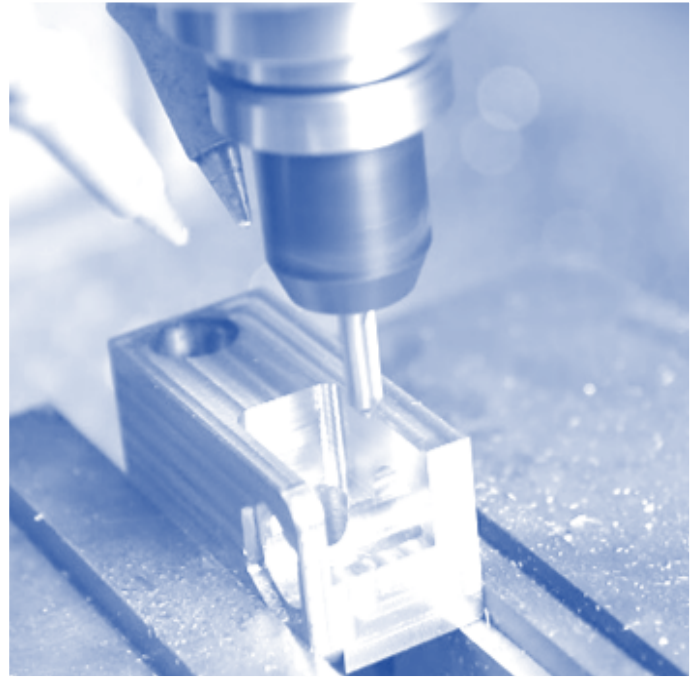
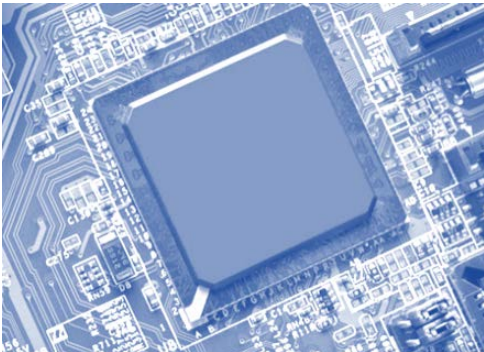


# Impacting Pennsylvania's Manufacturing Economy



An Economic and Fiscal Impact Analysis of Industrial Resource Center (IRC) Engagements in Pennsylvania

May 2017



**Regional Economic  
Studies Institute**

 **TOWSON UNIVERSITY**

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**NEPIRC**  
northeastern pennsylvania industrial resource center

## Introduction

The primary purpose of this analysis, commissioned by the industry-led Board of Directors of the Northeastern Pennsylvania Industrial Resource Center (NEPIRC), is to calculate the fiscal year 2016 economic and fiscal impacts of Industrial Resource Center (IRC) engagements with Pennsylvania small and mid-sized manufacturers.

To perform this study, NEPIRC's Board of Directors partnered with the Regional Economic Studies Institute (RESI) of Towson University – an independent, objective, and nonpartisan applied research extension of Towson University with a strong reputation for providing unbiased economic and policy analyses to guide public, private and nonprofit organization decision-making.

The analysis team consisted of:

- Dr. Daraius Irani, Ph.D.
- Dr. Julie Knight, Ph.D.
- Jessica Grimm, Research Manager; and
- Ellen Bast, Research Associate.

## About the Industrial Resource Center Network

The statewide IRC network consists of seven (7) distinct nonprofit economic development organizations strategically located across the Commonwealth of Pennsylvania:

- Catalyst Connection – Greater Pittsburgh and southwestern Pennsylvania region;
- Delaware Valley Industrial Resource Center (DVIRC) – Greater Philadelphia and Delaware Valley region;
- Innovative Manufacturers Center (IMC) – Williamsport and central Pennsylvania region;
- MANTEC – Harrisburg, York and south central Pennsylvania region;
- Manufacturers' Resource Center (MRC) – Allentown, Bethlehem and Lehigh Valley region;
- Northeastern Pennsylvania Industrial Resource Center (NEPIRC) – Scranton, Wilkes-Barre and northeastern and northern tier regions; and
- Northwestern Pennsylvania Industrial Resource Center (NWIRC) – Erie and northwestern Pennsylvania region.

