Location and Competitive Strategy in Retail: The Case of GameStop in Michigan

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LOCATION AND COMPETITIVE STRATEGY IN RETAIL:
THE CASE OF GAMESTOP IN MICHIGAN

Karl P. Schrantz, M.A.
Western Michigan University, 2013

The State of Michigan offers a unique retail environment that offers a diverse arena for firms to interact and compete in. The state has many cities of different size and a multitude of retail chains that operate within them. Over the past two decades this competition has become even stiffer with the rapid growth of big box retailers. In spite of this general notion there are often the less known stories of small retailers that have been able to compete and survive big box retailing. This research aims to assess how a smaller retail chain, GameStop in this case, is capable of surviving by assessing their location strategies. Additionally this research aims to examine GameStop’s performance and measure its success in the videogame entertainment retail market of Michigan.
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Karl P. Schrantz
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CHAPTER I

INTRODUCTION

1.1 The Problem

Retailing has always been a competitive sector. Over the past several decades, this competition has become even stiffer with the rapid growth of big box retailers. These retailers (e.g. Best Buy, Wal-Mart, Target, and Meijer) are characterized by their free standing locations, enormous sizes and wide product mix. The combination of such creates a store that is full of infrequently purchased items, but they are priced cheaply enough that people are willing to travel farther to make their purchases (Hernandez and Simmons 2006). One of the most well-known effects of big box retailers is their ability to drive small retailers out of the market (McNeal 1965, Stone 1995). Wal-Mart has been the poster child of this phenomenon, to the extent that many US communities have either fought hard or enacted local ordinances to prevent this big box retail chain from locating in them (Ulmer 2003, Anonymous 2004).

In spite of this general notion, there are often the less known stories of small retailers that have been able to compete and survive big box retailers (Clarkin, 1998, Barron 1999, Peterson and McGee 2000). One such story takes place in the video-game retail market. This market is dominated by the familiar big box retail chains of Best Buy, Target, and Wal-Mart; and GameStop, a much smaller retail chain. The obvious question then is, “how has GameStop been able to compete against and survive with big box retail stores in this particular market?”

According to Runciman (1998), retailers compete by attempting to gain a
competitive advantage over their rivals. They do this in one of four ways. First, they can use pricing of their products. Second, they can use geographic location whereby they select a more suitable site of the market to locate in. Third, they can use product selection, differentiation or packaging. Finally, they can differentiate themselves from their competition by offering better customer service. The relative importance of these factors to a retailer varies. Runciman (1998) argues that no retailer competes on only one of these factors; instead, they compete by combining a number of these strategies. However, others argue that geographic location is the prime factor because prices and product selection, differentiation or packaging, as well as customer service can all be imitated by competitors, but it is pretty difficult to assail the location of a competitor (e.g. Jain and Mahajan 1979, Levy and Weitz 2004, Litz and Rajaguru 2008). Similarly, Scarborough and Zimmerer (2003) attribute the failure of many good potential retail firms to the inability of their owners to find a location that is compatible with the nature of the business.

1.2 Research Objectives

The purpose of this research is to examine the role of location strategy in retail competition with GameStop in Michigan as a case study. Specifically, this research attempts to:

1. Analyze the location strategy used by GameStop.
2. Examine how this strategy influences GameStop’s survival and measure the firm’s performance in the videogame retail market of Michigan.

1.3 Study Area

The State of Michigan offers a diverse retail environment for firms to interact
and compete with one another. The state has many cities of different sizes and populations and a multitude of retail chains that operate within them at varying levels. Within this arena, retailers are constantly jockeying for position to gain advantages over their competitors.

This research looks at the spatial competitiveness of GameStop to other electronic and game retailers, specifically, Best Buy and Wal-Mart, within the lower peninsula of the State of Michigan. The study limits itself to the Lower Peninsula because of population differences between the upper and lower peninsulas that could skew the analysis. Also, the research looks only at the competition within the years of 2000 and 2010, because GameStop as a company was formally created in 2000.

GameStop in Michigan was selected for this study because of personal interest and experience within the company. The researcher worked for the company for five years and has some knowledge with the company’s business agenda and the researcher has lived in Michigan for 25 years and has a good knowledge of the study area’s features.

1.4 Methods

Research Design

This research uses a case study approach. The case study industry is the videogame retail market and the case study firm is GameStop. To assess the performance of GameStop, the study also includes GameStop’s competitors, Wal-Mart and BestBuy. In order to complete this research, the following data were needed: store locations for each firm organized by year, yearly demographic and economic estimates at census tract level boundaries, and estimates of what percentage
of revenue for the supercenter stores comes from gaming products.

**Data Collection**

All information collected was available from secondary sources. Store locations were gathered from store websites, the InfoUSA database and the ESRI Business Analyst database. Demographic and economic data were gathered from the U.S. Census Bureau, and the Department of Labor’s websites. Census boundaries were gathered from the Tiger/Line files supplied by the U.S. Census Bureau.

**Analysis of Data**

The data were organized into a database that could be analyzed with ESRI’s ArcGIS and associated Business Analyst. In order to analyze the location strategy of GameStop, cluster analysis of store locations was performed in conjunction with information about each chosen firm’s business practices. Synthesizing those facts helped determine the location strategies. For the second objective, various models were used to estimate GameStop’s performance within the market. Comparing how GameStop located stores to its competitors and relating that to their performance in the retail videogame market provided an answer to the second objective, which was to examine GameStop’s performance in the gaming market of Michigan.

**1.5 Significance of Research**

For this study, GameStop was selected as the primary case firm for several reasons. The firm has a unique business model when evaluated against competitors and this has great importance to the firm’s successes. The model also applies to a surprisingly broad demographic. According to the Electronic Software Association, in
2010 72% of households participated in Gaming. Furthermore, the literature associated with retail competition is lacking in observing how smaller firms can use location strategies to better compete with big-box retailers. This research contributes to filling this gap in location strategy studies.

1.6 Structure of Thesis

In addition to this introduction, the thesis consists of five more chapters for a total of six. Chapter two is a comprehensive literature review of retail competition and the factors that affect successful retail business. Chapter three provides an overview of the history of videogame retailing, as well as a history of the three selected firms for the case study. A more thorough introduction to the study area is also included in the chapter. Chapter four is comprised of a detailed explanation of the methodology that was used to evaluate the firm’s location strategies and performance at every location present in the study area by year. Chapter five presents analysis and results of the methods that were previously described. The final chapter is a conclusive summation of the research findings, implications and provides recommendations for future study.
CHAPTER II

LITERATURE REVIEW

Two sets of literature will be relevant for this thesis. The first set is the literature on retail competition, and the second is retail location strategy. The purpose of this chapter is to review this literature. The review will start with an overview of retail competition, a more specific review of supercenter or hypermarket competition, and end with retail location theory and practices.

2.1 Retail Competition

Since retailers have many options when choosing a strategy for how they will compete with their rivals, I have elected to separate some of the research in retail competition into two categories: the concept and theory of competition, and the practice of competition.

Concept and Types of Competition

Within the neoclassical economic theory of competition two general types of competition can be identified, perfect and imperfect competition. Perfect competition exists when there are a large number of buyers and sellers who are able to enter and exit the market, freely. All firms and consumers have equal access to information about the availability, quantity and quality of goods in the market. As a result, no single firm or consumer is capable of affecting the price of a good. All actors are rational, based on supply and demand forces. These assumptions lead to competitive equilibrium, where all firms sell their products for its marginal cost, or in identical ways.
In contrast, imperfect competition occurs when a few suppliers or consumers dominate the market. Imperfect competition can take various forms, including monopoly, oligopoly and duopoly. Monopoly competition exists where one firm controls the entire market of a good and can set the price unilaterally. Duopoly exists when two firms have control of the market and oligopoly exists when a comparatively few firms have the greatest market share (Veblen 1900, Sullivan and Sheffrin 2003, Weintraub, 2007).

Methods of Competition

The literature of the methods of competition identifies various ways by which retail firms compete. Among these are competition by price, by quantity, by variety, by product differentiation, by service differentiation, and competition by location (Runciman, 1998).

Competition by Price

Firms can engage in competition by adjusting the pricing of their goods to gain a competitive advantage. In economics, comparing competition solely based on price often leads to equilibrium in price amongst competitors. This type of competition is referred to as Bertrand competition after Joseph Bertrand, who first theorized it in 1883. In Bertrand competition, firms are rational and make decisions to maximize profit and every decision affects the price of a good. In a two-firm model, Bertrand argues that firms will compete by only changing the price of their product to undercut each other until they both reach equilibrium, where the marginal cost will equal the marginal revenue. However, there are assumptions and criticisms of Bertrand competition. Bayes and Morgan (1999) point out that the monopoly profits
have to be limited for a unique case of equilibrium to exist and that there are other mixed strategies that can result in equilibrium in price yet still yielding profits to the retailer.

**Competition by Quantity**

Bertrand competition was the opposite of the competition by quantity theory that had been advanced by Antoine Cournot in 1838. Cournot argued that a theoretical model of competition existed and that firms compete by choosing the quantity of the product they want to offer so as to affect the price of product. This type of competition is similar to and influenced Bertrand competition, in that competing firms will eventually come to equilibrium in the quantity of goods sold by each firm (Cournot and Fisher, 1897).

**Competition by Variety**

A modern method that is used by many retailers to compete by price and variety is to bundle items together for sale. Mulhern and Leone (1991) show how this can be used to achieve store wide profit increases. The idea behind bundling similar items together creates a lower price for the consumer than if they were to purchase each item individually. But the overall profits of selling the items all at once, if done correctly, can create an overall higher profit margin.

**Competition by Product Differentiation**

Firms can also compete by differentiating the types of products that they sell from their competitors in order to separate their product in a manner that is more attractive to the consumer. This can be done by either offering products that are different in quality or by mixing products differently. Additionally, advertising or packaging can be used to sway consumers into believing a product or service is
superior to others (Moorthy, 1988).

**Competition by Service Differentiation**

Retailers can also compete by choosing to provide superior or more personal service for the consumer. Typically, smaller stores can provide the consumer with more personalized service which helps them differ from their competition (Gronroos 1990, Bernstein and Federgruen 2004, Addison 2010).

**Competition by Location**

The article “Stability in Competition” by Harold Hotelling (1929) was one of the first to address the issue of retail competition with respect to location. Hotelling assumed a world of two firms competing for customers in a linear market in which population distribution is even. Both the firms and consumers behave rationally, and consumers would only shop at the location that was the closest to them. At any time, each firm can have only one location, but firms do not incur any cost by changing location (Hotelling 1929, Phlips and Thisse, 1982, Ofori-Amoah 2003).

Under these assumptions, Hotelling showed how the two firms would alter their locations to achieve an advantage. Each firm would locate on either end of a theoretical linear market. In order to gain an advantage, firms would change location to gather more customers. In the end they would reach a state of equilibrium where both stores would locate close to each other in the center of the market. Hotelling also believed that firms would compete efficiently by selling the same products; he called this the principle of minimum differentiation.

