Residential Comfort Level:

An Analysis of the Venetian Retail Sector

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Abstract

This project examined the availability of basic necessities and the decline of residential comfort in Venice, Italy by exploring the impact of economic changes through the cataloging of current shops, recording their transformations over time integrating changing population data, and proposing methods for the improvement of residential comfort in the city. Additional databases and map layers were created using data collected by the team along with a complete analysis of the comfort level of two sestieri, as far back as 1970.

Executive Summary

In a city where walking is the most popular means of transportation, it is becoming more and more difficult to obtain the things needed for daily life in Venice. The aging and less mobile population is forced to travel longer distances to obtain these goods, the difficulty of which is increased when bridges and hauling bags of groceries is factored in. It makes going shopping more of a chore, a hassle, and an inconvenience, when it shouldn't be. But, it is an inconvenience Venetians face on an everyday basis.

Venice has changed greatly in the past sixty years, for those who have been residents in that time, the change is very clear. The severe decrease in the population of Venice is an issue that has plagued the city for years now. Since World War II the decline in population has forced a dramatic change in the retail sector. The closing of shops is a problem in Venice, and if a shop doesn't close it may change interests to a shop that doesn't focus on catering to the residents of the city. Local shops, necessary for everyday life, are quickly dwindling away. The population drop may have caused shops to close and in some cases shop closings may have caused the population to drop, both of these scenarios must be addressed when looking at the changes in Venice. With the shift in the economy of Venice focusing more on tourism, local shops are significantly outnumbered by the swarms of masks and trinket stores. The relationship between tourism, the decreasing population, increased real estate costs, and the closing of basic necessity shops is one that is closely intertwined and is affecting the city's commerce.

Since the increase in the cost of living the people can no longer afford the high real estate prices and are forced to move to the mainland. Many who work in Venice don't live on the island, they live in Mestre, where it is cheaper to live and access to basic food necessities is greater. In order to keep citizens happy in any city there has to be a certain level of comfort that is obtained by providing convenient locations of basic food necessities and resources. In Venice the decline in basic necessity food stores is a growing problem. If nothing is done Venice will be stuck in this continuous loop, and it will continue to lose its citizens.

The city has done very little to determine the severity of this problem in Venice. A project completed by a student from the Massachusetts Institute of Technology studied the shops in Sant' Elena, and Worcester Polytechnic Institute projects have catalogued shop evolutions in the regions of Santo Stefano, Madonna Dell'Orto, and of bread shops in Castello. These projects have also mapped out all of the current stores in Venice of 2004. The evolution of the majority of Venetian shops remains uninvestigated and there is not yet a standard method to analyze the state of economic change. To address the situation in Venice a semi-unique

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approach was taken, since there are challenges in determining a social issue in this manner. To assist us an original methodology was created and carefully tailored for completion of this project. The Worcester Polytechnic Institute students that mapped out the stores of 2004 helped us by creating a skeleton for us to begin our data collection. With that help in our initial step in documenting shops present and past, the data was be analyzed to be related to the state of residential comfort in Venice.

Our project catalogs present day stores in the sestieri of Castello, Cannaregio, and Dorsoduro and maps the evolution of Venetian shops in Cannaregio and Dorsoduro, in an effort to examine the changes in the local commercial environment. Through personal interviews with Venetian residents, who were native to the particular sestieri of focus, our team collected data regarding local retail shops and how they have developed since 1945. The ultimate goal of this project was to determine if there is a point where the lack of basic food necessities can become so harmful to the residents of an area that it forces public intervention. This project aims to provide Venetian residents, students and visitors with a complete searchable database and maps providing instant access to the city's commercial resources.

The cataloging of the present day stores was completed by obtaining a picture, address, name, and a description of what the store sold, for each shop in our sestieri of interest. After that, categories were formed in which each store was placed under. There were seven categories created, the most important of which being basic necessities.

The information obtained was placed into a searchable Access database, from which an index called the Basic Necessity Acquisition Index was created, so that the information can be easily comparable and accessible. From the information in the database, the stores were mapped out in MapInfo and are searchable by address, area, store type, and other categories. These maps and databases alone are useful tools for searching the retail shops of Venice and can be utilized in future studies.

In order to show the population change in Venice in a clear manner, thematic maps were created for the years of 1971, 1981, 1991, and 2001. These maps were used to show the population per island. Interactive census tract maps with the population embedded in each tract were drawn for each decade using raw census data obtained from the *Uficia Statistica.*

With the integration of population data, an original method was produced to determine a threshold level where obtaining basic food necessities is uncomfortable, once the threshold was found, a thematic map of comfort level per island was created. The comfort level of each island was the mapped out through use of an equation relating population, island size, and the radius of imagined geographic circles of propinquity to basic food necessity.

Once this all the information, from our methodology, was found our group made recommendations about what can be done with the information. These recommendations include new store placement and new store type. They also discuss distributed supermarkets which could also help areas in severe retail discomfort and are listed below.

- Planning the Location of New Store
- Planing the Type of New Store
- Distributed Supermarkets
- Home delivery
- Evoulutionay Database

A distributed supermarket is a chain-owned supermarket, with various departments broken up into smaller stores, much like the individual food stores that Venetians are used to. The shops are under central management, and the space is owned by either the supermarket company, or the city of Venice, which would lease to the operators for little or no rent. This central ownership provides the constant supply and lower prices of a supermarket. However, the de-centralized location allows the superior quality of individual stores, as well as the ability to meet store needs in neighborhoods that normally would not have the space, or economy to support a few local stores.

We believe that distributed supermarkets are a remedy to the lack of residential comfort in certain neighborhoods. In addition to improving residential comfort, distributed supermarkets will provide a cost effective compromise between the economics and lifestyle Venetians desire.

Our recommendations for implementation are accompanied by an explanation of what should be done to continue this project in the future. This includes methods which expand upon our data collection and analysis, and also some new ideas which would be essential to the projects development.

Authorship:

As a group we all contributed equally in the data collection, writing, presenting, that this project required.

Figure 1: From right to left: Danielle Modeste, Freddy Jervis, Ta Karra Greene, and Benjamin Isabella.

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Chapter 1: Introduction

In heritage cites such as Salzburg, Austria, Bruges, Belgium and Amsterdam, Holland, there is a problem; local stores closing down to be replaced by trinket and souvenir shops. The closing of stores does not necessarily affect the economy of the city negatively, but it creates a socioeconomic problem. Social dynamics, which were once thriving, are now disintegrating[1]. Shops that are imperative to the survival of the residents are closing down, and therefore there is a decrease in the level of retail comfort, which alters the social dynamics of the city. Retail comfort level is defined as the ease of which consumers can obtain their basic necessities, for example bread, meat, fish, fruit, and medicine. The lower the level of comfort, the harder it is for a consumer to obtain the necessary goods. Reasons for low levels of comfort can include the disappearance of grocery and other food stores from a neighborhood.   This thinning of stores causes the inhabitants to travel farther and take more time out of their day to get the goods that they need. If the general population cannot get these necessities then it becomes a social problem, and remedies need to be found.

Venice, a well known heritage city today, was once thriving with stores that fulfilled the needs of the residents; but over the past 50 years basic necessity stores in Venice have been closing. Increasing tourism has caused storeowners to change their businesses to cater to tourists rather than have businesses that support the local population. Because of this shift in the economy, the level of residential comfort for the citizens has decreased and has become a serious concern. The change might be beneficial because it brings market stability and income to Venice. Furthermore, the stores that don't get replaced remain abandoned or used for storage, creating a waste of space in an already tightly packed city, but also increasing the distance a citizen must travel to get their basic necessities. Compound an average increase of 8% in the population of citizens that are over the age of 64[2] in the last 20 years and it becomes pertinent to find alternative methods for getting the necessary products to the residential consumer.   The easiest way would be to determine the threshold where the level of comfort changes into one of discomfort, a signal that indeed that city has transformed into a museum or theme park neglecting the necessities of the inhabitants.

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[1] Costa, Gotti, Van Der Borg (314)

2 Commune Di Venezia, Schede Riepilogative per quartiere e zone.

However, this determination is not an easy feat. In Venice, there are increasing real estate pressures and with the change to the euro from the lira the increase in price competition is evident. In general, real estate in Venice is getting more expensive because hotels are more profitable than houses. The effect causes the owner of a property to be pressured to sell it off or replace it with an establishment that would bring more revenue to the economy. Also it raises the property cost, making it harder for a Venetian to buy property. In order to maintain or open a store successfully the amount of income has to be balanced with the amount of expenditures. To sustain this equilibrium, depending on the location and the size of the store, it might be necessary to raise prices on the items that you are selling. For example a store in San Marco, which has a higher tourist market, will sell goods at a higher price than the stores in Cannaregio. However, most people, both locals and tourists, try to shop where the prices are relatively low; unfortunately, these stores can be a considerable distance away.

A lot of urban planning goes into the accessibility of a retail sector. One may sometimes find planning not as necessary, but with an aging population where people move because of the danger of the tourist phenomena taking over the economy, it becomes increasingly important. As can be expected, the populace is not happy about their inability to get necessary goods nearby, but they manage to live on in spite of this decline. The people care; however, their complaints fall upon deaf ears. Our project will attempt to make the voice of the people heard by showing that there is a problem and that it needs to be dealt with. Similar projects have been conducted in countries such as China and Australia, where the subject was urban planning and how best to accommodate the comfort level of the consumer. There has also been extensive work done in Venice, which consisted of cataloging and documenting the current stores in Venice, based on type and location. The past projects have attempted to investigate the changes in the retail sector in Venice by classifying the degree by which an area is focused on catering to tourists, more than to residents.

Although these projects successfully categorized all the stores in Venice, they were still left incomplete in various aspects. For example, last year's IQP group failed to do a complete analysis of the residential comfort for all of Venice. Previous projects were only able to complete the residential bread comfort for all of Venice, and did not cover the various other necessities such as, meat, fish, and fruits/vegetables. Our project will aim to complete these and include pharmaceutical needs as a basic necessity also. We also aim to cover a cost analysis of needs in Venice, specifically how the cost of basic necessities has changed over the years. What also hasn't been done is determining whether any corollaries can be drawn between retail development and other social issues, such as population decrease.

To organize the data we created an index of consumer comfort; BNAI, which is the Basic Necessity Acquisition Index; that was used to analyze problematic retail districts. The main focus was to determine a threshold for retail decrease and consumer basic necessity comfort. In the course of this project attempted to identify areas that have passed this threshold and ones that are nearing it, by mapping out the evolution of the Venetian retail sector and evaluating it in terms of economics and demographics. We also researched possible remedies to aid areas that have surpassed the threshold and to potentially bring the retail comfort back to an acceptable level.

Chapter 2: Background

All over the world cities have fallen into a state of disarray called urban decay. This state is characterized by a failing economy, a dwindling population and high numbers of abandoned or run-down stores and buildings. One such city is Detroit, Michigan, "Over the last 50 years, the population of Detroit, Michigan dropped by over 50%, from a high of over 1,849,568 residents in the 1950 US Census to just 951,270 in 2000. Fueled by a complex mix of social, economic, and political dynamics, a half-century of flight from the inner city - of both people and capital - has produced devastating effects on the city's population, economic base, and infrastructure[1]."

But what causes this urban decay? Well, for one, the decrease in business, due to a lack of appeal of an area. Also, an area's primary stores might be scattered through out the city. These instances are called underutilized space, and are characterized the following symptoms:

First properties that are vacant in an in-fill area and were previously developed and have had the principal structure removed; properties that are non-conforming with respect to the base zone must be brought into conformance; or properties that are non-conforming with respect to the flood way fringe must be brought into conformance with applicable flood plain regulations.[2]

2.1 Plight of the Venetians

Venice is city of heritage, which is partially because of its participation in trade in the early days. Venice is history physically in statues, monuments and buildings. Even though San Marco gets the most attention from tourists other areas such as Dorsoduro, Cannaregio, and Castello are all prime areas for discovering the history of Venetians. These are all places where you can buy trinkets and other souvenirs.

As well as being the location historical treasures, Dorsoduro, Cannaregio, and Castello are home to many Venetians. Venice was once a very affordable and comfortable place to live. Now, due to the inflation and transformation of supply shops into souvenir shops, these areas

[1]Elizabeth Gerber, Sarah Jepson, and Alexa Shore, "Regional Solutions to Urban Revitalization: A Policy Forum on Alternative Locations for a Detroit Metro Park,"[Paper on-line]; available from http://www.fordschoool.umich.edu/academics/IPE2004/home.html#urbanrevitalization; Internet; accessed 25 April 2005.

[2] "Urban Revitalization Commercial Criteria Matrix," 11 August 1999 [proposal on-line]; available from http://www.city.ames.ia.us/housingweb/P&Z%20Applications/UrbanRevit/Urban_Revit_Comm_Matrix.htm; Internet; accessed 26 April 2002.

are growing arduous for the residents and storeowners. Since World War II Venice has changed immensely. The population is gradually leaving this historic island. In the past 50 years the population has dropped from 165,000 to 63,000. Venice's inhabitants leaving the island are affecting the number and type of stores left on there. Too few customers mean that stores such as bakeries, butchers, and shoe-menders close. Without such services even more people will leave. Between 1990 and 2000 the number of stores has decreased by 100, from 675 to 575; 75 of them that have closed could fall under the title of providing basic needs items. In the same period the number of restaurants has increased by 110 and the number of bars has shot up by 77[1]. Looking at the fact that there is a shortage in affordable housing and well paying jobs, the problems of this city becomes a little clearer.

For most educated middle class citizens the jobs in Venice are few and far between; the only option for them is to work at the university. The banks, insurance companies, and some doctor's offices have moved to the mainland[2] because the cost of doing business on the island is too high. They can't afford the rent and neither can the citizens nowadays. The leaving of businesses and citizens has one similar trait; real estate costs. There is an increasing cost in real estate for both the resident and the storeowner.

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[1] Pasqualetto, Claudio.

[2] Weideger, Paula

2.2 Effects of Tourism

Out of towners coming in and buying homes no longer occupied

Tourists flocking to the city by the millions each year

Cost of living rises and real estate is hard to obtain

Venetians leaving the Island

Stores in Venice becoming more pro-tourist for survival

Venetians left with a smaller shopping base to obtain their basic needs

"Mom and Pop" stores closing down or changing interests

Figure 2: The Tourist Cycle

Even though more and more of the population is leaving Venice there is still an issue with finding a home in Venice. Outsiders are part of the problem. Foreigners such as Milanese, Londoners and New Yorkers have turned one in ten apartments into second homes[1], and since they are willing to pay top dollar for these second homes the cost of living for the locals also goes up. An apartment bought in the 1960s would now be able to sell for around 300,000 pounds (441,743.97 Euro, 571,440 USD), which is the equivalent of 32 years salary for a municipal worker in Italy. Radicals have suggested incentive programs for housing, which have included giving ownership to every young couple that stay in an apartment for ten years and have a child. Instead of doing something so drastic the mayor has implemented his own program. He offered grants to first-time buyers. Most couples that took up the offer still couldn't afford a house because the rent was too high. So they decline the grants and used their own money to buy in Mestre on the mainland where the cost of living is 30 per cent less[2]. So even though he is trying to promote residing on the islands of Venice, people are still moving away.

The city is in a never-ending loop that needs to be broken. The continuous change in shops, availability of homes, and the amount of people in Venice is causing the downward spiral of the city and will soon lead to Venice becoming a museum or theme park.

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[1] Ibid

[2] Ibid

2.3 Adoption of the Euro

Venetians also have had to deal with the increased cost. It is approximated that from the change from the lira to euro in January 2002 the prices of certain items doubled. Naturally, since the conversion it is more common to shop around for the lowest price. Store owners in Venice that are having trouble bringing in enough income to support the store might need to raise their prices, which in turn may drive the population to go to other stores farther away, for lower prices.

2.4 Re-establishing the Economy

"In 1966 it was images of a submerged city that horrified the world; this time it is not death by drowning that is feared but death by desertion."(Weideger, Paula) Programs have been put in place to attempt to control the flow of water coming into Venice, but nothing is being done to stop the citizens of Venice from flowing out. In the city, there are comfortable places to live in, but there are other areas that are in need of development to be adapted for necessities of its inhabitants. Also, Venice's lack of youth is decreasing the amount of entrepreneurial drive in the city. There are areas that can be developed but they need someone willing to put in the time and the effort, which someone in there 30s would be more willing to do then some one in the 60s. With the youth flocking to the mainland it is difficult to find those willing to open a new business. So other things are being done to adapt the city to these changes, Venice has begun a promotional campaign, the "Venice district for innovation", which supports the investors of basic necessities shops and characterizes areas that hypothetically could be akin for this purpose.[1] Hopefully this attempt at an incentive program will open more stores and decrease the amount of emigrating citizens.

"Businesses that do not profit from the tourist trade are leaving. A visitor can spend an hour searching for a supermarket"[2] commented Alan Feuer in his article about tourists in Venice. This issue has become of major concern in the past decades because the availability of basic necessities has decreased in Venice due to these stores closing. To define and measure this availability presents its challenges, as Karen Witten says in her study: *The Quality of Urban Environments: Mapping Variation in Access to Community Resources*. In this study, she researches the

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[1] Ibid.

