

A Methodology Enabling Analysis of Industry Clusters in Greater New Orleans (RPC Project SLE3)

Commissioned by:
Regional Planning Commission for Jefferson,
Orleans, Plaquemines, St. Bernard,
St. Tammany and Tangipahoa Parishes



The Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes (RPC) is a 31 member board of local elected officials and citizen members, appointed to represent you on regional issues. The RPC is a Locally Designated Economic Development Organization by the Economic Development Administration (EDA); as such the RPC is obligated by the EDA to develop a five-year Comprehensive Economic Development Strategy (CEDS). This work will inform the 2014 update to the CEDS.

Acknowledgments: The Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes (RPC) wishes to thank The Data Center (a project of Nonprofit Knowledge Works) for their detailed analysis that formed the foundation for this memo on clusters and economic development along with accompanying training materials.

Summary: This memo begins by detailing background information on the cluster concept in order to promote a broader understanding of what it means to take a cluster-based approach to regional economic development. The memo then provides a clear explanation of Michael Porter’s methodology for defining clusters. The methodology is described to demonstrate the rigor of the approach. Next, the 2009 CEDS definitions of clusters are critiqued, and reasoning is provided for why the 2014 CEDS should adopt the Porter definitions. The memo then addresses the problem of identifying emerging industries before closing with an explanation of how a cluster-based approach changes economic development practices.

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Introduction:

This report accompanies teaching materials prepared by The Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes (RPC) on the use of a cluster-based approach to economic development (RPC Project SLE3). The goals of the project were to (1) evaluate cluster definitions the RPC used in its *Comprehensive Economic Development Strategy, 2009 Update*; (2) provide a new methodology for defining clusters, and (3) offer training to staff at regional economic development organizations (EDOs) and members of the Comprehensive Economic Development Strategy (CEDS) committee on how to use EMSI, a private data subscription service, in the analysis of the newly defined clusters. In fulfilling these goals, the RPC would possess a methodologically rigorous set of cluster definitions that would be included in the revised *Comprehensive Economic Development Strategy*. The RPC would also have made progress towards unifying EDOs in their thinking and practice on defining targets for development, analyzing regional economic activity, and developing any additional plans of action for stimulating the economy outside of those established in the revised CEDS.

This report primarily addresses the first two goals mentioned above but does so in reverse order. First, a theoretical background is provided on clusters in order to orient thinking on what it means to follow a cluster-based approach to economic development. Second, the new methodology for defining clusters is explained. Third, the older RPC definitions are critiqued. Finally, the report ends by revealing some limitations to the cluster approach and detailing how the approach may alter existing practices that EDOs follow in their development efforts.

Theoretical Background on the “Cluster” Concept:

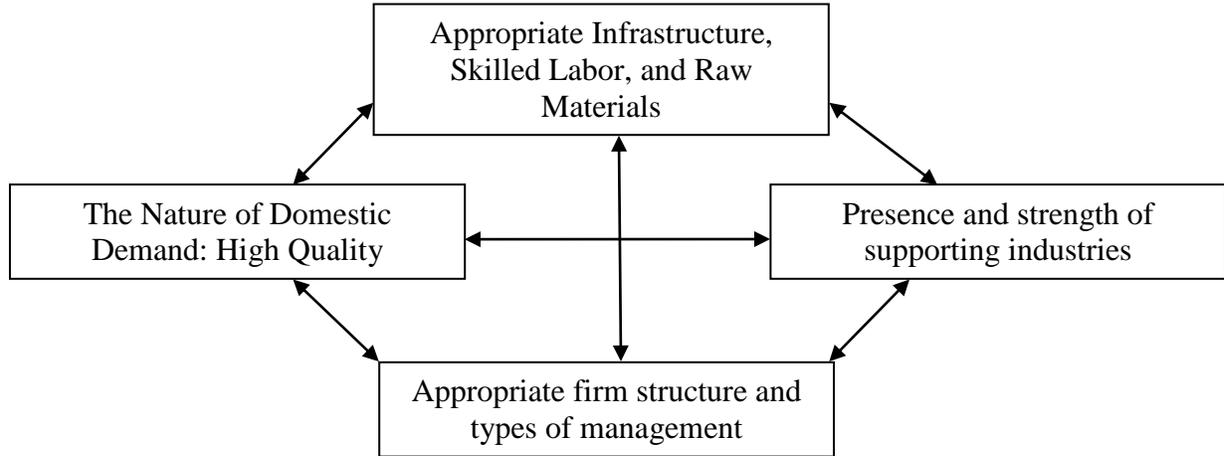
The concept of “clusters” has been heavily promoted by influential thinkers in economic development from the Harvard Business School to the Metropolitan Policy Program at the Brookings Institution, and government agencies and regional planners have responded. For example, the Department of Commerce requires planning departments to incorporate clusters into their Comprehensive Economic Development Strategies (CEDS). As a part of what can be described as an “Innovation School” of economic development, cluster-based approaches are attractive to professionals in economic development because the approach relies upon cultivating innovation within existing industrial strengths. Economic leaders within regions can work with what they have, rather than focusing on the difficult task of building entirely new industries and skill sets into their economies. To work with existing strengths and to make them more innovative, economic development professionals employ some of the traditional practices used in other approaches, such as offering incentives, but they also engage in practices that make cluster-based development unique. A thorough comparison of approaches to economic development is beyond the scope of this report, but some of the practices that are characteristic of cluster-based approaches are provided below (See Conclusion: How Does a Cluster-Based Approach Change Economic Development Practice? below).ⁱ

Clusters tend to produce innovation because they are composed of interconnected businesses/industries within a small geographic area. The connections between the companies allow for easier sharing of information and ideas, leading to an accumulation of expertise within a certain specialization. The close proximity to one another accelerates the speed at which information, labor, technologies, and goods and services

can be exchanged across the cluster. The combination of a deep knowledge pool and speed fuels innovation in both products and processes. Thus, it is *change* that drives economic vitality and growth.

