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Transitional Cluster Development: A Case Study From the New York Wine Industry

Arthur L. Centonze[1]

Abstract

A number of economic development studies have examined established wine industries around the world using Porter's cluster model. This article uses Porter's cluster model to study the strengths and weaknesses of the Hudson River Valley wine region as it transitions from an agricultural cluster to a wine cluster. The study seeks to determine what the cluster model can contribute to our understanding of the strengths and weaknesses of the Hudson Valley wine cluster, and what the prospects are for its future development as an export-based wine region rather than an agritourism region. The nature of this transformation is explored as well as the challenges to the cluster's future development and competitive performance. Some of the major policy implications of the case are discussed in light of the literature and specific development needs of a transitioning cluster.

Keywords

wine industry, transitional cluster, New York, cluster development

Over the past two decades, the emergence of clusters as a focus of academic research and economic development policy has been significant. Michael Porter's cluster model has been applied to the analysis of a number of urban and regional economies and adopted as a framework for regional economic development throughout the world. More recently, there have been a number of economic development studies on established wine industries using Porter's clustering model and his seminal work on the California wine cluster (1998): Australian (Aylward, 2004, 2005; Aylward & Glynn, 2006), Chilean (Giuliani & Bell, 2005; Visser, 2004), French (Ditter, 2005), and Canadian (Mytelka & Goertzen, 2003).

Using Porter's cluster model, this study examines the New York wine industry and the strengths and weaknesses of the Hudson River Valley wine region, a downstate subcluster of the New York State wine cluster where winemaking first began in the United States in the late 17th century. Several features make the Valley an interesting subject of study. Despite its long tradition as a winemaking region, the Valley is just recently transitioning from an agricultural cluster to a wine cluster. The literature on redefining clusters, particularly as it relates to the wine industry, is scarce. Moreover, the Valley enjoys a growing reputation as an agritourism destination just a short distance from New York City, a major wine, culinary, and lifestyle center, suggesting the potential for a successful transition to a wine cluster. The study explores three key questions related to the development and concentration of the wine industry in the Hudson Valley. First, what can Porter's cluster model contribute to our understanding of the Hudson Valley winemaking industry? Second, what can the model tell us about the future growth and development prospects of the cluster, specifically relative to the stated goal of transitioning from an agritourism region to a wine region producing a large quantity of high-quality wine for export? Third, what are the implications of the cluster model for economic development strategy and policy making relative to the Hudson Valley?

A case study analysis is used to demonstrate the cluster's distinct development path and includes a review of the literature on clusters, relevant data, and personal, in-depth interviews during July 2007 with wine industry leaders in the Hudson Valley: Michael Migliore, president of the Hudson Valley Wine and Grape Association and owner of Whitecliff Vineyards, and John Hudelson, PhD, vice president of the Hudson Valley Wine and Grape Association and viticulture research support specialist at Cornell University (hereafter Migliore and Hudelson). A structured, open-ended questionnaire was used covering the following five broad areas:

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demand, distribution, linkages, access to information, and competitiveness.

The article is divided into several sections. Porter's clustering model and its application to the wine industry is summarized. The U.S. and New York State wine industries are explored as context for an examination of the Hudson Valley cluster. Finally, the wider public policy lessons from the case study are discussed.

The Cluster Model

Porter (2000) defines clusters as "geographical concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (e.g., universities, standards, agencies, trade associations) in a particular field that compete but also co-operate" (p. 15).

The cluster model is an analytical concept and economic development tool, applied increasingly subnationally, that can be considered an extension of Porter's earlier work on national competitive advantage and global competitiveness. There he argued that a nation's export firms are capable of achieving productivity and innovation by seeking competitive advantage through the character and quality of the country's "diamond" of competitive advantage, that is, the relationships between four sets of variables: factor inputs such as natural, human, and capital resources and physical, administrative, information, scientific, and technological infrastructure; local demand conditions that exhibit a core of sophisticated and demanding local customers; locally based suppliers and firms from the same or related industries; and a contextual set of rules, incentives, and norms that encourages a firm strategy of investment and continuous improvement and fosters intense competition among locally based rivals. Each of these four attributes defines a point on the diamond, and the strength or weakness of each will affect the others and promote or constrain an industry's competitiveness and potential for advancement.

