The Impact of Population Distribution in the Toronto Census Metropolitan Area (CMA) on the Location of Ethnic Retail

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Table of Contents

Abstract

Due to the importance of consumption in the urban economy, increasing consumer demand, and rising ethnic business activities, ethnic retail has become a topic of growing interest in the academic community. The article uses census and supermarket location data to examine the distribution of ethnic Chinese supermarkets in the Toronto CMA area. Utilize consumption data to estimate the sales potential. The Chinese ethnic supermarket's trade area was determined using the buffer zone and Thiessen Polygon. Additionally, this research analyzed the population characteristic within its trade area for specific cases. The study's findings indicate that (1) the Toronto CMA does have a geographical pattern of Chinese supermarkets moving to the suburbs; (2) Chinese communities continue to be the primary location consideration for some Chinese supermarket operators; and (3) a sizable proportion of companies has begun to shift to a new business model services South Asian population.

Introduction

As a well-known country of immigrants, Canada has a high degree of cultural tolerance that many countries cannot reach. The Toronto Census Metropolitan Area (CMA) in Ontario has the most significant proportion of immigrants in the country, and its ethnic minorities have exceeded half of the region's population. Asians, especially the Chinese community, have become the largest ethnic group in the Toronto CMA (Wang & Lo, 2005; Wang & Hernandez, 2018; Perry et al., 2020). With the arrival of a large number of Chinese immigrants, Toronto CMA became one of the largest Chinese economies in North America (Preston et al., 2017). At the same time, the rapid expansion of the Chinese community has also enabled ethnic Chinese retailing to develop at an astonishing speed. Among them, the demand for ethnic grocery stores is extremely prominent. Today, there are more than 50 Chinese supermarkets in the Toronto CMA alone, which shows that their influence on consumers has increased (Wang, 2004; Wang & Hernandez, 2018). For those new Chinese immigrants who have just landed or the visa students who are not familiar with the Canadian culture, the friendly environment makes them more inclined to shop at these ethnic supermarkets in their consumption choices. The ethnic identity of the consumers has enabled ethnic retailers to gain inherent advantages that local companies cannot obtain, while the attraction of foreign goods and services to local consumers has increased significantly and magnified the advantages of ethnic companies (Wang, 2004; Wang & Lo, 2007).

For a long time, scholars have been paying attention to the ethnic business development models and their changes (Wang, 1999; Fong et al., 2007; Fong et al., 2008). There is also a large body of literature that studies the consumption behaviour of ethnic groups (Chung & Fischer, 1999; Wang, 2004; Wang & Lo, 2007; Wang & Lo, 2007; Lo, 2009). Many site selection studies focused on clustering economy and differentiation strategies (Alcácer & Chung, 2013; Valencia & Wang, 2016; Lee & Kim, 2017; Pangarkar, 2018). Although there are many studies on ethnic retail, research gaps remain. Most of the literature is bottom-up, researching from the perspective of consumers, but few studies are top-down, analyzing ethnic retail from the perspective of suppliers.

This proposed study intends to expand the research on ethnic retailing by investigating the location strategies of the ethnic Chinese supermarkets, in particular in relationship with the distribution of the Chinese population in the Toronto CMA. This study aims to answer three research questions: (1) What are the geographical patterns and location strategies of the ethnic Chinese supermarket in the CMA? (2) Is the distribution of Chinese communities a primary location consideration for the Chinese supermarket operators? (3) What are the characteristics of the new format Chinese supermarkets from the viewpoint of entrepreneurship.

The Toronto CMA was chosen as the research area for two reasons: (1) the size of the Chinese population and (2) the development time of ethnic enterprises. The Toronto CMA is Canada's largest consumer market with the largest Chinese population, which accounted for 12 percent of the CMA's population in 2016 (Statistics Canada, 2017). It is home to a sizable Chinese population, including immigrants, international students, and others. These populations have created a massive supply and demand chain with ethnic Chinese enterprises in the region. In addition, the Toronto CMA was developed earlier. Due to the long history of the Chinese community, the number and quality of Chinese ethnic businesses in this area far outstripped that of other CMAs in Canada (Wang & Hernandez, 2018). Therefore, the Toronto CMA should afford a typical study of ethnic Chinese retailing in Canada.

Following this Introduction is a literature review on ethnic retailing in the Toronto CMA. After the literature review, the data sources and methods will be described and explained.

