

Using the Porter model to analyze the US elderberry industry

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Abstract Elderberry, a perennial shrub native to North America with a variety of uses and benefits, is neither well known nor widely utilized as a specialty crop in the US. Up-to-date information is lacking with regard to the elderberry market or market potential. This research identifies the market participants along the value chain, the current status of the industry, direction, future trends, and elderberry market limitations as well as risks and potential opportunities for elderberry producers and processors. A combination of quantitative (mail survey) and qualitative (phone interview) methods have been used. The theoretical model used for the survey and interview development and analysis is based on the Porter Five Forces Model (PFFM) which describes the competitive forces that coordinate and control the market. The PFFM has been used previously to shed light on the chestnut and shiitake mushroom specialty crop markets. Seventy-four mail survey responses and 20 follow-up phone interviews provided information on the market participants, challenges, opportunities and competitive forces in the elderberry industry. Results show a nascent industry with mostly small scale participants poised for growth. Demand trends are favorable and prices are good across the value chain. Challenges

include a limited domestic supply of fruit, few regionally adapted varieties suitable for commercial production, and high labor costs. Additionally, the absence of existing mechanical harvesting equipment limits future production potential and industry growth. Respondents identified low levels of competition within the industry at the present time. Based on identified market size and demand, opportunities exist to increase the domestic elderberry industry across the value chain.

Keywords Market analysis · Specialty crops · Quantitative and qualitative research

Introduction

The American elderberry (*Sambucus canadensis*) is a fruit-bearing shrub, native to eastern and Midwestern North America. The European elderberry (*Sambucus nigra*) is common in western and central Europe as well as in North Africa, Scandinavia, and Great Britain. Commercial elderberry production is concentrated in Europe in Denmark, Italy, Austria, and Germany. In the US, elderberry is not as well known and utilized. According to Finn et al. (2008) Oregon was a major elderberry producer but production has declined in recent years. Wild harvested fruit is sold commercially in a number of areas, particularly in the Midwestern US (Finn et al. 2008). Most of the elderberry cultivars in North America were developed

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decades ago either at the New York Agricultural Experiment Station (e.g., ‘Adams I’, ‘Adams II’, ‘York’) or at Agriculture and Agri-Food Canada in Nova Scotia (e.g., ‘Johns’, ‘Nova’) (Finn et al. 2008). Recently, scientists from the University of Missouri have introduced two new cultivars: ‘Wyldeewood’, a tall, vigorous elderberry plant that consistently produces heavy yields, is efficient to harvest, and produces fruit well-suited for processing (Byers et al. 2010); and ‘Bob Gordon’, a productive cultivar that has outperformed the standard ‘Adams II’ and other genotypes in multiple studies (Byers and Thomas 2011).

According to an article published in New York Berry News (Byers and Thomas 2005), most of the elderberries grown in the Midwest are harvested for processing markets. Several wineries produce elderberry wines from the fruit, while the flowers and panicles are used to flavor wines. Elderberry juice or fruit are used for jam and jelly. Elderberry juice and concentrates are marketed as nutraceuticals. The pigments in elderberry juice are suitable for colorant use. Nearly every part of the American and European elderberries has some culinary use. The berries are also used in the preparation of pies, punch, and liqueurs. The flowers can be added to the batter used to make various items, such as pancakes, muffins, or waffles. The flower clusters can be made into fritters. Elderberry flowers can also be used to make tea or a nonalcoholic cordial. Leaves and stems are considered to be toxic and need to be avoided in human consumption (Charlebois et al. 2010).

The American Botanical Council (2004) provided a review about elderberry uses as a medicinal plant. European and American elderberry’s medicinal value has also been recently reviewed by Charlebois (2007). Elderberry is especially popular for its antiviral properties as it is recommended for the prophylaxis and treatment of influenza (Roschek et al. 2009; Zakay-Rones et al. 1995, 2004).

The literature about elderberry production and marketing in the US is very scarce. A comprehensive horticultural review was published in 2010 (Charlebois et al. 2010) which compiles literature from around the world about elderberry botany, horticulture, propagation, and uses. Very little information has been published on the market potential and the production volumes and costs of elderberries, and only general information is available

(Charlebois et al. 2010). Weeder-Einspahr (2001) conducted a Midwest regional market assessment for small fruits, including elderberries. In this study, 66 jam and jelly manufacturers and 57 wineries were contacted in Nebraska, Iowa, Minnesota, South Dakota, Missouri, and Kansas, using guided telephone interviews. Information collected included types and form of fruit used, current fruit source, quality criteria, annual quantities sources and prices paid. The study found that companies in the region used about 90,000 pounds/year (1 pound = 0.45 kg) of fresh or frozen elderberries in products ranging from jams, jellies, syrups, and wines. Prices paid averaged \$0.75 per pound (\$1.65 per kg) of fruit. Some value added producers sourced their product (juice concentrate) from Europe and the Pacific Northwest region. The study found that many of the jam and jelly companies in the Midwestern US were small, often picked their own fruit from wild sources and processed it themselves. However, several larger jam and jelly manufacturers purchased large amounts of fresh fruit from growers, often under a verbal contract. Most wineries purchased concentrate from national suppliers, but also purchased fresh fruit when available. Smaller growers of fresh fruits for jam, jelly and wine markets had the best potential for success if they partnered with these companies to produce fruit under contract. However, given the overall volumes of fruit used by this industry in the Midwest, commercial production would be limited to a relatively small number of growers. Juice processors require large quantities and subsequent greater production investments by the grower. The possibility of addressing these markets in combination with others (e.g., nutraceuticals, organic colorings, etc.), and expansion of sales to small or medium processors could provide a market of sufficient size for a number of producers (Weeder-Einspahr 2001).

