OHIO UNIVERSITY | Voinovich School of Leadership and Public Service

OVRDC Region Task 2

Industry Cluster Enhancement

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OVRDC Task 2. Industry Cluster Enhancement

Final Report – December 23, 2021

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Summary

This report presents the final report for the OVRDC Region Industry Cluster Enhancement Assessment. It includes the results of the data analysis as well as details on introducing targeted industry clusters within the region. While the full description of the report with a focus on the task is presented below, there are a few observations that we highlight here:

- Advanced Manufacturing, Aerospace & Aviation, Automotive, Biohealth, Energy, Financial Services, Food Processing, Hardwood Products and Manufacturing, Information Technology and Services, Logistics, and Polymers and Chemicals industry clusters are the most influential clusters within the OVRDC region.
- Logistics cluster with 883 firms and 11,567 employments is the largest economy within the region followed by Advanced Manufacturing with 95 firms and 11,107 employments and Financial Services with 711 firms and 9,025 employments.
- Soft Drink, Wineries, Breweries industry with 20 firms and 658 employments is the largest economy within the Food Processing cluster in region followed by Breakfast Cereal, Flour Milling, and Rice Milling industry with 5 firms and 399 employments, and Cookie and Cracker, Retail Bakeries, Commercial Bakeries industry with 32 firms and 201 employments.
- Compared to the U.S., Advanced Manufacturing followed by Automotive, and Polymers and Chemicals, and Logistics clusters are stronger clusters with a Location Quotient above 1.
- Compared to the U.S., Breakfast Cereal, Flour Milling, and Rice Milling industries along with Soft Drink, Wineries, Breweries, and Dog, Cat, and Other Animal Food operations have stronger economy.
- Food processing and energy clusters have the highest employment multipliers, at 8.76 and 3.64, respectively. Although the multiplier for food processing as a cluster may be inflated due to limitations of input-output modeling in IMPLAN, other sub-clusters such as pet food, ice cream and frozen dairy products, and cookie and cracker manufacturing have employment multipliers above 2.5.
- Hardwood products manufacturing has the highest output multiplier at 2.09.
- Investment strategies for the OVRDC region to achieve sustainable growth should target investments towards declining clusters with high employment, such as logistics, or industries with high multipliers, such as food processing, energy, and hardwood manufacturing.

Project Description

The Center for Economic Development and Community Resilience of the Ohio University Voinovich School of Leadership and Public Service engages with existing OVRDC firms in the region's industry clusters to determine their industry needs. Additionally, this activity provides opportunities to identify and immediately serve expanding cluster businesses in the OVRDC region seeking to relocate or expand.

Project Implementation

For this task, the team identified existing primary industry clusters within counties represented by the Ohio Valley Regional Development Commission (henceforth, OVRDC) to assess industry and firm-level needs. The OVRDC represents Adams, Brown, Clermont, Fayette, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, and Vinton Counties. The primary purpose of this section is to identify and serve expanding clusters in the OVRDC region seeking to relocate or expand. The team identified 11 clusters composed of a total of 2,397 industries based on the Nexis Uni dataset.

Project Methodology

This study assesses the industry cluster enhancement of the OVRDC region through an examination of current economic activities to identify positive regional industrial sectors and associated potential business opportunities. The study includes:

- Definition of targeted industry clusters within the region
- A Location Quotient analysis of regional employment sectoral distribution and concentrations
- Scan and map of existing firms in each targeted cluster
- A characterization of relevant business demographics such as number of firms, employment, revenue, and ownership structures
- An Economic Impact Analysis of targeted industry clusters to identify top ten industries within the supply chain most impacted and supported by each cluster

This report presents the outcome of each assessment and analyzes the findings.

Task 2.1: Identify and Map the Existing Industry Clusters in the OVRDC, CEDS and JobsOhio Regional Focus Areas

In this section, we explore JobsOhio, OVRDC, and the OVRDC related subregions' clustering algorithm. This exploration enables us to discuss the procedure on how each region defines targeted clusters of industries. It is worth mentioning that we analyze the OVRDC region as a whole, not at the county level. The analysis demonstrates the overall strength or weakness of the OVRDC region industries. The goal is to gain more insight into examining and identifying opportunities for economic growth and gaps that could be filled, as well as providing opportunities for sustainable growth in the OVRDC region.

Targeted Industry Clusters (OVRDC Reports)

First, we explore the OVRDC region related resources to understand how targeted industries are defined by the OVRDC entity. There are two comprehensive reports available on the OVRDC website: 1.

Comprehensive Economic Development Strategy, 2011 Performance Report,[1] and 2. 2017 CED Comprehensive Full Report.[2] Below is the definition of targeted clusters in 2011 and 2017 reports, respectively:

OVRDC, CEDS 2011 report identifies five clusters in the OVRDC region:

- Agriculture Related Businesses with 24 businesses and 649 employees in the region
- Freight and Transportation Related Businesses with 72 businesses and 3,178 employees in the region
- Healthcare Related Businesses with 344 businesses and 25,986 employees in the region
- Total Manufacturing Sector with 272 businesses and 26,509 employees in the region
- Wood Industry and Related Businesses with 56 businesses and 7,329 employees in the region

The reasons referred to in the report for identifying these clusters are mostly land resource prominence, export-orientation, the need for support, the opportunity for facilitation, employment concentration factor, and the economic prosperity factor.[3]

OVRDC CED 2017 report identifies five clusters in the OVRDC region:

According to CED 2017 report, five clusters were selected due to their prominence, employment concentration factor, economic prosperity factor, focus on becoming export-oriented, need of support, and opportunity for facilitation:

- Manufacturing with 41,524 employees (ACS 2015 estimated data)
- Retail with 36,744 employees (ACS 2015 estimated data)
- Food Accommodation and Production with 19,025 employees (ACS 2015 estimated data)
- Healthcare with 44,656 employees (ACS 2015 estimated data)
- Public Sector with 11,394 employees (ACS 2015 estimated data)

Targeted Industry Clusters (JobsOhio Website)[4]

According to the JobsOhio website, there are 10 industries in Ohio listed as targeted clusters in 2020:

- Advanced Manufacturing with 3,527 jobs created
- Aerospace and Aviation with 210 jobs created
- Automotive with 3,293 jobs created

[1] Available at https://www.ovrdc.org/CEDS/2011%20CEDS/OVRDC%20CEDS%202011%20Performance%20Report.pdf
[2] Available at https://www.ovrdc.org/media/2017-Full-Approved-CEDS.pdf
[3] Business data list purchased by OVRDC from March 2008 from InfoUSA.
[4] Available at https://www.jobsohio.com/annual-report-2020/

- Financial Services with 962 jobs created
- Food Science and Agriculture with 1,554 jobs created
- Healthcare with 2,406 jobs created
- Information Services and Software with 1,593 jobs created
- Logistics and Distribution with 3,287 jobs created
- Military and Federal with 300 jobs created
- Shale Energy and Petrochemicals with 959 jobs created

JobsOhio lists the top characteristics that are benefits of doing business in Ohio as friendly approaches, decisive interventions, a job-friendly regulatory environment, access to top level talented workforce, dependable infrastructure, Ohio's attractive location for minimizing supply chain disruptions, supportive system for research and innovation, loan and grant opportunities and incentives, small state corporate income or profits taxes, no tax on products sold outside of Ohio, no state tax on machinery and equipment investments, no state tax on R&D investments, and having only one state business tax – the Commercial Activity Tax (0.26 percent).

Targeted Industry Clusters (JobsOhio Document)[5]

According to the JobsOhio document, there are nine targeted clusters and four targeted business functions in Ohio. These industries are identified by JobsOhio according to their strength and contribution to the overall state economy:

Clusters

- Aerospace and Aviation
- Advanced Manufacturing
- Automotive
- BioHealth
- Energy
- Financial Services
- Food Processing
- Information Technology and Services
- Polymers and Chemicals

Business Functions

- Headquarters and Consulting

[5] Available at https://www.ohiohighered.org/sites/ohiohighered.org/files/uploads/rfp/JobsOhio-NAICS-codes.pdf

- Back Office
- Logistics
- Research & Development

To further study the clustering algorithm, in addition to the OVRDC and JobsOhio, we explore three other entities that include and overlap some of the OVRDC region counties: APEG/ OhioSE, REDI Cincinnati, and Dayton Development Coalition.

APEG/ OhioSE[6]

According to the OhioSE website, the APEG region includes Adams, Gallia, Highland, Jackson, Lawrence, Pike, Ross, Scioto, and Vinton Counties, which are nine out of 12 OVRDC counties. APEG defines the targeted industries in the whole APEG region as:

- Energy and Chemical
- Wood and Paper Product
- Metal Fabrication
- Food Manufacturing
- Logistics and Distribution
- Automotive and Aerospace

According to OhioSE website, in terms of the energy and chemical industry's intensity in the APEG region, the region is located on top of a large portion of the Utica and Marcellus shale formations. These resources have accounted for 85 percent of U.S. shale gas production growth since 2012.

According to the OhioSE website, wood-related industries in the OhioSE region have access to over 30 billion board feet of standing timber (trees grown for commercial use) and over 400 million board feet of hardwood harvested each year. The hardwood and paper products supply chain is well developed with logging, sawmills, kilns, stave mills and specialized trucking operations across the region, which provides opportunities for growth.

The metal fabrication industry has a long history of utilizing local ore and energy resources benefiting from the Ohio River for transport. The metal fabrication industry in the region includes 300 businesses and relies on a skilled workforce, abundant low-cost energy, and the powerful Ohio River (footnote 6).

Food manufacturing has a long and successful history with a concentration of food processing workforce 81 percent above the national average. In addition to well-known food manufactures, smaller, specialized food manufactures also support the region and are major employers (footnote 6).

Logistics and distribution are named as one of the state's strengths. Based on OhioSE website, the region is within a 10-hour drive of eight of the largest metro areas in the US: New York, Chicago, Washington DC, Philadelphia, Atlanta, Detroit, St. Louis, and Charlotte. In addition, the region benefits from an easy drive to other metro areas within and neighboring the State of Ohio, such as Columbus, Pittsburgh, Cleveland, Cincinnati, Indianapolis, and Louisville (footnote 6).

[6] Available at https://ohiose.com/

When it comes to the Automotive and Aerospace industry, access to major assembly plants in Ohio, Michigan, Indiana, Pennsylvania, Kentucky, and Tennessee is named an important factor for comparative advantages and growth within the region (footnote 6).

In general, the labor surplus, favorable tax climate, low operating costs and abundant and affordable energy are opportunities that make the OhioSE region an ideal location to grow a business.

REDI Cincinnati

REDI Cincinnati region contains two OVRDC counties: Brown and Clermont. There are four targeted clusters listed on the REDI Cincinnati website.

- Advance Manufacturing
- Biohealth
- Business and Professional Services
- Technology

According to their website, the regional growth in manufacturing in REDI Cincinnati has more than doubled during the last five years. A fast-growing economy, access to one of the busiest inland ports, skilled talent and strong market access are listed as some of the advantages of the REDI Cincinnati region for advanced manufacturing. According to EMSI, 2021.4 REDI Cincinnati has 2,694 business locations, 115,877 industry workers, 0.4% Job growth (2015-2020), and $26.59 billion in Gross Regional Product (GRP) from advanced manufacturing industries. There are 913 business locations, 14,388 industry workers, 7.2% growth in jobs (2015-2020), and $3.89billion in Gross Regional Products (GRP) in the region's Biohealth cluster. The comparative advantages of business and professional services are strength in providing financial services, back-office support services, and consumer insights. Extracted from EMSI, 2021.4, REDI Cincinnati contains 131,995 business administrators, 62,054 business managers, 48,603 finance professionals, 32,195 information technology professionals, 9,741 print and digital media professionals, and 111,632 sales professionals and marketers.[7]

Dayton Development Coalition

The Dayton Development Coalition contains one OVRDC county: Fayette. They identify seven targeted clusters within the Dayton Development Coalition region listed below:

- Advanced Manufacturing
- Aerospace and Defense
- Agricultural and Food Processing
- Automotive
- Bioscience
- Cyber
- Logistics and Distribution

[7] Available at https://redicincinnati.com/

Dayton Development Coalition website identifies region-specific talents as a "can do" work ethic, connections to community partners, local incentives, infrastructure to move products where they need to go, resources to support research, development, production and logistics, access to leading research institutions, and Wright-Patterson Air Force Base as important factors in the region's comparative advantages in advanced manufacturing. The Dayton Development Coalition hosts many agricultural businesses along its vast supply chain that brings fresh food to restaurants, grocery stores, and residential tables each day, which is the region's advantage in agricultural and food processing industries. Automotive has been a robust industry in the region with involvement in parts manufacturing, assembly, research and development, and much more. Having access to different universities and training centers add competitive value to the bioscience industry in the region. In addition to other targeted clusters, according to the Dayton Development Coalition website, the region is home to nearly 600 IT and services firms that support 13,000 skilled employees. The region is also strong in logistics and distribution businesses too. There are more than 730 logistics and distribution businesses with more than 20,000 employees in the region focused on logistics.[8]

Targeted Industry Clusters (This Study)

To create the targeted clusters for the OVRDC region, we use the JobsOhio document as a baseline and then observe industries with more overlapping with other resources. These industries are Advanced Manufacturing, Aerospace & Aviation, Automotive, Biohealth, Energy, Financial Services, Food Processing, Information Technology & Services, Logistics, and Polymers & Chemicals. In addition, the Wood Industry also overlapped within two entities, specifically OVRDC and APEG/OhioSE. Table 1 presents a summary of all the entities we investigate.

[8] Available at https://www.daytonregion.com/dayton-region-economy/industries

Table 1: Targeted Clusters Defined by this Project, OVRDS, JobsOhio, APRG/OhioSE, REDI Cincinnati, and Dayton Development Coalition

Cluster	This Study	OVRDC 2011, 2017	JobsOhio Website	JobsOhio Document	APEG/ OhioSE	REDI Cincinnati	Dayton Development Coalition
Advanced Manufacturing	*	*	*	*	*	*	*
Aerospace & Aviation	*	*	*	*	*		*
Agriculture Related Businesses		*					*
Automotive	*	*	*	*	*		*
Back Office				*		*	
Biohealth	*	*	*	*		*	*
Consumer Insights						*	
Energy	*		*	*	*		
Financial Services	*		*	*		*	
Food Processing	*		*	*	*		
Hardwood Products Manufacturing	*	*			*		
Headquarters & Consulting				*			
Information Technology and Services	*		*	*		*	*
Logistics	*	*	*	*	*		*
Military and Federal			*				
Polymers and Chemicals	*	*		*	*		
Research & Development				*			
Retail		*					

Note: Industries in OVRDC 2011 and 2017 reports are repeated within the column as it matches more than one category in "JobsOhio Document".

Source: OVRDC Website, JobsOhio Website, APEG/ OhioSE Website, REDI Cincinnati Website, Dayton Development Coalition Website

Table 2 lists our 11 targeted clusters in OVRDC with more detail on their corresponding NAICS codes.