Appendix A provides a color-coded representation of each IRC and its respective service area.

Established in 1988, the IRCs share a common mission of improving the competitiveness and long-term viability of Pennsylvania's small and mid-sized manufacturers, defined as those with fewer than 500 employees. The IRCs accomplish this mission by providing those companies with the technical, consultative and technology-based services needed to accomplish growth objectives. That growth, in turn, creates additional jobs within Pennsylvania's manufacturing sector as well as other sectors impacted by industrial expansion, such as logistics, research, retail and others.

By operating at the regional level, each IRC has the flexibility to identify common manufacturer needs, leverage community resources and continuously refine its business model and suite of services to supplement its regional private industry and economic development organization offerings – thus avoiding the provision of duplicative services.

The above notwithstanding, the IRCs have several common services, including Lean Enterprise, Quality Systems, Manufacturing Leadership, Advanced Manufacturing Technologies, Innovation Acceleration and Supply Chain Optimization or Risk-Management.<sup>1</sup>

In addition to providing company-specific consultative and training engagements, the IRCs offer training programs and outreach efforts that raise manufacturer awareness of emerging technologies, techniques and business practices. This is particularly relevant within the Innovation Acceleration and Advanced Manufacturing Technology areas.

The IRCs receive support from the Commonwealth of Pennsylvania. That support leverages additional resources provided by the U.S. Department of Commerce, other governmental agencies and fees charged to clients in exchange for IRC professional services, thus creating a public-private partnership model. Based upon financial reports filed by each IRC, every \$1 of Commonwealth of Pennsylvania support leverages nearly \$3 of additional revenue.

## Data Collection and Validity

This study utilized objective data voluntarily reported to an independent third-party by actual IRC clients. In many cases, this data was subsequently verified by the U.S. Department of Commerce.

At the end of every calendar quarter, each IRC provides a completed client engagement database to the U.S. Department of Commerce as a requirement of their federal awards. This database includes, among other information, engagement specifics and client contact information. In order to allow actual engagement impacts to occur, the U.S. Department of Commerce holds that data for an average period of nine (9) months, after which it is transferred to the Fors Marsh Group – a Virginia-based independent applied research firm.

The Fors Marsh Group utilizes IRC engagement and client contact information to conduct a blend of online and telephone surveys of IRC clients to determine the specific impacts of reported engagements. Impact questions focus on jobs created and retained, new revenue generated, at-risk revenue retained, cost savings realized and expansion investments made possible. Clients are given a reasonable period of time to complete their survey.

Appendix E provides a copy of the actual survey instrument utilized by the Fors Marsh Group.

Given the intentional time lag between the completion of an IRC engagement and its provision to the Fors Marsh Group for survey, and the span of time IRC clients are given to calculate project impacts and complete their survey, economic impacts reported by IRC clients throughout fiscal year 2016 reflect, for the most part, the results of engagements completed in fiscal year 2015.

To the extent that the IRCs and all IRC stakeholders are independent of the Fors Marsh Group survey process, data provided through that process is considered highly valid.

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<sup>1</sup> Advanced Manufacturing Technologies encompasses new and emerging technologies such as Additive Manufacturing (3D Printing), Automation & Robotics, Cloud Computing, Cybersecurity, Internet of Things, Sensors, Smart Factories, Virtual Reality and similar.

## Data Completion

Throughout fiscal year 2015, the IRCs submitted completed engagement data pertaining to 889 different Pennsylvania-based small and mid-sized manufacturers to the U.S. Department of Commerce. That information was subsequently relayed to the Fors Marsh Group at the end of the aforementioned nine (9) month (on average) impact realization period. Thus, the Fors Marsh Group distributed surveys to those 889 companies during fiscal year 2016.

Of the 889 different companies surveyed during fiscal year 2016, a total of 515 (57.9%) completed their online or telephone survey.

While a robust dataset of 515 responses was utilized in the analysis, **the absence of 374 responses, and their related impacts, from the analysis likely resulted in a significant understatement of actual IRC engagement economic/fiscal impacts in the aggregate**, since the commissioners of the study (NEPIRC's Board of Directors) elected to not extrapolate impacts onto the non-respondent population.

