Shifts in the American Floriculture Industry: Insight from Industry Experts[1]

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Abstract

The U.S. floral industry is constantly shifting due to several factors that are involved in nearly every aspect of an industry that sells a living product. In order to determine these factors, over forty leaders from different sectors within the industry were interviewed in order to gain expert insight into which factors are directing these shifts. Utilizing the participants' responses, Leximancer software was used to conduct a quantitative content analysis using a machine learning technique. Through our analyses, we pinpointed many of the same recurring responses from the participants regarding structural shifts in the industry, omnichannel development, and key future success factors. Implications are discussed.

Index words: Cut flowers, trends, supply chain, consumer, decline, production.

Significance to the Horticulture Industry

The findings from the information presented in this article will benefit members from nearly every sector of the horticulture industry by providing insights provided by experts from different points in the supply chain for horticulture products. Questions were asked in a manner that allowed each participant to voice their experiences, the primary issues they face, and the changes they feel need to be made to maintain success in the floriculture industry.

Introduction

The U.S. floriculture industry has seen many changes over the past several decades. While the U.S. maintains its status as the highest consumer of floriculture products worldwide, the floral products purchased primarily come from outside the U.S. This is due to several factors, including lower labor costs outside the U.S., more ideal climate for year-round production, and increased demand over time. Within the U.S., we appear to be approaching somewhat of a decline stage in the floriculture industry as it is reaching the mature stage of its life cycle (Knuth 2019). To determine the contributing factors causing this decline and to determine the driving forces that have changed the cut flower industry, we met with industry leaders from all points of the supply chain to gain their perspectives and insight into what has led to this decline and how they view the state of the industry as a whole. We found there was a predominant agreement that the industry continues to operate in "silos" which hampers the ability to adapt to structural changes in the industry over time.

State of the floriculture industry. As of January 2022, the global floriculture market was estimated to be valued at around 49.8 billion USD and is projected to increase to around 80.5 billion USD by 2029 (Floriculture Market 2022), while the total value of sales across floriculture crops in the U.S. totaled 6.43 billion dollars in 2021 (USDA 2022). Among all countries involved in the floriculture industry, the United States ranks the highest in the amount of annual consumption of floriculture products, while remaining below the top 10 in production of floriculture products (Global Floriculture 2021). The United States is currently importing around 80 percent of cut flowers that are consumed while the demand for cut flowers continues to rise (United States Floriculture Market 2021). Colombia is the primary source of the United States' floricultural products (A Mixed Bouquet 2022). In the United States, the total floriculture crop value at wholesale for all growers (with 10,000 USD or more in sales) was estimated at 4.80 billion USD for 2020 (USDA 2021). These sales numbers went up in 2021 when the total value of sales across all floriculture crops totaled 6.43 billion USD (USDA 2022). This resulted in a growth in sales expenditures of floriculture crops of nearly 2 billion USD from 2020 to 2021.

The floriculture industry is comprised of several sectors that each play an important role in the process of supplying available floricultural products for consumers to purchase. Among these included sectors: allied organizations, associations, bouquet makers, importers, plant breeders, floral designers, direct-to-consumer pipelines, domestic growers, international growers, online retailers, supermarkets, and wholesalers.

Allied organizations are defined as distributors or producers of non-floral products that are directly involved in the floriculture industry. These organizations include suppliers of floral wire and foam, containers, ribbon, spray paint, etc. Associations are groups or organizations dedicated to using education and action to improve the state of the floral industry through research grants or public education programs, and they provide financial support for future members of the industry. Bouquet makers are firms that focus primarily on creating market bouquets for consumption at mass market retailers. Some bouquet makers are housed internationally and import into the U.S. finished bouquets while others import into the U.S. boxes of

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flowers and assemble bouquets in packing houses near the ports (for example, Miami-Dade International Airport). Plant breeders are the individuals who target the desired genetic characteristics of plants used in the floriculture industry in order to produce new varieties and cultivars. Floral designers can include traditional floral shops that provide floral arrangements to consumers as everyday bouquets and vase arrangements, as well as for events such as funerals, weddings and prom, birthdays, sympathy, Valentine's Day, and Mother's Day. Floral designers can also include event and studio designers who specialize in niche markets such as corporate events, weddings, or creating designs for businesses. Typically, event and studio florists operate out of their own studio or home rather than renting or owning a brick and mortar site. Direct-to-consumer involves the companies that provide floral products directly to the end consumer either physically on-site or through online ordering; there are normally several other nodes within the supply chain that floral products go through before ending up at this stage. Domestic growers are producers who grow cut flowers and foliage plants within the U.S. to provide "locally-sourced" floral products or products for export. International growers are producers who grow the floral products outside the U.S. and import the products into the U.S. from other countries. Online retailers are defined as companies that have adopted a partially or completely online-based presence where consumers can order products for pickup or delivery through their company's website. Supermarkets, or mass markets, are large-scale stores that have a large public presence that are not florally-based in their nature, but sell flowers to customers in a more readily-accessible capacity. Wholesalers are producers or suppliers who provide their finished or unfinished products to another company before it reaches the end consumer.

