

# Linkages between Regional Clusters and National Technology Clusters

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# Section I: National Technology Clusters

1. Nationally, 15 technology clusters are identified (Feser, 2005)
2. We match sectors under these technology clusters with those sectors we identified under the regional sub-clusters
3. Numeric codes in columns in the following tables represent regional clusters
4. The number (1) in the cells indicates that that technology sector is currently present in the region and part of a given regional industry cluster
5. For example, in Table 1, under “Aerospace,” a technology cluster, the “other aircraft parts and equipment” sector has regional presence and associated with the regional cluster “13,” that is “Motor Vehicle.”

## Section II: How to read these tables and what to make out of them

- These tables
  - give us a sense of what technology sectors the region currently has and how these regional technology sectors are related to the regional industry clusters
  - guide us in selecting target clusters by providing an answer to the question of “what technology clusters and sectors are missing in the regional economy?”
  - finally, help us see the connections between various national technology clusters and regional clusters that may be useful in the final evaluation of target industries

# Section III: National Technology Clusters and Regional Linkages: Aerospace and Architectural and Engineering Services

Table 1. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters														Local Gaps? (Missing Sectors)	
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>Technology Cluster: Aerospace</b>																
<b>Aircraft engine and engine parts manufacturing</b>																Yes
<b>Aircraft manufacturing</b>																Yes
<b>Guided missile and space vehicle manufacturing</b>																Yes
Other aircraft parts and equipment			1													No
<b>Propulsion units and parts for space vehicles and guided missiles</b>																Yes
<b>Technology Cluster: Architectural &amp; Engineering Services</b>																
Architectural and engineering services									1							No
Custom computer programming services													1			No
Environmental and other technical consulting services									1							No
Information services													1			No
Management consulting services									1							No
<b>Other communications equipment manufacturing</b>																Yes
Scientific research and development services												1				No
Specialized design services									1							No

# Section III: National Technology Clusters and Regional Linkages: Cable Manufacturing and Chemicals

Table 2. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters														Local Gaps? (Missing Sectors)
	11	12	13	22	32	51	54	55	61	72	111	112	132	151	
<b>Technology Cluster: Cable Manufacturing</b>															
<b>Fiber optic cable manufacturing</b>															Yes
<b>Other communication and energy wire manufacturing</b>															Yes
Paint and coating manufacturing												1			No
<b>Switchgear and switchboard apparatus manufacturing</b>															Yes
Wiring device manufacturing												1			No
<b>Technology Cluster: Chemicals</b>															
Adhesive manufacturing								1							No
<b>Cellulosic organic fiber manufacturing</b>															Yes
Custom compounding of purchased resins								1							No
<b>Nitrogenous fertilizer manufacturing</b>															Yes
<b>Noncellulosic organic fiber manufacturing</b>															Yes
Other basic organic chemical manufacturing						1									No
<b>Other miscellaneous chemical product manufacturing</b>															Yes
Pesticide and other agricultural chemical manufacturing								1							No
<b>Petrochemical manufacturing</b>															Yes
Plastics material and resin manufacturing							1								No
<b>Printing ink manufacturing</b>															Yes
<b>Surface active agent manufacturing</b>															Yes
<b>Synthetic rubber manufacturing</b>															Yes

# Section III: National Technology Clusters and Regional Linkages: Computer and Electronic Equipment

Table 3. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

Regional Clusters

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters													Local Gaps? (Missing Sectors)	
	11	12	13	22	32	51	54	55	61	72	111	112	132		151
<b>Technology Cluster: Computer &amp; Electronic Equipment</b>															
All other electronic component manufacturing	1														No
Broadcast and wireless communications equipment	1														No
<b>Computer storage device manufacturing</b>															<b>Yes</b>
<b>Computer terminal manufacturing</b>															<b>Yes</b>
<b>Electricity and signal testing instruments</b>															<b>Yes</b>
<b>Electromedical apparatus manufacturing</b>															<b>Yes</b>
<b>Electron tube manufacturing</b>															<b>Yes</b>
<b>Electronic computer manufacturing</b>															<b>Yes</b>
Irradiation apparatus manufacturing	1														No
<b>Other computer peripheral equipment manufacturing</b>															<b>Yes</b>
<b>Search, detection, and navigation instruments</b>															<b>Yes</b>
<b>Semiconductors and related device manufacturing</b>															<b>Yes</b>
<b>Telephone apparatus manufacturing</b>															<b>Yes</b>