[2] Alan Feuer, "Venice faces new intruders: the day trippers," *New York Times*, 12 Jun. 2004, page 3.

importance of the accessibility of different services in New Zealand. By looking at various aspects and ranking them by their importance to the lives of the citizen, the researches created an index called CRAI (Community resources Accessibility Index) in order to measure this quality of environment. Based on the availability of transportation, the researchers used GIS mapping to find how close certain services should be to the consumer. Similarly, we plan to use this method in order to determine how badly a residential area is affected by lack of public services. The implementation is similar as to what was implemented here, though we will be comparing the results based on walking distances and times, and include boat travel where applicable. Amenities are rated high on the list of importance and the lack of them, as we expect to see in Venice, is therefore an important social problem that needs to be assessed.[1]

2.5 Urban Planning

As we stated before urban planning becomes a key issue when dealing with these kinds of problems like the one we see in Venice today. For this reason knowing the willingness a consumer has to travel a certain distance is equally important. According to Christopher Bates, an economist under the direction of the Australian Planning congress, there is a formula that dictates the willingness of a consumer to travel to a shopping centre. The most basic of these formulas is as follows: $P=S/D^2$. Where P is the willingness of the consumer to travel to an area, S is the size of the population within the area of the centre, and D is the distance that the consumer must travel to the shopping center.[2]

Mr. Bates goes on to say that this formula is too general to be applied to modern day retail facilities, and attempts to improve it with the following adapted formula: $P=F*k/t^2$. Where P is still the willingness of the consumer to travel to the centre, F is the floor space that the retail centre has to offer, k is the attractiveness of the center, in terms of its appeal to a shopper, and t is the time it takes for a consumer to travel to said center. To clarify the above, the attractiveness is not the aesthetic attractiveness of a particular shopping centre but the physical attractiveness that draws a consumer to it, in way of better shops and such. Given that our study is on the acquisition of basic necessities we will consider that k is going to be rather high.

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[1] Karen Witten, Daniel Exeter and Adrian Field, "The Quality of Urban Environments: Mapping Variation in Access to Community Resources," *Urban Studies*, Vol 40, No. 1, 161-177, 2003.

[2] Bates, Chris: Retail Forecasting p 3

The latter of the two formulas can be used to determine, for one, why Venetians go to the mainland for their basic goods. While the local shops around them might have the basic necessities that they need, it may not have the selection that the Venetians may prefer. Although one might think this consideration to be trivial, one must remember that as society has advanced we demand more than the basics. A store may provide the necessities a Venetian needs, like the bare necessities, but bareness decreases their consumer markets, because not many consumers will want the bare minimum that they need to survive; they want more. If the stores on the mainland offer a broader spectrum of products, because they have a larger area to store and present them, then a consumer will naturally be inclined to choose that centre over the smaller shop because of the selection. Also, the increased reliability of travel to the mainland can be added to these reasons for mainland travel. With the introduction of motorboats to the Venetian lagoon, getting around has become easier. Also, the addition of a bridge to the main land, with free bus service there, causes the mainland supermarket to look far more appealing than a small store in the city. This attractiveness however does not rule out the smaller stores. A consumer wouldn't travel all the way to the mainland just to pick up a loaf of bread or a couple hundred of grams of meat, a consumer would use the local store for that. This is what gives more of the market share to the smaller stores, because they are more of a convenience.

But if a supermarket were to be built in the actual city of Venice, what would the effect on the smaller stores be? The Bates study asked a similar question, involving the Shire of Nillumbik in Australia. "In the case of Nillumbik, the Council wished to estimate the effect of a possible new shopping centre nearby its major supermarket in Diamond Creek. In this case it was found that although supermarkets in Diamond Creek would recover over a ten year period, the associated specialty shops would have increased difficulty maintaining there present performance."[1] The outcome of this study points to a possible source of relief for the Venetians. The concept of a supermarket would eliminate empty spaces in Venice, by utilizing them for its containment area, this taking real-estate away from tourist shops. Also, it would allow for citizens to obtain more goods at a closer radius, with a variety to choose from, because the facility would have the space available to them to stock enough products for there to be diversity.

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[1] Bates, Chris: Retail Forecasting p 8

Chapter 3: Methodology

The scope of this project encompasses only the "basic necessity stores" of Venice. Throughout the years the definition of what a basic necessity is has fluctuated with the evolution of technology. One example is the use of wood and coal for cooking, which is no longer needed because of electric ovens. We have chosen not to acknowledge these previous basic necessities because it would involve going further back into Venice's history and deciding whether or not the availability of those necessities were dwindling with the change in technology.

A store will be from here on defined as an establishment that sells items to the public. A basic necessity store will be classified as any store that sells basic food necessities which are the elements needed to create a meal in a residence. Examples of basic necessity stores are bakeries supermarkets or butcheries. Following the principles of our definition, we are eliminating restaurants and bars because they provide the meal, not the basic elements needed to create one.

The focus of our project is to determine at what specific point an area is no longer able to provide the basic food necessities that its citizens need at a reasonable proximity. So, we've established the goal of this project to be to determine at what point public intervention is appropriate, in order to prevent further decline in the availability of basic food necessities. Our objectives are as follows:

- To reconstruct the evolution of the retail sector.
- To correlate said evolution with demographics and economic changes.
- To assess past dynamics and input them into an index, B.N.A.I. (Basic Necessity Acquisition Index), and use said index to predict future trends.
- To determine means of public intervention where forecasted availability of basic food necessities will negatively affect citizens.

In order to accomplish these objectives, our group began by reconstructing the pasts of the retail stores in Venice, Italy, from 1945 to the present. This data will be sectioned off in ten-year increments, and the availability of these food necessities at each of these increments will be assessed.

The retail store data for all areas of present day Venice has been collected, thanks to the efforts of an IQP group from the summer of 2004, and they also began obtaining the evolutionary data. Once our somewhat limited history was completed we created a database so the information can be accessed and represented visually, and the decline of stores and population can be better comprehended.

The information, from the database, was used to observe the changes of the food store's focuses and establish any correlations with these changes based on the demographics of the time. Using the data we established a threshold of availability/residential comfort, in which comfort is a measure of the accessibility that a citizen has to the basic food necessities. With this threshold we could gauge other sectors of the city, and observe the retail decline there. For an area to be of reasonable comfort level, a certain radius must have a majority of the basic necessity stores present, though ideally all should be present and within an acceptable distance to a citizen. If the comfort level is low we will attempt to find sources to alleviation of this problem, perhaps in the form of distributed supermarkets or home delivery systems.

3.1 Limits of Study

3.1.1 Temporal

The temporal boundary of this project centers the evolution that we are obtaining. We discovered evolution data that spans 1945 till the present. Also we have to consider the consumer-shopping day, or the hours of operation of the stores. In Italy the shopping day is roughly from 9am to 1pm, then 3pm to 7pm. The concept behind this method is that we will be able to obtain both the store histories from the storeowners, but also we will be able to get an idea of the number of patrons/customers to the stores and the items sold currently in the stores. If necessary we will also attempt to obtain data before the shops open in the morning, in order to avoid interfering in the business of the shops themselves.

3.1.2 Spatial

Venice is a rather large city, and collecting the data on foot consumed a lot of time, so we focused on only three sectors or sestieri, specifically Castello, Cannaregio, and Dorsoduro, (featured on the map on the right) out of the six that make up the city,. These sestieri were

Figure 3: Areas of focus: Cannaregio (yellow), Castello (purple), and Dorsoduro (red).

chosen for either their already existing or potential of turning into an area of economic decay of Venice today.

3.2 Data Collection
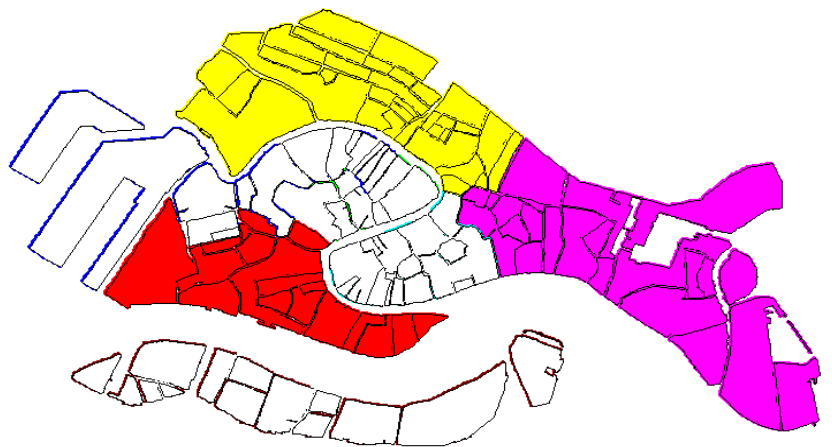
As our first step, the confirmation of the data last year's group collected about the present stores needed to be completed. We chose Dorsoduro as our starting sestieri because it has fewer stores in it. In order to confirm the data, last year's GIS map and database were used to create a checklist of stores; we then began to follow the streets and noted any retail shops that we had found. The key to an efficient and methodical approach is to systematically take down the stores street by street, and a map is very helpful in this regard.

We decided that even though we were only concerned with basic food necessity stores, we would use a list of all the stores in the area at the current time, to determine if any of them had been basic necessity stores in the past. It would be completed more efficiently if the area was marked in the database and in a GIS layer. Any changes in the retail section were noted in the database, including closures, changes in the shops interests, the opening of any new stores, as well as the times these stores have been existent for.

Our database is very similar to the one already created and is described in further detail below. To categorize the stores used our definition of what a basic necessity store is and judged each store accordingly. In the instance where we ran into a store that could be classified as both a basic necessity and something else, if the majority of the store was a basic necessity then it was labeled as such. For example there are many bakeries that are also bars. If the bakery is the prevailing section then it will be labeled as such or vice versa.

In order to obtain the evolution data, which includes all the transformations, or changes in to the stores of Venice, our group went around from store to store, with a translator/liaison, talking to citizens of that particular area and questioned them on what type of stores have been in their neighborhood over the past three decades. Although this method did provide a perfect account of what the area might have looked like, it provided us with an idea of the history to we can construct a simulation to what the comfort level could have been.

When possible, information from previous decades (before 1970) was included in our database. To catalog the evolution data we used a system of labeling from and to the store in existence as we had used for the present stores data. Each sestiere was given its own database per decade, so as to be easier analyzed.

3.2.1 B.N.A.I.

The data obtained from our fieldwork was placed in a database that our team created specifically for this project. This database was the tool our group used to establish the Basic

Necessities Acquisition Index, B.N.A.I, which helped us determine a crucial threshold of the availability of basic food necessities and compare the different sestiere of the city. B.N.A.I. was derived from the database and amalgamated with the following information for each store. A more detailed view of the database can be found in the appendix D.

- Name (present)
- Address
- Photographs
- Evolutionary history of the store
- Type (butcher, bakery, etc.)
- The radius of citizens it caters to
- Population and density of a given radius
- permitting)

B.N.A.I. will not only helped us complete the goals of our project but it also helped citizens with locating stores that contain basic necessities.

3.3 Compiling and assessing the evolution of stores

Once we've cataloged all the stores we will compile and assess all of this data in order to determine how the evolution has affected citizens. Using MapInfo, the location and type of store can be seen for up to thirty years in the past. These will be compared with present day data; based on the location and number of basic necessity stores in a particular sestieri; we were able to find the comfort level of the Venetian residents. The maps below are examples gathered from last year's IQP group of what we expect to see for each basic necessity.

Figure 4: Bread stores in Castello in 1991.

Figure 6: Bread Stores in Castello in 1981.

Figure 5: Bread stores in Castello in 1971.

3.4 Correlating evolution of stores with demographic changes

In order to assess the state of residential comfort in each area we need to take into account any demographic changes. In order to do this correlation, we will need to use census data compiled by previous year's projects. This data goes back as far as 1971, which is as far back as the census data available to us goes (in actuality the data goes back to 1951 but, 1971 is the first year in which there are census tracts, so while we have the data for 1951 and 1961, it is only by island that we can view the population.). This data allowed us to see the various types of information such as population and average age in each area. These two data sets are our main concern because of their effect on retail comfort. Using population data, we can then hypothesize how the change in retail comfort has affected citizens.

Using graphs, we were able to determine if stores closed down or whether they changed the type of goods they sold due to a population decrease. With this being said, a decrease in the demand because of people moving out may have caused stores to move out, but the remaining population is left without basic necessity stores.

3.4.2 Correlation of Demographics

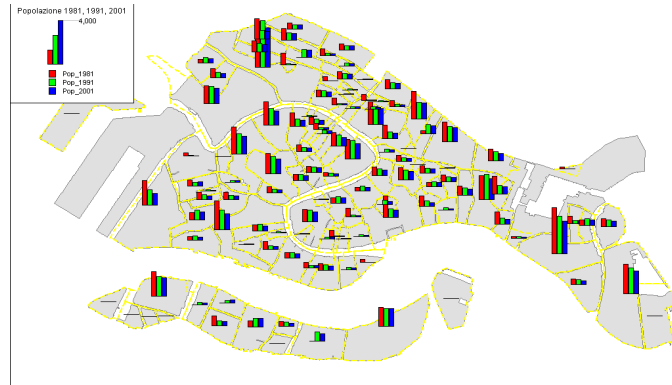These two sets of data show a direct correlation with each other, which is illustrated by the graphs below:

Figure 7: Population changes in Venice during 1981, 1991, and 2001.
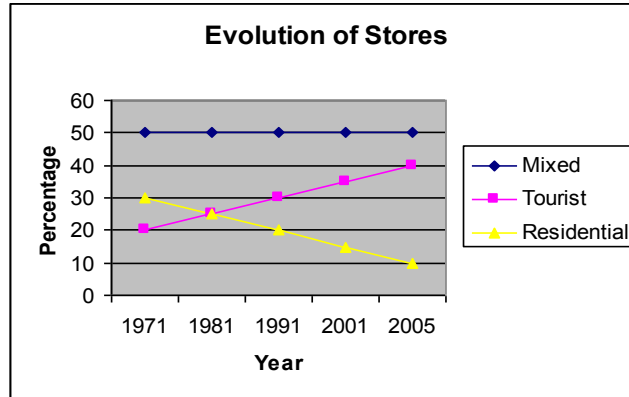
Evolution of Stores

Figure 8: Evolution of store types from 1971 to 2005.

From these two figures we observed that population and evolution of the retail sector are directly intertwined with each other as the availability of basic necessities decreases because less shops are selling these products and changing for the most part to cater tourists, the prices of goods at these stores has gone up and hence the population has gone down, in part, because they cannot afford the new cost. In the next section we will try to measure these availability trends.

3.6 Predicting Future Trends

What we hope to take away from this project is the ability to predict future problem areas. To accomplish this task we will utilize the B.N.A.I. to establish a threshold level that indicates when a certain area changes over from meeting the needs of the people, to meeting the needs of the economy's focus, which in Venice's case is tourism.

With the data that we collect and input into B.N.A.I. we will look for certain telltale signs that the stores are not catering to the residents needs. These signs might come in the form of data on:

- The number of basic necessity stores in the area
- The density of these stores
- The distance from theses houses to the stores
- The density of the population
- The number of people living in the area

Once we have the data we began to graph these variables against each other and looked for trends, such as a drop in population when the density of stores is low, or a drop in store numbers when the distance from the consumer increases. The basic idea is that we were

comparing what a consumer needs to what is available to them and then use those needs to determine the current comfort level.

After determining the factors that may be causing the decrease in the comfort level we compared the levels of areas that have already gone downhill, and look at their past to see when the breakdown occurred. When we obtained that data, we compared it with current areas and see if they correspond. A correspondence signifies a decline of the economy and indicates that the problem is there and is growing larger.

Once we've seen the trends in our data, we manipulated this data in order to show the residential comfort level at the time.

There has been a significant decline in the po decrease in population is directly related to the increa basic necessities. In order to see this trend more clea ty of basic necessity stores over the years as the figures
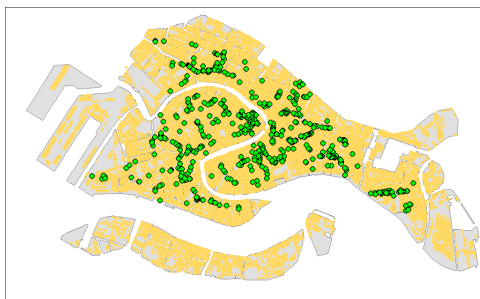
Figure 9: Basic Necessity Stores in 1971.

Figure 10: Basic Necessity Stores in 2001

These maps show a great decrease in the number of basic necessity stores in Venice from 1971. This will use store density and accessibility of stores, meaning the distance traveled to get there and the population density in order to take into account the decreased demand due to population decrease. Additionally, one more factor will be included in this index, which is age distribution.

Ultimately BNAI allowed us to show what areas of Venice are most greatly affected by this change over the years. For example last year's project made a comfort index that was based on the availability of bread, as can be seen in the figure following.

