



Genesee/Finger Lakes Region Supply Chain Analysis



Genesee/Finger Lakes
Regional Planning Council

Prepared for the Genesee/Finger
Lakes Regional Planning Council by:

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Executive Summary

This report explores supply chains in the Genesee/Finger Lakes (G/FL) Region in order to identify opportunities and potential vulnerabilities that could impact the regional economy in the future. Throughout this study, the terms “import” and “export” refer to purchases from and sales to locations outside of the region. Specifically, there are four areas of study within this report:

- 1) Supply Chain Overview – a general look at supply chains in the region. This section examines the level of demand met in-region versus imported for all industries, and then the level of sales made in-region versus exported.
- 2) Supply Chain Attraction Opportunities – an analysis of industries that would be beneficial to attract, start, or grow within the region due to unmet demand and/or an abundance of supply available to support the industries.
- 3) Opportunities to Localize Supply Chains – an analysis reconciling the Region’s top import-dependent industries with the Region’s export-led industries that are positioned to potentially serve regional demand in a more substantial way. This provides insight to the kinds of products that may be able to be produced locally within the region rather than being imported.
- 4) Supply Chain Vulnerabilities – an analysis of the highest exporting and importing industries, key supply chain drivers for those industries, and how disruptions in those supply chains may impact other local supplier/customer industries.

Furthermore, the last section of this report offers a listing of resources that could help with supply chain related issues and opportunities.

The analysis to follow is simply a starting point for understanding regional supply chains. The data and information presented here should ideally be supplemented by in region interviews and local knowledge of industries and products. That being said, the following sections can help to better understand existing supply chains, where there may be opportunities to connect businesses within the region, and help to anticipate, plan for, and recover from key supply chain disruptions.

Supply Chain Overview

This section provides a broad overview of supply chains that characterize the Genesee/Finger Lakes Region (G/FL region) economy by analyzing the purchases various industries make from within and outside the region.

Overall G/FL Demand and Sales

The two tables on the pages that follow summarize the region's demand by sector (2-digit NAICS level) and sales by sector. The tables display the volume of these transactions in 2020 dollars, and the percent of these transactions that take place within the region ("demand met in-region" and "in-region sales") versus outside the region ("demand met by imports" and "exported sales.") This data can help identify the strengths and weaknesses of the region's supply chain: More in-region purchases indicate a stronger supply chain, while a larger share of imports indicates a weaker supply chain, due to the lack of supply available locally or lack of supply chain alignment within the region.

Findings of note from this data include the following:

- 89% of the region's demand for the Mining, Quarrying, and oil and Gas Extraction products and services is met by businesses outside of the region. Similarly, regional businesses in this industry are selling 73% of their goods to buyers outside the region. However, this is not a substantial employing sector in the region, accounting for less than 1% of total employment, and imports far exceed exports. The sector is projected to grow in employment over the next 10 years, but will still be a minor part of the overall economy.
- 77% of the region's demand for Manufacturing sector products is met by manufacturers outside the region. Moreover, regional manufacturers are selling 84% of their goods to buyers outside the region.
- 66% of the region's demand for Agriculture, Forestry, Fishing and Hunting sector services is met by businesses outside the region. Meanwhile, regional businesses in this sector are selling 72% of their services to buyers outside the region.
- 61% of the region's demand for Information services is met by providers outside the region. Meanwhile, regional Information businesses are selling only 39% of their services to buyers outside the region.

GFL Region Demand by Sector (2020)

NAICS & Description (of goods and services demanded by GFL businesses and consumers)		Demand Met In-Region	% Demand Met In- Region	Demand Met by Imports	% Demand Met by Imports	Total Demand
21	Mining, Quarrying, and Oil and Gas Extraction	\$83,424,214	11%	\$698,445,092	89%	\$781,869,306
31	Manufacturing	\$4,222,239,684	23%	\$14,415,478,972	77%	\$18,637,718,657
90	Government	\$11,941,826,446	32%	\$25,014,498,842	68%	\$36,956,325,288
11	Agriculture, Forestry, Fishing and Hunting	\$407,974,284	34%	\$801,385,863	66%	\$1,209,360,147
51	Information	\$2,380,494,068	39%	\$3,754,215,609	61%	\$6,134,709,678
48	Transportation and Warehousing	\$1,629,762,900	41%	\$2,371,490,406	59%	\$4,001,253,306
42	Wholesale Trade	\$2,897,571,057	43%	\$3,817,755,376	57%	\$6,715,326,432
44	Retail Trade	\$3,244,430,017	47%	\$3,589,067,423	53%	\$6,833,497,440
71	Arts, Entertainment, and Recreation	\$575,564,649	56%	\$455,739,942	44%	\$1,031,304,592
22	Utilities	\$1,020,413,503	56%	\$794,423,365	44%	\$1,814,836,868
52	Finance and Insurance	\$6,715,307,348	61%	\$4,260,049,710	39%	\$10,975,357,058
54	Professional, Scientific, and Technical Services	\$4,936,475,803	66%	\$2,498,386,638	34%	\$7,434,862,441
81	Other Services (except Public Administration)	\$1,721,302,558	70%	\$731,516,788	30%	\$2,452,819,346
23	Construction	\$4,308,020,546	70%	\$1,809,849,662	30%	\$6,117,870,208
55	Management of Companies and Enterprises	\$1,825,626,836	71%	\$763,561,992	29%	\$2,589,188,828
53	Real Estate and Rental and Leasing	\$3,839,650,023	71%	\$1,586,554,681	29%	\$5,426,204,704
56	Admin., Support, Waste Management, and Remediation Services	\$2,519,353,524	71%	\$1,012,169,024	29%	\$3,531,522,547
62	Health Care and Social Assistance	\$7,072,448,318	77%	\$2,116,676,587	23%	\$9,189,124,905
72	Accommodation and Food Services	\$2,447,642,957	78%	\$696,997,996	22%	\$3,144,640,953
61	Educational Services	\$1,090,742,320	83%	\$226,746,640	17%	\$1,317,488,960
Totals		\$64,880,271,056	48%	\$71,415,010,607	52%	\$136,295,281,662

Source: Emsi. Note: For NAICS 90 (Government), "demand met by imports" primarily concerns federal and state services, state-run higher education, and inter-governmental transfers.

