

Reid, Neil; Carroll, Michael C.

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The benefits of participating in an industrial cluster from the perspective of the firm

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The benefits of participating in an industrial cluster from the perspective of the firm

Neil Reid
Department of Geography and Planning
Urban Affairs Center
University of Toledo
Toledo, Ohio 43606
neil.reid@utoledo.edu

Michael Carroll
Department of Economics
Center for Regional Development
Bowling Green State University
Bowling Green, Ohio 43403

1. INTRODUCTION

Industrial clusters have received considerable attention as a regional development strategy in recent years. While their efficacy has been debated in the academic literature (Martin and Sunley, 2003; Taylor, 2006; Torre, 2007), clusters have become extremely popular in the world of economic development practitioners. In Europe alone there are over one thousand cluster initiatives (Sölvell, 2008). This lends credence to Asheim, *et al.*'s (2006, p.3) observation that "clusters, it seems, have become a worldwide craze, a sort of academic policy fashion item". Clusters have also been embraced in the United States. For example, the National Governors Association (NGA, 2007) published *Cluster-Based Strategies for Growing State Economies* and subsequently announced that it was launching a policy academy for states using cluster analysis and innovation-based economic development strategies.

Despite the acceptance of clusters by many academics and policy makers, there are surprisingly few attempts to objectively measure the success of clusters or the impact of a cluster on the constituent firms (Feser *et al.*, 2008; Fromhold-Eisebith and Eisebith, 2005; Hendry and Brown, 2006). Sölvell (2008) reported that only five cluster organizations out of 50 he surveyed had completed cluster evaluations. Fromhold-Eisebith and Eisebith (2005) suggested that the heterogeneity of clusters leads to intricate methodological issues that inhibit evaluation. Also they noted, there may be a vested interest on the part of management and public officials not to have an evaluation because it may yield undesirable results. Nonetheless, for those persons managing a cluster, an evaluation of the progress of a cluster is necessary in order to attract funding and participants (Sölvell, 2008). The purpose of this paper is to discuss the initial measures that have been developed to evaluate the success of a cluster focused around the greenhouse industry which has been operating in northwest Ohio since 2004. Success for this paper is defined as the benefits that the cluster has generated for the participating firms and the local industry. An assessment of the impact of the cluster on the regional economy is outside the domain of this paper. The work reported in this paper is only the beginning phase of a longer-term, on-going effort to track the progress and success of the cluster.

In the remainder of this paper, we begin by providing background information on the cluster, which is necessary to understand the metrics that have been developed. This is followed by a discussion of the metrics used and results obtained.

2. THE NORTHWEST OHIO GREENHOUSE CLUSTER

The greenhouse cluster has been developing in northwest Ohio since 2004 (Figure 1). It was initiated with strong support from U.S. Congresswoman Marcy Kaptur who, for many years, has been concerned with the sustainability of family owned agricultural enterprises in her congressional district. In addition, funding for the cluster project has been provided by