Specialty crop market research

The most common methods in market research for specialty crops are experimental in nature. Usually, companies and individuals are identified and then mail or phone surveys are conducted to obtain baseline information such as, number of companies, sales, volume, production size, production operation, trends in demand and supply, etc. (Gold et al. 2005, 2006, 2008). Qualitative methods (in depth interviews) can

be used as an exploratory and developmental market research tool when little is known about market participants and more in depth information is required (Bichard et al. 2005). Through a literature search, different studies were identified that led to the development of marketing strategies for specialty products.

Research conducted in New Zealand (Hunt et al. 2005) used mixed (qualitative and quantitative) research methods to understand approaches to sustainable kiwifruit production. One of the goals of the research was to determine if the adoption of a particular management system is influenced by the social characteristics of orchardists. To accomplish this, a suite of social methods (e.g., semi-structured interviews, quantitative surveys, participant observations and interactive activities) were used to study the social lives of participants and to identify any relations between these and management practices, especially those that impact sustainability.

Another application of a study on specialty products was performed on calla growers in the New Zealand floricultural industry (Clemens et al. 1999). Callas are a relatively new exotic crop, as opposed to traditional standard flowers such as roses, carnations and chrysanthemums. The success of the calla industry in a deregulated environment was studied to analyze and describe the parties involved, their problems and methods being used to address them. Researchers adopted a qualitative approach because information about the calla industry was not available (i.e., uncertainty about the number of calla growers, lack of addresses for businesses involved in the calla industry, lack of an official census of property sizes and outputs). Results provided information about growers' problems regarding their own operation and sector related and the important role of a strong grower organization in the success of the calla industry.

An exploratory and qualitative design was performed in the Virginia non-forest products study (Greene et al. 2000). In person interviews with market players explored market potential for crafts, medicinal and herbal and specialty wood products.

The California Institute for Rural Studies, through a cooperative agreement with the USDA Agricultural Marketing Service, performed a study to explore the principal marketing barriers facing small and medium organic growers in California. Based on interviews and surveys with growers, buyers and experts familiar

with the organic sector, the findings provided a detailed picture of key marketing challenges with recommendations for improving marketing opportunities (Cantor and Stochlic 2009).

Although no qualitative studies on elderberry have been published to date, similar studies conducted on other specialty crops provide insights on successful qualitative methodologies that can be applied to the analysis of the elderberry market.

For the emerging elderberry market, up-to-date information is lacking with regard to the size, growth trends, and market competition. The present study sought to answer the following questions:

- How can the market for elderberries and elderberry products be described?
- Who are the market participants along the value chain?
- Where does the industry stand, where is it headed and what is its long-term potential?
- What are the elderberry market limitations?
- What are the risks and potential opportunities for elderberry producers and processors?

Theoretical framework

Agroforestry enterprises often produce specialty products for markets about which little is known (Gold et al. 2004). All that may be known about a product's market is that it is produced and eventually purchased and consumed (Thomas and Schumann 1993). What happens to the product along the value chain between producer and consumer and why the consumer is buying the product is unknown. By shedding light on the market and understanding the market's competitive forces, firms can create strategies for success.

There are a variety of approaches to market definition and strategy development. The structure–conduct–performance (SCP) paradigm of industrial economics defines relationships between market conditions, firm strategy and firm performance (Brooks 1995). *Structure* refers to market structure (number of firms, barriers to entry, size of firms). *Conduct* represents firms' behavior (strategy related to pricing, R&D, advertising, production, choice of technology, etc.). *Performance* represents social efficiency, mainly defined by the extent of market power (profitability, market share, sales revenue).

The SCP paradigm evolved and was later applied by the business community. Michael Porter (1980) took the economic SCP paradigm and represented it in a business friendly format by developing the Porter Five Forces Model (PFFM) (Franklin and Fredericks 2003; Teece et al. 1997). Porter's framework guides the analysis of competition within a particular industry. The model relates a company to its environment and provides a systematic way of thinking about how competitive forces work at the industry level and how these forces determine the profitability of different industries and industry segments. Porter (1980) argues that firms who develop better strategies than their competitors, by understanding and exploiting the conditions of the industry better than others, might achieve sustainable competitive advantage (i.e., a more profitable position in the long term).