GFL Region Sales by Sector (2020)

NAICS & Description		In-Region Sales	% In-Region Sales	Exported Sales*	% Exported Sales	Total Sales
31	Manufacturing	\$4,275,862,281	16%	\$22,142,479,286	84%	\$26,418,341,567
61	Educational Services	\$1,090,742,320	22%	\$3,780,991,838	78%	\$4,871,734,157
21	Mining, Quarrying, and Oil and Gas Extraction	\$83,424,214	27%	\$230,416,620	73%	\$313,840,835
11	Agriculture, Forestry, Fishing and Hunting	\$764,576,226	28%	\$1,959,765,283	72%	\$2,724,341,509
90	Government	\$9,176,821,545	29%	\$22,684,480,920	71%	\$31,861,302,465
42	Wholesale Trade	\$2,897,571,057	43%	\$3,913,442,706	57%	\$6,811,013,763
44	Retail Trade	\$3,244,430,017	44%	\$4,119,638,030	56%	\$7,364,068,047
22	Utilities	\$1,020,413,503	47%	\$1,163,991,167	53%	\$2,184,404,669
51	Information	\$2,380,504,208	61%	\$1,526,293,935	39%	\$3,906,798,143
62	Health Care and Social Assistance	\$7,072,448,318	63%	\$4,077,520,290	37%	\$11,149,968,608
52	Finance and Insurance	\$6,726,183,201	72%	\$2,634,319,228	28%	\$9,360,502,429
55	Management of Companies and Enterprises	\$1,825,626,836	74%	\$630,513,399	26%	\$2,456,140,235
56	Admin., Support, Waste Management, and Remediation Services	\$2,519,353,524	75%	\$836,576,273	25%	\$3,355,929,796
48	Transportation and Warehousing	\$1,677,733,484	75%	\$546,051,981	25%	\$2,223,785,465
71	Arts, Entertainment, and Recreation	\$575,564,649	76%	\$182,523,034	24%	\$758,087,683
54	Professional, Scientific, and Technical Services	\$4,936,475,803	78%	\$1,427,452,011	22%	\$6,363,927,815
53	Real Estate and Rental and Leasing	\$4,888,291,252	84%	\$911,191,971	16%	\$5,799,483,223
23	Construction	\$4,308,020,546	85%	\$785,654,208	15%	\$5,093,674,754
72	Accommodation and Food Services	\$2,447,642,957	86%	\$382,406,751	14%	\$2,830,049,707
81	Other Services (except Public Administration)	\$1,721,302,558	87%	\$259,869,713	13%	\$1,981,172,271
Totals		\$63,632,988,499	46%	\$74,195,578,643	54%	\$137,828,567,142

Source: Emsi. *Here, "exported" refers to sales being made to purchasers located outside the region.

Note: For NAICS 90 (Government), the vast bulk of "exported sales" are made by "state government excluding education and hospitals," state agency offices within the region, etc.

Supply Chain Attraction Opportunities

This section explores the region's supply chains in more depth. First it identifies industries with products being imported and exported in high volume. These industries could, in theory, be good attraction targets given the existing customer and supplier bases within the region. Then, the analysis looks at the top industries to identify which ones may be the best attraction targets based on the local context, such as existing support, infrastructure, and policies that would impact the ability of those industries to succeed in the region.

Demand-Based Supply Chain Opportunities

Goods and Services Representing Large Imports into the Genesee/Finger Lakes Region

The table on the following page shows industries representing high dollar values of goods and services being imported into the G/FL Region from beyond its borders. For purposes of this analysis, we have excluded:

- Public-sector industries (federal government, local government, and public education and hospitals), as they do not generally represent potential business attraction targets;
- Industries where demand can be assumed to be consumer-based rather than business-to-business (B2B) (e.g. physicians' offices, restaurants);
- Wholesalers, which we are considering to be supply chain intermediaries;
- Other industries for which B2B proximity is a minimal factor in supply chain efficiency (e.g. banking, insurance, data processing, and telecommunications services); and
- Service industries that can be assumed to be provided on a regional basis (e.g. construction contractors).

Given these exceptions, the ten industries with the highest "demand met by imports" are listed in the next table, all representing at least \$350 million annually in imports to the region. Subject to further analysis, they may represent potential candidates for business attraction to the region.

Goods and Services of Interest Representing Large Imports Into the GFL Region (2020)

NAICS & Description		Demand Met by Imports*	% Demand Met by	2021 Jobs	2021 Location Quotient	2020 Payrolled Business
3241	Petroleum and Coal Products Manufacturing	\$1,381,568,928	97%	84	0.21	8
3361	Motor Vehicle Manufacturing	\$1,103,368,112	99%	<10	0.01	1
3251	Basic Chemical Manufacturing	\$755,464,595	79%	412	0.75	13
3116	Animal Slaughtering and Processing	\$680,659,436	92%	247	0.13	10
3254	Pharmaceutical and Medicine Manufacturing	\$607,869,050	82%	549	0.46	6
4841	General Freight Trucking	\$538,628,451	56%	2,263	0.50	184
3261	Plastics Product Manufacturing	\$461,293,134	65%	4,949	2.46	57
1120	Animal Production	\$447,435,485	64%	4,568	2.81	201
3112	Grain and Oilseed Milling	\$392,184,678	93%	131	0.57	6
3115	Dairy Product Manufacturing	\$367,824,613	58%	1,378	2.40	13

Source: Emsi. *Here, imports refers to goods and services being purchased from outside the region.

Supply-Based Supply Chain Opportunities

Uncovering potential supply-based supply chain opportunities required us to perform a two-step analysis that first identifies the industries exporting significant amounts of products beyond the G/FL Region's borders, and then determines what types of industries are likely purchasers of such products.

Industries with High Volume of Sales to Outside the County

The following table shows G/FL Region industries, again filtered for relevance to B2B supply chain attraction, that made the highest volume of sales to industries and consumers outside the region in 2020.

GFL Region Industries of Interest with Highest Sales to Outside the Region (2020)						
NAICS & Description		Exported Sales	Exported Sales as % of All Sales	2021 Jobs	2021 Location Quotient	2020 Payrolled Business Locations
3342	Communications Equipment Manufacturing	\$2,344,874,989	96%	4,382	13.77	13
3261	Plastics Product Manufacturing	\$1,801,844,245	88%	4,949	2.46	57
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	\$1,405,046,925	92%	3,874	2.62	49
3115	Dairy Product Manufacturing	\$1,144,550,292	81%	1,378	2.40	13
1120	Animal Production	\$1,140,179,557	77%	4,568	2.81	201
3259	Other Chemical Product and Preparation Manufacturing	\$1,129,685,179	97%	1,487	6.15	15
3121	Beverage Manufacturing	\$1,048,713,793	77%	2,496	2.56	115
3339	Other General Purpose Machinery Manufacturing	\$1,040,994,218	92%	2,621	2.72	41
3333	Commercial and Service Industry Machinery Manufacturing	\$1,028,703,159	95%	3,371	11.78	59
3251	Basic Chemical Manufacturing	\$871,223,838	81%	412	0.75	13

Source: Emsi.

