

Profiling Businesses on Nantucket

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Abstract

The goal of this project was to assist the Nantucket Island Center for Entrepreneurship (NICE) to benchmark businesses on Nantucket, and to identify and measure the metrics used to define success in each sector of Nantucket's economy. We identified, refined, and integrated a wide range of business listings and economic data to create a Composite Business List (CBL). We also developed a survey for Nantucket's Chamber of Commerce members to understand the impact of Nantucket's economic fluctuations on entrepreneurship, and the metrics used for success by businesses in various sectors. We determined that Chamber membership underrepresents the trades and recommended that NICE develop outreach and survey tools to better understand the needs of this portion of Nantucket's economy.

Table of Contents	
Acknowledgements	i
Abstract	ii
Table of Figures	iv
List of Tables	v
Executive Summary	vi
Authorship	xi
1.0 Introduction	1
2.0 The Nantucket Island Center for Entrepreneurship	3
2.1 The Nantucket Island Chamber of Commerce.....	3
2.2 The Nantucket Island Center for Entrepreneurship	4
3.0 Nantucket's Economy - A Brief Overview	5
3.1 Nantucket’s Population and Impacts on the Economy	5
3.2 Composition and Structure of Nantucket’s Economy	7
3.3 Employment Trends in Nantucket’s Economy	9
3.4 Best Practices of Benchmarking Businesses.....	11
4.0 Overview of Data and Methodology	13
4.1 Data Sources used for Composite Business List (CBL)	13
4.2 Survey and Interview Methodology.....	15
4.3 Interviews with Other Chambers of Commerce.....	16
5.0 Results and Findings	17
5.1 Findings from Chamber Survey.....	17
5.2 Findings from the CBL	23
5.3 Findings from Supplemental Interviews	31
6.0 Conclusions and Recommendations	33
6.1 Maintenance and Expansion of the CBL	33
6.2 Supporting Island Businesses and Entrepreneurs	34
Bibliography	36
Appendix A: Alcoholic Beverage Control Commission License Page	38
Appendix B: Survey Instrument Distributed by NICE	39
Appendix C: Interview Questions for Supplemental Interview of Survey Respondents	42
Appendix D: Programing and Data Analysis	43

Table of Figures

Figure 1: Population by month on Nantucket	5
Figure 2: Open businesses by sector during the year	6
Figure 3: Results of 2019 survey distinguishing seasonal and year-round businesses	7
Figure 4: Total number of employees by month on Nantucket in 2001-2002	10
Figure 5: Total number of employees on Nantucket by month 2017-2021	10
Figure 6: Distribution of survey respondents by sector. Reported as the number of operating establishments in each sector.	18
Figure 7: Distribution of businesses started, purchased, and inherited.....	18
Figure 8: Number of businesses started, purchased, or inherited since 1945	19
Figure 9: Businesses started compared to S&P 500 performance since 1945	19
Figure 10: Range of average full-time employment by sector.....	20
Figure 11: Range of average part-time employment by sector	21
Figure 12: Average annual revenue of survey respondents	22
Figure 13: Excerpted CBL	26
Figure 14: Distribution by sector of operating businesses represented in CBL.....	27
Figure 15: Distribution of operating businesses in service sector represented in CBL	28
Figure 16: Distribution by sector of the number of businesses that received PPP loans	30

List of Tables

Table 1: A comparison of the percentage of jobs in Massachusetts and Nantucket in the year 2000.....	7
Table 2: A comparison of the percentage of jobs on Nantucket in 2000 and 2019	8
Table 3: Table representing the current distribution of member businesses to the chamber of commerce by sector	9
Table 4: Data fields from each dataset integrated into CBL. A cross indicates a field that is not present in that dataset. A checkmark indicates a field that is present in that dataset.	24
Table 5: Comparison between the contribution of sectors to CBL and to chamber membership.....	29

Executive Summary

Although businesses in tourist destinations often operate year-round, many businesses in seasonal tourist and resort communities operate only during their peak season, and either downsize or shut down completely during the off season. This creates fluctuations in both the number of operating businesses and employment levels in resort economies.

Supporting and strengthening businesses, regardless of their operational season, is a topic of concern for Chambers of Commerce and local governments across the country. Nantucket is no different. [The Nantucket Island Center for Entrepreneurship](#) (NICE), created in 2018 as a subsidiary of [Nantucket Island Chamber of Commerce](#) (NICC), works specifically to foster the growth of business and entrepreneurship on Nantucket (Nantucket Island Chamber of Commerce, n.d.). NICE provides entrepreneurs with mentoring services and workshops specialized for the unique business environment on Nantucket, and helps businesses owners and new entrepreneurs grow their business by gaining better insight into the structure and composition of Nantucket's economy. A foundation of NICE being able to provide support to entrepreneurs is having a detailed database of businesses on Nantucket, along with their size, sector of operation, and other metrics used to define success in each sector. The accuracy of this database is crucial for NICE to identify areas of Nantucket's economy in which to provide targeted programs aimed at promoting the growth of entrepreneurship.

Goals and Objectives

The goal of our project was to determine how Nantucket's businesses are distributed by sector, how they can be benchmarked, how success is defined for each sector of Nantucket's economy, and to present recommendations on how NICE can support the island's entrepreneurs. To accomplish this goal, we identified the following objectives:

1. Developed an inventory of businesses (e.g. our Composite Business List, CBL) on Nantucket, listing pertinent attributes such as size (e.g., number of employees, payroll, etc.), sector, and period of operation.
2. Investigated best practices to benchmark and measure business success by sector.
3. Researched the types of support programs NICE could implement to aid the Nantucket business community

The integration of the CBL (i.e., Objective 1) involved incorporating Payroll Protection Program (PPP) COVID relief loan data, Doing Business As (DBA) records, Alcohol License and Food/Lodging Permit records, and data from NICE's Rock Solid Grant (RSG) program. RSG was, in particular, a program initiated by NICE to help smaller businesses on Nantucket recover from the adverse economic effects of the COVID pandemic. Data integration was conducted by comparing-business addresses across each data set as a primary common key and then integrating the final data into one (CBL) data set.

Our survey instrument (i.e. Objective 2) was distributed to all NICC member businesses as a google form URL. The purpose of our survey was to determine the following:

- The primary focus and nature of respondents' businesses.
- The expected full and part time employment along with months of operation in 2022 of respondent's businesses.
- Average annual revenue
- Metrics used to define business success
- What programs/initiatives would be beneficial to businesses and entrepreneurs.

CBL Findings

We tabulated 1175 total businesses in our database. That is significantly more than the 726 member businesses of NICC. We categorized each business by the first two digits of its NAICS ([North American Industry Classification System](#)) code, which represents the broadest sector categorization possible for a NAICS code. The following percentages represent the breakdown of the businesses in the CBL:

- 32.8% Services
- 13.1% Restaurants
- 12.5% Retail/Wholesale Trade
- 21.9% Construction

Table ES 1: Sectoral comparisons of underrepresented sectors between CBL and NICC membership

CBL to NICC Membership Sectoral Comparisons		
Sector	CBL Businesses	Chamber Members
Construction, Contractors	258 (21.9%)	72 (10%)
Real Estate	74 (6.3%)	18 (2.5%)
Landscaping	63 (5.4%)	5 (0.7%)
Restaurants	154 (13.1%)	75 (10%)
Transportation	30 (2.5%)	19 (2.6%)
Accommodations	25 (2.1%)	48 (7%)
Retail & Wholesale Trade	146 (12.4%)	129 (18%)
OVERALL TOTAL	1175	726

As can be seen in the table:

- NICC membership significantly underrepresents the construction, real estate, landscaping, and restaurants sectors

- NICC membership is a more accurate representation of accommodations and is less under-representative of retail, and transportation than of construction and the like

Survey and Interview Findings

The retail, services, and healthcare sectors were among the largest shares of our survey sample. The trades (electricians, plumbers, landscapers etc.) make up a very small portion of responses. We acknowledge the distribution of respondents is not completely representative of the known distribution of NICC membership, or Nantucket’s economy overall. We found that ~76% of respondents started their businesses, ~18% purchased their business, and ~6% inherited their business.

We asked respondents to estimate their highest and lowest-number of part and full-time employees for 2022. For sectors in which we received 3 or more responses, estimated employment levels were averaged across each sector and represented as a range. Our survey results included the following observations.

- All sectors of the support some number of full-time employees throughout the year.
- Healthcare, services, and restaurants sectors have the highest numbers of full-time employees. Healthcare, restaurants, and personal services also have the highest number and most extensive ranges of part-time employees.
- The number of part-time employees exhibits a bigger fluctuation in more sectors of our survey sample than does full-time employment. This suggests that these sectors take on large numbers of part-time employees to account for the significant fluctuations in Nantucket’s population and economic activity during the summer months.
- Perhaps surprisingly 69/72 (~95%) respondents disclosed their revenue data which fell into a bimodal distribution.
 - o ~25% of respondents were in the \$50,000-\$199,999 range
 - o ~26% fell into the \$1,000,000-\$4,999,999 range

We also asked respondents to identify areas in which they needed more support or guidance in running their business. Among the most common responses were the need for assistance with advertising and marketing, leadership training, and connections to business services. Many respondents highlighted a lack of connections to lawyers, accountants, and contractors to assist their business, and recommended that NICE find a way to make the connection between businesses and those providing necessary business services more seamless. Respondents also highlighted the need for direct financial support through grants and loans to support their endeavors.

Recommendations

1. To ensure the CBL remains useful, we recommend that NICE periodically reintegrate data from business data sources as the data become available

The CBL is the most comprehensive inventory of businesses on Nantucket and gives NICC and NICE a better understanding of the quantity and type of businesses on the island. It also provides insight into the nature and contribution of each sector to Nantucket's economy. The CBL draws from a multitude of data sources, the largest of which being PPP loan data. DBA information is updated every 4 years, and all license and permit information in the CBL has a listed expiration date.

2. We recommend that NICE work to procure and incorporate phone book listings and license/permit information into the CBL.

We have identified two other sources we believe are vitally important to add to the CBL to increase its accuracy in portraying the business community on Nantucket. These sources are phone book listings and permit information from sectors beyond those already listed in the CBL. We were able to include food and lodging permits from the Health Department; however, other businesses such as salons, spas, accountants, and virtually every medical practice need licenses or permits to legally operate. The phonebook is one of the largest composite sources of businesses available publicly, and includes the added benefit of contact information for each business listed. Integration of permit information outside of restaurants and lodging will allow NICE to better understand the nature and size of the medical, personal care services, and financial services sectors among others. The phonebook would provide a larger pool of businesses to cross-reference with, and includes contact information which is vitally important to future outreach programs or survey initiatives NICE may wish to conduct.

3. NICE should commission an outside contractor or delegate to a future project team the task of creating a more robust database tool to represent the data contained in the CBL.

While the CBL is currently the most complete inventory of businesses on Nantucket available, there is still room for improvement in the representation of the data we have collected. Using a commercial database software to collect and maintain a list of Nantucket businesses would provide the following advantages:

1. The data contained would be more secure than if it were stored in an excel spreadsheet
2. The database would allow for an easier incorporation of new data sources, or reissued data from current sources into NICE's records
3. Commercial software would likely allow for more adept and efficient search and filter functions to sort and iterate through NICE's records

4. A commercial database would likely allow for more professional data visualization (graphics, figures, tables etc.)

- 4. We recommend that the Chamber make a concerted effort to identify why businesses in the construction, landscaping, food/dining, and real estate sectors are not members of the Chamber and what kinds of programs and incentives might encourage them to join.**

Analysis of the CBL indicates that the Chamber membership substantially under-represents the construction, landscaping, food/dining, and real estate sectors of Nantucket's economy. Efforts to better incorporate businesses from these sectors into the Chamber might include increased outreach programs, and/or serialized survey instruments to better understand the types of support businesses in these sectors require.

- 5. We recommend NICE take steps to provide programs for business owners to learn leadership, marketing, advertising, and social media skills. NICE should also work to promote the availability of business services and establish reliable connections between Nantucket's business and off-island resources.**

Our survey and supplemental interviews were two important sources of subjective feedback from business owners, providing insight into the types of support NICE should work to provide where possible. Among survey respondents, the most cited areas NICE could provide better support were:

1. Workshops or support programs for business owners in leadership, marketing, advertising, and usage of social media
2. Many respondents highlighted a lack of connection with important business services such as lawyers, accountants, insurance, and hiring services
3. Expanded access to grant programs in the aftermath of COVID

Our interviews with business owners revealed similar areas NICE can work to provide support to island entrepreneurs. A few interviewees mentioned a lack of connection to business services and off island contractors, as many on island contractors have limited availability during the shoulder seasons as businesses are preparing for peak-season visitation (Ridge, personal communication, 2021; Life, personal communication, 2021). Another interviewee proposed that NICE could develop better insight into certain sectors by becoming more active in business associations in those areas of the economy (i.e. the Nantucket Builders Association, or the Nantucket Restaurants Association.) (Handy, personal communication, 2021). Understanding and acting on the needs of businesses in all sectors of Nantucket's economy will not only better support existing members of the Chamber, but also incentivize new membership as well.

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3.4	PJ	NT/JP
4.0	PJ	NT/JP
4.1	NT	PJ/JP
4.1.1	JP	NT/PJ
4.1.2	PJ	NT/JP
4.1.3	NT	PJ/JP
4.1.4	PJ	NT/JP
4.1.5	PJ	NT/JP
4.2	PJ	NT/JP
4.2.1	PJ	NT/JP
4.2.2	PJ	NT/JP
4.3	NT	PJ/JP
5.0	PJ	NT/JP
5.1	PJ	NT/JP
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5.3	NT	PJ/JP
6.0	NT	PJ
6.1	JP	PJ
6.1.1	JP	PJ
6.1.2	JP	PJ
6.2	NT	PJ
Appendix A	NT	-
Appendix B	NT	-
Appendix C	NT	-
Appendix D	JP	-

1.0 Introduction

Across the United States, tourism represents a significant portion of the national and local economies. In 2019, tourism contributed \$1.94 trillion in gross total output to the United States economy, and helped create 9.5 million job opportunities (Osborne, n.d.). Although businesses in tourist destinations often operate year-round, many businesses in seasonal tourist and resort communities operate only during their peak season, and either downsize or shut down completely during the off season. This creates fluctuations in both the number of operating businesses and employment levels in resort economies. Supporting and strengthening businesses, regardless of their operational season, is a topic of concern for chambers of commerce and local governments across the country. Nantucket is no different.

The [Nantucket Island Chamber of Commerce](#) (NICC) along with the Town government are actively engaged in promoting business activity and economic growth on the island. The [Nantucket Island Center for Entrepreneurship](#) (NICE), created in 2018 as a subsidiary of NICC, works specifically to foster the growth of business and entrepreneurship on Nantucket (Nantucket Island Chamber of Commerce, n.d.). NICE is working to gain better insight into the structure, and composition of Nantucket's economy in order to identify areas of Nantucket's economy in need of targeted programs and initiatives aimed at promoting the growth of entrepreneurship. A foundation of being able to provide such initiatives is having an accurate database of businesses on Nantucket, along with their size, sector of operation, and other metrics used to define success in each sector.