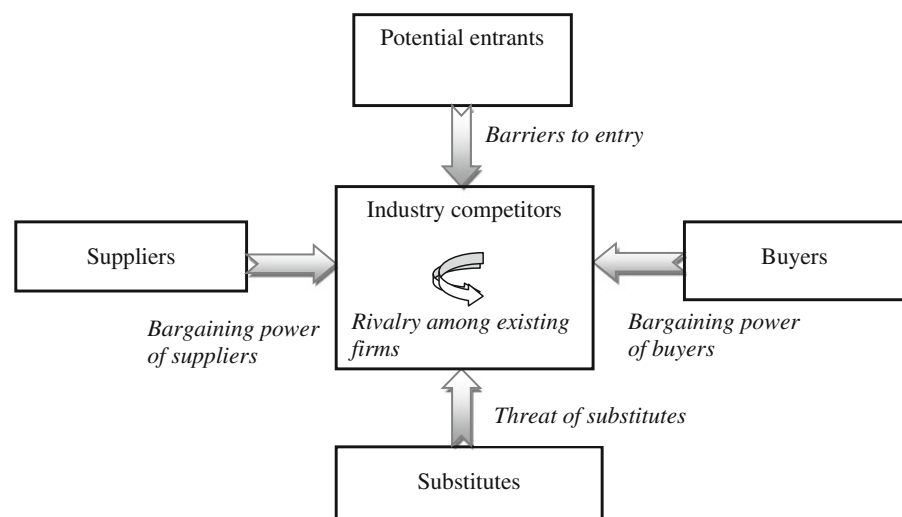
The PFFM approach has been applied by Gold et al. (2005, 2006, 2008) to describe the red cedar, chestnut, and shiitake mushroom markets and has been proven successful in shedding light on specialty crop markets. The framework has been also applied in a series of articles published in *Choice: The Magazine of Food, Farm and Resource Issues*, by Olson and Boehlje (2010) to describe fundamental forces affecting agribusiness industries; Bechdol et al. (2010) who looked at forces affecting change in crop production in agriculture; Olson et al. (2010) who described changes in the plant input supply industry; and, Cook (2011) to describe forces affecting the US fresh berry subsector. Oppenheim (2004) also used the PFFM to describe the Australian strawberry industry.

The PFFM looks at five areas of competition that market participants face. These areas include barriers to entry (threat of new entrants), bargaining power of suppliers, bargaining power of buyers, substitute products, and rivalry among existing firms (Fig. 1). According to Porter (1980), competition for profits in a given industry goes beyond regular competitors to include four other forces: customers, suppliers, potential entrants, and substitute products. The interaction between all these forces defines an industry's structure and shapes the nature of the competitive interaction within that industry. While many factors can influence profitability in the short run, industry structure revealed in the competitive forces, establishes industry profitability in the medium and long term (Porter 2008). By understanding the competitive forces within the elderberry industry, participants in the market can develop successful strategies to influence the forces for their own benefit.

Research methods

Because little is known about the elderberry market and market participants a combined quantitative and qualitative approach was used to get baseline information about the market and the industry. Elderberry producers throughout the US were identified using information from the Internet (e.g., keyword searches for businesses involved in all aspects of elderberry production, university and university extension websites) and a database was created. More subjects were

Fig. 1 The PFFM (Porter 1980)



identified through a snowball approach (reference from other individuals). A four-page mail survey was used to collect general information about market participants (e.g., position in the elderberry chain, products purchased, products sold, approximate annual gross sales figure from elderberry, percentage of elderberry in the business, length of time in the elderberry business, description and trends of supply, description and trends of demand, marketing area, and competition). A final question in the survey asked respondents if they would agree to participate in a follow-up phone interview. Survey construction and implementation followed the Tailored Design Method (Dillman 2007). Validity and reliability of the survey were checked with a group of established growers, producers, and researchers. Survey questions were modified based on comments received to reduce ambiguity. The survey is posted online for reference (UMCA 2009). The survey was mailed to all identified market participants accompanied by a cover letter signed by a recognized industry representative. Two post card reminders and a follow-up mailing were sent to non-respondents (Dillman 2007). PASW Statistics 17.0 (SPSS, Chicago, IL) was used to analyze the data.

The mail survey was followed by interviews of people who agreed to participate in the second part of the research. The approach of responsive interviewing was used (Creswell 2007). Open-ended questions guided the conversation. To assure thoroughness, main questions, follow-up questions, and probes were designed to guide the interview. The main questions followed the theoretical model, addressing all forces that influence competition based on PFFM. Follow-up questions were developed as necessary to fill gaps in information, complete ideas, define and explain terms, or state implied concepts. A set of general questions targeted information about the business (where is the business situated along the value chain, how much do elderberries represent from the total business), about the motivation and challenges encountered in starting to produce elderberries or elderberry products, and about the vision for the future. These questions also helped the interview get started, allowing the interviewee to talk about something familiar. The next questions integrated the business in the context of the industry and provided information about barriers to entry and challenges; supplies, suppliers and supply trends; products sold, buyers and demand trends; competitors and the competitive environment;

substitutes and ways to differentiate; and governmental policies that help or hinder the industry. The last question tried to fill the gaps by asking if there is anything missed from the interview. To test the interview questions, a pilot face-to-face interview was conducted with one grower and one producer. No significant changes were made to the interview questions and therefore, the pilot interviews were kept, analyzed and included in the reported results. All other interviews were conducted over the phone.

To assure accuracy, all interviews were audio recorded using a digital recorder, after obtaining participants' permission to record. Notes were also taken during the interview by using an interview protocol (e.g., all main and follow-up questions and probes in a structured format with room for notes). All interviews were transcribed verbatim and all records were maintained with the caution to maintain anonymity and confidentiality.