As an innovation approach, clusters have a long history. Alfred Marshall is credited with first characterizing clusters, but the concept has found expression in the more contemporary work of political economists, such as Paul Krugman's work on "agglomeration economies," Michael Piore and Charles Sabel's work on "flexible specialization," and of course, Michael Porter's research on the "diamond model" of development.ⁱⁱ Michael Porter's work has arguably obtained the most traction outside the halls of academia. Not unlike the other versions of cluster theory mentioned above, Porter argues that vibrant, urban economies are built around industry-specific concentrations of firms. However, he also suggests four "factors" combine to provide a competitive advantage to clusters of local firms: appropriate infrastructure, skilled labor, and raw materials; the nature of domestic demand for the product; the presence of related or supporting industries; and finally, appropriate firm structure, or models of business management.ⁱⁱⁱ The factors are a part of a four-point system (the diamond) in which deficiencies in one has negative effects on the others.

Figure 1: Porter's Diamond Model of Economic Development



For metros to build strong economies, they need to identify their clusters and then work to ensure that all of the parts of the diamond surrounding them are properly supported. Importantly, defining a cluster is not the same as highlighting an industrial concentration, which is just a high concentration of total employment in one industry. A concentration can be accomplished with the location of a very large employer. Clusters consist of interconnected businesses. Once the interconnections are discovered, business and political leaders must maintain the diamond system to preserve a local production environment supportive of innovation.

Beyond Porter's groundbreaking research, there are no thorough examinations of the mutually reinforcing pillars of the diamond model. The absence of supporting literature draws attention to the difficulty in applying Porter's work. It is very difficult to gather data on all parts of the diamond, especially firm structure and the nature of demand. In fact, Porter's follow-up research has in large part focused simply on identifying existing clusters, as many known measures for them, like location quotients, fail to adequately highlight interorganizational linkages, and instead, simply show

industrial concentrations.^{iv} As mentioned above, having a lot of employment in an industry (a concentration) is different than having a lot of employment in linked industries (a cluster). For example, the impressive number employed in energy and petrochemicals in Southeast Louisiana can easily be a concentration rather than a cluster. To verify the existence of a cluster, research has to show meaningful connections, whereby one industry's dynamics are directly supportive of (or detrimental to) the dynamics of another within the given geographic area. For instance, petrochemical producers may be located within close proximity of waste disposal providers that specialize in highly toxic materials. Hence, as employment in the petrochemical industry rises, so does employment in the waste removal industry.

Covariation in employment trends is just one measure that highlights an interindustry linkage. Usually, researchers rely upon more than just one measure to verify a cluster. Some of the measures relate specifically to connections between industries, but Porter's work suggests that interconnected industries are embedded in larger systems – the diamond model. The parts of the diamond are what ensure the cluster works appropriately and enables innovation. Hence, if policymakers and/or researchers wish to verify the presence of a cluster that is embedded in the correct, supportive environment, they also have to identify the other components of the diamond, as explained in the following example of a hypothetical petrochemical and energy cluster:

An Example of Porter's Diamond Model: A Hypothetical Petrochemical and Energy "Cluster."

- *Appropriate infrastructure, skilled labor, and raw materials:* This could be highlighted by a large number of high quality, workforce development programs within Southeast Louisiana's secondary education system; proximity to natural gas resources; and sophisticated system of the handling, monitoring, transporting, and disposing of hazardous substances.
- *The nature of domestic demand for the product:* This is usually not a quantifiable indicator. It is demand for better quality or sophisticated products that fuels innovation in a cluster. Thus, local establishments using petrochemicals would be asking for more complex types that could be used in a variety of resins and finished plastics.
- *The presence of related or supporting industries:* This is highlighted in the inter-industry linkages (employment trends) described above. Again, the petrochemical producers might be closely aligned with waste handlers, or research and development facilities.
- *Appropriate firm structure or models of business management:* Just as demand for complex, high quality goods drives innovation, there is an appropriate firm structure as well. Rigid hierarchical systems of control dampen creativity and complex problem solving. Therefore, flexible management models and flexible, network forms of organization are necessary to fuel thinking on new ways to acquire, make, and use petrochemicals.

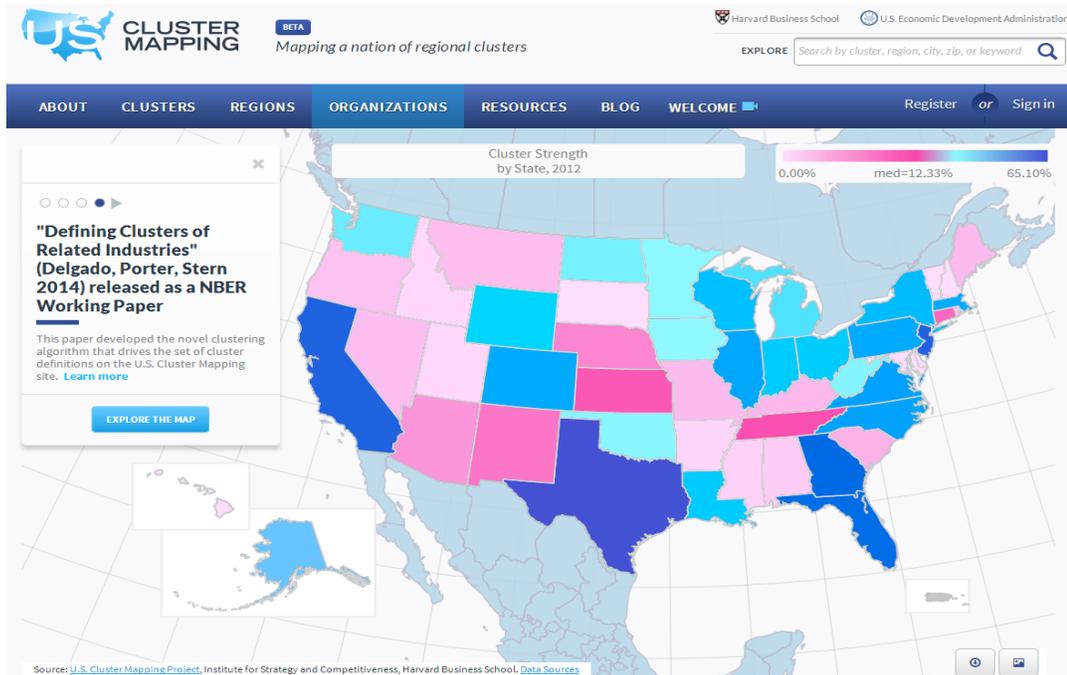
Again, it is important to note, that all of the parts of the diamond must coexist. Inferior workforce development systems do not produce creative thinkers that can implement appropriate firm structure or models of management. A weak workforce can also lessen the capacity of supporting industries to deliver high quality goods and services, which would stifle local demand. When local demand for high quality or innovation is suppressed, the cluster can settle into a model of standardization, which fails to deliver the regional prosperity that clusters are supposed to bring. Or, the cluster will have weak commitment, as existing businesses will seek new sites to locate that put them closer to the sources of higher quality goods and services (i.e., they will seek a site where the diamond model is stronger). Overall a weak diamond model fails to produce an innovative environment and clusters will fail to reach their potential.