Nantucket's economy is characterized by a peak of visitor activity in July and August, and a lull in the winter months. Some of Nantucket's businesses operate year-round regardless of the island's population, while others only operate seasonally to take advantage of the summer tourist surge. The seasonal nature of tourism on Nantucket makes measuring and quantifying business activity and population numbers challenging and planning for future economic development difficult. Unfortunately, neither NICE nor any other organization has a comprehensive inventory of all businesses on the island. This lack of data limits NICE and others from understanding the true composition of Nantucket's business community, and the contributions of each sector to the local economy. NICE also has very little understanding of the metrics businesses use to define success in their respective sectors. As a result, it is difficult for NICC and NICE to identify and target initiatives and programs to help businesses grow while also helping new entrepreneurs to start ventures of their own.

The goal of our project was to determine how Nantucket's businesses are distributed by sector, and how they can be benchmarked. To accomplish this goal, we identified the following objectives and associated tasks:

1. Develop an inventory of businesses on Nantucket, listing pertinent attributes such as size (e.g., number of employees, payroll, etc.), sector, and period of operation.

- i. Identify and obtain datasets on Nantucket business from various state and local sources
 - ii. Clean up data (remove duplicates, etc.)
 - iii. Develop integrated, searchable database
2. Examine best practices to benchmark and measure business success by sector.
 - i. Review business literature regarding monitoring and benchmarking business activities in communities
 - ii. Interview business representatives from other seasonal communities in Massachusetts and elsewhere (e.g., Martha's Vineyard, Cape Cod, Bermuda etc.)
 - iii. Interview representatives of companies developing benchmarking tools, such as [SizeUp](#)
3. Determine the types of support programs NICE could implement to aid the Nantucket business community
 - i. Survey business community in Nantucket
 - ii. Interview business owners and other stakeholder in Nantucket

2.0 The Nantucket Island Center for Entrepreneurship

This section will present an overview of the Nantucket Island Chamber of Commerce ([NICC](#)) and the Nantucket Island Center for Entrepreneurship ([NICE](#)). Topics discussed will include the mission statements, goals and initiatives, and membership of both organizations.

2.1 The Nantucket Island Chamber of Commerce

Chambers of Commerce are associations that advocate for a resilient economy and a higher standard of life for their communities (United States Chamber of Commerce, n.d.). Chambers strive for this goal by advocating for business-friendly policies, and by introducing programs to aid businesses as they grow and develop. The scale of these organizations can range from national chambers, which act as advocates for corporations throughout the country, to regional chambers which work closely with their local governments and entrepreneurs. The specific programs managed by each chamber serve to help businesses address the unique challenges and regulations in each region.

The Nantucket Island Chamber of Commerce ([NICC](#)) was founded in 1937 with the goal of building a healthy economy on Nantucket while at the same time preserving its citizens' unique way of life (Nantucket Island Chamber of Commerce, n.d.). It accomplishes this goal by providing support to its members and working with local and governmental organizations to promote businesses on the island. These efforts are undertaken by the executive committee of the Chamber as well as its seven staff members. NICC hosts events and workshops throughout the year to promote island businesses and offer resources to help them grow. [Christmas stroll](#) and the [Daffodil festival](#), for example, are held by the Chamber in December and April respectively. These events increase visitation to the island during the shoulder seasons and lengthen the operation of businesses. It is estimated that these events bring a combined surge of 45,000 visitors annually (Gehly, Gold, Keklik, Raymond, 2019, pg. 11). Keklik, Raymond, 2019, pg. 11).

In addition to being responsible for some of the most well recognized events of Nantucket, the Chamber also periodically hosts smaller-scale events to boost economic activity on the island. For example, in 2021, the [Cranberries and Cobblestone](#) event was held from October 8th to October 11th. This event incentivized consumers to shop at their local stores by having the store offer discounts and raffle tickets to customers during the event. Cranberries and Cobblestone was held in tandem with a storefront decorating contest, which is frequently organized by the chamber during the holiday season (Nantucket Island Chamber of Commerce, n.d.). store offer discounts and raffle tickets to customers during the event. Cranberries and Cobblestone was held in tandem with a storefront decorating contest, which is frequently organized by the chamber during the holiday season (Nantucket Island Chamber of Commerce, n.d.).

Aside from participation in Chamber-sponsored events, businesses on Nantucket can benefit from membership through the NICC's various support programs. Most notably of which is

the chambers advertisement services where the Chamber promotes their members by advertising them on newsletters and in directories. Members can also pay an additional fee to be featured as a banner ad on the Chamber [website](#) and guidebook. Another support mechanism the chamber provides to its members is business mentoring services. NICC provides guidance for entrepreneurs on a wide range of topics including marketing, funding, and revenue forecasts through its NICE program (Nantucket Island Center for Entrepreneurship, n.d.). Together, the Chamber business support programs form a structure which helps businesses succeed on the island. More information about the support programs and benefits offered by NICC can be found on their [website](#).

2.2 The Nantucket Island Center for Entrepreneurship

The Nantucket Island Center for Entrepreneurship (NICE) is a sub-organization of the Nantucket Chamber of Commerce created in 2019. It was formed with the goal of “creating the optimal local environment where resources are provided, and connections are made, to support the successful launch and growth of new businesses on the island of Nantucket” (Nantucket Island Center for Entrepreneurship, n.d.). Of the various programs initiated by the Chamber, NICE specializes in supporting companies through mentoring sessions, workshops, and grant programs. These services are designed to nurture businesses in their early stages of development and are provided to entrepreneurs regardless of Chamber membership (Nantucket Island Center for Entrepreneurship, n.d.). The guidance NICE provides at sessions and workshops differs depending on the size of a business and its sector of operation. For example, the recommended operating season of a business in the construction sector would be winter and spring while restaurants generally peak during the summer.

NICE would like to develop a better understanding of the metrics used to define a successful business in each sector of Nantucket’s economy, which would in turn improve their ability to help new entrepreneurs to understand what to expect as their new business venture grows and develops. Furthermore, with limited knowledge of the aggregate economy, it is difficult to benchmark one business against its sector, or one sector against another to know how Nantucket’s overall economy is growing and evolving. With that understanding, NICE could quantify the success of its mentees both for members of the chamber and those who are not members; thus, providing better recommendations on how to improve their business. NICE conducted a survey in 2020 to understand the impact of COVID on Nantucket's business community. They used these results to distribute aid and grants to the hardest-hit businesses throughout Nantucket's economy." (Blair, Middleton, Ruderman, 2020). With a better understanding of the nature, structure, and composition of Nantucket’s economy, and the ability to quickly access information on each sector and its performance, NICE would be able to utilize their resources to better serve businesses on Nantucket.

3.0 Nantucket's Economy - A Brief Overview

This section will present an overview of the general nature and structure of Nantucket's economy, and the factors that influence its performance. Topics covered will include the effective population of Nantucket, business distribution by sector, and employment trends during both the peak and off-peak seasons.

3.1 Nantucket's Population and Impacts on the Economy

Nantucket's economy is influenced by significant fluctuations in the island's population throughout the year primarily due to increased visitation in the summer months. It is estimated that an average August weekend brings 12,000 - 15,000 visitors a day to Nantucket. In February, however, the island sees fewer than 500 visitors per weekend. (Morrison, Edmondson & Ferrantella, n.d. pg. 1). The year-round population on Nantucket is estimated to be 18,000 people, while the summer population may exceed 50,000 in July and August with even higher spikes on weekends (figure 1).

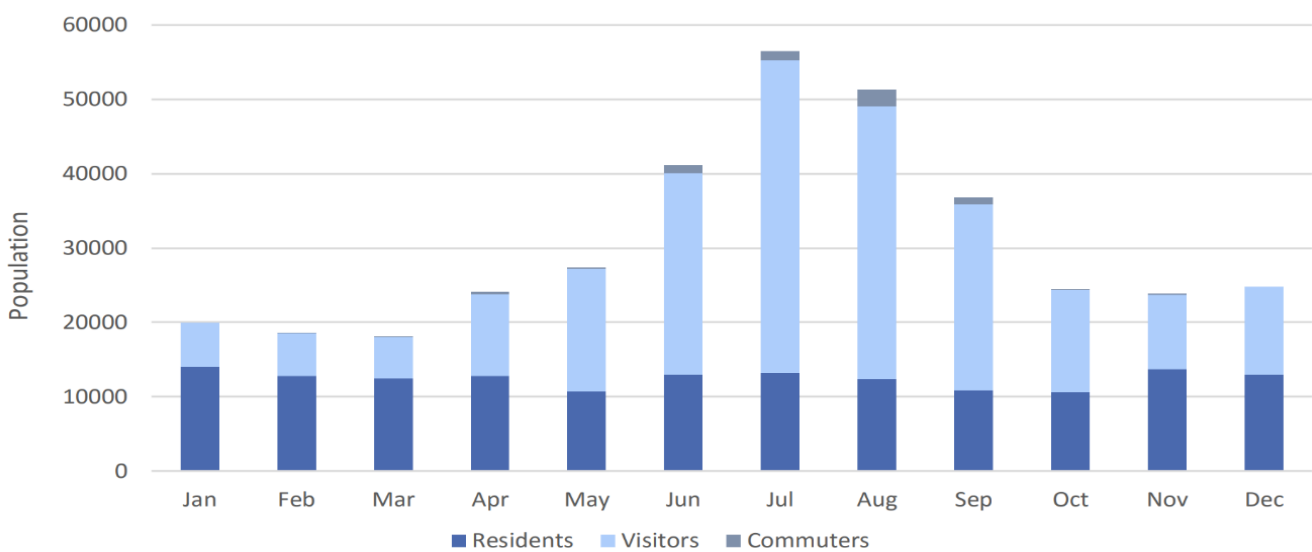


Figure 1: Population by month on Nantucket (Campanelli, et. al. 2017)

This fluctuation in visitors has a profound effect on the overall population and economy of the island. Tourism has been, and will continue to be, the most significant contributor to Nantucket's economy.

Figure 2 (Gehly et al. 2019), shows the number of businesses that are open in each of the major sectors of Nantucket's economy by month. As illustrated in this figure, the number of operating businesses increases across all sectors between spring and fall, but the increase is most pronounced in the retail sector. The 'other' category (which refers to businesses in the construction sector among others) shows marked peaks in the spring and fall shoulder seasons construction is prohibited during the summer months. Figure 2 highlights the impact of the seasonal fluctuation in visitation on Nantucket's economy and illustrates how businesses in each sector react differently to the population surge. Because there are so many

influencing factors on the performance of Nantucket’s economy, it is important for NICE to understand the metrics used by businesses across all sectors to define success.

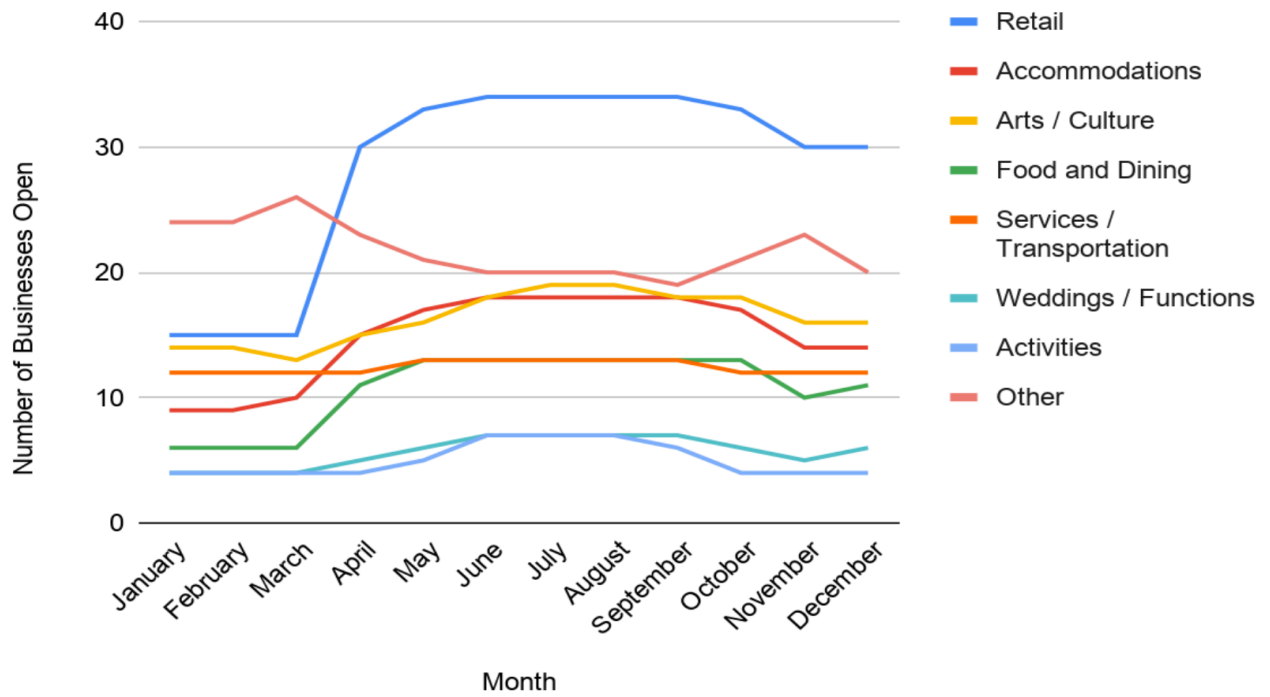


Figure 2: Open businesses by sector during the year.
 (Gehly, Gold, Keklik, Raymond, 2019, pg. 22)

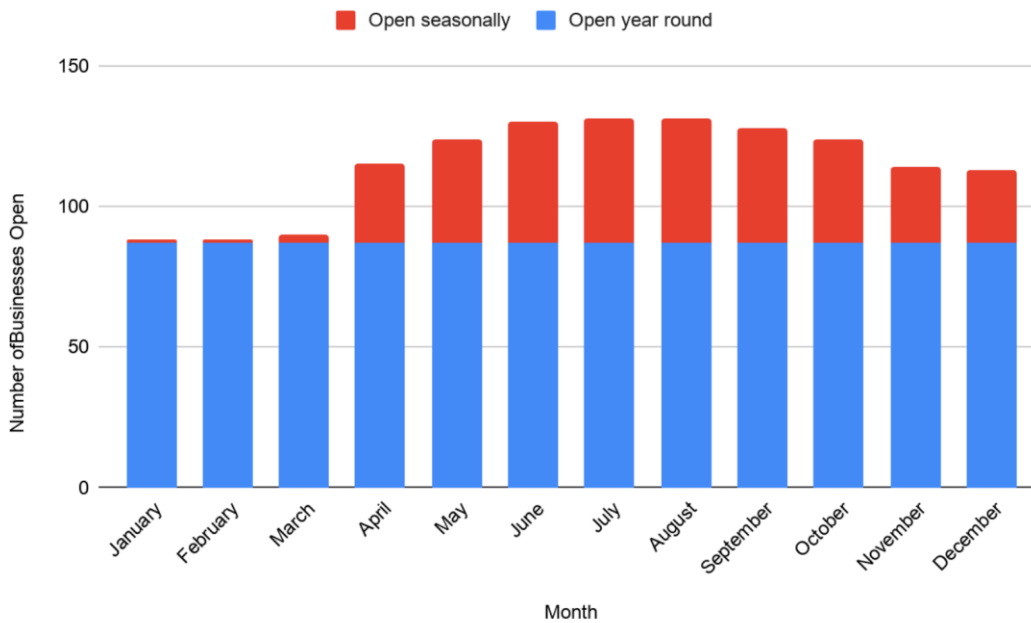


Figure 3: Results of 2019 survey distinguishing seasonal and year-round businesses (Gehly, Gold, Keklik, Raymond, 2019, pg 22)

3.2 Composition and Structure of Nantucket’s Economy

In 2000, as part of the Nantucket Master Plan, the Massachusetts Division of Employment and Training determined the distribution of employment in each of the major sectors of Nantucket’s economy (Nantucket Planning Board, 2009). Accordingly, 35% of the jobs in Nantucket were in the retail sector, ~27% in services, and ~8% were in construction (Table 1). By comparison, ~17% of the jobs in Massachusetts were in retail, ~35% in services, ~4% in construction, and ~13% in manufacturing (Table 1).

