.4	34.3	166.9
2010	9.6	2.9	3.2	15.7
2013	25.5	9.4	9.1	44.0
2014	5.2	1.9	1.9	9.0

The employment supported by the construction activities at the ARTP generated labor income in the form of wages and proprietor income within the state totaling \$1.2 million in 2003 and \$7.6 million in 2009 during construction of the Enterprise Center. Over the time period from 2003 to 2014, the construction activity was responsible for \$10.6 million in direct labor income and the total labor income generated by the economic activities related to the construction was \$17.0 million.

Table 9: Labor Income Impacts of ARTP Construction by Year

Labor Income Impacts of ARTP Construction				
Year	Direct Effect	Indirect Effect	Induced Effect	Total Effect
2003	\$745,721	\$237,809	\$205,103	\$1,188,633
2004	\$1,881,126	\$599,889	\$517,384	\$2,998,399
2005	\$59,585	\$19,002	\$16,388	\$94,975
2006	\$502,956	\$160,392	\$138,333	\$801,680
2007	\$316,363	\$100,888	\$87,012	\$504,263
2008	\$411,423	\$131,202	\$113,158	\$655,782
2009	\$4,770,157	\$1,521,197	\$1,311,983	\$7,603,338
2010	\$448,571	\$143,049	\$123,375	\$714,994
2013	\$1,201,241	\$471,551	\$348,701	\$2,021,493
2014	\$245,478	\$96,363	\$71,258	\$413,100
Total Impacts	\$10,582,620	\$3,481,342	\$2,932,695	\$16,996,657

The economic activity related to construction projects at the ARTP generated state and local tax revenues that was assessed on various levels of economic activity like production, employment, and wages. Total state and local taxes generated in Arkansas amounted to \$1.6 million between 2003 and 2014.

Table 10: State and Local Tax Impacts of ARTP Construction by Year

State and Local Tax Impacts of ARTP Construction					
Year	Employee Compensation	Tax on Production and Imports	Households	Corporations	Total Taxes
2003	\$2,298	\$72,409	\$29,682	\$4,172	\$108,561
2004	\$5,796	\$182,657	\$74,876	\$10,524	\$273,853
2005	\$184	\$5,786	\$2,372	\$333	\$8,675
2006	\$1,550	\$48,837	\$20,020	\$2,814	\$73,221
2007	\$975	\$30,719	\$12,592	\$1,770	\$46,056
2008	\$1,268	\$39,949	\$16,376	\$2,302	\$59,895
2009	\$14,698	\$463,182	\$189,870	\$26,687	\$694,437
2010	\$1,382	\$43,556	\$17,855	\$2,510	\$65,303
2013	\$3,807	\$122,545	\$50,573	\$7,001	\$183,926
2014	\$778	\$25,042	\$10,335	\$1,431	\$37,586
Total Taxes	\$32,736	\$1,034,682	\$424,551	\$59,544	\$1,551,513

Overall Economic Impacts

The Arkansas Research and Technology Park serves the state as an asset fostering growth of companies in the knowledge-based economy. The operations of the ARTP, whether the business expenditures of the tenants that it houses, or the construction activity of the Park itself, have exceeded \$179 million since 2003¹. These economic activities have had a combined economic output impact of \$523.0 on the state of Arkansas. Labor income generated by these activities totaled \$206.5 million and \$18.0 million in state and local taxes were generated.

Table 11: Overall Economic Impact of ARTP (2014)

Overall Economic of Impact of ARTP	
Total Direct Expenditures	\$179,372,226
Total Output Impacts	\$522,976,087
Average Operation Employment Impact	387.8
Maximum Construction Employment Impact (2009)	166.9
Total Labor Income Impacts	\$206,483,326
Total State and Local Taxes in Arkansas	\$18,034,200

¹ Tenant business expenditures are underestimated as no business expenditure data is available for the years 2005 to 2009.