Clearly, research that considers all of the pillars of the diamond and shows how they support one another is comprehensive and beyond the research capacity of most economic development organizations or city and local governments. It is a tall task to develop a system that quantifies each pillar and its impact (note: Saxenian 1994 provides an example of what this research would look like).^v This does not however, mean that policymakers and professionals in economic development should drop the diamond from their thinking. Instead, the diamond model should inform how such actors approach the further development of linked industries within their regions, which meet a baseline definition of a “cluster,” but according to Porter, require the factors in the diamond to flourish. How then, do economic development professionals or policymakers identify their linked industries, or clusters? This is a task Porter has taken on in developing his benchmarking definitions.

Porter's Benchmarking Definitions (A Rigorous Cluster Methodology):

Michael Porter's research agenda for roughly the last decade has focused on defining clusters. Much of the earlier work on identifying clusters was case-based, meaning researchers identified examples, such as silk-making in Milan, and simply detailed all of the industrial connections and supportive institutions that existed around silk-making in that particular place.^{vi} Case-based research identifies local interindustry connections, but excludes economic activities not shown within the region. The excluded activities could very well be critical to a cluster, but for various reasons were prevented from forming within the region being analyzed. In effect, two clusters specializing in the same product, furniture, for example, would appear to have different interindustry linkages depending on whether the cluster was located in Grand Rapids, Michigan, versus Greensboro, North Carolina. The different linkages led to different definitions for the same cluster. As a result, researchers could not determine which metro had a stronger cluster. Neither could they determine what factors (think the diamond model here) led one place to be better than the other, or what factors were shared and were equally important to both. Basically, standardized definitions were needed for proper comparisons and for more generalizable knowledge on how regions could strengthen their clusters. Fortunately, after a decade of work, Porter and his colleagues developed a methodology for creating uniform definitions of clusters, or "benchmarking definitions."^{vii} The results are made available through the U.S. Cluster Mapping Project, which is a national economic initiative that provides open, interactive data to understand regional clusters and support business, innovation and policy in the United States. It is based at the Institute for Strategy and Competitiveness at Harvard Business School and

is supported by various academic and regional partners and the U.S. Department of Commerce's Economic Development Administration.^{viii}



To create the benchmarking definitions, Porter and his colleagues used a sophisticated cluster methodology -- a statistical method that groups industries based on their relatedness across a variety of dimensions chosen by the researchers. They chose five measures for interindustry linkages that are commonly used in the existing research on regional economic development. They include three locational measures and two measures that are not place-based:

Porter's Five Measures of Inter-Industry Linkages

1. *Regional Industrial Employment Correlations*: The extent to which employment trends move together in particular regions. For example, if the location of employment in tool and die making and machinery were highly correlated, it

would suggest that there are meaningful interdependencies between these industries.

2. *Location correlations for establishments within industries:* The extent to which the number of establishments move together in regions over time. For example, if the location of many establishments producing glass were highly correlated with many companies producing wire, it would suggest there are meaningful interdependencies between these industries.
3. *The Coagglomeration Index: The physical proximity of industries.* This is an index developed by Michael Porter's fellow Harvard economist Edward Glaeser.^{ix} This index differs from the previous measures because it is sensitive to the size of places and the size of companies. In other words, economies of scale can influence the correlations between industries and employment and between industries and the number of establishments. This index shows, for example, that the physical distance between paint and adhesive companies and chemical companies is narrow, suggesting interdependency. In contrast, the distance between semiconductor producers and coal processing facilities is very wide, indicating no interdependency. Note: this is not an employment measure. It assumes employment is equally distributed across the country and then examines the actual distance between industry locations.
4. *Input-Output Links: How industries spend to produce their goods and services.* This is a measure widely used to highlight interindustry linkages through spending patterns.^x There is no locational component to this measure. It only highlights supplier and buyer flows at the national level. If a toolmaking

company spends a large percentage of its total expenses on ferroalloys, these industries are considered linked in a meaningful way.

5. Labor Occupation Links: The extent to which industries draw from similar labor pools/employ similar occupations. The final measure relies upon the Occupational Employment Statistics (OES) Survey of the Bureau of Labor Statistics, which provides 792 non-governmental occupations and information on their prevalence within each industry. These data provide yet another correlation matrix, showing the pairwise correlation between the occupational composition of any two industries. For instance, this matrix could highlight that the percent of engineers in software is closely correlated with the percent of engineers in electronics. From this correlation it is reasonable to assume that these industries have meaningful interdependencies.

The five measures above produce five rather large correlation matrices. These are not analyzed separately – a rather impossible analytical task. Rather, using a cluster methodology, Porter and his colleagues “layer” the matrices to determine similarities between each. In other words, they determine the extent to which high correlations in employment, number of establishments, coagglomeration, input-outputs, and labor occupation links are similar. A way to visualize this process is to think of the five matrices described above as large sheets of brail. There are five large sheets and when they are layered upon one another, some parts of the sheets fit together quite nicely while some do not. Porter and his colleagues then adjust the number of clusters and the number of industries included in a cluster until they achieve the best possible “goodness of fit”

with the data. One can imagine this as a process of moving the sheets of brail around upon one another until they appear to have the best fit. At this point, Porter and his colleagues are able to identify clusters. They conclude their analyses by determining outliers, if these outliers should be included in established clusters, and if established clusters should be partitioned.