# Section III: National Technology Clusters and Regional Linkages: Engine Equipment

Table 4. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters														Local Gaps? (Missing Sectors)	
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>Technology Cluster: Engine Equipment</b>																
Air and gas compressor manufacturing					1											No
<b>Fluid power cylinder and actuator manufacturing</b>																Yes
<b>Fluid power pump and motor manufacturing</b>																Yes
<b>Measuring and dispensing pump manufacturing</b>																Yes
Metal valve manufacturing				1												No
<b>Military armored vehicles and tank parts manufacturing</b>																Yes
Motor and generator manufacturing					1											No
Motor vehicle parts manufacturing			1													No
<b>Other engine equipment manufacturing</b>																Yes
Power-driven handtool manufacturing					1											No
<b>Pump and pumping equipment manufacturing</b>																Yes
<b>Scales, balances, and miscellaneous general purpose machinery</b>																Yes
<b>Small arms manufacturing</b>																Yes
Speed changers and mechanical power transmission equipment				1												No
Turbine and turbine generator set units manufacturing		1														No
<b>Welding and soldering equipment manufacturing</b>																Yes

# Section III: National Technology Clusters and Regional Linkages: Fertilizer and Chemical Products and Industrial Machinery and Distribution Equipment

Table 5. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection	Regional Clusters															Local Gaps? (Missing Sectors)
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>National Technology Clusters: RED FONTS INDICATE LOCAL GAPS</b>																
<b>Technology Cluster: Fertilizer &amp; Chemical Products</b>																
Carbon and graphite product manufacturing						1										No
Explosives manufacturing						1										No
<b>Fertilizer, mixing only, manufacturing</b>																<b>Yes</b>
<b>Industrial gas manufacturing</b>																<b>Yes</b>
<b>Nitrogenous fertilizer manufacturing</b>																<b>Yes</b>
Other basic inorganic chemical manufacturing						1										No
<b>Petrochemical manufacturing</b>																<b>Yes</b>
<b>Phosphatic fertilizer manufacturing</b>																<b>Yes</b>
Synthetic dye and pigment manufacturing						1										No
<b>Technology Cluster: Industrial Machinery &amp; Distribution Equipment</b>																
Construction machinery manufacturing		1														No
<b>Conveyor and conveying equipment manufacturing</b>																<b>Yes</b>
<b>Electric power and specialty transformer manufacturing</b>																<b>Yes</b>
Elevator and moving stairway manufacturing		1														No
<b>Industrial process furnace and oven manufacturing</b>																<b>Yes</b>
Industrial truck, trailer, and stacker manufacturing		1														No
Mining machinery and equipment manufacturing		1														No
<b>Oil and gas field machinery and equipment</b>																<b>Yes</b>
<b>Overhead cranes, hoists, and monorail systems</b>																<b>Yes</b>
<b>Packaging machinery manufacturing</b>																<b>Yes</b>
<b>Railroad rolling stock manufacturing</b>																<b>Yes</b>
<b>Semiconductor machinery manufacturing</b>																<b>Yes</b>

# Section III: National Technology Clusters and Regional Linkages: Information Services and Medical Instruments and Optics

Table 6. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

Regional Clusters

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters														Local Gaps? (Missing Sectors)	
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>Technology Cluster: Information Services</b>																
<b>Cable networks and program distribution</b>																Yes
Computer systems design services														1		No
Custom computer programming services														1		No
Data processing services														1		No
Information services														1		No
Other computer related services, including facilities management														1		No
<b>Software publishers</b>																Yes
Telecommunications														1		No
<b>Technology Cluster: Medical Instruments and Optics</b>																
<b>Ammunition manufacturing</b>																Yes
<b>Audio and video equipment manufacturing</b>																Yes
<b>Dental equipment and supplies manufacturing</b>																Yes
Miscellaneous electrical equipment manufacturing	1															No
<b>Ophthalmic goods manufacturing</b>																Yes
<b>Other ordnance and accessories manufacturing</b>																Yes
<b>Photographic and photocopying equipment manufacturing</b>																Yes
<b>Photographic film and chemical manufacturing</b>																Yes
<b>Primary battery manufacturing</b>																Yes
<b>Storage battery manufacturing</b>																Yes
Surgical and medical instrument manufacturing											1					No
Surgical appliance and supplies manufacturing											1					No