Each of these sectors in the floriculture industry plays an important role in the process of getting flowers from production to the end consumer, and some are more closely intertwined than others. Additionally, there is a defined "traditional" floral chain that the products move through that includes most of these sectors. The traditional floral supply chain begins with the genetics that the breeder provides for subsequent sectors in the supply chain. The desired genetics are determined by what sellers and growers see are desirable traits based on data from the end consumer or traits that could ease the production process. From the breeder, stock plants are sent to domestic or international growers, where they will grow the plants to a shippable product. Before entering another country, plants must undergo several procedures to gain approval to enter the designated country, which is part of what importers do in the supply chain. After being approved and moved along by importers, plants are then sent to wholesalers, where the plants will stay until they meet their customers' preferences. The final destination before ultimately selling the plant is when the plant product hits the shelves in retail florists or supermarkets to reach the end consumers. Finally, a consumer will purchase their flowers from one of these retail outlets. Each phase in the supply chain plays an important role that is somewhat dependent on the prior phase, so it is important that information and products flow seamlessly between each of these stages.

Changes in the floral industry. The U.S. floriculture industry underwent considerable changes after the second World War. Developments in technology and air travel allowed plants to be transported between different markets at a much swifter rate and with a more direct approach (Besemer 1966). The value of the U.S. floriculture industry during the late 1940's to early 50's was valued at around 250 million dollars – a little over 3 billion USD today. This number was 12.5 times higher than during the year 1900, where it was valued at a mere 19 million dollars – around 225 million dollars today (Wintz 1953). During the 70's, the floriculture industry was one of the faster growing segments of the U.S. agricultural economy (Powell 1976). This rapid growth was in a large part due to the shift in markets, where plants and flowers became readily available and accessible to the general public year-round in supermarkets and other large-scale vendors. With the U.S. floriculture industry being valued at around 6.4 billion USD as of 2021 (USDA 2022), we have seen tremendous growth over the past century, but not as rapid over the last several decades.

Yet, there have been negative impacts on the industry over time as well. In 1989, the U.S. accounted for less than 1 percent (300 million USD) of the over 3 billion USD of the world trade in flowers and plants with their share of those trade volumes continuing to rise. The U.S. was noted as the largest producer of plants and flowers in the world, but with substantially lower domestic consumption than other developed countries; the U.S. were even referred to as "the largest underdeveloped market in the world for ornamentals" by major exporting countries to the U.S. (Johnson 1989). The number of domestic floral producers has decreased dramatically over the years; in the late 80's-early 90's, there were 12,000-14,000 growers of cut flowers and decorative greens in the U.S. compared to today's less than 10,000 (USDA 2022). This is, in large part, due to consolidation, where firms have been expanding their operations through acquisitions in order to service larger customers (Hall 2006). These consolidations have led to a reduced number of producers within the U.S. floriculture industry and a reduction in the number of employees found in most businesses that sell floral products.

Issues with labor shortages in the agricultural sector of the United States have been present for the past few decades. The aging population, a decline in the domestic labor force participation rate, and continued growth in employment of other industries have all contributed to issues with labor (Knuth 2019). Fortunately, higher utilization of H-2A programs has allowed the U.S. to mitigate some of the domestic labor shortages by bringing in temporary migrant labor, especially in the agricultural sector. In fact, reverse migration rates are higher than migration rates in the U.S. for the first time in decades, meaning more workers are returning from the U.S. to Mexico than are coming to the U.S. from Mexico (Knuth 2019).

The production of cut flowers by domestic growers has been gradually declining since the early 2000's, while imports of cut flowers have continued to rise over the years

Table 1. **Key concepts provided in floriculture industry member interviews were indicated based on per-individual interview feedback, which was uploaded through transcript data into Leximancer software. The key concepts are separated by floriculture industry role with overall themes aggregated across industry roles at the bottom of the table.**