The results of the analyses are 778 industries (at the six digit NAICS level) that are sorted into 51 traded clusters. These are existing clusters within the nation. As traded clusters, they are concentrated in a subset of geographic areas in the country and sell to

other regions and nations. The results also show 310 industries that are sorted into 16 local clusters. The local clusters are present across all places (for example, healthcare). Through the U.S. Mapping Project, the clusters are mapped onto regions across the

Porter's Cluster Types

Traded Clusters serve markets in other regions and countries. They are located in select regions that afford them a competitive advantage and are the drivers of regional prosperity.

Local Clusters serve local markets and are found in every region. They are the largest employers in regions.

country.^{xi} For a region to enjoy the economic benefits of a cluster, the activity within the defined cluster must be greater than the national average. With this last step of determining their locations, Porter and his colleagues provide the most rigorous and systematic evaluation of clusters available to date. Importantly, they also do so providing standardized definitions that allow regions to compare themselves to one another. This is critical for moving beyond definitions to actually determining the factors that drive cluster success. In other words, the Porter methodology is the only approach that makes comparative research possible.

Comparing the 2009 CEDS Methodology to the Porter Methodology:

Two economic development organizations within the region use cluster terminology in their plans: The Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany and Tangipahoa Parishes (RPC) and the New Orleans Business Alliance (NOLABA). For NOLABA, the clusters are definitely meant to drive action. For the RPC, a list of “priority clusters” is given in the *2009 Comprehensive Economic Development Strategy (CEDS)*. In the CEDS the RPC uses the clusters primarily for descriptive purposes, revealing employment trends in the region. However, by labeling them as “priority” they do send a message that these clusters are meant to inform strategy. The CEDS clusters include:

- Tourism
- Recovery and Redevelopment
- Creative Media and Design
- Higher Education
- Energy
- Petrochemicals and Plastics
- Aerospace and Advanced Manufacturing
- Food Manufacturing
- Green Tech and Environmental Services
- International Trade & Logistics

In the 2009 CEDS, the RPC also provides a list of all industries that define each of the above clusters. There is no documentation on how the industries were chosen, but it appears that clusters were selected based primarily on substantive knowledge of economic activity in the region (i.e., the oil and gas presence in Southeast Louisiana is common knowledge, so there must be an “energy” cluster). Then, industries were selected into these clusters based on work descriptions provided in NAICS codes. Those industries sharing similar NAICS were assumed connected.^{xii}

There are numerous shortcomings to this approach. First, the 2009 CEDS identifies clusters that may not be clusters in any meaningful way. For example, the RPC designates Recovery and Redevelopment as a cluster. However, using Porter’s methodology, there is no evidence that this kind of economic activity is a permanent cluster in any other region in the country. An optimistic interpretation of this finding is that the Greater New Orleans region can be the first economy of this type. A more realistic interpretation is that this cluster does not exist elsewhere because it does not provide regional prosperity. In other words, the RPC is selecting a cluster that appears to be a local strength based on past events with disaster recovery with no evidence that it can be leveraged for further benefit. Scholars warn against this type of application of a cluster approach.^{xiii} When practitioners create original clusters or select clusters that are not currently strengths (or verifiable forms of economic activity elsewhere), they fail to take an objective approach to development. Targeting desirable clusters rather than focusing on existing strengths often leads to poor results -- a conclusion drawn by Porter as well.^{xiv}

Second, the methodological approach employed by the RPC in its 2009 CEDS does not necessarily distinguish local from traded sectors, when it is the latter that deliver broader economic benefits to the region. For instance, the Higher Education cluster, as specified by the RPC, consists of three NAICS codes: 611210 Junior Colleges; 611310 Colleges, Universities, and Professional Schools; and 611519 Other Technical and Trade Schools. The first two codes have been shown linked to other industries in the traded Education and Knowledge Creation cluster.^{xv} The last code however, NAICS 611519 Other Technical and Trade Schools, is a part of a different local cluster – Local Education and Training. As a part of a local cluster, it is an industry that fails to distinguish the region from anywhere else in the country. This does not mean it is unimportant, but rather, it is a support industry that serves the local market rather than being a more dynamic industry that generates prosperity for the region. By including this code into the tradable Higher Education cluster, practitioners are overstating its importance to the economy and artificially inflating the size of the Higher Education cluster in the region. Also, by not properly placing this code in the local serving Local Education and Trading sector, practitioners are understating the size and importance of a key local cluster. In practice, this can lead to neglect of the tradable cluster when in fact attention may be needed to strengthen it, and it can lead to unnecessary attention provided to a local traded cluster when in fact it is strong. Essentially, traded and local serving clusters need to be analytically distinct to produce actionable research and analyses.

Third, and perhaps most important, the selection of industries based on NAICS, fails to capture whether or not there is an interindustry linkage between the industries – the key component of the cluster concept. By not identifying interindustry linkages, the

2009 CEDS definitions for clusters may include industries that are completely unrelated, and this can hinder development efforts. For example, economic development organizations and training providers could agree to increase their effort to train a qualified workforce for a particular industry, assuming that doing so would benefit the cluster, when the targeted industry may not be meaningfully linked to the cluster at all. At the same time, an industry that needs workforce enhancement may go unnoticed because it was assumed unrelated to the cluster when it was in fact it related. This problem is highlighted by the RPC’s definition for the Creative Media and Design Cluster in the 2009 CEDS. The complete RPC definition is provided in the Table 1 below:

Table 1: 2009 RPC CEDs: Creative Media and Design Cluster Definition

NAICS Code	Description
511210	Software Publishers
512110	Motion Picture and Video Production
512120	Motion Picture and Video Distribution
512131	Motion Picture Theaters (except Drive-Ins)
512132	Drive-In Motion Picture Theaters
512191	Teleproduction and Other Postproduction Services
512199	Other Motion Picture and Video Industries
512210	Record Production
512220	Integrated Record Production/Distribution
512230	Music Publishers
512240	Sound Recording Studios
512290	Other Sound Recording Industries
516110	Internet Publishing and Broadcasting
541410	Interior Design Services
541420	Industrial Design Services
541430	Graphic Design Services
541490	Other Specialized Design Services
541810	Advertising Agencies
541820	Public Relations Agencies
541830	Media Buying Agencies
541840	Media Representatives
541850	Display Advertising
541860	Direct Mail Advertising
541870	Advertising Material Distribution Services
541890	Other Services Related to Advertising
541922	Commercial Photography

Using Porter’s methodology to define this cluster reveals four industries in the RPC definition fail to show any interindustry linkage to the cluster. In other words, they should not be included as part of the cluster, as their employment, location, spending, and occupation trends are unrelated to those for the other industries. In addition, Porter identifies eleven industries that are linked to this cluster but excluded from the RPC definition.