## Analysis Methodology

To quantify the economic and fiscal impacts of IRC engagements, RESI used the IMPLAN input/output model. This model has the ability to quantify the economic and fiscal impact of each dollar earned and spent by the following: employees of the companies receiving IRC engagement services, other vendors supporting the companies receiving IRC engagement services, each dollar spent by those vendors on the services or merchandise of other firms, each dollar spent by the households of IRC client employees and/or the employees of impacted vendors, and activity/spending at other businesses that result from households increasing their purchases at local businesses.

IMPLAN modeling allows the measurement of three (3) types of economic impacts: direct, indirect and induced. **Direct** economic effect is generated as the companies receiving IRC services expand and, ultimately, hire new workers. **Indirect** economic impacts occur as those companies purchase goods and services from other firms. In the case of both direct and indirect impacts, the heightened business activity and hiring of new workers generates an increase in household incomes. Higher household incomes drive **induced** economic impacts as spending within the local economy increases.

Effective use of IMPLAN modeling requires the identification of key inputs. For this study, client-reported new employee, retained employee and regional investments were utilized as inputs.

## Findings

The analysis sought to answer the following questions:

1. How many jobs were supported in FY2016 as a result of IRC engagements?
2. What was the FY2016 impact of IRC engagements on Pennsylvania's Gross State Product (GSP)?
3. What was the FY2016 impact of IRC engagements on Pennsylvania employee compensation – both within and outside of the manufacturing sector?
4. What incremental state (Pennsylvania) and federal (U.S.) tax revenues were generated in FY2016 as results of IRC engagements?
5. Given the computed impacts, what is the Commonwealth of Pennsylvania's return on its IRC investment (or ROI)?

### Jobs, Gross State Product and Employee Compensation Impacts

RESI's analysis, utilizing the data and methodology detailed above, determined that IRC engagements supported **15,393 jobs in FY2016**, including **6,335** in good-paying manufacturing sectors.

RESI's analysis further concluded that IRC engagements **bolstered Pennsylvania's 2016 GSP by more than \$3.75 billion**, including **over \$2.0 billion** in direct manufacturing output, and **added over \$930 million to total 2016 Pennsylvania employee compensation**, with **\$463.9 million** provided within the manufacturing sector. These impacts are represented in Figure 1 below.

Figure 1: IRC Engagement Fiscal 2016 Job, GSP and Employee Compensation Impacts<sup>2</sup>

Impact Type	Direct	Indirect	Induced	Total
Jobs Supported <sup>3</sup>	5,629	4,842	4,922	<b>15,393</b>
Gross State Product (Output) (GSP) <sup>4</sup>	\$ 2,049,174,012	\$ 994,416,590	\$ 708,130,555	<b>\$ 3,751,721,158</b>
Employee Compensation <sup>5</sup>	\$ 416,994,241	\$ 305,229,384	\$ 212,654,579	<b>\$ 934,878,205</b>

Sources: Regional Economic Studies Institute – Towson University and IMPLAN

As detailed in Figure 1, the economic impacts associated with IRC engagements predominantly consist of direct activity. These impacts are the result of new or retained employees that companies within Pennsylvania are able to employ as a result of IRC engagement outcomes. Indirect and induced impacts stem from expenditures that support the direct IRC client activity and jobs created within other firms. Purchases from increased household income also contribute to impact levels such as client investments in new products, new plant and equipment, updated information technology, workforce training and other areas also contribute to direct, indirect and induced impact levels.

<sup>2</sup> Figures throughout this report may not add or cross-foot exactly due to rounding of individual component numbers/amounts.

<sup>3</sup> For more detailed jobs impact, see Appendix B.

<sup>4</sup> For more detailed Gross State Product impact, see Appendix C.

<sup>5</sup> "Employee compensation" includes the total payroll cost of an employee (or employees) paid by their employer(s), including wage and salary, benefits (such as health insurance and retirement plan contribution) and payroll taxes. Since "employee compensation" includes items other than worker income, it is not the basis for computing state, federal or other income taxes. For more detailed employee compensation impacts, see Appendix D.