Table 2: Targeted Industry Clusters in OVRDC Region

Cluster	NAICS Code
Advanced Manufacturing	3272, 3279, 3311, 3312, 3314, 3324, 3329, 3332, 3339, 3351, 3352, 3353
Aerospace & Aviation	3345, 3364, 4811, 4812, 5174, 9271
Automotive	3336, 3361, 3362, 3363
Biohealth	3254, 334510, 334516, 334517, 3391
Energy	2111, 2121, 2131, 2211, 2212, 3241, 2371
Financial Services	5221, 5222, 5223, 5231, 5232, 5239, 5241, 5251, 5259
Food Processing	3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3121
Hardwood Products Manufacturing	321, 337110, 337121, 337122, 337127, 337211, 337212, 337215, 3379, 4232, 423310
Information Technology and Services	5112, 5182, 5191, 5415
Logistics	4841, 4842, 4881, 4882, 4883, 4884, 4885, 4889, 4921, 4922, 4931
Polymers and Chemicals	3251, 3252, 3253, 3255, 3256, 3259, 3261, 3262

Source: JobsOhio Document

Scan and Map Targeted Industry Clusters Within the Region

When examining OVRDC targeted clusters, it is important to recognize the variance between the different types of clusters. Table 3 presents the number of firms in each cluster, their share from total firms in 11 clusters, number of employees in each cluster, their share from total employees in 11 clusters, the number of headquarters in each cluster, their share from total headquarters in 11 clusters, sales/revenues in each cluster, and their share from total sales/revenue in 11 clusters.

Through our examination, we find that a vast number of firms in targeted clusters in the area are found in the NAICS clusters of logistics and financial services, with one of the largest employers in the area being insurance companies. Logistics includes more than 1,200 firms within the OVRDC region. However, the logistics cluster is mostly compromised of small operations, as they account for around 37% of the firms in the area but only employ around 24% of the working population within 11 targeted clusters. Rather, a much greater concentration of employment lies in the field of advanced manufacturing, where 4% of the firms comprise almost 23% of employees within 11 targeted clusters in the region. Figure 1 shows the number of firms in each targeted cluster in the OVRDC region. Figure 2 shows the number of employees in each targeted cluster in the OVRDC region. Figure 3 presents the map of the firms in the region.

Table 3: Number of Firms, Employees, Headquarters, and Sales/Revenue in Each Targeted Cluster in OVRDC Region

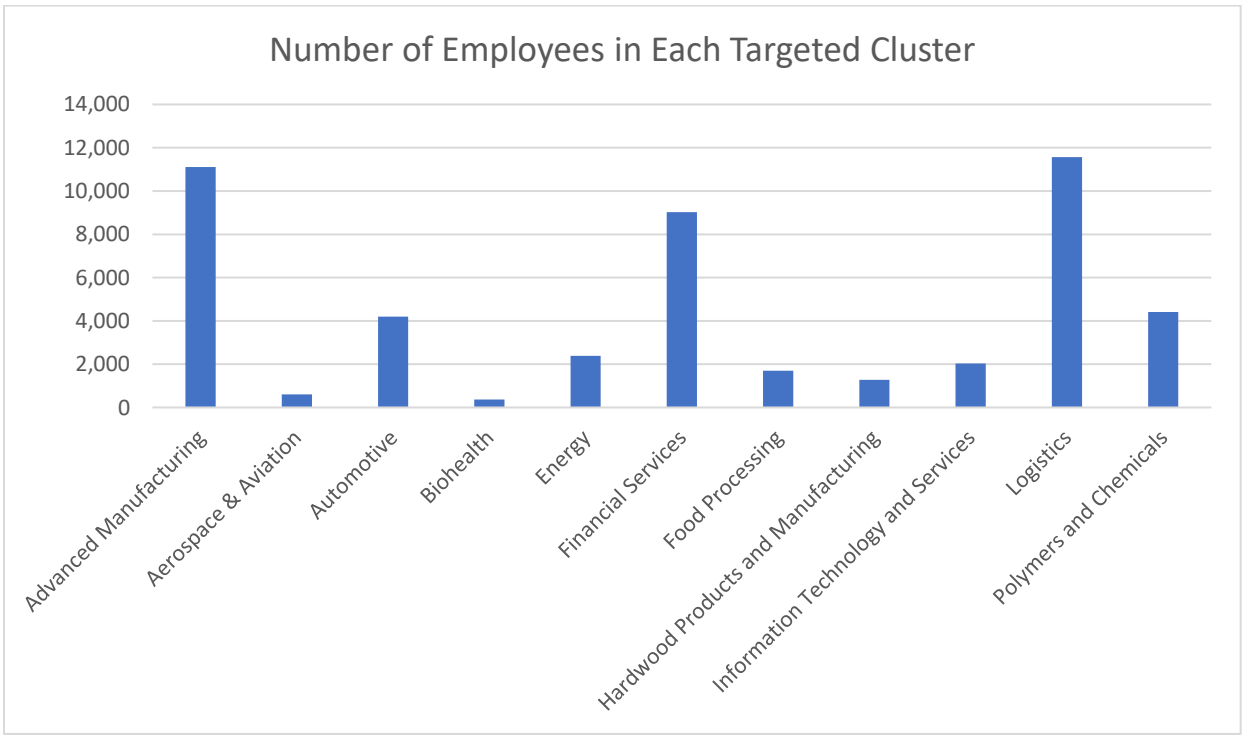
Industry Cluster	Number of Firms	Firms from Total (%)	Number of Employees	Employees from Total (%)	Number of HQs	HQs from Total (%)	Sales/ Revenue ($)	Sales/ Revenue from Total (%)
Advanced Manufacturing	95	4.0	11,107	22.8	12	13.3	$830,626,998	22.1
Aerospace & Aviation	23	1.0	602	1.2	1	1.1	$0	0.0
Automotive	26	1.1	4,196	8.6	5	5.6	$87,041,078	2.3
Biohealth	17	0.7	365	0.8	0	0.0	$0	0.0
Energy	89	3.7	2,386	4.9	7	7.8	$771,849,560	20.6
Financial Services	711	29.7	9,025	18.5	22	24.4	$1,920,483,000	51.2
Food Processing	86	3.6	1,695	3.5	5	5.6	$26,424,000	0.7
Hardwood Products and Manufacturing	159	6.6	1,280	2.6	9	10.0	$34,587,878	0.9
Information Technology and Services	225	9.4	2,031	4.2	15	16.7	$43,264,000	1.2
Logistics	883	36.8	11,567	23.8	6	6.7	$4,230,000	0.1
Polymers and Chemicals	83	3.5	4,409	9.1	8	8.9	$34,524,252	0.9
TOTAL	2,397	100	48,663	100	90	100	$3,753,030,766	100

Source: Nexis Uni Database

Figure 1: Number of Firms in Each Targeted Cluster in OVRDC Region

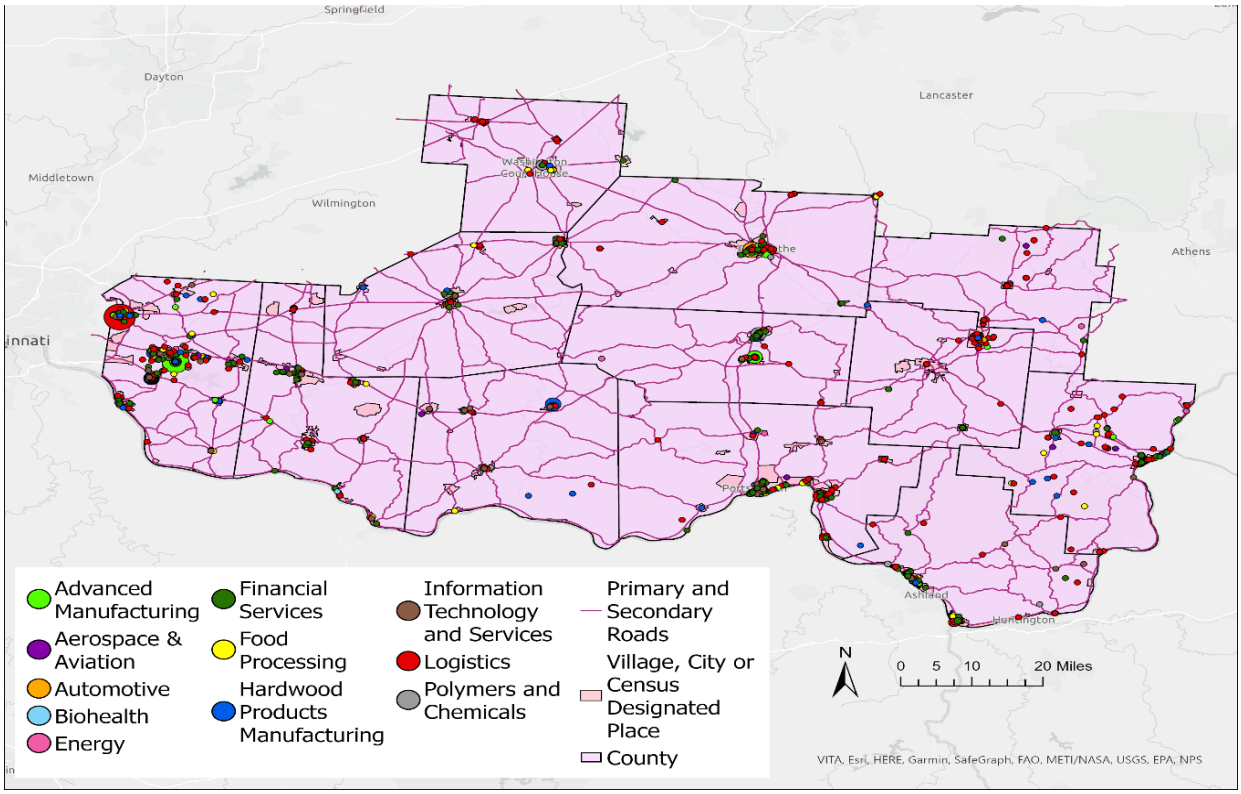
Source: Nexis Uni Database

Figure 2: Number of Employees in Each Targeted Cluster in OVRDC Region



Source: Nexis Uni Database

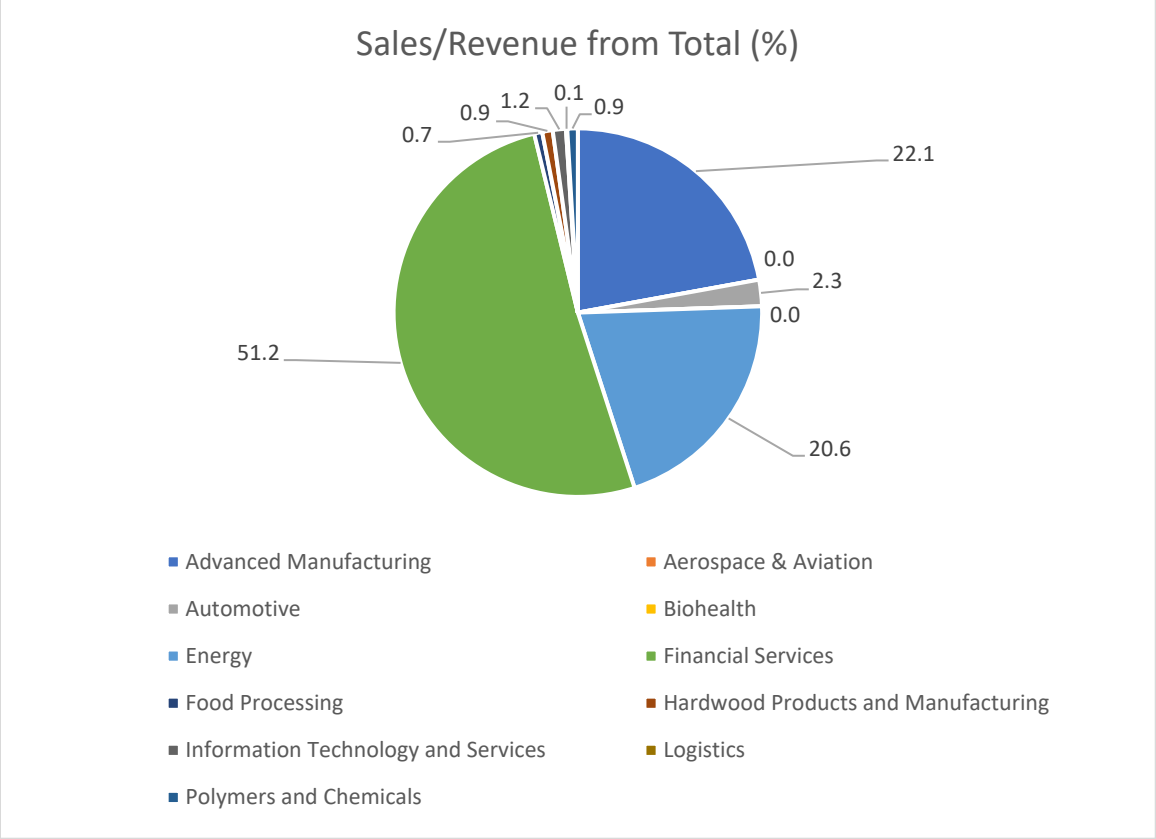
Figure 3: Map of the Targeted Clusters in the OVRDC Region



Source: Nexis Uni Database

The Financial services cluster holds as one of the most prominent out of targeted clusters within the region, being the highest revenue producer, one of the highest in firm count and the largest employer by far. Second as the highest revenue in the area is the advanced manufacturing corporations, with a strong history of manufacturing in the region. The energy industry in OVRDC also is important to make note of as it has historically contributed strongly to the OVRDC economy. Figure 4 shows the percentage of sales/revenue from total for each cluster. From our analysis, these percentages **rely on reported sales/revenue from firms in the region.**

Figure 4: Sales/Revenue in Each Targeted Cluster in OVRDC Region



Source: Nexis Uni Database

When we investigate the Nexis Uni dataset, we realize not all the firms report their sales/revenue. To find out the distribution of firms which have not responded to the sales/revenue information, we analyze firm ownership status. Table 4 shows the statistics of the firms that reported their sales/revenue and how that seems to relate to the firms being publicly or privately owned. Out of the 2,397 companies examined, 2,393 of the total firms were found to be privately owned and only 8 firms are public corporations, which all reported their revenue. Upon examining private corporations, it becomes more difficult to gain an accurate picture of the total revenue of firms in the area. Out of the 2,393 private firms, it was found that only 28 reported their revenue, which is around1.3% of the total companies' reporting revenue.

Within the discussion of clusters and reporting sales/revenue, we analyze the Nexis Uni database to see the frequency of reporting sales/revenue in each cluster within the OVRDC region. Sales/revenue reported most often are the advanced manufacturing cluster at around 13% of the 175 firms in the cluster reporting their revenue. A thorough analysis of the region becomes more difficult because many firms in the region do not report their revenues, likely because 98.7% are privately owned.

Much of the revenue of targeted clusters in OVRDC seems to come from Financial Services. This could be because there are 36 Financial Service firms headquartered in the area, with one of the most profitable being the American Modern Insurance Firm, a part of MunichRe one of the top 100 most profitable companies in the world, netting around $1 billion in reported revenue for the area. The advanced

manufacturing cluster reported the second highest revenue for all reported clusters. This segment of the economy also is responsible for 19 percent of the total employed residents in 11 targeted clusters within the area. This combination provides a mutually beneficial relationship as the companies prove to be successful and a source of reliable employment in the region. Along with this, the Financial Service cluster has the largest number of headquartered firms in the area with 36 firms being based in the OVRDC region, followed by the Advanced Manufacturing cluster with 33 headquartered firms. Out of the 3,931 total targeted clusters' companies with facilities in the region, 197 are headquartered in the OVRDC region.

Within the clusters and firms, we analyzed there were two distinct classifications we were able to use along with what has been discussed so far, which are the distinctions between private and publicly owned companies. To distinguish between the two, it is important to make the distinction that public companies are traded on the New York Stock Exchange, while the privately owned companies are not and therefore do not have a shareholder structure. Most companies in the region are privately owned, sitting at 99.7% of all companies being listed as privately owned. 99.7% of companies in the region are listed as privately owned. As seen in Table 4, the most publicly owned companies lie in the financial services cluster. Following financial services, advanced manufacturing, and information technology and services are the only clusters that have several publicly owned firms. The rest of the targeted clusters are fully owned by private sectors.