Literature Review

Ethnic business history is almost the epitome of immigration history. Over the past two decades, ethnic businesses have experienced significant growth, but they have also experienced structural changes in several areas (Wang & Hernandez, 2018). As a general rule, recent research on Chinese ethnic retail in Toronto can be divided into three categories: investigating changes in ethnic business development models from the perspective of business management; analyzing the impact of ethnic businesses and entrepreneurs on retail communities from the perspective of urban planners; examining the disparities in identity and consumer behaviour between ethnic groups from the perspective of consumers.

Research conducted from the perspective of business management indicates that Toronto's Chinese retail sector is gradually relocating to the suburbs and evolving into a self-contained new retail sub-economy as a result of the relocation (Wang, 1999; Fong et al., 2007; Wang et al., 2013; Wang & Hernandez, 2018). By studying the path of change in the company's development model, ethnic retailing can better grasp the overall scenario. Chinese ethnic retail businesses have experienced rapid expansion in the two recent decades (Wang, 1999). The rapid expansion of Chinese retail companies has resulted in significant changes to Toronto's business structure. The Chinese commercial activity space in Toronto is rapidly altering the city's traditional retail pattern, the new trend is toward multi-core, and it is no longer confined to the city's Chinatown neighbourhood. The new retail model pioneered by Chinese retailers—the concept of condominium retail—is slowly but steadily challenging both the traditional retail concept in North America and the local government planning system, and it is expected to continue. Fong et al. (2007) hypothesized the factors that influence the distribution of ethnic firms in the City of Toronto based on an examination of the Toronto business data set. They found that Toronto was a pioneer in a new retail paradigm, particularly in the suburbanization of ethnic enterprises. Subsequently, Fong et al. (2008) looked into the distribution of ethnic businesses among communities composed of people of different ethnicities and industrial location patterns associated with ethnic businesses in the context of multi-ethnic communities and enterprises. Upon further investigation, it is discovered that the location of Chinese ethnic businesses in Toronto is influenced by various industries and local surroundings, illuminating the significant link between suburban ethnic businesses and larger immigrant populations in the city. Theodoridis & Bennison (2009) confirmed this theory by examining how retail companies formulate retail strategies in a complex environment. They pointed out that the complexity adaptive method will direct decision-makers toward more innovative strategies for defining retail strategy.

Furthermore, Wang et al. (2013) noted that the Chinese retail industry in Toronto has developed into a significant component of the local retail economy. According to their analysis, Toronto retail has followed three distinct trends since the late 1990s: (1) The food retail industry, dominated by large supermarkets, is showing signs of recovery; (2) The retail industry is transitioning from a single ethnic cluster to mainstream business and mixed-use development; and (3) The ethnic community dominated by Chinese is developing a new Chinese retail corridor. Wang & Hernandez (2018) presented a new framework for research on Chinese ethnic retail in this context. They pointed out that ethnic retail in Canada has evolved into a diverse and complex industry, and that Chinese ethnic retail has not only increased its commercial scope, but also shifted in corporate ownership and market orientation. Nowadays, the ethnic retail sector is transitioning to a mixed embeddedness age due to mainstream retailers' involvement. In some locations where mainstream retailers are unable to operate, there are already Chinese ethnic retail enterprises run by mainstream merchants that have stepped in to fill the void in the market (Perry et al., 2020).

While concentrating on business development models provides a useful analytical framework, it is also important to consider the needs of consumers. This area of research focuses primarily on the purchasing choices of the Toronto Chinese consumer group in relation to the local mainstream and the Chinese ethnic economy, emphasizing the Chinese in Toronto's ethnic identity (Chung & Fischer, 1999; Wang, 2004; Wang & Lo, 2007; Lo, 2009). According to studies, the consumption habits of Chinese in Toronto are heavily influenced by ethnicity. Although this shared ethnic identity is not readily apparent in consumer products relating to privacy, it is mirrored in products relating to social activities. The stronger the links, and the stronger the ethnic ties, the more frequently these things are used (Chung & Fischer, 1999; Wang, 2004). This kind of behaviour will intensify with the time when they spent in Western society. This type of ethnic affinity frequently trumps economic reasons, particularly when it comes to shopping sites. A strong sense of ethnicity will encourage many consumers residing in places outside of China's retail economy to consume at ethnic retail outlets located further afield (Wang & Lo, 2007). Following Wang & Lo (2007), additional research on the consumption patterns of travel agencies, supermarkets, and other retail enterprises from the perspective of consumption substitution and complementarity was conducted by including variables such as space accessibility, store attributes, and so on. The findings indicate that the Chinese in Toronto view mainstream and Chinese consumption venues as complementary. The Chinese economy has supplanted the mainstream economy in terms of low-frequency and high-priced consumer products; yet, the two are complementary in terms of high-frequency and low-priced consumer products. However, Non-Chinese believe that the two are distinct points of consumption (Lo, 2009). This also demonstrates that, while economic concerns continue to influence the selection, they are inextricably linked to ethnic identity and corporate preferences.