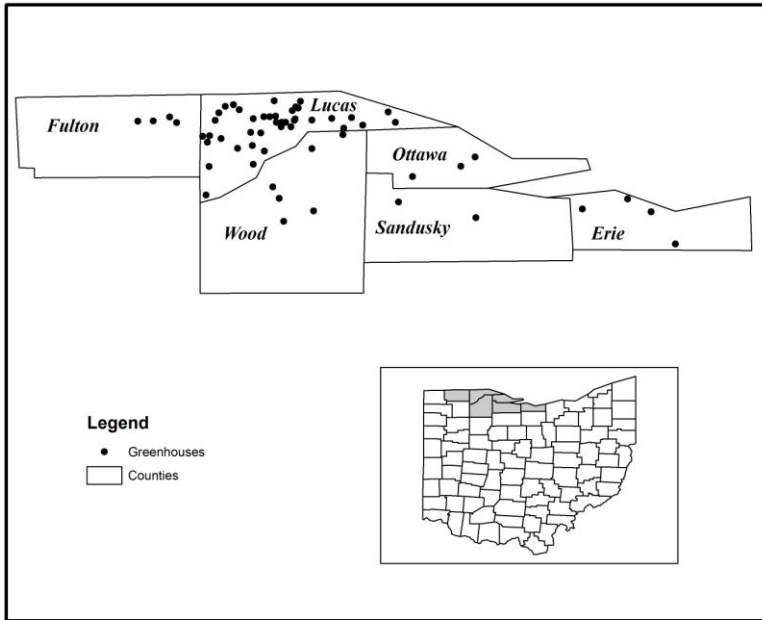


FIGURE 1
NORTHWEST OHIO GREENHOUSE CLUSTER REGION

the United States Department of Agriculture. Approximately 60 greenhouse owners in the region have joined with university researchers, industry suppliers, and other community stakeholders to identify and implement solutions to common problems and challenges that the local industry has been experiencing. Those challenges include a weak market presence, international competition, dated infrastructure and production technology, and high and rising energy costs (LaFary *et al.*, 2006). As a result of these problems, many greenhouse operators are pessimistic about their industry's future. In a 2004 survey, only 27 percent of the growers in northwest Ohio were optimistic about the future of the industry (Gatrell *et al.*, 2009).

To organize the greenhouse industry endeavor, a cluster-based economic development strategy was selected (Reid and Carroll, 2006). A cluster approach seemed appropriate for the greenhouse industry because initial analyses found a fragmented local industry composed of very small growers operating family-owned businesses. In the greenhouse project, cluster-based economic development is viewed as a network driven economic strategy built on collaboration and joint action among the participants in order to achieve collective efficiencies. The goal is to generate the positive synergy that can occur when growers, suppliers, researchers, economic development agencies, and other community stakeholders strategically join forces to confront the competitive challenges which due to the lack of resources individual businesses cannot successfully address by themselves.

Joint action can be problematic since firms within a particular industry often view each other as competitors, leading to and resulting from low levels of social capital. Cohen and Prusak (2001, p. 4) defined social capital as "the stock of active connections among people: the

trust, mutual understanding, and shared values and behaviors that bind the members of human networks and communities and make cooperative action possible". Like any form of capital, social capital by definition must have the ability to be used for pecuniary gain. Therefore, the benefit of a cluster network rich in social capital is the ability to turn the social characteristics of the network into economic advantage. Consequently, the building of social capital becomes a paramount consideration for the cluster.

In the case of the northwest Ohio greenhouse industry, enhancing social capital and collaboration has been significantly impacted by the grower culture. Most of the greenhouses have been owned by the same family for multiple generations, resulting in a complex network of embedded relationships. While one might expect this to be a positive characteristic from the perspective of the stock of social capital inherent within the industry, this is not the case. Not all of these embedded relationships are positive. Moreover, many of the growers are independent and working collaboratively does not come easy, even in the face of common threats. Consequently, an ongoing challenge for the cluster management team has been the fostering of positive social capital.

Unlike many cluster projects which are top-down and expert-driven, this is a "grass roots" initiative. The greenhouse endeavor was initially conceptualized as a university-led project to provide support to the industry and to make specific recommendations for improving the industry's competitiveness. However, the research team learned quickly that the grower culture would not adapt to that strategy. Consequently, the project has been transformed into a grower-led cluster, providing yet another reason why grower collaboration and a strong social network among the participants are essential.

The northwest Ohio greenhouse growers have undertaken a variety of projects to enhance the local industry's competitiveness. The selection of the projects was endorsed by the growers and strongly influenced by the potential of a project to demonstrate to the growers the value of joint action. One of the initial projects was the creation of a brand identity, Maumee Valley Growers (MVG), and a marketing campaign to enhance the local growers' market presence, which will ultimately increase their market share relative to non-local greenhouse products. The implementation of the branding project was slow because the growers had never previously engaged in joint marketing efforts. Moreover, a 2004 survey found that nearly two-thirds of the northwest Ohio growers reported a lack of marketing expertise and market information. Thus they were unfamiliar, and initially uncomfortable, with larger scale marketing projects.