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Figure 16: Population 2001.
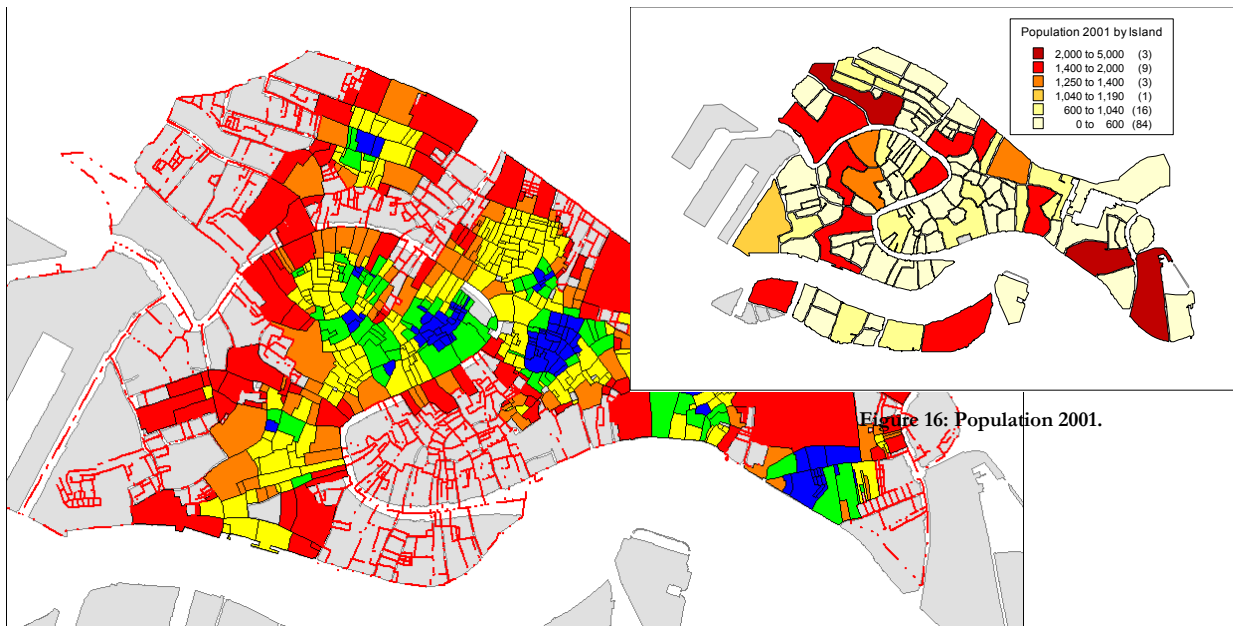
Figure 11: Comfort based on the availability of bread

Chapter 4: Results

4.1 Demographic Results

From the census databases we were able to direct the information into a graphical representation. The databases were separated by decades starting with 1971 and ending at 2001. The population was originally recorded by the census tracks in which they were collected. However we manipulated this information in order to represent the population by island presented in the following maps (seen in Figures 1-6). The graphical image was colored in a thematic map representing the various ranges of populations throughout Venice. On the maps below you can see the trends of the declining population from 1951 to 2001; the darkness in red of an island denotes a higher population in that particular area where the light colors denote a lower population.
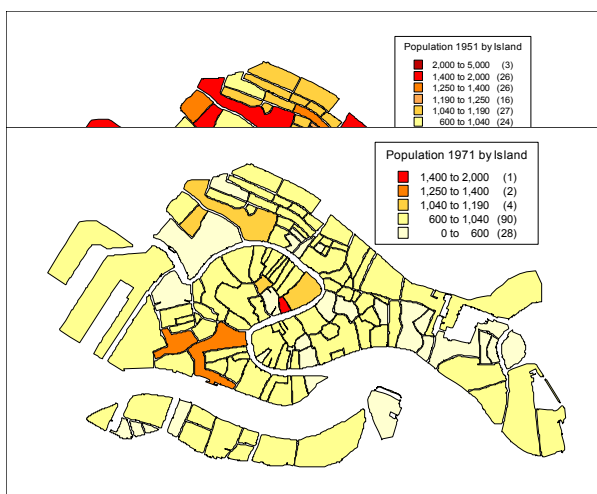
Figure 14: Population 1971.
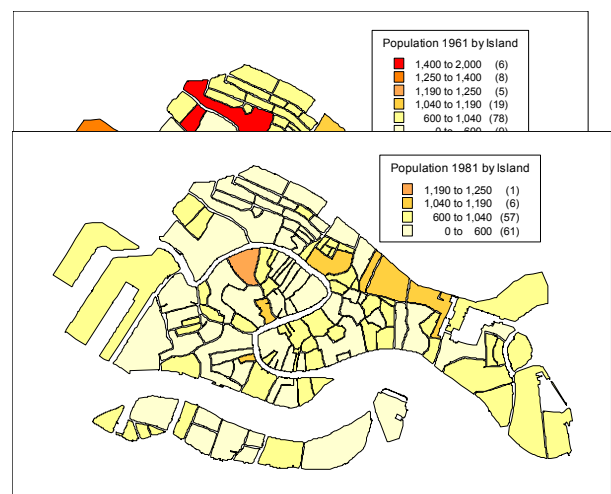
Figure 15: Population 1981.
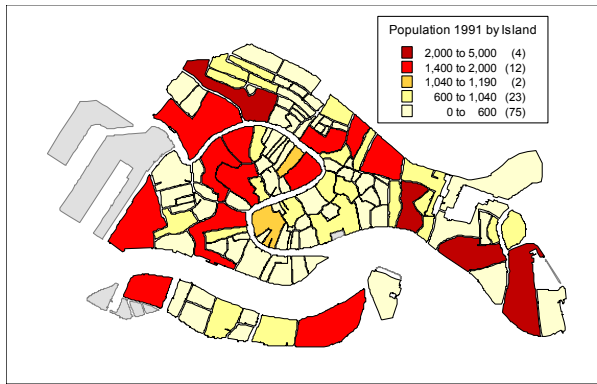
Figure 17: Population 1991.

There seems to be a jump in population for certain islands between 1981 and 1991. However, it is also acknowledged that some islands that were populated in 1981 are now not populated. There has been a total decrease of the population from 160,000 people to only 63,000, which can be seen in the following table of the total population of Venice over the past 6 decades.

Years		Totals
1951	9	15545
1961	1	11933
1971		89695
1981		76204
1991		74040
2001		63846

A significant decrease can also be seen from 1951 to 1981 in these maps. Using our legend and looking at the colors of the islands it can be seen that in this 30 year time span the number of islands with a population of 1,040 has gone from 98 to a mere 7(figures 7 and 8).
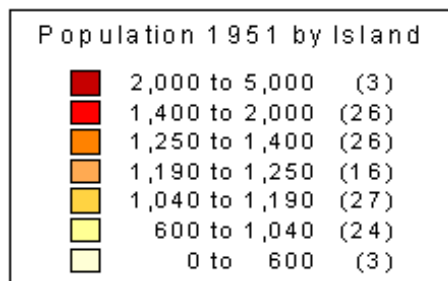
Figure 18: The legend of population in 1951 by island.
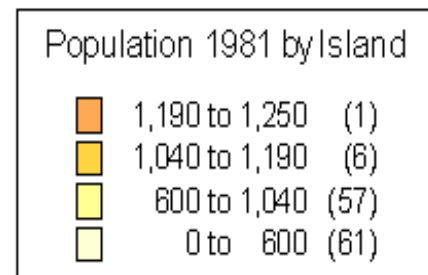
Figure 19: The legend of the population in 1981 by island.

Unfortunately we were unable to get evolution data of all the store dating back to 1951 however so the time period we will be focusing on will be from 1970 to the present. The population data over this time period is figuratively represented in the following graph.
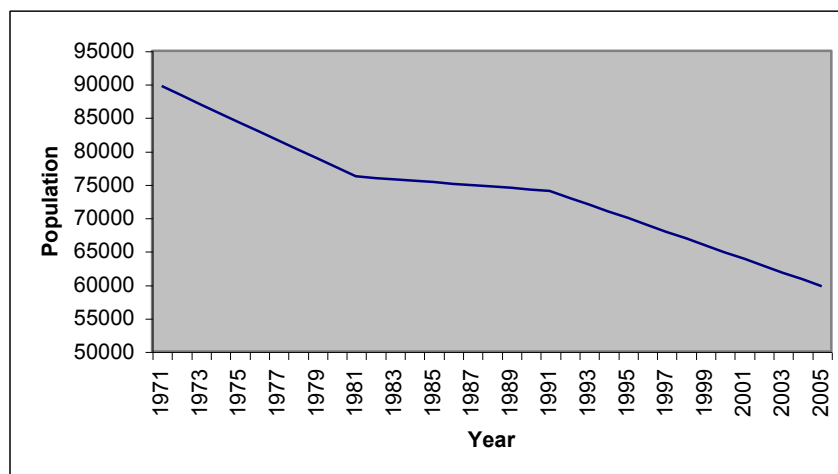
Figure 20: Population of Venice from 1970 to 2005.

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4.2 Dorsoduro

4.2.1 Current Stores:

In terms of the number of stores in Dorsoduro there is no shortage. There are a total of 526 stores. We've split the type of stores into certain categories which can be seen in appendix C2. From the pie chart below it can be observed that currently in Dorsoduro the highest percentage is closed stores at 23.7 percent. There are actually 142 total closed stores; many of them very just blocks apart or sometimes right next to each other. Service is in second at 23 percent and food service rounds off the top three with 19.5 percent.
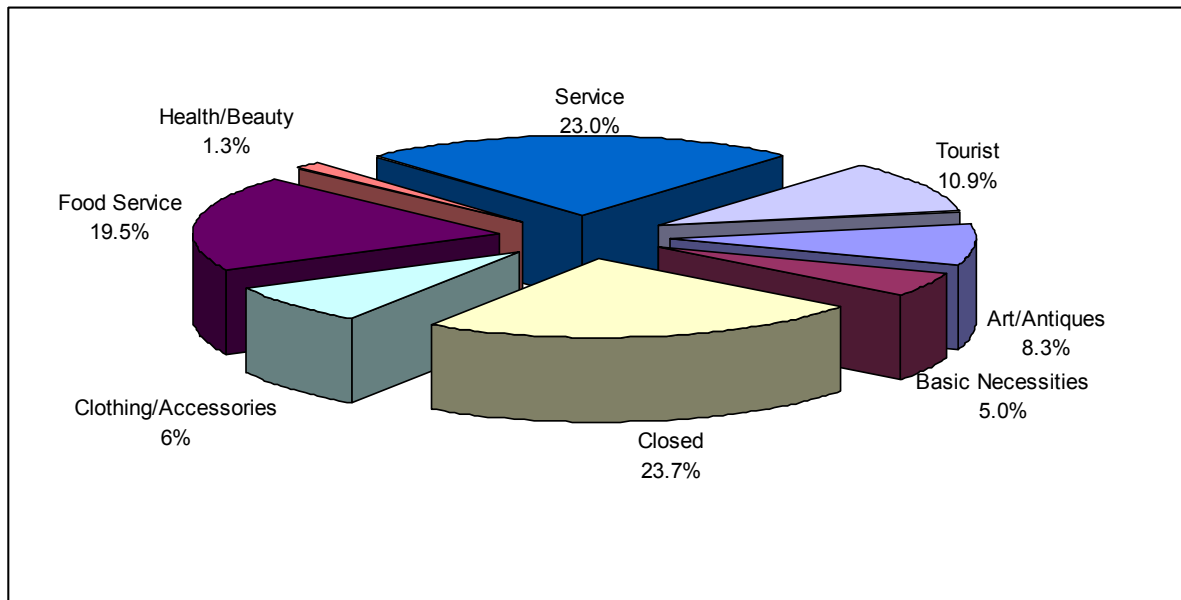
Figure 21: Dorsoduro percentage of the categories of store in 2005.

Presently there are few basic necessity stores which seem to be spread out in more commercial areas and not in residential areas. As seen in the figure below the blue circles represent all the stores in Dorsoduro while the yellow stars represent the basic necessity stores in the sector.
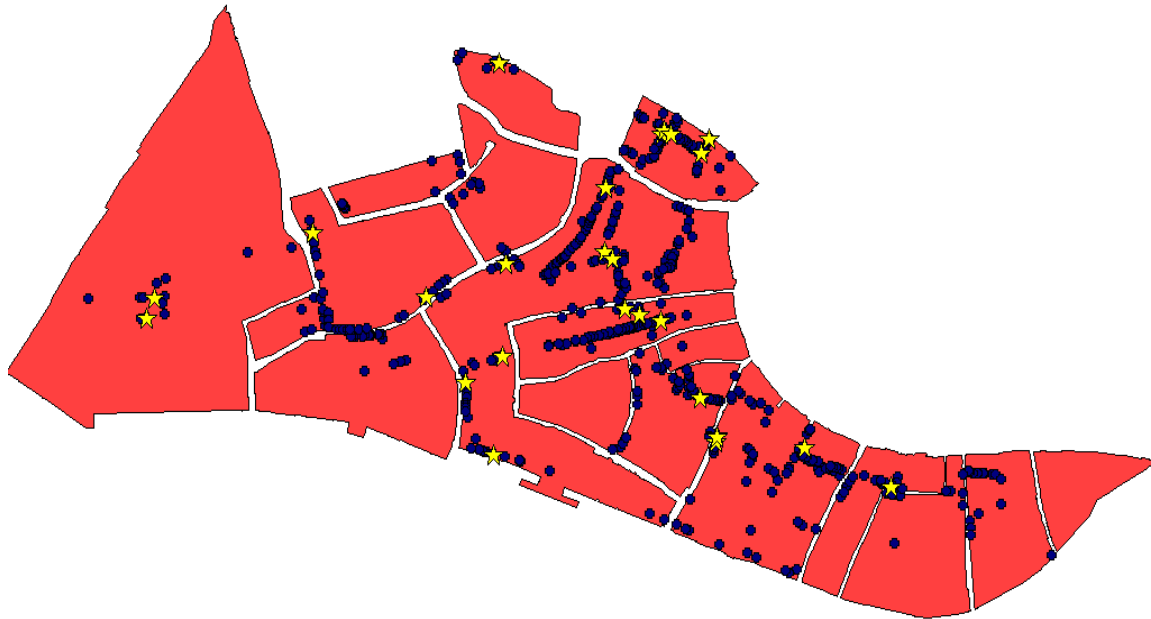
Figure 22: All Stores in Dorsoduro

Just by obtaining this map ratio of basic necessity stores to all other types of stores can be seen as low at only 5 percent. There are 526 current stores and only 26 of those are basic necessity stores. They are organized as follows:

Type of Basic Necessity Store	Number
Alimentari (pink)	6
Bakery (light blue)	3
Bread (black)	4
Butcher (light green)	4
Deli (dark blue)	2
Fruit Vegetables (orange)	3
Pharmacy (maroon)	2
Supermarket (dark green)	2

This chart is further exemplified by the map following locating them in their respective location.
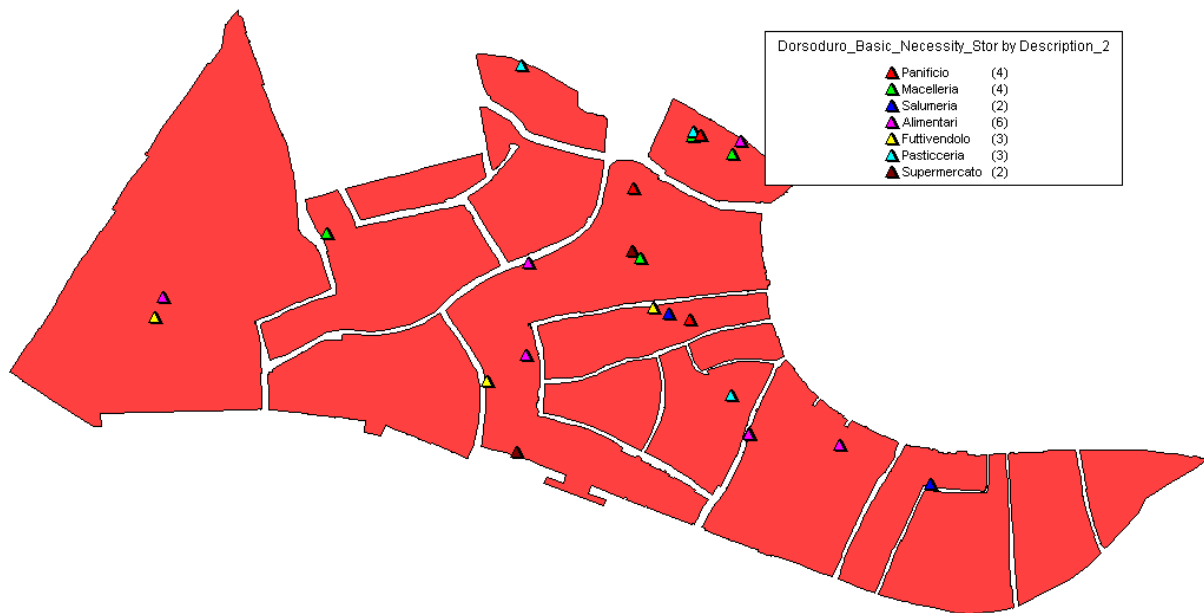
Figure 23: Basic necessity stores in Dorsoduro.