Table 1: A comparison of the percentage of jobs in Massachusetts and Nantucket in the year 2000 (Adapted from Nantucket Planning Board, 2009).

	Percentage of Jobs in Nantucket in 2000	Percentage of Jobs in Massachusetts in 2000
Retail	34.6%	17.5%
Services	27.2%	35.4%
Construction	8.3%	4.0%
Manufacturing	1.5%	13.3%

As indicated in Table 1, Nantucket’s economy is significantly more dependent on the retail and construction sectors than Massachusetts, while having virtually no industry or manufacturing sectors, unlike the state. The strong retail and service sectors on Nantucket reflect the impact of the summer visitation surge on the island’s economy and highlights the reliance on tourism for a significant portion of Nantucket’s businesses.

The [Nantucket Planning and Economic Development Commission](#) has not yet submitted a revised Master Plan for Nantucket, although such plans are expected every 10 years. Absent an updated Master Plan, we were able to find more recent employment data (Table 2) from the business census that indicate how the business sectors on Nantucket have changed. As of 2019, Nantucket’s employment distribution consisted of 14% retail, 41% services, and 18% construction among others. (Table 2) (*Nantucket, MA | Data USA, 2021*). The construction and services sectors have seen the most significant growth on Nantucket since the Master Plan data was collected. The construction sector has grown by 52% since 2000, and the services sector grew by 35%. (*Nantucket, MA | Data USA, 2021*) There is still little to no industry or manufacturing on the island. Much of the data collected at the state level on jobs, revenues, etc. are only available in aggregate form and do not allow a more disaggregated analysis of the economy on Nantucket.

Another source of data on the composition of the Nantucket business community is the NICC membership records. The Chamber has 987 members, although membership varies from year to year, not all businesses on the island are members. The Chamber uses its own classification of members for internal uses, and these categories do not match those used in state and federal data. As shown in Table 3 retail merchants comprise 17% of the Chamber’s members, but services of various kinds represent the largest percentage at (34%). It is likely that the construction and landscaping sectors are underrepresented among Chamber members (Macumber, personal communication, 2021). It should also be noted that different organizations use different categorizations for retail, services, etc. so it is difficult to compare data from one source to another or even from one year to the next using even the same source.

Table 2: A comparison of the percentage of jobs on Nantucket in 2000 and 2019
(Adapted from Nantucket Planning Board, 2009, and Nantucket, MA | Data USA, 2021)

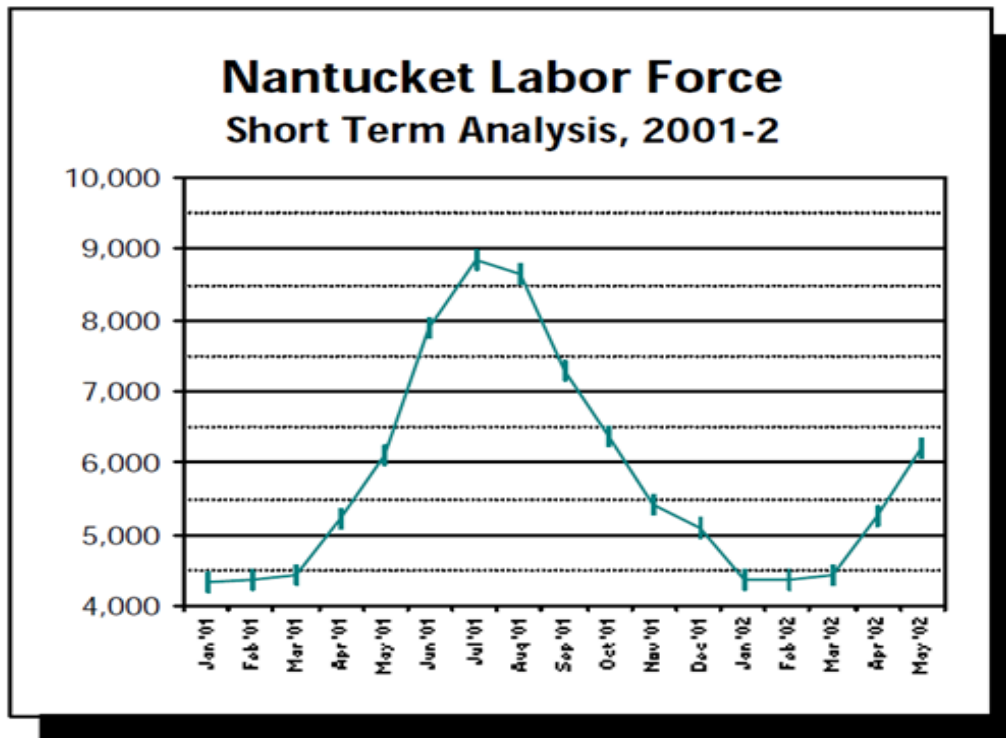
	Percentage of Jobs on Nantucket in 2000	Percentage of Jobs on Nantucket in 2019
Retail	34.6%	13.6%
Services	27.2%	41.4%
Construction	8.3%	17.5%
Manufacturing	1.5%	2.67%

Table 3: Distribution of Chamber member businesses by sector
(adapted from Nantucket Island Chamber of Commerce, 2021. Categories and member types)

Distribution of NICC Active Membership		
Sector	Count	Percentage
Accommodations	48	7%
Activities	67	9%
Arts & Culture	53	7%
Business Services	45	6%
Food & Dining	75	10%
Merchants	129	18%
Personal Services	151	21%
Property & Building Services	72	10%
Real Estate	19	3%
Travel & Leisure	44	6%
Weddings & Functions	23	3%
TOTAL ACTIVE MEMBERS		726

3.3 Employment Trends in Nantucket’s Economy

The fluctuation in Nantucket's population and business activity causes a seasonal variation in employment as well. Figure 4 shows the change in employment on Nantucket (from the Nantucket Master Plan) during 2001 and 2002 by month. In 2001-2002, employment rose from about 4400 in the offseason to 8700 in the peak season (Nantucket Planning Board, 2009). More recent data from the St. Louis federal reserve illustrates a similar seasonal rise and fall in employment on Nantucket from 2017 to 2021 (Figure 5), with peak season and off-season employment around 1,000 more than the 2001-2002 data (*Employed Persons in Nantucket County/town, MA*, 2021). The more recent data indicates a roughly 14% increase in both peak season and off-peak season labor force on Nantucket from 2001 to 2019 (Nantucket Planning Board, 2000).



Source: Massachusetts Division of Employment and Training, 2002

Figure 4: Total number of employees by month on Nantucket in 2001-2002 (Nantucket Planning Board, 2009)

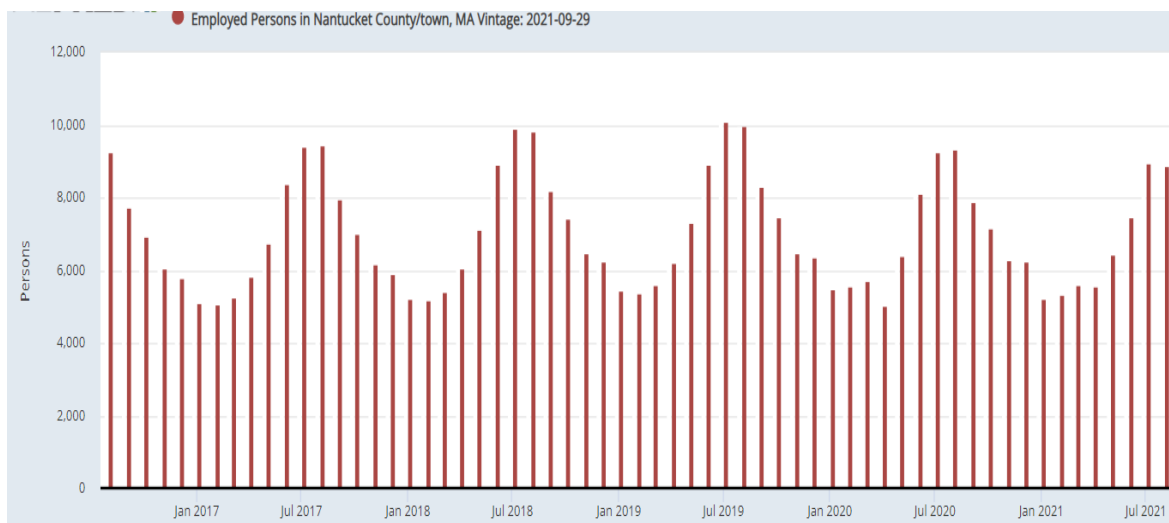


Figure 5: Total number of employees on Nantucket by month 2017-2021 (Employed Persons in Nantucket County/town, MA, 2021)

The COVID-19 pandemic negatively impacted economies across the United States. Its effects were also felt on Nantucket. The 2020-2021 peak shoulder season employment was 1000 fewer employed than in previous seasons for peak and off season (*Employed Persons in Nantucket County/town, MA, 2021*). These data show the pandemic caused an 11% decrease

in peak season employment between 2019 and 2021 while off season employment remained relatively stable (*Employed Persons in Nantucket County/town, MA, 2021*).

The data in figures 4 and 5 indicates that Nantucket's economy is vulnerable to changes in visitation which can have significant impacts on the employment levels and output of the economy, especially during the peak season. By comparison, the data also indicates that the consistent level of off-season employment even through the pandemic illustrates the importance of the year-round economy to Nantucket's overall economy.

The seasonal nature of tourism, population, and business activity on Nantucket makes it difficult to know exactly how businesses and the aggregate economy are performing at a given point in time. Unfortunately, there is a dearth of accurate, high-quality information describing the structure, composition, and performance of Nantucket's economy for a variety of reasons. For example, the population census is taken only every 10 years and typically underestimates the actual population. The business census is taken every five years but is only available in aggregate form. Employment data is reported to the state, but these 'official' numbers typically underestimate the number of people working on Nantucket at any time of the year since there is a large informal sector of workers who do not appear in official data (bbushardim, 2021). Another issue is that there is only a very limited Chamber infrastructure available to collect and integrate available data into one location for analysis. In turn, this makes it more difficult for NICE to collect data on Nantucket's economy, and target programs accordingly.

3.4 Best Practices of Benchmarking Businesses

According to Spendolini (1992), the benchmarking process can be divided into five distinct stages. The first stage is for a business to choose which aspect of their company will be benchmarked. Second, a benchmarking team will then be assembled to collect data. Third, a target company will be chosen for comparison. Fourth, data on this company will be analyzed by the benchmarking team. Fifth and finally, the benchmarked business will be compared with the targeted company and shortcomings of the benchmarked business will be identified and improved on. To summarize, the five steps of benchmarking are as follows:

1. Choose Benchmarking Metric
2. Assemble Benchmarking Team
3. Choose Target of Comparison
4. Analyze Target of Comparison
5. Identify and Improve Shortcomings of Company Benchmarked

Benchmarking teams working through these five stages can choose to benchmark companies using different metrics. First, they can do product benchmarking which compares the physical product of a business with its competitor. Another method is to do functional benchmarking,

which studies the costs of other businesses. The final method, called strategic benchmarking¹ is a general term encompassing other benchmarking of strategic decisions of other companies. After the team has chosen its method of benchmarking, they will choose their method of collecting data. This can be done through either covert benchmarking, in which teams gathers data independently of the target business, or cooperative benchmarking, which requires the cooperation of the target company to provide data. Once the benchmarking team has collected adequate data businesses can choose to incorporate or ignore recommendations made by the team. Companies which decide to incorporate recommendations from benchmarking teams will usually feel the nonfinancial effects of the changes first. These effects include a change in yield, number of defectives and functionality. These qualitative effects will, in turn, affect the financial gain of the business after an extended amount of time (Elnathan et al., 1996).

¹ For example, see: <https://smallbusiness.chron.com/use-benchmarking-techniques-effectively-13083.html>

4.0 Overview of Data and Methodology

We consulted with our sponsor and advisors to identify relevant data sets to procure and review. Each of the data sets we gathered contained inconsistencies and/or duplicate entries that we needed to identify and remove. We accomplished this using two different Java programs we wrote to compare fields within a data set, or to compare common fields across multiple datasets.

The first program we wrote compared the percentage similarity between the business names in a source, allowing us to find businesses that were listed more than once or may have been spelt or represented slightly differently (Appendix D). The second program formatted all business addresses in exactly the same way allowing for direct comparison across multiple sources, and combined information about the same business from multiple sources into one Composite Business List (CBL) (Appendix D). We created our composite business inventory from 6 individual sources: DBA Listings (Doing Business As), Alcohol License data, Restaurant and Lodging permit data, Rock Solid Grant records, and Paycheck Protection Program (PPP) records.

4.1 Data Sources used for Composite Business List (CBL)

This section will present in more detail the data we collected and integrated from various sources to create the Composite Business List. Topics discussed will include the source of the dataset, the relevant fields from each dataset, and the contribution of each set to the CBL. It should be noted that for the remainder of this report, CBL will be used to refer to the integrated list we created of businesses on Nantucket.