Industry Roles	Key Concepts
Allied Organizations	People, industry, business, retail, flowers, different, time, doing, florist, work
Associations	Industry, flowers, people, need, business, consumer, different, retail, time, work, change
Bouquet Makers/Importers	Flowers, product, truth, down, happen, quality, space, e-commerce, different, problem
Breeders	Industry, flowers, companies, information, problem, today, presence, reason, consolidation, process
Designers	Flowers, industry, business, florist, take, need, number, shops, event, wholesale
Direct to Consumer	Florist, local, business, flowers, technology, need, online, experience, service, customer
Domestic Growers	Flowers, industry, retail, need, florist, time, business, wholesale, domestic, trying
International Growers	Flowers, industry, different, business, important, time, florist, information, distribution, talk
Online	Industry, need, business, time, florist, product, feel, event, different, data
Supermarket	Flowers, digital, floral, industry, channel, buy, customer, mass, store, chain (fresh, color, world, day, retail, love)
Wholesaler	Industry, flowers, business, time, retail, customers, need, market, sales, future
Overall Themes:	Work, business, time, wholesale, industry, florist, different, flowers, event, product, customers, future, market, sales, information, customer

(Jerardo 2006). This decline is partially due to increases in production costs, where the U.S. is primarily impacted by higher labor costs during the production process. Since many other countries have much lower labor costs, it is more cost-efficient to import cut flowers from areas with lower labor expenses in many scenarios. Additionally, the passing of the Andean Trade Act of 1991 fostered several additional market intermediaries to become present in the floral supply chain (Knuth 2019). These additional steps in the process ultimately led to further increased costs in production, discouraging many new domestic growers from becoming involved in the floriculture industry.

Therefore, with all of these background positive and negative influences affecting the floriculture industry, this analysis was conducted to gain a comprehensive understanding of the major factors that are currently influencing the change in the cut flower industry and how key industry leaders observe these changes. By understanding what is leading to certain changes within the floriculture industry, we can take measures that provide insights leading to more positive changes in the U.S. floriculture industry.

Materials and Methods

The first step in the research process was to compile and catalog existing floral industry research and/or secondary data (i.e. peer-reviewed publications and non-peer-reviewed reports). By using this sectoral approach, we were able to determine the changes in industry structure, how firms conduct themselves in the marketplace, and the operational and financial performance of firms in the floral industry. The Structure-Conduct-Performance (SCP) paradigm of strategic industry-level analyses assumes market structure will determine firm conduct which then will determine performance (Hannan 1991, Weiss 1978). In a typical SCP analysis, market structure establishes the overall environment (or playing field) within which each firm operates. Essential market structure characteristics include the number and size distribution of the sellers and buyers, the type of product offered for sale, barriers to entry, and whether any asymmetry of information exists between buyers and sellers.

Market structure often differs across industries because of variations in basic conditions, including the underlying technological base, the regulatory and legal environment, demand conditions, and the relative importance of economies of scale (Weiss 1978). All of these basic conditions tend to affect the number and size distribution of firms observed in an industry. Market conduct, the second element, shows up in the firm-level value chain activities such as production, pricing, marketing, promotion, and research and development. Whether a firm decides its strategic intent independently or in conjunction with other firms in the market has a crucial impact on the conduct of the industry. The third element, market performance, is reflected in the degree of production efficiencies, technological progress, and other factors affecting revenue volatility.

Once the research team generated the literature review through collecting, cataloguing, categorizing, summarizing, and benchmarking existing data and reports, gaps in existing information were identified. To aid in this investigation, primary market research was conducted in the form of personal interviews with floral industry thought leaders. Forty-one interviews were conducted with floral industry professionals that are leaders in their respective sectors within the industry (refer to Table 1 to see each sector). Interviewees were selected and approached based on their title in their company (i.e., CEO and CFO). Each interview consisted of asking each participant the following questions in this order: What keeps you up at night? What do you feel are the key drivers of change in the industry? How have these contributed to the decline in the floral sector in which you compete? What are the key success factors for firms in this sector in the future? How will your sector evolve going forward into the future? How has your business changed its strategy throughout the years and how have you influenced the future success of the industry? Each interview that was conducted was recorded (with the participants' permission) and a transcript was produced for referencing quotes and gathering data.

For the analysis procedure, each of the 41 transcripts recorded during each interview process was evaluated by noting responses directed towards each of the five questions asked of each participant during the interview process. Direct quotes with especially meaningful insight into

the prompted questions were notated to determine key themes between specific roles in the industry, and themes present across the entire industry. These quotes were categorized by the responding individual, by the question the response was gauged towards, and by the sector the respondent represents within the floriculture industry. These key insights were then further analyzed to see which themes, concepts, and responses appeared most often or were most impactful according to the responses.