Table 2: Comparing 2009 CEDS Definition to Porter’s Cluster Definition: Creative Media and Design

Unrelated Industries Included in Definition	
NAICS Code	Description
511210	Software Publishers
512131	Motion Picture Theaters (except Drive-Ins)
516110	Internet Publishing and Broadcasting
541922	Commercial Photography
Related Industries Excluded from the Definition	
NAICS Code	Description
334612	Prerecorded Compact Disc (except Software), Tape, and Record Reproducing
511120	Periodical Publishers
511130	Book Publishers
511140	Directory and Mailing List Publishers
511199	All Other Publishers
519110	News Syndicates
519120	Libraries and Archives
519130	Internet Publishing and Broadcasting and Web Search Portals
519190	All Other Information Services
541613	Marketing Consulting Services
541910	Marketing Research and Public Opinion Polling

Again, Porter’s methodology provides the most rigorous definitions of clusters available. His definition for creative media and design is provided in Table 3 below. In reviewing the included industries it is important to note that these have been proven to be linked to one another across the five dimensions of locational employment growth,

locational growth in the number of businesses, coagglomeration, spending patterns, and finally, shared labor pools. Basically, the dynamics of these industries move together for better or worse.

Table 3: Porter's Definition: Creative Media and Design

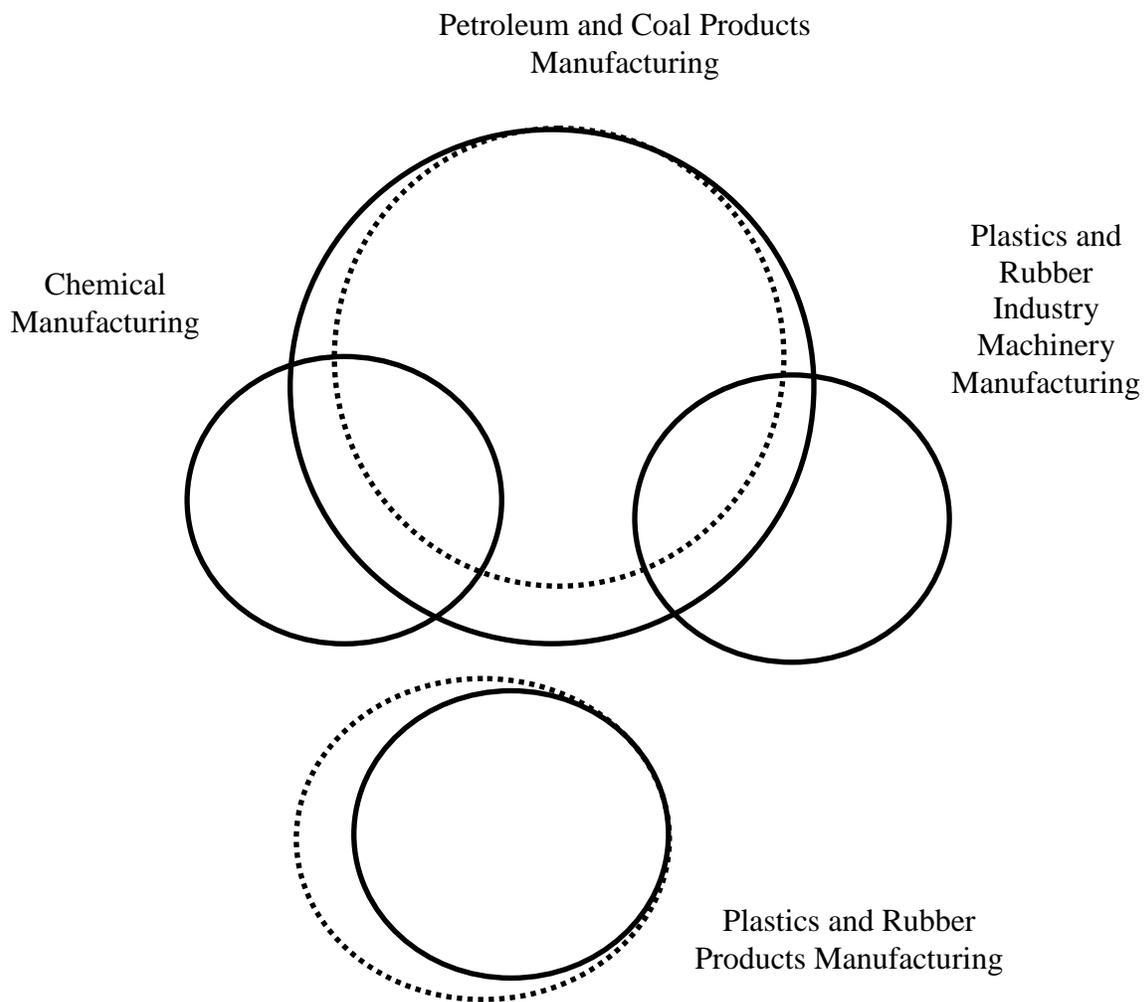
NAICS Code	Description
334612	Prerecorded Compact Disc (except Software), Tape, and Record Reproducing
511120	Periodical Publishers
511130	Book Publishers
511140	Directory and Mailing List Publishers
511199	All Other Publishers
512110	Motion Picture and Video Production
512120	Motion Picture and Video Distribution
512132	Drive-In Motion Picture Theaters
512191	Teleproduction and Other Postproduction Services
512199	Other Motion Picture and Video Industries
512210	Record Production
512220	Integrated Record Production/Distribution
512230	Music Publishers
512240	Sound Recording Studios
512290	Other Sound Recording Industries
519110	News Syndicates
519120	Libraries and Archives
519130	Internet Publishing and Broadcasting and Web Search Portals
519190	All Other Information Services
541410	Interior Design Services
541420	Industrial Design Services
541430	Graphic Design Services
541490	Other Specialized Design Services
541613	Marketing Consulting Services
541810	Advertising Agencies
541820	Public Relations Agencies
541830	Media Buying Agencies
541840	Media Representatives
541850	Display Advertising
541860	Direct Mail Advertising
541870	Advertising Material Distribution Services
541890	Other Services Related to Advertising
541910	Marketing Research and Public Opinion Polling