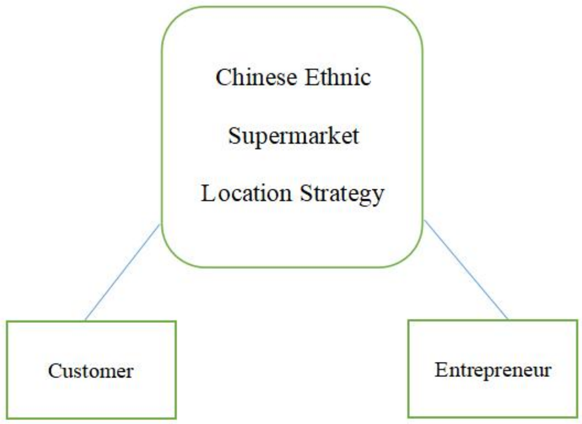
Nonetheless, it should be noted that the research cited above rarely takes into account the economic development of ethnic groups at the same time. Furthermore, because of the unique role played by geography in ethnic retail, it is not recommended to approach ethnic retail solely from a macroeconomic perspective. Wang & Lo (2005) are among the few individuals who have quantified their economic status based on ethnic results, and their work is noteworthy. Their research revealed that, despite an increase in the number of Chinese economic immigrants in Canada, there is still a significant disparity in employment rates and economic outcomes between Chinese immigrants and native-born citizens of Canada. Larsen & Gilliland (2008), in their research on the evolution of food deserts in mid-sized Canadian cities (London, Ontario), also confirmed the relationship between economic conditions and retail formats. They discovered that spatial inequality in urban residents' access to supermarkets is most pronounced among those with lower socioeconomic status, and that this inequality will continue to grow over time.

The existing literature on the location strategy places a premium on the market's economic clustering. Alcácer and Chung (2013) noted that economically developed regions can provide businesses with access to a large pool of skilled labour, high-quality suppliers, and potential knowledge spillovers. These benefits provide businesses with a competitive edge, which results in the formation of an agglomeration economy. They then combined economic and strategic concepts to examine foreign companies' entry strategies into the United States. The findings indicate that the location of a business is largely determined by three fundamental concepts: localization, concentration, and market efficiency. However, due to the spatial proximity and similarity of the less differentiated consumer markets, the phenomenon of market cannibalization is inevitably unavoidable (Valencia & Wang, 2016). This phenomenon is fully manifested in the retail industry, particularly in supermarkets and grocery stores. Lee & Kim (2017) examined differentiated retail location strategies, they discovered that first-entry firms will maximize their first-mover advantage through a cluster location strategy in order to establish a high-quality brand image. However, the majority of late-entry companies can only use differentiated positioning strategies to create brands that are distinct from those of the pioneers and to consolidate their corporate brands through the establishment of the concept of economical and practical. Pangarkar (2018) also established the existence of this strategy through research of two Singaporean supermarket chains. They analyzed store location data using Thiessen polygons and discovered that companies with dominant market positions frequently pursue a preemptive location strategy. This strategy allows for the establishment of new stores completely bounded by its existing stores. However, non-dominant companies frequently pursue random strategies, which results in a much smaller sharing boundary between new and existing stores.

To summarize, when analyzing the location strategy of ethnic Chinese supermarkets, it is necessary to consider the following factors: the development and evolution of new retail formats driven by Chinese retail; planners' expectations for ethnic retail to revitalize communities; consumer preferences influenced by ethnic identity; economic data that sheds light on ethnic minorities' actual consumption levels; as well as the retail market's agglomeration and the order in which companies enter the market(see Figure 1).