Interview analysis focused on identifying themes and categories about all topics regarding the PFFM (Rubin and Rubin 2004). This analysis was performed using the computer-assisted qualitative data analysis software: QSR NVivo Version 8 (QSR International, Southport, UK). The software was used to add rigor to qualitative research and to facilitate data analysis (Welsh 2002). NVivo helped to manipulate data records, and to code and gain access to data records quickly and accurately. It helped maximize efficiency and speed up the process of grouping data (Wong 2008). All interview transcripts were uploaded and read several times. The software facilitated the process of data grouping by creating tree nodes. The root consisted of one of the main topics of the interview (e.g., motivation to start) and the branches were created one by one, every time a potential theme was identified (e.g., availability of supply, challenging, enjoyment). Coding was accomplished in NVivo by placing references to text at nodes. Passages of text were stored under the appropriate nodes along with their location or address so that the researcher could locate all information associated with a certain theme. Themes were refined and integrated based on how many and how relevant text passages were stored under them. Diagrams containing themes and quotes were created for each topic to help with visualization and interpretation (Cernusca et al. 2011).

The research was conducted within the sets of constraints set forth by the University of Missouri

Institutional Review Board to make sure that the participants were informed about the risks and benefits of participating in the research. Only aggregated data were reported and no names were associated with any particular answer.

Results and discussion

Mail survey results

From 159 surveys sent to individuals and companies with any involvement in the elderberry value chain identified through Internet search and referral, 74 responses were obtained. Surveys were received from all over the US: AR (3), CA (3), FL (1), IA (1), ID (1), IL (2), IN (2), KS (4), KY (2), LA (1), MA (2), ME (1), MI (1), MO (10), MT (1), NC (1), ND (1), NE (1), NH (1), NV (1), NY (6), OH (4), OK (3), OR (3), PA (1), SC (1), SD (1), TN (2), TX (1), UT (1) and VA (5).

Of the 74 respondents, 49 % grow elderberry to sell or to create value added products; 44 % grow plants for their own use or sell plants as a nursery; 26 % pick elderberry from the wild and use them in their own business or sell them to wineries or to other value added producers, 22 % produce value added products other than wine and nutraceuticals; 18 are wineries and 4 % produce and sell nutraceutical products. Most survey respondents are involved in more than one activity in the value chain (Fig. 2). For example, of the 49 % of respondents (35) that grow elderberry, 10 also pick elderberry from the wild in addition to their own production, 13 also propagate their own plants and 12

produce value added products. Most respondents are part time growers/producers or hobbyists: 75 % earn less than \$10,000 a year from elderberry, 13 % earn between \$10,000 and \$50,000 and 10 % earn more than \$50,000 per year (Table 1). For the majority of respondents (75 %), elderberry accounts for less than 10 % of their business (Table 1). Thirty-eight percent have been in the elderberry business less than 5 years, 30 % 6–10 years and 32 % over 10 years (Table 1).

Respondents purchase plants, flowers, fruit, juice or concentrate for their elderberry business (Table 2). Out of the total sample of respondents, 60 % grow/produce their own supply and 53 % purchase the input needed for their elderberry business (e.g., plants, flowers, fruit or juice). Respondents sell plants (42 %), flowers (8 %), elderberry fruit (22 %), juice (11 %), concentrate (8 %), wine (18 %), and nutraceutical products (4 %) (Table 2). In general, elderberry fruit requires processing. Much of the crop is frozen immediately after harvest, which facilitates long-term storage until processing. Alternately, the fresh fruits can be pressed and the resulting juice frozen (Charlebois et al. 2010). Other value added products sold included juice, concentrate, jelly, preserves, sauce, jam, yogurt, ice cream, fudge, and colorant.

Nurseries sell plants to elderberry growers, wholesalers, retailers, individual customers (e.g., home owners) and to conservation agencies for restoration, reforestation and reclamation. Elderberry growers sell elderberries to wineries, nutraceutical companies, other value added producers, and directly to consumers. Wineries sell directly to consumers, retailers, and other wineries. Value added producers (other than wineries and nutraceuticals) sell to individual consumers, retailers, distributors, and wholesalers. Nutraceutical producers sell to distributors, retailers, and health practitioners. Fifty-seven percent of respondents sell to a local market, 40 % sell regionally, and 43 % sell nationally. Most respondents sell to a combination of areas.

Regarding trends in demand, 54 % indicated that demand has increased in the past 5 years, 19 % that demand remained stable, 1 % that demand decreased, and 26 % had no opinion. Present demand is steady according to 47 % of respondents, strong according to 24 %, and weak according to 13 %. Over the next 5 years, 59 % stated that demand is going to increase, 19 % that demand will remain stable and 1 % that demand will decrease, while 21 % don't know.