The more developed and intense the interaction between these four sets of factors, the greater the productivity of the firms concerned. Moreover, the intensity of the interaction within the competitive diamond is enhanced if the firms are geographically localized or clustered. Geographically clustered firms synergistically achieve competitive advantage through mutual proximity to each other, linkages to specialized suppliers and service firms, personal interactions with customers and producers of complementary products, access to information and knowledge spillovers, and face-to-face communications and networking with competitors, standard-setting organizations, trade associations, research institutions, training organizations, and government agencies (Porter, 1990, 2000; Simmie, 2004). For Porter, clusters explain the location of economic activity, and much of a firm's competitive advantage lies outside the firm and is derived from the activity in the cluster. Thus, clusters are the spatial manifestation of the competitive diamond, and the microeconomic conditions favoring competitiveness, productivity, and innovation are increasingly associated with geographic clusters (Porter, 1990, 2000).

For policy makers, clusters represent a unit of analysis that is broader than traditional industry classification systems and succeeds in capturing important externalities, linkages, and spillovers across firms, industries, and institutions. Policy makers, including those responsible for economic development within international institutions such as the Organization for Economic Cooperation and Development, World Bank, and European Commission, have found clusters to be a useful paradigm for developing strategic initiatives that are intended to enhance local, regional, and national growth and competitiveness at all levels.

The Wine Cluster

The wine sector is a natural resource–based industry organized around site-specific characteristics. Mueller and Sumner (2006) suggest that the California wine cluster originated as a result of the state's conducive natural environment (climate, soil, etc.), significant demand from a large and growing local population, and the availability of immigrant labor from Europe. Its growth and development, however, are the result of agglomeration effects, reduced transport costs, and clustering.

Porter demonstrated that the California wine industry specialized in brandies and dessert wines until the 1960s, when the innovative and entrepreneurial Napa Valley winemaker Robert Mondavi gave direction and purpose to the struggling industry. Mondavi's vision was of a high-quality California wine industry tied to winemaking innovation, investment, research, and wine-related education and tourism that would redefine the modern American wine culture. As a result of his winemaking and promotional efforts, the California wine cluster is now a highly developed industry with linkages to three other clusters: the agricultural cluster through grape growers and vineyards and the tourism and food clusters through winemaking and wineries (Austrian, 2000). Porter's model illustrates the full range of interactions between vineyards and wineries and the other members of the wine cluster: suppliers of fertilizers, pesticides, grape harvesting and winemaking equipment, irrigation technology, barrels, bottles, corks, caps, and labels; and advertising and public relations firms, government agencies, regulators, educational institutions, research centers, trade associations, and the associated agriculture, tourism, and food clusters. Some "New World" wine clusters in Australia also exhibit a high level of development whereas wine clusters in South Africa, New Zealand, Argentina, Chile, and Niagara are less evolved,

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with fewer cluster participants and linkages and less activity and intensity (Aylward & Glynn, 2006).

U.S. Wine Industry

The United States is the fourth largest wine-producing country in the world after France, Italy, and Spain, where shares in export markets are declining (Anderson, Norman, & Wittwer, 2004; U.S. Department of Agriculture, 2006). In 2005, there were 4,929 bonded wineries in the United States employing 33,560 full-time equivalent employees, excluding owners and seasonal and occasional employees. Total wine sale revenue from wineries, distributors, retail stores, and restaurants was $239 billion, which accounted for 73% of all wine sales in the United States.

In the same year, U.S. wine production totaled 716 million gallons. California accounted for 91% or 648 million gallons. New York State followed with 5%, approximately 38 million gallons, and Washington State was third with 3%, approximately 21 million gallons (MKF Research, 2007). Although the number of U.S. wineries has been expanding rapidly, most U.S. grape growers and wineries are small, often multigenerational family businesses. In 2004, the top 30 wine companies represented more than 90% of the U.S. wine market.

Two forces, consolidation and globalization, have been driving the composition and performance of the global wine industry in its quest for increasing sales and earnings. The consolidation movement grew in the 1980s when smaller wineries began to sell to larger public wineries to gain the economies of scale, larger sales force and distribution network, opportunity for cross-selling, and higher earnings potential of the larger operation. Globalization has enabled the new expanded organization to reduce business risk by spreading sales across countries and product lines and taking advantage of favorable exchange rates and expanded growing seasons and production sources. With a globalized supply chain, grapes can be purchased almost anywhere at any time of year.

These movements have resulted in a wave of mergers, acquisitions, joint ventures, and strategic investments affecting the global industry. Today, the world's largest and most well-known wine companies control wine labels all over the globe. This helps account for the increasing international share of the U.S. wine industry, as well as the increase in U.S. consumption of wines from abroad. Approximately a quarter of total U.S. demand is satisfied by imports. Likewise, between 1986 and 2004, the volume of wine exports from the United States grew from 7.2 million gallons to 120 million gallons (Mueller & Sumner, 2006).