Figure 1

Chinese Ethnic Supermarket Location Strategy Factors



Data and Methods

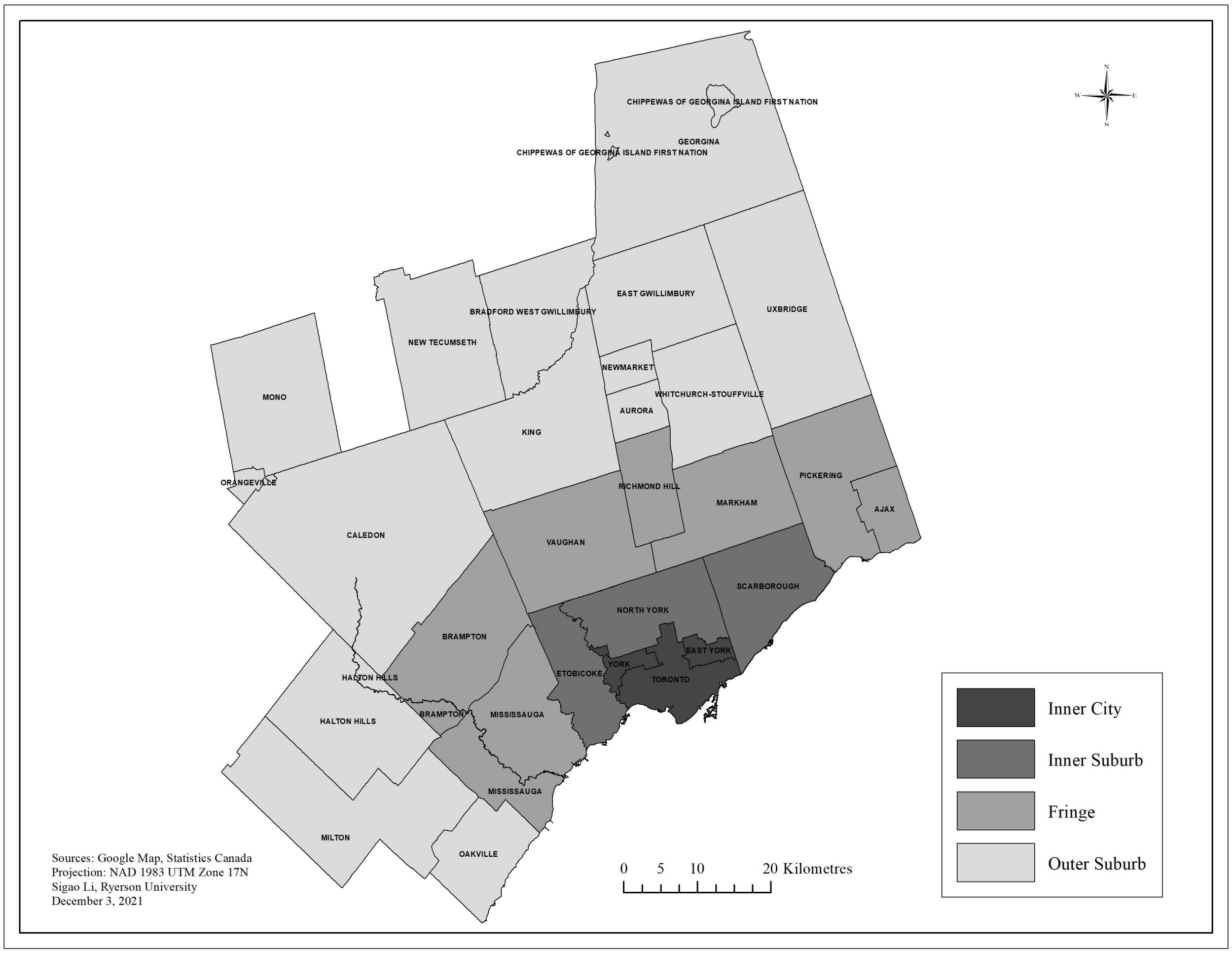
This study aims to contribute to the knowledge base about ethnic retail by examining the location strategy of ethnic Chinese supermarkets in the Toronto CMA. Particular attention is paid to the relationship between the Chinese ethnic supermarket and the distribution of Toronto's CMA Chinese population. The research is designed to achieve three objectives: (1) What are the CMA Chinese ethnic supermarket's geographic pattern and location strategy? (2) Do Chinese supermarket operators prioritize the Chinese community's population distribution when determining their location? (3) From an entrepreneurial standpoint, what are the characteristics of the Chinese ethnic supermarket in the Toronto census metropolitan area?

There are two reasons for evaluating the location strategy with a Chinese ethnic supermarket. First, Chinese ethnic supermarkets in Toronto offer products and services that are largely comparable to those offered by mainstream supermarkets, thereby minimizing the differences caused by ethnic factors. Second, supermarkets, as a high-frequency and low-price commodity, are a low-profit, high-volume, and highly competitive business entity. As a result, there are stringent requirements for site selection, which aids in the research on site selection strategies.