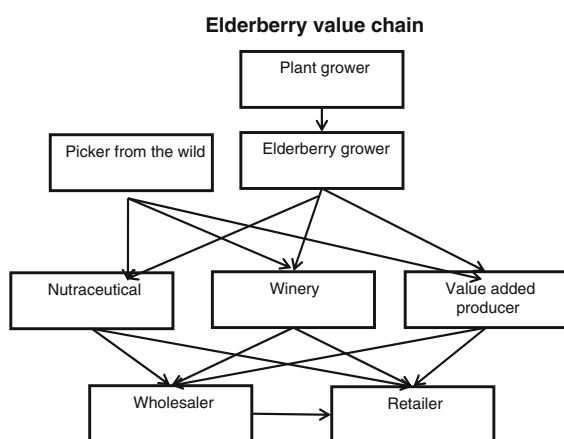


Fig. 2 The elderberry value chain

Table 1 Involvement of survey respondents in the elderberry business (survey results, N = 74)

Question in the survey	Scale/percentage of respondents (%)					
	Less than \$1,000	\$1,000–5,000	\$5,000–10,000	\$10,000–50,000	\$50,000–100,000	More than \$100,000
Approximate annual gross sales from elderberry	32 %	27 %	16 %	13 %	3 %	9 %
How long have you been in the business	Less than 1 year	1–5 years	6–10 years	11–20 years	21–30 years	More than 30 years
	9 %	29 %	30 %	17 %	9 %	6 %
Percentage of elderberry from your business	Less than 1 %	1–5 %	6–10 %	11–50 %	100 %	
	40 %	21 %	14 %	6 %	1 %	

Table 2 Percentage of respondents who purchase and sell elderberry products (survey results, N = 74)

Elderberry product	Percentage of respondents	
	Purchase	Sell
Plants	44	42
Flower	1	8
Fruit	22	22
Juice	13	11
Concentrate	19	8
Wine	–	18
Nutraceutical products	–	4

Forty-one percent of respondents felt that the elderberry industry is non-competitive, 21 % moderately competitive, and 38 % had no opinion.

Interview findings: PFFM analysis

Twenty follow-up phone interviews were conducted with people from the following states: AR (1), CA (1), IL (2), KS (1), MO (3), NC (1), ND (1), NY (1), OK (3), SC (1), SD (1), VA (2), VT (1), and WI (1), comprising six growers, four value added producers, six wine producers, three nutraceuticals and one plant grower (Table 3). A respondent was considered a grower if their primary product sold was fruit. Wild harvesters who pick and sell elderberry were also classified as growers. If an interviewee grew elderberries but used them exclusively to produce value added products, he/she was considered a value added producer.

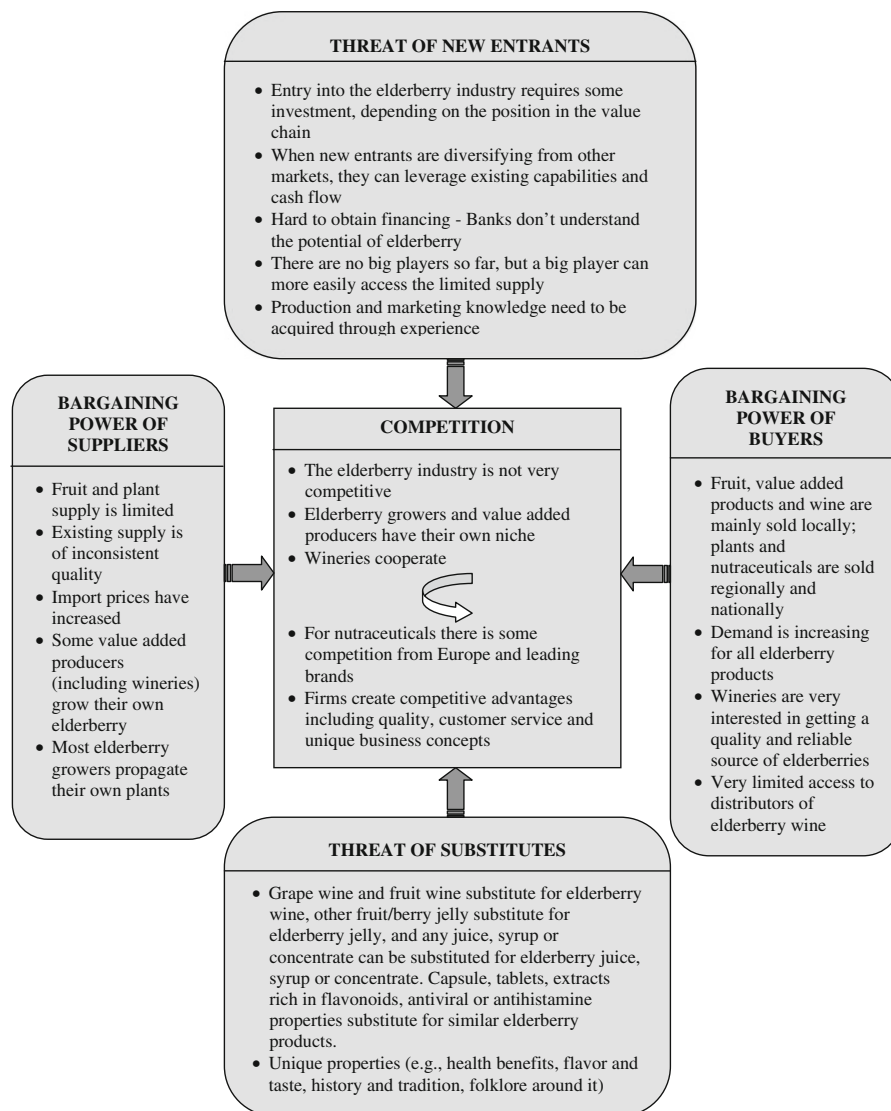
Respondents varied from businesses that are predominantly elderberry based (20 %), to those that have a significant proportion of products that are

elderberry based (40 %), along with others for whom elderberry is a minor component in their business (35 %). Four respondents had produced elderberry for less than 5 years, six had produced elderberry for 6–10 years, 5 respondents had produced for 11–20 years, and two respondents had been in production for over 20 years (Table 3).