Table 4: OVRDC Companies Reporting Revenue

Clusters	Number of Firms	Number of Private Firms	Private Firms out of Total Cluster (%)	Number of Firms that Reported No Revenue	Number of Firms that Reported Revenue	Percentage of Total Companies Reporting Revenue by Cluster (%)
Advanced Manufacturing	95	94	98.9	89	6	6.3
Aerospace & Aviation	23	23	100	23	0	0
Automotive	26	26	100	24	2	7.7
Biohealth	17	17	100	17	0	0
Energy	89	89	100	86	3	3.4
Financial Services	711	709	99.7	708	3	0.4
Food Processing	86	86	100	83	3	3.5
Hardwood Products and Manufacturing	159	159	100	157	2	1.3
Information Technology and Services	225	224	99.6	222	3	1.3
Logistics	883	883	100	882	1	0.11
Polymers and Chemicals	83	83	100	74	9	10.9
TOTAL	2,397	2,393	99.8	2,365	32	1.3

Source: Nexis Uni Database

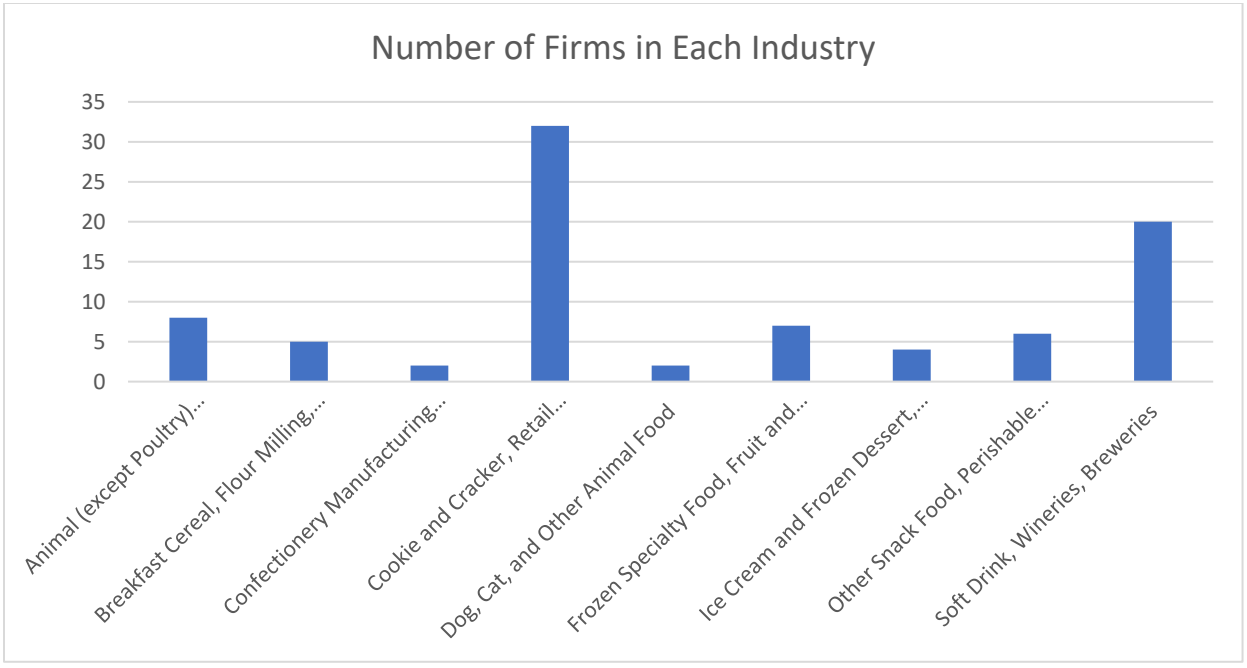
Because of the importance of the Food Processing cluster, we focus on this and analyze it in more detail. The food processing cluster includes 86 targeted firms supporting 1,695 jobs within the region. Table 5 presents the number of firms in each cluster, their share from total firms in 11 clusters, number of employees in each cluster, their share from total employees in 11 clusters, number of headquarters in each cluster, their share from total headquarters in 11 clusters, sales/revenues in each cluster, and their share from total sales/revenue in 9 industries with the food processing cluster. Cookie and cracker, retail Bakeries, and commercial bakeries contain 32 firms within the OVRDC region and support 201 direct jobs. Following cookie and cracker establishments, retail bakeries, and commercial bakeries, there are 20 soft drink firms, wineries, and breweries located in OVRDC. These firms support a total of total, 685 jobs. While there are only 5 breakfast cereals, flour milling, and rice milling establishment in the OVRDC region, this industry supports 399 direct jobs. Figure 6 shows the number of firms in each targeted food processing industry in the OVRDC region. Figure 7 shows the number of employees in each targeted food processing industry in the OVRDC region. Figure 8 presents the map of the food processing firms in the region.

Table 5: Number of Firms, Employees, and Headquarters in Each Industry within Food Processing Cluster in OVRDC Region

Industry Cluster	Number of Firms	Number of Employees	Number of HQs
Dog, Cat, and Other Animal Food	2	138	0
Breakfast Cereal, Flour Milling, and Rice Milling	5	399	0
Confectionery Manufacturing from Purchased Chocolate, and Nonchocolate Confectionery	2	27	0
Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty Canning	7	130	0
Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, Fluid Milk	4	22	0
Animal (except Poultry) Slaughtering, and Meat Processed from Carcasses	8	50	1
Cookie and Cracker, Retail Bakeries, Commercial Bakeries	32	201	2
Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food Manufacturing	6	70	1
Soft Drink, Wineries, Breweries,	20	658	1
TOTAL	86	1,695	5

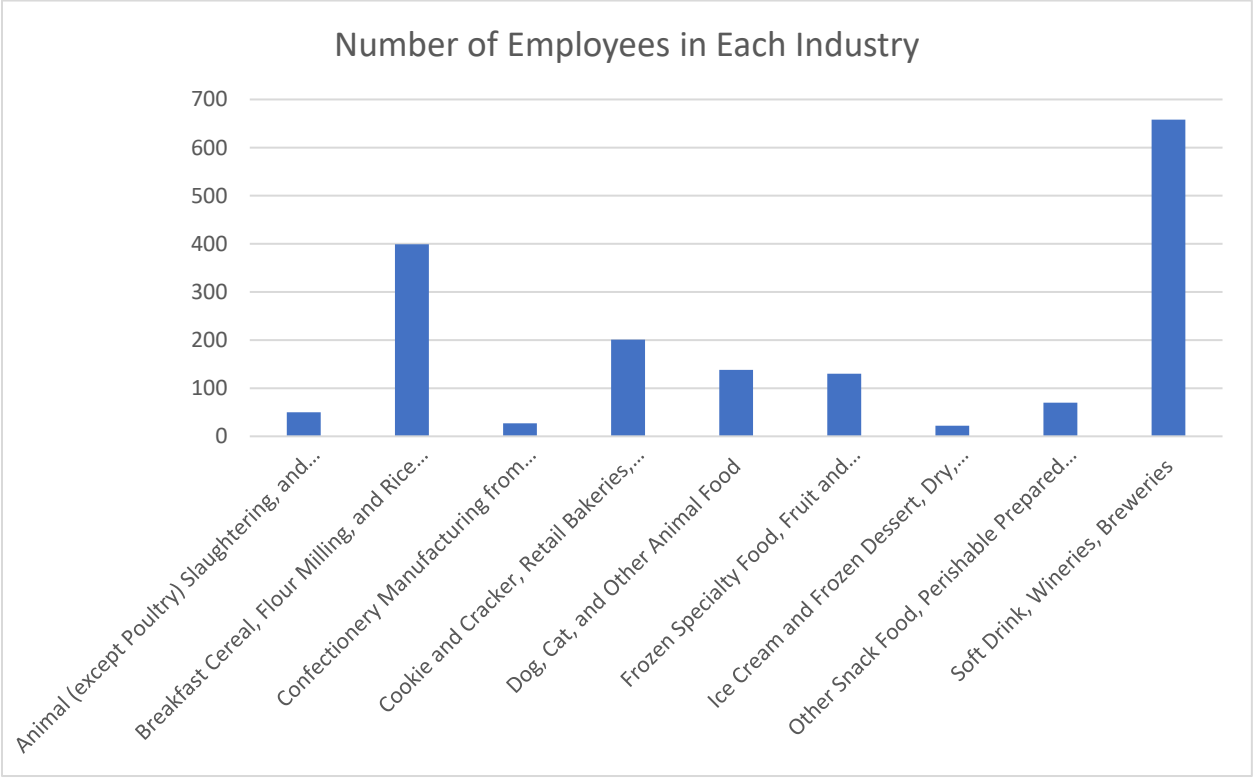
Source: Nexis Uni Database

Figure 6: Number of Firms in Each Targeted Food Processing Industry in OVRDC Region



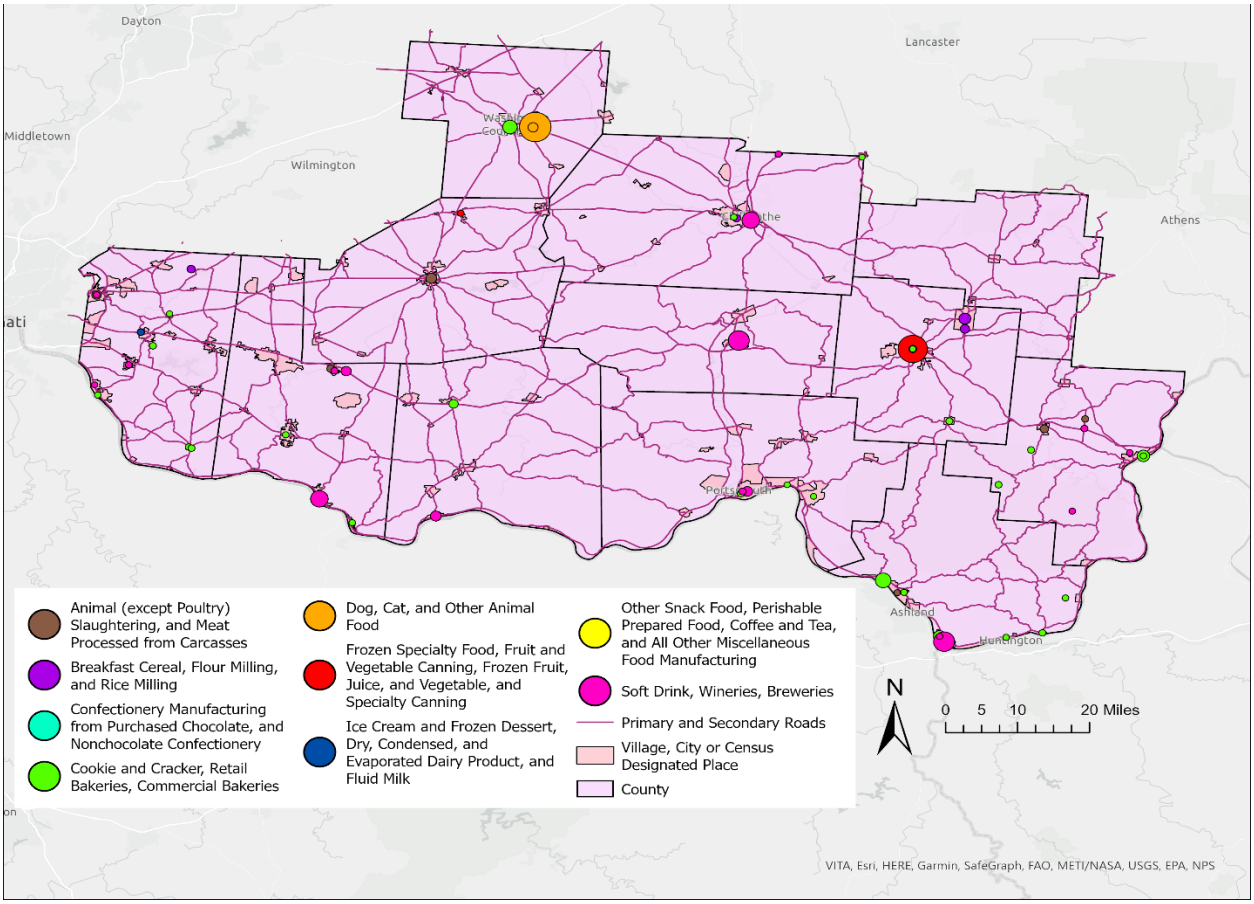
Source: Nexis Uni Database

Figure 7: Number of Employees in Each Targeted Food Processing Industry in OVRDC Region



Source: Nexis Uni Database

Figure 8: Map of the Targeted Industries within Food Processing Cluster in the OVRDC Region



Source: Nexis Uni Database

Task 2.2: Complete firm level interviews with company executives and/or managers to assess firm and cluster level needs with goal of identifying needs for sustainability, growth, expansion and assistance with capital access plans

This subtask is focused specifically on identifying needs for sustainability, growth, and expansion at the firm and cluster level. While clusters can continually evolve and prosper, they can and do lose their competitive edge over time. Factors that can determine the success for growth (or lack thereof) for an industry cluster include employee skills, market information, technological advancements, and supply chain advantages (Derlukiewicz et al., 2020). Technological advancements are particularly critical success factors for clusters wishing to facilitate sustainable growth.

Sustainable growth for a firm, establishment, or business is defined as the realistically attainable growth that a business can maintain without compromising the future growth of the company. When a business grows too rapidly, it can run into issues with funding its expansion. This may lead to the firm relying on financing this growth with additional equity or debt. On the other hand, when a firm grows too slowly, it

can stagnate. To prevent stagnation while also encouraging optimal growth, businesses and firms must find the rate at which the business can grow without over-leveraging the establishment.

To achieve sustainable growth, a firm, establishment, or business must calculate its sustainable growth rate. A sustainable growth rate is a maximum rate at which an establishment can sustain itself without needing to increase its financial leverage through loans or other forms of debt. To determine a business's sustainable growth rate, they must consider several outside factors including consumer and industry trends, political and economic factors, and industry. Additionally, the business must determine its growth capacity within its company. This involves the resources the company has access to in order to meet growth.

As stated previously, we introduced 11 targeted clusters in the OVRDC region exploring several resources. We apply a cluster analysis and generate location quotient measures to analyze OVRDC targeted industries characteristics, uniqueness, and opportunities for growth and expansion compared to the rest of the state as well as to the U.S.

In addition to identifying needs for sustainable growth, this report also aims to identify OVRDC cluster needs for capital access plans, or financial needs that can help facilitate sustainable growth. For example, OCAP (the Ohio Capital Access Program) assists for-profit or nonprofit small businesses in Ohio that struggle receiving loans through conventional means.

One of the approaches to be able to identify needs for sustainable growth is conducting a Location Quotient analysis (LQ). A location quotient of 1 signifies that the selected region is equally as strong in the industry as the comparison region. A location quotient above 1 signifies the industry is stronger and below 1 signifies the industry is weaker. Table 6 shows the LQs for 11 targeted industry clusters within the OVRDC region. Compared to the U.S., among 11 clusters advanced manufacturing followed by automotive, polymers and chemicals, and logistics are the clusters with an LQ above 1.

Table 6: Location Quotient for 11 Targeted Industry Clusters in OVRDC

Cluster	Location Quotient
Advanced Manufacturing	4.094
Aerospace & Aviation	0.202
Automotive	1.882
Biohealth	0.238
Energy	0.685
Financial Services	0.923
Food Processing	0.437
Hardwood Products and Manufacturing	0.722
Information Technology and Services	0.300
Logistics	1.312
Polymers and Chemicals	1.703

Source: Nexis Uni Database and Ohio University Calculations

Within the food processing cluster, we calculate LQs for nine different presented industries in OVDC. Table 7 presents the LQs for food processing industries in the OVRDC region. Compared to the U.S., breakfast cereal, flour milling, and rice milling industries along with soft drink, wineries, breweries, and dog, cat, and other animal food operations are stronger.