Hotelling’s pioneering work led to the development of spatial competition theory, which refers to the mechanism by which competing firms attempt to capture the largest share of the market after choosing a position in geographic space, under
certain assumptions (Phlips and Thisee 1982, Ofori-Amoah 2003). This theory has
provided several insights on location and retail competition. For example, some
research disputes the idea that firms will locate as close as possible, rather their work
indicates that they would instead locate as far from the competitors location whilst
still being in the market (d’Aspermont et al., 1979 Economides, 1983). In contrast,
Litz and Rajaguru (2008) established that a retailer’s proximity to rivals is more
important than its proximity to the market. In spite of that notion these studies use the
assumption that the market in question is oligopolistic in nature. Given the number of
retailers that sell gaming products this may not be the case. Additionally, the location
of the store is merely stated as a given property and not something that is subject to
change or has any influence on how prices can be influenced by the location. Firms in
these studies simply picked retail locations then altered their competition by price or
quantity or service. The impact that the market environment has no influence how a
location performs. As an example, stores that are located more closely to a
distribution hub will have less transportation costs associated with that location’s
overhead.

Other studies have expanded on the idea of minimum difference to show how
differing or adding variety to products from competitors could yield a competitive
advantage (e.g. Balderston, 1956). Basker (2007) demonstrates this as he looks at
how Wal-Mart grew as its ability to use economies of scale and technology combined
with its growth patterns. Pinkse, Slade, and Brett (2002) offer a semi-parametric
model that is aimed at assessing and predicting price changes in multiple scales and
markets. Their primary example was with a gas station market. By looking at how
neighboring competitive gas stations within the market altered gas prices, they were
able to estimate who had market dominance. They found that the gasoline
competition was strongly localized. Miller, Reardon, and McCorkle (1999) explored using a multiple regression approach to assessing competition at these different levels. Their study looked at sporting goods retailers and showed that combining smaller and larger retail formats with varied product selections in an area resulted in a beneficial environment for all firms involved. This is one of the few examples in the research that show how location can impact the other methods of competition.

Several studies observe how firms disperse or agglomerate store locations. Hamilton et al. (1989) looked at both Cournot and Bertrand competition in space and found that when firms located and competed by quantity of product that the firm’s locations would result in agglomeration of the retail locations. Anderson and Neven (1991) found similar results. Gupta et al. (1997) also found that agglomeration would result in an equilibrium but only if customer densities were sufficient to do so. In another study of Cournot competition in a circular model city, Gupta et al. (2004) concluded among other things, that stores selling substitute products would locate farther away from one another. A substitute product is one that may have a different appearance or function, but still satisfies the need of the consumer. Peng and Tabuchi (2007), outline a multi-store model of an oligopolistic competition to see how locations could come to equilibriums when variety of the locations and variety of the goods sold were endogenously determined. Store locations in single store competitions were shown to neither demonstrate maximum nor minimum differentiation from their competitor’s locations. This finding is in contrast to those found in the works where firms locate then compete by quantity; as they either tend to show clear separation or clustering. These studies show how firms disperse or agglomerate in space in the wake of other forms of competition but the location itself is not perceived as a determining factor. Instead of firms locating then competing,
these studies showed how firms would locate when only competing by price or quantity. But the location of the store in the market has no intrinsic affect on the ability of the firm to compete with price or quantity as it would in an actual market. One of the most successful ways of competing in retail has been the development and rapid adoption of the supercenter model. Supercenters as described by Hernandez and Simmons (2006) are free standing locations, meaning they are separated from other retailing that may or may not be close by. Supercenters are characterized by their large size and subsequently expansive parking lots. The supercenter mixes products in a fashion that makes it cheaper for the consumer to shop at that location and so will be willing to travel farther to obtain such savings. Supercenters are able to compete by combining several of the aforementioned methods of competition and have done so on a large scale.

**Supercenter Competition**

Supercenter, also known as hypercenter competition, has become a powerful force in retailing. One simply needs to look at the number of large big-box retailers that have existed in the last few decades. Some famous examples of big-box firms are K-Mart, Target, Best Buy, Meijer and most famously Wal-Mart, who has capitalized the supercenter format. The supercenter remains profitable by the sheer volume of sales it is able to generate, so marginal losses are often eliminated by gains in other products sold. However, Wal-Mart was not the first firm to engage in this kind of competition; K-mart began successful large format discount stores and Meijer had created supercenter locations with groceries before Wal-Mart. However, Wal-Mart has been able to adapt itself to emulate those practices and even improve upon them (Marquard, 2007).

Supercenter competition grew out of the widespread acceptance of discount
retailing that had started in the 1960’s when most major big-box retailers were founded (Graff, 2006). By the 1990’s discount stores were rapidly adopting supercenter ideas and included grocery goods into their product mix. Wal-Mart, Target and K-mart had all set up supercenter stores by 1995(Graff, 2006).

Since the supercenter’s popularity has been established, much of the literature on the sector has focused on the outcry against the practice. Many studies have shown how a supercenter store once entering a market decimates the smaller “mom and pop” downtown retailers because they cannot compete with the lower prices that Wal-Mart can profit from (Mc Neal, 1965 and Stone, 1995). Popkowski et al. (2004) conducted a study of grocery and supercenter competition in New Zealand, their analysis of location strategy concluded that smaller format firms have difficulty competing and should locate closer to their target population than their competition. McGee (1996) discusses the negative impacts Wal-Mart has on smaller stores and local economies as well. This has resulted in public outcry against such retailing. Wal-Mart has become the focal point of such frustration as it is the largest firm engaging in these business practices (Marquard, 2007 Peterson and Mcgee, 2000). There are also those who believe that Wal-Mart locations directly increase urban sprawl, prompting many cities to regulate the size and locations that supercenters can occupy in cities (Store Wars, 2001). Wal-Mart has also had to endure several lawsuits dealing with the unionization of its workers, wage violations, and sexual discrimination (Directory of Company Histories Vol 63 2004). Despite the pushback it has received, Wal-Mart does not show any signs of changing its strategy anytime soon.

There are also some instances where smaller retailers have been able to survive Wal-Mart’s entrance into a market. Barron (1999) shows that smaller retail chains, such as Dollar General and smaller grocers like Save-A-Lot, are able to
directly compete with Wal-Mart and are not shy about locating near one. Clarkin (1998) shows that specializing or providing better service then Wal-Mart can be used as a means to combat the presence of a Wal-Mart. However, all of these studies do not directly address how the location of the smaller firm may or may not be important to its survival in this competition.

In summary, the literature on competition by location or spatial competition has followed three essential strategic models: location-then-price, location-then-quantity and location-then-variety. In each of these models the location is simply a given and little contemplation of how the location itself is chosen. Nor do they consider how the location of a store may affect the firm’s competitiveness (Ofori-Amoah, 2012). Since standard competitive theories don’t properly measure location’s impact an overview of retail location theory is also necessary.

2.2 Retail Location Theory

Unlike the theory of competition, the theory of retail location is built on the idea that location is of primary importance to a retail firm’s ability to compete. Given this, how does a retail firm choose its location? Existing literature that attempts to address this question includes Christaller’s central place theory; Alonso’s bid rent theory and Ghosh and McLafferty’s Model of site selection.

The Central Place Theory of Christaller (1933)

Christaller’s (1933) central place theory created has he studied how cities would be organized in geographic space, if their only function was the provision of services. The theory assumes an infinite isotropic plane with no inherent boundaries. Distances and angles between locations are constant throughout the system. All
resources are evenly distributed throughout the plane. Each location has a monopoly in its given area or hinterland and boundaries for these areas are not allowed to overlap. Such boundaries are described by hexagons as Figure 2.1 illustrates.
On the basis of these assumptions, Christaller defined a central place as any place that offers a good or service. The minimum level of demand required to offer the good or service is what Christaller defined as the threshold of the good or service, while how far people are willing to travel to the center to purchase the good or service defines the range. Christaller deduced that central places would be arranged into a hierarchy on the basis of the threshold and range of the good or service being offered at the place. The threshold and the range also defined the order of the good or service. Thus, low order goods have short ranges and small thresholds while high order goods have long ranges and large thresholds. The order of a good or service also defined the order of the center. Thus, low order centers offer only low order goods and services while high order centers offer both high order and low order goods and services.

In terms of spatial arrangements of the central places, Christaller used three principles, each distinguished by what he called K-factor. Each factor meant that a good that has a higher or lower order ascribes an area K times in size. The first is the marketing principle which aims at efficient market coverage. The K-Factor is 3. Thus, lower order centers will be located at the apexes of the hexagonal trade area of the larger central place. The second principle is the transportation principle, which aims at efficient transportation systems among all the central places. The K-factor is 4. The third principle is the administrative principle which constrains lower order trade areas to locate inside the higher order centers. The K-factor is 7.

Implicitly, Christaller’s central place theory emphasizes the role of transportation and predicts that demand will decline with increasing distance (Christaller, 1966). Consequently, the central place theory also suggests that central location provides better access to the market than other locations. Christaller’s theory has proven very useful for modeling the growth and interaction of cities at a large
scale and markets at a smaller scale. It is however a partial theory because it addresses retail location from the point of view of cities as service centers and it does not provide any clear methodology of how such locations might be selected.

Christaller’s work is important to this research as it was the first attempt to theorize location as an impact of the function of cities and trade. This heavily influenced later works that tried to address location, such as the Bid Rent theory of Alonso.

**Bid Rent Theory of Alonso**

In order to understand the Bid Rent Theory of Alonso (1960) one should be familiar with the Von Thunen model of agricultural location (Von Thunen, 1826). Von Thunen’s model had similar assumptions as Christaller’s theory involving an isotropic plane with one market center for agricultural goods. The only means of transportation was the horse-drawn wagon. Transportation costs would increase as one traveled away from the market. Farmers would behave rationally. The market is also free from governmental interference. As a result of these assumptions, land use will be allocated by the principle of highest and best use with the lands closest to market commanding the highest rent. The result is a concentric pattern of land use, with intensity of land use declining with distance from the market center. Figure 2.2 illustrates the model.
Alonso (1960) patterned his bid rent theory after Von Thune’s model. He assumed the urban landscape as an isotropic plain, with a single nucleus the central business district (CBD) as the most profitable location. He also assumed a perfect competitive land market, in which utility of firms and households depends on accessibility, declines uniformly with distance from the CBD. Under these conditions, Alonso argued that service firms will compete for locations by trading off location with operating costs. Land will therefore be allocated by a competitive bidding process. The closer a land use is to the CBD is, the higher the rent will be for that land. Alonso also went a step further and showed that the amount of land required by
a resident should be factored in; this helps explain how higher income people live at the edges of a city and lower income are at the middle. Alonso suggests that higher income people have more choice and can choose to live closer to the CBD if they want to. The concentric areas around the city center went from retailing to manufacturing to residential as one travels away from the city center (Alonso, 1960). In retailing this means that locations that are closer to the customers will have higher rents but also that retailing will occur in areas that are more centralized. Figure 2.3 demonstrates the concentric areas. Von Thunen and Alonso’s works are important to retail location studies such as this as they were the first to address the idea that patronage of a location decays with distance and that locations can have a pulling effect on the surrounding population.

Retail Location Strategy of Ghosh and McLafferty

Ghosh and McLafferty (1987) proposes a three stage model used by retail and service firms to determine the best location for their business. The three steps are market selection, areal analysis, and site selection.