Table 3 Description of 20 people who participated in interviews

No.	Longevity in the elderberry business (years)	Main position in the chain	Second position	Percent elderberry
1	21–30	Grower		<5
2		Grower		6–10
3	11–20	Grower		<5
4	6–10	Grower		>80
5	<5	Grower	Value added	<5
6	6–10	Grower		<5
7	6–10	Nutraceutical		11–20
8	6–10	Nutraceutical	Grower	11–20
9		Nutraceutical		<5
10	11–20	Plant grower		>80
11	11–20	Value added	Plant grower	>80
12	6–10	Value added	Grower	6–10
13	6–10	Value added	Grower	6–10
14	<5	Value added	Grower	11–20
15	21–30	Winery		<5
16	11–20	Winery		<5
17	<5	Winery	Value added	
18	11–20	Winery	Nutraceutical	>80
19	<5	Winery	Value added	6–10
20	6–10	Winery	Value added	21–40

Fig. 3 Representation of the influence of the Porter's Five Forces (Porter 1980) on the elderberry market



The PFFM served as a framework for examining the competitive environment. Each force is analyzed in detail. In the following sections, exact quotes from respondents, maintaining respondent anonymity, are included in italics. A descriptive representation of the five forces and their influence on the elderberry market is presented in Fig. 3. A more detailed presentation is provided in the full report available online (Cernusca et al. 2011).

Threat of new entrants

New entrants to an industry can raise the level of competition, thereby reducing its attractiveness. The

threat of new entrants depends on the height of entry barriers and the reaction entrants can expect from incumbents. Barriers to entry are advantages that incumbents have relative to new entrants like economies of scale that favor large firms and keep small firms out, cost advantages for existing firms, the investment needed for start-up, the lack of necessary information, and steep learning curves, etc. (Porter 1980).

There are few large players in the elderberry industry. Larger firms can more easily gain access to the limited supply: *Because of our success, people come to us, they want to grow for us, that's how we get growers as compared to a smaller business: I haven't*

had the opportunity to get any more elderberries, I even put an ad in the local paper for people to pick elderberry and we would pay them per pound. The result of this situation is a much higher price paid for supply by a potential entrant leading to limited production due to limited supply.

Entry into the elderberry industry requires some investment, depending on the position in the value chain. Buildings, freezers, and processing equipment are some of the necessary investments required to start an elderberry business. When new entrants are diversifying from other markets, they can leverage existing capabilities and cash flow. Presently, obtaining financing is a challenge because banks lack detailed financial information concerning the elderberry industry and are therefore reluctant to provide loans: *And there is no help. Banks don't even know what elderberry is; Banks don't understand the potential elderberry can have.* Information about growing elderberry is lacking but a recently published guide will help to address this concern (Byers et al. 2012). In a few areas, universities, experienced growers or processors lower this barrier by organizing workshops and providing the necessary information to get started. The laws regarding alcohol create barriers in the wine industry. Different laws in different states are a major problem for wineries trying to get wine to the people that want it. Some states don't allow shipping wine out of the state, other states don't allow shipping wine into the state. FDA regulations limit the market because producers are not allowed to promote the medicinal values of elderberry unless long term, expensive clinical trials support the claims.

In conclusion, in the early stages of the life cycle of the elderberry industry, new entrants are relatively benign, they help grow the market. However, even if new entrants are not currently a threat, all the entry barriers should be taken into consideration by market participants and used to create advantages for the future.

Bargaining power of suppliers

Suppliers are the individuals and businesses that provide the raw materials to be transformed into goods provided to customers (e.g., plant growers are suppliers for elderberry growers; growers are suppliers for value added producers).

Most respondents indicated that the domestic elderberry fruit supply is limited therefore they either supplement fruit with imported concentrate: *The main supply is local and we supplement with European concentrate when we need to* or limit their production: *If I could buy 1,000 pounds of elderberry, I would like to make more elderberry wine and I would like to make a port out of it, and a dry elderberry wine.* Import prices have increased over the past few years and imported concentrate is becoming harder to obtain: *I have friends that can't get enough elderberry concentrate and the price is on the high side compared to the past.* Imports come from Germany or Poland but finding the right quality and a reliable supplier poses challenges to US producers. Most respondents prefer locally produced elderberry over imports. Because of the limited supply most value added producers, including wineries, grow their own elderberry: *I have never purchased any but that's largely because there is none available to be purchased that I know of.* According to one respondent, most nutraceutical companies strongly prefer European elderberry varieties because more medical research has been done on European elderberry.

Plant supply of known cultivars is also limited. Some growers purchase plants (domestic or imports) and propagate. However, large quantities of plants for commercial production are not available, locally proven varieties are hard to find, and supply is not always reliable. Additional plant and fruit supply is needed for the existing industry players to operate at full capacity or to grow.