Industries Purchasing G/FL Region Exports of Interest

Taking the above ten industries above representing large volumes of exports out of the Region, we researched what types of industries are typical *buyers* of their products.¹ These are listed below. Subject to further analysis, these may also represent potential candidates for business attraction to the G/FL Region, as such industries are likely buying G/FL Region goods and services as inputs into their own operations.

National Industries that Purchase Goods and Services Produced by Industries Exporting the Most from the GFL Region

NAICS & Description	
3116	Animal Slaughtering and Processing
3115	Dairy Product Manufacturing
1120	Animal Production
3251	Basic Chemical Manufacturing
3261	Plastics Product Manufacturing
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments Manufacturing
3121	Beverage Manufacturing
3361	Motor Vehicle Manufacturing
3119	Other Food Manufacturing
3363	Motor Vehicle Parts Manufacturing

Source: Emsi, MRB Group. Industries are listed by dollar value of domestic sales made to those industries by the industries identified as significant G/FL exporters. We have excluded public sector industries and petroleum refineries from this list as non-viable industry attraction targets.

¹Data is not available for the specific industries that G/FL Region industry operators are selling/exporting to outside the Region, so we conducted this analysis on the basis of national industry patterns.

Preliminary Recommendations for Further Study

On the basis of the preceding research, we compiled a preliminary list of business attraction targets at the 4-digit NAICS level by combining the industries listed in the tables titled “Industries with High Volume of Sales to Outside the Region” and “National Industries that Purchase Goods and Services Produced by Industries Exporting the Most from the G/FL Region.”

We presented them below alongside data about their existing jobs and establishments in Genesee/Finger Lakes Region, as a measure of existing local and regional capacity, as well as Location Quotient (a measure of local industry concentration). Taking these factors into consideration, we have highlighted the industries that could potentially be filled through business attraction efforts.

Recommended Industries for Further Study						
Rationale			2021 Jobs	2021 Location Quotient	2020 Payrolled Business Locations	Average Earnings Per Job
Both Demand- and Supply-Based Supply Chain Opportunities	1120	Animal Production	4,568	1.57	316	\$44,645
	3115	Dairy Product Manufacturing	1,378	2.40	13	\$44,676
	3116	Animal Slaughtering and Processing	247	0.13	10	\$44,677
	3251	Basic Chemical Manufacturing	412	0.75	13	\$44,701
	3261	Plastics Product Manufacturing	4,949	2.46	57	\$44,708
	3361	Motor Vehicle Manufacturing	<10	0.01	1	\$44,746
Demand-Based Supply Chain Opportunities	3112	Grain and Oilseed Milling	131	0.57	6	\$44,673
	3241	Petroleum and Coal Products Manufacturing	84	0.21	8	\$44,700
	3254	Pharmaceutical and Medicine Manufacturing	549	0.46	6	\$44,704
	4841	General Freight Trucking	2,263	0.50	184	\$44,809
Supply-Based Supply Chain Opportunities	3119	Other Food Manufacturing	1,212	1.42	21	\$44,680
	3121	Beverage Manufacturing	2,496	2.56	115	\$44,681
	3252	Resin, Synthetic Rubber, and Artificial and Synthe	215	0.59	1	\$44,702
	3363	Motor Vehicle Parts Manufacturing	1,497	0.78	14	\$44,748

Source: Emsi, MRB Group.

Opportunities to Localize Supply Chains

This section focuses on what products and industries already exist in the Genesee/Finger Lakes Region, and which of those may be able to support local supply chains to a greater extent. In short, the analysis looks to identify industries where regional demand is met by high volumes of imports but that also have high volumes of exports. From there, we analyze the regional impacts of local recapturing and supplying some of those imports within the region.

Industries with High Potential for Localizing

A multi-step process was used to identify industries with high levels of both imported purchases and exported sales. First, the industries from which G/FL regional businesses and consumers were purchasing imported products were identified. The industries with the highest volume of imported products were isolated, and then an analysis gathered data about each target industry's presence in the region and exported sales. From there, industries meeting the following criteria were excluded:

1. Government, retail, wholesalers, power generation, and industries not impacted by location (e.g. insurance, software, telecommunications, etc.) for reasons largely consistent with those in the Demand-based attraction section above.
2. Industries where imports exceeded exports, assuming that these industries would have less capacity to redirect products from exports to in-region sales and thus would not be able to meet a substantial portion of the demand within the region.
3. Industries that have less than 50% of products imported, or that have low regional demand overall. Since it is expected that there will be some need for imports given the diversity of products in each industry, it is likely that these industries would provide lesser opportunity for recapture of purchases.
4. Similarly, industries that export less than 50% of sales as it is expected that there is some level on exporting expected.
5. Industries with 0 or 1 business locations within the region.

Given these exclusions, the table on the following page shows the industries with the highest potential for regional businesses to recapture imported purchases based on the data. However, it should be noted that this data ideally should be further vetted through interviews with regional economic development and business services partners, as well as regional businesses.

Industries GFL is Importing From (2020)

NAICS & Description		Imported Purchases	Imported Purchases as % of all Purchases	Regional Industry Information		
				2021 Jobs	Payrolled Business Locations	Exported Sales
112000	Animal Production	\$406,157,148	62.8%	4556	201	\$1,125,920,733
111000	Crop Production	\$192,431,795	70.8%	4461	320	\$789,081,365
325199	All Other Basic Organic Chemical Manufacturing	\$164,744,407	51.1%	297	8	\$738,263,434
311119	Other Animal Food Manufacturing	\$153,150,706	71.5%	375	15	\$358,071,099
322211	Corrugated and Solid Fiber Box Manufacturing	\$149,055,223	75.2%	454	10	\$167,452,253
332710	Machine Shops	\$108,447,794	61.3%	2520	137	\$290,664,923
311513	Cheese Manufacturing	\$108,348,700	50.1%	425	3	\$331,393,216
311612	Meat Processed from Carcasses	\$85,230,677	78.8%	239	6	\$102,800,522
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	\$58,376,436	62.7%	1006	11	\$310,755,879
311511	Fluid Milk Manufacturing	\$56,097,082	72.4%	462	7	\$254,040,423
311211	Flour Milling	\$52,651,736	77.1%	96	3	\$105,161,896

Source: Emsi.

Impact of Localizing Supply Chains

Now knowing the industries that have the highest potential to convert imported purchases to in-region purchases, and thus localize supply chains, the following analysis looks at the impacts that could occur if this is in part done through increased production. Since it is unlikely that all, or even most, imports can be sourced locally for a variety of reasons, the analysis assumes the following:

- 1) 25% of imported purchases can be recaptured/localized; and
- 2) 25% of those recaptured purchases can be met by increased production, and thus are overall new sales to regional businesses.