Deeper insight analysis was conducted through the Leximancer analysis software program (Leximancer Pty Ltd, Brisbane, Queensland, Australia). Leximancer is computer software that conducts quantitative content analysis using a machine learning technique. It learns what the main concepts are in text and how they relate to each other (Leetaru 2012). It conducts a thematic analysis and a relational (or semantic) analysis of the interview data. Leximancer provides word frequency counts and co-occurrence counts of concepts present in the transcripts of the narrative interviews. It is a method for transforming lexical co-occurrence information from natural language into semantic patterns in an unsupervised manner (Cretchley 2010). It employs two stages of co-occurrence information extraction — semantic and relational — using a different algorithm for each stage (Smith 2006). The algorithms used are statistical, but they employ nonlinear dynamics and machine learning. Once a concept has been identified by the machine learning process, Leximancer then creates a thesaurus of words that are associated with that concept giving the "concept" its semantic or definitional content (Smith 2006).

Emergent themes are then visible to the user, and are expandable using the map visualization that links directly to the areas of the data in which the concept occurs. The themes map enables a quick reading of the narrative interviews. It lets us see what the dominant themes are, rather than imposing our own interpretations on the data. The proximity of two concepts indicates how often or not they appear in similar conceptual contexts. So, when two concepts are placed at a distance from each other, it indicates that they are not used in the same context. The themes are the colored circles around clusters of concepts. The lines or pathways navigate the most likely path in conceptual space between concepts in order to aid reading the map. The connectivity score reflects the degree (equivalent to degree score in network analysis) to which the theme is connected to the other concepts in the map. A broader analysis was conducted using the raw transcript files from each interview. This same analysis was then conducted for the key concepts identified by the research team to provide a more focused insight into selected key themes and points made by the participants.

Secondly, the analysis was broken down and categorized by sector to provide more focused results by each sector representation. The "Concept Summary" and "Concept Map" tools were utilized from Leximancer to generate graphical data. Additionally, a filtering option was utilized to remove filler words such as "umm", "yeah", "and", or the names of the individuals speaking in our interview transcripts so it would not skew the data results based on word frequencies and correlations.

Results and Discussion

The Leximancer software program analyzes the frequency and connectedness between certain words and phrases to make a visual graphic displaying the results. In Figure 1, the large, colored circles are the main themes identified by the software. The size of each of these circles indicates the prominence of that particular theme; the larger the circle, the more words, and frequency within the interviews the words were stated, used to convey that theme. Additionally, the overlap of these circles shows how often these themes intersect; the more overlap between two theme circles, the more connected those overarching themes are.

Secondly, the black words and gray lines and circles indicate the key concepts. The words appear within the theme bubble they were mostly associated with and their gray bubbles vary in size based on their frequency of appearing under that certain theme. The concepts also have gray lines that indicate the words' connectedness to other concepts and within other themes; the more lines connected between concept bubbles, the more concepts to which that particular concept is connected. The closer the concept words are to each other, the more associated they are with one another; and the closer the concept words are to the center of the theme circle, the more associated they are to that particular theme.

Figure 1 was generated using the data from every transcript gathered from each participant in the interview process. The generated concept map revealed the top 50% of key themes throughout the interviews. The key themes, ranked in order of highest to lowest prevalence, were business, flowers, people, industry, coming, information, and future.

Under the "business" theme, associated concepts included wholesale, retail, florist, supermarket, event, customer, and market (Fig. 1). The "business" theme had moderate overlap between the "industry" and "flowers" theme circles and little overlap with the "people" theme. Concepts shared between "business" and overlapping themes were "supermarket," "customer," and "market." Business as a concept is connected to several other concepts within the business theme including florist, probably, continue, wholesalers, and question.

Flowers as a theme had much greater overlap with "people" and minimal with "coming," but no direct overlap with "industry," "future," or "information." Concepts under the "flowers" theme included consumer, time, buying, sell, and cut (Fig. 1). Concepts connecting flowers to people included "products" and "take." Flowers as a concept has a significantly larger concept bubble and is highly interconnected to many other concepts, including day, consumer, buy, and order.

The "people" theme moderately overlapped both the "flowers" and "industry" circles, but had significant overlap with the "coming" circle. However, there was little to no overlap between people and the remaining themes. Concepts within the people theme include saying, world, whole, need, and looking (Fig. 1). People as a concept also has a large concept circle and many connections to other concepts, including coming, take, huge, course, saying, and sure. The "coming" theme circle is nearly exclusively