Table 7: Location Quotient for nine Targeted Industries within Food Processing Cluster in OVRDC

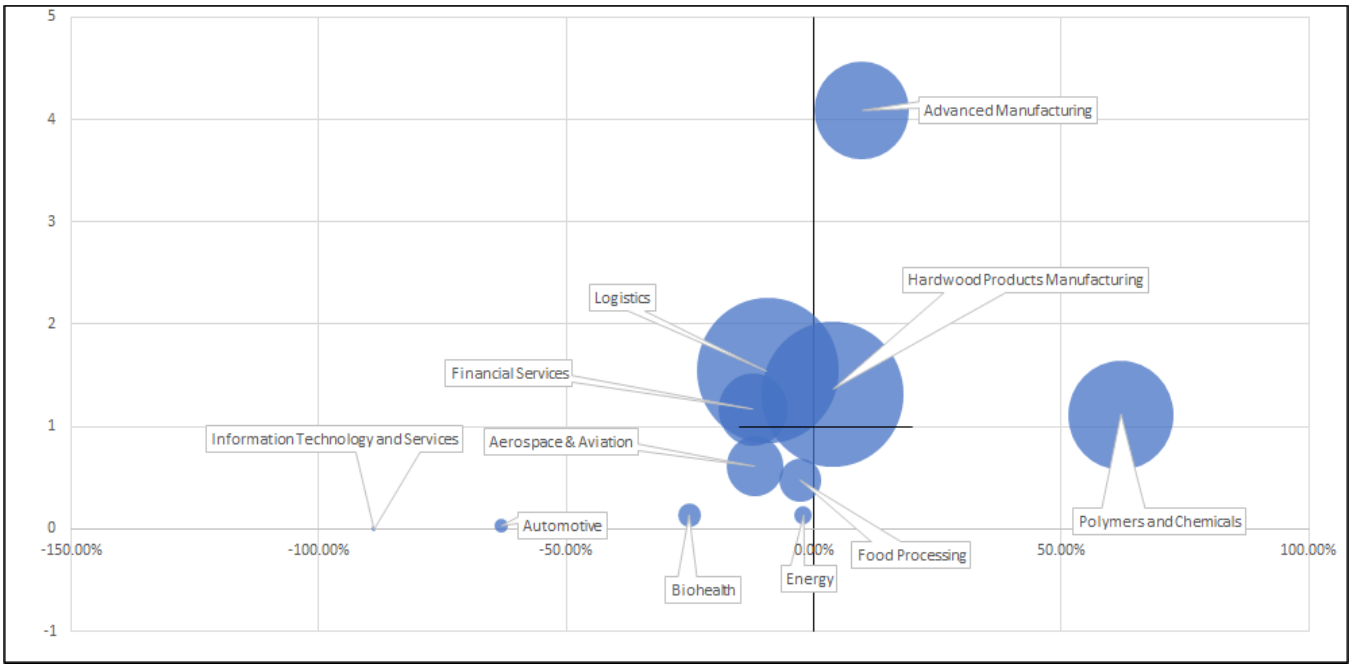
Cluster	Location Quotient
Animal (except Poultry) Slaughtering, and Meat Processed from Carcasses	0.046
Breakfast Cereal, Flour Milling, and Rice Milling	3.191
Confectionery Manufacturing from Purchased Chocolate, and Nonchocolate Confectionery	0.173
Cookie and Cracker, Retail Bakeries, Commercial Bakeries	0.315
Dog, Cat, and Other Animal Food	1.067
Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty Canning	0.370
Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, Fluid Milk	0.071
Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food Manufacturing	0.151
Soft Drink, Wineries, Breweries	1.171

Source: Nexis Uni Database and Ohio University Calculations

We include a cluster chart for the aggregate industries in the OVRDC region (Figure 9). Due to problems of suppressed data, we were not able to include a similar chart for the food-processing sub-clusters. The X-axis details the growth rate of these firms from 2014 to 2019, and the y-axis details the location quotients of these firms. The size of the bubbles showcases the raw size of each industry in total employment.

Bubbles on the right side of the y-axis represent growing clusters, while those on the left represent declining clusters. Further, clusters above a value of 1 represent clusters with location quotients above 1, meaning that the clusters are strong compared to the national average. Therefore, the Advanced Manufacturing Cluster is the strongest cluster in the OVRDC region compared to the United States average, while the polymers & chemicals industry is the fastest growing cluster. Logistics and Hardwood Manufacturing are the largest industries in the region in raw employment numbers. However, logistics as a cluster has declined over the observed five-year period.

Figure 9: Bubble Chart for Targeted Industry Clusters, 2014-2019



Source: Nexis Uni Database and Ohio University Calculations

Task 2.3: Conduct value chain and supply chain profiles, with an eye to expansion opportunities of these firms

This section will create a supply and value chain profile for the industry clusters within the region. Supply chain refers to the sequences of processes involved in the production and distribution of a commodity. Value Chain refers to the flow of revenue from the end customer of any product or service, which produces revenue for each stage of the supply chain (Cox, 1999). In other words, a value chain analysis will track how a firm or industry adds value to raw materials through production and manufacturing processes, and a supply chain analysis will observe the steps required to get the product or service to the final customer. These steps include supplier, procurement, manufacturer, product, inventory, distribution, logistic, retail, and consumer. Figure 10 shows the supply chain template.

It's recommended to do the supply chain analysis at a business level, where business leaders start by mapping out their supply chain. Analysis of the market is as important as mapping the supply chain. Analyzing the market provides the ability to follow the price, transportation, labor, and overhead costs. By following the market closely, leaders will become more efficient in predicting future fluctuations. The first two steps to do the supply chain at a business level help leaders recognize inefficiencies along the chain. These steps are crucial to improving productivity and lowering costs. The next step is adaptation. Adaptation and adjustment to a new approach and procedure play an important role in the supply chain. The final step is regularly checking the supply chain. To be able to remain successful in the business and industry, business leaders need to regularly check and conduct supply chain.

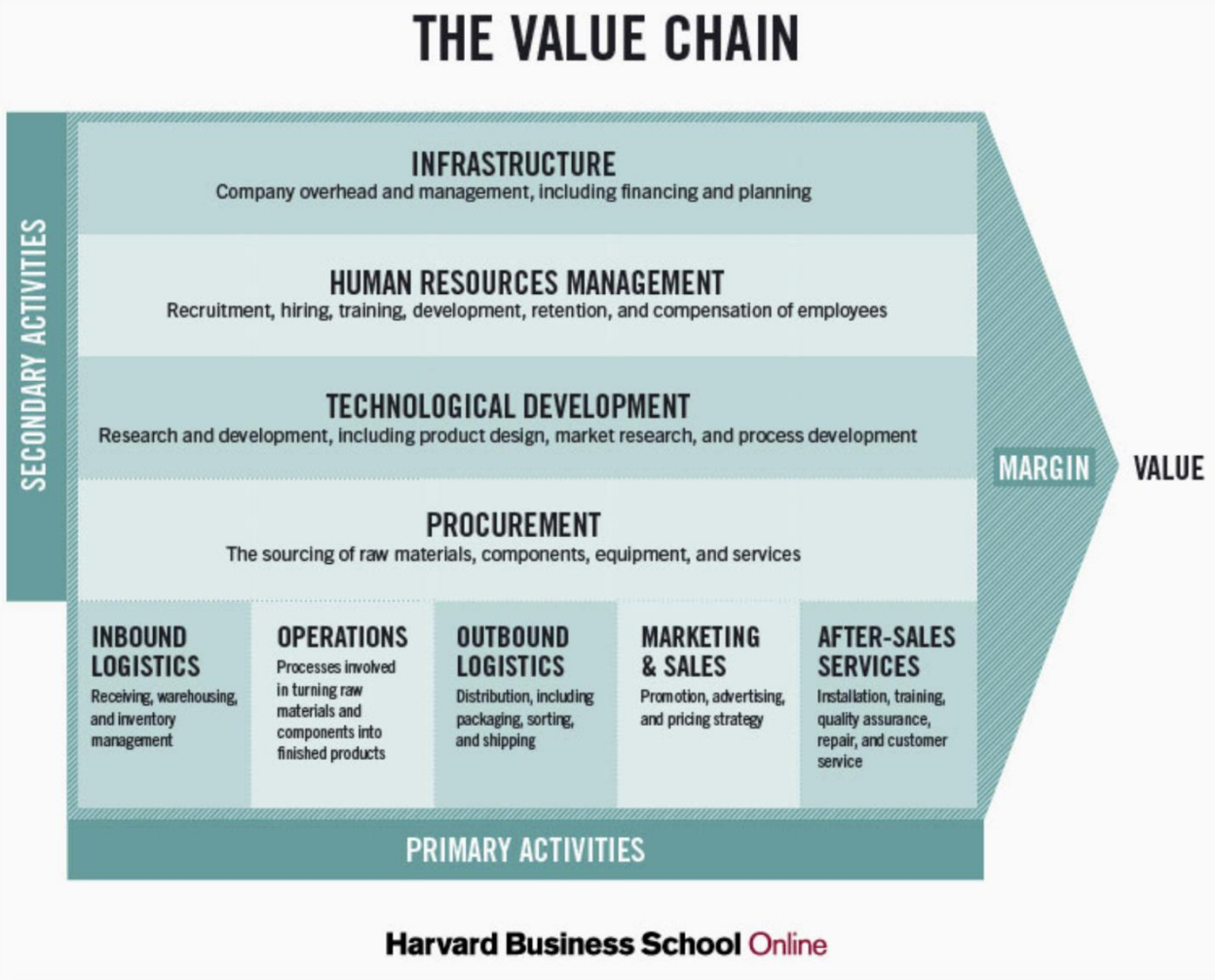
Figure 10: Supply Chain Template

Source: Nexterus[9]

The value chain analysis portion of this section is organized based on Michael Porter's value chain theory (1950). According to Porter, any corporate level activity is organized based on two activities; Primary activities, or activities related to the ongoing production, marketing, delivery and servicing of a product; secondary activities, or activities providing purchased inputs, technology, human resources and infrastructure and activities supporting the value system of the industry, mostly relating to suppliers and distributors (Porter, 2008). Figure 11 organizes these streams and activities into a visual representation. Figure 12 presents the main differences between the supply chain and the value chain.

[9] Available at https://www.nexterus.com/franchising/2020/08/12/supply-chain-analysis/

Figure 11: Porter's Value Chain Template



Source: Harvard Business School

Figure 12: Supply Chain vs Value Chain

SUPPLY CHAIN	VS	VALUE CHAIN
Meaning		
Collection of processes and activities pertaining to procurement, logistics, product development and delivery		The processes through which value is added to products
Origin		
Operations management		Business management
Focus		
Transfer of materials		Offering value for the product
Main objective		
Attaining customer satisfaction		Obtaining competitive advantage
Order of activities		
Starts with product request and ends with supply of product to customers		Starts with customer requests and ends with the product

Source: Terms Compared.com[10]

[10] Available at https://www.termscompared.com/supply-chain-vs-value-chain/

As a supplement to the supply and value chain analyses, this study applied an economic impact analysis to identify the employment, labor income, value added, output, tax revenue in different levels, and top impacted industries by each targeted industry cluster within the region. We leverage IMPLAN to construct input-output models for each industry cluster. This software uses an input-output methodology to track the ripple effects of each job in the OVRDC region. For example, one job in the OVRDC automotive industry will generate salaried pay for that employee. They will spend their salary within the region to support local firms, who in turn will use that money toward business-to-business transactions and hiring more employees. Reported multipliers summarize this effect; for instance, an employment multiplier of 1.5 means that, for every two jobs within an industry, an additional job is generated within the region.

Note that for some industries in the food-processing industry, IMPLAN can sometimes report inflated multiplier effects. This is due to issues of double counting in industries with significant support from government aid (Swenson, 2006). We have included an asterisk next to these industries, and results for these industries should be taken with a grain of salt. However, it is still reasonable to make conclusions on which industries are the most influenced by the existing firms in the industries of choice.

Each summary table reports direct, indirect, induced, and total effects, as well as multipliers for employment, labor income, value added and output. Direct effects report the initial employment in the cluster of interest and their effect on the regional economy. When salaried workers spend their income on local businesses, these transactions are reported in indirect effects. Induced effects refer to the business-to-business transactions generated by this activity, and total effects sum up all effects. Multipliers are simply the ratio of direct effects to total effects.

Furthermore, each industry reports tax effects at the local, state, and federal levels. Note that sub county special district tax refers to school and fire department taxes, while sub county general tax refers to town and city taxes. Additionally, we include top ten industries impacted by each industry to dissect the effect that each cluster has on other industries in the area.

The results for economic impact analysis in advanced manufacturing cluster imply that, while 11,107 yearly employment is supporting advanced manufacturing cluster operations in the OVRDC region, a total of 16,168 employment is being generated for the OVRDC ending in $3,027,203,195 in economic activity. Additionally, an employment multiplier effect of 1.46 implies that for every 2 jobs supported through advanced manufacturing operations, an additional job will be supported within the OVRDC region. Table 8 shows the employment, labor income, value added, and output generated by advanced manufacturing operations.

Table 8: Advanced Manufacturing Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	11,107.00	$555,588,538	$614,663,130	$2,224,324,499
Indirect Effect	2,744.26	$136,287,860	$227,878,722	$478,010,100
Induced Effect	2,317.27	$93,556,492	$183,418,645	$324,868,596
Total Effect	16,168.53	$785,432,891	$1,025,960,496	$3,027,203,195
Multiplier	1.46	1.41	1.67	1.36

Source: Ohio University Calculations

Table 9 estimates taxes paid by advanced manufacturing operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Advanced manufacturing cluster in the OVRDC region generates $138,912,884 total direct tax revenue and $233,112,777 total tax revenue annually.

Table 9: Advanced Manufacturing Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$2,220,789	$4,384,471	$2,287,845	$20,387,214	109,632,565	138,912,884
Indirect Effect	$1,766,182	$4,599,463	$2,497,352	13,771,382	$28,989,342	$51,623,722
Induced Effect	$1,670,451	$4,502,609	$2,454,997	$12,778,764	$21,169,351	$42,576,171
Total Effect	$5,657,422	13,486,543	$7,240,193	$46,937,360	159,791,258	233,112,777

Source: Ohio University Calculations

One of the advantages of economic impact analysis is its strength in investigating industries that are impacted the most by the operation of specific industries like advanced manufacturing. This analysis helps us to recognize opportunities for growth within each industry's supply and value chain. Among all other industries, real estate, full-service restaurants, limited-service restaurants, wholesale - other durable goods merchant wholesalers, management of companies and enterprises, employment services, hospitals, marketing research and all other miscellaneous professional, scientific, and technical services, and wholesale - other nondurable goods merchant wholesalers are industries that are impacted more by advanced manufacturing operations. In addition to supporting 11,111 direct jobs in all other miscellaneous manufacturing, advanced manufacturing operations help support 234-117 jobs in mentioned industries within the OVRDC region. Table 10 shows the top ten industries impacted by advanced manufacturing operations.