The consolidation and globalization movements have further diminished the ability of small and mid-sized wineries, like those found in New York, to compete. This suggests that these wineries may need a new, innovative business model and a more captivating product to survive and succeed.

U.S. Wine Demand and Distribution Channels

Only about 25% of Americans consume wine. Wine is widely perceived as an upscale drink for special occasions, and the many different types of wines and labels can be confusing and intimidating to consumers. Nevertheless, wine consumption in the United States has experienced a long-term rising trend since the 1970s. Annual adult per capita consumption of wine rose from 1.05 gallons in 1970 to 2.88 gallons in 2006, an all-time high, yet far below annual per capita wine consumption in France and Italy.

Most of the gain in U.S. wine sales has been in the premium wine categories in response to the changing tastes and increasing affluence of wine consumers. Premium wines (and increasingly more expensive super and ultra premium wines as distinguished from inexpensive jug wines) generally carry a vintage date on their labels, assuring that the wine was made with grapes from the appellation of origin, with at least 95% of the grapes harvested, crushed, and fermented in the year shown on the label. This has greatly benefited the increasingly upscale wine industries in California, New York, Washington, and Oregon. In addition, the market has shifted from elite wines defined by geographical area such as Bordeaux, Burgundy, and Champagne to more generic varietals such as Chardonnay, Chenin Blanc, Cabernet Sauvignon, Pinot Noir, and Merlot, which should also help U.S. winemakers like those in New York (Cass, 2000; Gilinsky & Lopez, 2005).

Wine is distributed in the United States through a three-tier system in which wine producers sell to licensed distributors or wholesalers who in turn sell to retail outlets, restaurants, and hotels. Large wineries with multibrand wine portfolios constitute a significant proportion of a distributor's sales (Gilinsky & Lopez, 2005). Most small wineries, which are often defined as those that sell fewer than 10,000 cases per year and represent the vast majority of U.S. wineries, including those in the Hudson Valley, have no access to this costly, capital-intensive distribution system that favors large wineries with multibrand wine portfolios. Also, shipping costs and distributor and retailer markups can easily double the price of the wine to the consumer, making the market price too high for moderately priced wines from small producers like those in the Hudson Valley (MKF Research, 2007).

Thus, the majority of all U.S. wineries self-distribute directly to local retailers and restaurants and to consumers through farmers' markets, wine clubs, and wine tourism. For example, it is estimated that 95% of all wines produced in the Hudson River region in New York are sold directly to consumers at local wineries (Lee, 2004). Although it is estimated that only about 16% of all winery revenue is generated through

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Figure 1. New York State wine-producing regions
SOURCE: http://www.newyorkwines.org.

this self-distribution and direct-to-consumer system, this income is vitally important to maintaining the economic viability of these rural farm communities as well as their agricultural traditions (MKF Research, 2007).

New York Wine Industry

New York State has nine American Viticultural Areas (AVAs, government-designated appellations of origin where grapes for wine are grown) divided into five wine-producing regions: Lake Erie in the western part of the state (one AVA); the Niagara Encarpment along the southern shore of Lake Ontario (one AVA); the Finger Lakes region, the state's largest wine producer, accounting for about 90% of total wine production, in the west-central part of the state (three AVAs); the Hudson River region in the southern end of the state, approximately 50 miles north of New York City (one AVA); and the Long Island region, approximately 100 miles east of New York City, encompassing the North Fork of the island as well as the southern Hampton fork (three AVAs; see Figure 1). In 2005, there were 212 licensed wineries throughout the five regions in New York State for a total wine production of 38.2 million gallons, of which 89% was shipped to other states, 10% was consumed in the state, and 1% was exported to other countries.

New York is a cold weather grape production environment with growing seasons varying by region from 180 to 233 days per year. Nevertheless, New York is the third largest grape producer in the United States after California and Washington, second in total area under cultivation behind California, and second in total wine production behind California.

Approximately 75% of New York's grape production, particularly from larger commercial wineries in the Lake Erie region, is devoted to native labrusca varieties, predominantly Concord and Catawba grapes for grape juice. Historically, this has given New York wines a reputation of being "grapey," which limited their commercial acceptance. However, the past 30 years have brought about a dramatic increase throughout the state's other wine regions in the planting of European and American vinifera varietals for the production of sophisticated, high-quality table wines such as Seyval, Chardonnay, Riesling, Pinot Noir, Cabernet Franc, Cabernet Sauvignon, and Merlot. By 2003, of the 38 million gallons of wine produced, the production of table wine equaled that of dessert wines at approximately 13.2 million gallons (MKF Research, 2005).