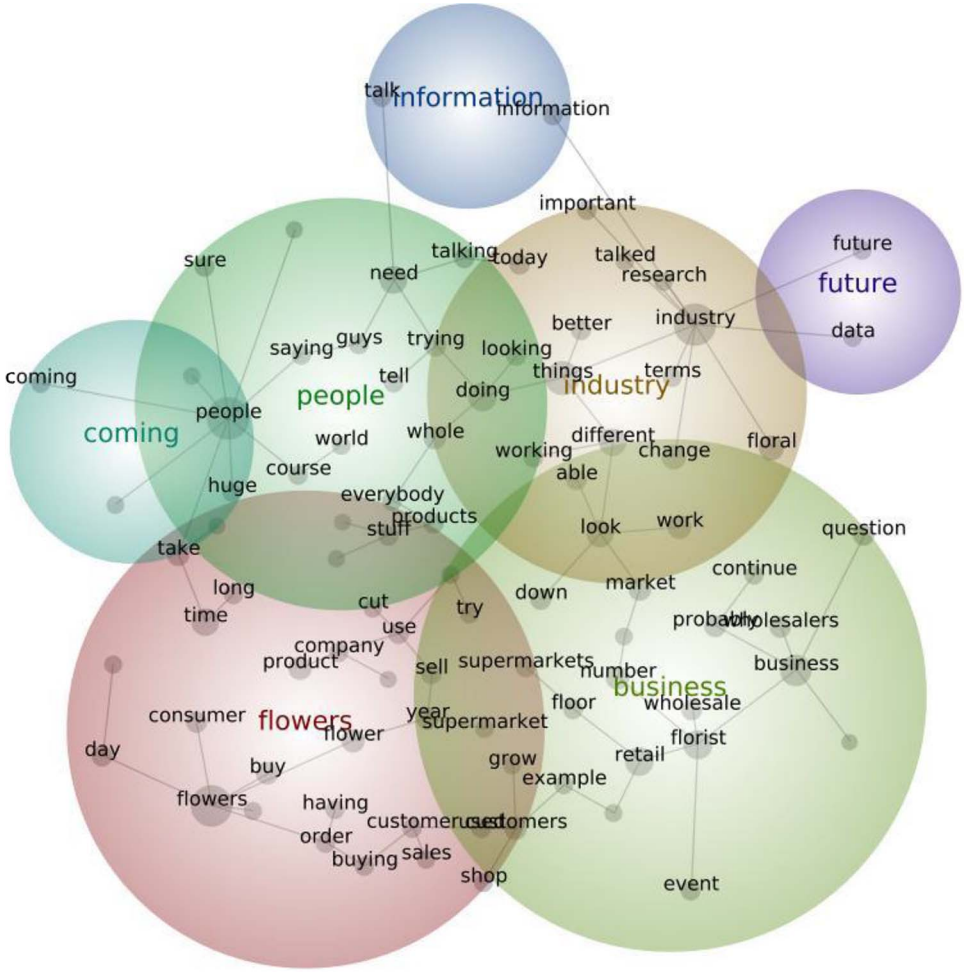

Fig. 1. Larger colored circles are used to indicate the main themes mentioned during the floriculture industry participants' interviews. Smaller gray circles represent the concepts discussed and their placement and connection within and between other concepts. Themes signify how each of them relate to and differ from one another and how frequently they were mentioned by the participants during the interview process (visual display settings set to 50% theme, 85% concept).

connected to the "people" theme, where it has a singular concept, which is the same as its theme title: "coming."

"Industry" was highly connected to "business" and "people," and is the only theme that had overlap with the "future" theme. Concepts within the "industry" theme include research, change, different, working, and better. Industry as a concept was highly interconnected with other concepts, and appears to be the largest concept circle in Figure 1; these interconnecting concepts include floral, change, terms, things, important, talked, and research. The "future" theme was slightly connected to "industry" through some overlapping of their theme circles, but is also connected through the "industry" concept, specifically through the concepts of "future" and "data."

The final theme circle is unique in that it is the only theme circle that is only minimally connected through concepts rather than having any theme circle overlap at all. "Information" was loosely connected to the "people" and "industry" themes through the respective concepts of "talk" and "information." This unique lack of overlap can lead to an assumption that information is one segment of our industry that has very little connection to any other component of our industry.

We then used the information gathered from all the transcripts to determine which themes and concepts were most representative of the overall information based on the interview participants' responses (Fig. 2). These responses were compiled into a document and categorized based on which of the questions they directly addressed. This document was then uploaded to Leximancer for its data analysis tool to produce a concept map in order to provide more focused results that emphasize the key points made by the interviewees.

While similar in the overall themes and concepts to Figure 1, Figure 2 shows much more overlap and connectedness between each of the theme circles; these overlaps signify a closer relationship between each of these themes and concepts. However, new themes arise in Figure 2, such as huge, doing, things, take, and media. One interesting change is that the newly produced themes are more action-oriented, which may be representative of the feedback given by interviewees of actions and measures needed to be taken by different members of the industry such as information and data sharing, educating consumers, and adapting to new technologies.