Finally, the CEDS definitions are at times too expansive, meaning what the RPC accepts as a single cluster (i.e., Petrochemical and Plastics) actually incorporates many different ones. By lumping clusters together, they lose their meaning, and as a result, analyses of cluster dynamics offer no real insights for action. The problem of lumping is evident in the RPC's definition for the Petrochemicals and Plastics cluster. This is a large cluster for the RPC, which is divided into four parts: petroleum and coal products manufacturing, chemical manufacturing, plastics and rubber manufacturing, and plastics and rubber industry machinery manufacturing. All four of these parts, as currently defined, suffer from the problem of failing to clearly identify the existence of interindustry linkages discussed above; industries are grouped together in non-meaningful ways. In addition, by lumping these four groups of industries together, one group, for example, petroleum and coal products, can be the clear driver of the "cluster." This means if the four parts were analyzed together, without more detailed analyses of the four component parts, the upwards and downwards swing of one component can hide positive opportunities in another part, or mask deficiencies that need to be addressed. The figure below demonstrates this issue. As a driver, the petroleum and coal products group of the "cluster" can shrink, as indicated by the dotted lines, and mask growth by any of the other three parts, such as the growth shown by the dotted lines in plastics and rubber. This can lead to the erroneous conclusion that the "cluster" as a whole is stagnant, or even worse, depending on the severity of petroleum's contraction, in decline.

Perceived stagnation or decline would likely provoke further attention, but growth of petroleum and coal could also hide contractions in the other parts of the "cluster." This scenario could produce a failure to act when key parts of the economy are struggling. In

effect, lumping actually works against the goal of defining clusters, which is to isolate industries that display uniform movement in employment, spending, occupational allocations, and so on.

Figure 2: The Problem of Driver Industries



As defined by the 2009 CEDS, the four groups in the RPC's definition of the Petrochemical and Plastics "cluster" could be analyzed separately, and as a result, driver trends could be identified. However, even separate analyses of each part do not correct for failing to identify interindustry linkages. The lack of linkages is demonstrated most clearly by the plastics and rubber grouping, which stands alone in Figure 1. It is disconnected from the other groups. Thus, efforts to facilitate the growth of this "cluster" as a whole may have no meaningful impact on the plastics and rubber grouping. For instance, a survey of business needs for the "cluster" as a whole may end up with a number of responses from chemical manufacturers. Their needs could be interpreted as important needs for the whole "cluster," when they may be unrelated and even in opposition to the needs of plastics and rubber manufacturers.

In sum, the RPC definitions, while based upon NAICS codes that do indeed capture similarities across groups of industries, fail to rigorously define clusters. As a result, if the RPC and other economic development organizations wish to pursue cluster-based strategies for stimulating regional growth, they should take a different approach.

Replacing the RPC's Cluster Definitions with Porter's Definitions:

As detailed above, the work of Michael Porter and his colleagues made public through the U.S. Cluster Mapping Project provides the most rigorous definitions of economic clusters currently available.^{xvi} Prior to his definitions, scholars used definitions built from in-depth case studies, which were assumed applicable to other regions. For example, Saxenian's (1994) description of the semiconductor industry in Silicon Valley became the standard to measure against elsewhere. To provide better definitions, Porter's methodology not only uses multiple indicators to assess interindustry linkages but also

shows how the trends across the indicators are correlated. In effect, the U.S. Cluster Mapping Project is the most reliable resource for information on clusters. Using this resource, it is possible to strengthen the Regional Planning Commission's cluster definitions. The first step in refining the clusters is to eliminate predetermined categories upon which to focus. While it is tempting to select and target industries that the RPC and other economic development organizations *would like* to see develop in the region, cluster approaches work with current, *existing* strengths. Porter has suggested this is the way to adopt a cluster-based approach, as have others.^{xvii} This means practitioners need to abandon their predetermined silos of economic activity and conduct a full cluster analysis of traded and local clusters within their region to assess their strengths and weaknesses. Of course, this suggestion overlooks emerging economic activity, which is a topic that will be addressed later (See, "The Problem of Emerging Clusters" below).

The strength of a cluster is determined by a combination of two measures: the location quotient for the cluster and also the share of national employment within the regional cluster. The U.S. Cluster Mapping Project offers the following benchmarks for strength levels:

- Strongest Level: High employment specialization (a location quotient greater than or equal to 1.3) and a large share of national employment (share of National Cluster Employment must be greater than the 90th percentile when measured across all MSAs with non-zero employment in the cluster).
- Medium Level: High employment specialization (a location quotient greater than or equal to 1.3).

- Weak Level: A large share of national employment (share of National Cluster Employment must be greater than the 90th percentile when measured across all MSAs with non-zero employment in the cluster).

A region has a cluster as long as it meets any of the above criteria. Even satisfying the criterion for the weak level reveals a strength.^{xviii} In determining their region's strengths, economic development organizations should look at both traded and local clusters.

Traded clusters build prosperity and will inevitably draw the most attention from economic developers. However, most of a region's employment is concentrated in local clusters, and oftentimes, the local clusters are supportive of traded clusters. Thus, they are equally important for a well-rounded, healthy economy. Knowledge on the performance of both is vital.