At the market selection stage, the firm decides which market, or markets, they are able to enter and grow in. This involves comparing demographics, transportation networks, local zoning laws and an understanding of how saturated a market already is.

At the areal analysis stage, the firm divides the selected market into subareas.
Next, the firm evaluates the physical, socioeconomic and competitive environments of the subareas to assess how attractive each one is. Then using these determinants the firm ranks the sub areas. Once the sub areas are understood, individual sites need to be analyzed.

At the site selection stage, the firm drills down to observe the visibility of the proposed locations, the local transportation network, parking, condition of surrounding neighborhood, and real estate costs in the selected sub area or areas. The firm then performs a detailed trade area analysis which involves defining the trade area, analyzing the demographics, transportation networks, competition, and forecasting potential sales. The firm ranks potential sites and selects one. Given the importance of the trade area analysis in this final stage, there has been a considerable amount of literature on the subject, particularly with the delineation of trade areas, which are reviewed here.

**Concept and Delineation of Trade Areas**

Trade areas are referred to, (Ghosh and Mcclafferty 1987) as the space surrounding a location that equates to where 70 percent or more of the location’s sales originate from. Werner and Kumar (1999) agree stating, “That is, everything else equal, stores draw their sales disproportionately from people living closer by or have higher sales in more densely populated areas.” It is analogous to Christaller’s threshold and range of the good or service. Defining the limits of the trade area is therefore of critical importance since the rest of the information needed to make a final location decision is based on the delineation of the trade area. Several approaches have been used to define the extent of a trade area, using both theoretical and empirical methods. The following examples are explored as they are important to this research’s methodology.
Thiessen Polygons or Proximal Areas Method

One of the simplest ways a trade area can be described is to create them out of what are mathematically known as Voronoi diagrams, after Georgy Voronoï, a Ukrainian mathematician, who defined them in 1908. In 1911, Alfred Thiessen, an American meteorologist, used them to interpolate weather variables over land sections. This application gave birth to the name Thiessen polygons. The polygons are created by drawing boundaries around points whereby the distance to that point is closer than any other point in space. In retailing, the points represent store locations and the space is the area where all customers will rationally shop at the closest location. Such an assumption is not very realistic, as consumer decisions are affected by more than just distance to a store. Thiessen polygons should not be used beyond getting basic understanding of trade areas or when no other method is available (Lea, 1998). Figure 2.4 exemplifies a Voronoi Diagram.

Figure 2.4 Voronoi Diagram. Source: http://mathworld.wolfram.com/VoronoiDiagram.html
The Method of Customer Spotting

William Applebaum’s (1936) work was the first to use a customer spotting or customer defined trade area. In his paper Applebaum outlines a process by which customers gave their address and filled out a shopping survey. Applebaum plotted the customer’s home locations on a map, and using concentric circles of fixed distance around the store was able to determine the limits of the store’s trade area and estimate the revenue generated in the area.

Gravity Modeling

Spatial interaction models often use the concept of attraction to explain the distribution of retail outlets. This attraction is defined in terms of product and service offering differences of retail stores and the location of the store in relation to the consumer. Riley’s Law of Retail Gravitation is the first of these models. Riley (1931) adapted the laws of gravitation of objects in space to deciding what retail center consumers would go to. His formula as seen as equation 1 identifies a breaking point based on the sizes of the retail centers and the distances between them. The breaking point represents the point at which consumers prefer a different store and thus serves as the boundary between two stores. The larger a retail center is, the greater gravitational impact it will have on consumers. Like many models of this time, this model has the classical deterministic assumptions of the isotropic plane and has been improved upon (Brown, 1992). The equation for the distance of the breaking point in the Riley model is given below in equation 1.

\[
BP = \frac{\text{distance between city } A \text{ and } B}{1 + \left(\frac{\text{population} A}{\text{population} B}\right)^{\text{populatio}n B}} \tag{1}
\]

David Huff (1963) also published a variation of the spatial interaction model
that casts interaction of consumers to retail outlets in terms of probability that a consumer will shop at a particular location. His method includes the distance and size of the stores and also includes measures of how time or distance would factor into different kinds of shopping trips a consumer might take. The Huff gravity model has become a standard in retail site selection analysis and has been adapted and elaborated on in multiple research papers since its publishing. Huff (1966) suggests a computer model dealing with location analysis. He presents a computational model that utilizes several variables from the demographics and available space of retail areas. In his model, he optimizes the location that will have the greatest amount of store profit organized by creating spatial boundaries based on probabilities of consumer patronage. Equation 2 provides the formula for the standard Huff model. P is the probability that a consumer will shop at a particular location, A is a measurement of location attractiveness and D is a measurement of accessibility, in this case it is the distance from the customer origin to the store location.

\[ P_{ij} = \frac{A_j^\alpha D_{ij}^\beta}{\sum_{j=1}^{n} A_j^\alpha D_{ij}^\beta} \]  

(2)

In fact, the Huff model is widely regarded as one of the most elegant and practical methods to estimate trade areas, forecast sales and to predict consumer shopping decisions. The validity and usefulness of the model has been proven through numerous studies as cited in the next paragraph.

Lakshmanan and Hansen (1965) demonstrated its successful application to retail areas in Baltimore. Their study helped validate that consumer patronage is inversely proportional to the distance traveled from the store’s location. Bucklin (1967) also used a similar approach to Huff, however Bucklin included and emphasized that store image may be more influential than just the store’s selling space. Brunner and Mason (1968) proved that distance, specifically drive time to a
shopping center, has great impact on consumer choice. Thomas (1976) used the Huff model to create trade areas of shopping areas in Coventry. Stanley and Sewall (1976) found additional support of the Bucklin theory that store image affects the probability of customer patronage. Lieber (1977) validated Huff’s work by showing that consumer’s choices of bowling alleys is most closely related to the size of the alley and its distance from the consumer. Turner and Cole (1980) again prove the Huff model’s usefulness in four cities in England. They stress the importance of properly calibrating the model to the available data. They also express concern that many in the business world were not calibrating their analysis properly, if at all (p146). Nevin and Houston (1980) again used the Huff model to assess the impact of store image on shopping centers; additionally they showed that store image is essential to customer loyalty. All of the previous examples use the Huff model successfully to learn more about the consumer trends in the markets they were studying. The wide variety of examples and data used are a testament to the models flexibility.

There has also been plentiful research done on how to best statistically calibrate the distance friction exponent in the Huff model. Traditionally, studies have shown that a value of around two, which indicates an exponential decay equivalent to inverse distance squared, is appropriate for most shopping needs (Forbes 1968, Bucklin 1971, Haines et al. 1972, Young 1975, Stanley and Sewall 1976, Wee and Pearce 1984). Though there are other examples of studies that claim that the effect distance has is either over or underestimated. Gautschi (1981) used the Huff model and calibrated it so that the distance factor was not overstated in the models results; other factors of store attraction were deemed more important than distance. Eppli and Shilling’s (1996) findings corroborated Guatschi’s results. However, other recent studies such as Lee and Pace (2005) indicate that when factoring in spatial
dependence between the store and the customer, distance can be understated. There is much ambiguity about how to best calibrate the model for each individual data set. Calibration in this research will be further discussed in Chapter 4.

There are other gravity models that exist for estimating trade such as the Poisson gravity model. The Poisson model is primarily used for estimating international trade patterns. Applications to individual retail centers have had mixed performance. An application to retail centers conducted by Okoruwa, Nourse and Terza (1994) was able to accurately estimate the retail sales of the Atlanta metropolitan area, but when looking at the residuals of individual malls the accuracy is highly variable, and the study was not able to use the model to estimate individual store sales within the selected malls. The Poisson method also requires consumer patronage data. As such the Huff model was deemed more appropriate for the purposes of this study.

**Introduction of Floating Catchment Areas**

Floating catchment areas (FCAs) have been a useful way to determine the relative accessibility of a location. In practice, FCAs have largely been used to research the effect hospital placement has on the accessibility of healthcare resources to a population. FCAs are based on the idea of a gravity model but behave differently. The origins of FCA research can be traced to Weibull (1976) who researched accessibility of employment to the population of Stockholm. What is unique about FCA metrics is that they do not provide a probability output like a Huff gravity model; instead they act more like the Riley gravity model and give a simple ratio of location usage per population. Though the following examples of how the FCA metrics have improved are mainly focusing on healthcare issues, the mathematics could easily apply to retail situations as well.
Modern computational work with FCAs began with Luo and Wang (2003) who adapted the standard two step floating catchment area (2SFCA) into GIS for use in estimating the populations of Chicago’s access to healthcare. The 2SFCA is very deterministic as the decay function used either states that a population at a location has complete or no access. Luo and Qi (2009) improved upon the previous study by including a decay function into the metric and determining weights based on fixed distances from the healthcare location. The case study was again in the Chicago region. Dai (2010) elected to use a kernel density function for the decay to create a continuous surface of decay from the healthcare facility.

Each of the preceding studies worked to predict the accessibility of healthcare but the model may overestimate the usage of a location, especially in more urban areas (Luo 2004, Luo 2009, McGrail 2012). In order to address this issue two solutions have been presented very recently. Wan, Zou and Sternberg (2012) have proposed a three step floating catchment area that incorporates the competition that exists between multiple healthcare locations. The overuse is removed by spatially impeding neighboring facilities.

Of great importance to this research is the work by Paul Delameter (2012). Delameter’s work addresses an overarching issue in all the previous works in that they intrinsically assume that all locations are in an optimal state. So they will always distribute 100 percent of their available supply on the surrounding population. A better solution is to apply a pair-wise weight to each location, so that unless the population is in very close proximity and the associated facility is in the centroid of population locations, it will not fully distribute its supply. The new method is called the Modified Two Step Floating Catchment Area (M2FCA) and equation 3 illustrates the formulas. W is the weight for a distance D, S is the supply variable and P is the
population or demand ratio. By aggregating the ratios for each distance the accessibility for a location A is given.

\[ Step1: D_{ij} = \frac{S_{i}w_{ij}}{\sum_{j}w_{ij}} \quad Step2: A_{i} = \sum_{j \in \{d_{ij} < d\}} D_{ij}w_{ij} \quad (3) \]

FCA metrics like the M2FCA are useful for retail planners as they give both a measurement of accessibility for each store location as well as a measurement of optimality. The challenge is picking an appropriate decay function from which to glean weights for the computations. Accessibility in more traditional gravity models is almost exclusively limited to straight line distance from customer locations or drive times from customer locations. Both are easy to compute but they have their flaws. Straight line distances ignore the actual travel routes that a customer takes. Drive time measurements are not necessarily accurate either, as drive times can change depending on the time of day, weather, design of the road network and many other reasons. The FCA metrics could also provide a way to differently assess access to retail locations in various interaction models. In the current research they are of interest because they may serve as a way to establish whether or not smaller stores can survive when their location is more accessible or optimal.

2.3 Conclusion

The purpose of this chapter was to review the two broad sets of literature on the subject matter of this thesis: retail competition and retail location strategy and how they relate to each other, the review so far has shown that competition literature does not take location into serious consideration. What little of the competition literature that does actually takes location as a given and does not really isolate the specific role it plays in affecting the nature of competition. On this point, retail
location theories, while taking competition as one of the factors in site selection, do not adequately demonstrate how location affects small store survival when faced with larger competitors. These combined represent a gap in the set of literature on competition and its role in retail location strategy.