## Fiscal Impacts

For purposes of this analysis, “fiscal impacts” refers to the tax revenue associated with new or retained employees and regional investment directly resulting from IRC assistance. As so defined, fiscal impacts include tax revenues generated at the local, state and federal levels.

According to the analysis, **IRC engagements generated nearly \$350 million of additional treasury revenue in fiscal year 2016**, including \$36.2 million in taxes remitted to local municipalities, cities and counties, **\$75.7 million of incremental and retained state tax revenue** and \$238.1 million of additional or preserved federal treasury revenue. Fiscal impacts are detailed within Figure 2 below.

Figure 2: IRC Engagement Fiscal 2016 Fiscal Impacts

Impact Type	Local (Municipalities, Cities, Counties)	State	Federal
Incremental Property Taxes	\$ 32,624,665		
Incremental & Retained Personal Income Taxes	\$ 3,583,935	\$ 18,815,660	\$ 79,418,910
Incremental Sales Taxes		\$ 36,790,290	
Incremental & Retained Payroll Taxes (SUTA, FUTA, FICA, etc.)		\$ 1,513,749	\$ 109,669,564
Other Taxes, Fees & Fiscal Revenue		\$ 18,538,430	\$ 49,013,618
<b>Total</b>	<b>\$ 36,208,600</b>	<b>\$ 75,658,129</b>	<b>\$ 238,102,092</b>

Source: NEPIRC (utilizing Regional Economic Studies Institute – Towson University and IMPLAN impact analysis)

## Return on Investment (for the Commonwealth of Pennsylvania)

For purposes of this analysis, “return on investment” was calculated by NEPIRC by dividing the 2016 state fiscal impacts associated with IRC engagements, as defined and illustrated above, by the Commonwealth of Pennsylvania’s investment in the statewide IRC initiative.

Stakeholders of many economic development organizations also measure impact and overall efficiency through a “cost per job” metric, which is also provided within this section.

Throughout fiscal 2015, the period within which the surveyed IRC engagements were performed, the IRCs received \$5.24 million of Commonwealth of Pennsylvania support through Pennsylvania’s Partnerships for Regional Economic Performance (PREP) initiative, a program of the Department of Community & Economic Development (DCED). Based upon that level of support, RESI’s analysis suggests a **treasury return on investment of \$14.42:\$1**, indicating that **for each \$1 of Commonwealth of Pennsylvania funding received the IRC Program generated \$14.42 of incremental or retained treasury revenue**. This is illustrated in Figure 3 below.

Figure 3: IRC Return on Investment (for the Commonwealth of Pennsylvania)

Return on Investment (ROI) Calculation Element	IRC Program
Incremental & Retained State Treasury Revenue (from Figure 2, above)	\$ 75,658,129
Commonwealth of Pennsylvania IRC Support (from PREP, fiscal 2015)	\$ 5,245,139
<b>IRC Program Return on Investment (for the Commonwealth of Pennsylvania)</b>	<b>\$ 14.42</b>

Source: Calculations by NEPIRC

IRC “cost per job” metrics were determined by dividing IRC Program fiscal 2015 Commonwealth of Pennsylvania support (\$5.24 million) by the number of jobs created or retained as a result of IRC engagements. This calculation was performed for both direct jobs impact, to provide a conservative “cost per job” metric, and total jobs impact, which includes direct, indirect and imputed jobs, to yield a “cost per job” metric that recognizes the multiplier effect of jobs in manufacturing.



Using only direct jobs in the calculation yields a cost per job of **\$931.80**. Taking total job impacts into consideration, the calculation results in a cost per job of \$340.75. Calculations are illustrated in Figure 4 below.