4.2.2 Evolution:

The overall effect is that there is a great amount of stores that have closed in the past 35 years. We've collected the history for approximately 200 stores in Dorsoduro. Focusing on the tip of Dorsoduro, from the Academia Bridge south, and in the Campo di Santa Margherita area. The relationship of the categories of all the stores is shown below.
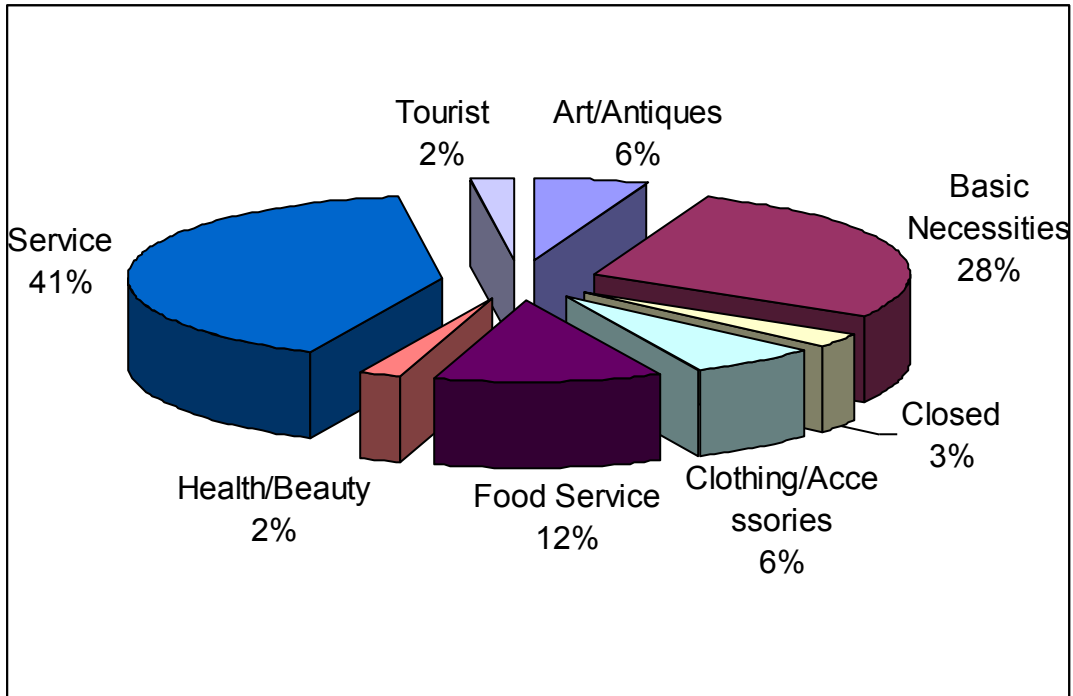
Figure 24: Dorsoduro percentage of the categories of store in 1970.

If the pie chart above were to represent the total distribution all the evolution of stores throughout all of Dorsoduro, it can be noticed that there has been a great change in the types of stores from 1970 to 2005.

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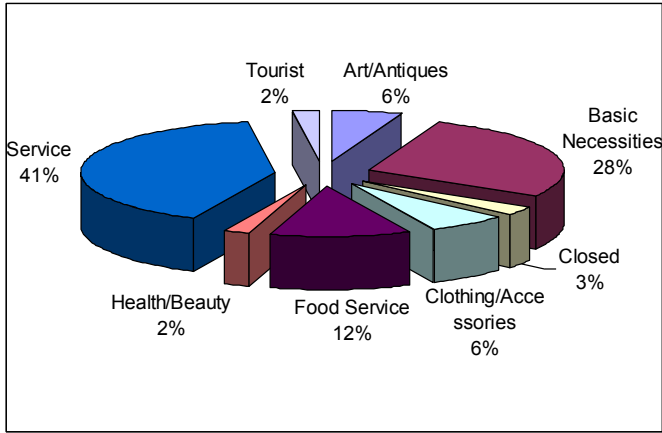
Figure 25: Dorsoduro percentage of the categories of store in 1970.
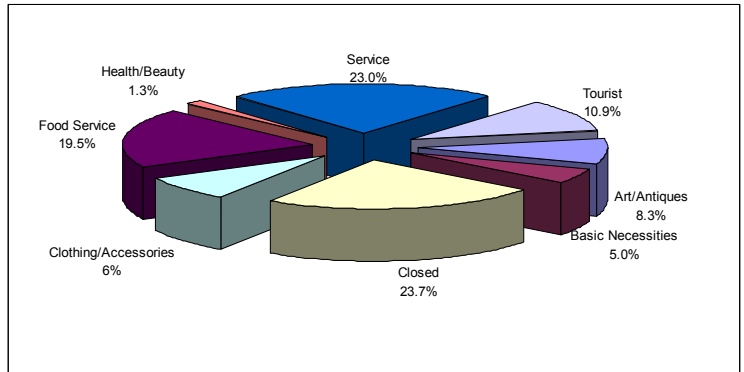
Figure 26: Dorsoduro percentage of the categories of store in 2005.

From the change we can see a direct correlation with the change of the economy. The percentage of closed stores has greatly increased. Also the percentage of antiques, tourist and food service stores has increased. Surprisingly the level of clothing stores has remained constant. Meanwhile the percentage of service and health stores, the items the aging Venetian population need the most, have decreased. Stores such as Wood/ Coal Stores, Electricity/ Water, Ironing, and Deposits for certain goods have been completely wiped out because they are no longer necessary in this type of city.

Furthermore, focusing on basic necessity stores, it is observed that the percentage of these stores has dropped from 28 percent in 1970 to 5 percent to date. In the graph below there is downward slope in the number of basic necessity stores through out the years.

Figure 28: Area of study of Dorsoduro store evolution.
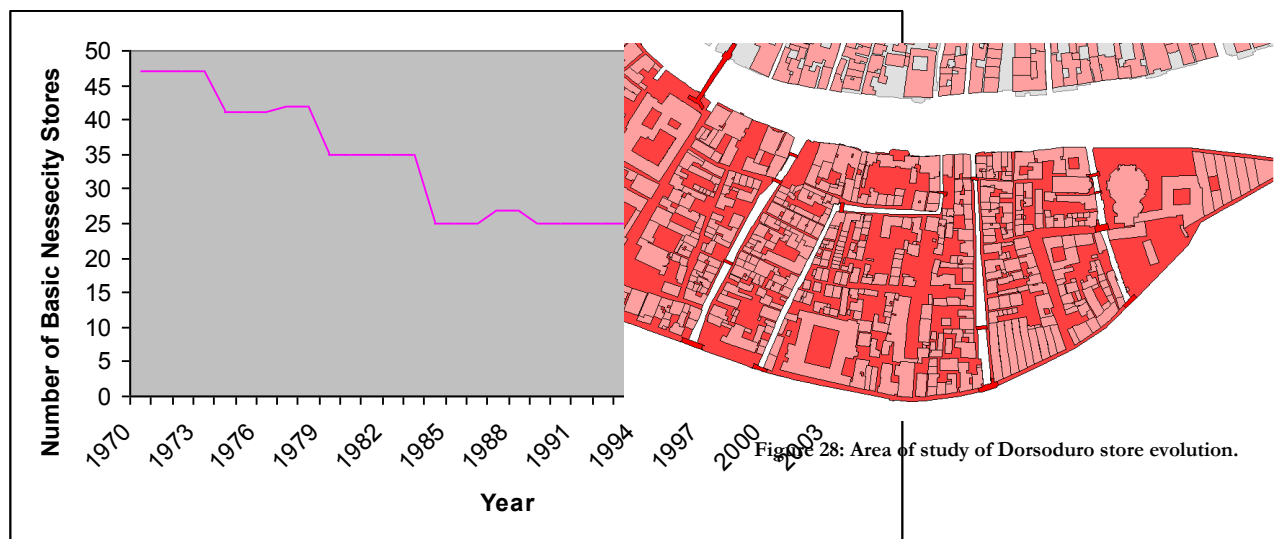
Figure 27: Number of basic necessity stores from 1970 to the present in Dorsoduro.

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There has been a declining progression and this model is exemplified and exaggerated especially when looking on the tip of Dorsoduro.

Before 1971	32 stores
1971	21 stores
1981	15 store
2001	7 stores
1991	9 stores
2001	7 stores
2005	1 store

(That last store is a deli)

4.3 Cannaregio

4.3.1 Current stores:

Figure 29: Cannaregio Stores.

Cannaregio, featured in the picture above, is one of the busiest sesitiere, primarily because it is home to the train station at Ferrovia which is one of the three ways off the island. It contains approximately twice the number of stores of Dorsoduro. There are a total of 1074 stores. The most prominent categories in existence today are service stores which is the highest at 26.2 percent, followed by food service at 19.5 percent and closed stores next with 16.9 percent.
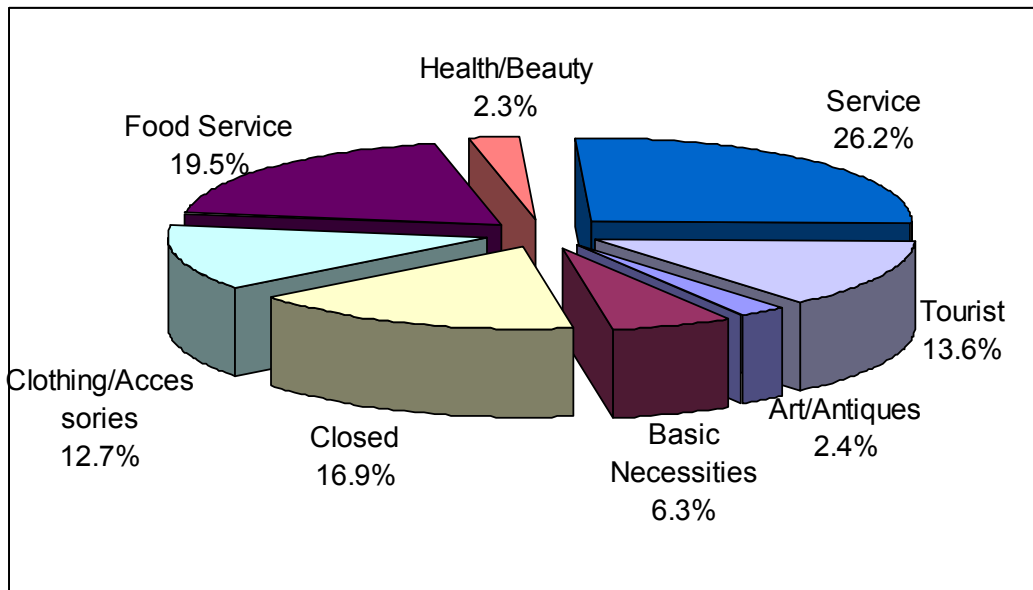
Figure 30: Cannaregio percentage of the categories of store in 2005.

In Cannaregio out of the 1074 stores there are only 67 basic necessity stores 67 stores making up only 6.3 percent from the total distribution. However, Cannaregio caters to special needs. For example there is a kosher bread store and typically more butcher, fruit stands, deli, and bread stores and these stores are spread all through the sector.

4.3.2 Evolution:

We've collected the evolution data for approximately 900 stores in Cannaregio. The dissemination the stores in 1970 are seen the following picture:
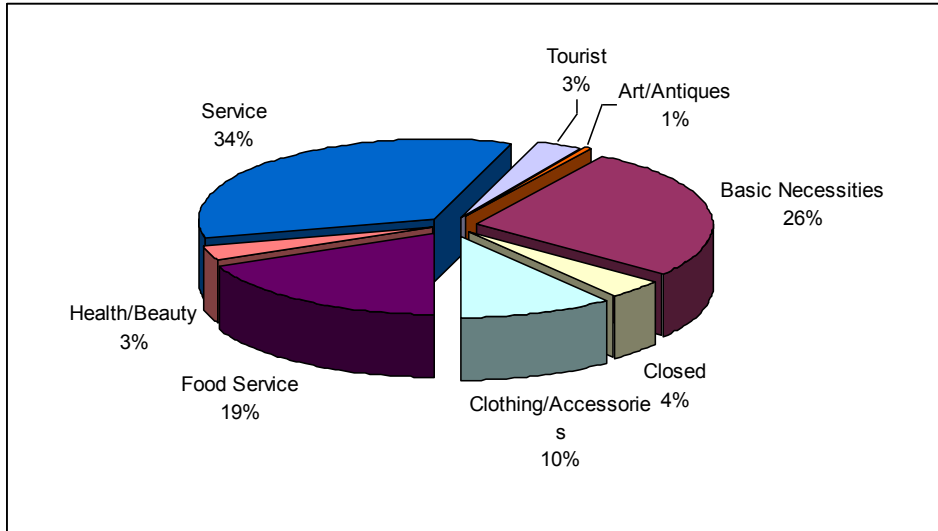
Figure 31: Cannaregio percentage of the categories of store in 1970.

Noticeably, the highest percentages are service stores at 34 percent followed by basic necessities store at 26 percent and food service stores at 19 percent. If we correlate the past percentages with the current percentages we can see the top three priorities have changed immensely.
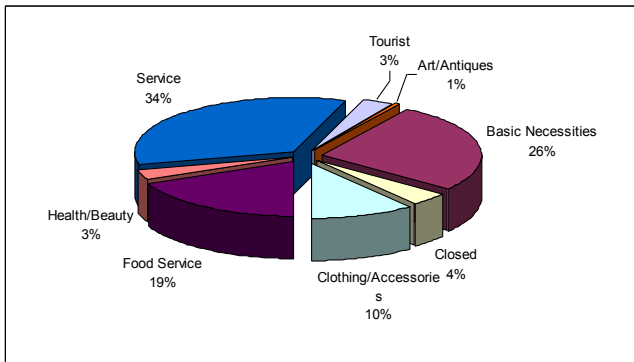
Figure 32: Cannaregio percentage of the categories of store in 1970.
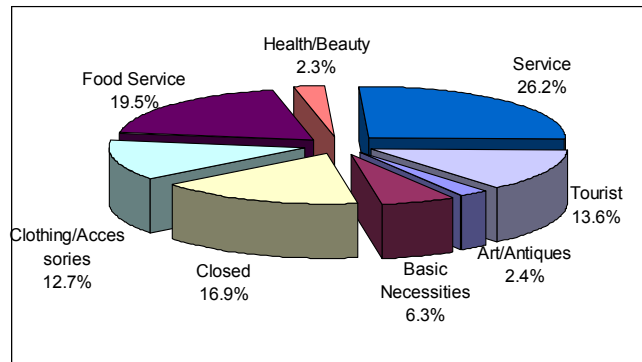
Figure 33: Cannaregio percentage of the categories of store in 2005.

The difference in the percentage of closed stores over the years is most shocking, jumping from only 4 percent to 16.9 percent in just 35 years. Also the number of tourist stores has increased almost four times the original percentage. However the number of health and service stores has decreased.

Unfortunately, today basic necessity stores are no longer in the top three categories. Theses stores in Cannaregio show the same progression as the basic necessity stores in Dorsoduro. From 1970 till 2005 there has be a downward trend which can be seen in the graph below.
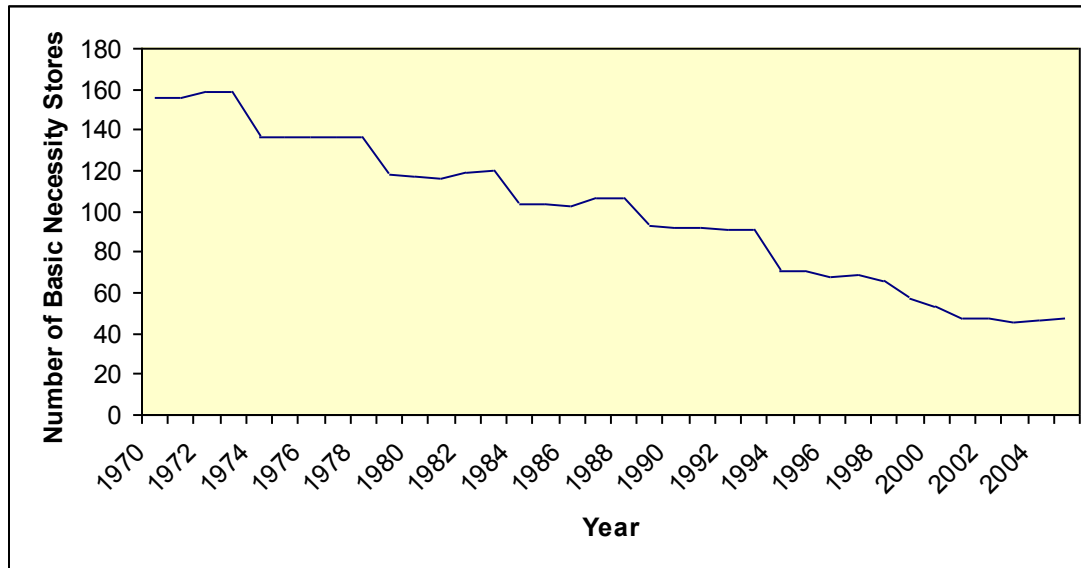
Figure 34: Number of basic necessity stores by year in Cannaregio.

4.4 Comparison

When looking at the two sestieri combined it is obvious that they follow the same trends. There is an increase in the number of stores that are catering towards tourist and a decrease in the stores that cater the residents namely health, basic necessity and service stores. In 1970, the categories that occupied the top of the list were basic necessity and food service stores for both sestieri. Today, however, for both sectors the top current top three percentages are closed, service, and food service stores in Dorsoduro and service, food service, and closed stores in Cannaregio respectively. This information shows the orientation of each sestiere in light of the economy changes in Venice. We were unable to get the evolution data for Castello however the current results are featured in appendix F.