The table below shows the new job creation and earnings that would be created, both directly and indirectly, given the above assumptions. Localizing supply chains partially through increased production would have the greatest impact in terms of jobs and earnings in the Animal Production industry, followed by Crop Production and Machine Shops.

Value and Impact of Recapturing a Portion of Imported Purchases (2020)					
NAICS & Description		25% Recapture of Imports	Assume 25% Met by Increased Production	New Jobs	New Earnings
112000	Animal Production	\$101,539,287	\$25,384,822	170	\$9,027,707
111000	Crop Production	\$48,107,949	\$12,026,987	102	\$4,563,757
325199	All Other Basic Organic Chemical Manufacturing	\$41,186,102	\$10,296,525	24	\$1,554,200
311119	Other Animal Food Manufacturing	\$38,287,676	\$9,571,919	25	\$1,497,927
322211	Corrugated and Solid Fiber Box Manufacturing	\$37,263,806	\$9,315,951	44	\$2,903,176
332710	Machine Shops	\$27,111,948	\$6,777,987	77	\$4,764,649
311513	Cheese Manufacturing	\$27,087,175	\$6,771,794	24	\$1,472,313
311612	Meat Processed from Carcasses	\$21,307,669	\$5,326,917	21	\$1,260,719
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	\$14,594,109	\$3,648,527	20	\$1,242,568
311511	Fluid Milk Manufacturing	\$14,024,270	\$3,506,068	14	\$957,834

Source: Emsi, MRB Group.

Supply Chain Vulnerabilities

This section is intended to provide some general ideas of vulnerabilities and risks to regional supply chains. The section includes information about external drivers impacting major regional industries, top importing and exporting industries, key external drivers for top importing and exporting industries, and how disruptions in those supply chains could further impact other businesses in the region. Unclassified and Government industries were excluded from this analysis.

Top Employing, Importing and Exporting Industries

The tables below show the top employing industries in the region, as well as industries that import and export the most based on value of purchases from and sales to, respectively, areas outside of the region. The tables also provide information about the industries' presence in the region. When identifying top importing industries, only Manufacturing sector industries were considered as Manufacturing had the highest overall level of importing among all industries (\$7,629,082,077). The next highest level of importing was in the Government sector (\$7,621,362,622), but most of this activity is with other government entities. There was a large gap between Government and the next largest importing industry, Health Care and Social Assistance (\$1,627,619,145). As such, it was assumed that the largest non-government importing industries would likely be within the manufacturing sector.

GFL Region Largest Employing Industries (2021)

NAICS & Description		2021 Jobs	2021 Location Quotient	2020 Payrolled Business Locations	Average Earnings Per Job
6221	General Medical and Surgical Hospitals	32,495	1.9	14	\$76,183
6113	Colleges, Universities, and Professional Schools	28,680	4.1	20	\$76,344
7225	Restaurants and Other Eating Places	26,598	0.9	1980	\$23,669
4451	Grocery Stores	13,761	1.4	374	\$32,216
6241	Individual and Family Services	11,454	1.1	371	\$36,713
5613	Employment Services	10,630	0.9	634	\$41,734
5511	Management of Companies and Enterprises	9,396	1.2	203	\$120,246
2382	Building Equipment Contractors	8,605	1.0	587	\$86,107
6231	Nursing Care Facilities (Skilled Nursing Facilities)	8,532	1.6	62	\$48,913
5617	Services to Buildings and Dwellings	7,680	0.7	978	\$37,160
Totals		157,830		5,222	\$58,136

Source: Emsi.

GFL Region Largest Importing Industries by Value (2020)

	NAICS & Description	Imported Purchases*	% Imported Purchases	Total Purchases	2021 Jobs	2021 Location Quotient	2020 Payrolled Business Locations	Average Earnings Per Job
3261	Plastics Product Manufacturing	\$697,669,931	60%	\$1,171,048,731	4,975	2.5	57	\$73,638
3115	Dairy Product Manufacturing	\$652,182,675	61%	\$1,076,603,050	1,356	2.4	13	\$74,943
3251	Basic Chemical Manufacturing	\$466,068,099	74%	\$629,646,240	391	0.8	13	\$107,390
3339	Other General Purpose Machinery Manufacturing	\$392,060,735	72%	\$542,174,390	2,573	2.7	41	\$105,292
3114	Fruit and Vegetable Preserving and Specialty Food Manufacturing	\$380,455,365	64%	\$594,355,955	2,159	3.5	26	\$73,733
3259	Other Chemical Product and Preparation Manufacturing	\$333,545,431	57%	\$590,300,968	1,469	6.2	15	\$107,681
3111	Animal Food Manufacturing	\$241,130,198	77%	\$312,444,130	376	1.5	15	\$69,845
3327	Machine Shops; Turned Product; and Screw, Nut, and Bol	\$229,249,089	55%	\$417,907,848	3,711	3.1	172	\$66,924
3119	Other Food Manufacturing	\$220,875,428	71%	\$313,220,890	1,232	1.4	21	\$72,764
3333	Commercial and Service Industry Machinery Manufacturir	\$198,831,529	39%	\$507,376,446	3,356	11.8	59	\$112,995
	Totals	\$3,812,068,480	62%	\$6,155,078,648	21,598		432	\$85,273

Source: Emsi. *Here, "imported" refers to purchases being made from outside the region.

GFL Region Largest Exporting Industries by Value (2020)

	NAICS & Description	Exported Sales*	% Exported Sales	Total Sales	2021 Jobs	2021 Location Quotient	2020 Payrolled Business Locations	Average Earnings Per Job
6113	Colleges, Universities, and Professional Schools	\$3,655,833,323	83%	\$4,390,174,449	28,680	4.1	20	\$76,344
6221	General Medical and Surgical Hospitals	\$2,747,181,799	47%	\$5,866,275,066	32,495	1.9	14	\$76,183
3342	Communications Equipment Manufacturing	\$2,344,874,989	96%	\$2,431,237,835	4,520	13.8	13	\$128,532
3261	Plastics Product Manufacturing	\$1,801,844,245	88%	\$2,047,628,204	4,975	2.5	57	\$73,638
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	\$1,405,046,925	92%	\$1,520,092,314	3,919	2.6	49	\$104,720
5173	Wired and Wireless Telecommunications Carriers	\$1,326,987,770	50%	\$2,642,606,609	2,903	1.4	110	\$101,725
5241	Insurance Carriers	\$1,174,052,191	47%	\$2,506,791,362	4,877	0.9	69	\$93,324
2211	Electric Power Generation, Transmission and Distribution	\$1,147,452,033	55%	\$2,072,662,984	1,579	1.1	44	\$171,622
3115	Dairy Product Manufacturing	\$1,144,550,292	81%	\$1,411,021,806	1,356	2.4	13	\$74,943
1120	Animal Production	\$1,140,179,557	77%	\$1,485,568,725	4,556	2.8	201	\$54,469
	Totals	\$17,888,003,124	68%	\$26,374,059,354	89,859		590	\$82,284

Source: Emsi. *Here, "exported" refers to sales being made to purchasers located outside the region.