The concepts generated in Figure 2 are nearly identical to those in Figure 1, but the themes are more overlapped. This

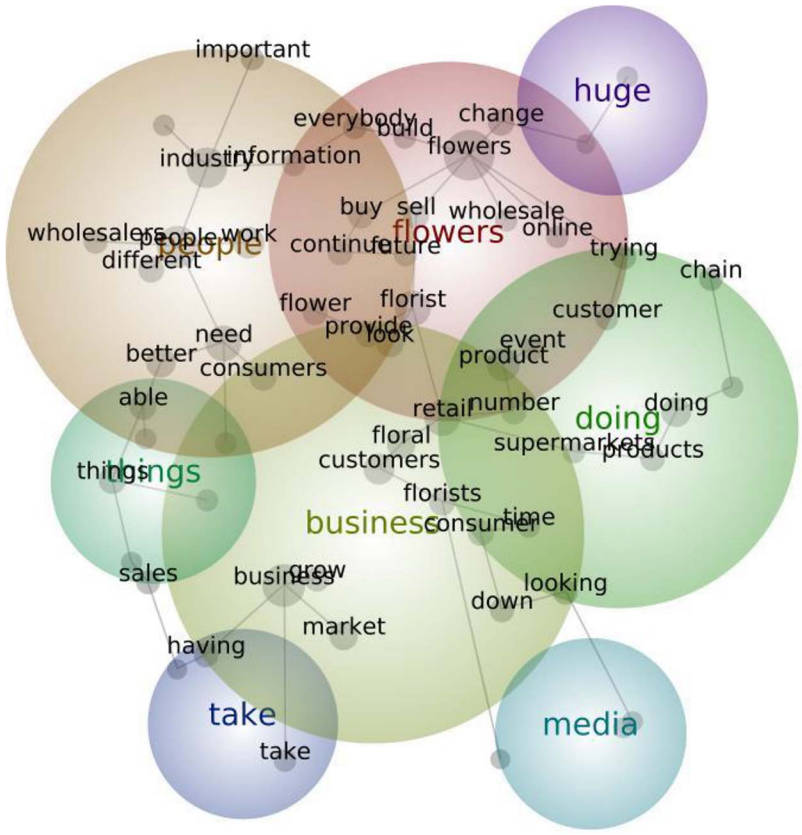

Fig. 2. **Large colored circles are used to indicate the main themes mentioned during the floriculture industry participant interviews with more focused results provided from the data results (visual display settings set to 50% theme, 80% concept). Smaller gray circles represent the concepts discussed and their placement and connection within and between other concepts. Themes signify how each of them relate to and differ from one another and how frequently they were mentioned by the participants during the interview process.**

is likely due to the fact that there is much less "peripheral" information and the data used to generate Figure 2 is much more targeted and the connections are more directly made. For example, the "business" theme circle in Figure 2 has overlap with more theme circles than it did in Figure 1 because all the data used for Figure 2 are responses that were given most frequently for the questions asked. Additionally, "media" is a new theme circle produced in Figure 2 based on responses given by multiple interviewees.

Another level of data analysis was based on the key concepts given by participating individuals based on the sector of the floriculture industry to which they are involved. This analysis was performed by taking the transcripts from each participating member, and grouping them together based on their role in the industry (for example, all "breeder" transcripts were uploaded together, but separately from all other transcripts). These groups of transcripts were then uploaded to Leximancer where an analysis was performed using the "ranked concepts" tool that gave a list in descending order of the most common concepts gathered from each industry role's uploaded transcripts. The key concepts are included in Table 1, with the "highest ranked" or most commonly mentioned concepts appearing leftmost, with each following rank proceeding to the right. The number of concepts was limited to the "top 10" for most of the roles, but a few additional concepts were included for roles that had more participants for their role included in our study or that had multiple concepts we felt were important to note with similar or identical percentages of ranking.

A final analysis of this data was conducted to gain the overall key concepts mentioned by the different industry roles. This was gathered by uploading the key concepts of each industry role to one document in Leximancer and using the "ranked concepts" tool once more to generate a summarized list of overarching key concepts for all of the roles that participated in our study. Instead of limiting the number of concepts included for this "overall themes" section, we included every ranked concept mentioned in the last row of Table 1.

The key concepts mentioned by Allied Trade organizations were people, business, retail flowers, different, time, doing, florist, and work. This alludes to the importance of people in influencing the changes seen in the cut flower industry over time. This may be due to the amount of change that is happening in the retail florist space and potentially how much the Allied Trade organizations rely on the retail florists to sell their products business-to-business. These concepts also were apparent in the key success factors mentioned by interviewees from this sector, including building the prestige around the product, be creative in your business, local flowers movement (https://localflowers.org/why-buy-local-flowers/), better marketing to the consumer, innovation, experimentation through trying new things, seeing how they work, which is best, and then try new things, fast and cheap, different ways to serve the market, training and education within your corporation, visual representations to help sell product via video calls and taking pictures, more communication, keep up to speed with the electronic world,

adapt to technology, social media, figure out what the consumer wants, reshaping the way we view floral products, consumer-based product thinking, talk to people and pay attention to trends, communication along the chain, customization for consumers, know your market, better utilize the international market, online sales and alternative channels to floral, omni-channel, knowing the data and the details about your business, use data internally and in the marketplace, and making sure they recognize your value proposition.