New York wineries are classified as either farm or commercial wineries. The Farm Winery Act of 1976 made it economically feasible for small wineries, producing less than 150,000 gallons annually, to sell directly to consumers, retailers, and restaurants in the state rather than through costly distributors. In return, farm wineries must use only New York grape stock in producing their wines. In 2005, farm wineries represented 82% of all New York wineries but accounted for only 5% of all production, with large commercial wineries, which are permitted to use out-of-state grape stock, accounting for the balance (MKF Research, 2005).

New York Wine Demand and Distribution

In 2005, sales of wines outside of direct winery sales in New York totaled $1.7 billion. The state is the third largest consumer of wine, with an 8.0% share of total consumption, and is the largest importer of wines in the country. The New York City metropolitan area, in close proximity to the Hudson Valley wine region, is the second largest consumer of wine and the largest consumer of imported wines in the nation, with a 7.3% share of wine imports among the top 25 U.S. metropolitan areas. This is partly explained by the higher average personal income in New York State: $40,507 in 2005, 17.1% higher than the national average and 9.4% higher than average personal income in California (MKF Research, 2005; U.S. Department of Commerce, Bureau of Economic Analysis, 2005).

Wine tourism is accountable for much of the growth of the wine industry in many regions though destination wine trails and winery tours. In 2005, the United States had 27.3 million wine-related tourist visits with estimated tourism expenditures of $3 billion. California had approximately 19.7 million winery visits with estimated tourism expenditures of $2 billion. Data available for 2003 indicate that New York had approximately 4.1 million visitors, with almost one quarter from out of state, up almost 200% from 1.4 million in 1995, with tourism revenues conservatively estimated at $312 million (MKF Research, 2007). A total of 23% of the New York visitors spent an average of $20.50 per visit, up 49% from an average of $13.75 in 2000. Long Island wineries reported the highest average spending of $27.75 per visitor (MKF

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Research, 2005). Figures for the Hudson River region were not available for 2003, but the reported average spending in the Valley for 2000 was $36.40, the highest of all regions in the state.

Generally, New York wine distribution channels are limited. Unlike California and many other wine-producing states that permit consumers to purchase wine in grocery and drug stores, New York limits consumers to buying wine in the state's 2,500 licensed liquor stores. Although New York State has 6.5% of the total U.S. population, consumes 8.0% of the wine in the United States, and is ranked third nationally in total wine sales, it has only 1.5% of the country's total retail outlets for wine. Whereas the growth of wine consumption in New York State is slightly faster than the growth trend nationally (5.0% vs. 3.8% nationally in 2004), this distribution inconvenience may partly account for the relatively low level of the state's per capita wine consumption, ranked 13th nationally (MKF Research, 2005).

In May 2005, the U.S. Supreme Court struck down laws in about a dozen states, including New York, that barred out-of-state wineries from shipping wine directly to in-state consumers. In July 2005, New York passed legislation allowing out-of-state wineries to ship directly to New York residents via telephone or Internet, without using licensed wholesalers, and the state's more than 200 wineries to ship to consumers in 28 other states where such shipments are legal (Tedeschi, 2005). This liberalization of the state's distribution channels has the potential to significantly increase the sale of New York State wines to consumers where direct shipping is permitted.

Industry Growth and Development

The growth and development of the New York wine cluster has been steady. In 1985, new major legislation created the New York Wine & Grape Foundation to support research and the marketing and promotion of the industry within the state. In 2005, the state created the New York Wine and Culinary Center as a nonprofit organization to showcase New York wine and food industries. The New York State Restaurant Association is a related advocacy group supporting the restaurant and hospitality industries in the state. The activities of these organizations, along with the 1976 legislation facilitating the sale of wine by small wineries directly to consumers, helped accelerate the growth of New York wineries from 24 in 1980 to 212 in 2005, virtually all relatively small farm wineries. According to the Valley's wine industry leaders who were interviewed, Migliore and Hudelson, these wineries uprooted vegetable fields and apple orchards to produce wine and juice grapes, requiring relatively less land and earning relatively higher profits per acre as their primary source of income. By this transition, they took advantage of the rising consumer demand for premium wines, vinifera cultivation innovations, and public support for wine and tourism industries as an economic development strategy in the state. Of the 212 New York wineries in 2005, only 23 produce more than 18,000 cases annually and only 2 produce more than 1 million cases per year. Just over half produce fewer than 3,000 cases annually. These tend to be destination wineries along the state's 10 wine trails, which produce table wines from vinifera and hybrids (MKF Research, 2005).