4.1.1 Paycheck Protection Program (PPP) Data

During the COVID-19 Pandemic many businesses needed additional support to stay in business. To address this problem, the US [Small Business Association](#) allowed for individuals and businesses to apply for [Paycheck Protection Program](#) loans known as PPP loans. We accessed this information through the [SBA PPP data search](#). Using Nantucket's three zip codes (02554 02584, and 02564) we were able to obtain a complete list of information about each PPP loan distributed on Nantucket during 2020 and 2021. These results contained information such as company name, city, state, zip code, loan amount, jobs retained, and industry. Each result contained a link to a more detailed description of the given loan such as the business's current address, The [North American Industry Classification System](#) (NAICS) code, the date that a loan was distributed, and if a business has received multiple rounds of loan funding.

We were able to then store this information in an Excel file giving each business a unique name, address, and NAICS code. This set, however, contained multiple entries of the same business classified as different entities. To circumvent this problem, an extra procedure was taken to reduce duplicate entries. If two businesses have similar names and have the same street address and NAICS code, we counted that as one business. We then removed the duplicate name entry and labeled the loans round one and round 2 respectively in our

spreadsheet. With duplicates removed, this brought the total number of PPP loans down from 1000 to around 750 entries. This allowed us to create a list containing names of a majority of businesses on the island including the number of employees, a government issued sector classification (NAICS code), and an address.

4.1.2 Doing Business As (DBA) Data

All businesses on Nantucket must register a DBA (Doing Business As) filing with the Town Clerk's office. This list is publicly available, and we contacted Nancy Holmes (the Nantucket Town Clerk) to retrieve it. We received the list in .csv format and manually removed duplicate entries. We extracted the DBA name, business address, and the issue and expiration date for each entry. It should be noted that the DBA name is often not the same as the name of the corporation. As a result, we included both names in two separate fields in the CBL. We presumed that not all businesses with active DBAs filed for a PPP loan or needed any kind of licensing for their business. Therefore, DBA listings were another way of quantifying the number of operating businesses on Nantucket, and served as a cross-referencing method against PPP data, and other similar sources.

4.1.3 Alcohol License Data

As a third comparative source of Nantucket businesses, we searched for a record of alcohol licenses in Nantucket to develop a better understanding of the restaurant and retail industries. Multiple sources of data containing alcohol data were found and combined into a comprehensive list of license data. These sources included: the alcohol license directory from the Nantucket government [website](#), [a list of alcohol licenses from the Alcoholic Beverages Control Commission \(ABCC\) in Massachusetts](#) and a list of alcohol licenses provided by the Nantucket police department. These different sources all provided different information about the businesses recorded.

From the Nantucket government website mentioned above, we extracted the license types, DBAs', addresses and the name of business owners. The Alcoholic Beverage and Control Commission had a more expansive list on alcohol handling licenses. Individual entries were added manually into a spreadsheet. Aside from pouring licenses that are issued by the police administration, the alcohol handling license list includes catering, retail, and transport licenses for alcohol. While this is a more comprehensive list of licenses on the island than from the Nantucket government website, it includes less types of information on its individual entries. The addresses of businesses with the license, for example, are not present within the ABCC license list and have to be taken from elsewhere; therefore, it is crucial for both datasets to be combined for them to present a complete view of alcohol licensing on Nantucket.

4.1.4 Rock Solid Grant Data

The [Rock Solid Grant](#) (RSG) was a grant program initiated by NICE and funded by [ReMain Ventures](#) to aid businesses as they adapted to the struggles of the COVID-19 pandemic2020. Businesses applying to this program provided general information on their structure and the

financial state and outlook of their business. We received data in a google drive folder from NICE in a digital format. From this data set we were able to extract the names, DBA names, dates of incorporation, corporate structure, owner, full time employees, number of part time employees, descriptions, along with the amount of loans that they have received and their revenue and expenses for 2019 and 2020. RSG was a particularly important source of data, albeit a smaller more limited dataset, as it provided business revenue information. Revenue and number of employees are the two most common methods to classify a business's relative size against competitors or businesses in other sectors. All entries were added into the CBL manually. the CBL manually.

4.1.5 Health Permit Information

All restaurants and lodging organizations are required to take out permits to ensure the safety of their establishments. We received permit records from the permit administrator for the Board of Health as another way of identifying restaurants, hotels, and other public facilities. We extracted the permit name, type, issue and expiration dates, and the address of the associated business. Interestingly, the records contained a considerable number of residential pool and septic abandonment permits that we removed so that the database only represented. There were some instances of more than one permit for the same businesses (i.e., hotels with multiple buildings, or a bed and breakfast needing a lodging and food permit) that also needed to be removed. Permit records served as a cross-reference in identifying dining and accommodations.

4.2 Survey and Interview Methodology

This section will present an overview of the methods used to collect primary data during the course of our project work. Topics covered will include the creation and distribution of our survey instrument, and interview protocols for various correspondence with town officials, business owners, and representatives of the business community.

4.2.1 Business Survey

The purpose of our survey was to determine the following:

1. The primary focus and nature of respondents' businesses.
2. The expected full and part time employment along with months of operation in 2022 of respondent's businesses.
3. Average annual revenue
4. Metrics used to define business success
5. What programs/initiatives would be beneficial to businesses and entrepreneurs.

Appendix B contains the questions issued in our survey. We refined the design of the survey instrument based on background research and review of prior surveys. We developed the survey instrument in an iterative fashion with review and feedback from advisors and NICE staff. We issued the survey online through Google Forms and it was distributed as a URL link to the email list of member businesses curated by the Chamber. We included a preamble to

describe the nature of our inquiry and research and to assure respondents that the results were anonymous and would only be reported in aggregate (Appendix B). We used simple descriptive statistics to summarize the findings and code the open-ended responses to facilitate analysis. We ended the survey by asking respondents if they would be willing to participate in a follow up interview. We collected contact information for follow up interviews *after* the survey had been completed to maintain a separation between the anonymous survey results and the contact information identifying the interviewee.

4.2.2 Supplemental Interviews

We conducted supplemental interviews with business owners, town officials, and members of the community who worked with or represented the businesses. The goal of these interviews was to gain a more in-depth understanding of the entrepreneurial goals of small businesses, the metrics businesses use to define success and benchmark themselves against competitors in their sector, and what factors most impact their success. We also wanted to be able to understand how business owners viewed the effects of the seasonal trends in Nantucket's economy, and whether it creates risks or benefits for businesses beyond what quantitative analysis tells us. A generalized draft of the interview preamble and questions are presented in Appendix C. We identified interviewees from positive responses to our survey, and/or from recommendations made by other interviewees. We maintained confidentiality by explaining to interviewees how information will be collected and asking permission to use collected information outside of the interview in our report. To use information from an interview, each interviewee was contacted and asked to review their quotes or information prior to publication. Results from interviews were analyzed for common ideas or recommendations among respondents and helped us understand how the chamber as well as the town government can better support the business community. Findings were presented either in figures, or through accounts and descriptions of the responses.

4.3 Interviews with Other Chambers of Commerce

We contacted other chambers of commerce to conduct an interview regarding their experiences collecting benchmarking data of their businesses. The goal of these interviews was to deepen our understanding of how chambers of commerce use benchmarking data to support their local businesses. We were also interested in their experience with benchmarking companies in the past and the services they provided. Information from this interview would have been used to determine best practices for creating our Composite Business List (CBL) for effective use by NICE. These interviews were ultimately not conducted for several reasons. First, NICE had a good understanding of their expectations for our CBL, and a concrete plan on how to use it. This leaves little incentive to collect information on the needs of other chambers. We also reasoned that if other chambers of commerce have commissioned a benchmarking company, it is unlikely that the chambers will oversee the exact data collection process of their providers. From these factors, along with the time constraints of our project and the lack of responses from our interviewees, we decided to leave this task incomplete.

5.0 Results and Findings

This section presents the findings from our survey instrument, the synthesis of the CBL, and supplemental interviews.

5.1 Findings from Chamber Survey

We received 72 responses to the survey, which accounts for approximately 9% of NICC’s approximately 750 member businesses. We suspect some of the results are influenced by the fact that our survey was implemented during the off-peak season, creating a sampling bias towards businesses that stay operational during this time. It should also be noted that the survey was sent to only Chamber members, which potentially underrepresents sectors of the economy with low rates of Chamber membership. Finally, we note that none of the questions required a mandatory response, and as a result, not every respondent answered of all the survey questions.

5.1.1 Distribution of Survey Sample by Sector

Figure 6 shows the distribution of respondents by sector as reported by respondents. The retail, services, and healthcare sectors were among the largest shares of our survey sample. The trades (e.g., electricians, plumbers, and landscapers) make up a very small portion of responses. Figure 6 shows the distribution of Chamber members by sector, using the Chamber’s custom classification of its members from Table 3. We acknowledge the distribution of respondents is not completely representative of the known distribution of NICC membership as depicted above in Table 3. In comparison to Table 3, the distribution of our responses is consistent in the retail sector. (16% of responses versus 17% of NICC membership) However, responses underrepresent restaurants and arts/culture by 5% and accommodations by 3%.

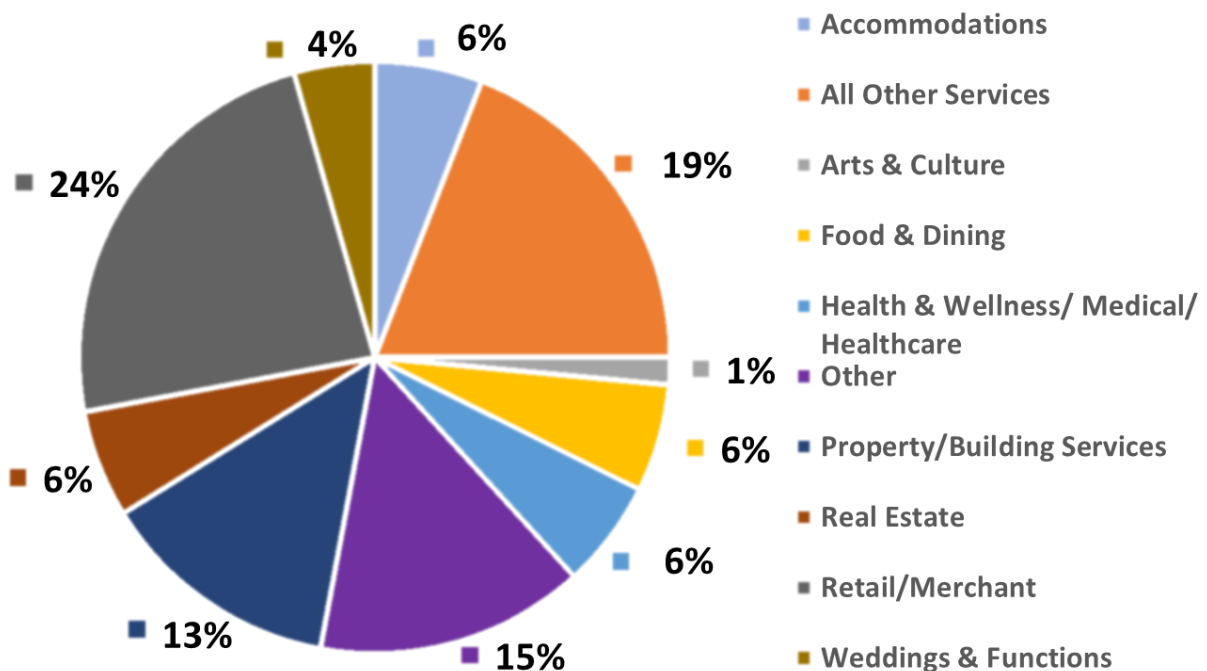


Figure 6: Distribution of survey respondents by sector. Reported as the number of operating establishments in each sector.

5.1.2 Data on the Transfer or Starting of Businesses

Figure 7 shows the distribution of respondents who started, purchased, or inherited their business. We found that 76.5% of respondents started their businesses, 17.6% purchased their business, and 5.9% inherited their business. The large percentage of start-ups among our respondents suggests the entrepreneurial spirit thrives on Nantucket, but we do not know how representative these data are of the larger Nantucket business community.

We also asked respondents to indicate the year in which they started, purchased, or inherited their business. Figure 8 shows that the number of start-ups, in particular, has varied from year to year since 1945, and we surmised this might reflect larger economic conditions. Thus, we compared that data to the performance of the S&P 500 as a macroscale indicator of aggregate economic performance. Figure 9 shows a general correspondence between economic conditions as represented by the S&P index, and the number of start-ups, although these are relatively limited data.

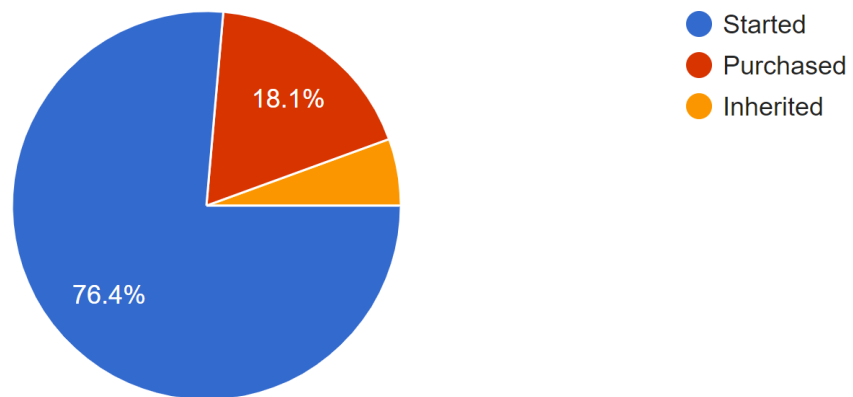


Figure 7: Distribution of businesses started, purchased, and inherited.