It is worth noting that all except one of the top importing industries and two of the top exporting industries have significant Location Quotients, indicating that the region has an inherent competitive advantage for these global industries.

Key External Drivers to Top Industries

Every industry is affected by numerous and varying market and economic factors. IBISWorld reports on supply chains identify key external drivers for each industry. Awareness of and attention to external drivers impacting key regional industries could help the region to anticipate and withstand future disruptions to those industries and their supply chains. Looking at reports for the G/FL region's top employing industries, there are a few external drivers that impact multiple industries. However, it is worth noting that the same driver might impact different industries in different, and sometimes opposite, ways. For example, the national unemployment rate might decrease demand for some goods and services (such as carpet cleaning), but increase demand for others (such as human and family services).

Some general external factors that affect many industries include:

1. Demand from key customer bases
2. Per capita consumption of the product (particularly for animal and food production)
3. Price of inputs (particularly for manufacturing)
4. Price of the product being sold
5. Price of competing, substitutable products (e.g. price of sugar is an external factor for bee keeping)
6. Governmental regulation of the industry or relevant factors to the industry

Top Employing Industries

In addition to these general factors, the table below shows five external factors that impact three or more of the top employing industries in the G/FL region.

External Drivers for Top Employing Industries	
External Driver	Impacted Industries
Per capita disposable income	General Medical and Surgical Hospitals
	Grocery Stores
	Individual and Family Services
	Building Equipment Contractors
	Nursing Care Facilities (Skilled Nursing Facilities)
	Services to Buildings and Dwellings
	Colleges, Universities, and Professional Schools
National unemployment rate	Grocery Stores
	Individual and Family Services
	Services to Buildings and Dwellings
	General Medical and Surgical Hospitals
Number of people with private health insurance	Individual and Family Services
	Nursing Care Facilities (Skilled Nursing Facilities)
	General Medical and Surgical Hospitals
Number of adults aged 65 and older	Individual and Family Services
	Nursing Care Facilities (Skilled Nursing Facilities)
	General Medical and Surgical Hospitals
Federal funding for Medicare and Medicaid	Individual and Family Services
	Nursing Care Facilities (Skilled Nursing Facilities)
	Individual and Family Services (adoption & childwelfare services)

Source: IBISWorld

Importing Industries

In addition to the general factors, the table below shows four external factors that impact four or more of the top importing industries in the G/FL region. Furthermore, all ten importing industries are impacted by the trade weighted index, a measure of the strength of the US dollar in comparison to the currencies of major trading partners.

External Drivers for Top Importing Industries	
External Driver	Impacted Industries
Industrial production index	Plastics Product Manufacturing
	Basic Chemical Manufacturing
	Other General Purpose Machinery Manufacturing
	Other Chemical Product and Preparation Manufacturing
	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
Value of construction	Plastics Product Manufacturing
	Basic Chemical Manufacturing
	Other General Purpose Machinery Manufacturing
	Other Chemical Product and Preparation Manufacturing
	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing
Per Capita Disposable Income	Plastics Product Manufacturing
	Fruit and Vegetable Preserving and Specialty Food Manufacturing
	Other Chemical Product and Preparation Manufacturing
	Animal Food Manufacturing
	Other Food Manufacturing
Consumer Spending	Plastics Product Manufacturing
	Dairy Product Manufacturing
	Basic Chemical Manufacturing
	Other Food Manufacturing

Source: IBISWorld

Exporting Industries

In addition to the general factors noted in the earlier section about top employing industries, many exporting industries are impacted by two additional drivers:

- 1) the trade weighted index - a measure of the strength of the US dollar in comparison to the currencies of major trading partners
- 2) per capita disposable income – the amount of income individuals have to spend on goods and services

There are no additional factors that impact more than two exporting industries. Those factors impacting two industries are in the table below.

External Drivers for Top Exporting Industries	
External Driver	Impacted Industries
Consumer spending	Plastics Product Manufacturing
	Dairy Product Manufacturing
Corporate profit	Communications Equipment Manufacturing
	Wired and Wireless Telecommunications Carriers
Federal funding for Medicare and Medicaid	General Medical and Surgical Hospitals
	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
Industrial production index	Plastics Product Manufacturing
	Electric Power Generation, Transmission and Distribution
Number of adults aged 65 and older	General Medical and Surgical Hospitals
	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
Number of broadband connections	Communications Equipment Manufacturing
	Wired and Wireless Telecommunications Carriers
Number of businesses	Wired and Wireless Telecommunications Carriers
	Electric Power Generation, Transmission and Distribution
Number of physician visits	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
	Insurance Carriers
Average annual precipitation	Electric Power Generation, Transmission and Distribution (solar)
	Animal Production (sheep)
Price of feed	Dairy Product Manufacturing
	Animal Production
Total health expenditure	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
	Insurance Carriers
Value of construction	Plastics Product Manufacturing
	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing

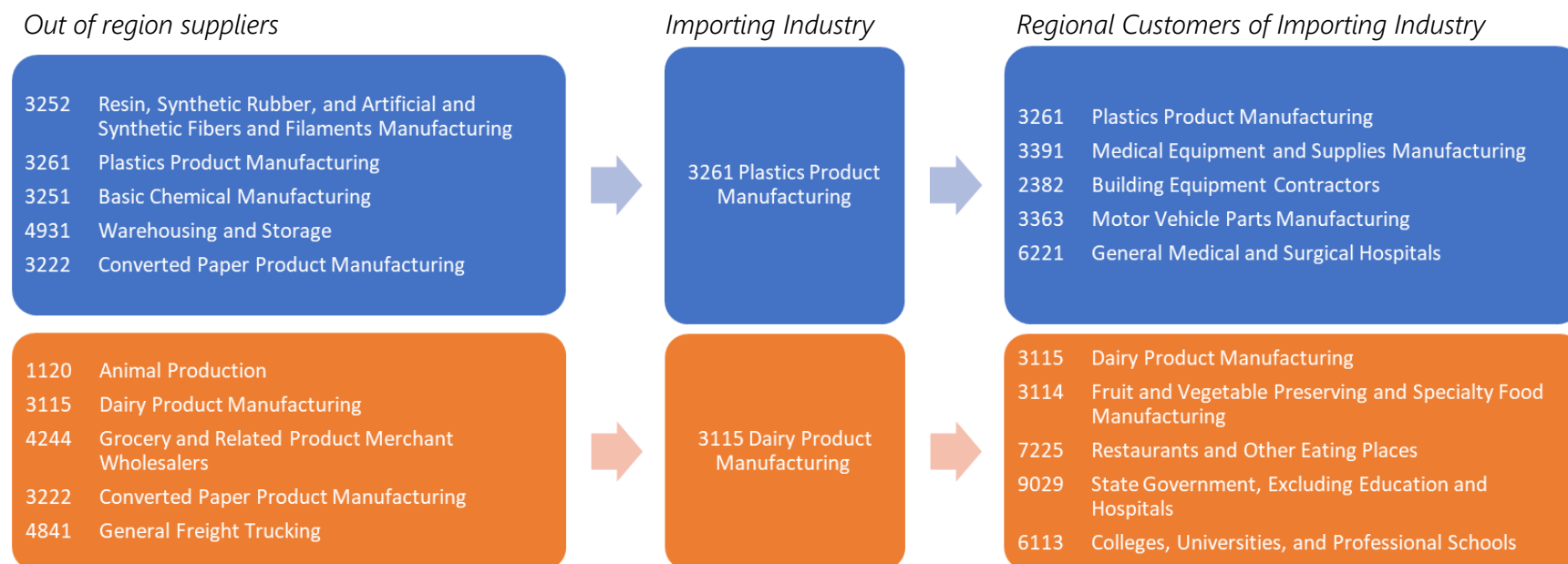
Source: IBISWorld

Broader Impacts of Supply Chain Disruptions

Supply chain disruptions can ripple through an economy as the impacts carry on to the customers and suppliers of those businesses directly affected. As such, awareness of how industries are connected can help to better anticipate, avoid, and/or prepare for disruptions to major industries. This section shows how major importing and exporting industries are connected to other regional industries. First this section looks at major importing industries, what industries they are importing from, and the top local industries they are selling to. Then the section looks at the top exporting industries, the industries they are likely exporting products to, and the industries locally they are purchasing from. This is intended to provide insights to what kinds of supply/demand shocks outside of the region could impact the importing/exporting industry, and then how that could then impact the local customers/suppliers of those industries.

Import Industries

The chart below shows the immediate supply chains for top importing industries in the G/FL region. Included are the top five industries that the target industry imports from, as well as the top five local industries that the target industry supplies. This is intended to show what supply shocks would impact the importing industry, as well as how that may then impact the supply of other regional industries that rely on the importing industry.