Filling this gap is necessary as videogames are a part of almost three of four American households (ESA Report, 2011). Better understanding how specialty videogame retailers compete via location, we can gain better insight as to how other smaller retailers might compete more efficiently. To not study this case, would be to miss out on an excellent opportunity. These deficiencies are important enough within retail geography that the research that has been undertaken should be viewed as relevant and worthwhile to the discipline.
CHAPTER III

THE RETAIL GAMING INDUSTRY

In order to better understand the connections that have existed between gaming and retail, a brief history of the interaction of gaming products and the selected retailers is presented to provide a suitable background for the analysis that was undertaken in this research. First, an introduction of the connection between gaming and retailing is presented. Second, comprehensive histories of Wal-Mart, Best Buy and GameStop are explored. Next, the individual location strategies for the firms are compared. Finally, the study area are introduced.

3.1 Introduction to Gaming and Retail

Videogames have had a massive impact on the entertainment industry in the United States since their wider adoption starting in the 1970’s, yet their history has been one of tumultuous change (Baer 2005). Earlier creations of videogames were largely experimental pursuits. The first widely available console game that could be sold to households was released in 1972. The console was called the Magnavox Odyssey. By placing transparent films on the screen and inserting a different cartridge into the system, the players were able to have multiple games at their disposal. The Odyssey was unlike other home systems of the time such as Atari’s Pong, which only had the means of playing one game (Baer 2005).

Then in 1977 the gaming industry suffered its first crash, or setback. The market which had been flooded with Atari and Magnavox clones bottomed out (Montfort and Bogost, 2009). In response to this setback was to produce and release new consoles with new technology and new games (Whittaker, 2004). This marked
the first downturn that the retail gaming industry would survive. The industry was saved by not only producing new home consoles, but the advent of gaming arcades brought gaming to the wider public. Gaming companies realized that good profits could be made by placing gaming terminals in malls and shopping centers, charging players quarters for the entertainment. This idea caught on and was extremely lucrative; in 1981 the estimated value of the gaming industry was $5 billion (Whittaker, 2004). However, in 1983, the industry crashed again due to a loss in consumer confidence due to the release of very poor quality titles (Katz, 1985).

Then, as had happened before, new technology pushed new consoles for the home user and spurred the industry back to life. In 1985, the Nintendo Entertainment System was launched and would become one of the most iconic gaming consoles of all time. In fact, Nintendo also dominated and created the handheld gaming market with the release of the Nintendo Game Boy hand held system in 1989. Handheld gaming along with a rise in popularity in new home consoles resulted in the eventual decline of arcade games (Johnson, 1982). Learning from the previous crashes, the gaming industry has since consistently launched a new series of consoles at five to six year intervals. The exception is with the current generation of consoles including the Xbox 360, Playstation 3 and Nintendo Wii. These consoles have not been superseded because of the economic downturn in 2008 and partially because they were designed with a 10-year lifespan (Ashcraft, 2010).

Once gaming had largely been comprised of PC gaming, handheld gaming, and home console gaming. Now, with the increase in the availability of tablets and smart phones, mobile gaming is expected to grow rapidly. The advent of the internet has also had a profound effect on gaming, allowing users on multiple consoles to connect and interact with each other via the game they are playing. The internet also
allows users to digitally purchase content for games, referred to as downloadable content or DLC. This has opened up new revenue streams for game developers as they can sell expansions or additional content to a game someone already owns for a price less than the cost of the initial game. However, widespread access to quality broadband internet remains elusive for more rural areas in the nation so physical gaming media still has its importance.

The year 2013 will be another milestone in gaming as two console manufacturers, Sony and Microsoft, are expected to unveil the next generation of home consoles. The Nintendo Wii-U was launched in 2012. Also of note during 2012, the gaming industry entered a slump. The significant decline in sales is due to the transition period that is present in the market as the game developers hold off on new projects until new consoles are released; only time will tell if the new consoles can stave off another crash in the cyclical evolution of the video gaming industry (NPD, 2012). Videogame retailing now has a long and lucrative history and dozens of retail firms have elected to sell gaming products at varying intensities. For the purpose of this study, we are interested in observing how Wal-Mart, Best Buy and GameStop interact whilst selling gaming products.

3.2 History of Selected Firms

The retail gaming industry has grown substantially from its early beginnings in the 1980’s Figure 3.1 comes from the Electronic Software Association’s 2010 report about the gaming industry and the data were collected from NPD Group Inc. The graph does not include hardware and accessories that were sold, but in 2010 the overall retail sales of gaming products including software, hardware and accessories totaled $25 billion. Comprehensive market shares between retailers for these products
are largely unknown as they do not release that information for study. Additionally
the percentage split of gaming products that were sold as physical media was 76
percent physical, 24 percent digital (ESA, 2011). This means that most sales of
gaming products still happen in brick and mortar locations. Among these brick and
mortar retailers that sell videogames, three prominent firms stand out, Wal-Mart, Best
Buy and GameStop. Understanding each firm’s background and history is essential to
understanding how they compete. Thus, the next section will provide a brief history
of the major players in the video gaming industry.

Figure 3.1 U.S. Sales of Gaming Software.
3.2.1 History of Wal-Mart

Wal-Mart is the creation of Sam Walton and is widely known as the world’s largest retailer. The first store was opened in 1962 in Arkansas. It featured a large store format that had a multitude of products that, by sheer volume, were able to be sold at discount prices. By 1969, the firm had opened 33 new Wal-Mart stores. By 1978, the firm included in its large array of products and services, jewelry, pharmacies and even auto service centers. Expanding even further in 1988, Wal-Mart began its famous “supercenter” format. This included the addition of grocery goods. The supercenter was very successful and the firm continued to expand at an accelerated rate. However such rapid expansion did not come without consequences. There were numerous instances of Wal-Mart destroying small retail businesses in smaller towns where Wal-Mart would locate. Wal-Mart attempted to fight this attitude with a public relations campaign and created various means to donate money to the communities it located in.

By 1994, the company’s growth had slowed and, in order to keep the firm growing at the pace it was used to, Wal-Mart began converting its discount stores to the supercenter format. This allowed them to continue to grow and expand into Canada, Mexico and even Europe. By 2001, Wal-Mart had more supercenters than it had discount stores. In the same year, it became the largest grocery retailer in the United States; along with already being the largest nongovernmental employer. By 2003, revenue passed the $240 billion mark and the company was facing increased scrutiny from its practices. Nevertheless Wal-Mart shows no interest in slowing its expansion. The preceding information about Wal-Mart’s history comes from the
3.2.2 History of Best Buy

According to the International Directory of Company Histories (2004), Best Buy was created by Richard Shulze in 1966. The first stores opened as a home and car sound equipment store called Sound of Music. Slowly, the stores that opened under the Sound of Music flag added home appliances and other consumer electronic goods. Eventually, the firm would rename itself Best Buy and converted its stores to a superstore format similar to that of Wal-Mart. However, competitors had also followed suit and competition between Best Buy and other supercenter retailers was fierce. In order to make the store more appealing to consumers, they famously changed formats. Best Buy removed its commissioned sales positions, lessening the focus on customer and store representative interactions. By letting the customers look at the products independently, but providing them the ability to ask salespeople if assistance was needed, customers enjoyed the shopping experience more. Subsequently, this allowed each store to operate with far less personnel.

By 1993, Best Buy operated 151 stores in the Midwest and was targeting areas controlled by its rival Circuit City. In fact, the next decade would be dominated by the competition between Best Buy and Circuit City. Best Buy countered by changing store formats again to an even larger format. The change worked and by 1996 Best Buy and Circuit City were virtually neck-and-neck in market share. By 1997, they surpassed Circuit City and were the largest consumer electronics retailer in the nation. In 1998, they opened even more store locations and created their own website for selling their products. They began offering smaller format stores to areas with lower populations in order to penetrate less dense markets. In the 2000’s, Best Buy
continued to grow and eventually forcing rival Circuit City out of the market in 2009, when Circuit City closed all of its remaining stores (International Directory of Company Histories, 2004).

Shortly after defeating Circuit City’s, Best Buy would face new rivals, as E-commerce, or E-tailing, companies began taking shares of the gaming market. Websites such as Amazon.com competed directly with them on consumer electronics goods and could ship them to the consumer in most states without charging sales tax, making the product cheaper as well. In 2011, the company lost 40 percent of its stock’s worth. Additionally, other problems with competing with e-commerce existed. As Larry Downs (2012) a contributor for Forbes magazine states:

Online giants, notably Amazon, are the future. Online retailers are more efficient, because they lack physical locations, and so can offer better prices. Shopping online is also more convenient. On the web, consumers can shop anywhere they are, day or night.

Best Buy and other traditional retailers complain that Amazon can undercut them in prices because the site doesn’t charge sales tax, and that Amazon customers use Best Buy as their showroom, taking advantage of the extensive, well-stocked locations and knowledgeable staff to research products they actually buy from someone else online.

Best Buy is currently engaging in a restructuring program, in an attempt to stay more relevant to the changing digital market for electronics. This includes closing 50 stores and 100 mobile locations (Smith, 2012). Whether or not Best Buy is able to survive its woes remains to be seen.

3.2.3 History of GameStop

The advent and growth of GameStop is a complicated journey involving several small gaming and computer stores, primarily Babbages and Software Etc. Rival stores that were eventually brought under the GameStop flag were Funco Land,
and Electronics Boutique.

**Babbages**

Specialized videogame retailing began in the early 1980’s and in fact Babbages and Software Etc. started in the same year, 1984. The stores were able to ride the new software that had taken the gaming world out of its second major decline. Babbages realized the market that existed for computer and home console software and opened a chain of specialty stores for videogames. They made a point of selling the newest software and games and updated the store’s inventory frequently to keep up with new developments. In four short years, Babbages had over 100 retail outlets. The same year the company went public and then by 1991, the firm opened another 100 stores and growth was spurred by the release of Nintendo’s Game Boy handheld game system. In 1994, with a total of 300 stores Babbage’s merged with a competitor Software Etc. The merger was seen as a way to better compete with larger retail companies such as Best Buy, Circuit City, and Wal-Mart. The merger resulted in the stores keep their individual names and the parent company becoming known as Neostar Inc.

**Software Etc.**

Software Etc. also opened its first store in 1984 and was a subsidiary of B. Dalton’s Bookstores. Initially Software Etc. began as an electronics store that was located inside the larger bookstore. In 1986, Dalton was sold to Barnes and Noble Inc. Under new leadership Software Etc. began separating from Barnes and Noble and individual locations were opened. These locations were located mainly in regional malls. By 1988, Software Etc. expanded quickly to 200 stores nationwide
and was able to take advantage of the new systems and software that were released in 1990. By the time Babbages merged with them, they operated almost 400 stores. After the merger, Neostar would have a hard time expanding as larger discount and electronics retailers had picked up on the profitability of gaming and were now much stronger competition.