A second project was launched to counteract the high and rising utility costs which growers face. A natural gas purchasing pool was developed in which the cluster buys large volumes of natural gas on behalf of the greenhouses which traditionally bought gas individually in lower volumes and at higher prices. Implementation of this project was slow and difficult. Many growers opposed it initially because it required collaboration between greenhouse wholesalers and retailers; two segments of the industry that had little history of collaboration. Also it was seen as being risky since it did not conform to their conventional procurement processes. Growers were also giving up their independence as buying decisions were made by an advisory group, in which not all growers had a voice. On the other hand, many growers had spent inordinate amounts of time researching gas prices and agonizing over buying decisions when they purchased natural gas individually.

Because collaboration among the growers and other cluster participants is fundamental to the long run success of the cluster, measures of collaboration are important in the evaluation of the success of the cluster as are assessments of the benefits of the branding/marketing and gas purchasing programs.

3. DATA

Ideally one would acquire economic data, such as sales, employment, and productivity growth, for the businesses in the greenhouse cluster in order to evaluate the cluster's success (Sölvell, 2008). However, the greenhouse owners are very reticent to share

such information. Moreover, they are small firms and therefore little data about them exist in published databases (e.g. Dun and Bradstreet). Consequently it was necessary to create indirect indicators by which we could begin to triangulate the success of the cluster. Sölvell (2008) provides an excellent discussion of the role of perceptual and analytical data, as well as hard data and soft indicators in assessing clusters. In addition, Sölvell (2008) provides an introduction to many of the issues surrounding evaluation in general. In this project, we employ a variety of types of information, including hard and soft data and perceptual indicators

One source of data was a survey of greenhouse operators. The survey, conducted in 2009, was sent to 60 greenhouses, of which 57 responded for a response rate of 95 percent. This survey provided insights into growers' perceptions of the value of the cluster to them.

A second source of data was a telephone survey of northwest Ohio residents that was conducted during 2008 (Reid *et al.*, 2009). One objective of this survey was to provide greenhouse owners with information on the characteristics and motivations of persons buying greenhouse products. Another objective was to determine consumers' awareness of the Maumee Valley Growers brand. A total of 2,388 adults completed the survey, resulting in a sampling error of 2.7 percent. Respondents were selected by randomly selecting telephone numbers from an electronic directory of active residential telephone lines. For the purposes of this survey, the response rate was defined as a ratio of the number of the eligible participants who responded to the number of the participants completing the entire questionnaire. The response rate was 56 percent.

Sölvell (2008) suggests that measures, such as membership and network meetings, are indicators of strengthening cluster dynamics. In the case of greenhouse cluster, one of the authors was instrumental in the establishment of the cluster. He is also a member of the Board of Directors of the Maumee Valley Grower Association and attends monthly stakeholder meetings. These activities provide rich insights into the growers' culture and attitudes toward all aspects of the cluster. Also Sölvell (2008) suggests that a cluster manager's log can be source of evaluative information. While the cluster manager has not maintained a log, he has kept extensive notes and compiled data on the natural gas project, which provides valuable information for assessing that program.

To measure the development and growth of social relations within the cluster, social network analysis was used. Social network analysis describes and analyzes the relationships among a group of people and/or organizations (de Nooy *et al.*, 2005). In social network analysis, the focus is on the relationships among individuals, with the underlying premise that the behavior of people and organizations is impacted by, and in turn, shape their social networks.