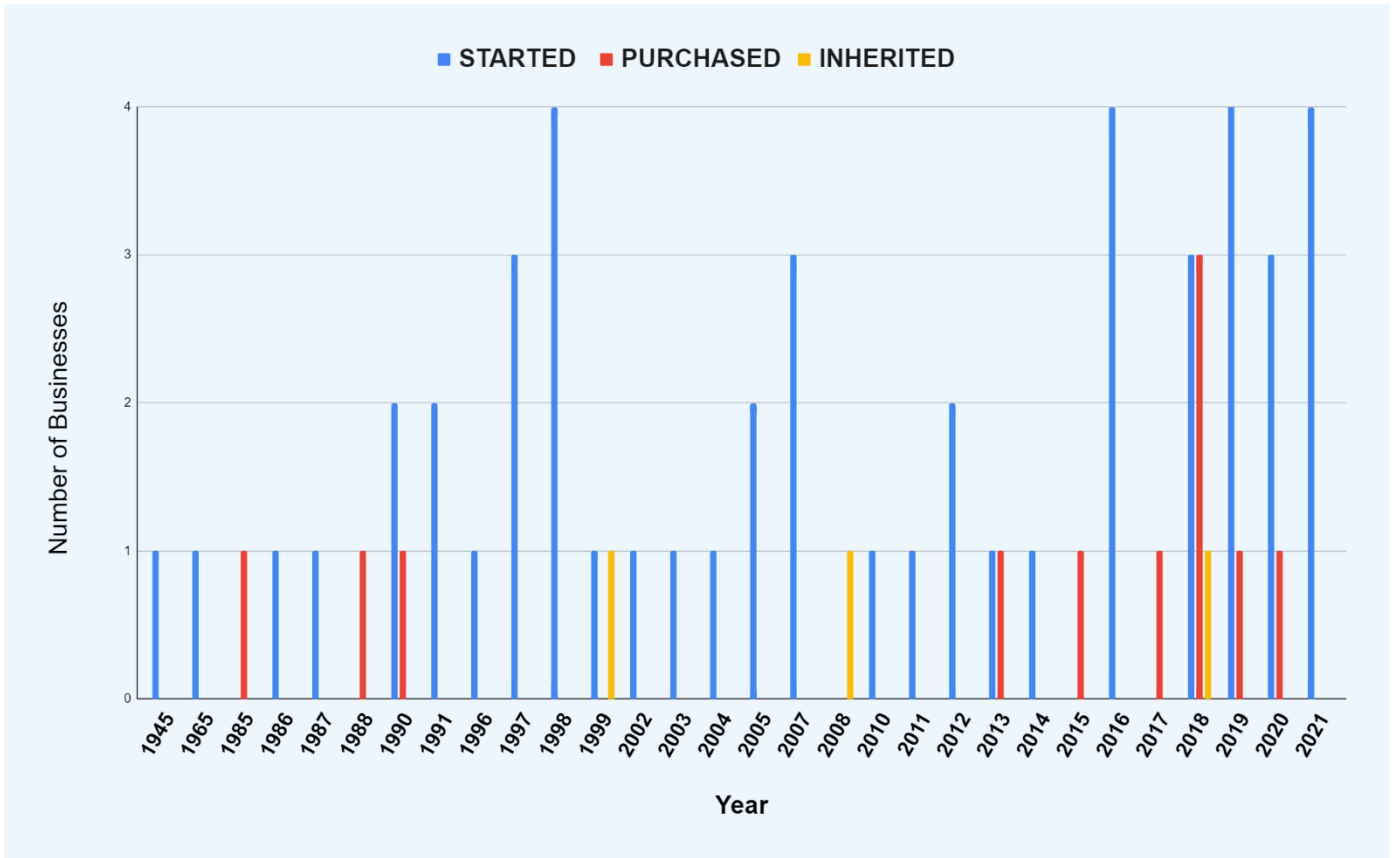


Figure 8: Number of businesses started, purchased, or inherited since 1945

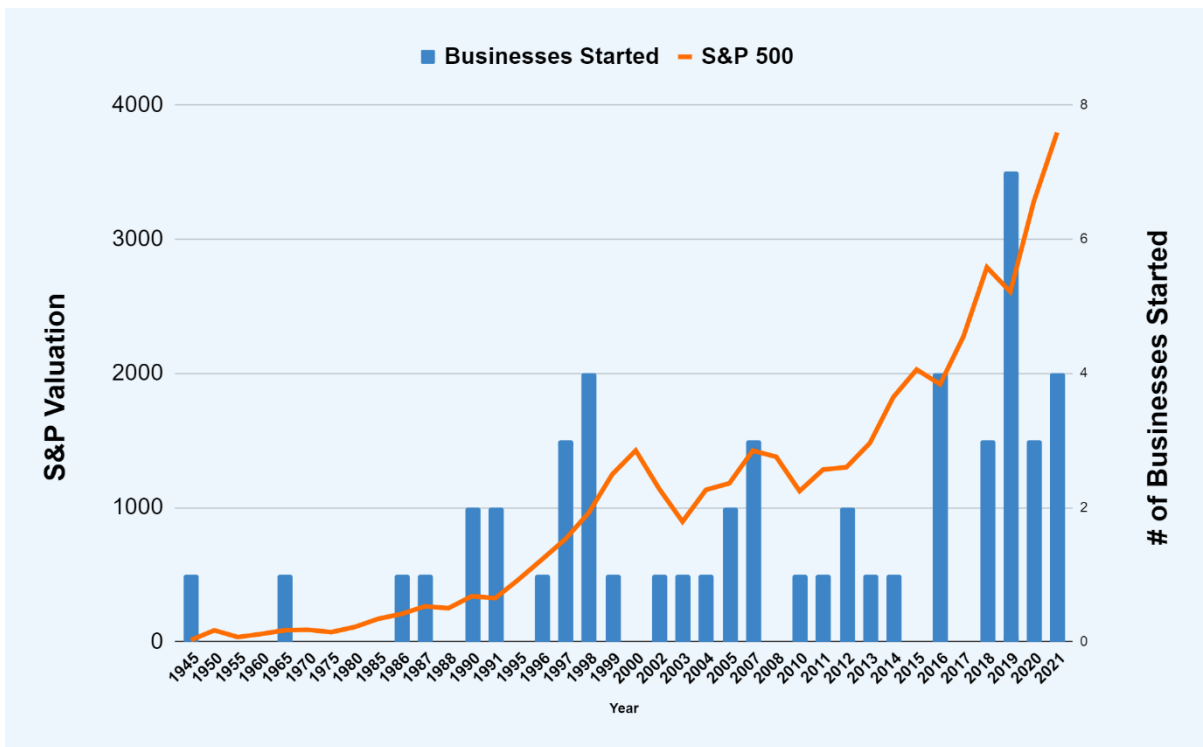


Figure 9: Businesses started on Nantucket as compared to S&P 500 performance since 1945

5.1.3 Employment Trends and Data

We asked respondents to estimate their highest and lowest levels of part and full-time employment for 2022. For sectors in which we received three or more responses, estimated employment levels were averaged across each sector and represented as a range. Figures 10 and 11 show these ranges of data for part-time and full-time employment (respectively) for various sectors. First, it should be noted that all sectors of the economy take at least a limited number of full-time employees throughout the year. Of these sectors, healthcare, services, and restaurants sectors have the largest numbers of full-time employees. These sectors also tend to have the largest fluctuation in full-time employment, with the food/dining and personal service sectors increasing by an average of 12 and 8 employees respectively. Healthcare, restaurants, and personal services also have the largest and most extensive ranges of part-time employment. It is important to note, however, that real estate and property/building services also experience a noticeable increase in part-time employment. The number of part-time employees experience a bigger fluctuation in more sectors of our survey sample than does full-time employment. This suggests that these sectors take on large numbers of part-time employees to account for the significant seasonal fluctuations in Nantucket’s population and economic activity during the summer months.

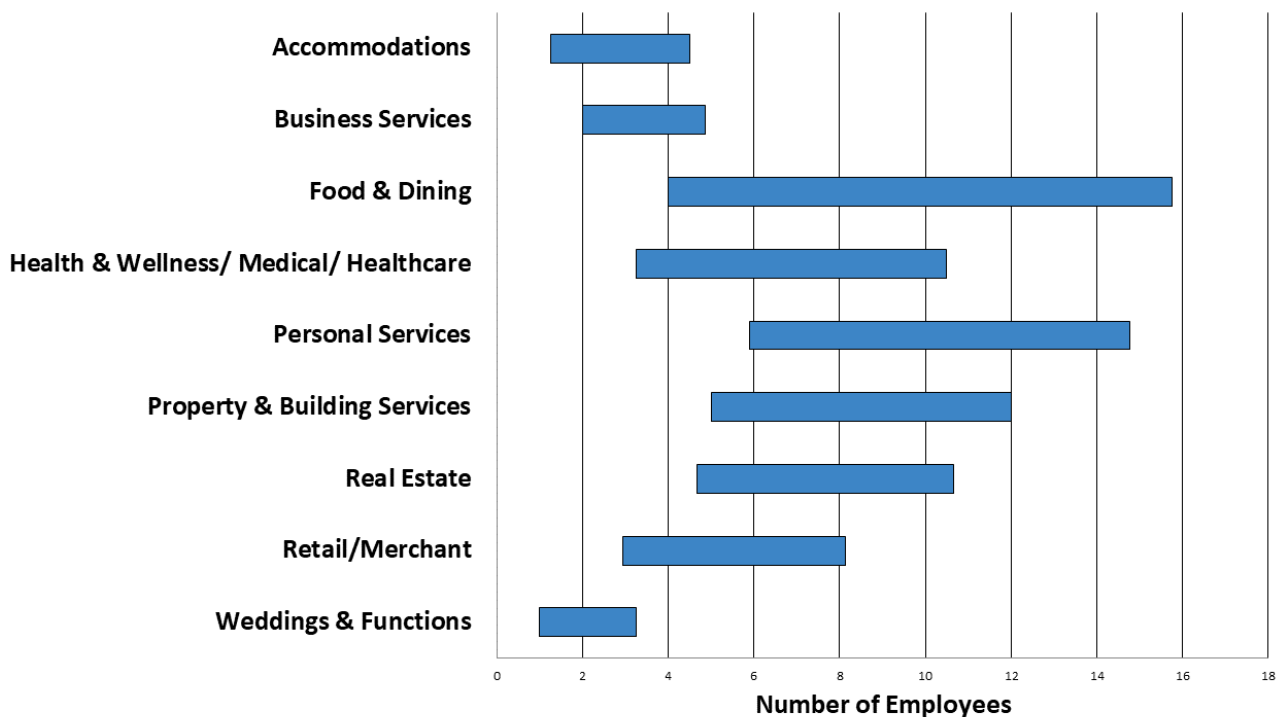


Figure 10: Range of average full-time employment by sector

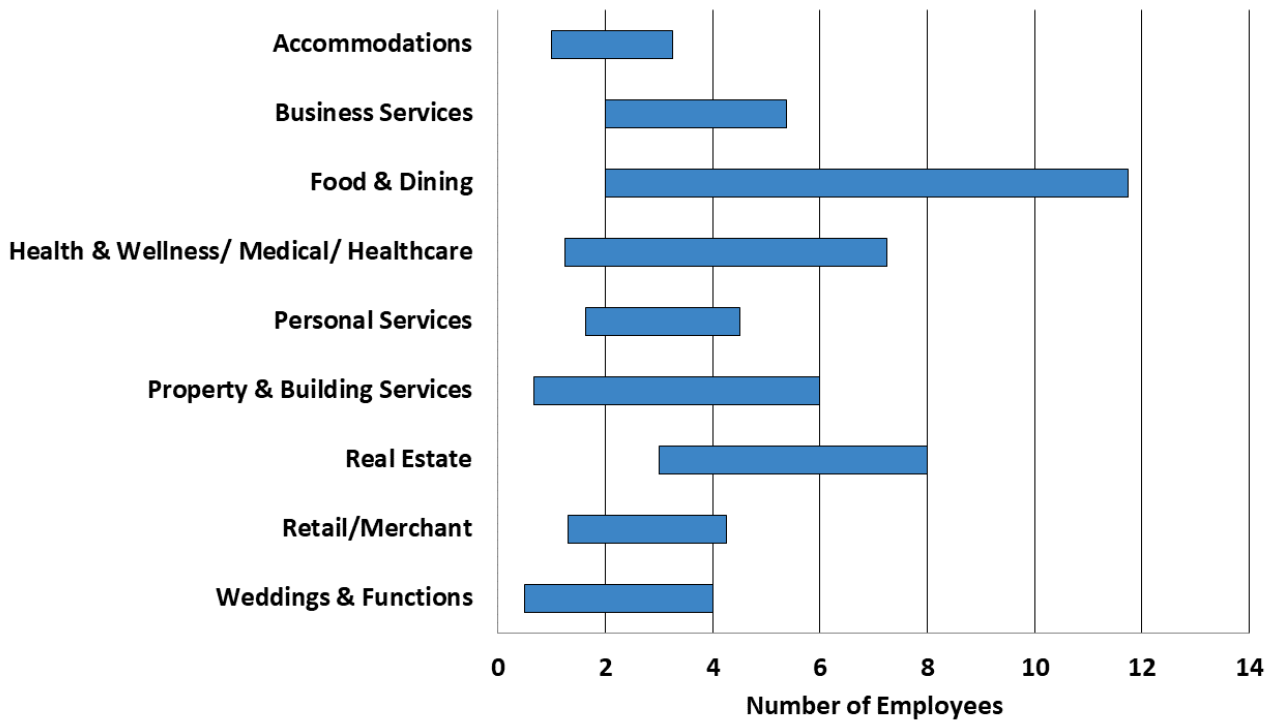


Figure 11: Range of average part-time employment by sector

5.1.4 Revenue of respondents

Perhaps surprisingly, a majority of the survey respondents (69/72 or 95%) disclosed their revenue data. Figure 12 shows a bimodal distribution of average annual revenue. Twenty-five percent of respondents were in the \$50,000-\$199,999 range, and 26.5% fell into the \$1,000,000-\$4,999,999 range, representing a majority of overall responses. The revenue responses in the ranges around these two peaks are not nearly as high, with 14% of businesses falling into the \$200,000-\$499,999 range and 13% businesses falling into the \$500,000-\$999,999 range. A small percentage (9%) of businesses had revenues over 5 million and a slightly larger percentage 13% of businesses fall under \$49,999.