When comparing the number of basic necessity graph from both Dorsoduro and Cannaregio it is easy to see the downward trends however there is a greater slope for the stores in Cannaregio.
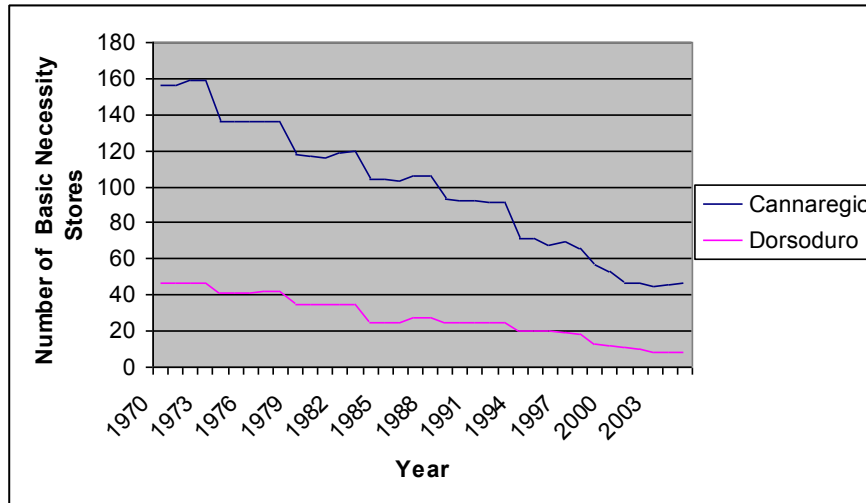
Figure 35: Number of basic necessity stores by year in Cannaregio and Dorsoduro.

Even with the decrease of basic necessity stores there is one store that seems to increasing in numbers. This particular store is the supermarket. In 1970 there was only one supermarket. By going around the sestieri we have currently found 3 supermarkets in Cannaregio and 2 in Dorsoduro. Even with the additions of supermarkets there has still been decline to the availability of basic necessities.

Chapter 5: Analysis

An analysis of present day Dorsoduro

The sestiere of Dorsoduro presently has an estimated population of about 6700 people, spread across a space of 843,000 square meters, and about an average level of basic necessity comfort. Below is a map of the current state of comfort in Dorsoduro.
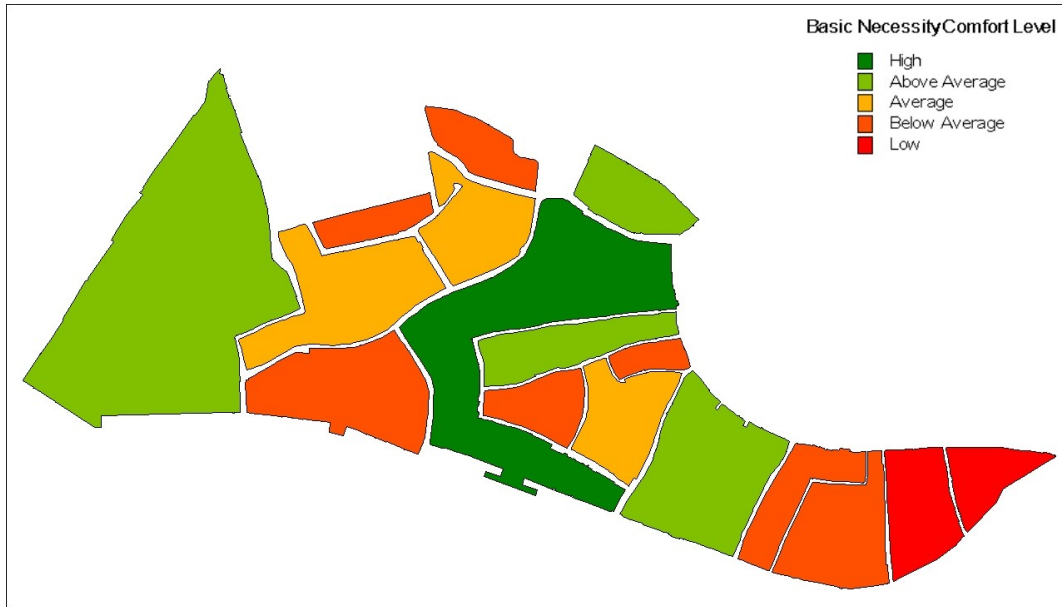
Figure 36: 2005 Dorsoduro Comfort Level

This is to say that things are not fabulous on Dorsoduro, but they are not that bad either. In order to analyze the trends of Dorsoduro we must first have an understanding of how these levels were obtained.

The first step in obtaining the ranges for comfort was to plot out the individual basic necessity stores; an example is given below, where the bread stores of Dorsoduro are marked on the map in blue diamonds.

Figure 37: 2005 Dorsoduro Bread Stores

This process was executed for each basic necessity type being studied, on each sestier of focus. Furthermore the same process will be used to obtain the comfort levels of the evolution stores.

Once the stores were plotted out we placed radii around each store, effectively its area of service. While our main consideration was the level of comfort for all citizens of the sestier, we also wanted to take into consideration the age of the population, and what it was like for them to get their basic necessities. To accomplish this task, we created a system of three radii distances and associated an age range with each; the map below features this system.
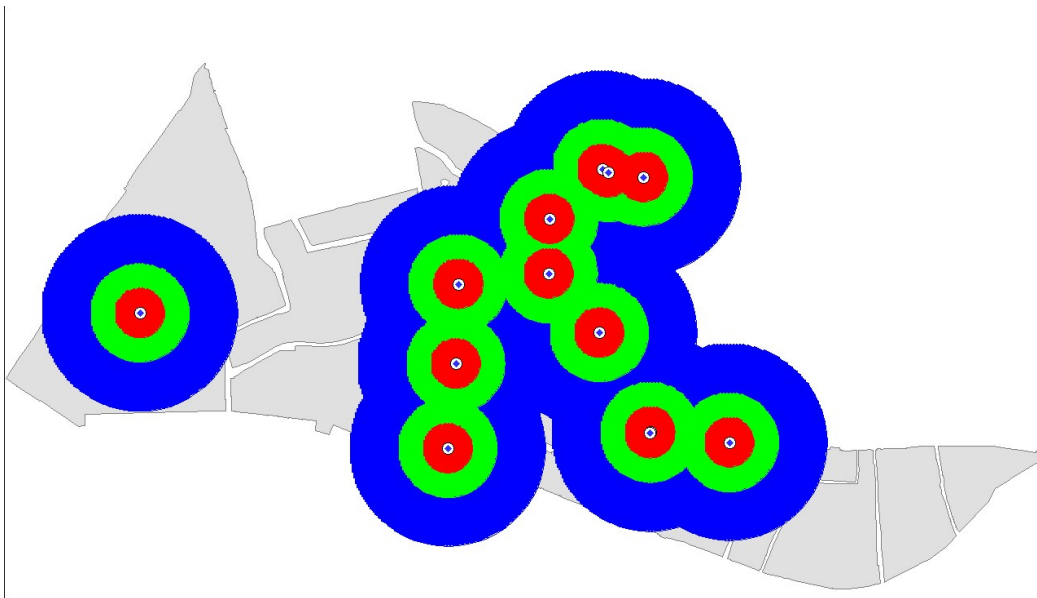
Figure 38: Dorsoduro with various age radii.

The smallest radius is 50 meters, featured in the red on the map; it is representative of the inclination toward travel distance estimated for persons over 65 years. When devising this system, we considered the round trip distance for a citizen to travel, not just one way. Taking that into consideration, we felt that a distance of 100 meters total distance was a fair amount for an elderly person to travel, especially when one considered the amount of groceries they might be returning with. The second radius, featured in green, represents persons of the ages 40 to 65. We arrived at this number by doubling the radius distance of the elderly, under the assumption that the younger of the two would be willing to go out farther to get basic necessities. The last range, in blue, is a radius of 200 meters, or 400 meters round trip, and represents the ages of 10 to 40. As with the previous range, the distance of this area was based on the energy and willingness to travel that one has at a younger age. We did not take into account anyone under the age of 10 because we didn't feel that they were old enough to actually go out and shop for

basic necessities. If they were to travel, we feel, it would be for trivial foods like gelato or candy, not for 500 grams of proscuito.

The next step of the process was to take each individual radius and find out how much of each island was covered by a basic necessity store's radius of service. Using Map Info we subtracted the areas of the island that were covered by the radii, obtained the remaining areas, and used simple mathematics to figure out how much of the island had been covered, both in square meters and in percentage. Upon completing these calculations for all three radii, the population of that island was multiplied by the percentage of the island that was covered; the resulting number was then used as the comfort level of that island. A map of the 50 meters radii is featured below.
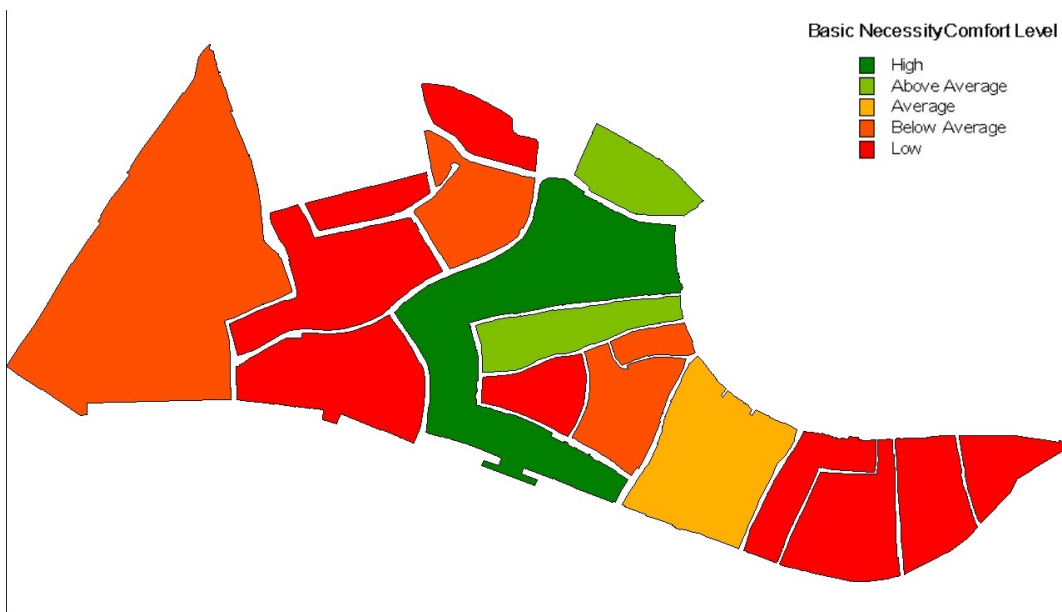
Figure 39: 2005 Dorsoduro Bread Comfort level for age 65+

The actual levels of comfort of an area were decided when the data was mapped in Map Info, where we used the natural break function of the legend to decide the levels. This method ends up making the values float, and wholly reflective of the maximum and minimum values of the data set being considered. To simplify this concept, the high areas of comfort in the radii 50 tables might not be very high levels in terms of the radii 200 values, but for what areas are covered in the radii 50, they are good. To find the comfort level of each specific basic necessity, we averaged the values of each radius together and divided by the three. A similar method was used to calculate the total comfort of the island, where the comfort level of each radius was added together and the total divided by 3, thus giving us an average comfort level.

In the course of analyzing the Dorsoduro data, we came across some interesting figures that we found to be of much significance. The basic necessity that was most prevalent in Dorsoduro turned out to be a meat store, which included macellerie and salumerie, butchers and delis in English. We found this to be rather surprising considering Venice's location as an urban island city. The logistics behind this trend don't quite make sense, because if Venice is getting the meat, then it must be being shipped to the city from the mainland, because there is certainly no longer any space in Venice to raise livestock. Also, considering the surrounding mainland facilities, which are made up mostly of industrial plants devoted to the refining of petroleum products and the city of Mestre, there isn't much around Venice where a fresh shipment could come from. Even if there were however, one would assume that the cost of this service would be rather higher than usual, especially for a non-traditional city such as Venice. But the shear fact that the meat stores have a better comfort level suggests that the meat industry is dominating Venice's basic necessities. This fact is equally surprising, considering that in the last (30) years the number of meat stores in Venice has decreased by almost half.

To obtain the comfort rating of a sestiere, which will be used for analyzing the threshold levels, we took the scale that we had devised for the comfort level, and associated values with each color. Areas of high comfort were given a rating of 4 and areas of low comfort were given a 0, with the others filled in sequentially in between. The next step was calculating the percentage of the population that was covered by that comfort level. From there, the resulting scores were averaged to get the total comfort rating of the sestiere. In the case of Dorsoduro today this rating was 2.4, and 2.7 in Cannaregio, translating into a score that was average. Further calculations showed that 55 percent of the sestiere was above the level of average; where as the remaining 45 percent are below average. In the course of setting a threshold we reasoned that if more than 50 percent of a sestiere had a rating of below average, or if the sestiere ratings as a whole were below the average range, then the sestiere would be considered to have passed the threshold. In the case when a sestiere has fallen below the threshold it means that it's residents are having a hard time getting the basic necessities that they need; and example of this can be seen in present day San Marco, where the tourist shops heavily outnumber the basic necessity stores, and which contains no supermarkets at all.

Analysis of Cannaregio

Unfortunately we were not able to complete a full analysis of Dorsoduro, due to time constraints; however, a complete analysis of Cannaregio was done. Though we have the evolution data for Cannaregio well into the past, as far back as 1945, we could only analyze it

from 1971 on, due to lack of confirmed census data. In addition to this, the analysis was done in 5-year intervals, save the last, in the interest of finishing in within these time constraints. The years of analysis were: 1971, 1976, 1981, 1986, 1991, 1996, 2001 and 2005. Since a census is only taken every 10 years, we extrapolated the data to find what the population in the in-between years would be, and did so for all the years, not just the ones listed above (a copy of this table can be found in the final CD, under the excel documents). The below chart that represents the population and the figure of basic necessity decline over the past 34 years for Cannaregio.

	1971	1976	1981	1986	1991	1996	2001	2005
Store Type								
Bread	95	81	74	64	55	43	32	30
Fish	45	38	37	30	26	21	14	14
Fruit	65	57	52	42	36	31	19	17
Meat	86	71	64	52	44	34	25	23
Population	22903	21375	19846	20235	20623	19368	18112	17108
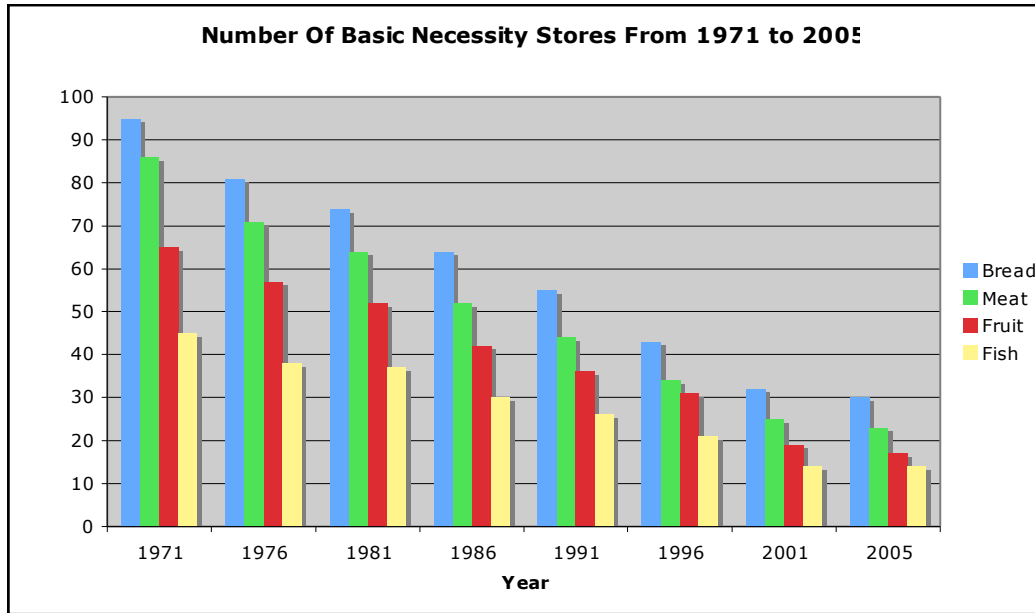
Figure 40: Number of basic necessity stores from 1971 to 2005.

As can be seen from the figures, the decreases are quite steady, and no sign of increase is present. Based on this data, we assumed that this would translate as a decrease in the comfort level. The following figure is a graph of the Cannaregio comfort level.
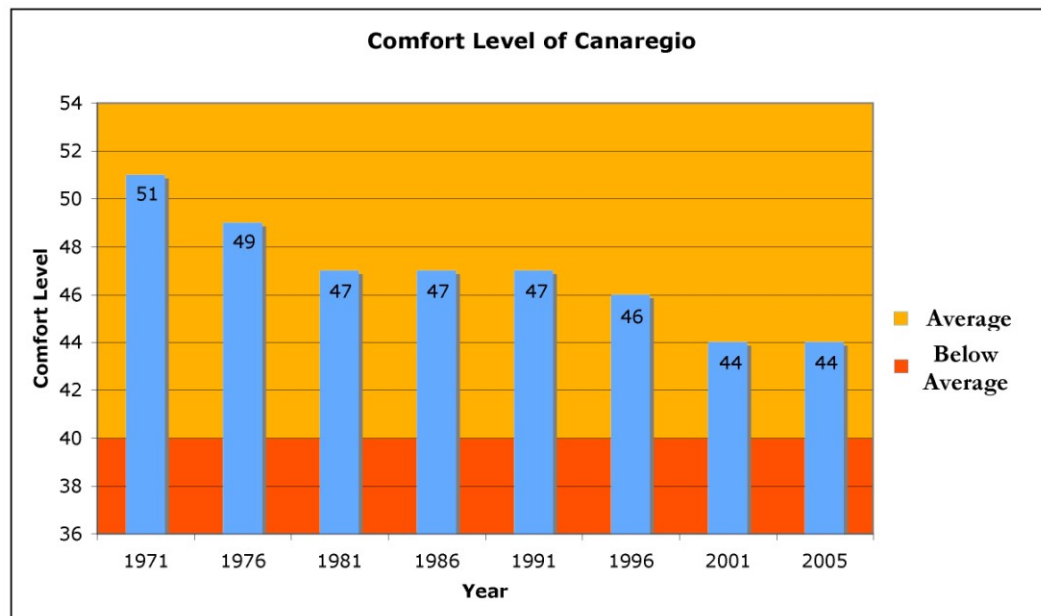
As you can see, the comfort level is exhibiting the trend expected, decreasing slowly. In order to arrive at this conclusion, a couple of calculation had to be made. In order to view the sestiere as a whole, the score of each island in each year had to be normalized. To do this, we

took the maximum comfort value for all years, and all the scores by it, and additionally multiplied the number by 100 to make it into a whole number instead of a percent.