**Figure 4: IRC Program Cost Per Job Metrics**

Return on Investment (ROI) Calculation Element	Direct Jobs (Only)	Total Jobs (Direct, Indirect & Imputed)
Commonwealth of Pennsylvania IRC Support (from PREP, fiscal 2015)	\$ 5,245,139	\$ 5,245,139
Jobs (Created & Retained)	5,629	15,393
<b>Cost Per Job (Commonwealth Support / Jobs Created &amp; Retained)</b>	<b>\$ 931.80</b>	<b>\$ 340.75</b>

Source: NEPIRC

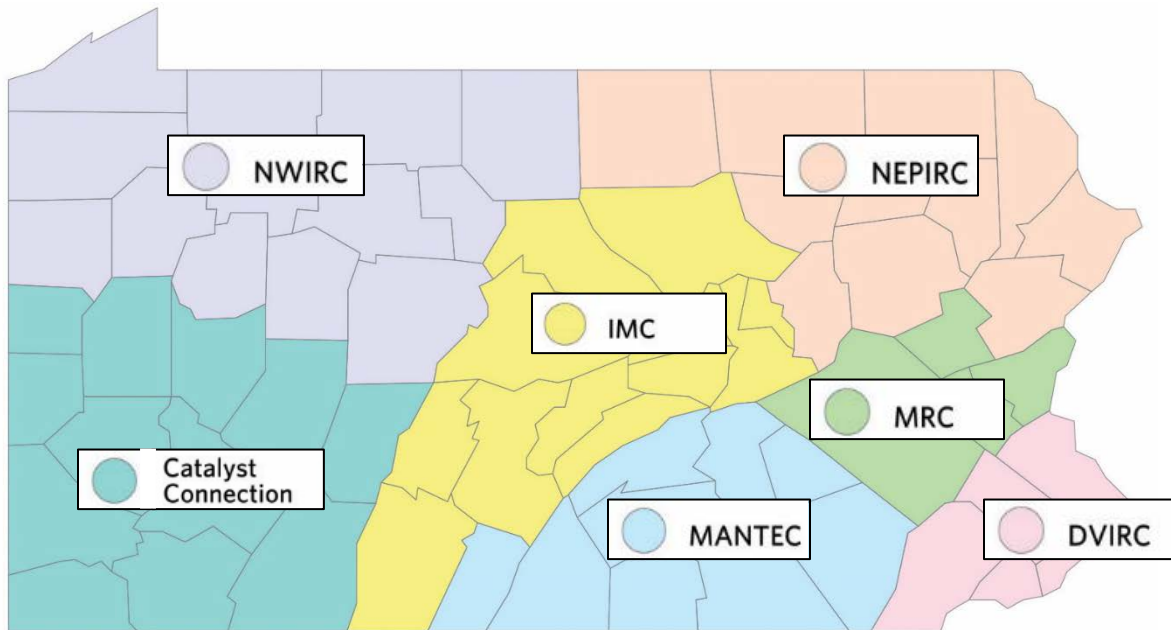
## Input and Economic Model Assumptions

As stated previously, RESI determined economic impacts based upon post-engagement client survey data (increased/retained sales, new/retained jobs, cost savings and investments) provided by the Board of Directors of the Northeastern Pennsylvania Industrial Resource Center (NEPIRC). That data was originally provided to NEPIRC from an independent third-party that conducted the surveys and, therefore, is third-party verified. RESI categorized the data by IMPLAN industry sectors for inputting into IMPLAN.

RESI's analysis includes the following assumptions:

- Economic impact multipliers are developed from IMPLAN input/output software.
- IMPLAN data are based on the North American Industry Classification System (NAICS).
- RESI categorized the client survey data provided based upon the NAICS classification of the impacted company, which was provided as part of the data set.
- IMPLAN employment multipliers are adjusted for inflation using the Bureau of Labor Statistics' CPI-U.
- Impacts are based on 2015 IMPLAN data for Pennsylvania, the most recent available at the time of RESI's analysis.
- Impacts are represented in 2016 dollars.
- Employment impacts include both full and part-time employees, as IMPLAN does not differentiate between part and full-time employment.