The key concepts mentioned by Associations were industry, flowers, people, need, business, consumer, different, retail, time, work, and change. This references the role that Associations play in gaining and providing information across all sectors of the floriculture industry in an attempt to bring about positive change across each level of the industry. The industry has changed and so have consumer needs, so different approaches may be needed in order to adapt to these changes. Other key success factors mentioned by this sector included appealing to alternative markets, sophisticated information systems, social media, embracing technology to get orders in front of customers, educate our consumers, carry a broad line of products, plan for the future, and become better at responding to trends and forces more quickly.

The key concepts mentioned by Bouquet Makers and Importers were flowers, product, truth, down, happen, quality, space, e-commerce, different, and problem. This alludes to the fact that consumers expect high quality products, honesty, and accurate information with the products and services we provide. Additionally, in order to deliver products and maintain customers, it may be necessary to adopt new channels to reach consumers, take orders differently, use different sales approaches for event florists, develop a language of sustainability, adopt cool designs with unique flowers, find new niches in the market, greater efficiency within the business, position properly as compared to other gift giving options, repositioning to either do-it-yourself or to high end, sustainability, enhance the firm's value proposition, and effectively market like other fresh, perishable products.

The key concepts mentioned by Breeders were industry, flowers, companies, information, problem, today, presence, reason, consolidation, and process. These concepts reveal that breeders, while mainly focused on providing the flowers needed by our customers, are also impacted by changes among other areas in the supply chain and will need to incorporate new key success factors such as all sectors of the supply chain working together and technology upgrades to address the issues the floriculture industry is currently facing.

The key concepts mentioned by Designers were flowers, industry, business, florist, take, need, number, shops, event, and wholesale. These concepts allude to the fact that designers are becoming more involved in events to mitigate the reduction of visits in traditional brick-and-mortar shops. They are also diversifying their services in order to meet the needs of consumers.

The key concepts mentioned by Direct to Consumer firms were florist, local, business, flowers, technology, need, online, experience, service, and customer. These concepts reveal that consumers are appearing to become increasingly interested in locally-sourced products, and that new technologies are capable of providing a more streamlined experience for consumers.

The key concepts mentioned by Domestic Growers were flowers, industry, retail, need, florist, time, business, wholesale, domestic, and trying. Domestic growers are an important source for providing local and time-sensitive products, so they are capable of serving the needs of many distribution channels with a quicker turnaround time since products are sourced domestically rather than internationally.

The key concepts mentioned by International Growers were flowers, industry, different, business, important, time, florist, information, distribution, and talk. For international growers, time is a very crucial factor, so the need for providing important information and ensuring that is available throughout the entire process is necessary to continue providing their products in a timely manner.

The key concepts mentioned by Online services were industry, need, business, time, florist, product, feel, event, different, and data. Online services have been able to reach a new demographic of consumers through their different and more convenient approach for some. Gathering data and information and sharing it with other segments of the industry may be an important role that online shopping can provide. Other key success factors mentioned included developing a compelling value proportion, creating a memorable experience, hand-holding with clients, share information (don't monopolize it), passion and grit, quality (10 or more days before expiration date), an excellent website interface, appeal to florists moving into events and décor, shifting customers to everyday purchases to buy more flowers (not just holidays), and perfecting the omnichannel approach.

The key concepts mentioned by Supermarkets were flowers, digital, floral, industry, channel, buy, customer, mass, store, chain, fresh, color, world, day, retail, and love. Supermarkets provide availability of products among many types of consumers, whether in-person or virtually, and are especially capable of leveraging special occasions associated with the beforementioned concepts as a method of marketing.

The key concepts mentioned by Wholesalers were industry, flowers, business, time, retail, customers, need, market, sales, and future. Wholesalers are aware of time-sensitivity and future trends and how these have changed over time, and are an important component of supplying products to the retail setting where consumers can purchase them. Future key success factors mentioned by interviewees from this sector included accurate in-house inventory, online order carts, have what they need when they need it, hands-on education classes, teach florists to increase their margins and lower amount of labor, make bouquets, delivery partnerships, vendor management program with box stores, manage themselves correctly for cost structure, charge enough for the products, so many SKU's to handle because growers are pushing new varieties, provide ways to add value, build strong relationships with customers, enhance professionalism of the business, less packaging (opposite to amazon), locally grown and being part of that movement, identify who are consuming

flowers, know where they are getting the flowers from, and if traditional gift giving and celebration is going to go away, then evolve to new audience. The overall themes or key concepts included work, business, time, wholesale, industry, florist, different, flowers, event, product, customers, future, market, sales, information, and customer (Table 1).