Table 10: Top Ten Industries Impacted by Advanced Manufacturing Cluster

Description	Employment	Labor Income	Value Added	Output
All other miscellaneous manufacturing	11,111.84	$421,189,475	$614,663,130	$2,225,294,003
Other real estates	234.62	$12,119,376	$966,129	$49,700,085
Full-service restaurants	225.3	$12,106,122	$805,013	$48,096,506
Limited-service restaurants	218.64	$8,960,431	$771,274	$44,817,318
Wholesale - Other durable goods merchant wholesalers	209.72	$8,935,666	$655,776	$37,188,739
Management of companies and enterprises	175.04	$6,441,483	$580,392	$36,285,634
Employment services	172.55	$5,993,741	$466,081	$30,596,191
Hospitals	129.69	$5,229,029	$355,819	$22,586,376
Marketing research and all other miscellaneous professional, scientific, and technical services	124.31	$4,351,327	$352,777	$22,184,671
Wholesale - Other nondurable goods merchant wholesalers	117.1	$4,350,267	$337,096	$20,672,899

Source: Ohio University Calculations

The results for aerospace and aviation cluster economic impact analysis imply that, while 602 yearly employment is supporting aerospace and aviation cluster operations in the OVRDC region, a total of 1,004 employment is being generated for the OVRDC ending in $600,716,256 in economic activity. Additionally, an employment multiplier effect of 1.67 implies that for every 3 jobs supported through aerospace and aviation operations, two additional jobs will be supported within the OVRDC region. Table 11 shows the employment, labor income, value added, and output generated by aerospace and aviation operations.

Table 11: Aerospace & Aviation Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	602.00	$40,578,719	$124,732,377	$535,520,149
Indirect Effect	227.27	$14,105,435	$21,150,173	$40,668,805
Induced Effect	174.89	$7,065,861	$13,850,448	$24,527,302
Total Effect	1,004.16	$61,750,015	$159,732,999	$600,716,256
Multiplier	1.67	1.52	1.28	1.12

Source: Ohio University Calculations

Table 12 estimates taxes paid by aerospace and aviation operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Aerospace and aviation cluster in the OVRDC region generates $16,116,856 total direct tax revenue and $24,014,300 total tax revenue annually.

Table 12: Aerospace & Aviation Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$449,366	$1,103,672	$598,354	$3,421,325	$10,544,139	$16,116,856
Indirect Effect	$142,862	$357,272	$192,973	$1,133,734	$2,852,824	$4,679,665
Induced Effect	$126,321	$340,541	$185,679	$966,308	$1,598,930	$3,217,780
Total Effect	$718,549	$1,801,486	$977,006	$5,521,367	$14,995,893	$24,014,300

Source: Ohio University Calculations

While the direct employment supported by aerospace and aviation cluster belongs to aircraft manufacturing, custom computer programming services, wholesale - machinery, equipment, and supplies, employment services, limited-service restaurants, full-service restaurants, computer systems design services, truck transportation, other real estate, and management of companies and enterprises are industries most impacted by aerospace and aviation operations (34-10 supported jobs). The top ten industries impacted by aerospace and aviation operations are listed in Table 13.

Table 13: Top Ten Industries Impacted by Aerospace & Aviation Cluster

Description	Employment	Labor Income	Value Added	Output
Aircraft manufacturing	602.01	$40,579,412	$124,734,506	$535,529,289
Custom computer programming services	34.06	$1,941,584	$3,795,946	$6,839,928
Wholesale - Machinery, equipment, and supplies	25.41	$1,471,723	$2,939,835	$3,731,991
Employment services	21.46	$714,234	$2,617,158	$3,617,511
Limited-service restaurants	13.76	$672,922	$2,023,791	$3,370,008
Full-service restaurants	13.57	$574,751	$1,234,962	$3,159,842
Computer systems design services	13.08	$541,038	$1,181,667	$1,933,321
Truck transportation	12.69	$507,534	$1,075,753	$1,862,337
Other real estates	10.7	$478,161	$862,386	$1,803,131
Management of companies and enterprises	10.32	$468,759	$844,192	$1,722,186

Source: Ohio University Calculations

The results for automotive cluster economic impact analysis imply that, while 4,196 yearly employment is supporting automotive cluster operations in the OVRDC region, a total of 9,415 employment is being generated for the OVRDC ending in $5,996,792,209 in economic activity. Additionally, an employment multiplier effect of 2.24 implies that for every 1 job supported through automotive operations, an additional 1.25 jobs will be supported within the OVRDC region. Table 14 shows the employment, labor income, value added, and output generated by automotive operations.

Table 14: Automotive Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	4,196.00	$456,583,222	$751,724,605	$4,965,802,576
Indirect Effect	2,920.61	$195,664,942	$320,566,800	$708,783,740
Induced Effect	2,298.82	$92,768,346	$181,893,339	$322,205,892
Total Effect	9,415.43	$745,016,511	$1,254,184,744	$5,996,792,209
Multiplier	2.24	1.63	1.67	1.21

Source: Ohio University Calculations

Table 15 estimates taxes paid by automotive operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Automotive cluster in the OVRDC region generates $146,997,361 total direct tax revenue and $261,556,168 total tax revenue annually.

Table 15: Automotive Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$3,458,718	$8,157,830	$4,382,590	$28,343,035	$102,655,188	$146,997,361
Indirect Effect	$2,470,230	$6,393,154	$3,468,187	$19,270,995	$40,758,193	$72,360,759
Induced Effect	$1,654,969	$4,460,442	$2,431,983	$12,660,635	$20,990,020	$42,198,048
Total Effect	$7,583,918	$19,011,425	$10,282,760	$60,274,664	$164,403,401	$261,556,168

Source: Ohio University Calculations

In addition to 4,196 direct employments in automotive manufacturing, the automotive cluster contributes to regional employment. Wholesale - motor vehicle and motor vehicle parts and supplies with 792, truck transportation with 215, wholesale - machinery, equipment, and supplies with 200, full-service restaurants with 172, limited-service restaurants with 170, employment services with 161, Other real estates with 143, retail - hospitals with 129, and wholesale - other durable goods merchant wholesalers with 129 are the most impacted industries in automotive cluster supply chain. The top ten industries impacted by automotive operations are listed in Table 16.

Table 16: Top Ten Industries Impacted by Automotive Cluster

Description	Employment	Labor Income	Value Added	Output
Automobile manufacturing	4,196.28	$282,054,330	$751,774,246	$4,966,130,495
Wholesale - Motor vehicle and motor vehicle parts and supplies	792.03	$42,651,772	$97,813,197	$259,209,691
Truck transportation	215.92	$15,254,537	$44,534,625	$61,557,056
Wholesale - Machinery, equipment, and supplies	199.67	$9,780,205	$38,970,627	$53,739,588
Full-service restaurants	171.66	$8,918,503	$29,823,793	$49,471,499
Limited-service restaurants	169.96	$8,856,595	$15,687,635	$29,535,518
Employment services	161.12	$7,434,232	$13,676,920	$24,558,845
Other real estate	143.5	$5,184,765	$10,754,512	$22,744,867
Hospitals	129.09	$4,914,399	$10,468,098	$22,480,688
Wholesale - Other durable goods merchant wholesalers	128.79	$4,062,163	$9,908,552	$22,359,079

Source: Ohio University Calculations

The results for Biohealth cluster economic impact analysis imply that, while 365 yearly employment is supporting Biohealth cluster operations in the OVRDC region, a total of 490 employment is being generated for the OVRDC ending in $57,019,158 in economic activity. Additionally, an employment multiplier effect of 1.34 implies that for every 3 jobs supported through Biohealth operations, one additional job will be supported within the OVRDC region. Table 17 shows the employment, labor income, value added, and output generated by Biohealth operations.

Table 17: Biohealth Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	365.00	$19,708,954	$22,641,065	$38,597,729
Indirect Effect	53.62	$2,358,744	$3,901,949	$8,410,383
Induced Effect	71.39	$2,883,559	$5,652,739	$10,011,046
Total Effect	490.02	$24,951,258	$32,195,752	$57,019,158
Multiplier	1.34	1.27	1.42	1.48

Source: Ohio University Calculations

Table 18 estimates taxes paid by Biohealth operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Biohealth cluster in the OVRDC region generates $4,490,610 total direct tax revenue and $6,627,759 total tax revenue annually.

Table 18: Biohealth Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$49,790	$69,622	$33,954	$505,023	$3,832,221	$4,490,610
Indirect Effect	$26,296	$66,673	$36,089	$206,460	$488,861	$824,380
Induced Effect	$51,522	$138,887	$75,727	$394,133	$652,499	$1,312,769
Total Effect	$127,609	$275,183	$145,770	$1,105,616	$4,973,581	$6,627,759

Source: Ohio University Calculations

The top ten industries impacted by Biohealth operations are listed in Table 19. In addition to 365 direct jobs supported by other ambulatory health care services, other real estates, employment services, full-service restaurants, limited-service restaurants, hospitals, legal services, automotive repair and maintenance, except car washes, retail - general merchandise stores, and nursing and community care facilities are the most impacted industries in Biohealth operations (12-2 employees).

Table 19: Top Ten Industries Impacted by Biohealth Cluster

Description	Employment	Labor Income	Value Added	Output
Other ambulatory health care services	365.34	$17,227,737	$22,662,187	$38,633,737
Other real estate	12.51	$275,306	$1,202,808	$1,983,129
Employment services	7.55	$190,326	$563,630	$1,526,912
Full-service restaurants	5.66	$161,172	$481,113	$882,357
Limited-service restaurants	5.32	$149,402	$393,383	$845,952
Hospitals	3.98	$131,321	$378,427	$693,957
Legal services	3.07	$118,004	$331,981	$605,829
Automotive repair and maintenance, except car washes	2.67	$109,254	$191,788	$471,510
Retail - General merchandise stores	2.64	$109,222	$187,245	$405,872
Nursing and community care facilities	2.45	$106,282	$183,019	$392,756

Source: Ohio University Calculations

The results for energy cluster economic impact analysis imply that, while 2,386 yearly employment is supporting energy cluster operations in the OVRDC region, a total of 8,693 employment is being generated for the OVRDC ending in $5,833,325,481 in economic activity. Additionally, an employment multiplier effect of 3.64 implies that for every 1 job supported through energy operations, 3.64 additional jobs will be supported within the OVRDC region. Table 20 shows the employment, labor income, value added, and output generated by energy operations.

Table 20: Energy Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	2,386.00	$381,498,817	$1,759,274,041	$3,862,684,450
Indirect Effect	3,827.66	$372,561,452	$784,893,137	$1,622,972,636
Induced Effect	2,479.81	$100,125,778	$196,294,701	$347,668,395
Total Effect	8,693.48	$854,186,048	$2,740,461,879	$5,833,325,481
Multiplier	3.64	2.24	1.56	1.51

Source: Ohio University Calculations

Table 21 estimates taxes paid by energy operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Energy cluster in the OVRDC region generates $587,469,234 total direct tax revenue and $832,411,406 total tax revenue annually.

Table 21: Energy Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$34,805,866	$100,961,200	$55,472,496	$256,579,373	$139,650,298	$587,469,234
Indirect Effect	$9,162,509	$25,222,031	$13,778,354	$69,019,683	$82,190,792	$199,373,369
Induced Effect	$1,787,966	$4,819,433	$2,627,746	$13,677,696	$22,655,962	$45,568,803
Total Effect	$45,756,341	$131,002,664	$71,878,596	$339,276,752	$244,497,052	$832,411,406

Source: Ohio University Calculations

The top ten industries impacted by energy operations are listed in Table 22. Electric power generation - All other supports 2,383 direct jobs however, employment services, full-service restaurants, electric power transmission and distribution, hospitals, other real estates, limited-service restaurants, scenic and sightseeing transportation and support activities for transportation, offices of physicians, and truck transportation are listed among most impacted industries in energy cluster supply chain (810-134 jobs).

Table 22: Top Ten Industries Impacted by Energy Cluster

Description	Employment	Labor Income	Value Added	Output
Electric power generation - All other	2,383.96	$405,941,096	$1,875,739,562	$4,118,397,629
Employment services	809.64	$60,072,656	$261,622,226	$608,207,011
Full-service restaurants	444.98	$20,412,540	$113,560,443	$120,961,079
Electric power transmission and distribution	295.55	$20,294,627	$41,876,297	$117,923,798
Hospitals	283.23	$9,584,352	$40,586,546	$71,041,504
Other real estate	188.25	$9,097,788	$35,471,843	$64,975,498
Limited-service restaurants	168.27	$6,850,059	$32,718,377	$53,160,119
Scenic and sightseeing transportation and support activities for transportation	158.11	$6,273,868	$26,007,232	$51,220,312
Offices of physicians	138.73	$5,707,972	$19,053,839	$36,397,105
Truck transportation	133.76	$5,693,554	$17,551,466	$26,670,764

Source: Ohio University Calculations

The results for financial services cluster economic impact analysis imply that, while 35,458 yearly employment is supporting financial services cluster operations in the OVRDC region, a total of 40,754 employment is being generated for the OVRDC ending in $2,085,624,643 in economic activity. Additionally, an employment multiplier effect of 2.53 implies that for every 1 job supported through financial services operations, an additional 1.53 job will be supported within the OVRDC region. Table 23 shows the employment, labor income, value added, and output generated by financial services operations.

Table 23: Financial Services Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	9,025.00	$754,218,658	$10,616,712,459	$12,872,720,033
Indirect Effect	9,802.81	$427,675,762	$797,304,904	$1,597,382,244
Induced Effect	4,030.23	$162,645,891	$318,900,846	$564,894,681
Total Effect	22,858.04	$1,344,540,310	$11,732,918,209	$15,034,996,957
Multiplier	2.53	1.78	1.11	1.17

Source: Ohio University Calculations

Table 24 estimates taxes paid by financial services operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Financial services cluster in the OVRDC region generates $697,365,657 total direct tax revenue and $914,001,687 total tax revenue annually.

Table 24: Financial Services Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$20,765,206	$49,607,320	$27,129,568	$136,044,738	$463,818,825	$697,365,657
Indirect Effect	$4,005,083	$9,748,927	$5,257,687	$31,631,350	$92,006,185	$142,649,233
Induced Effect	$2,901,800	$7,820,949	$4,264,249	$22,198,934	$36,800,866	$73,986,798
Total Effect	$27,672,090	$67,177,196	$36,651,503	$189,875,022	$592,625,876	$914,001,687

Source: Ohio University Calculations

In addition to 9,033 jobs directly supported by financial services cluster, other real estates, securities and commodity contracts intermediation and brokerage, employment services, full-service restaurants, management consulting services, monetary authorities and depository credit intermediation, couriers and messengers, insurance agencies, brokerages, and related activities and management of companies and enterprises are industries most impacted by financial services in the OVRDC region (2,141-313 jobs). The top ten industries impacted by financial services operations are listed in Table 25.

Table 25: Top Ten Industries Impacted by Financial Services Cluster

Description	Employment	Labor Income	Value Added	Output
Other financial investment activities	9,033.62	$451,979,737	$10,626,856,934	$12,885,020,167
Other real estate	2,140.58	$70,511,256	$336,787,432	$527,237,561
Securities and commodity contracts intermediation and brokerage	1,161.42	$57,595,111	$68,300,784	$142,512,445
Employment services	899.11	$22,900,895	$66,818,304	$132,929,041
Full-service restaurants	742.47	$18,719,022	$37,219,300	$128,201,730
Management consulting services	631.23	$15,630,881	$34,573,943	$86,704,844
Monetary authorities and depository credit intermediation	488.15	$12,792,768	$22,371,278	$59,584,833
Couriers and messengers	389.83	$11,853,405	$21,859,074	$48,108,427
Insurance agencies, brokerages, and related activities	338.84	$9,427,844	$19,087,143	$48,054,356
Management of companies and enterprises	313.03	$9,090,213	$18,848,735	$39,400,444

Source: Ohio University Calculations

The results for food processing cluster economic impact analysis imply that, while 1,695 yearly employment is supporting food processing cluster operations in the OVRDC region, a total of 14,843 employment is being generated for the OVRDC ending in $1,451,937,951 in economic activity. Additionally, an employment multiplier effect of 8.76 implies that for every job supported through food processing operations, an additional 7.79 jobs will be supported within the OVRDC region. Table 26 shows the employment, labor income, value added, and output generated by food processing operations.