The U.S. Cluster Mapping Project provides definitions by NAICS (six-digit level) for all of the industries composing clusters. Unlike previous definitions, there are no industrial overlaps between clusters. The definitions are provided in accompanying documents. If the RPC elects to follow a cluster-based strategy, they should use these definitions in place of those contained in the 2009 CEDS. They should then determine for which clusters the region possesses a strength, and these strengths should be the focus of strategic action.

The Problem of Emerging Clusters:

Newly forming economic activity is very difficult to detect even with the most advanced quantitative methods and the most fine-grained data. Porter's cluster methodology is descriptive; it only captures existing strengths and fails to identify new economic activities that may be generating momentum. Clusters can be used in an

attempt to identify new clusters, but to meet the highest standards of rigor they should be used in combination with other strategies. Specifically, Porter and his colleagues supplement their methodology with a case-based approach to identifying emerging clusters.^{xix}

Unfortunately, even with case-based methods, identifying newly emerging activities is a challenge given existing social scientific methods. Perhaps the best approach is to use a network methodology that traces the relationships of actors and the formation of organizations over time.^{xx} For example, if the region wishes to give water management its most rigorous form, The Data Center uses a cluster approach to provide a definition.^{xxi} This should then be supplemented by lists of known actors in the field of water management at both the individual and organizational levels. Eventually, the lists will grow to the point that they can confirm movement in employment. In other words, the lists can be traced back to the Porter definitions to confirm that they are accurate or to suggest alterations. This case-based, network methodology also offers the additional advantage of highlighting other non-economic supports to the growing cluster. For example, it can model leadership structures, labor spillovers and idea sharing, as well as kinds of civic infrastructure attached to economic activities. A full description of how this is done is beyond the scope of this memo, as it could, in time, require advanced network methodologies, such as block models. Overall, this is not an easy way to chart the formation of a system supportive of a particular form of economic activity over time. Essentially, it is labor intensive, requiring a lot of “in-the-field” effort, and it is time consuming. However, there is no better alternative if accurate data is desired that actually captures the growth of something new.

The Reasons Why the RPC should Adopt Porter's Definitions:

There are several reasons why the RPC should use Porter's cluster definitions in their economic analyses. First, they are the most rigorous available. By converting, the RPC would be following the methods currently employed by the best researchers in the country. While the rigor would not be immediately noticeable to the novice, it would be to audiences at the federal level that control funding decisions. Hence, the method serves as a tool for conveying organizational legitimacy.

Second, the RPC would set a standard that other economic development organizations can use to coordinate their activities. Currently, there is agreement across organizations about what clusters, or sectors, to target for future growth, but definitions vary. By implementing a uniform set of definitions, all organizations would be working with the same information and off of the same conclusions about their local economy. This would not only build trust and collaboration across the organizations in the region, but it would signal to outsiders that the economic actors are on the same page in their missions and methods. Again, organizational legitimacy would be conveyed, but in this case, it would be for all organizations in the area and the audience would not only include actors at the federal level but also funders and businesses. By having all organizations use the cluster methodology, economic development practice will be more transparent.

Finally, analyzing clusters turns attention away from individual export sectors, and encourages a wider focus on the economy. Here, it is relevant to return to the diamond model. When clusters are identified, all of the other components of the diamond should shape the ways in which development professionals think and act. Instead of working with individual firms, they should probably work with groups of firms. Instead

of looking at training programs for specific industries, they should probably think about broader skill sets and how they can be best developed. Essentially, a cluster framework encourages a more holistic view of the economy. Indeed, this is the precise benefit that scholars have identified as most useful for practitioners.^{xxii} Essentially, the cluster approach is a useful tool that enables practitioners to better observe the strengths and weaknesses of their local economy, and thereby facilitate more effective action.

Conclusions: How a Cluster-Based Approach Changes Economic Development

Practices:

Adopting a cluster-based approach to economic development does not necessarily change how economic development is performed, as oftentimes, EDOs are already engaged in cluster-based practices. However, it does promote a stronger commitment to collaborative thinking, which is encouraged by the underlying characteristic within clusters of the interindustry linkage.^{xxiii} Thus, individual firms and industries no longer become the focus of development efforts, giving way to groups of industries or strategically important relationships between industries and supporting institutions. The benefit in the shift in focus from individual to group is that it de-emphasizes incentive-based development, curbing rent-seeking while developing more durable economic institutions.^{xxiv} For those who advocate for cluster-based approaches, they suggest the following action steps, many of which underscore the need for collaboration:

Example Practices Characteristic of Cluster-Based Approaches

- Focus on strengths, as clusters cannot be built from scratch. This does not mean new clusters will not emerge; they are just likely to be off shoots of existing economic activities.
- Not only should practitioners focus on existing clusters but pre-existing strategies and programs that support clusters should be identified and strengthened.
- Focus on clusters where the region has an existing advantage in comparison to other regions.
- Within strength areas, the private sector must be made a collaborator with economic development organizations in guiding thoughts on how the cluster can be improved upon.
- Oftentimes, members in a cluster are not aware of their interdependencies. For this reason, practitioners must encourage ways to encourage collaboration. Essentially, they need to act as relationship brokers, focusing on networking within clusters, across the region, and even clusters in other locations.
- Collaboration is encouraged through membership groups, councils, conferences, business incubators that bridge companies and industries, workforce programs that bridge companies and industries, career fairs, and informal peer networks. Economic development organizations should look to these options and beyond to encourage collaboration.
- Weaknesses in supplier networks should be assessed and regions should work hard to ensure the availability of technical support services. Filling in weaknesses in supplier or support services can be accomplished by encouraging homegrown companies or from recruiting companies from elsewhere.

- Since clusters bring prosperity through change, entrepreneurship is important. Economic development organizations should find ways to support start-ups and spin-offs. They should also find ways to get companies to support employee entrepreneurs rather than taking a proprietary approach to products and services.
- A high quality workforce is needed for clusters to work properly. Workforce needs for clusters (not industries) should be assessed and actions should be taken to address them. Importantly, not only is it important to build a labor force to plug into a cluster, it is equally important to upgrade the skills of workers already placed within clusters.
- Finally, knowledge spillover happens in social environments. For this reason, it is important to maintain a strong civic infrastructure. In other words, the development of informal institutions that bring business leaders together is important. In Washington, DC, for instance, there is a healthy rivalry played out in think-tank softball. As unrelated as these social institutions may appear, they are vital for clusters.