# Section III: National Technology Clusters and Regional Linkages: Motor Vehicles, Pharmaceuticals and Precision Instruments

Table 7. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters															Local Gaps? (Missing Sectors)
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>Technology Cluster: Motor Vehicles</b>																
<b>Audio and video equipment manufacturing</b>																<b>Yes</b>
Automobile and light truck manufacturing			1													No
<b>Heavy duty truck manufacturing</b>																<b>Yes</b>
Motor vehicle parts manufacturing			1													No
<b>Technology Cluster: Pharmaceuticals</b>																
Pesticide and other agricultural chemical manufacturing								1								No
Pharmaceutical and medicine manufacturing											1					No
<b>Polish and other sanitation good manufacturing</b>																<b>Yes</b>
<b>Soap and other detergent manufacturing</b>																<b>Yes</b>
Toilet preparation manufacturing														1		No
<b>Technology Cluster: Precision Instruments</b>																
<b>Analytical laboratory instrument manufacturing</b>																<b>Yes</b>
<b>Automatic environmental control manufacturing</b>																<b>Yes</b>
<b>Electricity and signal testing instruments</b>																<b>Yes</b>
Industrial process variable instruments	1															No
<b>Optical instrument and lens manufacturing</b>																<b>Yes</b>
Relay and industrial control manufacturing					1											No
<b>Totalizing fluid meters and counting devices</b>																<b>Yes</b>
Watch, clock, and other measuring and controlling device manufacturing	1															No

# Section III: National Technology Clusters and Regional Linkages: Technical and Research Services and Wiring Devices and Switches

Table 8. Regional Cluster Connections and Local Gaps in Technology Clusters

National Technology Cluster Template and Regional Cluster Connection

National Technology Clusters: RED FONTS INDICATE LOCAL GAPS	Regional Clusters														Local Gaps? (Missing Sectors)	
	11	12	13	22	32	51	54	55	61	72	111	112	132	151		
<b>Technology Cluster: Technical &amp; Research Services</b>																
Architectural and engineering services									1							No
Custom computer programming services													1			No
Environmental and other technical consulting services									1							No
Information services													1			No
Management consulting services									1							No
Other ambulatory health care services											1					No
Scientific research and development services											1					No
Specialized design services									1							No
<b>Technology Cluster: Wiring Devices &amp; Switches</b>																
Architectural and engineering services									1							No
Motor and generator manufacturing					1											No
<b>Other communications equipment manufacturing</b>																<b>Yes</b>
<b>Switchgear and switchboard apparatus manufacturing</b>																<b>Yes</b>
Wiring device manufacturing													1			No

# Section III: National Technology Clusters and Regional Linkages: Different perspective on linkages across the clusters

Table 9. Regional Clusters vs. National Technology Clusters

Regional Cluster Name	Regional Clusters	Aerospace	Architectural & Engineering Services	Cable Manufacturing	Chemicals	Computer & Electronic Equipment	Engine Equipment	Fertilizer & Chemical Products	Industrial Machinery & Distribution Equipment	Information Services	Medical Instruments and Optics	Motor Vehicles	Pharmaceuticals	Precision Instruments	Technical & Research Services	Wiring Devices & Switches
Computer and Electronic Equipment	11					3					1			2		
Construction Machinery and Distribution Equipment	12						1		4							
Motor Vehicles	13	1					1					2				
Machine Tools	22						2									
Nondurable Industry Machinery	32						3							1		1
Chemical-Based Products	51				1			4								
Petroleum and Gas	54				1											
Plastics Products	55				3									1		
Business Services	61		4												4	1
Optical Equipment and Instruments	72										2					
Management, Higher Education and Hospitals	111		1											1	2	
Construction	112			2												1
Information Services	132		2							6					2	
Breweries and Distilleries	151													1		
Technology Industries not in the region	Missing	4	1	3	8	10	9	5	8	2	9	2	2	5		2

Thank You!

Questions?