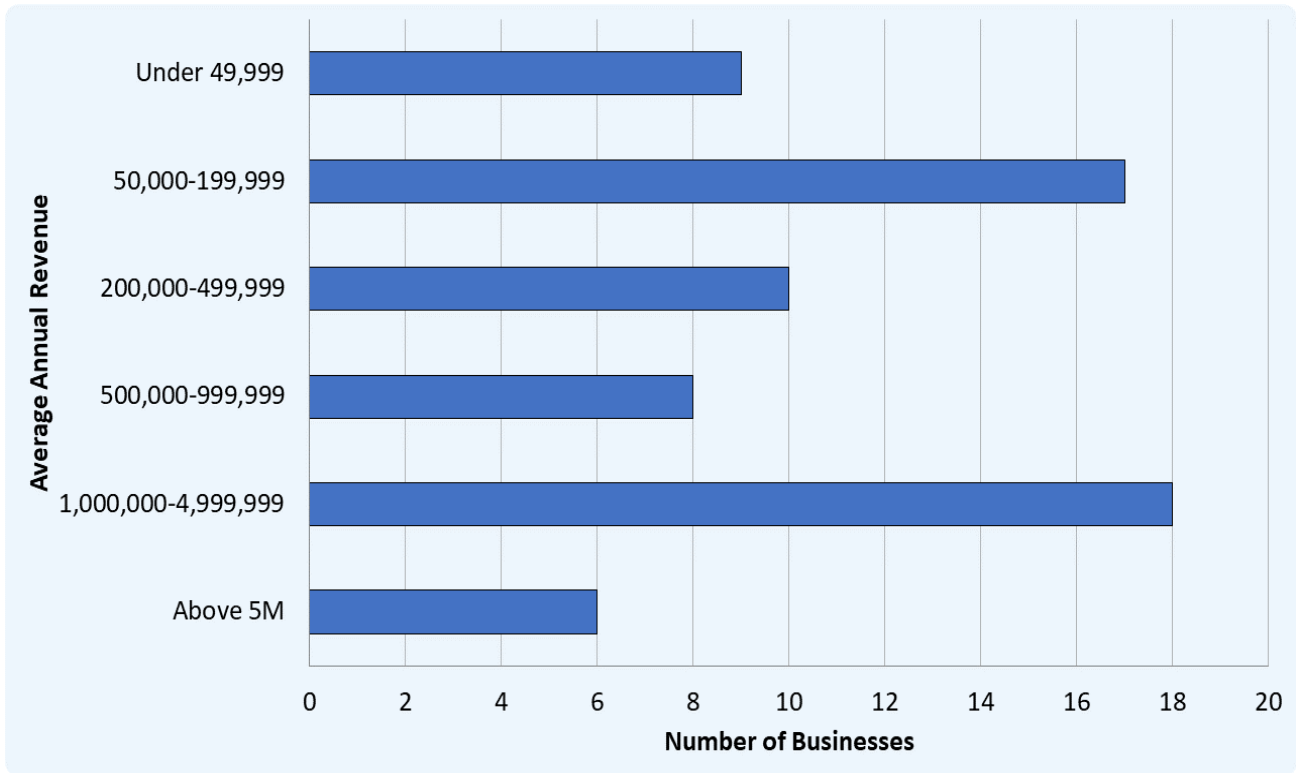


Figure 12: Average annual revenue of survey respondents

5.1.5 Metrics of Success Used by Survey Respondents

Part of the goal of our survey instrument was to gain a more subjective understanding of the definition of success and the metrics used to measure it in each sector of Nantucket's economy. We asked respondents to rank the metrics used to quantitatively evaluate business performance. Among the commonly cited most important metrics were total revenue/sales, total profit, and average revenue per unit sold. We suspected businesses in different sectors would use different units, and time frames to measure their profitability and success. We also asked respondents to provide the most common units of measurement and timeframes they used to keep track of their performance. 47% of respondents used monthly data to measure success, and 38% used yearly data. A small minority of respondents used weekly or daily metrics as a primary criterion of success. The most common units of measurement were total revenue and/or profit per timeframe, sales per timeframe, and net profit. A smaller but considerable portion of respondents noted the importance of client traffic, returning clients, and client satisfaction as criteria for determining the success of their business.

We also asked respondents to highlight and identify areas in which they needed more support or guidance in running their business. Among the most common responses were the need for assistance with advertising and marketing, leadership training, and connections to business services. Many respondents highlighted a lack of connections to lawyers, accountants, and contractors to assist their business, and recommended NICE find a way to make the connection between businesses and those providing necessary business services more seamless. Respondents also highlighted the need for direct financial support through grants

and loans to support their endeavors. Different businesses made different recommendations to address this need, with some respondents requesting help with loan applications, and others asking for new loan programs from NICE.

5.2 Findings from the CBL

This section will introduce our CBL, and the important quantitative findings from the integration of data sources highlighted in section 5.1. Figure 13 depicts an excerpted version of the CBL. Each section of data is color coded in the following manner:

- Gray: General business information (name, NAICS code, sector etc.)
- Blue: PPP Loan Information
- Green: DBA Information
- Red: Alcohol License Information
- Yellow: Rock Solid Grant Information
- Orange: Restaurant/Lodging Permit Information

Table 4 shows the contributions of each dataset integrated into the CBL. Not every business listed contains information from all of the sources used in the CBL's integration, and in some cases, there is very limited information about the identity of a particular business listed. PPP loan data, DBA listings, and permit records were the largest contributors to the overall count of businesses listed in the composite sheet.

Table 4: Data fields from each dataset integrated into CBL. A cross indicates a field that is not present in that dataset. A checkmark indicates a field that is present in that dataset.

	PPP Loan	DBA	Alcohol Licenses	Health Permit	Rock Solid Grant
Businesses Name	✓	✗	✗	✗	✓
DBA Names	✗	✓	✗	✗	✓
Address	✓	✓	✓	✓	✓
Loan amounts	✓	✗	✗	✗	✓
NAICS Code	✓	✗	✗	✗	✗
Sector Description	✓	✗	✓	✓	✓
Revenue and Expenses	✗	✗	✗	✗	✓
Number of Employees	✓	✗	✗	✗	✓
Corporate Structure	✗	✗	✗	✗	✓

General Business Information					PPP Loan Information					DBA Information			Alcohol License	
BUSINESS NAME	SECTOR DESCRIPTION (FROM PPP)	NAICS	NAICS Prefix	ADDRESS	R1	R1J	R2	R2J	TOTAL	DBA NAME	ISSUED	EXPIRES	LICENSE NUMBER	LICENSE NAME
	All Other Business Support Services	561499	56		\$ 47,270.00		2 \$ 47,270.00		2 \$ 94,540.00					
	Theater Companies and Dinner Theaters	711110	71		\$ 48,800.00		4 \$ 48,800.00		3 \$ 97,600.00				03400-GP-0762	
		0	4											
		0	8								6-Apr-21	6-Apr-25		
	All Other Home Furnishings Stores	442299	44		\$ 64,858.00		4 \$ 65,992.00		4 \$ 130,850.00					
	Fitness and Recreational Sports Centers	713940	71		\$ 42,680.00		2 \$ 19,711.00		2 \$ 62,391.00		22-Jan-19	22-Jan-23		
	Full-Service Restaurants	722511	72		\$ 157,700.00		25 \$ 220,658.00		19 \$ 378,358.00				00195-RS-0762	
		0	44											
	All Other Miscellaneous Store Retailers (except	453998	45		\$ 20,000.00		1 \$ -		0 \$ 20,000.00		8-Jan-18	8-Jan-22		
		0	56											

Permit Records		Rock Solid Grant (RSG) Records								Food/Lodging Permit Records				
TYPE	CATEGORY	RSG DESCRIPTION	CORPORATE STRUCTURE	FTE	PTE	REV19	EXP19	REV20	EXP20	PERMIT NUMBER	TYPE	CLASS	ISSUED	EXPIRES
General On-Premises	All Alcoholic Beverages									HLNIC-2020-11-0032	Nicotine Delivery Product(s)	Nicotine Delivery Product(s)	1/1/2021	12/31/2021
		Salon & SPA	S-Corp		3	2 \$ 339,133.00	\$ 297,524.00	\$ 255,662.00	\$ 217,523.00	HLTF-2021-05-00000594	Food Service	Food Service	6/2/2021	12/31/2021
Restaurant	All Alcoholic Beverages									HLTF-2020-11-00000412	Food Service	Food Service	1/1/2021	12/31/2021
		Women's consignment shop	LLC		1	2 \$ 67,400.00	\$ 62,400.00	\$ 143,700.00	\$ 142,000.00					
		Fabric/Clothing Manufacturer	Single Member LLC		0	4 \$ 102,103.00	\$ 65,623.00	\$ 148,392.00	\$ 121,026.00	HLTF-2020-11-00000441	Food Service	Food Service	1/1/2021	12/31/2021

Figure 13: Excerpted CBL

5.2.1 Profile of Nantucket's Business Sector

Our CBL of businesses on Nantucket contains 1176 unique businesses. We categorized each by the first two digits of its NAICS code, which represents the broadest sector categorization possible for a NAICS code. Figure 14 shows the result of that categorization and provides insight into the distribution of businesses operating in each sector of Nantucket's economy. The following percentages represent the breakdown of Nantucket's operating businesses: 32% Services, 13% Restaurants, 12% Retail/Wholesale Trade, and most notably, 21% Construction among others. Figure 15 is a further disaggregation of the services sector. As can be seen in the images and table, the largest portions of the services sector are Waste Management/ Remedial Services, Personal Services, and Healthcare Services (16%). Remedial services are a broad portion of the services sector containing landscapers, housecleaners, septic services among others. Likewise, personal services cover a wide range of businesses including yoga studios, spas/salons, auto repair, and computer repair stores among others.

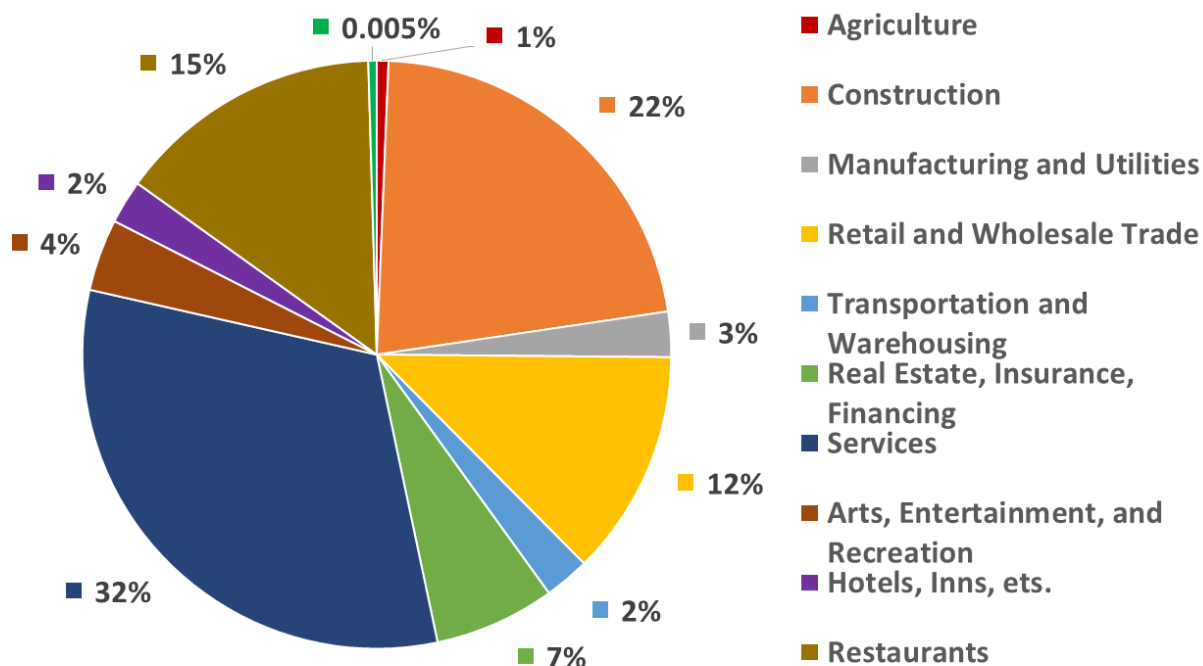


Figure 14: Distribution by sector of operating businesses represented in CBL

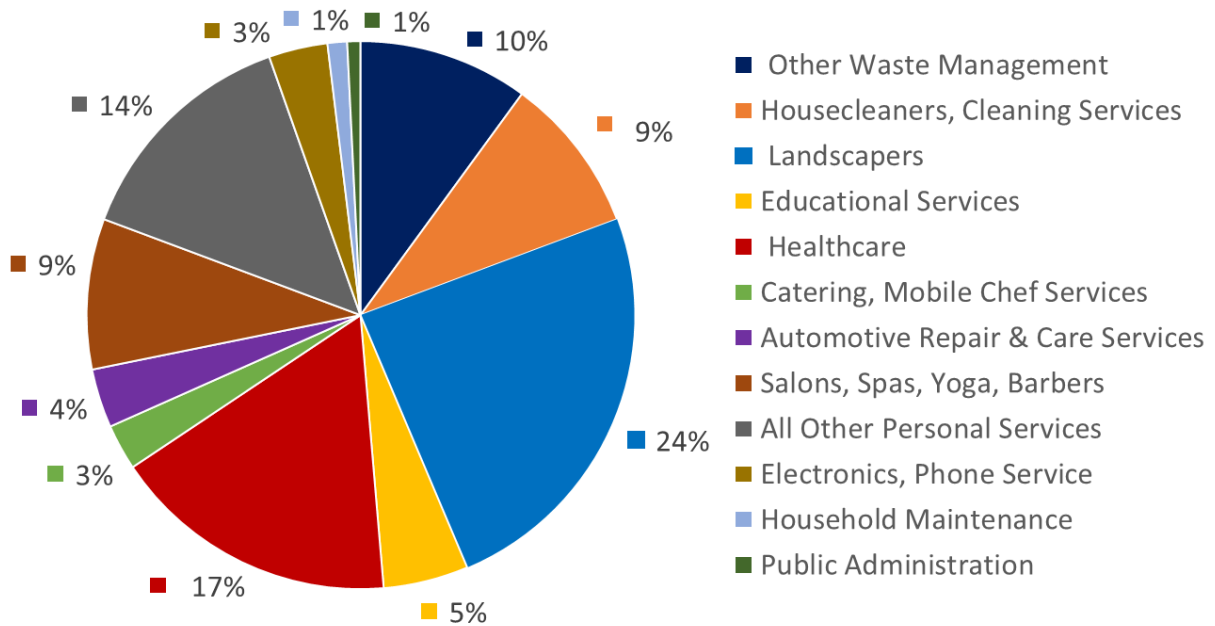


Figure 15: Distribution of operating businesses in service sector represented in CBL

5.2.2 Underrepresented sectors among Chamber membership

We determined sectors underrepresented among Chamber membership by comparing the sectoral distribution of the CBL (Table 5) to that of Chamber membership (as shown in Table 3). We found four sectors which are most significantly unaccounted for in Chamber membership: Construction, Real Estate, Landscaping, and Restaurants. For instance, the construction sector accounts for 21% of the businesses listed in the CBL, but only 10% of Chamber member businesses. Similarly, Restaurant's account for 13% of the businesses listed in the CBL, yet only 10% of Chamber membership. It is also worth acknowledging the disparities in representation in terms of absolute numbers of establishments and not just percentage contributions to a particular dataset. For instance, the CBL lists 258 businesses in the construction sector, yet only 75 of those (less than 30%) are listed among Chamber members. Likewise, the CBL lists 154 restaurants, only 57 of which (less than 40%) are members. We see this data as an opportunity for the Chamber to expand its membership by further investigating these dissimilarities between the CBL and their membership.

There were three sectors in which we found the difference in representation between NICC membership and the CBL were significantly less pronounced. The transportation sector accounts for 2.5% of CBL businesses, and 2.6% of Chamber membership. It is worth noting however, that the CBL does contain 11 more businesses in the transportation sector than are present in Chamber membership, suggesting an underrepresentation therein (albeit smaller than those previously mentioned). Similarly, in the retail/wholesale trade sector, the CBL lists 146 businesses (12%), while Chamber membership lists 129 (18%).