In no way are the above suggestions a comprehensive list. In addition, they do not necessarily give guidance on what the content of collaborations should be. Here, it is important to return to Porter's diamond model. If demand for high quality goods and services drives clusters, collaborations should focus on how demand for quality can be stimulated. If organizational models that encourage creativity are important, collaborations should provide guidance on what those models look like. If interindustry linkages matter, how can training programs be designed so they build bridges across

industries, or even clusters? If density, or co-location matters, how can zoning policies be approached in a collaborative matter to ensure clustering? As mentioned earlier, the diamond model should figure into the thinking and actions of economic development organizations. This is the only way to ensure that actions conform to the underlying theory of cluster-based development.

Endnotes

ⁱ The innovation approach stands in contrast to other perspectives on development, such as business climate approaches, ecological arguments, amenity-based development, human capital perspectives, labor-centered development, and diversity approaches. While the boundaries between these perspectives are not cut and dry, the innovation approach differs on the key mechanism that drives growth -- innovation. A detailed review of all these perspectives is beyond the scope of this paper, but for specific information on each, see the following. Business climate approaches include standard, incentive driven practices. They have no theoretical foundation, and in fact, they have been harshly critiqued. For an overview, see Markusen, A. (ed) 2007. *Reigning in the Competition for Capital*. Kalamazoo, MI: Upjohn Institute.; On ecology, see Bogue, D.J. (1951). *State economic areas: A description of the procedure used in making a functional grouping of the cities of the United States*. Washington, D.C.: U.S. Government Printing Office.; On amenities, see Clark, T. (ed.) (2004). *The city as an entertainment machine*. New York: Elsevier; and also, Florida, R. (2002). *The rise of the creative class*. New York: Basic Books.; On human capital, see Glaeser, E. & Saiz, A. (2004). The rise of the skilled city. *Brookings-Wharton Papers on Urban Affairs*, 5, 47-94. On labor-centric approaches, see Markusen, A. & Schrock, G. (2008). Placing labor center-stage in industrial city revitalization. in R.M. McGahey and J.S. Vey (Eds.), *Retooling for growth* (179-210). Washington, D.C.: Brookings Institution Press.; and finally, on diversity see Jacobs, J. (1969). *The economy of cities*. New York: Vintage Books.

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ⁱⁱⁱ Porter, M.E. (1990): 71.

^{iv} Porter, M.E. (2003). The economic performance of regions. *Regional Studies*, 37, 549-578. For a review of common measures of clusters, see Wagner, J.E. (2000). Regional economic diversification: Action, concept, or state of confusion. *The Journal of Regional Analysis & Policy*, 30(2), 1-22.

^v Annalee Saxenian provides an excellent example of what this research would look like in Saxenian, A. (1994). *Regional advantage: Culture and competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University.

^{vi} See, for example, Hill, E.W., and Brennan, J.F. (2000) A methodology for identifying the drivers of industrial clusters: the foundation of regional competitive advantage. *Economic Development Quarterly*, 14: 65-96., and Cortright, J. (2010) The athletic and outdoor industry cluster: A white paper." Impresa Economics.

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- ^{viii} See <http://clustermapping.us>.
- ^{ix} Ellison, G., Glaeser, E., & Kerr, W. (2010) What causes industry agglomeration? Evidence from coagglomeration patterns. *The American Economic Review*, 100 (3), 1195-1213. ; and Ellison, G. and Glaeser, E., (1997). Geographic concentration in U.S. manufacturing industries: a dartboard approach. *Journal of Political Economy* 105 (5), 889-927.
- ^x Feser, E.J. (2005). Benchmark value chain industry clusters for applied regional research. Regional Economics Applications Laboratory (working paper), University of Illinois at Urbana-Champaign.; and Feser, E.J. and Bergman. E.M. (2000). National industry cluster templates: A framework for applied regional cluster analysis, *Regional Studies*, 34(1), 1-19.
- ^{xi} See <http://clustermapping.us>.
- ^{xii} Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, and St. Tammany Parishes. 2009. Comprehensive economic development Strategy, 2009 update, economic development district one. Retrieved June 1, 2014, from http://www.norpc.org/assets/pdf-documents/econ-dev_ceds2009.pdf.
- ^{xiii} See for example, Martin, R. & Sunley, P. (2003). Deconstructing clusters: Chaotic concept or policy panacea? *Journal of Economic Geography*, 3, 5-35.
- ^{xiv} Porter, M.E. (2009).
- ^{xv} See <http://clustermapping.us>.
- ^{xvi} Delgado, M., Porter, M. E., & Stern, S. (2013).; Porter, M.E. (2003).
- ^{xvii} Porter, M.E. (2009). Clusters and economic policy: Aligning public policy with the new economics of competition. White Paper, Institute for Strategy and Competitiveness, Harvard Business School.; Muro, M. and Katz, B. (2010). The new "cluster moment": How regional innovation clusters can foster the next economy. Metropolitan Policy Program, Brookings Institution.; and Rosenfeld, S. (1997). Bringing business clusters into the mainstream of economic development. *European Planning Studies*, 5 (1), 3-23.
- ^{xviii} For practitioners to assess all three strength levels they need access to data for all metros. Currently, the RPC's subscription to EMSI only allows comparisons of Southeast Louisiana to the nation. Thus, only the medium level can be determined.
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- ^{xxi} Hobor, G. and Plyer, A. (2014). The coastal index. Retrieved from https://s3.amazonaws.com/gnocdc/reports/TheDataCenter_TheCoastalIndex.pdf.
- ^{xxii} See Bacheller, J. (2000). Commentary on State-Level Economic Development in New York. *Economic Development Quarterly*, 14 (1), 5-10.; and Waits, M. (2000). The added value of the industry-cluster approach to economic analysis, strategy development, and service delivery. *Economic Development Quarterly*, 14 (1), 35-50.
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