General conclusions that can be drawn from the interviewees' responses include a lack of information and data flow between different sectors within the industry due to silo formation (i.e., working singularly and not collaboratively). Without an understanding of sharing information benefitting the industry as a whole, discrepancies on how best to conduct business between sectors of the industry have emerged. Additionally, adaptability and foresight are important characteristics for a business or firm to possess in order to stay successful in the floral industry. Historically, it is evident that those who are creative and adjust their approaches to address certain issues are the ones who continue to be successful, and those who fail to do this almost inevitably cease to be successful. Lastly, a more integrated educational role may be beneficial for consumers and for the industry as a whole. Most consumers of floral products have been reported to lack the information required to understand the benefits of, and the care needed for, the products and services that the floral industry provides. If each of these issues are addressed and implemented, it can lead to a more cohesive industry along with greater levels of success overall.

The Leximancer software was used in this study to elicit concepts or themes from 41 interviews conducted in 2019 of professionals representing the entire floral industry supply chain. These major concepts describe the overall tone of the conversations regarding structural shifts in the industry, omnichannel development, key future success factors, and other major issues facing the floral industry.

Literature Cited

A Mixed Bouquet of Developments in Floriculture: World Floriculture Map 2021. https://research.rabobank.com/far/en/sectors/fresh-produce/a-mixed-bouquet-of-developments-in-floriculture-world-floriculture-map-2021.html. Accessed 9 October 2022.

Besemer, S.T. 1966. Economic analysis of the carnation industry in the United States. PhD Thesis, Colorado State University. 137 p.

Cretchley, J., D. Rooney, and C. Gallois. 2010 .Mapping a 40-year history with Leximancer: Themes and concepts in the Journal of Cross-Cultural Psychology. J. Cross-Cult. Psychol. 41:318–328.

Global Floriculture Industry Statistics & Trends. 2020. http://www.florinews.com/index.php/featured-articles/476-global-floriculture-industry-statistics-trends. Accessed 9 October 2022.

Hall, Charles R. 2006. "The U.S. Floriculture Industry: Structural Changes, Marketing Practices, and Economic Impacts" at the Inaugural Lecture of the International Floriculture Distinguished Lecture Series, College Station, Texas, April 11, 2006.

Hannan, T.H. 1991. Foundations of the Structure-Conduct-Performance Paradigm in Banking. J. Money Credit Bank. 23:68–84.

Jerardo, A. 2006. Floriculture and Nursery Crops Yearbook. p. 1–120.

Johnson, D.C. 1989. Alternative agriculture opportunities in floriculture and environmental horticulture crops. Agriculture Economics Search. No. 2076-2018-2051. University of Minnesota. https://ageconsearch.umn.edu/record/270469/files/aaea-1989-006.pdf. Accessed October 11, 2022.

Knuth, M., C. Hall, and M. Palma. 2019. Change and disruption in the floral industry; Texas A&M University: Miami, FL. p. 1–137.

Leetaru, K. 2012. Data mining methods for the content analyst: An introduction to the computational analysis of content. Routledge, New York, NY. p. 58–64.

Powell, J.V. 1976. Changing marketing patterns for flowers and plants in the United States. p. 285–294. *In*: Proceedings of the Acta Horticulturae; International Society for Horticultural Science (ISHS), Leuven, Belgium, August 1 1976.

Smith, A.E. and M.S. Humphreys. 2006. Evaluation of unsupervised semantic mapping of natural language with Leximancer concept mapping. Behav. Res. Methods 38:262–279.

United States Floriculture Market 2022 - 27 Industry Share, Size, Growth - Mordor Intelligenc. https://www.mordorintelligence.com/industry-reports/united-states-floriculture-market. Accessed 9 October 2022.

USDA. 2021. Floriculture Crops 2020 Summary 05/27/2021. https://www.futuremarketinsights.com/reports/floriculture-market. 63 p. Accessed 9 October 2022.

USDA - National Agricultural Statistics Service - Surveys - Floriculture. 2022. https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Floriculture/index.php. Accessed 9 October 2022.

Weiss, L.W. 1978. Structure-conduct-performance paradigm and antitrust. U. Pa. Rev. 127, 1104.

Wintz, R.P. 1953. Effects on carnation cut flowers of storage with grocery produce. PhD Thesis, Colorado Agricultural and Mechanical College. p. 8–10.