With regard to accommodations, we believe the CBL is under representative of the true nature of the sector. Chamber membership lists 48 businesses in accommodations, while only 25 are listed in the CBL. We know that for all businesses in the accommodations sector, in order to be a member of the [Nantucket Lodging Association](#) must also be a member of the chamber. (Karen Macumber, personal communication, 2021) We suspect that Chamber membership is a more accurate count of businesses in this sector.

Table 5: Comparison between the contribution of sectors to CBL and to chamber membership.

CBL to NICC Membership Sectoral Comparisons		
Sector	CBL Businesses	Chamber Members
Construction, Contractors	258 (21.9%)	72 (10%)
Real Estate	74 (6.3%)	18 (2.5%)
Landscaping	63 (5.4%)	5 (0.7%)
Restaurants	154 (13.1%)	75 (10%)
Transportation	30 (2.5%)	19 (2.6%)
Accommodations	25 (2.1%)	48 (7%)
Retail & Wholesale Trade	146 (12.4%)	129 (18%)
OVERALL TOTAL	1175	726

5.2.3 Analysis of PPP findings to assess the impact of COVID

The purpose of this analysis is to better understand the sectors most impacted by the COVID pandemic and more generally, understand the sectors which are most vulnerable to external shocks to Nantucket’s economy. Figure 16 shows the distribution by sector of businesses on Nantucket who received one or more PPP loans. The construction and services sectors were the largest portions of PPP recipients at 24.7% and 33% respectively, while the restaurant, and retail sectors made up 12.3% and 11.4% respectively, among others. We suspect for retail, restaurants, and the services sector, their reliance on the seasonal increase in Nantucket’s population and economic activity made them additionally vulnerable to the adverse economic impacts of COVID 19. The decrease in visitation to the island along with the resulting labor shortages were likely contributors to the increased need for financial assistance in these sectors.

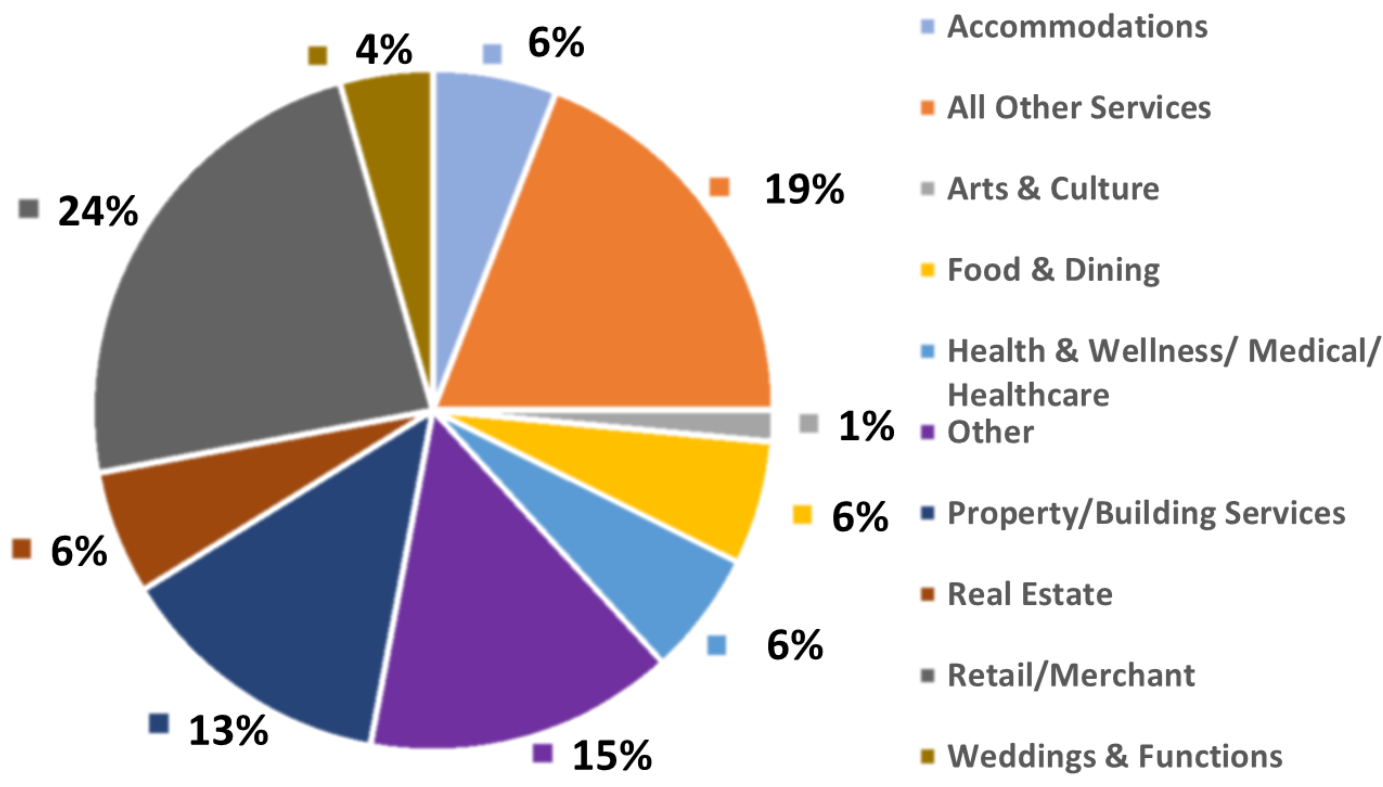


Figure 16: Distribution by sector of the number of businesses that received PPP loans

Table 6 shows the sectors of Nantucket’s economy with the largest ranges of total loans (combining round one and round two where applicable) taken out. Eligibility for PPP loans is based on the payroll of the applying company. Therefore, the sectors listed in Table 6 have the largest ranges of business size.

Table 6: Minimum, Maximum, and Range of total loans by sector.

Sector	Minimum total loan \$	Maximum total loan \$	Range of total loans \$
Restaurants	1,889,131	19,960	1,869,171
Construction	1,478,898	8,700	1,470,198
Landscapers	1,486,013	16,250	1,469,763
Transportation	926,453	22,075	904,378

Table 7 shows the average round one, round two, and total loans across all sectors of Nantucket's economy. The largest average total loans are found in the restaurants, food services, and transportation sectors. This suggests these sectors have companies with larger payrolls, which is corroborated by the previously referenced survey data in which restaurants were among the highest values of full-time employment and highest ranges of part time employment. (Figures 10 and 11).

Table 7: Average round 1, round2, hand total PPP loans across all sectors of Nantucket’s economy.

Sector	Average Round 1 Loan \$	Average Round 2 Loan \$	Average Total Loans \$
Restaurants	151,998	197,670	349,668
Food Services	102,580	185,195	287,776
Transportation, Warehousing	146,805	71,651	218,456
Landscapers	124,259	70,511	200,898
Retail/Wholesale Trade	102,736	31,853	134,589
Waste Management	108,943	15,359	124,302
Hotels, Inns, etc.	58,794	57,835	116,630
Real Estate, Insurance, etc.	76,214	39,345	115,560
Construction	74,261	36,980	112,626
Cleaning Services	51,918	59,436	111,354
Personal Services	78,030	31,587	109,617
Healthcare, Medical	68,775	39,227	108,003
Educational Services	54,714	47,257	101,972
Manufacturing & Utilities	50,049	34,017	75,701

5.3 Findings from Supplemental Interviews

From the pool of positive respondents from our survey, we interviewed four business owners which each represent different sectors of the economy; specifically, food & dining, accommodations, construction, weddings and real estate. Each interviewee was asked a set of questions, which are listed in Appendix C.

We found that each business owner uses different metrics as well as different levels of details to measure success. One interviewee, for example, defined success as maintaining a constant cost/labor cost/fixed cost of 30% each to generate a profit of 10% (Ridge, personal communication, 2021). On the other hand, another interviewee described her metrics as “being able to pay the bills” (Life, personal communication, 2021). We found that some business owners we interviewed had industry specific metrics to measure their business performance. An interviewee in the construction sector stated that his metrics are the volume of work, the profitability of each project and the size and scope of each project (Handy,

personal communication, 2021). This result suggests that business which work per contract can have different metrics of success than those that only serve consumers. Our interviewees had an overall positive view on the seasonality of Nantucket, with all participants praising the increase in demand during the summer. They also noted the heavy maintenance required to remain profitable during peak season. During our interview, participants made several suggestions to NICE on how they can support island entrepreneurs (Ridge, personal communication, 2021; Handy, personal communication, 2021; Life, personal communication, 2021). These are:

1. A program for businesses to connect with off island contractors
2. More investment into island entrepreneurs
3. More coaching by summer tourists with a specialty in business management
4. A Chamber alternative for Online Travel Agents (OTAs)
5. More Chamber participation in the Nantucket Builders Association

6.0 Conclusions and Recommendations

This section will propose a set of recommendations to NICE to better support Nantucket entrepreneurs and maintain the CBL we created.

6.1 Maintenance and Expansion of the CBL

1. **To ensure the CBL remains relevant and useful, we recommend that NICE reintegrate data from periodically updated sources into the CBL as the data become available.**

The CBL is the most comprehensive inventory of businesses on Nantucket that has ever been available, and gives NICC and NICE a better understanding of the quantity and type of businesses on the island. It also provides insight into the nature and contribution of each sector to Nantucket's economy. The CBL draws from a multitude of data sources, the largest of which being PPP loan data. Unfortunately, PPP loans are a one-time installment of data that provide a snapshot of the business community in 2019-2020. However, businesses are required to update their DBA listings every four years, and the CBL contains the expiration dates for all of the alcohol licenses and permit records contained within it. There are other data sources which are also updated regularly, such as the town census which is recorded every 10 years. Updating the CBL will involve the annual reincorporation of license and permit records from their respective issuers, and DBA listings from the town clerk's office. This process will help determine when new businesses are started, when establishments go out of business, and will aid in corroborating the existence of the businesses already listed in the CBL.

2. **We recommend NICE work to procure and incorporate phone book listings and permit information from sectors not currently included in the CBL.**

Another important aspect of sustaining the CBL is its expansion through the incorporation of data sources beyond what we included during the duration of our project. We have identified two other sources we believe are vitally important to add to the CBL to increase its accuracy in portraying the business community on Nantucket. These sources are phone book listings and permit information from sectors beyond those already listed in the CBL. We were able to include food and lodging permits from the Health Department; however, other businesses such as salons, spas, accountants, and virtually every medical practice need licenses or permits to legally operate. Integration of permit information outside of restaurants and lodging will allow NICE to better understand the nature and size of the medical, personal care services, and financial services sectors among others. The phonebook would provide a larger pool of businesses to cross-reference with, and includes contact information which is vitally important to future outreach programs or survey initiatives NICE may wish to conduct.

- 3. NICE should commission an outside contractor or delegate to a future IQP team the task of creating a more robust database tool to represent the data contained in the CBL.**

While the CBL is currently the most complete inventory of businesses on Nantucket available, there is still room for improvement in the representation of the data we've collected outside of an excel spreadsheet. Using a commercial database software to collect and maintain a list of Nantucket businesses would provide the following advantages:

1. The data contained would be more secure than if it were stored in an excel spreadsheet
2. The database would allow for an easier incorporation of new data sources, or reissued data from current sources into NICE's records
3. Commercial software would likely allow for more adept and efficient search and filter functions to sort and iterate through NICE's records
4. A commercial database would likely allow for more professional data visualization (graphics, figures, tables etc.)

6.2 Supporting Island Businesses and Entrepreneurs

- 4. We recommend that the Chamber make a concerted effort to identify why businesses in the construction, landscaping, food/dining, and real estate sectors are not members of the Chamber and what kinds of programs and incentives might encourage them to join.**

Analysis of the CBL indicates that the Chamber membership substantially under-represents the construction, landscaping, food/dining, and real estate sectors of Nantucket's economy. Efforts to better incorporate businesses from these sectors into the Chamber might include increased outreach programs, and/or serialized survey instruments to better understand the types of support businesses in these sectors require.

- 5. We recommend NICE take steps to provide programs for business owners to learn leadership, marketing, advertising, and social media skills. NICE should also work to promote the availability of business services and establish reliable connections between Nantucket's business and off-island resources.**

Our survey and supplemental interviews were two important sources of subjective feedback from business owners, providing insight into the types of support NICE should work to provide where possible. Among survey respondents, the most cited areas NICE could provide better support were:

1. Workshops or support programs for business owners in leadership, marketing, advertising, and usage of social media
2. Many respondents highlighted a lack of connection with important business services such as lawyers, accountants, insurance, and hiring services
3. Expanded access to grant programs in the aftermath of COVID

Our interviews with business owners revealed similar areas NICE can work to provide support to island entrepreneurs. A few interviewees highlighted a lack of connection to business services and off island contractors, as many on island contractors have limited availability during the shoulder seasons as businesses are preparing for peak-season visitation (Ridge, personal communication, 2021; Life, personal communication, 2021). Another interviewee proposed that NICE could get better insight into certain sectors by becoming more active in business associations in those areas of the economy (i.e. the [Nantucket Builders Association](#), or the [Nantucket Restaurants Association](#).) (Handy, personal communication, 2021). Understanding and acting on the needs of businesses in all sectors of Nantucket's economy will not only better support existing members of the Chamber, but also incentivize new membership as well.

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Appendix A: Alcoholic Beverage Control Commission License Page

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Appendix B: Survey Instrument Distributed by NICE

Business Benchmark Survey

This survey is being issued by the Nantucket Island Center for Entrepreneurship on behalf of a student team from Worcester Polytechnic Institute. The purpose of this survey is to understand more about businesses on Nantucket. Responses to this survey will remain completely anonymous and reporting of the result will only be in aggregate. You do not have to answer any questions you do not feel comfortable doing so. If you have any questions, feel free to reach out to the student team at gc-ACK21NICE@wpdl.edu.

*** Required**

Draft restored

Which of the following is the primary focus of your business on Nantucket?

- Accommodations
- Activities
- Arts & Culture
- Business Services
- Food & Dining
- Retail/Merchant
- Personal Services
- Property & Building Services
- Real Estate
- Travel & Leisure
- Weddings & Functions
- Other:

Briefly describe the nature of your business (eg, full-service restaurant, landscaping services, hotel with restaurant etc.)

Your answer

Select all months in which your business is open/operational for at least 10 days:

- All Months
- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

During the months you expect your business will be operational/open, what would you estimate your lowest number of part-time employees to be in 2022?

Your answer

Please rank the following metrics from most important to least important as indicators of the relative success of your business for a given time period. (1 Being most important and 6 being least important)

	1	2	3	4	5	6
a) Total revenue/sales	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Total profit	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Number of units sold	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Average \$\$ per unit sold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Average profit per unit sold	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
f) Number of customers served	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Clear selection

What is the most common time period you use when measuring the success of your business?

- Day
- Week
- Month
- Year

During the months you expect your business will be operational/open, what would you estimate your highest number of part-time employees to be in 2022?