This study analyzes population distribution and sales potential using Census Tract (CT) level data, and uses Census Subdivision (CSD) level data to define the distribution of Chinese ethnic supermarkets in the Toronto CMA. The reason for not using CT level data in both tests is that the Toronto CMA contains over 1000 CTs, which makes studying the distribution of large supermarkets prohibitively complicated. By contrast, CT level data provides a more detailed view of population and sales potential, whereas CSD level data provides a more intuitive view of the overall distribution of Chinese ethnic supermarkets. The existing classification system divides the Toronto CMA into 24 CSD (Statistics Canada, 2017). To more accurately reflect the distribution of the City of Toronto, and in accordance to Wang & Zhong (2013), the Toronto area is divided into six areas (Toronto, East York, York, North York, Etobicoke and Scarborough). Prior to 1998, these areas were independent municipalities, and were later merged into the City of Toronto (Farooqui, 2017). Following the split, the 29 CSD areas can be roughly classified into four categories (see Figure 2): Inner city, which includes East York, Toronto, and York; Inner suburb, which includes Etobicoke, North York, and Scarborough; Fringe, which includes Ajax, Brampton, Mississauga, Pickering, Richmond Hill, and Vaughan; and Outer suburb, which includes the remaining areas.

Figure 2

Map of Toronto CMA at CSD Level



All data are gathered from the Internet in order to answer research questions. The data is divided into two sections: data from Statistics Canada and data from third-party sources such as Google Maps.

The first step is to compile a list of Chinese ethnic supermarkets that include geographical coordinates. To begin, conduct a Google search for "Chinese Supermarket in

Ontario." Due to Google Map's anti-crawler feature, not all data can be accessed directly using Google Map. To acquire information on the Chinese supermarket in the Toronto CMA in 2021, it is necessary to use the Instant Data Scraper plug-in to collect the data presented on the search page. Following data cleansing, just the Chinese supermarket's shop name and address are preserved. Then, using Octoparse software, re-capture the supermarkets' latitude and longitude locations and feature information. Name, Type, Address, City, CSD, Postal code, Longitude, Latitude, and Target are all included in the cleaned data.

The second step is acquiring demographic and consumption statistics: first, acquire the 2016 Household actual final consumption statistics from Statistics Canada; then choose the yearly food and non-alcoholic beverage consumption data from this table. However, due to the fact that this is household data, it must be calculated prior to use. The number of households in the Toronto CMA and the total population can be determined using data from the 2016 Census of the Toronto CMA. Divide the two to obtain the average number of households in the Toronto CMA. Then, divide the annual food and non-alcoholic beverage data by the population to obtain the food and non-alcoholic beverage consumption per capita in the Toronto CMA in 2016. Finally, multiply it by the Chinese population of each census tract to obtain the sales potential of each census tract.

The third step is to clean and export each census subdivision's data. Begin with obtaining the census boundary file for the Toronto CMA from Statistics Canada. The sales coverage of the supermarket is determined by creating buffers and Thiessen polygon for the supermarket's location data. Additionally, the data can be merged using ArcMap "Dissolve" and "Intersect" functions. Finally, data on the Chinese and South Asian populations, as well as the number of Chinese supermarkets, are obtained for each census subdivision.

Data Analysis and Interpretation

This research applies the selection above criteria and principles to create a distribution map of the Toronto CMA Chinese Ethnic Supermarket using data obtained from Google Maps. First, classify all Chinese ethnic supermarkets according to their CSD, and compare these Chinese ethnic supermarkets to the sales potential map. Then, a buffer zone was established around each Chinese ethnic supermarket for further analysis. Following that, the trade area under the buffer zone and the Thiessen Polygon were compared using a specific case. Finally, this research conducted a market analysis and estimated sales potential for an under-construction Chinese ethnic supermarket.

Distribution of Chinese Supermarket

As of October 2021, there are 78 Chinese ethnic supermarkets operating in the Toronto CMA. As Fong et al. (2007) noted, the suburbanization of Chinese businesses in Toronto is well evidenced. The majority of Chinese ethnic supermarkets are concentrated in the Inner suburb (34 stores) and Fringe (31 stores), with the remaining 8 in the Inner city and 5 in the outer suburbs (see Table 1). Each CSD has an average of three Chinese ethnic supermarkets, with seven regions exceeding the average. There are only three regions in the Toronto CMA with more than ten Chinese ethnic supermarkets. Scarborough has the highest concentration with 18 of Chinese ethnic supermarkets, followed by North York (13) and Markham (11). However, 13 CSDs have no Chinese ethnic supermarkets. The majority of them are in the outer suburbs. East York is the only area that does not have Chinese ethnic supermarkets and is not an outer suburb.