Explanation of Results

Upon using the above system, we found that one time interval threw off the system significantly. This interval occurred in 1986, specifically the island of San Leonardo where starting at 1971 the population was on a steady decline, to the point where in 1981 the population reached a low of 442 people. At this point the population began to drastically rise, reaching it's new high in 1991 where the population was 4294 persons. A diagram of the
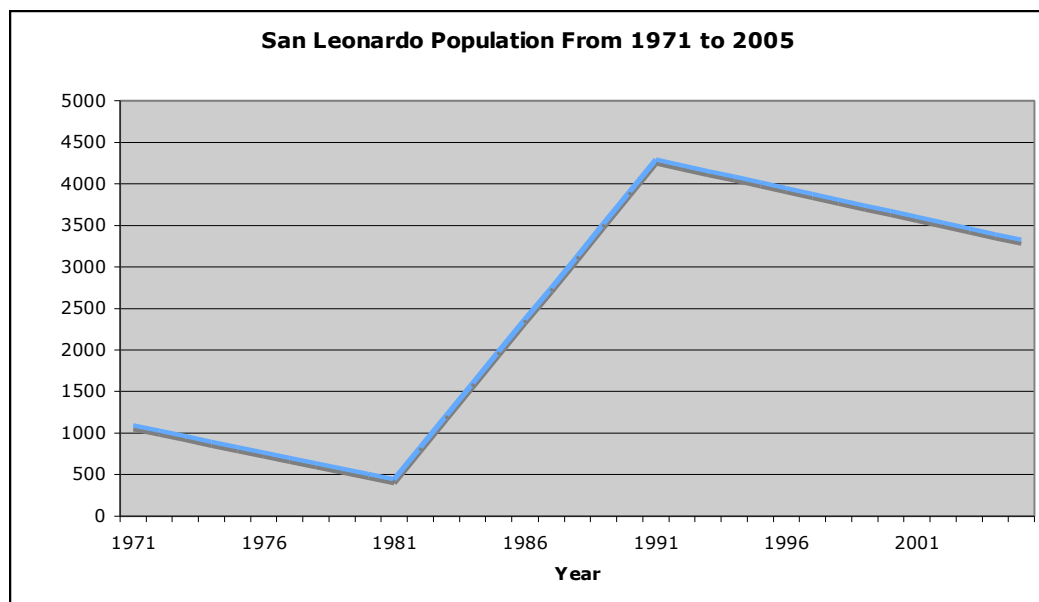
Figure 41: San Leonardo Population from 1971 to 2005

population trend is below.

This rise in population throws off the number system because the max value that an island can have at that point becomes this island's max, which averaged around 3000. When the results were mapped out, every year prior to 1986 was almost completely red, signifying a very bad comfort level. Since the data would clearly suggest that the comfort level should be going down, we decided to calculate the change in the comfort level. First off, we compared the 1971 data with it's own highest value, and found that the comfort level was average, not low like the prior data was suggesting. From there we figured out the average score, and the average decrease for each year, and plotted out the decrease. When that was obtained, we took the highest number of that whole set and used it as the normalizing value. Once again the value was San Leonardo's and, again, the data was thrown out of alignment. Because of this we chose to

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eliminate San Leonardo, claiming it as an outlier, and used the value of the next highest island as the normalizing value. San Leonardo was then given the same value as the next highest island, Sant'Apostoli, which kept the data down at a reasonable level.

What follows below is a series of maps that show the progression of Canaregio's comfort level, for the years studied.
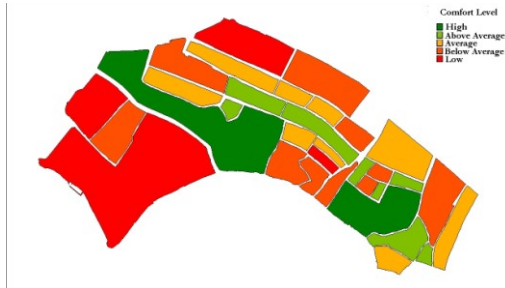
Figure 42: Cannaregio comfort levels 1971.
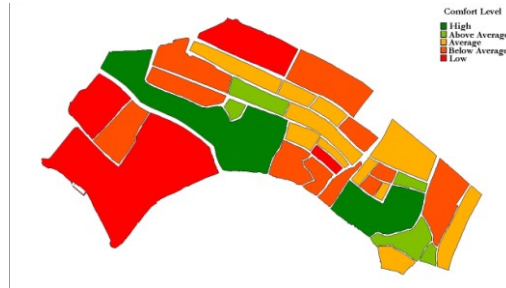
Figure 43: Cannaregio comfort levels 1976.
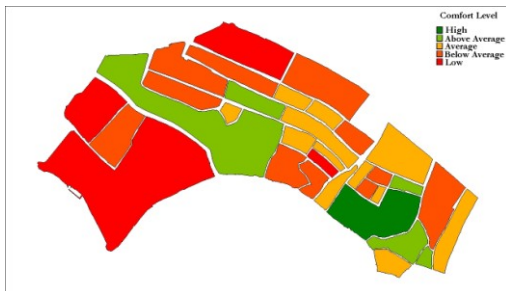
Figure 44: Cannaregio comfort levels 1981.
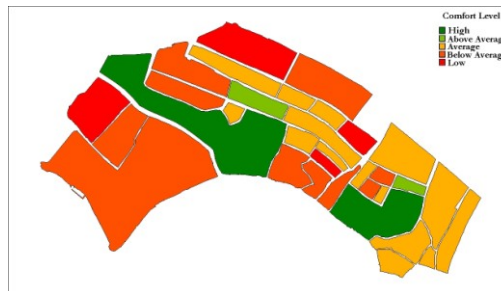
Figure 45: Cannaregio comfort levels 1986.
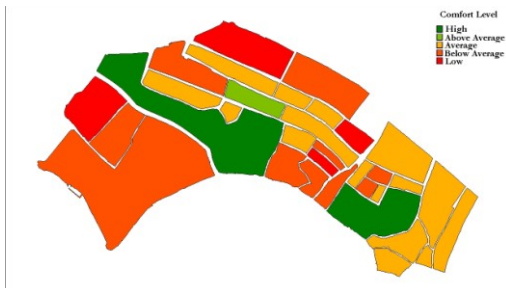
Figure 49: Cannaregio comfort levels 1991.

Figure 48: Cannaregio comfort levels 1996.
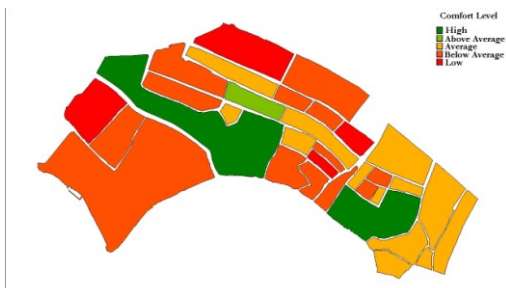
Figure 46: Cannaregio comfort levels 2001.
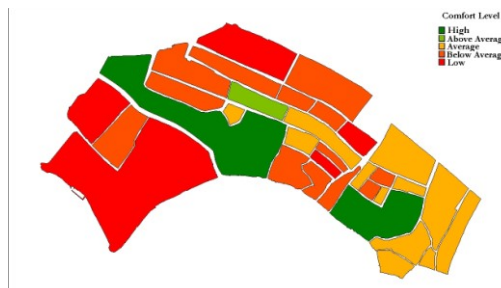
Figure 47: Cannaregio comfort levels 2005.

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Effect on Venice

Given the information that was just discussed, what effect will this comfort level increase have on its citizens? If the trends continue as they are now, with the population and store numbers decreasing, then eventually, there will be only one store in an area that caters to the people, and all the people of that island will live around that store. This prediction, while bleak, is surprisingly real, and if nothing is done, that which up until now has been speculation, will become fact and the way of life in Venice.

Store Locations

In order to raise the comfort level of the sestiere above what it is already is, it would be necessary to eliminate out low comfort areas, thus raising the comfort of the respective island and consequently the comfort of the whole sestiere. Naturally, the spot to put stores in would need to be calculated based on population levels in the area, and what stores already exist there. But as a general rule the best place to put a store is in an area of low comfort. In order to raise the total comfort area of the island, a supermarket would be built and would probably benefit the sestiere the most. The consideration that must be accounted for, however, is whether or not this addition of a store would close down other stores in the area.

From our travels with the citizens we have obtained conflicting views on the cause of trouble in Venice. The one thing that all of the citizen's have agreed on is the fact that tourism has taken over the economy in a stranglehold grip, and doesn't seem to be willing to let go. The observation of Signore Giamberto Siebezzi, one of the citizens that helped us obtain the evolution data, was that the basic necessity stores had all started to close down when the supermarkets moved in. This would make logical sense because the super markets steal market share away from the individually owned stores; and since a company running a chain of stores can deal with loosing a few customers better than a single citizen who owns a store, the smaller stores are forced out of the market. The unfortunate fact of this is, and this can be seen in our database, that a good majority of stores, once closed, remain closed, thus new stores aren't popping up as much as they should be.

So to put a supermarket in an area might actually decrease the comfort level of the area. The question that must then be answered is which effect will be greater. If a supermarket was put in a low comfort area, assuming the area was low comfort because not enough basic necessity stores were present, and then would the supermarket increase the comfort level enough

to cancel out the closing down of the other stores in the area. In other urban places, a person would normally be more inclined to shop at a supermarket because it provides a wider selection of goods, and possibly a lower price, than a store that specializes in such things, like a bread store. Our comfort system does not take into enough account the weighing of a store's value, or the price index, to be useful in this respect. However, if we use just the population density and store concentration data to estimate a store location, then we can find a general area that might benefit from a supermarket.

Chapter 6: Conclusion and Recommendations

6.1 Conclusion

From our analysis we have seen that the comfort level of Cannaregio is steadily decreasing. Unfortunately, because we did not have enough evolution data for the other sestieri, we were not able to adequately compare Cannaregio against anything else. Until all of Venice's retail evolution is cataloged, one cannot get a real sense of what is happening. One declining sestiere is a stand alone analysis; it doesn't provide a full view of what is happening in Venice. But given what information we do have, we can recommend sources of alleviation for the comfort problems in Venice. These recommendations are described in further detail below.

6.2 Recommendations for implementation of project information

6.2.1 Planning Location of New Stores

From our comfort index the areas in red are the ones that are the least comfortable. In order to remedy the situations on these particular islands, a store needs to be placed on them to raise the comfort level of that island. In the figure below, the blue dots represent the ideal location for a store, in this case a store that sells bread. These locations cater to citizens at a range of distances; from 200m out and as close as 50m. The possible store location is centralized on each island so that when the radius that the store caters to is created it will cover the whole island. (for an economical approach to store locations see appendix E)
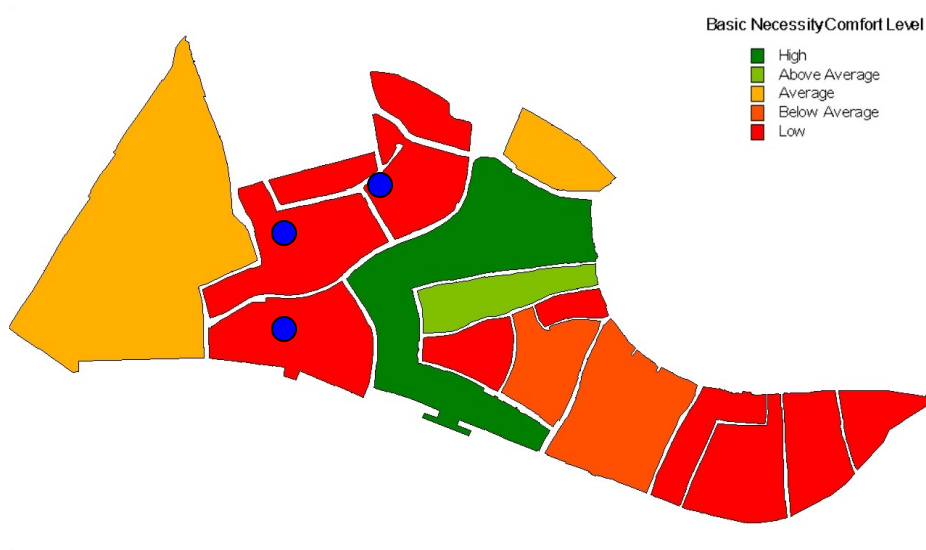
Figure 50 Centralized Store Locations.

Another option for store placement would be one that is more focused. The stores could be placed in a location which is close to where most of the population on a particular island reside. The radius a store caters to may not fill an entire island but it will fill all of the area where the most citizens are located. Since this method allows the store to be closer to the citizens ant not just in a central location it would be better for citizen 65 and over, where there are difficulties with travel. That information was not obtainable in this project, but an example of store location would look like the following:
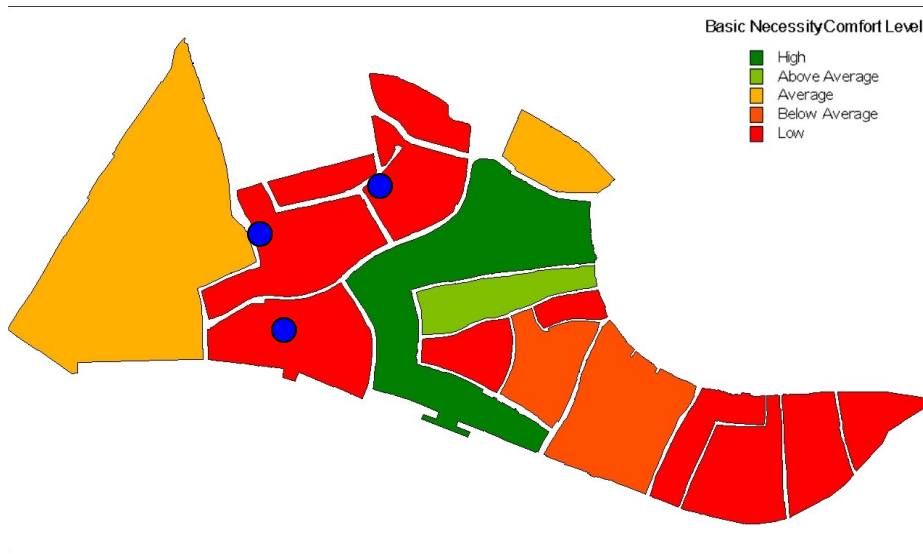
Figure 51 Store Location based on Population

6.2.2 Planning Type of New Store

Once the location of a store is determined, what type of store will be opened there is what needs to be planned next. Since in our project we have mapped out all of the current stores in Venice, it will be easy for a potential shop owner to see what types of shops are in a respective area. From that he can determine which type of shop he would like to open. Our maps allow the viewer to see what type of store is lacking in a particular area. And since there is a void of some

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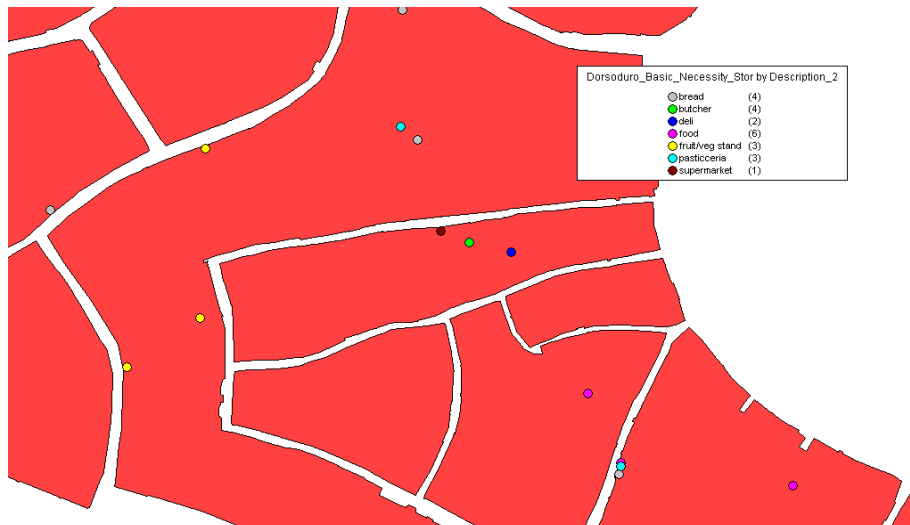
Figure 52: Zoomed in View of basic necessity stores in Dorsoduro.

type in that area, the business will flourish by filling it. For example, if there are three fruit vendors are clustered in particular area someone may choose to open a bread store because it would prove to be most beneficial to that area than another fruit store.