Your answer

During the months you expect your business will be operational/open, what would you estimate your lowest number of full-time employees to be in 2022?

Your answer

During the months you expect your business will be operational/open, what would you estimate your highest number of full-time employees to be in 2022?

Your answer

In what range does your business's average annual revenue fall?

- Under 49,999
- 50,000-199,999
- 200,000-499,999
- 500,000-999,999
- 1,000,000-4,999,999
- Above 5M

What is the most common unit you use when measuring the success of your business? (e.g., average daily rate, number of covers/day, etc.)

Your answer

Did you start, purchase, or inherit your business? *

- Started
- Purchased
- Inherited

In what year did you start, purchase, or inherit your business?

Your answer

What programs/initiatives from the Nantucket Island Center for Entrepreneurship would you consider beneficial to your business endeavors?

Your answer

Would you be willing to provide contact information to us to be a part of a supplemental interview process we will be conducting? This is entirely VOLUNTARY, and your previous responses will NOT be linked to the contact information you provide. If you are interested, please provide an email below.

Your answer

Submit

Clear form

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Appendix C: Interview Questions for Supplemental Interview of Survey Respondents

Preamble: The interview you will participate in will take between 30 and 60 minutes. If you have any questions after the interview process has concluded, please feel free to reach out to the student team at gr-ACK21NICE@wpi.edu. Please understand your participation in this interview is completely voluntary and you can end it at any time if you choose to do so. You are not required to answer any question you do not feel comfortable answering. Is it okay for us to anonymously use your responses in our report? Understand that prior to submitting our report for publication, we will review any part of this interview that we plan to use with you to ensure it is used accurately.

1. What type of business do you operate?
2. Do you operate seasonally or year-round?
3. What motivated you to start your business?
4. How would you define success for your business?
5. In your eyes, how does the seasonal nature of Nantucket's economy affect your business?
6. Do you view the seasonal fluctuations in Nantucket's effective population and economy as a net positive or net negative for your business and why?
7. What could the NICC or town government do to further strengthen and assist your business?

Appendix D: Programing and Data Analysis

Git repository with all code: <https://github.com/jdpalmieri/IQP-NICE.git>

Constructor:

Each of the following classes depicted bellow are constructors for different data sources. For Example, PPP loan data is written to hold values for each round of funding and jobs retained for a maximum of three possible rounds.

```
1 public class PPP {
2     double round1, round2, round3, total, r1jobs, r2jobs, r3jobs;
3
4     public PPP (double round1, double round2, double round3, double total, double r1jobs, double r2jobs, double r3jobs) {
5         this.round1 = round1;
6         this.round2 = round2;
7         this.round3 = round3;
8         this.total = total;
9         this.r1jobs = r1jobs;
10        this.r2jobs = r2jobs;
11        this.r3jobs = r3jobs;
12    }
13
14    public String formatForCSV() {
15        return (round1 + "," + r1jobs + "," + round2 + "," + r2jobs + "," + r3jobs + "," + total + ",");
16    }
17 }
18
19
```

```
1 public class License {
2     String licenseNum, licenseName, type, category;
3
4     public License (String licenseNum, String licenseName, String type, String category) {
5         this.licenseName = licenseName;
6         this.licenseNum = licenseNum;
7         this.type = type;
8         this.category = category;
9     }
10
11    public String formatForCSV() {
12        System.out.println(licenseNum + "," + licenseName + "," + type + "," + category + ",");
13        return (licenseNum + "," + licenseName + "," + type + "," + category + ",");
14    }
15 }
16
17
18
19
```

```
2 public class DBA {
3     String dbaName, issued, expires;
4
5     public DBA(String dbaName, String issued, String expires) {
6         this.dbaName = dbaName;
7         this.issued = issued;
8         this.expires = expires;
9     }
10
11    public String formatForCSV() {
12        return (dbaName + "," + issued + "," + expires + ",");
13    }
14 }
15
16
```

```
2 public class Permit {
3     String permitNum, companyName, type, category, issued, expires, address;
4
5     public Permit (String permitNum, String companyName, String type, String category, String issued, String expires, String address) {
6         this.permitNum = permitNum;
7         this.companyName = companyName;
8         this.type = type;
9         this.category = category;
10        this.issued = issued;
11        this.expires = expires;
12        this.address = address;
13    }
14
15    public String formatForCSV() {
16        return (permitNum + "," + type + "," + category + "," + issued + "," + expires + ",");
17    }
18 }
19
20
```

```

1
2 public class SBA {
3
4
5 public SBA(String comp, String city, String state, int zip, int loan, int jobs, String industry){
6     String Company;
7     String City;
8 }
9
10 public static void main(String[] args) {
11     // TODO Auto-generated method stub
12
13 }
14
15 }
16

```

```

1
2 public class RSG {
3     String name, description, DBAname, corpStructure;
4     int FTE, PTE;
5     double rev19, rev20, exp19, exp20;
6
7     public RSG (String name, String description, String DBAname, String corpStructure, int FTE, int PTE, double rev19, double rev20, double exp19, double exp20) {
8         this.name = name;
9         this.description = description;
10        this.DBAname = DBAname;
11        this.corpStructure = corpStructure;
12        this.FTE = FTE;
13        this.PTE = PTE;
14        this.rev19 = rev19;
15        this.rev20 = rev20;
16        this.exp19 = exp19;
17        this.exp20 = exp20;
18    }
19
20    public String formatForCSV() {
21        return (description + "," + corpStructure + "," + FTE + "," + PTE + "," + rev19 + "," + exp19 + "," + rev20 + "," + exp20 + ",");
22    }
23
24 }

```

Business Class:

This class merges all the different constructors into one business class constructor which contains data on everything about a given business using the address as the primary key.

```

1 import java.util.ArrayList;
2 public class Business {
3
4     String name, sector, address;
5     int NAICS;
6     PPP ppp;
7     DBA dba;
8     License license;
9     ArrayList<License> licenses;
10    ArrayList<Permit> permits;
11    RSG rsg;
12    Permit permit;
13
14    public Business (String name, String sector, int NAICS, String address, PPP ppp, DBA dba, License license, RSG rsg) {
15        this.name = name;
16        this.sector = sector;
17        this.NAICS = NAICS;
18        this.ppp = ppp;
19        this.dba = dba;
20        this.license = license;
21        this.address = address;
22    }
23    public Business (String name, String sector, int NAICS, String address, PPP ppp, DBA dba, ArrayList<License> licenses, RSG rsg) {
24        this.name = name;
25        this.sector = sector;
26        this.NAICS = NAICS;
27        this.ppp = ppp;
28        this.dba = dba;
29        this.licenses = licenses;
30        this.address = address;
31    }
32
33    public Business (String name, String sector, int NAICS, String address, PPP ppp, DBA dba, License license, RSG rsg, Permit permit) {
34        this.name = name;
35        this.sector = sector;
36        this.NAICS = NAICS;
37        this.ppp = ppp;
38        this.dba = dba;
39        this.license = license;
40        this.permit = permit;
41        this.address = address;
42    }

```

```

public String formatToCSV() {
    String pppPrint, dbaPrint, licensePrint, rsgPrint, permitPrint;

    //System.out.println("Processing: " + this.address);

    if(this.ppp != null) {
        pppPrint = this.ppp.formatForCSV();
    }
    else {
        pppPrint = (",,,,,,");
    }
    if(this.dba != null) {
        dbaPrint = this.dba.formatForCSV();
    }
    else {
        dbaPrint = (",,");
    }
    if(this.rsg != null) {
        rsgPrint = this.rsg.formatForCSV();
    }
    else {
        rsgPrint = (",,,,,,");
    }
    if(this.license != null) {
        licensePrint = this.license.formatForCSV();
    }
    else {
        licensePrint = (",,");
    }
    if(this.permit != null) {
        permitPrint = this.permit.formatForCSV();
    }
    else {
        permitPrint = (",,,,");
    }
    return (this.name + "," + this.sector + "," + this.NAICS + "," + this.address + "," + pppPrint + dbaPrint + licensePrint + rsgPrint + permitPrint);
}

```

Read File:

Read File class is responsible for reading Comma-separated values (csv) files from a directory and then inputting the data contained in those csv's into their correct constructor object. It also has the functionality to print the output back to a csv using the paste to excel function.

```

1  import java.io.File;
2  import java.io.FileNotFoundException;
3  import java.io.FileWriter;
4  import java.io.IOException;
5  import java.util.ArrayList;
6  import java.util.Scanner;
7  import java.io.PrintWriter;
8
9  import javax.swing.plaf.synth.SynthOptionPaneUI;
10
11
12  public class ReadFile {
13      //"LicenseeList2021.csv"
14      public static ArrayList<String> lines = new ArrayList<String>();
15
16      public static final String PATH2 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\DBA CSV.csv";
17      public static final String PATH3 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\Rock Solid Grant.csv";
18      public static final String PATH4 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\Alcohol License Data.csv";
19      public static final String PATH5 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\PPP.csv";
20      public static final String PATH6 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\Permit Data.csv";
21      public static final String PATH7 = "C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\PPP FULL.csv";
22      // input location of desired file to read from its file location in computer
23
24      public static File fileDBA = new File(PATH2);
25      public static File fileRSG = new File(PATH3);
26      public static File fileALC = new File(PATH4);
27      public static File filePPP = new File(PATH5);
28      public static File filePERM = new File(PATH6);
29      public static File filePPPFULL = new File(PATH7);
30
31
32      static ArrayList<Business> Businesses = new ArrayList<Business>();
33

```



```

35     public static void main(String[] args) throws Exception {
36         //addLine(file);
37         //System.out.flush();
38         //Businesses.forEach(e -> System.out.println(e.address));
39         //ScannerCSV(file);
40         //System.out.printf("this: %d", 4);
41
42
43         read(fileDBA);
44         processDBA(lines);
45         lines = new ArrayList<String>();
46
47         //read(filePPP);
48         read(filePPPFULL);
49         processPPP(lines);
50         lines = new ArrayList<String>();
51
52
53         read(fileRSG);
54         processRSG(lines);
55         lines = new ArrayList<String>();
56
57         read(fileALC);
58         processLicense(lines);
59         lines = new ArrayList<String>();
60
61         read(filePERM);
62         processPermit(lines);
63         lines = new ArrayList<String>();
64
65         pasteToExcel();
66     }
67 }

```

```

69     public static void read(File file) {
70         try {
71             Scanner sc = new Scanner(file);
72             while (sc.hasNextLine()) {
73                 String line = sc.nextLine();
74                 lines.add(line);
75                 //System.out.println(line);
76             }
77             sc.close();
78             //System.out.println(lines.size());
79         }
80         catch (FileNotFoundException e) {
81             e.printStackTrace();
82         }
83
84     }
85 }

```

```

public static void pasteToExcel() {

    //Setup CSV output
    PrintWriter pw = null;
    try{
        pw = new PrintWriter(new File("C:\\Users\\Paul\\Desktop\\IQP\\CSVs\\deliverable.csv"));
    }catch(FileNotFoundException e){
        e.printStackTrace();
        return; //Something broke
    }

    for(Business j: Businesses){
        pw.write(j.formatToCSV() + "\n");
        pw.flush();
    }

    pw.close();
}

```

Filters and Sorting:

The following method called string similarity compares two strings together and breaks them apart and compares their substrings and returns a float value. This float value is a percentage similarity of how closely related the two words are. This filters out names of business and helps determine if two businesses are the same.

```

193 public static float stringSimilarity2(String s1, String s2) {
194     int size;
195     int dif = 0;
196     int start = 0;
197     int count = 0;
198     int total = 0;
199     //boolean b = s1.length() > s2.length();
200     //s1 = s1.toLowerCase();
201     //s2 = s2.toLowerCase();
202     s1 = removeChar(s1, " ");
203     s2 = removeChar(s2, " ");
204     boolean b = s1.length() > s2.length();
205     if(s1.equals(s2)) {
206         return 1;
207     }
208     //System.out.println(dif);
209     ArrayList<String> temp = new ArrayList<String>();
210     if(b) {
211         size = s1.length();
212         dif = s1.length()-s2.length();
213         for(int i = 0; i < dif; i++) {
214             s2 = s2 + ";";
215         }
216     }else {
217         size = s2.length();
218         dif = s2.length()-s1.length();
219         for(int i = 0; i < dif; i++) {
220             s1 = s1 + ";";
221         }
222     }
223 }

```

```
224 | //System.out.println(s1);
225 | if(b) {
226 |     for(int i = 0; i < size; i++) {
227 |         if(s1.charAt(i) != s2.charAt(i)){
228 |             temp.add(s1.substring(start,i));
229 |             start = i;
230 |             if(temp.get(temp.size()-1).equals(";")){
231 |                 count++;
232 |             }
233 |         }
234 |     }
235 | }else {
236 |     for(int i = 0; i < size; i++) {
237 |         if(s1.charAt(i) != s2.charAt(i)){
238 |             temp.add(s2.substring(start,i));
239 |             start = i;
240 |             if(temp.get(temp.size()-1).equals(";")){
241 |                 count++;
242 |             }
243 |         }
244 |     }
245 | }
246 |
247 | //printArray(temp);
248 | for(int i = 0; i < count; i++) {
249 |     temp.remove(";");
250 | }
251 |
252 |     //printArray(temp);
253 |     if(b) {
254 |         for(String s : temp) {
255 |             if(s2.contains(s)) {
256 |                 total += s.length();
257 |             }
258 |         }
259 |     }else {
260 |         for(String s : temp) {
261 |             if(s1.contains(s)) {
262 |                 total += s.length();
263 |             }
264 |         }
265 |     }
266 |
267 | //System.out.println((double)total/((double)size);
268 | return (float)((double)total/((double)size);
269 | }
```

The class process address filters any addresses and replaces common abbreviations such as “Street” and “st” with a single term which allows for them to be matched together.

```

public static String processAddress(String a) {
    String[] streets = {"Street", "street", "STREET"};
    String[] roads = {"Road", "road", "ROAD"};
    String[] aves = {"Avenue", "avenue", "AVENUE"};
    String[] lanes = {"Lane", "lane", "LANE"};
    String[] drives = {"Drive", "drive", "DRIVE"};
    String[] ways = {"Way", "way", "WAY"};

    if(a == null) {
        return "";
    }

    for(int i = 0; i<streets.length; i++) {
        if (a.contains(streets[i])) {
            a = a.replace(streets[i], "st");
            break;
        }
    }

    for(int i = 0; i<roads.length; i++) {
        if (a.contains(roads[i])) {
            a = a.replace(roads[i], "rd");
            break;
        }
    }

    for(int i =0; i<aves.length; i++) {
        if (a.contains(aves[i])) {
            a = a.replace(aves[i], "ave");
            break;
        }
    }

    for(int i =0; i<lanes.length; i++) {
        if (a.contains(lanes[i])) {
            a = a.replace(lanes[i], "ln");
            break;
        }
    }
}

```