Table 26: Food Processing Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	1,695.00	$114,072,624	$235,882,778	$1,052,177,858
Indirect Effect	12,424.28	$107,239,273	$156,705,625	$298,226,096
Induced Effect	724.08	$29,246,048	$57,331,624	$101,533,998
Total Effect	14,843.36	$250,557,945	$449,920,026	$1,451,937,951
Multiplier	8.76*	2.20	1.91	1.38

Source: Ohio University Calculations

*Note: As mentioned above, the multiplier for this industry is inflated due to issues of double counting in IMPLAN. Conclusions from this value should be taken with a grain of salt.

Table 27 estimates taxes paid by food processing operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Food processing cluster in the OVRDC region generates $46,561,153 total direct tax revenue and $88,881,182 total tax revenue annually.

Table 27: Food Processing Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$1,552,220	$4,063,117	$2,210,241	$12,022,722	$26,712,854	$46,561,153
Indirect Effect	$629,303	$1,361,543	$721,793	$5,250,114	$21,042,339	$29,005,091
Induced Effect	$522,586	$1,408,726	$768,098	$3,997,641	$6,617,886	$13,314,937
Total Effect	$2,704,109	$6,833,386	$3,700,132	$21,270,477	$54,373,079	$88,881,182

Source: Ohio University Calculations

The top ten industries impacted by food processing operations are listed in Table 28. Direct employment in the food processing cluster belongs to all other crop farming industries (11,267 jobs). Spice and extract manufacturing, and truck transportation are most impacted by food processing operations followed by support activities for agriculture and forestry, other real estates, wholesale - grocery and related product wholesalers, management of companies and enterprises, full-service and limited-service restaurants, and employment services (1,848-148 jobs).

Table 28: Top Ten Industries Impacted by Food Processing Cluster

Description	Employment	Labor Income	Value Added	Output
All other crop farming	11,266.58	$114,261,961	$235,945,670	$1,052,458,393
Spice and extract manufacturing	1,695.45	$29,171,829	$43,230,316	$84,104,926
Truck transportation	145.9	$6,608,946	$30,094,148	$41,597,008
Support activities for agriculture and forestry	85.08	$4,482,194	$12,196,324	$15,893,820
Other real estate	74.04	$4,452,059	$8,699,973	$15,482,697
Wholesale - Grocery and related product wholesalers	70.35	$3,913,997	$7,417,465	$13,317,952
Management of companies and enterprises	64.3	$3,738,473	$7,309,003	$13,170,116
Full-service restaurants	63.86	$2,791,578	$6,527,732	$11,734,906
Limited-service restaurants	62.31	$1,634,671	$5,262,135	$11,611,972
Employment services	51.62	$1,618,697	$3,366,267	$11,239,528

Source: Ohio University Calculations

The results for hardwood products manufacturing cluster economic impact analysis imply that, while 1,280 yearly employment is supporting hardwood products manufacturing cluster operations in the OVRDC region, a total of 3,460.57 employment is being generated for the OVRDC ending in $1,432,625,181 in economic activity. Additionally, an employment multiplier effect of 2.70 implies that for every 1 job supported through hardwood products manufacturing operations, 1.7 additional jobs will be supported within the OVRDC region. Table 29 shows the employment, labor income, value added, and output generated by hardwood products manufacturing operations.

Table 29: Hardwood Products Manufacturing Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	1,280.00	$86,342,621	$97,571,956	$341,468,862
Indirect Effect	1,147.90	$85,939,890	$116,469,130	$208,040,843
Induced Effect	1,032.67	$51,414,011	$94,309,639	$163,711,284
Total Effect	3,460.57	$223,696,523	$308,350,725	$713,220,989
Multiplier	2.70	2.59	3.16	2.09

Source: Ohio University Calculations

Table 30 estimates taxes paid by hardwood products manufacturing operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Hardwood products manufacturing cluster in the OVRDC region generates $23,293,139 total direct tax revenue and $68,649,336 total tax revenue annually.

Table 30: Hardwood Products Manufacturing Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$1,040,943	$1,142,609	$447,405	$3,567,788	$17,094,393	$23,293,139
Indirect Effect	$1,200,012	$1,713,181	$683,105	$4,473,722	$16,902,272	$24,972,291
Induced Effect	$1,056,944	$2,385,854	$971,157	$4,943,701	$11,026,250	$20,383,907
Total Effect	$3,297,899	$5,241,644	$2,101,667	$12,985,212	$45,022,915	$68,649,336

Source: Ohio University Calculations

In addition to 1,282 direct jobs supported by sawmill, woodworking, and paper machinery, custom computer programming services, employment services, management of companies and enterprises, truck transportation, full-service restaurants, hospitals, other real estates, limited-service restaurants, and wholesale - machinery, equipment, and supplies are the most impacted industries by hardwood product manufacturing operation through its supply chain (277-54 jobs). The top ten industries impacted by hardwood products manufacturing operations are listed in Table 31.

Table 31: Top Ten Industries Impacted by Hardwood Products Manufacturing Cluster

Description	Employment	Labor Income	Value Added	Output
Sawmill, woodworking, and paper machinery	1,282.55	$83,328,684	$97,766,505	$342,149,716
Custom computer programming services	277.03	$19,738,569	$25,264,185	$36,214,268
Employment services	106.32	$13,335,825	$15,383,510	$24,596,921
Management of companies and enterprises	99.11	$5,281,532	$12,322,026	$15,642,271
Truck transportation	77.42	$4,566,488	$8,787,392	$15,267,158
Full-service restaurants	71.4	$3,929,056	$7,771,887	$12,580,321
Hospitals	68.75	$3,557,414	$6,420,722	$12,524,241
Other real estate	60.04	$3,338,629	$6,335,024	$11,527,832
Limited-service restaurants	56.66	$3,174,018	$5,693,650	$11,051,135
Wholesale - Machinery, equipment, and supplies	54.1	$2,710,122	$4,803,070	$9,337,217

Source: Ohio University Calculations

The results for information technology cluster economic impact analysis imply that, while 4,159 yearly employment is supporting information technology cluster operations in the OVRDC region, a total of 6,167 employment is being generated for the OVRDC ending in $752,205,439 in economic activity.

Additionally, an employment multiplier effect of 1.67 implies that for every 1 job supported through information technology operations, an additional 0.67 job will be supported within the OVRDC region. Table 32 shows the employment, labor income, value added, and output generated by information technology operations.

Table 32: Information Technology and Services Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	2,031.00	$72,933,166	$127,006,482	$362,460,694
Indirect Effect	986.52	$41,253,803	$62,690,006	$130,097,583
Induced Effect	381.74	$15,410,812	$30,213,803	$53,515,681
Total Effect	3,399.27	$129,597,781	$219,910,291	$546,073,957
Multiplier	1.67	1.78	1.73	1.51

Source: Ohio University Calculations

Table 33 estimates taxes paid by information technology operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Information technology cluster in the OVRDC region generates $20,882,229 total direct tax revenue and $40,922,054 total tax revenue annually.

Table 33: Information Technology and Services Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$403,058	$867,104	$460,923	$3,387,613	$15,763,531	$20,882,229
Indirect Effect	$370,985	$905,970	$488,021	$2,966,571	$8,295,749	$13,027,296
Induced Effect	$275,109	$741,526	$404,308	$2,104,565	$3,487,022	$7,012,529
Total Effect	$1,049,152	$2,514,600	$1,353,252	$8,458,749	$27,546,302	$40,922,054

Source: Ohio University Calculations

The information technology cluster in the OVRDC region through marketing research and all other miscellaneous professional, scientific, and technical services, employment services, other real estates, full-service restaurants, office administrative services, all other food and drinking places, accounting, tax preparation, bookkeeping, and payroll services, management consulting services, limited-service restaurants, and management of companies and enterprises the most (2,052-30 jobs). The top ten industries impacted by information technology operations are listed in Table 34.

Table 34: Top Ten Industries Impacted by Information Technology and Services Cluster

Description	Employment	Labor Income	Value Added	Output
Marketing research and all other miscellaneous professional, scientific, and technical services	2,052.47	$55,287,736	$128,349,287	$366,292,891
Employment services	293.94	$7,410,692	$14,734,786	$23,589,100
Other real estate	94.5	$2,116,887	$6,454,393	$14,979,259
Full-service restaurants	50.45	$1,751,273	$5,863,883	$9,179,853
Office administrative services	48.27	$1,477,193	$3,634,013	$8,193,569
All other food and drinking places	44.64	$1,391,497	$2,502,065	$7,828,684
Accounting, tax preparation, bookkeeping, and payroll services	42.63	$1,242,608	$1,961,799	$5,344,225
Management consulting services	38.44	$1,227,688	$1,851,082	$4,123,539
Limited-service restaurants	33.98	$1,023,368	$1,839,460	$3,790,868
Management of companies and enterprises	30.57	$974,323	$1,806,833	$3,723,530

Source: Ohio University Calculations

The results for logistics cluster economic impact analysis imply that, while 11,567 yearly employment is supporting logistics cluster operations in the OVRDC region, a total of 16,983 employment is being generated for the OVRDC ending in $1,967,392,471 in economic activity. Additionally, an employment multiplier effect of 1.47 implies that for every 2 jobs supported through logistics operations, an additional job will be supported within the OVRDC region. Table 35 shows the employment, labor income, value added, and output generated by logistics operations.

Table 35: Logistics Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	11,567.00	$565,044,888	$590,297,416	$1,240,756,542
Indirect Effect	3,102.62	$131,351,313	$206,982,382	$402,330,129
Induced Effect	2,313.39	$93,389,239	$183,095,565	$324,305,800
Total Effect	16,983.01	$789,785,440	$980,375,363	$1,967,392,471
Multiplier	1.47	1.40	1.66	1.59

Source: Ohio University Calculations

Table 36 estimates taxes paid by logistics operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Logistics cluster in the OVRDC region generates $130,155,953 total direct tax revenue and $213,240,363 total tax revenue annually.

Table 36: Logistics Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$1,650,620	$2,717,665	$1,370,620	$16,258,328	$108,158,720	$130,155,953
Indirect Effect	$1,097,688	$2,629,846	$1,413,778	$8,813,107	$26,634,656	$40,589,074
Induced Effect	$1,667,122	$4,493,531	$2,450,042	$12,753,376	$21,131,265	$42,495,336
Total Effect	$4,415,430	$9,841,043	$5,234,440	$37,824,810	$155,924,640	$213,240,363

Source: Ohio University Calculations

In addition to the management consulting services industry that supports the highest number of employments in the logistics cluster within the OVRDC region (11,707 jobs), employment services, full-service restaurants, other real estates, limited-service restaurants, all other food and drinking places, accounting, tax preparation, bookkeeping, and payroll services, transit, ground passenger transportation, monetary authorities and depository credit intermediation, and hospitals are the most impacted industries in logistics supply chain operations (640-129 jobs). The top ten industries impacted by logistics operations are listed in Table 37.

Table 37: Top Ten Industries Impacted by Logistics Cluster

Description	Employment	Labor Income	Value Added	Output
Management consulting services	11,707.13	$423,768,133	$597,448,468	$12,885,020,167
Employment services	640.46	$16,147,167	$45,465,942	$527,237,561
Full-service restaurants	307.91	$9,518,944	$39,117,053	$142,512,445
Other real estate	266	$8,952,557	$32,105,644	$132,929,041
Limited-service restaurants	214.21	$6,338,040	$10,795,577	$128,201,730
All other food and drinking places	193.64	$6,263,710	$10,228,538	$86,704,844
Accounting, tax preparation, bookkeeping, and payroll services	187.88	$5,946,838	$10,195,022	$59,584,833
Transit and ground passenger transportation	179.91	$5,389,685	$8,106,322	$48,108,427
Monetary authorities and depository credit intermediation	156.79	$5,219,630	$7,836,955	$48,054,356
Hospitals	129.58	$4,509,883	$7,491,279	$39,400,444

Source: Ohio University Calculations

The results for polymers and chemical cluster economic impact analysis imply that, while 4,409 yearly employment is supporting polymers and chemical cluster operations in the OVRDC region, a total of 10,757 employment is being generated for the OVRDC ending in $7,876,592,315 in economic activity. Additionally, an employment multiplier effect of 2.44 implies that for every 1 job supported through

polymers and chemical operations, an additional 1.44 jobs will be supported within the OVRDC region. Table 38 shows the employment, labor income, value added, and output generated by polymers and chemical operations.

Table 38: Polymers and Chemicals Cluster Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	4,409.00	$389,158,352	$1,092,816,711	$4,073,432,771
Indirect Effect	4,144.23	$293,773,039	$565,208,027	$1,128,153,309
Induced Effect	2,203.76	$89,012,786	$174,492,808	$309,024,322
Total Effect	10,757.00	$771,944,177	$1,832,517,546	$5,510,610,403
Multiplier	2.44	1.98	1.68	1.35

Source: Ohio University Calculations

Table 39 estimates taxes paid by polymers and chemical operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Polymers and chemical cluster in the OVRDC region generates $166,876,548 total direct tax revenue and $355,410,311 total tax revenue annually.

Table 39: Polymers and Chemicals Cluster Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$5,446,289	$14,081,334	$7,663,087	$41,433,332	$98,252,506	$166,876,548
Indirect Effect	$6,480,441	$17,771,203	$9,703,498	$49,163,119	$64,889,628	$148,007,889
Induced Effect	$1,590,589	$4,287,739	$2,337,862	$12,167,559	$20,142,125	$40,525,874
Total Effect	$13,517,320	$36,140,275	$19,704,447	$102,764,010	$183,284,259	$355,410,311

Source: Ohio University Calculations

While the direct employment supported by polymers and chemicals cluster through other basic inorganic chemical manufacturing supports 4,418 jobs, this cluster helps support other industries. The most impacted industries by polymers and chemicals operations within the OVRDC regions are electric power transmission and distribution, wholesale - other nondurable goods merchant wholesalers, rail transportation, truck transportation, waste management and remediation services, electric power generation - fossil fuel, management of companies and enterprises, hospitals, and commercial and industrial machinery and equipment repair and maintenance (388-167 jobs). The top ten industries impacted by polymers and chemical operations are listed in Table 40.

Table 40: Top Ten Industries Impacted by Polymers and Chemicals Cluster

Description	Employment	Labor Income	Value Added	Output
Other basic inorganic chemical manufacturing	4,418.73	$390,016,777	$1,095,227,299	$4,082,418,147
Electric power transmission and distribution	387.67	$21,856,633	$95,187,749	$221,287,990
Wholesale - Other nondurable goods merchant wholesalers	240.5	$16,243,967	$49,604,845	$93,031,447
Rail transportation	227.67	$13,922,533	$42,371,519	$68,565,262
Truck transportation	212.88	$10,893,671	$37,114,737	$65,962,923
Waste management and remediation services	212.21	$10,794,704	$36,106,840	$48,735,938
Electric power generation - Fossil fuel	209.2	$9,169,898	$26,228,119	$47,115,527
Management of companies and enterprises	199.86	$9,145,789	$24,334,417	$41,059,874
Hospitals	192.67	$8,495,104	$22,800,522	$31,484,616
Commercial and industrial machinery and equipment repair and maintenance	166.57	$7,744,093	$19,758,450	$30,799,646

Source: Ohio University Calculations

Next, we look closely to the food processing cluster to explore industries and their impact on the supply chain. Starting from dog, cat, and other animals' food industry, this industry supports 138 direct jobs as well as 216 jobs in other related industries within the supply chain. The total of 354 employment generates $178,794,512 in total economic activities in the OVRDC region. Table 41 shows the employment, labor income, value added, and output generated by dog, cat, and other animals' food industry.