6.2.3 Distributed Supermarkets

Another option could be a distributed supermarket. Instead of a series of small shops strategically placed in locations to cater to citizens, a distributed supermarket could be placed in the same general area and cater to more citizens. If a supermarket was put in a low comfort area, then the supermarket would increase the comfort level enough to cancel out the closing down of the other stores in the area. In other urban places, a person would normally be more inclined to shop at a supermarket because it provides a wider selection of goods, and possibly at a lower price, than a specialty store. Our comfort system does not take into enough account the weighing of a store's value, or the price index, to be useful in this respect. However, if we use just the population density and store concentration data to estimate a store location, then we can find a general area that might benefit from a supermarket.

If we look at the current day data, we can see that the area surrounding the island of San Felice could use some improvement. Below is a close up of the area.
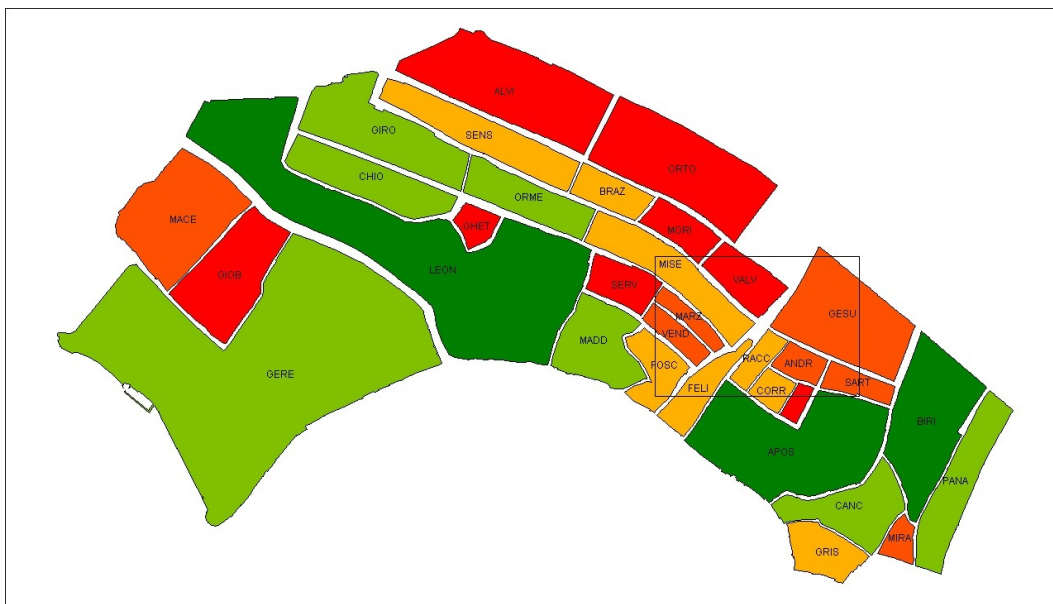
Figure 53 Area where distributed supermarket should be placed

The area in the box in the figure above, is of average comfort level, contains the islands of Ca'Vendramin, San Marziale, Santa Fosca, San Felice, Misericordia, Racchetta, Santa Maria di

Valverde, Corrente, Sant'Andrea, Gesuiti, and, of course, San Felice. The area also contains 12.52% of the population of Canaregio. It is our opinion that if a supermarket were to be placed in that area, specifically at the northern tip of San Felice, where it would have maximum coverage onto the surrounding islands, the comfort level of the area would be raised up considerably.

6.2.4 Home delivery

In light of the previous methods failing to increase residential comfort another possible solution would be to create a home delivery system, where the larger chain grocery stores take orders over the phone or through internet and delivery the groceries directly to the person's door. If implemented we feel this should only be for those citizens of a certain age, where mobility is limited. The home delivery service should also be restricted to only those who are living on an island in which our project has deemed as "low" on the residential comfort scale.

This service will be expensive, because of the urban landscape that is not easily travelable, and because more hired help will be needed for grocery stores to undertake creating such a delivery system. Also the creation and upkeep of ordering through the internet can be costly; although this method can work very effectively, it would cost those who it was catering to extra money.

6.2.5 Evolutionary Database

The information obtained from our evolutionary database was not only useful for or project but can be used in different applications. Once it is fully complete, it should be a historical reference that can be used to see changes around Venice, not only to look at the retail sector, but also to look at conversions of buildings and the effects of big business. It is a resource with not only economic information but it also has applications where social changes can be extracted.

6.3 Recommendations for Further Study

Our project, even though successful was not completely finished. The following are our ideas and considerations that we recommend to further examination on the project:

6.3.1 Completion of the Evolution Data

Our group cataloged all the current stores in the sesitieri of Cannaregio, Dorsoduro, and Castello and only obtained the evolution for Cannaregio and part of Dorsoduro. Unfortunately

the evolution for Castello and the rest of Dorsoduro need to be completed. There are, in total, 6 sesiteri in Venice and the three that weren't studied in the project need to be catalogued for both the current and the evolution data. This is a very time consuming task when going with liaisons to different areas, so we would recommend systematically planning ahead and obtaining the guides at least one week in advance. If studying more than one area in constrained time, and there are sufficient number of people in the group, it would be possible to have several people walk around with different liaisons.

6.3.2 Effects in MapInfo

When inputting the evolution information into a database and geocoding it, the appearance of dots in the place of store can be a hassle and confusing. One thing that we hoped to do was to create actual interiors of all the stores in Venice. The map would look similar to floor plans however. Geocoding the stores and creating a surface area is a time consuming task however very beneficial to the project. It is beneficial because when doing the evolutions it is easier to see the evolutions of the stores especially if one store was once three separate stores or if what was one store, now is three stores. The when corresponding the buildings layer to the address layer there is not necessarily a building for each address or one building has many addresses. Also it is possible the address doesn't exist the actual surface area of the store would give each building a store or correspond the actual building to a figure instead of figurative dots. The surface area is primarily beneficial because it allows analysis of the area to the store. For example a store (not only a basic necessity store) that has a bigger surface area can accommodate more people because it can contain a greater variety of goods. Concepts like this can be implemented into the analysis in order to improve the index.

6.3.3 Factors involving Cost Analysis

One of the factors that are weighted the most when buying goods is the expected cost of a certain item. In Venice, where there are mostly tourists, the price of most commodities is already high. Residents would like to shop for their basic food necessities without having to spend too much money. This cost distribution would be ideal to input in to the index especially since the cost of certain basic necessities is already sufficiently high. The cost distribution should also evaluate information concerning the cost of opening and renovating a store in Venice and deduce whether it is possible or not with the sale of goods to be within a reasonable price range.

For next year's project we strongly recommend that a way be found to weigh some stores more heavily than others, say supermarkets, because they provide more goods than a

smaller store. This task could possibly be done with the inclusion of the frontage or the area of the shop into the comfort equation. Additionally, a more complete and efficient method of weighing the population age into the equation should be worked towards. Also, we recommend that the census data from 1951 and 1961 be obtained, so the stores prior to 1971 can also be analyzed and factored in with the total scores.

Finally, the cost of living should also be addressed here. An in depth look at real estate, housing costs and how affordable it is to live in Venice should be factored in when finding reasons for the population decrease in order to draw direct correlation between demographic, economic and retail changes

Chapter 7: Bibliography

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Appendices

Of

Residential Comfort Level:
An Analysis of the Venetian Retail Sector

Table of Appendices

Appendix A: Annotated Bibliography

Russo, Antonio Paolo "Cultural Assets: Cultural Cities, Historic and Religious Buildings, Archeological Sites."

This is a personal essay by Dr. Russo on the effect of tourism on a city, both economically and socially. Also he has made a map of the areas in Europe that are most susceptible to having tourism take over, and effectively ruin the area's historic preservation. While I know this project is not about tourism per say, I feel it is good to find an article in which somebody else shares the views of tourism that I feel, and has started to document the phenomena of "touristicity".

Neil Wrigley; Cliff Guy; Michelle Lowe. "Urban regeneration, social inclusion and large store development: the seacroft development in context." Urban Studies, Oct 2002 v39 i11

This source talks about the perceived worsening access to food retail provision in certain poor neighborhoods of British cities. This could be useful to see how it was handled in other parts of the world and when did it become a social problem.

Zhong Zhen Yang, "Microanalysis of Shopping Center Location in Terms of Retail Supply Quality and Environmental Impact" Journal of Urban Planning and Development, Volume 128, Issue 3, pp. 139-149 (September 2002)

This article is actually an experiment/investigation done by a Chinese institute on a small city, to determine the economic level of comfort in the city, and used the data to determine where to place shopping centers to optimize the comfort level for the consumer. We found this article most relevant because it documents the existence of consumer comfort, and what factors play a part in it.

Davis, Jim "Retail, residential combo seen as downtown boost." The Business Journal, Sept 1, 2000 v18 i18

This site talks about the interplay between retail and residential uses. It sees the need for people to have access to these things to see what they do if they don't. Many people move like what happens in Venice it could be a similar situation

Bates, Christopher "New Approaches to Retail Forecasting"

Same type of article as before, but dealing with Australia instead of China. The article focuses more on how to get the consumers to go to a placed shopping area. Theoretically one could take the formula presented in the article for consumer want to go to the shopping area and reverse it to show why one would stay away, or not be willing to travel as far. All in all, valuable research is presented, even though the goal is different from that of this project.

http://www.foresight.gov.uk/Previous_Rounds/Foresight_1999__2002/Retail_and_Consumer_Services/urban.htm

This site talks about home delivery and urban planning. A lot of it relates to the specific case they are dealing with but it could be useful to see the effects if we decide it could be applicable to Venice.

Appendix B: Statistical Classification of Economic Activities

Overview

Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods

NACE -- Classification of Economic Activities in the European Community

ISIC -- International Standard Industrial Classification of all Economic Activities

NACE	DESCRIPTION	ISIC
G	Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	
50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	
50.1	Sale of motor vehicles	501
50.10	Sale of motor vehicles	5010
50.2	Maintenance and repair of motor vehicles	502
50.20	Maintenance and repair of motor vehicles	5020
50.3	Sale of motor vehicle parts and accessories	503
50.30	Sale of motor vehicle parts and accessories	5030
50.4	Sale, maintenance and repair of motorcycles and related parts and accessories	504
50.40	Sale, maintenance and repair of motorcycles and related parts and accessories	5040
50.5	Retail sale of automotive fuel	505
50.50	Retail sale of automotive fuel	5050
51	Wholesale trade and commission trade, except of motor vehicles and motorcycles	
51.1	Wholesale on a fee or contract basis	511
51.11	Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods	5110x
51.12	Agents involved in the sale of fuels, ores, metals and industrial chemicals	5110x
51.13	Agents involved in the sale of timber and building materials	5110x

51.14	Agents involved in the sale of machinery, industrial equipment, ships and aircraft	5110x
51.15	Agents involved in the sale of furniture, household goods, hardware and ironmongery	5110x
51.16	Agents involved in the sale of textiles, clothing, footwear and leather goods	5110x
51.17	Agents involved in the sale of food, beverages and tobacco	5110x
51.18	Agents specializing in the sale of particular products or ranges of products n.e.c.	5110x
51.19	Agents involved in the sale of a variety of goods	5110x
51.2	Wholesale of agricultural raw materials and live animals	512x
	These groups include only wholesale on own account	
51.21	Wholesale of grain, seeds and animal feeds	5121x
51.22	Wholesale of flowers and plants	5121x
51.23	Wholesale of live animals	5121x
51.24	Wholesale of hides, skins and leather	5121x
51.25	Wholesale of unmanufactured tobacco	5121x
51.3	Wholesale of food, beverages and tobacco	512x
51.31	Wholesale of fruit and vegetables	5122x
51.32	Wholesale of meat and meat products	5122x
51.33	Wholesale of dairy produce, eggs and edible oils and fats	5122x
51.34	Wholesale of alcoholic and other beverages	5122x
51.35	Wholesale of tobacco products	5122x
51.36	Wholesale of sugar and chocolate and sugar confectionery	5122x
51.37	Wholesale of coffee, tea, cocoa and spices	5122x
51.38	Wholesale of other food, including fish, crustaceans and mollusks	5122x
51.39	Non-specialized wholesale of food, beverages and tobacco	5122x
51.4	Wholesale of household goods	513
51.41	Wholesale of textiles	5131x
51.42	Wholesale of clothing and footwear	5131x
51.43	Wholesale of electrical household appliances and radio and television goods	5139x

51.44	Wholesale of china and glassware, wallpaper and cleaning materials	5139x
51.45	Wholesale of perfume and cosmetics	5139x
51.46	Wholesale of pharmaceutical goods	5139x
51.47	Wholesale of other household goods	5139x
51.5	Wholesale of non-agricultural intermediate products, waste and scrap	514
51.51	Wholesale of solid, liquid and gaseous fuels and related products	5141
51.52	Wholesale of metals and metal ores	5142
51.53	Wholesale of wood, construction materials and sanitary equipment	5143x
51.54	Wholesale of hardware, plumbing and heating equipment and supplies	5143x
51.55	Wholesale of chemical products	5149x
51.56	Wholesale of other intermediate products	5149x
51.57	Wholesale of waste and scrap	5149x
51.8	Wholesale of machinery, equipment and supplies	515
51.81	Wholesale of machine-tools	5159x
51.82	Wholesale of mining, construction and civil engineering machinery	5159x
51.83	Wholesale of machinery for the textile industry and of sewing and knitting machines	5159x
51.84	Wholesale of computers, computer peripheral equipment and software	5151
51.85	Wholesale of other office machinery and equipment	5159x
51.86	Wholesale of other electronic parts and equipment	5152
51.87	Wholesale of other machinery for use in industry, trade and navigation	5159x
51.88	Wholesale of agricultural machinery and accessories and implements, including tractors	5159x
51.9	Other wholesale	519
51.90	Other wholesale	5190
52	Retail trade, except of motor vehicles and motorcycles; repair of	

	personal and household goods	
52.1	Retail sale in non-specialized stores	521
52.11	Retail sale in non-specialized stores with food, beverages or tobacco predominating	5211
52.12	Other retail sale in non-specialized stores	5219
52.2	Retail sale of food, beverages and tobacco in specialized stores	522
52.21	Retail sale of fruit and vegetables	5220x
52.22	Retail sale of meat and meat products	5220x
52.23	Retail sale of fish, crustaceans and mollusks	5220x
52.24	Retail sale of bread, cakes, flour confectionery and sugar confectionery	5220x
52.25	Retail sale of alcoholic and other beverages	5220x
52.26	Retail sale of tobacco products	5220x
52.27	Other retail sale of food, beverages and tobacco in specialized stores	5220x
52.3	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	523x
52.31	Dispensing chemists	5231x
52.32	Retail sale of medical and orthopaedic goods	5231x
52.33	Retail sale of cosmetic and toilet articles	5231x
52.4	Other retail sale of new goods in specialized stores	523x
52.41	Retail sale of textiles	5232x
52.42	Retail sale of clothing	5232x
52.43	Retail sale of footwear and leather goods	5232x
52.44	Retail sale of furniture, lighting equipment and household articles n.e.c.	5233x
52.45	Retail sale of electrical household appliances and radio and television goods	5233x
52.46	Retail sale of hardware, paints and glass	5234
52.47	Retail sale of books, newspapers and stationery	5239x
52.48	Other retail sale in specialized stores	5239x
52.5	Retail sale of second-hand goods in stores	524
52.50	Retail sale of second-hand goods in stores	5240

52.6	Retail sale not in stores	525
52.61	Retail sale via mail order houses	5251
52.62	Retail sale via stalls and markets	5252
52.63	Other non-store retail sale	5259
52.7	Repair of personal and household goods	526
52.71	Repair of boots, shoes and other articles of leather	5260x
52.72	Repair of electrical household goods	5260x
52.73	Repair of watches, clocks and jewellery	5260x
52.74	Repair n.e.c.	5260x

Appendix C: Reference Tables

1. **Italian Store Type – English Store Type:**

English store type	Italian
Antiques	Antiquariati
Art	Arte
Bags	Borse
Bakery	Pasticceria
Bank	Banca
Bar	Bar
Boat	Barca
Bookstore	Libreria
Bread	Panificio
Butcher	Macelleria
Carpentry	Falegnameria
Closed	Closed
Clothing	Vestiti
Cosmetics	Estetiche
Dairy Products	Latteria
Deli	Salumeria
Deposit	Deposito
Electricity/ Water	
Electronics	Elettronica
Erboristeria	Erboristeria
Exchange	Cambio
Fish	Pescheria
Florist	Fioraio
Foods	Alimentari
Fruit/ Veg Stand	Fruttivendolo
Gas Station	Stazione di Gas

Gym	Palestra
Hair Salon	Parruccheria
Hotel	Albergo
Household Appliances	Elettrodomestico
Household Goods	
Household Textiles	
Ice Cream	Gelateria
Ice Factory	Frigoifero
Ignore	Ignore
Information	Informazione
Ironing	Incollarina
Jewelry	Oreficeria
Laundry Service	Lavanderia
Metal Work	Lavorazione del Metallo
Misc	Assortilo
Mortuary	Obitorio
Optical Store	Occhiali
Orthepedic	Sanitaria
Pet Accessories	
Pharmacy	Farmacia
Photo Shop	Foto
Postal Service	Servizo Poatale
Real Estate Agency	Agenzia Immobiliare
Repair	Riparazione
Restaurant	Ristorante
Shoes	Calzoleria
Souvenirs	Ricordo Pegni??
Stationary	Cartoleria
Supermarket	Supermercato