**Acquisition of Funco Land**

In fact, the competition was so overwhelming that in 1996 Neostar Inc. filed for chapter 11 bankruptcy protection. As a part of a large restructuring of the company 42 stores were closed and the owners renamed their firm Babbage’s Etc. The restructure strategy worked and by 1999 the company was growing again. The expansion was again spurred on by a new generation of game consoles and software, namely the Nintendo 64. This year was also a pivotal one for Babbage’s Inc. as they opened 20 new test stores in strip malls called GameStop. That same year Babbage’s Etc. was purchased again by Barnes and Noble. Barnes and Noble were so aggressive that the next year they also purchased Funco Inc., a competing gaming retailer founded in 1991 that had operated mainly in strip malls. More importantly to GameStop’s future, Funco Land stores were unique in that they dealt with used gaming equipment and software. All Funco Land stores were renamed GameStop. In 2005, GameStop Inc. bought back its shares from Barnes and Noble effectively becoming autonomous (International Directory of Company Histories, 2005).

**Acquisition of Electronics Boutique Inc.**

The year 2005 marked another major milestone in GameStop’s history. The firm bought out long time competitor Electronics Boutique Inc for the sum of 1.44
billion dollars (Thorsen, 2005). This effectively created the largest gaming specialty retailer in the world. By 2010, the firm operated 4500 stores in the US and over 2000 stores internationally where the firm continues to grow (2010 GameStop Company Report), of those 4500 national stores 108 of them exist in the study area for this research.

3.3 Study Area

The State of Michigan was chosen for this study as the researcher has unique knowledge of the state and some of the retailing that takes place in it. Michigan is located in the center of the Great Lakes; Indiana and Ohio lay to its south and Wisconsin lies to the west across Lake Michigan. The Lower Peninsula is home to the majority of Michigan’s population, cities and the majority of the retail sites in the state; as a result the Upper Peninsula will be removed from this research.

The state also has a wide variety of retailing firms and markets for them to compete in. Specifically, this research aims to assess the competition that is present between three retailers that all sell videogames at varying degrees. Wal-Mart, a general retailer, Best Buy an electronics and appliance retailer, and GameStop a smaller retailer that specializes in videogame related products. The competition between these retailers is evenly spread out throughout the study area. Assessing the competition between these retail firms is applicable to academic study because it could shed light on whether or not a smaller retailer, such as GameStop, is capable of surviving by virtue of its location strategies. In 2010, GameStop operated 108 stores, Wal-Mart had 77 stores and Best Buy had 26 stores within Michigan. Figure 3.2 illustrates with a map where the store locations are in the year 2010.
Figure 3.2 Store Locations 2010
3.4 Conclusion

As the histories of each firm show, they have very different approaches to retailing videogame products. The review of each firm and the overall history of gaming retail should provide a sufficient enough background to provide context for the objectives that this research aims to accomplish. In the next chapter this work will describe the methods used to analyze the competition between these selected firms.
CHAPTER IV

METHODS

This chapter provides a thorough overview of the methods used to address the research question and complete the objectives presented in the introduction chapter. First it will provide a more detailed look at the study area. Next the research design, data needs and collection procedures are presented. Finally, the various methods of analysis are explained.

4.1 Study Area

The study area chosen for this research is the State of Michigan, specifically the Lower Peninsula. Michigan is located in the center of the Great Lakes, with Indiana and Ohio to its south and Wisconsin to the west across Lake Michigan. The Upper Peninsula was not included in the study because of its very sparse population.

4.2 Data Collection and Design

Research Design.

This research was conducted using a case study approach. The main research question is how can a smaller format retailer compete with supercenters and survive when most others fail. To highlight an example of a firm that seems to be surviving in a retail climate dominated by supercenters GameStop was selected because its primary competing firms appear to be Best Buy and Wal-Mart, both of which are supercenters. Combining information that can be disseminated from GIS software and the history of each firm provided both quantitative and qualitative information to assess the location strategy of GameStop and how that has influenced its ability to
compete successfully. These are the previously established research objectives.

**Data Needs**

In order to address the research objectives accurate financial information at a store level would be ideal. Real time and historical market share figures and up to date store locations provided by each firm would provide accurate ways to compare each firm’s performance. Additionally interviewing or getting written statements of company representatives outlining the location strategies employed by the selected firms would allow a quick and complete comparison.

However, due to their sensitive nature of these kinds of data all three companies in the case study companies were unwilling to provide data. As a result, the required data was primarily gathered and estimated from publicly available resources.

**Data Collection**

A significant amount of data was taken from the United States Census Bureau including the 2000 and 2010 ten-year census populations, yearly population estimates at the county level from the American Community Survey. Income and spending estimates were obtained from the Bureau of Labor Statistics and the Bureau of Economic Analysis. Store locations and square footages were obtained from the Info USA database and ESRI’s Business Analyst Software. Shapefiles for the census tracts of Michigan were downloaded from the State of Michigan Geographic Data Library.

**Store Data Collection and Preparation**

In order to accomplish the first objective, assessing the location strategy of
GameStop, it was essential to analyze the spatial distribution of the store locations. The addresses gleaned from the InfoUSA database and the Business Analyst software was geocoded into shapefiles that included sales and square footages on a yearly basis. Duplicates were removed.

Wal-Mart, Best Buy and GameStop are very different sized companies with very different business strategies. In order to make a useful comparison between the three firms, the store sales information for Wal-Mart and Best Buy was multiplied by their estimated percentages of store revenue that comes from the sale of videogame related products. The Statistics Brain website showed that Wal-Mart made approximately 6% of its revenue from gaming products. Best Buy’s annual company reports showed that approximately 12% of its revenue came from gaming products. These are admittedly estimations, but considering the lack of publicly available information about these firms it was, for the time being, the best estimation that can be made.

**Location Strategies of Selected Firms**

As the history of each firm shows, the different retailers have very different growth strategies and business models. In order to understand how the firms expand and locate stores, recognizing how phenomena diffuse through space is vital.

**Diffusion of Retailers**

Essentially, phenomena in space spread out by a method of diffusion. There are four methods of diffusion described by Cliff et al. (1981) and Gould et al. (1991) include: expansion diffusion, relocation diffusion, contiguous diffusion and hierarchical diffusion. Expansion diffusion occurs when a phenomenon expands
steadily either in one direction or in all directions. Relocation diffusion occurs when something jumps location entirely, but leaves its starting location as well. Migration is an example of this. Contiguous diffusion occurs when the phenomena have to touch one another or can only exist within a certain distance of one another. Hierarchical diffusion occurs when a phenomenon spreads through a hierarchy or some organized structure.

Wal-Mart, who pioneered supercenter retailing, sells the greatest variety of goods and locates primarily in rural areas as the lower prices will make people willing to drive farther to the store locations. Best Buy locates close to shopping malls and other central business districts, but almost always in more populated areas. They attempt to use the supercenter model of retailing but as they limit themselves to electronic goods they are not able to diversify their inventory as much as Wal-Mart. GameStop as a much smaller retailer operates stores that locate primarily in strip malls but does have a presence in more traditional retail centers. What is more important to this research is ascertaining how they have grown and how does each firm geographically expand.

It has been found that Wal-Mart has expanded via Inverse Hierarchical Diffusion. They locate in rural areas before moving into the inner cities of markets. This is seen as what is opposite of the idea of the diffusion of supermarkets (Gulati 2008, Graff 2006). Best Buy appears to engage in supercenter or hypermarket competition as well but does so using the standard hierarchical diffusion from areas with larger population before moving outward to smaller cities. Assessing GameStop’s diffusion is challenging as they have conglomerated 4 retail firms with different strategies into one company. As the company history shows, Babbage’s located primarily in regional malls and city centers as did Software Etc. EB Games
and Funco Land operated more exclusively in strip malls. As a result it is difficult to see if GameStop behaves as either Wal-Mart or Best Buy. One goal of this research is to ascertain exactly how is GameStop expanding.

**Trade Area Preparation**

Since accurate market share or financial information was not available, it had to be estimated by creating approximate measurements of each store’s trade area. This facilitated the completion of this research’s second objective, determining if and how GameStop’s location strategy affects its ability to compete. In order to measure each firm’s control of space, accurate population and income figures for each of the 2613 census tracts in the study was required.

These datasets were available from the Census, but only for the years of 2000 and 2010, and the definition of the census tracts changed with each census, so for this research the 2010 census tracts architecture was used. The census has yearly population and income estimates through the American Community Survey program at the county level. In order to disaggregate the demographics accurately down to the census tracts, the dasymmetric method and tool created by the USGS (http://geography.wr.usgs.gov/science/dasymetric/) was implemented. Land usage imagery was taken from the Michigan Geographic Data Library. The National Land Cover Database images were obtained for the years 2001 and 2006, the 2001 image was applied to the years 200-2005 and the 2006 image as applied for the years 2006-2010. These images were classified into four levels of urbanization. The dasymmetric tool, using these as a base, calculated the demographic variables at an interval of every 30 meters. Then, a series of spatial joins and pivot tables were used to total and append the demographics back to the tracts shapefile. The result was a yearly
population and per capita income estimate by census tract. Out of the available income information, the amount of income that was used to purchase videogame related products was estimated from the Bureau of Labor Statistics Consumer Expenditure Survey using the “Income after Taxes” tables and using the average of the “Audio Visual Equipment and Services” and “Entertainment” spending fields.

4.3 Data Processing and Analysis

Cluster and Distance Analysis as Competition

Clustering and distance analysis was used to accomplish the first objective of assessing GameStop’s location strategy. In order to test the level of competition among the three firms, a couple of techniques can be administered. One method to assess the competition between firms was to measure the distance between competing stores. Firms that locate close to one another typically are competing more directly (Hamilton et al 1989, Gupta et al 1997, Miller et al 1999). This can be done using the Nearest Neighbor Table tool in ESRI ArcInfo 10.0. This tool creates a table that shows the distance between the closest stores. This was done for each year of the data to see if there were changes in the location strategies.

Secondly, cluster analysis of the stores was done by using Ripley’s K function that is also available as a tool in Arc 10.0. Ripley’s K function provides a useful metric of measuring the clustering of locations at varying distances. At each distance interval, the clustering or dispersion of stores is measured and if it goes beyond the set confidence interval the locations are either clustered or dispersed. Both of the described metrics should give insight as to the store location tactics employed by the firms in question. Having the data on a yearly basis will show if any patterns exist.
and identify patterns changes over time. If distances or clustering between locations changes significantly from year to year then a possible change in strategy can be implied. Additionally looking at maps created yearly can isolate when and where GameStop will locate to its competitors; this can also give a window into its location strategy. Connecting the history of GameStop’s business practices should also demonstrate its current strategy. It should be noted that firms which do not cluster can still compete, but in this case study it provides a measurement of how directly the firms are choosing to compete.

Trade Area Analysis

In order to accomplish the second objective of this research, estimating the performance of GameStop in the videogame market was necessary. This was done by approximating the trade areas of each store location and assessing each firm’s performance yearly. Three methods were used to do this: Thiessen polygons, Huff modeling, and using the M2FCA accessibility output as a substitution for the exponent on the Huff model to represent accessibility beyond distance. Three methods were used because this research hopes to show that with varying assumptions, the performance of GameStop will remain consistent. This will provide the best way to assess if GameStop’s location strategy is effective with the limited data.