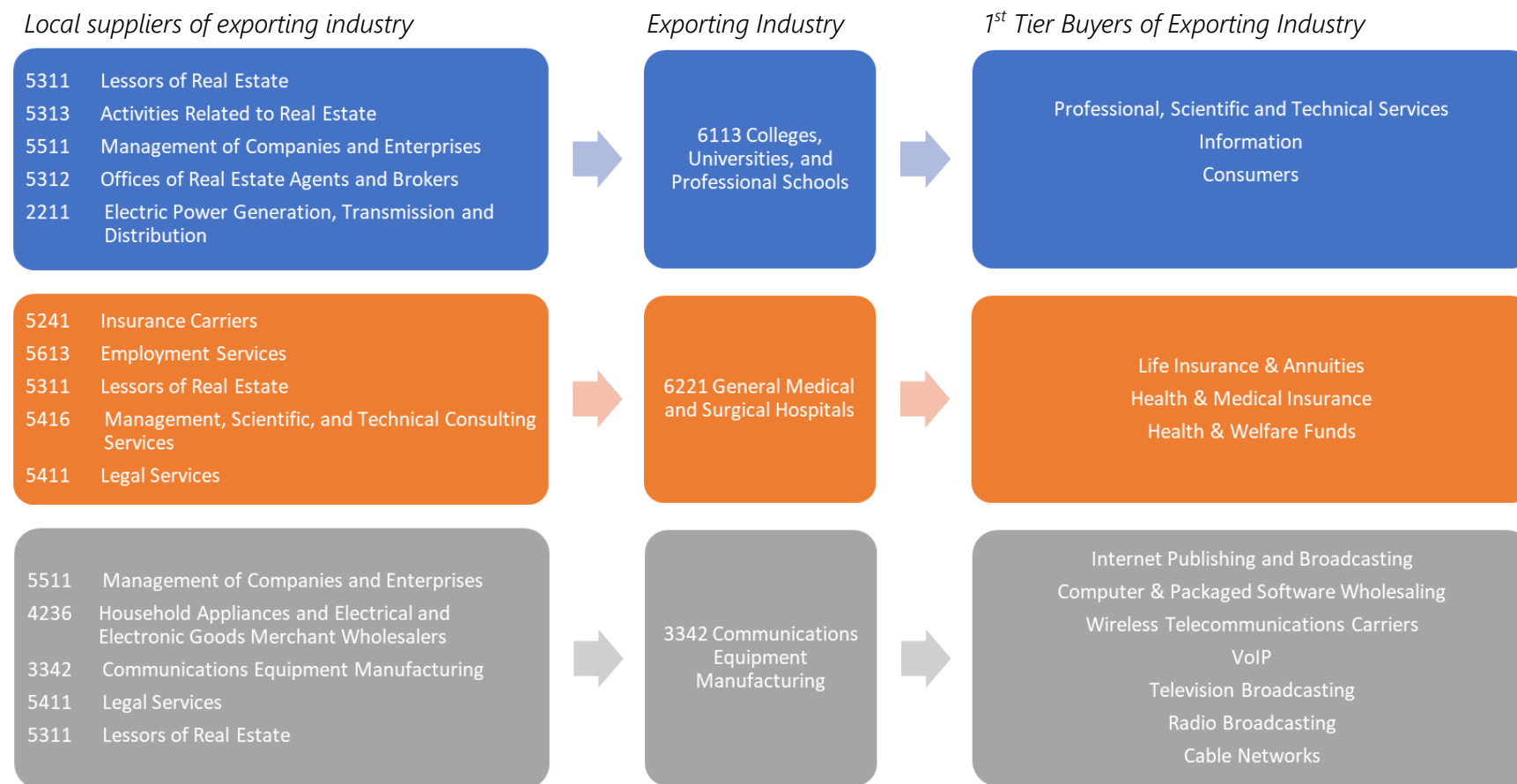




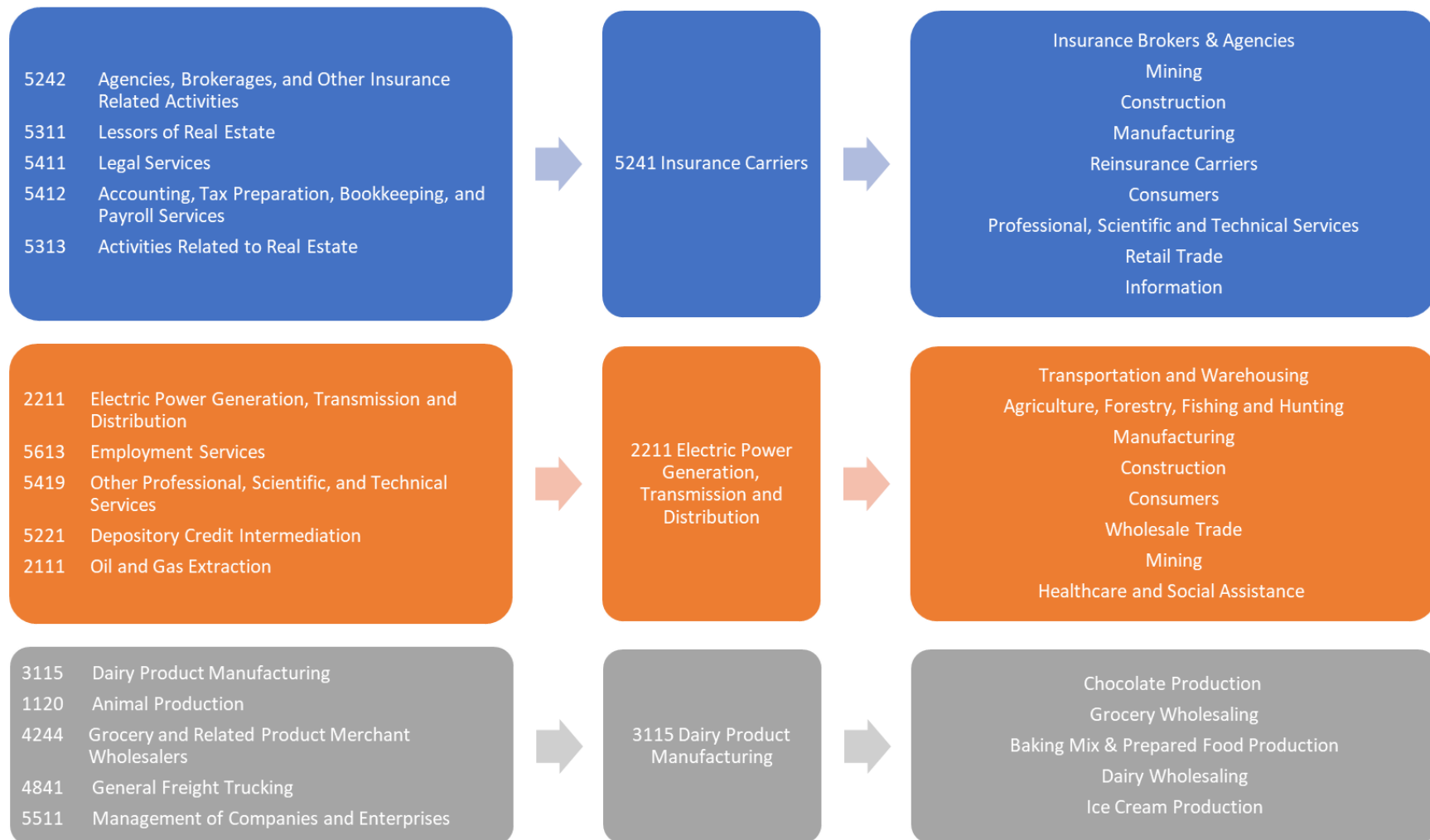
Source: Emsi,

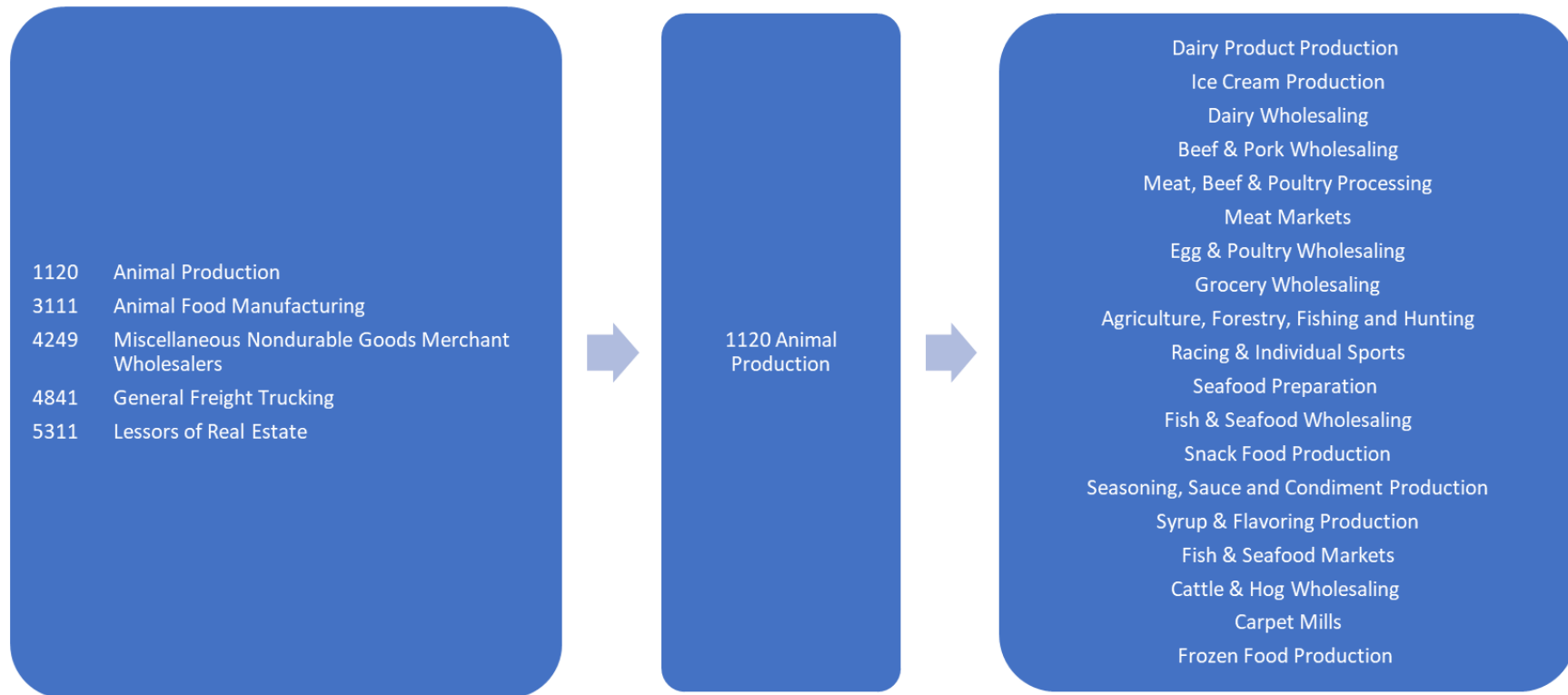
Export Industries

In terms of the top regional exporting industries, the chart below reflects two things: 1) 1st tier buyers of products from that industry, and 2) the top 5 local industries from which that the exporting industry makes purchases. This is intended to show what demand shocks would impact the exporting industry, as well as how that may then ripple through the local economy if the exporting industry reduces purchasing.









Source: Local suppliers are sourced from Emsi, 1st Tier Buyers are sourced from IBISWorld.

Supply Chain Resources

There are a number of national and regional organizations and programs that the Genesee/Finger Lakes Regional Planning Council and regional businesses can leverage to evaluate and implement profitable supply chain improvements, whether to increase a business's resiliency or to draw greater economic activity to the region. The following resources offer expertise in monitoring supply chain risks, localizing procurement and reducing and re-using waste and byproducts for greater sustainability.

Resilinc Supply Chain Tracking

- Free reports and webinars available via the website Learning Center, including annual and half year reports that provide an overview of current supply chain conditions and disruptions. *Reports and webinars available by providing contact information.*
- State of Risk Half Year Report 2021 - <https://www.resilinc.com/learning-center/white-papers-reports/resilinc-half-year-report-2021/>
- Multiple paid subscriptions to monitor supply chain risks and provide early warnings of possible disruptions. However, there are multiple companies that provide online tools for supply chain monitoring.
- Headquartered in Milpitas, CA.
- <https://www.resilinc.com/>

TDO (Central New York Technology Development Organization)

- Syracuse-based, regional New York Manufacturing Extension Partnership center supported by federal and state funding.
- Assists manufacturers with finding qualified domestic/local suppliers. (Currently working with at least one Cayuga County manufacturer on such a project.)
- Value Stream Mapping and other tools and services to assist manufacturers in identifying and eliminating non-value-added waste.
- Affordable/subsidized assistance and identification of grants to offset costs of assistance to small and mid-sized manufacturers.
- <https://www.tdo.org/>

Reshoring Initiative

- Total Cost of Ownership Estimator (online) that helps companies account for all relevant factors—overhead, balance sheet, risks, corporate strategy, and other external and internal business considerations—to determine the true “total cost of ownership” rather than making solely price-point decisions in choosing suppliers.

- Import Substitution Program identifies and qualifies major U.S. importers of products that your company produces or can produce competitively, and provides data that helps your company make the case to potential buyers.
- <https://www.reshorennow.org/>

Reshoring Institute

- Non-profit business consulting assisting businesses with evaluating profitable supply chain localization strategies.
- <https://reshoringinstitute.org/>

Cornell AgriTech

- Cornell Food Venture Center provides area food businesses, large and small, with referrals for local suppliers and service providers.
- Scientific expertise and applied research addressing sustainability issues with agriculture, food, and beverage businesses.
- <https://cals.cornell.edu/cornell-agritech>

REMADE Institute