Sweets	Dolciumi
Textiles	Tessili
Tobacco Store	Tabacchi
Toy Store	Giocattoli
Travel Agency	Agenzia di Viaggi
Utilities	Servizio
Video Rental	Video
Wine Cellar	Cantina
Wood/ Coal	
Workshop	Dibattttito

2. Category – English Store Type:

Category	English Store Type
Art/ Antiques	Antiques
	Art
Basic Necessity	Bread
	Fish
	Foods
	Fruit/ Veg Stand
	Supermarket
	Deli
	Dairy Products
	Bakery
	Butcher
Clothing/ Accessories	Shoes
	Clothing
	Optical Store
	Jewelry
	Bags
Food Service	Sweets
	Ice Cream
	Restaurant
	Wine Cellar
	Deposit
	Bar
Health/ Beauty	Cosmetics
	Orthepedic
	Pharmacy
	Erboristeria
Ignore	Ignore

	Closed
Service	Ironing
	Mortuary
	Travel Agency
	Florist
	Utilities
	Video Rental
	Electronics
	Wood/ Coal
	Gym
	Carpentry
	Hair Salon
	Ice Factory
	Bookstore
	Boat
	Electricity/ Water
	Bank
	Workshop
	Metal Work
	Real Estate Agency
	Postal Service
	Photo Shop
	Pet Accessories
	Stationary
	Gas Station
	Misc
	Repair
	Laundry Service
	Textiles
	Toy store

	Household Appliances
	Household Textiles
	Household Goods
	Tobacco Store
Tourist	Information
	Souvenirs
	Exchange
	Hotel

3. **English Store Type – NACE Codes:**

English store type	NACE CODES
Antiques	52.50.1
Art	52.49.1
Bags	52.42
Bakery	52.24
Bank	65.11
Bar	55.4
Boat	
Bookstore	52.47.1
Bread	52.24
Butcher	52.22
Carpentry	
Closed	closed
Clothing	52.42
Cosmetics	52.33
Dairy Products	51.33
Deli	52.22
Deposit	14.40
Electricity/ Water	40
Electronics	52.49.3
Erboristeria	52.3
Exchange	65.10
Fish	52.23
Florist	52.48.7
Foods	52.11.3
Fruit/ Veg Stand	52.21
Gas Station	50.5
Gym	52.48

Hair Salon	52.48
Hotel	55.1
Household Appliances	52.45
Household Goods	52.46.1
Household Textiles	42.44
Ice Cream	52.2
Ice Factory	52.48
Ignore	closed
Information	ignore
Ironing	52.48
Jewelry	52.48.4
Laundry Service	52.48
Metal Work	28
Misc	52.48
Mortuary	52.48
Optical Store	42.48.1
Orthepedic	52.32
Pet Accessories	52.48
Pharmacy	52.3
Photo Shop	52.48
Postal Service	64.11
Real Estate Agency	70
Repair	52.7
Restaurant	55.2
Shoes	52.43.1
Souvenirs	52.48
Stationary	52.47.1
Supermarket	52.11.2
Sweets	52.24.2

Textiles	52.41
Tobbacco Store	52.26
Toy store	52.48.6
Travel Agency	63.3
Utilities	40
Video Rental	52.45.3
Wine Cellar	55.5
Wood/ Coal	51.54
Workshop	52.63

Appendix D: Database

SESTIERE	NUMBER	LETTER	WITH_SLASH	ADDRESS	NAME	ENGLISH	FROM	TO	NOTES
DD	-946		DD-946	DDAcross from 946		Boat	2004	10000	Squero now it's recent
DD	-549		DD-549	DDAcross from 549		Boat	0	1965	Squero
DD	19		DD19	DD19	lineadombra	Restaurant		10000	ristorante
DD	127		DD127	DD0127		Carpentry	0	1955	Carpenter/Craftman
DD	129	A	DD129/A	DD0129A		Boat	0	1975	Boat Construction (sails)
DD	129	A	DD129/A	DD0129A	Bar Boseca	Bar	1975	10000	
DD	140		DD140	DD0140		Fruit/ Veg Stand	0	1995	
DD	143		DD143	DD0143		Bar	0	1975	Osteria
DD	156		DD156	DD0156		Wood/ Coal	0	1975	
DD	164		DD164	DD0164		Foods	0	1995	
DD	165		DD165	DD0165	San Gregorio Art Gallery	Art		10000	art gallery
DD	167		DD167	DD0167		Souvenirs		10000	glass souvenirs
DD	169	A	DD169/A	DD0169A	CLOSED	Closed	1975	10000	
DD	169	A	DD169/A	DD0169A		Ironing	0	1975	
DD	181		DD181	DD0181		Butcher	0	1955	

Appendix E: Walter Christaller and The Central Place Theory

Walter Christaller, a German geographer, elaborated on the Central Place Theory (CPT) in 1933. The CPT states the following[1]:

A Central Place is a settlement which provides one or more services for the population living around it.

- Simple basic services (e.g. grocery stores) are said to be of low order while specialized services (e.g. universities) are said to be of high order.

- Having a high order service implies there are low order services around it, but not vice versa.

- Settlements which provide low order services are said to be low order settlements. Settlements that provide high order services are said to be high order settlements.

- The sphere of influence is the area of under influence of the Central Place.

- The minimum population size required to profitably maintain a service is the threshold population.

Factors affecting a fall in the threshold population are

- A decrease in population

- Change in tastes

- Introduction of substitutes

While studying settlements in Southern Germany Christaller came up with his Theory as a way of understanding how urban settlements evolve and are spaced out in relation to each other.[2] Christaller added the following assumptions to create his own version of the CPT:

All areas must have:

- an isotropic (all flat) surface

- an evenly distributed population

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[1] Central Place Theory RevisionNotes.Co.Uk

[2]Agarwal, Pragya Walter Christaller: Hierarchical Patterns of Urbanization Center for Spatially Integrated Social Science

- evenly distributed resources

- similar purchasing power of all consumers

     The model in CPT is developed by the placement of hexagons to determine the location in which the firms should be placed. Hexagons are the shape of choice for Christaller because it prevents gaps and overlaps, unlike the spheres of the previous CPT.[1]

     In Figure 1 we can see Christaller's model more clearly. Each lettered circle correlates with the same lettered hexagon. The circles represent a central place, the hexagons represent how far of a radius this central place can supply goods in.
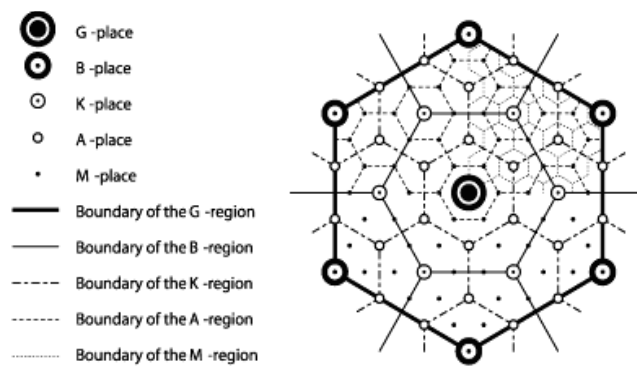

◉	G -place
◉	B -place
⊙	K -place
○	A -place
·	M -place
──	Boundary of the G -region
──	Boundary of the B -region
-----	Boundary of the K -region
-------	Boundary of the A -region
··········	Boundary of the M -region

Figure 54: Cenrtal Place Model

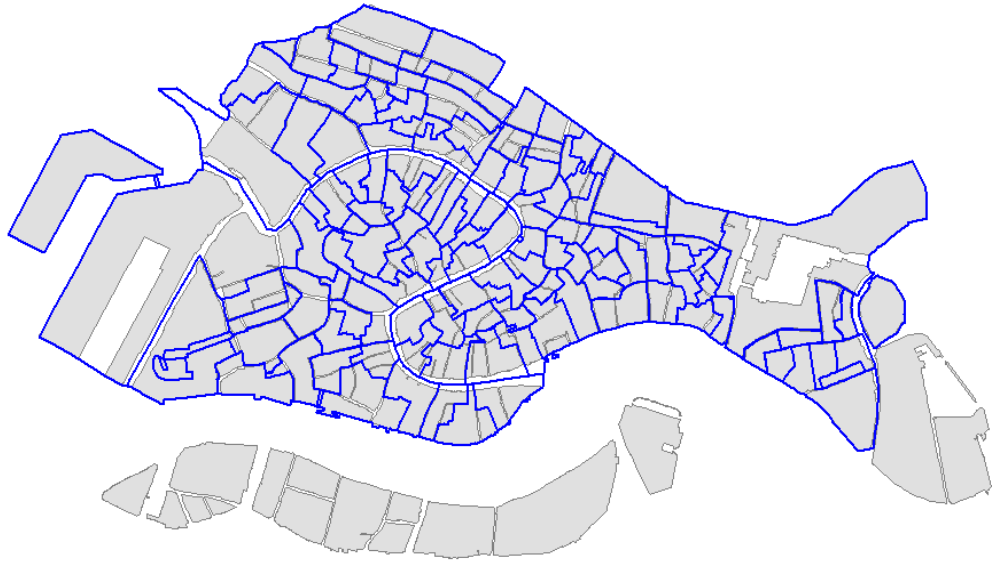# Appendix F: Census Tracts

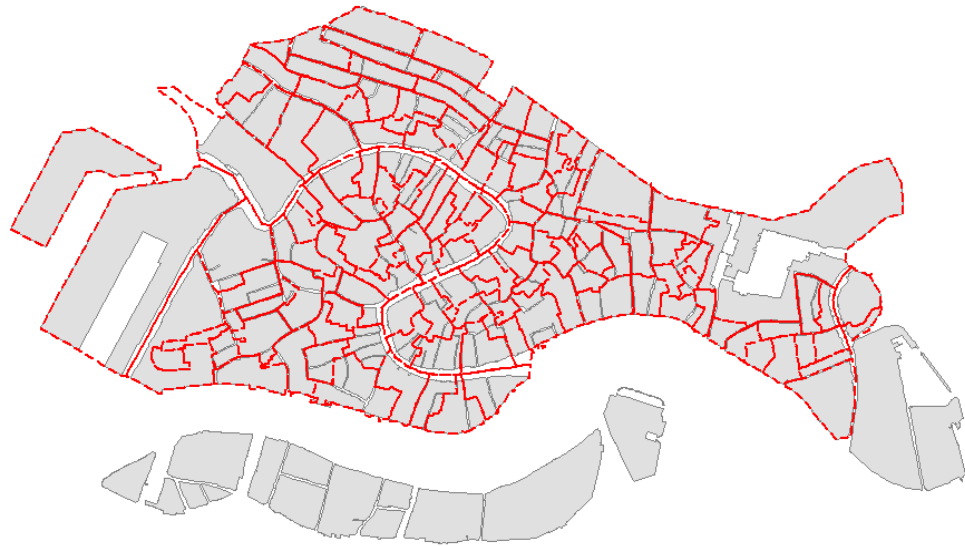**Figure 55. 1971 Census Tracts**
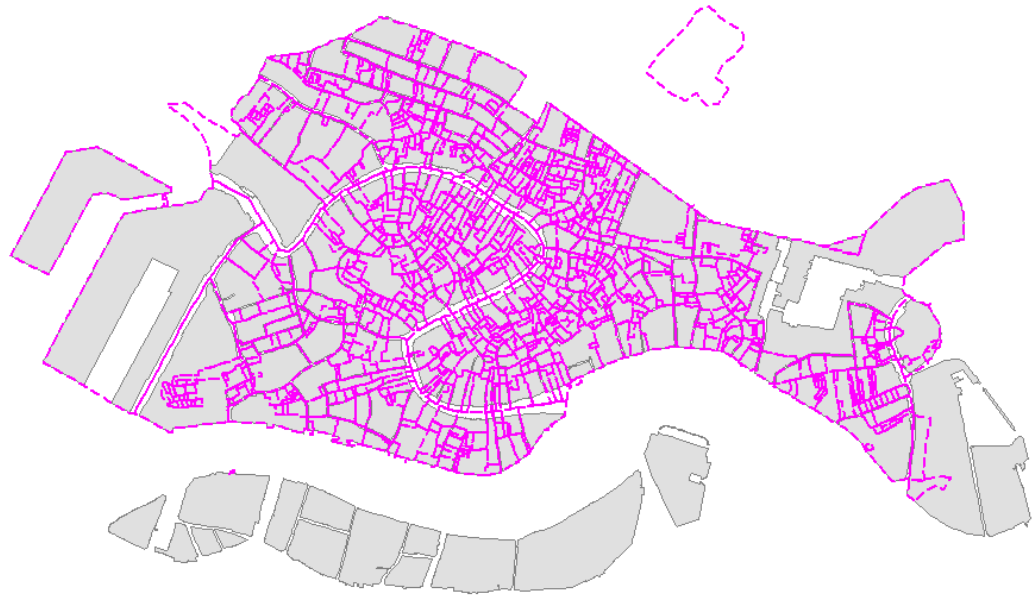

Figure 56. 1981 Census tracts
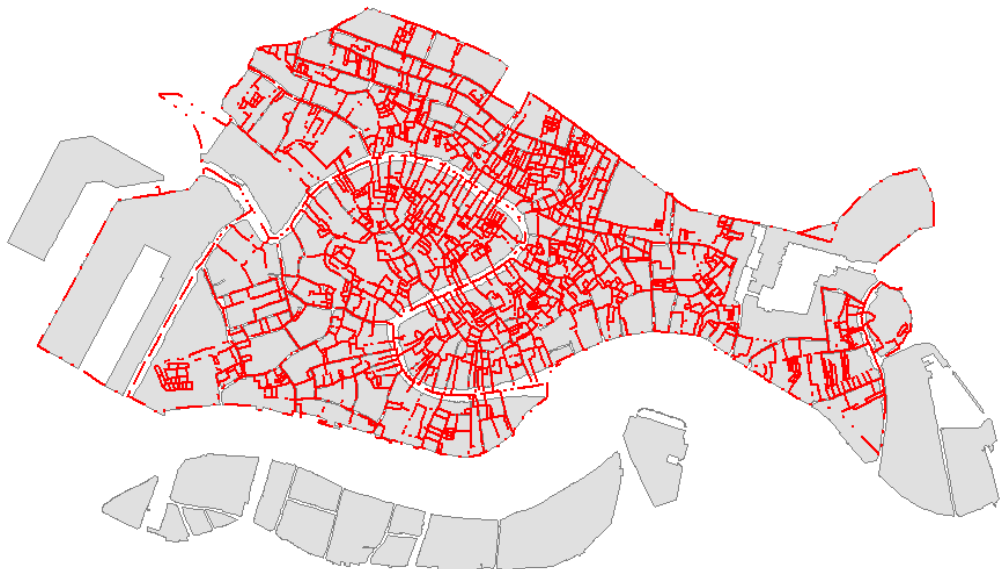
Figure 57. 1991 Census tracts

Figure 58. 2001 Census tracts

Figure 60: All Castello Stores

Appendix G: Castello Results
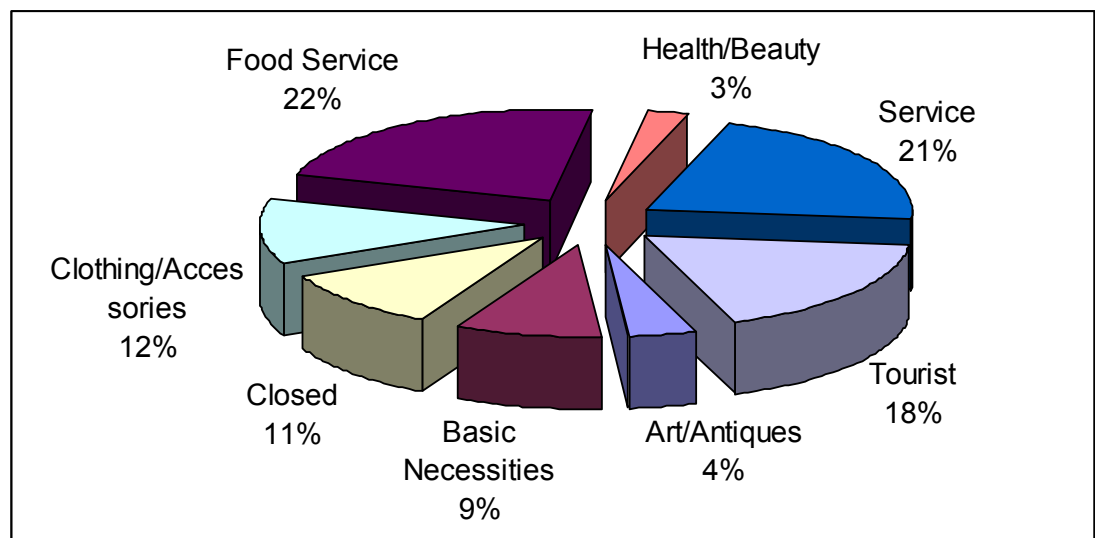
Type of Basic Necessities	Number
alimentari	**2**

Figure 59: Distribution of stores in to categories for Castello 2005.

panificio	**7**
macelleria	**10**
latteria	**1**
salumeria	**10**
pescivendolo	**2**
fruttivendolo	**12**
pasticceria	**8**
supermercato	**7**