Thiessen Polygons

First, trade areas for each store were created with Thiessen polygons, also known as Voronoi polygons. Such polygons are created by drawing the boundaries between points where the distance to a point is shorter than any of the alternate
points. In the case of this research, the polygons represented areas that customers, if operating in a purely rational manner with respect to distance, will shop only at the closest location available. Though consumers are inherently not perfectly rational, this method is quick at determining trade areas and can uncover general trends in where store locations are being chosen. Thiessen polygons were created for each year of data for store locations.

**Huff Model**

Second, trade areas were created using the Huff model. The Huff model of retail gravitation is an inverse exponential decay model that uses the measurement of attractiveness of a location and a measurement of accessibility to the location, most often the distance between the store and the customer origin. The result is a probability that customers within certain distances from the store will use it. This can be used to estimate sales of a location. If there are multiple stores then the probability is spread between them based on the distances and attractiveness of the locations.

The model has seen widespread use and has been externally verified by several studies (Lakshmanan and Hansen 1965, Bucklin 1967, Brunner and Mason 1968). The tool for creating Huff models in this fashion from ESRI’s Business Analyst was unfortunately not feasible for this research as it only created the probabilities one store at a time, with over 200 stores and a decade of data it made processing the information quickly impossible. Thankfully, a python script had been created from another ESRI user that was capable of handling multiple stores, the script can be found here: http://arcscripts.esri.com/details.asp?dbid=15999. The script was executed on each year of store data to provide analysis as to who has market control. The alpha exponent was set at 1 and the beta exponent for distance decay was set at -2, or inverse distance squared. This is generally understood as the best way to
use the huff model when customer survey data is not available. Attractiveness was the estimated store square footages gleaned from the InfoUSA and ESRI business databases. There are numerous ways someone could calibrate the Huff model, but given the lack of specific information about customers for each store this method was deemed appropriate.

**Modified Huff Model**

Lastly this research proposed a new way of approaching the beta exponent in the Huff Model. Typically the beta value is estimated by using known customer locations and frequencies of shopping visits to obtain a value for the inverse exponential decay (Wee, 1985). The model can also be calibrated by taking a log transformation of the equation and the related data to invoke the linear form of the equation whereby the exponents can be measured via regression (Huff, McCallum, 2008). Or, less empirically, the model could simply be re-run with changing the beta value until the most accurate exponent is found. Since this research did not have information dealing with actual customer locations or frequencies, it was decided to substitute the mean value of the accessibility of the stores for that year obtained from the M2SFCA functions for the beta exponent in the Huff model. Essentially, the distance decay as one travels away from the location decreases on a measurement of the accessibility to the available stores. This method provided a possible new way to create a value for the exponent.

Much work has been done assessing the optimal location for hospitals; this has recently been done via the application of Floating Catchment Areas referred hereafter as FCA’s. FCA’s are used to measure the accessibility of a location. Recent research has resulted in the creation of the Modified Two Step Floating Catchment Area (Delamater, 2012). This method of conducting an FCA is unique in that it does
not mathematically assume that the location is inherently optimal. The formula results in a simple ratio between supply and usage. For hospitals, it relates to the number of beds to the population in defined areas around the hospital.

In the instance of this research, the equations were adapted to use store sales as the supply and the available income for electronic goods spending as the potential usage of the store. This methodology was completed by using inverse distance squared as the decay function, in order to coincide with the other forms of analysis that was undertaken. Weights were taken from the inverse distance decay function at the distances of 5, 10, and 20 miles around the site. Once buffers were created at those distances they were overlaid with a shapefile of the census tracts. In order to facilitate efficient processing and to avoid inaccurate overlaps, the census populations were converted into point shapefiles based upon the tract’s centroid.

4.4 Limitations of Methodology

There are a number of limitations of this study that need to be acknowledged. First off is the availability of relevant data. Retailing is such a competitive entity and gaming is such a lucrative product that real market share information is virtually nonexistent for researchers outside of the industry itself. As such, the percentage of revenue the selected supercenters earn from videogame sales were estimated. Population and income data are only available at the county level at yearly intervals. Smaller scale estimates were obtained dasymetrically from land use land cover imagery at five square kilometer intervals and then aggregated up to census tract boundaries. The process may not fit the actual population distributions exactly. Additionally, census tract boundaries change and for the purposes of this research the 2010 framework was applied to all years.
Obtaining accurate consumer spending statistics for videogames is problematic as the Consumer Expenditure Survey from the Bureau of Economic Analysis does not have a specific category for gaming products and an estimate was made from the categories of electronics, entertainment and toys. Additionally, the NAICS system does not classify GameStop for what it is specifically. The store databases use different NAICS designations of either toy stores or electronics stores. In reality it is a bit of both. To create an accurate estimate of consumer spending on gaming products, the average of these two categories from the Consumer Expenditure Survey was used.

In order to make the data processing as perspicuous as time constraints dictated only two competing firms were chosen in contrast with GameStop. In reality, there are many other firms including Target, Meijer, K-Mart, Circuit City, and Toys’R’Us, that should be included if the intention of further research is to accurately model market shares.

The trade area analysis has a number of assumptions that also have to be acknowledged. The Thiessen polygon analysis assumes perfect rationality of the consumer, something that is commonly known to be untrue. The Huff model has some very specific limitations outlined succinctly by Buckner in 2005:

While gravity models are typically known as mathematical simulations, it is important to remember that there is ample opportunity for analysis error. […] it involves quantitative input of qualitative aspects of the competitive environment. […] As a result, analyst experience and expertise play a definite role in working with gravity models

A second limitation of gravity models concerns the methodological premise of which the model is based. By its definition, a gravity model in large part explains the store sales on the basis of size and distance. […] Such a relationship, in its purest sense, implies that shoppers travel to the nearest shopping opportunity, never deviating from the
motivation of locational convenience. [...] In such cases analyst judgment must enter into the process in order to properly set up the model’s exceptions to better simulate reality (139-140).

The FCA metrics explored in this research are also very new and mainly deal with issues of accessibility in medical geography. This study is the first to attempt to fit them to the needs of the retail and site selection industries. It will take time for such metrics to be used in more retail studies and for them to be validated comprehensively in other markets beyond gaming products.

Despite the almost overwhelming lack of industry specific data, this research has been able to make the best estimates possible with the secondary data that is available through public governmental datasets and the data obtained from the InfoUSA and Business Analyst databases. The results should not be considered a precise real world model of the gaming market, but should be sufficient enough to answer the research question as to how do location strategies impact GameStop’s ability to survive in a market dominated by larger format retail outlets.

4.5 Conclusion

The methods outlined in this chapter provided sufficient ways to address the research questions related to how smaller format stores compete with supercenters. This next chapter presents the analysis and results of the study using these methods.
CHAPTER V

RESULTS

This chapter presents the results of the methods used in this study. It begins with the analysis of the location strategy of GameStop and follows with an analysis of the ways in which this location strategy has helped it to survive. The first involves the results of the distance and cluster analysis and the historical location pattern of GameStop stores in Michigan. The second involves the results of the trade area estimation and analysis, using multiple techniques: Thiessen polygon analysis by year, the Huff model by year, and a modified Huff model using a substitution with an FCA metric.

5.1 Location Patterns

To best understand the spatial analysis that follows, it is important to understand where the physical locations of the stores exist and to understand what patterns or changes are present. This can be accomplished by looking at the maps of store locations between the years of 2000, 2005, and 2010 and table 5.1 below indicates the number of stores in the study area categorized by year and firm.
Table 5.1

*Number of Stores in Michigan by Firm and Year*

<table>
<thead>
<tr>
<th>Year</th>
<th>Best Buy</th>
<th>Wal-Mart</th>
<th>GameStop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>9</td>
<td>39</td>
<td>22</td>
</tr>
<tr>
<td>2001</td>
<td>14</td>
<td>41</td>
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</tr>
<tr>
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<td>16</td>
<td>44</td>
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</tr>
<tr>
<td>2003</td>
<td>19</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>2004</td>
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<td>52</td>
<td>62</td>
</tr>
<tr>
<td>2005</td>
<td>22</td>
<td>58</td>
<td>74</td>
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<tr>
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<td>67</td>
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<tr>
<td>2007</td>
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<td>68</td>
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</tr>
<tr>
<td>2008</td>
<td>24</td>
<td>73</td>
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</tr>
<tr>
<td>2009</td>
<td>24</td>
<td>76</td>
<td>103</td>
</tr>
<tr>
<td>2010</td>
<td>26</td>
<td>77</td>
<td>108</td>
</tr>
</tbody>
</table>

As the table shows GameStop has grown rapidly and Wal-Mart effectively doubled their number of stores in the decade. Best Buy also grew, but at a much slower pace.
Figure 5.1 Store Locations 2000.
The Store Location map above (Figure 5.1) shows that in 2000 GameStop already had multiple locations in the Greater Detroit area and has expanded as far north as Midland. Wal-Mart had a presence in almost every area and controlled the more rural northern section. Best Buy had a significant showing in Detroit, but also has other stores in Grand Rapids, Lansing, Kalamazoo and Bay City. At this point in time GameStop is already locating multiple stores to any given supercenter primarily Best Buy.
Figure 5.2 Store Locations 2005.
Wal-Mart, by the year 2005, had inundated the Greater Detroit Region and had opened stores close to existing ones near Kalamazoo and Lansing. Best Buy opened new stores in Detroit, Lansing, Holland and Traverse City. GameStop opened new stores around the supercenters that had expanded in Detroit and began competing directly with Wal-Mart in more rural areas further north. GameStop also followed Best Buy into Traverse City.
Figure 5.3 Store Locations 2010.
By the year 2010 Wal-Mart had opened even more locations in the Detroit region and towards Lansing. New locations also appeared in Muskegon and Bay City. Best Buy’s store distribution remained largely unchanged. It is possible that by this point they had saturated the available urban centers that had the ability to support their store. GameStop followed the new expansion of Wal-Mart’s quickly and managed to engulf almost all the space between supercenters in Detroit. GameStop continued to expand northward locating very close to Wal-Mart’s long established rural foothold.

These three maps show that GameStop is following the expansion of the supercenters through space and time. GameStop locates closely to the supercenters and appears to open multiple locations around them when possible. This could be an indication of GameStop using cannibalism to compete with the supercenters. Most GameStop’s appeared around a new supercenter location within five years and as the company grew it spread out northward into more rural, smaller cities.

5.2 Distance and Cluster Analysis

In order to assess the level of competition between the firms, quantifying how the firms locate in space to each other was necessary. The near table tool was used in ArcGIS to assess the average distance between GameStop and its competitors as a measure of competition, as well as GameStop to GameStop distances as an indicator of cannibalism. Table 5.1 shows the average distance to the closest store by year. The average distance from GameStop to BestBuy locations decreased from 2000 to 2004, and then it increased through 2010. This makes sense when looking at the maps of store locations as Best Buy in 2010 only had 25 stores in the entire state. GameStop had most likely saturated the areas around BestBuy stores as early as 2004 and then
proceeded to expand elsewhere increasing the average distance. GameStop to Wal-Mart distances decreased steadily throughout the decade indicating they were diffusing their locations to compete with Wal-Mart as resources allowed. GameStop to GameStop distances also decreased steadily for the ten-year period. This is a good indication that GameStop cannibalizes its own stores in order to achieve more comprehensive market penetration. Overall the distance measurements show that GameStop vies directly with its larger competition.