In addition, New York is a leading wine, food, and lifestyle media capital, and a tourism magnet particularly in the downstate regions close to New York City. The state is headquarters to Constellation Brands, the largest wine company in the world, the wine magazines *Wine Spectator* and *Wine Enthusiast* as well as the food magazines *Food & Wine*, *Bon Appetit*, and *Gourmet*. Restaurants are the state's largest private sector employer. Out of 58,000 eating places, 25,000 or 43% are licensed to serve wine (MKF Research, 2005).

The industry is supported by a number of training and research institutions in the state. Cornell University in upstate New York, well known for its hospitality programs, is a leading center of wine education and research in the United States, comparable to the renowned programs at the University of California, Davis. The University has undergraduate and graduate programs in enology and viticulture, provides agricultural extension support for viticulture, and manages the New York State Agricultural Experiment Station at Geneva, a leading agricultural research facility for viticulture since 1880 and enology since the 1960s. Other New York educational institutions also have enology, viticulture, and hospitality education and research programs such as Rochester Institute of Technology's School of Hospitality and Service, the State University of New York (SUNY) at Stony Brook, SUNY Geneseo, and SUNY Fredonia, supplemented by a number of community colleges. The Culinary Institute of America, a leading food preparation school, is located in the heart of the Hudson River wine region.

Hudson River Valley Wine Region

This section looks at the Hudson River Valley wine industry as a subcluster of the New York wine industry. The four points of Porter's diamond frame the discussion: factor conditions; demand conditions; related and supporting industries; and firm strategy, structure, and rivalry. The strengths or weaknesses of each of the four points will affect the others and will promote or constrain the industry's potential for development along the lines envisioned by the region's wine advocacy organization, the Hudson Valley Wine and Grape Association (HVWGA), as well as New York State elected officials (see Larkin, 2006): to expand the production and quality of the region's wine to be sold at a reasonable and competitive price point to a national market. The study seeks to determine what the cluster model can contribute to our

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understanding of the strengths and weaknesses of the Hudson Valley wine cluster, and what the prospects are for its future development as a high-quality, export-based wine region rather than an agritourism region, for which it is currently known.

Porter and Bond (2006) combined all 95 California AVAs into one wine cluster. Mueller and Sumner (2006) suggest that there are at least two California wine clusters: the central valley and the coastal districts. The central valley cluster, a low tourism area, produces low-priced grapes used for grape juice and low-priced wines. The coastal cluster, a popular tourism destination, produces higher priced grapes and wines and relatively little grape juice. Moreover, they have different terroirs: Their climates differ, they grow different varieties, achieve different yields, employ different vineyard management principles and vinification methods, and fetch different prices, even for the same varieties (Mueller & Sumner, 2006). Similarly, one can view New York's nine AVAs as one cluster. Comparable differences exist between the upstate Lake Erie and Finger Lakes regions and the downstate Hudson River and Long Island regions. Thus, we can study the downstate regions separately from the upstate regions while noting the connectedness and, according to Migliore and Hudelson, competitiveness between them, particularly at higher price points.

The Hudson River wine region resides in the Hudson River Valley north of New York City. The region begins approximately 50 miles north of the city and extends approximately 70 miles from Warwick in the south to Red Hook in the north on both the east and west sides of the Hudson River. The wine region encompasses parts of five counties: Orange, Ulster, Greene, Columbia, and Dutchess (see Figure 1).

Winemaking in the United States began in the Hudson Valley. French Huguenot settlers planted the first vines in the Valley in 1677, 100 years before vines were planted in what is now California (Martell & Long, 1993). Because European wines were readily available in the colonies through the ports in New York City, most of the early Hudson Valley wines were made for home consumption. It was not until 1827 that grapevines brought from Europe were crossbred with native grapes and planted in the Valley with the intention of making wines to sell. The first commercial winery in the Hudson Valley, Jacques Brothers Winery, was established in 1837 in Washingtonville for the production of alter wines. It was renamed Brotherhood in 1885 and continues to operate today as the nation's oldest continuously operated winery (Martell & Long, 1993).