According to the calculation results from Statistics Canada and the 2016 Census, the average household in Toronto CMA is 2.74; the household actual final consumption (2016): food and non-alcoholic beverages are $39,671. Divide the two to get Individual actual final consumption (2016): Food and non-alcoholic beverages are $14,453.72 (Since Statistics Canada did not publish consumption data at the CT level, this study relies on provincial-level data. If data is accurate to the CT level, it will be more precise). The approximate regional sales potential can be estimated by multiplying by the region's population (Chinese population).

The Toronto CMA's sales potential distribution appears to be divided into three segments (see Figure 3). Four geographically concentrated and contiguous areas: Markham, Scarborough, North York and Richmond Hill; Mississauga and part of Milton; and Toronto. Curiously, there are no Chinese ethnic supermarkets in the two areas (CT level) with the highest sales potential level in Markham. According to the predicted distribution map, not all ethnic Chinese supermarkets cater exclusively to their own ethnic group members. Around half of Chinese ethnic supermarkets are not located in areas with high sales potential.

Table 1

Chinese Ethnic Supermarket Distribution in Toronto CMA at CSD Level

Zone	CSD	Supermarket		Chinese Population		South Asian Population		Chinese & South Asian Population	
		#	%	#	%	#	%	#	%
Inner City	East York	0	0%	6282	1%	20350	2%	26632	2%
	Toronto	7	9%	73662	12%	47040	5%	120702	8%
	York	1	1%	3382	1%	5496	1%	8878	1%
Inner Suburb	Etobicke	3	4%	9597	2%	47699	5%	57296	4%
	North York	13	17%	88322	14%	60056	6%	148377	9%
	Scarborough	18	23%	118241	19%	158308	16%	276550	17%
Fringe	Ajax	1	1%	3395	1%	24880	3%	28275	2%
	Brampton	4	5%	8930	1%	261695	27%	270625	17%
	Markham	11	14%	147700	23%	58255	6%	205955	13%
	Mississauga	8	10%	54120	9%	165770	17%	219890	14%
	Pickering	2	3%	2465	0%	13805	1%	16270	1%
	Richmond Hill	2	3%	56915	9%	14955	2%	71870	4%
	Vaughan	3	4%	20790	3%	30620	3%	51410	3%
Outer Suburb	Aurora	2	3%	5555	1%	1845	0%	7400	0%
	Bradford West Gwillimbury	0	0%	605	0%	1925	0%	2530	0%
	Caledon	0	0%	710	0%	6640	1%	7350	0%
	Chippewas of Georgina Island First Nation	0	0%	0	0%	0	0%	0	0%
	East Gwillimbury	0	0%	700	0%	460	0%	1160	0%
	Georgina	0	0%	665	0%	695	0%	1360	0%
	Halton Hills	0	0%	490	0%	1390	0%	1880	0%
	King	0	0%	435	0%	915	0%	1350	0%
	Milton	1	1%	2480	0%	22900	2%	25380	2%
	Mono	0	0%	50	0%	280	0%	330	0%
	New Tecumseth	0	0%	250	0%	595	0%	845	0%
	Newmarket	1	1%	5595	1%	3295	0%	8890	1%
	Oakville	1	1%	13440	2%	17075	2%	30515	2%
	Orangeville	0	0%	105	0%	410	0%	515	0%
	Uxbridge	0	0%	245	0%	150	0%	395	0%
	Whitchurch-Stouffville	0	0%	5955	1%	5640	1%	11595	1%
Average		**3**		**21761**		**33557**		**55318**	
Total		**78**		**631080**		**973145**		**1604225**	

Note. Red colour indicates a value above average, while blue colour indicates a value below average.

Figure 3

Map of Sales Potential for Chinese Ethnic Supermarket in Toronto CMA

Diversified Market Expansion

Wang & Hernandez (2018) demonstrate that not all Chinese ethnic supermarkets cater to the primary Chinese consumers. The South Asian population also has a significant influence on the location of Chinese enterprises. After incorporating data on the South Asian population, it is apparent that those Chinese ethnic supermarkets located outside the Chinese community appear to be able to achieve the effect of ensuring sales by simultaneously targeting

Chinese and South Asian customers (see Table 2).