Table 5.2

<table>
<thead>
<tr>
<th>Year</th>
<th>Best Buy</th>
<th>Wal-Mart</th>
<th>GameStop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>10.7</td>
<td>9.0</td>
<td>13.2</td>
</tr>
<tr>
<td>2001</td>
<td>7.9</td>
<td>7.8</td>
<td>13.8</td>
</tr>
<tr>
<td>2002</td>
<td>8.6</td>
<td>8.5</td>
<td>12.2</td>
</tr>
<tr>
<td>2003</td>
<td>5.4</td>
<td>6.9</td>
<td>9.5</td>
</tr>
<tr>
<td>2004</td>
<td>5.9</td>
<td>5.4</td>
<td>8.2</td>
</tr>
<tr>
<td>2005</td>
<td>6.7</td>
<td>5.1</td>
<td>8.4</td>
</tr>
<tr>
<td>2006</td>
<td>6.7</td>
<td>3.6</td>
<td>7.9</td>
</tr>
<tr>
<td>2007</td>
<td>6.2</td>
<td>3.4</td>
<td>6.5</td>
</tr>
<tr>
<td>2008</td>
<td>6.7</td>
<td>3.0</td>
<td>6.5</td>
</tr>
<tr>
<td>2009</td>
<td>6.8</td>
<td>2.7</td>
<td>6.5</td>
</tr>
<tr>
<td>2010</td>
<td>7.7</td>
<td>2.7</td>
<td>6.8</td>
</tr>
</tbody>
</table>

In order to determine if the firms were clustered by year and at varying scales, Ripley’s K function was executed via ArcGIS. The equation for the Ripley’s K
function can be found below as equation 4. Essentially, the Ripley K function gives a result $L$, at a distance $D$ within a calculated confidence interval. If the observed $L$ values fall above the expected $L$ values the point pattern or distribution is significantly clustered. If the observed $L$ values fall below the expected $L$ values, the point pattern or distribution is significantly dispersed. Figures 5.1 through 5.10 graphically illustrate the results. The output from the Ripley’s K function is consistent throughout the decade indicating that at every scale the firms in question are clustered significantly. This strongly support spatial competition between the firms and subsequently support the idea that competing firms will locate via the principle of minimum differentiation.

$$L(d) = \frac{\sqrt{A \sum_{i=1}^{n} \sum_{j=1}^{n} k(i,j)}}{\pi n (n-1)} \quad (4)$$

![K Function Diagram](image)

*Figure 5.4 K-Function Results for year 2000 (Distance in Meters)*
**Figure 5.5** K-Function Results for year 2001 (Distance in Meters)

**Figure 5.6** K-Function Results for year 2002 (Distance in Meters)
Figure 5.7 K-Function Results for year 2003 (Distance in Meters)

Figure 5.8 K-Function Results for year 2004 (Distance in Meters)
Figure 5.9 K-Function Results for year 2005 (Distance in Meters)

Figure 5.10 K-Function Results for year 2006 (Distance in Meters)
Figure 5.11 K-Function Results for year 2007 (Distance in Meters)

Figure 5.12 K-Function Results for year 2008 (Distance in Meters)
Figure 5.13 K-Function Results for year 2009 (Distance in Meters)

Figure 5.14 K-Function Results for year 2010 (Distance in Meters)
5.3 Trade Area Analysis

To ascertain how GameStop’s location strategy has helped it to compete against supercenters, trade area analysis was performed using Thiessen polygons, the original Huff model and an alternate Huff model approaches.

Thiessen Polygons

As a general metric for estimating trade areas, Thiessen polygons are a useful and quick way to estimate the potential sales that are captured by each store. However, the method assumes perfect customer rationality when considering distance. In particular, it is based on the nearest center hypothesis which states that given all choices, consumers will go to the store that is nearest to them to buy the goods they need. Thus, no features of the stores that could impact patronage are considered either. As distance is the only determinant of store patronage, the firm that bisects the greatest number of competing locations will end up with the most sales.

Figures 5.15-5.17 are maps of the Thiessen polygons.
Figure 5.15 Thiessen Polygon Trade Areas 2000
As Figure 5.15 shows, Wal-Mart had a significant coverage in the northern part of the Lower Peninsula and in the more rural regions in 2000. At that point, Wal-Mart had already expanded across the geographic extent of the study area. This matches its method of inverse hierarchical diffusion. GameStop had a small selection of stores, mainly focused in the major urban areas like Detroit and Lansing. Best Buy had a similar distribution of stores.
Figure 5.16 Thiessen Polygon Trade Areas 2005
In just five years, by 2005, Best Buy had opened additional locations close to their existing ones and expanded in the Grand Rapids and Traverse City areas. Wal-Mart, now embroiled in its competition with Meijer, started expanding more directly into the urban centers including Detroit. GameStop’s presence seems to expand dramatically. The reason for this is twofold: (1) GameStop did open new locations by 2005 and (2) more importantly in 2005 GameStop bought out its primary rival EB Games. The result is an abundance of locations in the major cities and some expansion northward.
Figure 5.17 Thiessen Polygon Trade Areas 2010
As Figure 5.17 illustrates, by 2010 each firm has largely saturated the Detroit region. GameStop started to expand into smaller towns and cities along the primary road networks. Best Buy mainly opened new locations in the Greater Detroit region, as did Wal-Mart. Beyond the geographic trends that can be seen in these figures; the Thiessen polygons provide a way to estimate market share percentages when overlaid with the potential gaming sales estimates. Table 5.2 shows the percentage of the yearly potential sales captured by each firm.

Table 5.3

<table>
<thead>
<tr>
<th>Year</th>
<th>Best Buy</th>
<th>Wal-Mart</th>
<th>GameStop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>14.4</td>
<td>45.1</td>
<td>40.3</td>
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<tr>
<td>2001</td>
<td>18.9</td>
<td>41.3</td>
<td>39.6</td>
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<td>2005</td>
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<td>2010</td>
<td>13.0</td>
<td>36.3</td>
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</tr>
</tbody>
</table>

Through this simple, some patterns can be observed. Best Buy expanded, but very slowly. Wal-Mart, despite its ability to expand quickly into the urban centers, got its percentage eaten up by GameStop. As GameStop opened more locations in
close proximity to Wal-Mart and Best Buy, it appeared to effectively interrupt the supercenters influence on space. This was reflected by the estimated sales captured.

**Huff Model Analysis**

As mentioned in previous chapters, the Huff model is one of the most popular methods for estimating trade areas. For this research, the standard coefficients were used for the model. Statistically, calibrating the model is not possible due to the lack of consumer information. Figures 5.18 through 5.20 are maps showing the impact of each firm for the years 2000, 2005 and 2010. Each map depicts which firm has the largest percentage of captured sales in each census tract.
Figure 5.18 Huff Trade Areas 2000.
The Huff analysis for the year 2000 shows that GameStop’s influence was highly concentrated in the main cities of the market, where they maintained a notable presence. However, Best Buy had an even stronger hold on the urban areas. Wal-Mart’s influence was focused on the rural areas.
Figure 5.19 Huff Trade Areas 2005.
The year 2005 shows that Best Buy had a solid hold on the major cities in the study area. Wal-Mart solidifies their foothold in the rural regions and expands into the Detroit region. GameStop, despite having the greatest number of locations, only had a strong showing in Detroit and Grand Rapids.
Figure 5.20 Huff Trade Areas 2010.
The 2010 results largely show the same trends as 2005 with each firm concentrating on the Detroit Region. GameStop again also expanded into the more rural areas of the state, but the impact appeared to be small.

As with the Thiessen polygons, the Huff model is capable of providing market share estimates via potential sales captured from the probability surfaces the model creates. Table 5.3 shows the results of the Huff model as the percentage of potential sales captured by each firm per year.

Table 5.4

<table>
<thead>
<tr>
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<th>GameStop</th>
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<tbody>
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<td>2009</td>
<td>19.2</td>
<td>38.4</td>
<td>42.2</td>
</tr>
<tr>
<td>2010</td>
<td>10.9</td>
<td>44.0</td>
<td>44.9</td>
</tr>
</tbody>
</table>

The Huff suggests that GameStop’s small size proved to be a disadvantage and any single Wal-Mart or Best Buy outperformed a singular GameStop. However, when assessing the entire market of Michigan, GameStop had a strong presence. Best
Buy lost sales over the decade to its competitors; Wal-Mart lost some ground but bounced back by the end of the time period, all while GameStop continued to grow. The results from the Huff model, while most likely a more accurate estimate of the market than the Thiessen polygons essentially showed the same trends. GameStop’s strategy proved to be an effective way to compete against supercenters. The key to this, as was discussed in the earlier proximity analysis, is that GameStop locates very closely to its competitors. When possible it opens multiple stores to cannibalize the market.

The result is that the probability surfaces overlap so greatly that GameStop is able to get a significant portion of sales that would have otherwise gone to the competing store. However, as the square footages of GameStop stores are smaller, its attractiveness measure is much smaller than Wal-Mart or Best Buy. Opening multiple stores to surround the supercenters is a way to offset this disadvantage. The result is that the supercenters more strongly command the areas at the periphery of their trade area. Metaphorically speaking, GameStop is taking the center of the pie, leaving the areas closer to the crusts to the competition. If Wal-Mart and Best Buy locations are close to local population centers this effect could be even more effective for GameStop. Locating closer might also allow GameStop to essentially leach off the larger store’s attractiveness pull on consumers.

**Modified Two Step Floating Catchment Area**

The overall accessibility of the store locations has an impact on GameStop’s survival as well. The Modified Two Step Floating Catchment Area (M2FCA) metric has the potential to create a measure of accessibility by providing a ratio of how much sales can be distributed in an area via a decay function from the potential sales in the
area. The formulas for the M2FCA can be found in the Appendix. Table 5.4 exhibits how accessible the retail locations are yearly by taking each firm’s output and dividing it by the mean of the output of all firms to create an index of accessibility for each year.

Table 5.5

<table>
<thead>
<tr>
<th>Year</th>
<th>Best Buy</th>
<th>Wal-Mart</th>
<th>GameStop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0.3</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2001</td>
<td>0.3</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2002</td>
<td>0.3</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2003</td>
<td>0.3</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2004</td>
<td>0.3</td>
<td>2.4</td>
<td>0.1</td>
</tr>
<tr>
<td>2005</td>
<td>0.3</td>
<td>2.5</td>
<td>0.1</td>
</tr>
<tr>
<td>2006</td>
<td>0.3</td>
<td>2.4</td>
<td>0.1</td>
</tr>
<tr>
<td>2007</td>
<td>0.3</td>
<td>2.4</td>
<td>0.1</td>
</tr>
<tr>
<td>2008</td>
<td>0.3</td>
<td>2.4</td>
<td>0.1</td>
</tr>
<tr>
<td>2009</td>
<td>0.3</td>
<td>2.4</td>
<td>0.2</td>
</tr>
<tr>
<td>2010</td>
<td>0.3</td>
<td>2.4</td>
<td>0.2</td>
</tr>
</tbody>
</table>

As the table demonstrates, Wal-Mart’s size and even distribution of stores to the population of the study area creates a network of locations that are very accessible to the populations within 20 miles; note though that the accessibility is slowly decreasing. Best Buy has an accessibility that is larger than that of GameStop but since they have few locations its accessibility is also much smaller than Wal-Mart. An explanation of this pattern could be because Wal-Mart has been able to spread very
deep into less urban areas and is capable of serving entire populations where Best Buy or GameStop have not yet had the ability to expand effectively.