Factor Conditions

Growers in the Hudson Valley region are challenged by the weather, which can be highly variable. Although located at a latitude comparable with northern Spain, southern France, and central Italy, the Valley's weather is generally more humid and rainy and is cooler than these other wine-growing areas. Hence, hybrid vines are often used rather than European vines to withstand the unpredictability of the region's weather. For example, in 1980, the region was hit by a "Christmas Massacre," a sudden and prolonged freeze that destroyed many vineyards. Wine producers fought back and planted new vines, particularly hardier hybrid species developed in France to withstand cold temperatures (Martell & Long, 1993).

According to the New York Wine & Grape Foundation, in 2006 there were 36 licensed wine producers in the Hudson Valley. Long an agricultural center, over 85% of the Valley's fruit lands are devoted to growing apples (Larkin, 2006). However, in the face of increased suburban pressure to convert farms to residential, commercial, or industrial uses, and because of the need for expensive hand labor provided by immigrant workers for pruning and harvesting, many of the Valley's farms and fruit crops have been converted to vineyards to provide a higher economic return per acre. Today, large commercial fruit growers are in the minority and small entrepreneurial farms dominate the Valley's rolling and rugged terrain. Of the Valley's approximately 310 orchards, 63.5% operate with less than 25 acres (Larkin, 2006).

The impact of this transformation to wine production on factor costs differs markedly from that of the California wine industry and has significant policy implications. The California wine cluster is endowed with large parcels of relatively flat land that rely on capital-intensive operations to produce large quantities of wine at low production costs despite the relatively high land prices, ranging from $60,000 to $150,000 per acre. The Valley's vineyard land prices are cheaper than California's, ranging between $8,000 to $50,000 per acre, but industry production costs are higher because of its small parcels, hilly terrain, scattered sites, and reliance on hand labor (Larkin, 2006).

The Valley's wine industry has access to research, training, and networking facilities that can support innovation, productivity improvements, and competitiveness of the cluster. The Hudson Valley Laboratory in the Cornell University College of Agriculture and Life Sciences provides grapegrowing and winemaking research, technical assistance and consultation, and extension study programs to the industry in the region. This is supplemented by New York's other educational institutions offering enology, viticulture, and hospitality education and research; the HVWGA that provides opportunities for members to collaborate, network, exchange information, and attend workshops and seminars on all aspects of winemaking; and the state's wine and hospitality associations that also provide opportunities for skill building and social networking.

Demand Conditions

The Hudson Valley's agricultural tradition, bucolic setting, and proximity to New York City has enabled the region to develop

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easily accessible, informal wine tours, combining artisanal cheeses, fresh fruits, and organic vegetables with local wines. As a result, the Hudson Valley wine industry has viewed its business as agritourism. According to Migliore and Hudelson, the industry's two main transformative goals are expressed by the HVWGA, the advocacy and educational membership organization for the region's wineries. The first goal is to increase the region's acreage allocated to grape production primarily by inducing fruit and vegetable farmers to convert their crops from, for example, apples to grapes for wine production. The second goal is to enhance the quality of the wine produced in the region by growing more vinifera varieties rather than hybrids that predominate in the region. Sometimes called "the Napa of the East," Hudson River wineries attracted 205,000 visitors in 2000, a 75% increase from 1985 (Lee, 2004). This branding, however, appears to apply more to the Valley's position as an agritourism destination rather than a wine destination. The wineries currently sell all the wine they can produce and, surprisingly, a strong desire to expand production to meet a potential regional or national export demand has yet to develop. This suggests a less-than-vigorous level of local competitive rivalry, which will be discussed in a later section.

Approximately 85% of the wine is sold in wine tours and tastings. Migliore and Hudelson state that the majority of the tourism market consists of entry-level wine drinkers, 25 to 45 years old, from neighboring communities in northern New Jersey and the lower Hudson Valley, seeking a home-grown, bucolic experience. The lack of demanding wine customers may be retarding innovation and the development of export-quality differentiated wine products suitable for a more sophisticated wine market beyond the region. The balance is sold through farmers' markets, wine clubs, local liquor stores, and the growing number of high-quality restaurants in the region. The larger wineries, according to Migliore and Hudelson, sell approximately 50% of their product to restaurants and stores within a wider radius, including New York City and up to 20 states outside New York. Rivendell, a Hudson Valley winery, owns Vintage New York wine stores in the Soho and upper west side districts of New York City, which feature their own wines and those from other New York State wineries. Migliore and Hudelson state that price competitiveness and quality are key, with Hudson Valley wines struggling to compete in a crowded market with prices comparable to good California and Long Island wines as well as lower priced, lower quality wines from upstate New York and New World producers such as Australia and Chile. The region continues to suffer from the poor image historically associated with New York wines, and many restaurants within and beyond the region, for example, hesitate to offer Hudson Valley wines on their menus because of a perceived lack of price competitiveness vis-à-vis New World wines. The HVWGA believes that growing more vinifera will attract the attention of the wine critics and the reviews and recognition that build regional and national export markets.