Table 41: Dog, Cat, and Other Animal Food Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	138.00	$11,508,680	$44,622,672	$146,189,573
Indirect Effect	158.34	$6,654,499	$9,662,598	$24,436,042
Induced Effect	58.25	$2,353,032	$4,612,653	$8,168,897
Total Effect	354.60	$20,516,211	$58,897,923	$178,794,512
Multiplier	2.57	1.78	1.32	1.22

Source: Ohio University Calculations

Table 42 estimates taxes paid by dog, cat, and other animal food operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Dog, cat, and other animal food industry in the OVRDC region generates $10,030,256 total direct tax revenue and $11,749,152 total tax revenue annually.

Table 42: Dog, Cat, and Other Animal Food Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$509,793	$1,444,830	$792,550	$3,771,614	$3,511,467	$10,030,256
Indirect Effect	($43,314)	($161,532)	($90,634)	($283,048)	$1,226,108	$647,581
Induced Effect	$42,049	$113,351	$61,804	$321,659	$532,454	$1,071,316
Total Effect	$508,528	$1,396,649	$763,720	$3,810,226	$5,270,029	$11,749,152

Source: Ohio University Calculations

In addition to the dog and cat food manufacturing industry which supports the highest number of employments in the dog, cat, and other animal food industry within the OVRDC region (138 jobs), grain farming, truck transportation, support activities for agriculture and forestry, other real estates, wholesale - other nondurable goods merchant wholesalers, employment services, wholesale - grocery and related product wholesalers, full-service restaurants, and limited-service restaurants are the most impacted industries in dog, cat, and other animal food supply chain operations (61-5 jobs). The top ten industries impacted by dog, cat, and other animal food operations are listed in Table 43.

Table 43. Top Ten Industries Impacted by Dog, Cat, and Other Animal Food Industry

Description	Employment	Labor Income	Value Added	Output
Dog and cat food manufacturing	138	$11,515,642	$44,623,034	$146,190,758
Grain farming	61.15	$471,853	$2,006,320	$5,550,626
Truck transportation	9.73	$440,606	$980,938	$2,773,194
Support activities for agriculture and forestry	8.32	$416,153	$925,018	$1,689,898
Other real estate	7.28	$330,068	$587,422	$1,245,258
Wholesale - Other nondurable goods merchant wholesalers	5.45	$304,188	$480,701	$1,153,965
Employment services	5.36	$241,396	$472,962	$1,007,590
Wholesale - Grocery and related product wholesalers	5.18	$224,525	$421,923	$980,732
Full-service restaurants	5.08	$195,207	$359,536	$919,603
Limited-service restaurants	4.92	$135,103	$359,127	$845,010

Source: Ohio University Calculations

The breakfast cereal, flour milling, and rice milling industry support 399 direct jobs as well as 4,464 jobs in other related industries within the supply chain. The total of 4,864 employment generates $2,469,026,847 in total economic activities in the OVRDC region. Table 44 shows the employment, labor income, value added, and output generated by breakfast cereal, flour milling, and rice milling industry.

Table 44: Breakfast Cereal, Flour Milling, and Rice Milling Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	399.00	$23,318,899	$170,784,580	$1,843,916,829
Indirect Effect	3,982.14	$116,893,289	$304,274,622	$557,448,028
Induced Effect	482.80	$19,478,760	$38,194,598	$67,661,990
Total Effect	4,863.94	$159,690,948	$513,253,800	$2,469,026,847
Multiplier	12.19*	6.85	3.01	1.34

Source: Ohio University Calculations

*Note: As mentioned above, the multiplier for this industry is inflated due to issues of double counting in IMPLAN. Conclusions from this value should be taken with a grain of salt.

Table 45 estimates taxes paid by breakfast cereal, flour milling, and rice milling operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Breakfast cereal, flour milling, and rice milling industry in the OVRDC region generates $37,032,703 total direct tax revenue and $89,411,776 total tax revenue annually.

Table 45: Breakfast Cereal, Flour Milling, and Rice Milling Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$2,103,087	$6,045,778	$3,321,860	$15,362,964	$10,199,015	$37,032,703
Indirect Effect	$1,378,057	$3,382,343	$1,828,587	$10,464,679	$26,467,032	$43,520,699
Induced Effect	$347,350	$936,125	$510,404	$2,657,282	$4,407,213	$8,858,374
Total Effect	$3,828,493	$10,364,245	$5,660,852	$28,484,925	$41,073,261	$89,411,776

Source: Ohio University Calculations

In addition to the breakfast cereal manufacturing, which supports the highest number of employments in the breakfast cereal, flour milling, and rice milling operations within the OVRDC region (1,622 jobs), wholesale groceries and related product wholesale, grain farming, truck transportation, management of companies and enterprises, other real estate, hospitals, full-service restaurants, employment services and paperboard container manufacturing (1,026-40 jobs). The top ten industries impacted by breakfast cereal, flour milling, and rice milling operations are listed in Table 46.

Table 46: Top Ten Industries Impacted by Breakfast Cereal, Flour Milling, and Rice Milling Industry

Description	Employment	Labor Income	Value Added	Output
Breakfast cereal manufacturing	1,622.43	$23,669,435	$172,748,106	$1,865,116,504
Wholesale – grocery and related product wholesale	1,026.01	$14,825,488	$146,365,937	$273,680,370
Grain farming	399.54	$7,296,941	$67,508,559	$93,312,298
Truck transportation	327.3	$6,584,886	$12,753,915	$25,543,001
Management of companies and enterprises	198.33	$2,859,112	$9,590,029	$19,565,685
Other real estate	122.98	$2,785,295	$8,280,614	$19,492,454
Hospitals	103.36	$2,656,574	$6,355,190	$12,352,287
Full-service restaurants	56.85	$2,405,863	$5,313,377	$11,610,179
Employment services	48.99	$1,894,959	$5,023,512	$10,511,876
Paperboard container manufacturing	40.36	$1,407,812	$4,728,927	$7,864,260

Source: Ohio University Calculations

Confectionery manufacturing from purchased chocolate, and nonchocolate confectionery industry support 27 direct jobs as well as 88 jobs in other related industries within the supply chain. The total of 116 employment generates $32,911,971 in total economic activities in the OVRDC region. Table 47 shows the employment, labor income, value added, and output generated by confectionery manufacturing from purchased chocolate, and nonchocolate confectionery industry.

Table 47: Confectionery Manufacturing from Purchased Chocolate, and Nonchocolate Confectionery Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	27.00	$4,183,245	$7,080,537	$19,178,346
Indirect Effect	46.39	$2,437,493	$3,808,355	$7,623,358
Induced Effect	38.53	$1,918,572	$3,520,075	$6,110,267
Total Effect	115.92	$8,539,310	$14,408,967	$32,911,971
Multiplier	4.29	2.04	2.04	1.72

Source: Ohio University Calculations

Table 48 estimates taxes paid by confectionery manufacturing from purchased chocolate, and nonchocolate confectionery operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Confectionery manufacturing from purchased chocolate, and nonchocolate confectionery industry in the OVRDC region generates $1,278,074 total direct tax revenue and $2,848,924 total tax revenue annually.

Table 48: Confectionery Manufacturing from Purchased Chocolate, and Nonchocolate Confectionery Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special District	County	State	Federal	Total
1 - Direct	$58,752	$87,786	$35,125	$223,855	$872,556	$1,278,074
2 - Indirect	$40,221	$73,934	$29,854	$168,918	$497,063	$809,990
3 - Induced	$39,454	$89,084	$36,262	$184,569	$411,490	$760,860
Total	$138,427	$250,804	$101,241	$577,342	$1,781,109	$2,848,924

Source: Ohio University Calculations

In addition to chocolate and confectionery manufacturing from cacao beans operations which supports the highest number of employments in the confectionery manufacturing from purchased chocolate, and nonchocolate confectionery operations within the OVRDC region (27 jobs), all other crop farming, wholesale groceries and related product wholesalers, full-service restaurants, management of companies and enterprises, hospitals, truck transportation, other real estates, employment services and limited-service restaurants are the most impacted industries in confectionery manufacturing from purchased chocolate, and nonchocolate confectionery operations (13-2 jobs). The top ten industries impacted by confectionery manufacturing from purchased chocolate, and nonchocolate confectionery operations are listed in Table 49.

Table 49: Top Ten Industries Impacted by Confectionery Manufacturing from Purchased Chocolate, and Nonchocolate Confectionery Industry

Description	Employment	Labor Income	Value Added	Output
Chocolate and confectionery manufacturing from cacao beans	27.49	$4,198,329	$7,085,052	$19,190,574
All other crop farming	13.33	$375,311	$531,232	$1,041,239
Wholesale - Grocery and related product wholesalers	5.28	$347,894	$459,551	$641,665
Full-service restaurants	2.6	$196,897	$401,313	$583,379
Management of companies and enterprises	2.59	$132,800	$381,626	$542,648
Hospitals	2.56	$125,881	$242,920	$468,998
Truck transportation	2.48	$119,550	$236,171	$456,735
Other real estate	2.2	$111,895	$230,755	$432,155
Employment services	2.09	$84,880	$205,711	$422,963
Limited-service restaurants	2.08	$80,503	$159,490	$401,259

Source: Ohio University Calculations

Frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations support 130 direct jobs as well as 120 jobs in other related industries within the supply chain. The total of 250 employment generates $60,989,208 in total economic activities in the OVRDC region. Table 50 shows the employment, labor income, value added, and output generated by

frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning industry.

Table 50: Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty Canning Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	130.00	$6,380,855	$10,355,253	$45,240,584
Indirect Effect	91.34	$2,804,070	$3,893,712	$11,609,471
Induced Effect	29.52	$1,192,363	$2,337,308	$4,139,152
Total Effect	250.86	$10,377,288	$16,586,273	$60,989,208
Multiplier	1.93	1.63	1.60	1.35

Source: Ohio University Calculations

Table 51 estimates taxes paid by frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations in the OVRDC region generates $2,051,132 total direct tax revenue and $2,198,437 total tax revenue annually.

Table 51: Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty Canning Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$53,406	$130,744	$70,531	$431,930	$1,364,520	$2,051,132
Indirect Effect	($67,026)	($213,056)	($117,962)	($478,610)	$481,006	($395,649)
Induced Effect	$21,313	$57,457	$31,328	$163,040	$269,817	$542,955
Total Effect	$7,694	($24,855)	($16,103)	$116,360	$2,115,342	$2,198,437

Source: Ohio University Calculations

While the direct employment supported by frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations through frozen specialties manufacturing supports 131 jobs, frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations help support other industries. The most impacted industries, by frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations after frozen specialties manufacturing within the OVRDC regions are support activities for agriculture and forestry, other real estates, wholesale - grocery and related product wholesalers, truck transportation, limited-service restaurants, full-service restaurants, management of companies and enterprises, and wholesale - wholesale electronic markets and agents and brokers (50-2 jobs). The top ten industries impacted by frozen specialty food, fruit and vegetable canning, frozen fruit, juice, and vegetable, and specialty canning operations are listed in Table 52.

Table 52: Top Ten Industries Impacted by Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty Canning Industry

Description	Employment	Labor Income	Value Added	Output
Frozen specialties manufacturing	131.3	$6,440,573	$10,458,628	$45,692,214
Grain farming	50.13	$386,812	$684,370	$4,550,250
Support activities for agriculture and forestry	6.84	$251,699	$496,444	$945,956
Other real estate	4.7	$150,294	$387,721	$747,873
Wholesale - Grocery and related product wholesalers	3.95	$149,293	$366,567	$745,557
Truck transportation	3.32	$142,911	$246,154	$630,214
Limited-service restaurants	2.25	$113,633	$200,644	$466,449
Full-service restaurants	2.23	$96,016	$180,874	$385,352
Management of companies and enterprises	2.06	$78,296	$174,034	$360,789
Wholesale - Wholesale electronic markets and agents and brokers	1.65	$77,681	$168,914	$317,940

Source: Ohio University Calculations

Ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations support 22 direct jobs as well as 36 jobs in other related industries within the supply chain. The total of 58 employment generates $16,947,956 in total economic activities in the OVRDC region. Table 53 shows the employment, labor income, value added, and output generated by ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk industry.

Table 53: Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, and Fluid Milk Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	22.00	$1,494,855	$2,434,068	$9,059,024
Indirect Effect	19.41	$1,347,557	$2,181,288	$5,250,163
Induced Effect	16.64	$828,588	$1,520,161	$2,638,769
Total Effect	58.06	$3,671,000	$6,135,517	$16,947,956
Multiplier	2.64	2.46	2.52	1.87

Source: Ohio University Calculations

Table 54 estimates taxes paid by ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations in the OVRDC region generates $523,634 total direct tax revenue and $1,311,410 total tax revenue annually.

Table 54: Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, and Fluid Milk Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$25,565	$50,780	$20,569	$112,633	$314,086	$523,634
Indirect Effect	$22,895	$43,460	$17,574	$97,701	$277,569	$459,199
Induced Effect	$17,038	$38,468	$15,659	$79,702	$177,710	$328,577
Total Effect	$65,498	$132,709	$53,802	$290,036	$769,365	$1,311,410

Source: Ohio University Calculations

While the direct employment supported by ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations through ice cream and frozen dessert manufacturing supports 22 jobs, ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations help support other industries. The most impacted industries, by ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations after ice cream and frozen dessert manufacturing within the OVRDC regions are wholesale - grocery and related product wholesalers, management of companies and enterprises, truck transportation, other real estates, hospitals, dairy cattle and milk production, full-service restaurants, employment services, and limited-service restaurants (2-1 jobs). The top ten industries impacted by ice cream and frozen dessert, dry, condensed, and evaporated dairy product, and fluid milk operations are listed in Table 55.

Table 55: Top Ten Industries Impacted by Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, and Fluid Milk Industry

Description	Employment	Labor Income	Value Added	Output
Ice cream and frozen dessert manufacturing	22.49	$1,533,957	$2,487,750	$9,258,819
Wholesale - Grocery and related product wholesalers	2.48	$260,527	$300,530	$487,686
Management of companies and enterprises	1.94	$175,785	$248,813	$480,522
Truck transportation	1.55	$85,054	$198,496	$344,893
Other real estate	1.18	$78,602	$130,825	$327,387
Hospitals	1.11	$57,348	$128,449	$268,825
Dairy cattle and milk production	1.05	$53,550	$116,256	$251,981
Full-service restaurants	1.04	$38,373	$102,020	$250,552
Employment services	0.87	$33,924	$99,654	$249,035
Limited-service restaurants	0.87	$33,765	$84,601	$225,767

Source: Ohio University Calculations

Animal (except poultry) slaughtering, and meat processed from carcasses operations support 50 direct jobs as well as 371 jobs in other related industries within the supply chain. The total of 421 employment generates $67,554,474 in total economic activities in the OVRDC region. Table 56 shows the

employment, labor income, value added, and output generated by animal (except poultry) slaughtering, and meat processed from carcasses industry.

Table 56: Animal (except Poultry) Slaughtering, and Meat Processed from Carcasses Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	50.00	$2,493,626	$3,770,438	$31,599,515
Indirect Effect	315.94	$6,984,744	$12,385,936	$27,095,541
Induced Effect	55.94	$2,784,744	$5,102,933	$8,859,418
Total Effect	421.88	$12,263,114	$21,259,307	$67,554,474
Multiplier	8.44*	4.92	5.64	2.14

Source: Ohio University Calculations

*Note: As mentioned above, the multiplier for this industry is inflated due to issues of double counting in IMPLAN. Conclusions from this value should be taken with a grain of salt.