**Huff Model with M2FCA Substitution**

The Huff model is a very popular method, but as described in the methods section, calibrating the model is challenging and there are several ways to legitimately do so. In this research, a proposed new way to handle the decay parameter is to use the mean of the M2FCA metric for one year as a substitute for the decay exponent.

In this case, the substitution decays the distance of customer patronage by how accessible the location is. The calibration issue is not handled, but it is pushed back a step to the M2FCA where the decay weights are produced. The value of this procedure is that the decay function is not initially limited to an exponential decay, if the decay is more linear or sigmoid, choosing the correct decay function can supply the weights needed. However as it is in the Huff model, this requires customer usage information and for this case inverse distance squared was used so that making a comparison between both Huff models was more sensible.

Areas that are more competitive seem to present lower accessibility values for the store. Competitive areas result in the stores having lower access to customers due to the inherent competition, but the consumers to have more access to gaming products. The output from the M2FCA gives all firms a much lower decay exponent for the Huff model, this perhaps indicates that gaming products are a higher order good and that distance traveled to purchase them does not have as dramatic an effect as using the original Huff model. Figures 5.21 through 5.23 illustrate the differences when the decay exponent is smaller.
Figure 5.21 Huff with M2FCA Trade Areas 2000.
With the M2FCA substitution, Best Buy had a commanding presence in most of the major cities and GameStop’s influence was minor. Wal-Mart controlled the rest of the study area, primarily the more rural areas.
Figure 5.22 Huff with M2FCA Trade Areas 2005.

The 2005 results show that Best Buy’s control of the main population centers
was still strong as GameStop and Wal-Mart expand in Detroit and Grand Rapids.
Figure 5.23 Huff with M2FCA Trade Areas 2010.
However, by 2010, GameStop, had aggressively expanded its control in Michigan and was strongly rivaling Best Buy in urban areas and even outperforming some Wal-Mart locations in some rural settings. Wal-Mart again expanded into the Detroit Region. As with the earlier Huff analysis the probability surfaces created for each store can provide market share estimates. Table 5.5 shows the yearly measurements with the M2FCA substitution causing the decay exponent to be smaller.

Table 5.6

<table>
<thead>
<tr>
<th>Year</th>
<th>Best Buy</th>
<th>Wal-Mart</th>
<th>GameStop</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>24.1</td>
<td>47.3</td>
<td>28.4</td>
</tr>
<tr>
<td>2001</td>
<td>29.2</td>
<td>43.7</td>
<td>27.0</td>
</tr>
<tr>
<td>2002</td>
<td>28.5</td>
<td>38.0</td>
<td>33.3</td>
</tr>
<tr>
<td>2003</td>
<td>25.9</td>
<td>37.5</td>
<td>36.4</td>
</tr>
<tr>
<td>2004</td>
<td>24.1</td>
<td>36.9</td>
<td>38.9</td>
</tr>
<tr>
<td>2005</td>
<td>22.5</td>
<td>36.6</td>
<td>40.8</td>
</tr>
<tr>
<td>2006</td>
<td>21.7</td>
<td>37.0</td>
<td>41.1</td>
</tr>
<tr>
<td>2007</td>
<td>23.3</td>
<td>35.9</td>
<td>40.7</td>
</tr>
<tr>
<td>2008</td>
<td>22.8</td>
<td>36.3</td>
<td>40.8</td>
</tr>
<tr>
<td>2009</td>
<td>21.2</td>
<td>37.7</td>
<td>40.9</td>
</tr>
<tr>
<td>2010</td>
<td>21.1</td>
<td>24.2</td>
<td>54.5</td>
</tr>
</tbody>
</table>

When distance mattered less for gaming consumers, GameStop’s strategy of locating very close to the competition was even more effective. In the decade using this method GameStop’s percentage of sales essentially doubled, whilst Wal-Mart’s
declined by the same amount. Interestingly, Best Buy’s performance stayed largely the same for this period. The effects shown in the previous two methods were compounded in this instance, but the overall trend was still prevalent. There are other reasons that GameStop chooses to locate near its competitors that are based off its business model. GameStop makes 40% of its transactions from new games and only 14% from used games. The rest is spent on hardware and peripheries. However, 60% of its revenue comes from those used items sold (GameStop Company Report, 2010). It thrives on the buying and selling of used products, something that Wal-Mart does not do at all and something Best Buy has only recently started to do. As such, it is vital for GameStop to locate centers of population that can support a healthy strip mall and in close proximity to its competition to ensure that each location has abundant access to used gaming products. GameStop also does have a presence in regional indoor malls; however, those locations tend to be smaller and do not generate the revenue of the strip mall locations. This occurs because it is more convenient for a customer who is carrying used merchandise into the store, to not have to cart it through an entire mall as opposed to walking across the smaller parking lot and into the store.

5.4 Conclusion

The proximity and clustering analysis shows that GameStop locates and clusters consistently to its supercenter competition. This, when combined with qualitative information about the firm, indicate that strip malls are used to accomplish this for a number of aforementioned reasons. The trade area analysis shows that through several different methods, each with different assumptions, GameStop is able to survive. The consistency in the estimated market share values from each method
shows the validity of the findings.
CHAPTER VI

CONCLUSION

6.1 Summary of Research.

Retailing has always been a competitive sector. Over the past several decades this competition has become even stiffer with the rapid growth of big box retailers. Despite the presence of such giants, there are smaller sized retail operations that have managed to not only survive the supercenters but even thrive in their presence. Yet how these small competitors survive have received very limited attention, compared to that given to big box retail competition. Although location is one of the factors recognized as important for survival, how firms actually use location as competitive strategy has also attracted very little attention.

Against this background, the purpose of this thesis was to examine the role of location strategy in retail competition with GameStop in Michigan as a case study. Specifically, this research attempted to:

1. Analyze the location strategy used by GameStop.

2. Examine how this strategy influences GameStop’s survival and measure its performance in the videogame retail market of Michigan.

The first step in this research was reviewing and assessing the previous literature on the subject matter. The two sets of literature deemed relevant for this research included: research on retail competition and research on location strategy. The competition research literature illustrated that location was often taken as given in competition analysis. But its role in competitive strategy is not actually analyzed. Similarly, while the literature on location strategy demonstrates the processes by
which optimal locations can be found, it did not directly define the role of location in competitive strategy.

Within this context, the goal of this research was to assess how GameStop’s location strategy has enabled it to survive. This was accomplished by first examining the distance and clustering of actual store locations of GameStop and its competitors with GIS and connecting that to the history and business practices of the firm. Three different methods of trade area analysis to measure GameStop’s performance in the gaming market of Michigan.

6.2 Findings

Based on the above analysis, this research has established that in Michigan GameStop has pursued a strategy of locating more closely to its competitors. Specifically, it locates more frequently to Wal-Mart than it does to Best Buy. This is because Best Buy only had 26 locations in the state, primarily locating in close to regional malls. Thus, while GameStop has kept a presence around most Best Buy locations it has not gone to the same extent as it has done with Wal-Mart. As Wal-Mart has expanded rapidly in Michigan, due to its competition with Meijer a rival supercenter within the state (Washebek, 2005), GameStop has equally expanded rapidly in Michigan. On average they opened 10 new stores every year.

In addition, GameStop has followed a hierarchical diffusion from population centers in its location, but it has done so only by the virtue of its competition. By locating close to its competitors, GameStop appears to behave in accordance with Hotelling’s principle of minimum differentiation, with respect to location strategy. Locating close provides customers with an alternative to the supercenter if their shopping needs are more specific. GameStop as a smaller location has the ability to
provide better one on one service to individual customers. Strip malls also are more convenient for customers that bring used items into the GameStop for trade in credit, something that is the backbone of their revenues. In fact, GameStop could be locating closely to itself and its competitors not only cannibalize the market, but to ensure that the consumer has ready access to purchase and sell used merchandise. This analysis completes the first objective of this research.

The trade area analysis consistently showed the GameStop has been able to compete successfully with its main competitors. Having more locations definitely helps the firm, but by locating close to its competition, GameStop appears to capture a significant portion of the sales in the market. The results of the trade area analysis from the previous chapter show that when stores locate close to one another, the market penetration of each location intersects greatly with the competing store. When GameStop has multiple locations to one competitor, each location intersects and interrupts the larger store’s trade area. This resulted in a higher percentage of sales captured for GameStop. The patterns observed indicate that GameStop locates with minimum differentiation in mind and actively engages in market cannibalism. The trends are present in each of the three methods used in this research; this lends to the validity that the location strategy used by GameStop positively affects its survival. This successfully answers the second objective.

6.3 Limitations of Research

As previously stated in the methodology section, there are several limitations of this study. Primarily due to the fact that much of the data needed for this kind of study were sensitive, a large portion of the data used had to be estimated. Other limitations are present in the methods used themselves. In spite of these, this research
has created the best analysis with the data available. In a practical context, if a small firm with limited funding wanted to evaluate its market position and the effectiveness of its location strategy, they would have to make similar assumptions and estimations that this research had to use.

6.4 Future Research

There has been little research on how location impacts small to large store retail competition where the smaller format has been able to survive. Even less research treats location as the determining factor of what kinds of competition a firm can engage in. Understanding how other smaller store format firms such as Family Dollar, Save A Lot and Aldi’s locate and survive supercenter impact should be researched as well. The scope of the research should also move to other states and regions with different features. This competition between GameStop and supercenters is prevalent in other states and may yield differing results.

The FCA metrics have not been applied to the retail world beyond this research and should be explored much more thoroughly by more experienced researchers with better data. There is great potential in the FCA metrics to estimate the accessibility of retail products. The model also could be used as a new way to delineate the size of a trade area for a retail location.

Substituting FCA metrics into the Huff model should also be explored more. Essentially, the Huff model creates a measurement of utility from attractiveness and accessibility. To date, little or no research has used a different measurement of accessibility, beyond drive time or straight line distances from customer origins to the store locations. Another way to include the FCA created accessibility measurements would be to do the following: (1) instead of substituting the mean output from the
FCA metric as the decay exponent, replace the distance matrix created by the Huff process with the accessibility matrix created from the FCA metric and (2) this would create a meta-Huff model as there would be a gravity model within a gravity model. With the advancements in GIS in recent years, there is much that can be done on improving gravity models. Even Huff himself states, “The model has not always been employed correctly and its full potential has not been realized” (2003).


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Young, W.J. (1975) "Distance Decay Values and Shopping Center Size," Professional Geographer, Vol. 27. 304-309.

ADDITIONAL SOURCES:


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