Table 2

Chinese and South Asian Population Distribution in Toronto CMA at CSD Level

CSD	No. of Supermarket	No.of Chinese Per Supermarket	No. of South Asian Per Supermarket	No. of Chinese & South Asian Per Supermarket
East York	0	0	0	0
Toronto	7	10,523	6,720	17,243
York	1	3,382	5,496	8,878
Etobicke	3	3,199	15,900	19,099
North York	13	6,794	4,620	11,414
Scarborough	18	6,569	8,795	15,364
Ajax	1	3,395	24,880	28,275
Brampton	4	2,233	65,424	67,656
Markham	11	13,427	5,296	18,723
Mississauga	8	6,765	20,721	27,486
Pickering	2	1,233	6,903	8,135
Richmond Hill	2	28,458	7,478	35,935
Vaughan	3	6,930	10,207	17,137
Aurora	2	2,778	923	3,700
Bradford West Gwillimbury	0	0	0	0
Caledon	0	0	0	0
Chippewas of Georgina Island First Nation	0	0	0	0
East Gwillimbury	0	0	0	0
Georgina	0	0	0	0
Halton Hills	0	0	0	0
King	0	0	0	0
Milton	1	2,480	22,900	25,380
Mono	0	0	0	0
New Tecumseth	0	0	0	0
Newmarket	1	5,595	3,295	8,890
Oakville	1	13,440	17,075	30,515
Orangeville	0	0	0	0
Uxbridge	0	0	0	0
Whitchurch-Stouffville	0	0	0	0
Average	**3**	**4,041**	**7,815**	**11,856**
Total	**78**	**117,199**	**226,631**	**343,830**

Note. Red colour indicates a value above average, while blue colour indicates a value below average.

Using the average number of people served in supermarkets as a metric. Chinese ethnic supermarkets in Richmond Hill, Markham, Toronto, North York, and Newmarket serve more Chinese than the average, while serving fewer South Asian groups; The Chinese ethnic supermarkets in Brampton, Ajax, Milton, and Etobicoke serve a more significant number of South Asians than the average, but fewer Chinese groups; Scarborough and Mississauga are the only two regions in which Chinese ethnic supermarkets serve both an above-average number of Chinese and South Asians.

To conduct a more accurate comparison of these areas, this study created and extracted data on Chinese and South Asians within a 2km buffer zone, with each Chinese ethnic supermarket serving as the centre (see Table 3 & Figure 4). Only 17 CSDs are covered in this data set, and all excluded areas are outer suburbs. Richmond Hill, Markham, Toronto, and North York remain relatively more targeted at Chinese customers, but Newmarket is excluded; Brampton, Milton, and Etobicoke remain relatively more targeted at South Asian customers, but Ajax is excluded; Scarborough and Mississauga remain the only two regions that cater to both Chinese and South Asian residents.

Table 3

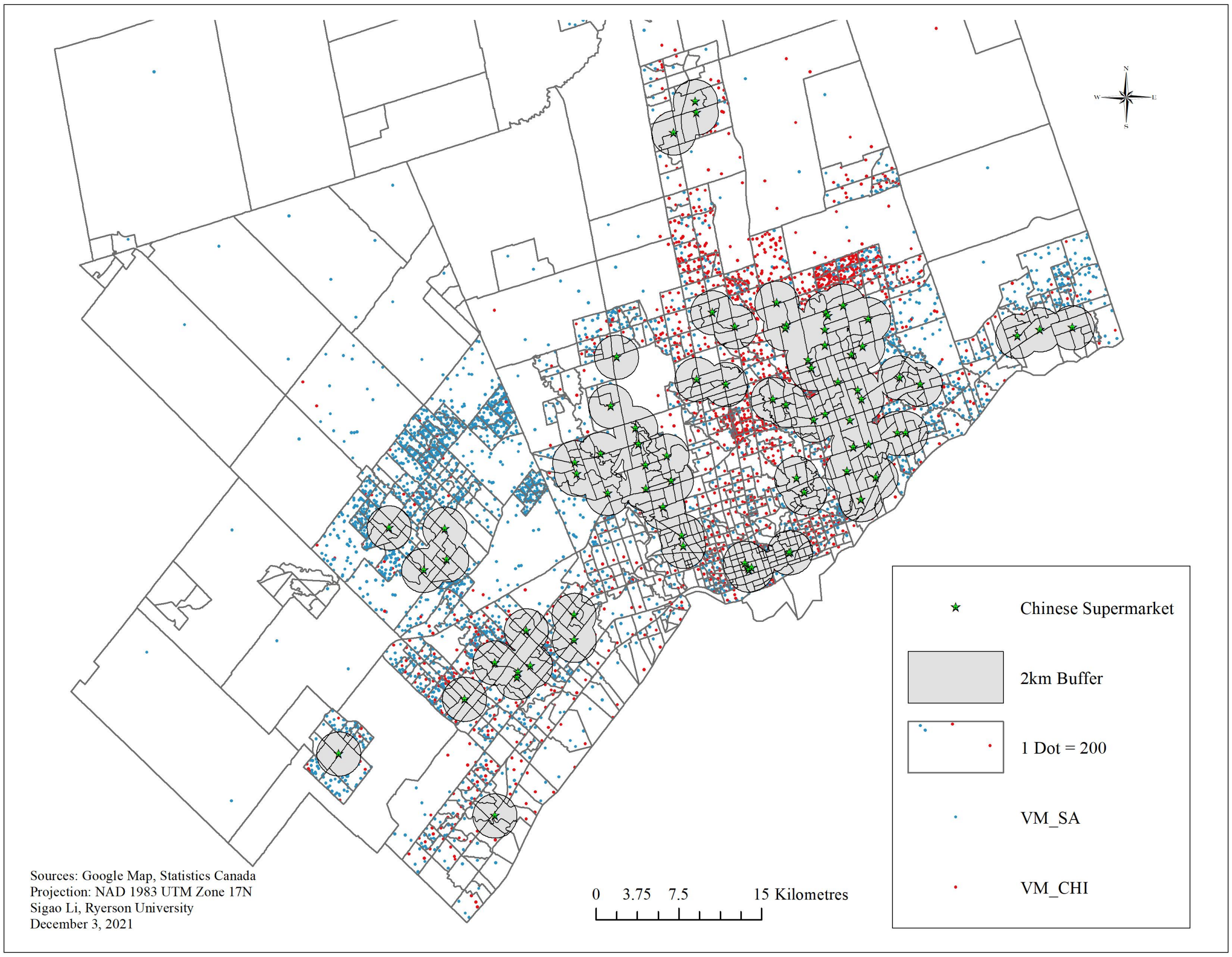
No. of Population Served in 2km Buffer by Chinese Ethnic Supermarket in Toronto CMA

