W. Frank Barton School of Business

Center for Economic Development and Business Research

Economic Impact – Semiconductor Manufacturing

February 1, 2023





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Executive Summary

In 2021, Kansas had 39 semiconductor and other electronic component manufacturing establishments supporting over 1,276 jobs with a total annual wage of \$63.4 million. The highly skilled labor and supply chain needs for this industry are similar to that of aerospace, machinery, battery, and automotive manufacturing, in which the state has a high concentration and competitive advantage.

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	Establishments	Employment	Qı	arterly Wages	Ave	rage Weekly
Arizona	192	23,839	\$	3,347,502,796	\$	2,700
Kansas	39	1,276	\$	63,357,505	\$	955
Florida	367	17,658	\$	1,849,426,651	\$	2,014
Texas	487	42,256	\$	6,448,569,412	\$	2,935
New York	257	16,307	\$	1,558,271,592	\$	1,838
U.S. TOTAL	6124	367,174	\$	50,259,269,486	\$	2,632

Semiconductor and other electronic component manufacturing

Source: CEDBR, BLS, QCEW 2021 (NAICS 33441)

The Kansas semiconductor sector has been expanding over the past five years. Employment has grown by 21% since 2016, and the number of establishments has increased by 18%, adding four new firms.



Due to the high level of skilled labor within Wichita and the Kansas market, adding a semiconductor manufacturing company is expected to fit within the market without any significant labor or wage disruptions. Further, such a development would complement the existing industrial base and strengthen the regional economy.

This project assumed that the firm would add two thousand jobs with an annual payroll of over \$51,000 per year by year five. At that rate, the total employment impact is expected to be 5,155 jobs with over \$237.7 million in yearly labor income. In addition, the capital investment from the development of the new firm will have a one-time economic boost to the economy by up to 13,586 temporary jobs.

Semiconductor Equipment Manufacturing Summary impact					
	Employment	Labor Income	Output		
Direct Effect	1,994	\$111,005,700	\$1,061,479,916		
Indirect Effect	2,330	\$86,885,994	\$337,855,056		
Induced Effect	831	\$39,844,185	\$123,568,061		
Total Effect	5,155	\$237,735,878	\$1,522,903,033		

Semiconductor Equipment Manufacturing Summary Impact

Source: CEDBR

Construction and Equipment - Summary Impact							
	Employment	Labor Income	Output				
Direct Effect	-	\$0	\$0				
Indirect Effect	10,281	\$772,656,751	\$2,210,912,546				
Induced Effect	3,306	\$158,233,388	\$489,773,630				
Total Effect	13,586	\$930,890,138	\$2,700,686,176				

Source: CEDBR

The project has the eligibility to use up to 304.2 million dollars of public costs, which include construction sales tax exemptions, investment tax credits, and training dollars, among other benefits. When comparing the total estimated impact over the ten-year period with the public investment of the firm's direct spending, the ratio was \$129.38. For every dollar spent, excluding the time value of money, the Kansas economy will gain \$129.38. Another way to look at this investment is to include the multiplier effect on the supply chain and household spending. Further expanding the concept shows that for every dollar invested, the Kansas economy will benefit from an additional \$218.53.

	Kansas					
Sales tax exemption	\$23,395,648					
HPIP (APEX Tax Credit)	\$18,093,500					
PEAK (APEX Payroll Rebate)	\$ 5,556,090					
TRAINING (APEX)	\$25,000,000					
OTHER (Residency Rebate)	\$10,000,000					
Total	\$82,045,238					

State Incentives

Direct Impact per Dollar Invested						
5 YR 10YR						
Direct Impact (firm output)	\$5	,307,399,580	\$1	0,614,799,160		
Public Costs	\$	65,220,443	\$	82,045,238		
Impact per dollar invested	\$	81.38	\$	129.38		

*Excluding Time Value of Money

Total Impact per Dollar Invested

		5 YR		10YR
Total Impact (frim+)	\$1	.0,315,201,341	\$1	7,929,716,506
Public Costs	\$	65,220,443	\$	82,045,238
Impact per dollar invested	\$	158.16	\$	218.53

*Excluding Time Value of Money

The Center also measured the fiscal impact of the project. When adding the structure of the regional economy and taxes, the study found that this project would create a net present value of benefits over ten years of \$182 million for Kansas. The total costs were estimated at 76.6 million, creating a return on investment of 237.4%. The benefit-cost ratio was 3.37, indicating that the state is expected to get significantly more public revenue than the public costs of the project.