## Appendix A: IRC Statewide Coverage Map



## Appendix B: Detailed Fiscal 2016 Jobs Impact - IRC Engagements

Industry	Direct	Indirect	Induced	Total
Manufacturing	5,493	781	61	6,335
Professional, Scientific and Technical Services	14	814	207	1,035
Wholesale Trade	5	566	121	692
Administrative, Support, Waste Management and Remediation Services	-	605	252	857
Transportation and Warehousing	-	406	143	549
Management of Companies and Enterprises	-	292	35	327
Finance and Insurance	-	216	343	558
Educational Services	-	207	207	414
Accommodation and Food Services	-	158	569	727
Agriculture	-	126	20	145
Real Estate and Rental and Leasing	-	116	189	305
Retail Trade	-	88	844	932
Construction	-	87	56	142
Information	-	81	61	142
Arts, Entertainment and Recreation	-	59	153	212
Mining	-	35	7	42
Utilities	-	34	16	50
Health Care and Social Services	-	-	1,081	1,081
Other Services and Sectors	127	172	557	846
<b>Total Jobs Impacts</b>	<b>5,629</b>	<b>4,842</b>	<b>4,922</b>	<b>15,393</b>

Sources: Regional Economic Studies Institute – Towson University and IMPLAN



### Appendix C: Gross State Product (Output) (GSP) Impact - IRC Engagements

Industry	Direct	Indirect	Induced	Total
Manufacturing	\$2,026,316,427	\$277,328,548	\$33,921,905	\$2,337,566,880
Prof., Scientific and Technical Services	\$2,553,732	\$134,033,881	\$28,940,683	\$165,528,297
Wholesale Trade	\$1,285,847	\$145,537,265	\$31,211,790	\$178,034,902
Management of Companies and Enterprises	-	\$78,542,289	\$9,392,630	\$87,934,920
Transportation and Warehousing	-	\$65,492,282	\$20,721,022	\$86,213,304
Finance and Insurance	-	\$43,561,282	\$79,018,703	\$122,579,986
Admin., Support, Waste Mgmt. and Remediation Services	-	\$43,300,325	\$17,793,963	\$61,094,289
Information	-	\$41,090,525	\$34,546,234	\$75,636,759
Real Estate and Rental and Leasing	-	\$41,089,683	\$129,683,895	\$170,773,578
Utilities	-	\$40,164,709	\$18,462,369	\$58,627,078
Construction	-	\$13,974,964	\$9,321,935	\$23,296,899
Mining	-	\$11,102,738	\$2,235,893	\$13,338,630
Accommodation and Food Services	-	\$9,539,480	\$32,844,193	\$42,383,674
Agriculture	-	\$9,484,718	\$2,173,971	\$11,658,689
Educational Services	-	\$8,192,931	\$16,215,987	\$24,408,917
Retail Trade	-	\$6,780,033	\$61,812,553	\$68,592,586
Arts, Entertainment and Recreation	-	\$3,395,674	\$13,128,103	\$16,523,777
Health Care and Social Services	-	\$6,138	\$113,384,022	\$113,390,160
Other Services and Sectors	\$19,018,005	\$21,799,126	\$53,320,704	\$94,137,835
<b>Total Gross State Product Impacts</b>	<b>\$2,049,174,012</b>	<b>\$994,416,590</b>	<b>\$708,130,555</b>	<b>\$3,751,721,158</b>

Sources: Regional Economic Studies Institute – Towson University, IMPLAN and NEPIRC

### Appendix D: Employee Compensation Impact - IRC Engagements

Industry	Direct	Indirect	Induced	Total
Manufacturing	\$403,657,328	\$56,096,228	\$4,108,598	\$463,862,154
Prof., Scientific and Technical Services	\$1,187,732	\$56,686,179	\$12,481,669	\$70,355,580
Wholesale Trade	\$427,909	\$48,432,404	\$10,386,770	\$59,247,083
Management of Companies and Enterprises	-	\$44,085,618	\$5,272,063	\$49,357,681
Transportation and Warehousing	-	\$21,034,873	\$6,496,956	\$27,531,828
Admin., Support, Waste Mgmt. and Remediation Services	-	\$20,844,336	\$8,137,912	\$28,982,247
Finance and Insurance	-	\$16,497,623	\$23,736,315	\$40,233,938
Information	-	\$6,733,538	\$5,015,160	\$11,748,698
Utilities	-	\$4,955,105	\$2,251,539	\$7,206,644
Educational Services	-	\$4,324,729	\$9,507,862	\$13,832,590
Construction	-	\$3,578,326	\$2,377,334	\$5,955,660
Accommodation and Food Services	-	\$3,180,094	\$11,771,917	\$14,952,011
Retail Trade	-	\$2,851,121	\$23,517,813	\$26,368,934
Real Estate and Rental and Leasing	-	\$2,494,564	\$3,077,794	\$5,572,359
Mining	-	\$1,614,871	\$344,622	\$1,959,493
Arts, Entertainment and Recreation	-	\$828,536	\$3,530,544	\$4,359,080
Agriculture	-	\$694,227	\$226,535	\$920,763
Health Care and Social Services	-	\$3,080	\$61,145,679	\$61,148,759
Other Services and Sectors	\$11,721,273	\$10,293,932	\$19,267,498	\$41,282,703
<b>Total Employee Compensation Impacts</b>	<b>\$416,994,241</b>	<b>\$305,229,384</b>	<b>\$212,654,579</b>	<b>\$934,878,205</b>