- Rochester-based, federally-funded “Manufacturing USA” institute performing R&D to accelerate the circular economy through cutting-edge sustainable manufacturing technologies.
- Focuses on four materials classes: metals, polymers, fibers, and e-waste.
- Has developed technologies that can be piloted or further co-developed with area businesses, including technologies for understanding material flow; improving material utilization and reuse at end-of-life; reducing in-process losses; reusing scrap materials; utilizing secondary feedstocks in manufacturing; component restoration; and recycling processes such as rapid gathering, sorting, separating, contaminant removal, reprocessing, and disposal.
- Engagement with REMADE can involve proposing collaborative R&D projects in response to their periodic RFPs; using the Institute’s available educational materials and research; or membership with additional benefits.
- <https://remadeinstitute.org/>

New York State Pollution Prevention Institute (P2I)

- Free technical consultations for businesses on topics such as waste reduction.
- Heavily subsidized “project support” for more involved technical assistance.

- Numerous case studies in which P2I helped brewing companies reduce environmental impacts, including through re-use of spent grains by local farms.
- Local example: P2I assisted Cayuga County's Sunnyside Farms in evaluating manure post-processing equipment with the goal of enabling its use in value-added products.
- Can also help manufacturers evaluate how to reduce waste generation.
- Headquartered in Rochester.
- <https://www.rit.edu/affiliate/nysp2i/>

Clarkson University Reh School of Business

- Among other universities in New York State with Global Supply Chain Management, faculty at Clarkson's Reh School of Business can develop economic models to help analyze improvements in a company's supply chain, including using effective methods to identify which parts of a supply chain are most strategic and most vulnerable, evaluating the economic benefits of supply chain localization as a resiliency strategy.
- <https://www.clarkson.edu/academics/business>

Advanced Materials Research Centers

As a variety of manufacturing industries turn to advanced materials solutions to address supply chain vulnerabilities related to key inputs previously sourced from abroad, New York State's materials-related university R&D centers can work one-on-one with companies to explore new opportunities to manufacture components with greater efficiency and higher performance.

- Cornell Center for Advanced Materials (<https://www.ccmr.cornell.edu/>).
- Center for Advanced Materials Processing at Clarkson University (<https://www.clarkson.edu/camp>).
- Center for Advanced Ceramic Technology at Alfred University (<https://www.alfred.edu/cact/>).
- Additive Manufacturing and Multifunctional Printing (AMPrint) Center at Rochester Institute of Technology (<https://www.rit.edu/amprint/>).
- Center of Excellence in Advanced & Sustainable Manufacturing (COE-ASM) at Rochester Institute of Technology (<https://www.rit.edu/gis/coe/>).

Empire State Development

- Grant funds available for manufacturers making capital investments in equipment and expansion.

- <https://esd.ny.gov/empire-state-economic-development-fund-program>.

Procurement Technical Assistance Center

- Cayuga County is served by the Cattaraugus Procurement Technical Assistance Center. These federally-supported organizations help small businesses with becoming suppliers to federal agencies, including assistance in filtering for bids, researching and responding to procurement opportunities, and connections to potential partner companies in government contract supply chains.
- <http://www.ccptac.org/>.