Related and Supporting Industries

Thus, despite a long winemaking tradition, the region is still transitioning from an agricultural cluster to an emerging wine cluster. According to Migliore and Hudelson, much of the region's infrastructure for fruit and vegetable growing is being used for wine production, such as for grapes; fertilizer, pesticides, and herbicides; irrigation technology and tractors; and banking and insurance services. Most of the grape harvesting is done by hand using migrant farm workers, so little grape harvesting equipment is needed. This suggests that a resource infrastructure focused primarily on wine production has yet to develop. Moreover, due to the unavailability of local grapes suitable for high-quality wine production, approximately 10% to 60% of the grapestock used annually originates outside of the region, primarily from the Finger Lakes and Long Island regions. Hence, the wine is sold as a Hudson Valley product without having 100% of the grapestock originating in the Valley. Whereas some wineries are self-contained, that is, they use their own and imported grapes and produce their wine at an on-premise wine production facility, a smaller number of grape growers have their grapes custom crushed and wine produced either via a contract with another winery or at the only custom-crush facility on the east coast, located a costly 150 to 200 miles away in the Long Island wine district.

Migliore and Hudelson state that most of the winemaking equipment originates with the local farm equipment suppliers who have adapted to the demand, while other wine-producing supplies originate inside and outside the region: for example, stainless steel tanks from New York, oak barrels from Kentucky, bottles from Mexico through an upstate New York distributor, corks from Portugal and California, and wrappers and labels from New York and New Jersey. The few large wineries have their own marketing and promotion professionals on staff, but much of the public relations and advertising is done cooperatively through two wine trail associations to which the wineries belong: the Shawangunk Wine Trail Association west of the Hudson River, and the Dutchess Wine Trail Association east of the river. A more fully developed cluster might benefit from having a single Hudson Valley Wine Trail Association to represent and promote the interests of the wineries and the Hudson Valley brand on behalf of the entire valley.

Firm Strategy, Structure, and Rivalry

According to Porter (1990), the character of firm strategies and rivalries is influenced by the incentives and norms that govern the type and intensity of local competitive rivalry among producers. The more intense the local rivalry, the

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greater the stimulation for the development of local specialized services. The Hudson Valley wine region is dominated by relatively small, privately owned wineries operating informally while seeking to build on the region's strength in agritourism by transitioning to a wine cluster. Yet, as mentioned earlier, a strong desire to expand production to meet potential regional or national demand for wine does not appear to have emerged. This suggests that the competitive climate is even less mature than the other three points of Porter's diamond. This can potentially undermine the incentive to upgrade the capital equipment, skills, and technology needed to drive down costs and develop the cluster into a large producer of high-quality wines to be sold at reasonable and competitive price points to a national market. This is the development model pursued on an international level by New World wine producers beginning with Chile over 30 years ago. The success of the model depends on low production costs and other factors that appear to be in short supply in the Hudson Valley wine region: a coordinated approach to research and development, a well-developed supply chain, sustainable alliances between growers and producers, significant public and private sector infrastructure, and a unified marketing strategy (see Aylward, 2005).

Moreover, New York legislative reforms to open up the state's wine distribution channels to national markets are quite recent. It will take more time before the impact of the reforms on the sale of Hudson Valley wines regionally and nationally can be evaluated.

Conclusion and Policy Implications

This article used Porter's cluster model to explore the strengths and weaknesses of a downstate wine subcluster in New York State, the Hudson Valley wine region, in the midst of a transition from small fruit farms within an agricultural cluster to small vineyards dedicated to producing reasonably distinguished table wines. The region has several cluster-type advantages: natural environment, access to farm labor and specialized information—including the knowledge of winemaking—access to locally based suppliers from the farm industry, and proximity to related tourism attractions convenient to affluent and sophisticated agritourists from the New York City metropolitan area. At the same time, some of these attributes and others do not appear to be sufficiently strong or specialized to achieve the stated goal of transforming the cluster into a large, cost-efficient producer of high-quality wine.