Bargaining power of buyers

Buyers are the people/organizations who create demand in an industry. There are a variety of elderberry products sold by the interview respondents: plants—plants in pots, cuttings, seeds (dry berries); fruit—fresh elderberries by the pound, de-stemmed elderberries to wineries, dry flowers, dry and fresh fruit to medicinal companies, de-stemmed elderberries for pies or jams, frozen berries; wine—different elderberry wines ranging from dry to sweet, pure and blended; nutraceuticals—juice, concentrate, extract, syrup; pure elderberry or in mixes; other value added—jelly, syrup, vinegar, fudge, barbeque sauces, salad dressing, carbonated beverages, cordial, juice blends, yogurt, jam, pie.

Plants are sold regionally and nationally. Demand for elderberry plants has greatly increased. As more people are trying to experiment or get into commercial production, demand for tested cultivars is increasing.

Fresh or frozen elderberries are sold through different outlets for various uses and various prices: to wineries for wine making for prices ranging from \$0.50 (with stems) to \$5 a pound (de-stemmed), in farmers markets or online to individuals (\$3–5 a pound), and to nutraceutical manufacturers for \$11 a pound. Respondents stated that demand for elderberry fruit is high. Wineries are seeking more local supply. Chefs are increasingly interested in elderberries. The “buy local” trend supports the increase in elderberry demand.

Wine is sold primarily at wineries and retail outlets. As mentioned, some states allow wine shipment, others do not. Distributors have power in the wine industry making it difficult for wine producers to enter distribution channels and obtain grocer shelf space: *Distributors claim that there is not enough demand for (state) wine for them to purchase our wine.* Because the wine industry is tightly regulated, most elderberry wine is sold inside state borders. Wine prices are good, selling between \$10 and \$14 a bottle. According to interview respondents, demand for elderberry wine is increasing and it's driven by increased consumer interest in their health: *For me, it seems that wine consumption in general has increased... But there seems to be a renewed interest in fruit wines especially in elderberry and blueberry. They get some recognition in being health beneficial, antioxidant. These made a lot of people seek them.* According to a respondent, the Internet is also helping to increase sales. Even if state laws prohibit shipping, potential customers find out about the wine on the Internet and travel to the winery.

A variety of value added products are sold by respondents—jelly, syrup, vinegar, fudge, barbeque sauces, salad dressing, carbonated beverages, cordial, juice blends, yogurt, jam, pie. Demand for value added elderberry is not increasing for all respondents. They sold out or increased their sales in general but do not know if this is an upward trend. Demand for jelly is lacking in some states because other fruits are preferred by consumers.

Nutraceuticals sold include juice, concentrate, extract, syrup, pure elderberry or in mixes. Nutraceuticals are mostly sold nation-wide, direct to health

food stores and to health food store distributors: *We sell to more than 10,000 health food stores and about 13,000 health professionals around the country. We sell only wholesale, nationwide.* Syrup and concentrate are also sold directly to the consumer.

In conclusion, besides distributors in the wine industry, there is no buyer power. According to one of the respondents, between suppliers and buyers *it's a partnership not an adversarial relationship.* Both suppliers and buyers work together to grow the industry.

Threat of substitutes

A substitute performs the same or a similar function as an industry product by a different means. There are substitutes for elderberry and elderberry products. Grape wine and fruit wine substitute for elderberry wine, other fruit/berry jelly substitute for elderberry jelly, and any juice, syrup or concentrate can be substituted for elderberry juice, syrup or concentrate. Capsule, tablets, extracts rich in flavonoids, antiviral, or antihistamine properties substitute for similar elderberry products.

However, elderberry has very unique properties that put it in a class by itself. While lacking in FDA approved medical research, many people recognize elderberry's unique health benefits: *If red wine is healthy for you than elderberry wine must be healthier. I don't know if there is data to support that, but this is the perception.*

According to the respondents, their customers recognize the health benefits of elderberry. Some believe elderberry lowers cholesterol, provides viral protection, is a natural antihistamine helping people who suffer from allergies, and contains high antioxidant levels. Some customers' doctors recommended elderberry: *We don't make health claims at all but is kind of cute when customers come in and say Oh, my doctor told me.* Flavor and taste also differentiate elderberry from other similar fruit/berries/products. Respondents describe elderberry wine's flavor as complex and rich with a finish that provides altogether a unique experience from the flavor stand point. Elderberry seems to be a new product on the market but with history and tradition. It has been used for centuries as a natural remedy and to improve the taste of grape wine. Memories of grandpa's elderberry wine or grandma's elderberry pie are also specific for elderberry. There

are stories around elderberry that help reintroduce it to the market: *And the folklore around it, for me is the biggest factor, maybe more than the health factor.* Although people can substitute elderberry with other similar products, the unique properties of the elderberry keep it as a choice for many customers.

Competition (intensity of rivalry among existing competitors)

Rivalry can take many forms such as price discounting, new product introductions, advertising campaigns, and service improvements. In this embryonic stage of the industry, competition is nonexistent or low but slightly differs for different players in the market.