Table 57 estimates taxes paid by animal (except poultry) slaughtering, and meat processed from carcasses operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Animal (except poultry) slaughtering, and meat processed from carcasses operations in the OVRDC region generates $1,134,499 total direct tax revenue and $4,646,452 total tax revenue annually.

Table 57: Animal (except Poultry) Slaughtering, and Meat Processed from Carcasses Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$60,797	$163,965	$67,067	$319,921	$522,750	$1,134,499
Indirect Effect	$128,741	$249,758	$101,128	$544,655	$1,384,971	$2,409,253
Induced Effect	$57,162	$128,881	$52,459	$267,192	$597,006	$1,102,699
Total Effect	$246,699	$542,604	$220,654	$1,131,767	$2,504,727	$4,646,452

Source: Ohio University Calculations

While the direct employment supported by animal (except poultry) slaughtering, and meat processed from carcasses operations through beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming supports 150 jobs, animal (except poultry) slaughtering, and meat processed from carcasses operations help support other industries. The most impacted industries, by animal (except poultry) slaughtering, and meat processed from carcasses operations after beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming within the OVRDC regions are animal production, except cattle and poultry and eggs, animal, except poultry, slaughtering, truck transportation, other real estates, support activities for agriculture and forestry, wholesale - other nondurable goods merchant wholesalers, full-service restaurants, employment services, and hospitals (89-4 jobs). The top ten industries impacted by animal (except poultry) slaughtering and meat processed from carcasses operations are listed in Table 58.

Table 58: Top Ten Industries Impacted by Animal (except Poultry) Slaughtering and Meat Processed from Carcasses Industry

Description	Employment	Labor Income	Value Added	Output
Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming	150.88	$2,477,295	$3,777,195	$31,656,147
Animal production, except cattle and poultry and eggs	89.39	$1,215,930	$3,124,047	$8,246,654
Animal, except poultry, slaughtering	50.09	$647,236	$2,328,895	$4,503,130
Truck transportation	23.96	$432,806	$1,987,030	$3,875,894
Other real estate	6.12	$316,220	$939,607	$1,671,559
Support activities for agriculture and forestry	5.9	$287,284	$669,086	$1,175,098
Wholesale - Other nondurable goods merchant wholesalers	5.22	$192,357	$440,343	$1,001,610
Full-service restaurants	3.88	$191,636	$427,964	$849,375
Employment services	3.83	$159,783	$364,775	$684,296
Hospitals	3.74	$126,282	$344,588	$608,537

Source: Ohio University Calculations

Cookie and cracker, retail bakeries, commercial bakeries support 201 direct jobs as well as 316 jobs in other related industries within the supply chain. The total of 517 employment generates $137,328,495 in total economic activities in the OVRDC region. Table 59 shows the employment, labor income, value added, and output generated by cookie and cracker, retail bakeries, commercial bakeries industry.

Table 59: Cookie and Cracker, Retail Bakeries, Commercial Bakeries Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	201.00	$11,987,360	$21,199,863	$72,776,212
Indirect Effect	174.17	$12,215,978	$18,376,983	$41,938,901
Induced Effect	142.62	$7,100,966	$13,027,213	$22,613,382
Total Effect	517.80	$31,304,304	$52,604,059	$137,328,495
Multiplier	2.58	2.61	2.48	1.89

Source: Ohio University Calculations

Table 60 estimates taxes paid by cookie and cracker, retail bakeries, commercial bakeries operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Cookie and cracker, retail bakeries, commercial bakeries operations in the OVRDC region generates $4,204,784 total direct tax revenue and $10,696,093 total tax revenue annually.

Table 60: Cookie and Cracker, Retail Bakeries, Commercial Bakeries Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$202,393	$383,724	$155,200	$866,629	$2,596,837	$4,204,784
Indirect Effect	$176,799	$267,842	$107,187	$674,778	$2,448,942	$3,675,549
Induced Effect	$146,008	$329,637	$134,179	$682,990	$1,522,946	$2,815,760
Total Effect	$525,200	$981,203	$396,567	$2,224,398	$6,568,725	$10,696,093

Source: Ohio University Calculations

While the direct employment supported by cookie and cracker, retail bakeries, commercial bakeries operations through cookie and cracker manufacturing supports 202 jobs, cookie and cracker, retail bakeries, commercial bakeries operations help support other industries. The most impacted industries, by cookie and cracker, retail bakeries, commercial bakeries operations after cookie and cracker manufacturing within the OVRDC regions are management of companies and enterprises, wholesale - grocery and related product wholesalers, truck transportation, other real estates, full-service restaurants, hospitals, employment services, limited-service restaurants, and grain farming (20-9 jobs). The top ten industries impacted by cookie and cracker, retail bakeries, commercial bakeries operations are listed in Table 61.

Table 61: Top Ten Industries Impacted by Cookie and Cracker, Retail Bakeries, Commercial Bakeries Industry

Description	Employment	Labor Income	Value Added	Output
Cookie and cracker manufacturing	202.39	$12,122,662	$21,346,896	$73,280,958
Management of companies and enterprises	19.73	$2,654,771	$3,062,405	$4,896,524
Wholesale - Grocery and related product wholesalers	18.71	$1,328,516	$1,880,438	$3,685,748
Truck transportation	12.55	$729,030	$1,701,263	$2,447,527
Other real estate	10.49	$636,975	$1,258,018	$2,159,679
Full-service restaurants	10.18	$559,029	$1,040,922	$2,030,420
Hospitals	9.49	$491,442	$874,447	$2,014,749
Employment services	8.57	$374,730	$813,527	$1,815,791
Limited-service restaurants	8.17	$334,442	$754,984	$1,788,823
Grain farming	8.09	$270,409	$671,638	$1,736,509

Source: Ohio University Calculations

Other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing industry support 70 direct jobs as well as 192 jobs in other related industries within the supply chain. The total of 262 employment generates $64,005,272 in total economic activities in the OVRDC region. Table 62 shows the employment, labor income, value added, and output generated by other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing industry.

Table 62: Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food Manufacturing Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	70.00	$4,035,732	$10,983,838	$37,216,595
Indirect Effect	137.62	$5,304,189	$8,203,580	$18,073,430
Induced Effect	54.97	$2,736,841	$5,020,682	$8,715,248
Total Effect	262.59	$12,076,762	$24,208,101	$64,005,272
Multiplier	3.75	2.99	2.20	1.72

Source: Ohio University Calculations

Table 63 estimates taxes paid by other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations in the OVRDC region generates $1,895,695 total direct tax revenue and $4,519,865 total tax revenue annually.

Table 63: Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food Manufacturing Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$95,976	$232,509	$94,948	$464,293	$1,007,969	$1,895,695
Indirect Effect	$72,677	$97,941	$38,956	$262,298	$1,067,116	$1,538,988
Induced Effect	$56,270	$127,032	$51,708	$263,210	$586,961	$1,085,182
Total Effect	$224,923	$457,483	$185,613	$989,800	$2,662,047	$4,519,865

Source: Ohio University Calculations

While the direct employment supported by other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations through other snack food manufacturing supports 202 jobs, other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations help support other industries. The most impacted industries, by other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations after other snack food manufacturing within the OVRDC regions are all other crop farming, wholesale - grocery and related product wholesalers, grain farming, management of companies and enterprises, other real estates, wholesale - other nondurable goods merchant wholesalers, full-service restaurants, hospitals, and wholesale - machinery, equipment, and supplies (62-4 jobs). The top ten industries impacted by other snack food, perishable prepared food, coffee and tea, and all other miscellaneous food manufacturing operations are listed in Table 64.

Table 64: Top Ten Industries Impacted by Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food Manufacturing Industry

Description	Employment	Labor Income	Value Added	Output
Other snack food manufacturing	70.02	$4,051,804	$10,987,680	$37,229,609
All other crop farming	62.05	$697,859	$966,129	$1,893,659
Wholesale - Grocery and related product wholesalers	9.61	$682,563	$805,013	$1,372,096
Grain farming	6.68	$355,268	$771,274	$1,287,147
Management of companies and enterprises	5.19	$301,609	$655,776	$1,008,369
Other real estate	4.95	$281,038	$580,392	$949,538
Wholesale - Other nondurable goods merchant wholesalers	4.28	$261,876	$466,081	$836,487
Full-service restaurants	3.68	$239,158	$355,819	$832,479
Hospitals	3.66	$189,395	$352,777	$763,350
Wholesale - Machinery, equipment, and supplies	3.57	$124,388	$337,096	$703,129

Source: Ohio University Calculations

Soft drink, wineries, and breweries support 658 direct jobs as well as 610 jobs in other related industries within the supply chain. The total of 1,298 employment in soft drink, wineries, and breweries generates $511,657,529 in total economic activities in the OVRDC region. Table 65 shows the employment, labor income, value added, and output generated by soft drink, wineries, and breweries industry.

Table 65: Soft Drink, Wineries, Breweries Industry Impacts

Impact Type	Employment	Labor Income	Total Value Added	Output
Direct Effect	658.00	$51,162,295	$94,139,910	$404,200,203
Indirect Effect	362.39	$22,309,366	$37,336,741	$72,683,512
Induced Effect	248.06	$10,013,522	$19,632,312	$34,773,814
Total Effect	1268.45	$83,485,183	$151,108,963	$511,657,529
Multiplier	1.93	1.63	1.61	1.27

Source: Ohio University Calculations

Table 66 estimates taxes paid by soft drink, wineries, and breweries operations, by type, at the sub county general, sub county special district, county, state, and federal levels. Soft drink, wineries, and breweries operations industry in the OVRDC region generates $22,575,537 total direct tax revenue and $36,138,318 total tax revenue annually.

Table 66: Soft Drink, Wineries, Breweries Industry Tax Revenue Impacts

Tax	Sub County General	Sub County Special Districts	County	State	Federal	Total
Direct Effect	$841,138	$2,264,995	$1,234,874	$6,490,018	$11,744,511	$22,575,537
Indirect Effect	$335,733	$889,555	$483,831	$2,594,475	$4,702,848	$9,006,442
Induced Effect	$178,743	$481,777	$262,683	$1,367,376	$2,265,760	$4,556,339
Total Effect	$1,355,614	$3,636,327	$1,981,388	$10,451,869	$18,713,120	$36,138,318

Source: Ohio University Calculations

While the direct employment supported by soft drink, wineries, and breweries operations through bottled and canned soft drinks and water supports 658 jobs, soft drink, wineries, and breweries operations help support other industries. The most impacted industries, by soft drink, wineries, and breweries operations after bottled and canned soft drinks and water within the OVRDC regions are retail - building material and garden equipment and supplies stores, wholesale - machinery, equipment, and supplies, truck transportation, limited-service restaurants, full-service restaurants, wholesale - grocery and related product wholesalers, other real estates, wholesale - other durable goods merchant wholesalers, and retail - general merchandise stores (41-17 jobs). The top ten industries impacted by soft drink, wineries, and breweries operations are listed in Table 67.

Table 67: Top Ten Industries Impacted by Soft Drink, Wineries, Breweries Industry

Description	Employment	Labor Income	Value Added	Output
Bottled and canned soft drinks & water	658.39	$37,310,623	$94,196,151	$404,441,678
Retail - Building material and garden equipment and supplies stores	41.28	$2,364,927	$4,623,613	$8,331,304
Wholesale - Machinery, equipment, and supplies	30.96	$1,481,211	$4,549,914	$6,289,023
Truck transportation	22.06	$1,300,182	$4,195,498	$5,326,000
Limited-service restaurants	20.89	$1,037,039	$3,078,136	$4,667,863
Full-service restaurants	20.67	$999,202	$2,244,788	$4,373,339
Wholesale - Grocery and related product wholesalers	20.41	$960,200	$1,907,864	$4,120,062
Other real estate	18.74	$807,190	$1,893,546	$3,863,233
Wholesale - Other durable goods merchant wholesalers	17.97	$602,644	$1,644,888	$3,823,958
Retail - General merchandise stores	16.79	$559,665	$1,477,467	$3,514,195

Source: Ohio University Calculations

Task 2.4: Identify Strategies for Growth/Expansion for these Firms

Using our previous analysis of I/O models and location quotients, we will use this section to make suggestions on which industries the OVRDC region should focus on for further investments. By focusing smart investments on certain industries, the region can help facilitate sustainable growth. We suggest such investments go towards clusters with large employment or output multipliers to ensure the largest dividends be paid on investment. Furthermore, investments towards declining industries with large employment location quotients should be prioritized.

Table 68 summarizes multiplier effects for each observed industry. Even though some multipliers for the food processing industry have potential for inflated multiplier effects, many others, such as pet food, confectionery, ice cream, cookie and cracker and other snack food manufacturing have large employment multiplier effects, each above 2.5. If local governments in the OVRDC region wish to expand the job market, investments in the food processing industry would pay dividends for other industries in the region. Furthermore, Hardwood Manufacturing has the highest output multiplier effect at 2.09. Investments in this industry would have the largest effect on the OVRDC region's aggregate economic activity.

Table 68: Targeted Industry Clusters Impact Summary

Cluster/Industry	Employment	Labor Income	Value Added	Output
Advanced Manufacturing	1.46	1.41	1.67	1.36
Aerospace & Aviation	1.67	1.52	1.28	1.12
Automotive	2.24	1.63	1.67	1.21
Biohealth	1.34	1.27	1.42	1.48
Energy	3.64	2.24	1.56	1.51
Financial Services	2.53	1.78	1.11	1.17
Food Processing	8.76*	2.20	1.91	1.38
Hardwood Products Manufacturing	2.70	2.59	3.16	2.09
Information Technology and Services	1.67	1.78	1.73	1.51
Logistics	1.47	1.40	1.66	1.59
Polymers & Chemicals	2.44	1.98	1.68	1.35
Food Processing Sub-Clusters				
Dog, Cat & Other Pet Foods	2.57	1.78	1.32	1.22
Breakfast Cereal, Rice Milling and Flour Milling	12.19*	6.85	3.01	1.34
Confectionary Manufacturing Purchased from Chocolate, and Non-chocolate Confectionary	3.74	2.04	2.04	1.72
Frozen Specialty Food, Fruit and Vegetable Canning, Frozen Fruit, Juice, and Vegetable, and Specialty	1.93	1.63	1.60	1.35
Ice Cream and Frozen Dessert, Dry, Condensed, and Evaporated Dairy Product, and Fluid Milk	2.64	2.46	2.52	1.87
Animal (except Poultry) Slaughtering, and Meat Processed from Carcasses	8.44*	4.92	5.64	2.14
Cookie and Cracker, Retail Bakeries, Commercial Bakeries	2.58	2.61	2.48	1.89
Other Snack Food, Perishable Prepared Food, Coffee and Tea, and All Other Miscellaneous Food	3.75	2.99	2.20	1.72
Soft Drinks, Wineries and Breweries	1.93	1.63	1.61	1.27

*Note: As mentioned above, the multiplier for this industry is inflated due to issues of double counting in IMPLAN. Conclusions from this value should be taken with a grain of salt.

Recommendations for the OVRDC Region

- Food Processing industries have large employment multipliers. To expand the job market in the area, investments should be made in this industry to have the largest aggregate effect within its supply chain.
- Similarly, hardwood manufacturing showcases the largest output multiplier. Investments in this industry cluster would have the largest impact on economic activity for the region.
- Advanced Manufacturing is the strongest existing cluster compared to national averages.
- The Polymers and Chemicals cluster is the fastest growing in the region and has the potential to continue growing with further support.
- Logistics employs a large portion of the region but has declined over the past five years. Investments to reverse this downward growth would be beneficial.
- Investing in targeted industries not only creates jobs, opportunities for sustainable growth and security within each cluster, but it will also support their supply chain through indirect economic impacts.

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