Sources: Regional Economic Studies Institute – Towson University and IMPLAN

## Appendix E: IRC Post-Engagement Impact Survey (Administered by the Fors Marsh Group)

1. What were the **two** most important factors for your firm choosing to work with your local Industrial Resource Center (IRC)?
  - Center/Staff Expertise
  - Cost/Price of Services
  - Fair and unbiased advice/services
  - Reputation for results
  - Knowledge of your industry
  - Specific services not available from other providers
  - Lack of other providers nearby
  - Other, please specify \_\_\_\_\_
  - Don't know
  
2. In addition to your local Industrial Resource Center (IRC), has your company used any other external resources or providers to address business performance issues over the past 12 months?
  - Yes    No    Don't Know
  
3. As you look forward over the next 3 years, what do you see as your company's **three** most important strategic challenges?
  - Product innovation/development
  - Identifying growth opportunities
  - Ongoing continuous improvement/cost reduction strategies
  - Employee recruitment and retention
  - Financing
  - Exporting/global engagement
  - Sustainability in products and processes
  - Managing partners and suppliers
  - Technology needs
  - Other, please specify \_\_\_\_\_
  - Don't Know
  
4. Did the services you received directly lead to an **increase in sales** at your establishment over the past 12 months?
  - Yes                      How much? \_\_\_\_\_
  - No                          Don't Know
  
5. Over the past 12 months, did the services you received directly lead you to **retain sales** that would have otherwise been lost?
  - Yes                      How much? \_\_\_\_\_
  - No                          Don't Know
  
6. Did the services you received lead you to **create any jobs** over the past 12 months?
  - Yes                      How many? \_\_\_\_\_
  - No                          Don't Know
  
7. Did the services you received lead you to **retain any jobs** over the past 12 months?
  - Yes                      How many? \_\_\_\_\_
  - No                          Don't Know
  
8. Did the services you received directly result in **cost savings** in labor, materials, energy, overhead, or other areas over what would otherwise have been spent in the past 12 months?
  - Yes                      How much? \_\_\_\_\_
  - No                          Don't Know

9. As a result of the services you received, has your establishment **increased its investment** over the past 12 months in.....

a. **New products or processes?**

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

b. **Plant and equipment?**

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

c. **Information systems or software?**

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

d. **Workforce practices or employee skills?**

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

e. **Other areas of the business?**

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

10. As a result of the services you received, did your establishment **avoid any unnecessary investments or save on any investments** in the past 12 months?

- Yes                      How much? \_\_\_\_\_  
 No                          Don't Know

11. Based on the benefits that resulted from the services provided, how likely would you be to recommend your local Industrial Resource Center (IRC) to other companies, assuming they are not direct competitors?

(Not at all likely)                      (Neutral)                      (Very likely)  
 1        2        3            4        5        6        7            8        9        10

If you did not give a score of "10" what one thing could the IRC have done to improve their score?

\_\_\_\_\_

\_\_\_\_\_

12. Do you have any suggestions or comments for your local Industrial Resource Center (IRC)?

\_\_\_\_\_

\_\_\_\_\_

For analytical purposes, we would like to verify who completed this survey.

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Job title: \_\_\_\_\_

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