Fiscal Impact - Kansas					
	10-year period		20-	year period	
Present value of net benefits	\$	181,993,001	\$	323,363,448	
Rate of Return on Investment					
Net public benefits	\$	181,993,001	\$	323,363,448	
Public costs	\$	76,647,773	\$	80,106,023	
ROI		237%		404%	
Benefit-Cost Ratio					
Public benefits	\$	258,640,774	\$	403,469,471	
Public costs	\$	76,647,773	\$	80,106,023	
Benefit-Cost Ratio		3.37		5.04	

Acknowledgment

The following people were responsible for the successful completion of the impact study, which includes the data collection and economic modeling. At the Kansas Department of Commerce, Robert North, Chief Counsel, led the project scope, developed the simulation estimates, and provided overall guidance. Nadira Hazim-Patrick provided project details for the economic and fiscal impacts.

At Wichita State University's Center for Economic Development and Business Research (CEDBR), Jeremy Hill, Director of CEDBR served as the Principal Investigator, provided theoretical, technical expertise, data collection, and project management.

The Center for Economic Development and Business Research, a unit of the W. Frank Barton School of Business at Wichita State University, is responsible for any errors in this report. Inquiries may be directed to: Center for Economic Development and Business Research, 1845 Fairmount St. Wichita, KS 67370. The Center can be reached by telephone at 1-316-978-3225 or through the website at www.CEDBR.org.

Methodology -Economic Impact model

There are two approaches to measuring the economic impact of this type of project: measuring net new or all economic activity. This project's scope was to estimate the economic contributions of a new industry to the regional economy; thus, all of the employment, wages, and estimated sales were considered new economic activity.

The impact model used to estimate the economic effects of the battery equipment manufacturing industry on the regional and state economies was IMPLAN (Impact analysis for PLANning). IMPLAN is one of the most commonly used models for impacts similar to this project. Alternative models are less common in practice and tend to involve a higher level of customization. The advantage of using this model is that it is broadly available and uses straightforward methodologies. Others could replicate the study or even develop similar studies to provide reliability or comparability.

Double counting is a common weakness of contribution studies. It tends to occur by inputting two similar direct economic activities like salaries and employment or adding in an indirect effect on top of a direct effect. This study went to great lengths to prevent double-counting by using the Analysis-By-Part technique developed by IMPLAN. Further, this study used an iterative process to identify and reduce inter-industry transactions.

Terms and Definitions

- **Cluster** An industry cluster is a group of industries that gain economic efficiencies through shared labor, knowledge, and supply chains.
- **Direct impact** A direct effect measures an industry's initial change or value in terms of dollars, jobs, or wages.
- Indirect impact An indirect effect measures the supply chain impact from an initial change or direct impact.
- Induced impact An induced impact measures the household effect from increased demand from an initial change or direct effects.
- Labor income impact Labor income includes all forms of employment income and encompasses employee compensation and proprietor income.
- Location quotient A location quotient measures an industry's relative concentration.
- Market area This study used Sedgwick County as the primary market area.
- **Multiplier** A multiplier captures the inter-industry effects from a change to a primary sector. A value greater than one indicates a positive impact on the economy for every dollar or job created.
- **Output impact** An output effect measures the total value of a business's production and equals revenues.
- Tax on corporations Corporation taxes include dividends and corporate profits.
- **Tax on households** Household taxes include income, fines and fees, motor vehicle license, property, and fishing and hunting.
- **Tax on production** Production taxes include sales, property, motor vehicle licenses, severance, and other related taxes.

- **TIPU sector** The TIPU sector includes transportation, information, and public utilities.
- **Total impact** A total effect adds the direct, indirect, and induced effects to estimate the full impact on a regional economy.