The Hudson Valley cluster can be classified as underdeveloped or, using Rosenfeld's (1997) terminology, "underachieving," suggesting that it contains opportunities that have not yet been fully exploited. For example, many of the factor inputs needed to improve productive efficiency and wine quality are still evolving. There appears to be an insufficient number of sophisticated wine customers to drive high-quality demand. The wineries continue to use much of the region's agricultural infrastructure, which has been designed for fruit and vegetable growing, rather than using an infrastructure dedicated to wine production. The region lacks a fully integrated promotion strategy, being marketed and branded as an agritourism destination rather than a high-quality wine producer. The wineries suffer from inadequate grape stock and a low level of interwinery competitive rivalry. According to the cluster model, all of these signs of weakness serve to retard innovation, productivity, and competitiveness as well as the cluster's economic growth and development. More to the point, the Hudson Valley wine cluster's continued evolution and development into a high-quality wine exporter appear to be largely dependent on improving the strength and depth of the region's competitive diamond and the willingness and ability of policy makers to facilitate the wine cluster's growth at the expense of the region's agritourism brand.

Porter's public policy approach to cluster development and regional competitiveness involves the provision of public goods that broadly attempt to improve the underlying microeconomic business environment as represented by the region's diamond. This can entail a range of activities, from establishing institutions that support knowledge creation to establishing a business culture that supports new entrepreneurial entrants to the market, to influencing rules and regulations affecting the underlying conditions that create strong local rivalries. For example, Porter (1998) advances the notion that one or two core or anchor firms can enhance cluster productivity and innovativeness by supporting the development of smaller firms and local knowledge sources and spillovers and acting as a magnet that attracts competitors, specialized suppliers and services, related industries, and associated institutions. This suggests that a small number of flagship wineries in the Hudson Valley, with reputations well beyond the region, may help to position the region to produce high-quality wines in large-enough quantities to satisfy the needs of distributors and national premium wine markets. Specifically, public policy can support winery consolidation so that a critical mass of sizable vineyards and dedicated support services such as viticulturists, marketers, publicists, and so forth, can attract the ancillary businesses, talent, and capital necessary to enable the cluster to become a larger presence in regional and national wine markets.

Furthermore, policy can reduce barriers to showcasing and selling wine and provide incentives to increase the supply of locally grown grapes, especially vinifera. Valley growers need a consistent source of demand from local wineries, and wineries need a larger local source of quality grapes, in the appropriate varieties, to produce high-quality, unique Hudson Valley–branded wines that cannot be duplicated elsewhere. Policy can also facilitate the cooperative production, marketing, and transporting of wine to enable small producers to reduce costs and increase profitability. Moreover, with land prices in the Hudson Valley competitive with those in

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California and the New York Hamptons, and with proximity to capital sources in New York City and its affluent surrounding areas (presumably once the current economic and financial crisis passes), policies can facilitate the availability of credit as well as capital investment in vineyards and wineries in the Valley, thus enhancing the cluster's competitiveness in national markets.

Finally, Porter's policy approach can facilitate the development of deep local network relationships among cluster firms and strong local supply chain linkages. According to Mueller and Sumner (2006), the wine industry can operate more effectively and competitively when participants have access to public goods such as public research, industry standards, and collaborative local networks and associations. However, for clusters aiming to be export oriented, policies that promote external links between cluster participants and national and international networks, including competitors, may be even more important to cluster development than local networks (McDonald, Huang, Tsagdis, & Tuselmann, 2007; Mueller & Sumner, 2006). In the case of the Hudson Valley wine industry, as it seeks to transition to its next phase of development, the ability to compete with other regional producers, California, and New World producers may well depend on the local industry's ability to gather information on new techniques and tastes outside its existing market.

Further research on the effectiveness of Porter's policy approach in general, and its relevance to the Hudson Valley wine region as conjectured above, would be helpful in determining whether the goal of expanding the production, quality, and distribution of the region's wine is at all achievable and preferable to growing the region's agritourism business. Moreover, two other relevant issues regarding Porter's policy approach deserve further study. Martin and Sunley (2003) question whether it is possible to target public policies to enhance specific cluster performance given the model's inability to accurately measure the cluster's geographical boundaries. Thus, for example, regional economic growth may be enhanced more cost-effectively by providing public goods to all meritorious businesses in the Hudson Valley, whether or not they are part of a cluster. This approach would appear to favor the development of the agritourism economy over the wine cluster. Relatedly, any decision to apply targeted incentives and public subsidies to the Hudson Valley wine cluster would likely benefit from analysis of the cost–benefit tradeoffs to affected taxpayers.

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