In early 2007, a social network survey of the participants in the greenhouse cluster was undertaken. At that time, 111 people were identified as having some affiliation with the cluster, including representatives from suppliers, academia, government agencies, and the economic development field. The data were collected using the roster-recall method (Ter Wal and Boschma, 2009). In this approach, each of the survey participants was given a list of all 111 members of the cluster project. They were asked to indicate those individuals with whom they had collaborated on an industry-related project during the previous year. In addition, each respondent could enter the names of persons not on the list with whom they had collaborated. In effect, this becomes a snowball type of sample because one can then send the questionnaire to those persons listed by respondents who were not on the initial roster (Steiner and Ploder, 2008). The results reported in this paper are based on the responses received from the original list of respondents. A total of 74 persons responded for a 66.7 percent return rate. Those 74 respondents wrote in additional people so a total of 168 different nodes (people) emerged from the survey.

4. MEASURES AND RESULTS

The measures constructed and the results obtained for each of those measures will be briefly described. First the results for collaboration will be reviewed, followed by a discussion of the marketing and natural gas projects respectively.

4.1. COLLABORATION

Various networking opportunities have been incorporated into cluster activities to build the social network. These include monthly stakeholder meetings, an annual dinner, and other periodic events. One positive indicator of relationship building and increasing collaboration is that average attendance at the monthly stakeholder meetings increased from 15.0 in 2004 to 25.6 in 2009. Moreover, as a result of their participation in the cluster, some growers have noted that they no longer feel as isolated as they did previously. In the 2009 grower survey, 80 percent of the respondents said that they have more interaction with their peers as a result of the cluster project. In addition, nearly 60 percent of the respondents reported greater access to university researchers as a result of their participation in the cluster. The fact that growers continue to attend stakeholder meetings on a regular basis indicates that the meetings and the project more broadly, provide value-added for the growers. As small business owners surviving on razor-thin margins, they do not have the time to attend meetings that they perceive to have little value.

An analysis of the social network data provides another avenue for examining collaboration. Cluster-based economic development is an active and participatory collaborative strategy that relies on a well-connected network. To determine the level of connectedness within a network, the density of the network can be calculated. Density is the ratio of actual node connections to the total potential node connections within a network (de Nooy *et al.* 2005). The greater the number of collaborative links (ties) between nodes (growers and non-grower members of the cluster) the higher will be the density of the network. Krätke (2002, p. 38) argued that network density impacts “the productive capacity of the cluster as a regional production system.”

In the greenhouse collaboration network, there were 168 people with a total of 1480 links out of a potential of 25,122 links for a 6% density. One challenge with using social network analysis metrics is that standardized thresholds have not been established to identify high and low values so it is difficult to make definitive statements that any given value is either high or low. Moreover, finding directly comparable studies is problematic due to variations in questions asked, data collection methodologies, etc. Also density values will vary depending on the size of the network. Nonetheless Krätke (2002, pp. 38-39) stated that: “the ‘realistic’ value range of the network density in production clusters tends to be between 0 and 0.4.” It is important to note that there is no agreement on the level of density that is beneficial as opposed to detrimental to a given network (Provan *e. al.*, 2007).

The generally lower density in the greenhouse cluster in part reflects the history of grower relations mentioned previously. These results are consistent with other research that has shown that actor characteristics and motivations impact their networking activities (Madill *e. al.*, 2004). As Bathelt (2005) suggested, formation of a cluster does not cause firms to immediately start working for the common good. Historical relations and power asymmetries among the actors initially are major barriers that must be overcome (Bathelt *et al.*, 2004).

One asset of network analysis is that it can be productively applied to build desired connections within the cluster. As suggested by Brandt *et al.* (2009), one can identify isolated people and fragments of the network that perhaps can be better integrated with the main cluster core. In fact, the cluster now has a “network weaver” whose function is to build links between appropriate persons in the cluster.

4.2. BRANDING AND MARKETING

To assess the outcomes of the branding and marketing campaign, data obtained from both the consumer and producer surveys were used. In the case of the consumer survey, people

were asked if they recognized the MVG brand. Forty-one percent of respondents indicated that they had. The highest brand recognition percentage was in Lucas County (47 percent) and the lowest was in Erie County (19 percent). One could debate whether or not the 41 percent rate is an acceptable level of brand recognition. It is apparent, however, that more work is needed to make the brand better known throughout the region. Also these data do not indicate if recognizing the brand causes consumers to be more likely to purchase MVG products. Point-of-sale data need to be collected to ascertain that likelihood.