Because of high demand and few growers, growers indicate no competition. Most of the grower respondents are the only growers in their region. If there are more growers, each has his/her own niche. For value added producers, because of the limited number of producers and limited supply, each elderberry producer created his/her own niche market. There are not many producers: *a few people making syrup, a few people making jelly but nothing on any kind of scale.* Respondents that sell in grocery or health food stores are competing like everybody else for shelf space.

Winery respondents also noted no competition: *No, I don't have competitors in my area. There are not many wineries producing elderberry wine; No really, I don't see much of elderberry wine produced in this region.* One respondent has other wineries in the area but they are not competitors: *I consider they are beneficial.* They have a wine festival jointly organized by all wineries in the area.

For nutraceutical manufacturers the situation is a little bit different. There is some competition from Europe and leading recognized brands. Even so, respondents don't consider this a competitive industry. Their products differentiate by quality. According to one respondent, the European products which are currently the leading sellers, are really inferior in terms of quality and this provides domestic companies an advantage and the opportunity to offer high quality products without artificial ingredients, without sugar in them and without fillers.

Respondents created competitive advantages that differentiate them from other producers in the eye of their customers. Some emphasize quality (e.g., the highest quality botanicals on the market, using natural

sweeteners, proprietary wine making techniques), others create economically priced products. Some respondents mentioned exceptional customer service as a competitive advantage. Producing locally and creating a relationship with the customer is considered a competitive advantage by other respondents. For most of the respondents, being the first in the market allows them to reap the benefits because nobody else is doing it. The industry is embryonic, from growers to value added producers. The business concept itself provides advantage to some of the respondents (e.g., *small enough and diversified enough or using food manufacturers to custom pack anything, or creating a demonstration site by the winery or having an active Internet presence*).

Conclusion

The five competitive forces provided a framework for identifying the most important industry developments and for anticipating their impact on industry attractiveness. According to this analysis, elderberry is a small but growing industry with high growth prospects. Being in its development stage, the industry is represented by a few important players who are entrepreneurs and innovators and other small scale participants producing at an experimental level. They sell to early adopter customers and focus their efforts on creating consumer awareness for the product and the industry.

The industry is vertically integrated. Most market participants are involved in multiple stages of the value chain: they propagate their own plants, grow elderberry, and produce some value added products (wine, juice or jelly) instead of focusing only on one product or service. As in any nascent market, there is room for new companies to enter and differentiate through innovation and product features along with brand, service or price.

Entry into the elderberry industry requires some investment, depending on the position in the value chain. When new entrants are diversifying from other markets, they can leverage existing capabilities and cash flow (e.g., vegetable producers, wine makers). Attracting financial support from financial institutions is difficult because of the newness of the industry. If industry returns are attractive and are expected to remain so, investors will provide entrants with the

funds they need. Information about growing elderberry is lacking and people need to go through trial and error and keep experimenting while dealing with different problems.

Due to a lack of mechanical harvesting equipment, elderberry is hand harvested and the process is labor intensive. Currently available mechanical harvesters, not designed specifically for elderberry, result in considerable fruit to fall to the ground (Charlebois et al. 2010). People need to be trained to pick quality fruit. Respondents had to deal with unknown pests and non-labeled pesticides. The lack of quality standards at the industry level creates challenges for growers and producers alike. In the early stages of the life cycle of the elderberry industry, new entrants are relatively benign, they help grow the market. However, being aware of all the entry barriers' will help market participants create competitive advantages for the future.

Domestic supply is low; there are few proven cultivars. It is important to plant cultivars tested in specific environments to assure good performance (Charlebois et al. 2010). In the absence of tested cultivars and dedicated nurseries, growers need to buy whatever they find and propagate their own plants. Processors face the same supply shortage. Fruit supply is not readily available. Some value added producers produce their own fruit, others compensate with imported concentrate while others pay more to obtain needed supply. Bigger players in the industry can more easily access the limited supply. The result is a much higher price paid for supply by a potential entrants and limited production because of limited supply.

There are a variety of products sold: plants in pots, cuttings, seeds, fresh and frozen elderberries, dry flower, wine, juice, concentrate, extract, syrup, jelly, syrup, vinegar, fudge, barbeque sauces, salad dressing, carbonated beverages, cordial, juice blends, yogurt, jam, and pie. Prices are good across the value chain. It is difficult to gain access to distribution channels because of the low volume or because distributors claim low demand (e.g., elderberry wine). Farmers markets, tasting rooms, farm stores, local groceries or health food stores, and Internet are the most widely used market outlets. Demand trends are favorable. The health properties of elderberries attract customers. Organic and locally grown foods are perceived by consumers as healthier and safer for both people and the environment. Consumers are seeking out locally

sourced nuts, fruits, and vegetables for their health and on farm agri-tourism experiences to reconnect with their food sources.

Although there are products on the market that can substitute for elderberry products, elderberry's unique properties (e.g., health benefits, flavor and taste, history and tradition, folklore) place elderberry in a class of its own. Competition is low or non-existent at this time, each firm creating its own niche and cooperating with one another. Firms attempt to establish early perceptions of product quality, service superiority, or advantageous relationships with customers to develop a competitive advantage.

The industry is poised for growth. Industry leaders have a special responsibility for growing the industry to the benefit of all market participants. Expanding the overall profit pool creates win-win opportunities for all industry participants (Porter 2008).

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