In the survey of the greenhouse operations, owners were asked if they thought that MVG projects had helped them attract customers or better serve their customers. Among the respondents, 55 percent agreed or strongly agreed that they had attracted new customers and were able to better serve their customers. Obviously this perceptual data does not directly measure the increased sales, if any, from the cluster marketing endeavors. However, it does demonstrate that many growers believe the branding and marketing campaigns have been of value.

4.3. NATURAL GAS PURCHASING

In contrast to the other projects, hard data are available for the natural gas project. Consequently, it is easier to demonstrate that the natural gas project has had a positive financial impact on the industry than in the case of the other projects. In the first year of the gas program's operation (2007), a total of \$150,000 in natural gas costs was saved for the participating greenhouses. In 2009, the total savings approximated \$450,000. This represents an average savings of approximately 12 to 15 percent for the individual growers. Moreover, the natural gas project has expanded its geographic footprint. It originally included only growers from northwest Ohio. By 2009, however, it had expanded to include growers from throughout Ohio and southeastern Michigan. To date this has been the most successful cluster initiative. It is easily understood by and appeals to growers and it is the topic that generates the most inquiries to the Maumee Valley Growers Association from growers across the region.

5. DISCUSSION AND CONCLUSION

Evaluation of cluster outcomes is important, but the topic has rarely been addressed in the literature. No doubt people involved in building and/or managing a cluster may lack the time or skill sets to execute sophisticated evaluation schemes. Such is the case with the northwest Ohio greenhouse cluster. For these reasons, it is important to develop metrics and procedures that can be compiled easily, while still providing meaningful information. Metrics of success must also be appropriate for the cluster in question and must reflect the goals of the cluster. For example, one of the advantages of clusters often cited in the literature is that it enhances the innovative capacity of the industry. In the case of the northwest Ohio greenhouse industry enhancing innovative capacity is not a primary goal at this time, and therefore it is not included as one of our success metrics.

There is evidence that the greenhouse cluster has had a positive impact on its participants. The most notable success is the natural gas program. It has saved participants substantial money and gained acceptance by growers located outside the local region. It is easier to quantify the impact of the gas program because the collection of monetary data is a necessary part of operating the program. Other hard data, such as sales of greenhouse products, are not available to the research team.

The evidence regarding the impact of the branding and marketing program is less solid than is the case of the gas project. On one hand, a notable percentage of surveyed northwest Ohio residents had heard of the MVG brand, but that percentage was very uneven across the cluster region. Also we do not know if brand recognition has led to greater sales. We need to collect point-of-sale data to validate such a relationship. The perception of many growers is that cluster activities have enabled them to attract more customers. However, we cannot measure the increase in sales. Moreover we do not know that the increased sales, if they

exist, have been caused by the cluster. In fact, a general problem in cluster evaluation is to determine if observed effects have been caused by the cluster or if there are other “explanatory drivers” (Sölvell, 2008, p. 62).

Measurement of collaboration is problematic. While some indirect indicators, such as grower interviews and participation in cluster activities, are positive, we cannot gauge the extent to which collaboration has generated positive economic impacts. Social network analysis provides a promising venue for assessing collaboration, but that technique has inherent problems in both data collection and interpretation (Ter Wal and Boschma, 2009; Brandt *et al.*, 2009). We will make greater efforts to create more useful indicators of collaboration and the impact of collaboration and joint actions.

The metrics developed to date provide a baseline for future comparison. One piece of perceptual data we believe is significant is the fact that 60 percent of the growers stated in 2009 that they were optimistic about the future of their business as a result of the cluster. This statistic is in marked contrast to the 27 percent who were optimistic about the future of the industry in 2004. This growth in optimism occurred while northwest Ohio experienced extreme economic distress. Therefore, this cluster may very well have had some real impact on the economic health of this industry.

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