CSD	No. of Chinese Supermarket	No.of Chinese Per Supermarket	No. of South Asian Per Supermarket	No. of Chinese & South Asian Per Supermarket
East York	0	0	0	0
Toronto	7	6,519	3,597	10,117
York	1	1,188	2,809	3,997
Etobicke	3	354	7,381	7,734
North York	13	2,953	3,131	6,083
Scarborough	18	5,751	6,503	12,255
Ajax	1	642	2,825	3,467
Brampton	4	514	13,270	13,784
Markham	11	6,579	2,729	9,308
Mississauga	8	3,621	8,205	11,826
Pickering	2	322	1,926	2,248
Richmond Hill	2	9,020	1,859	10,879
Vaughan	3	2,030	1,844	3,873
Aurora	2	1,386	421	1,807
Milton	1	680	5,898	6,578
Newmarket	1	2,049	826	2,875
Oakville	1	936	1,223	2,159
Average	**5**	**2,620**	**3,791**	**6,411**
Total	**78**	**44,543**	**64,446**	**108,989**

Note. Red colour indicates a value above average, while blue colour indicates a value below average.

Figure 4

Map of Chinese Ethnic Supermarket with 2km Buffer in Toronto CMA



While these ethnic Chinese supermarkets cover 51.67 % and 40.18 % of Chinese and South Asians, respectively, within the 2km buffer zone, there are still many areas with a high Chinese/South Asian population that are unserved. The most apparent remaining areas of Chinese settlement are northeast of Markham, east of North York, and the north of Richmond Hill. South Asia's remaining areas include Brampton's central and eastern portions; and north of Mississauga's.

Buffer vs Thiessen Polygon

The Thiessen Polygon is also often used to calculate the trade area. Typically, the two produce disparate results due to their different calculation methods. The following study compared the two methods above using the T&T supermarket in the Toronto CMA. T&T Supermarket, one of the Chinese companies establishing a presence in the Toronto Census Metropolitan Area for several years, has opened eight locations in the Toronto CMA thus far. Unlike most Chinese ethnic supermarkets, T&T supermarkets have been acquired by local businesses and feature a layout similar to the mainstream supermarkets. Despite the change in ownership, T&T is still managed by the same management team.

This study extracted the data of the 2km buffer zone and Thiessen polygons from eight existing T&T supermarkets. If other supermarkets are excluded from the market division, only these eight T&T supermarkets will divide the 100,552 Chinese population and the 37,267 South Asian population within a 2km buffer zone (see Table 4). Additionally, all T&T supermarkets have not shared boundaries with their sister supermarkets within the 2km buffer zone (see Figure 5).

Table 4

No. of people served by T&T Supermarket in Toronto CMA

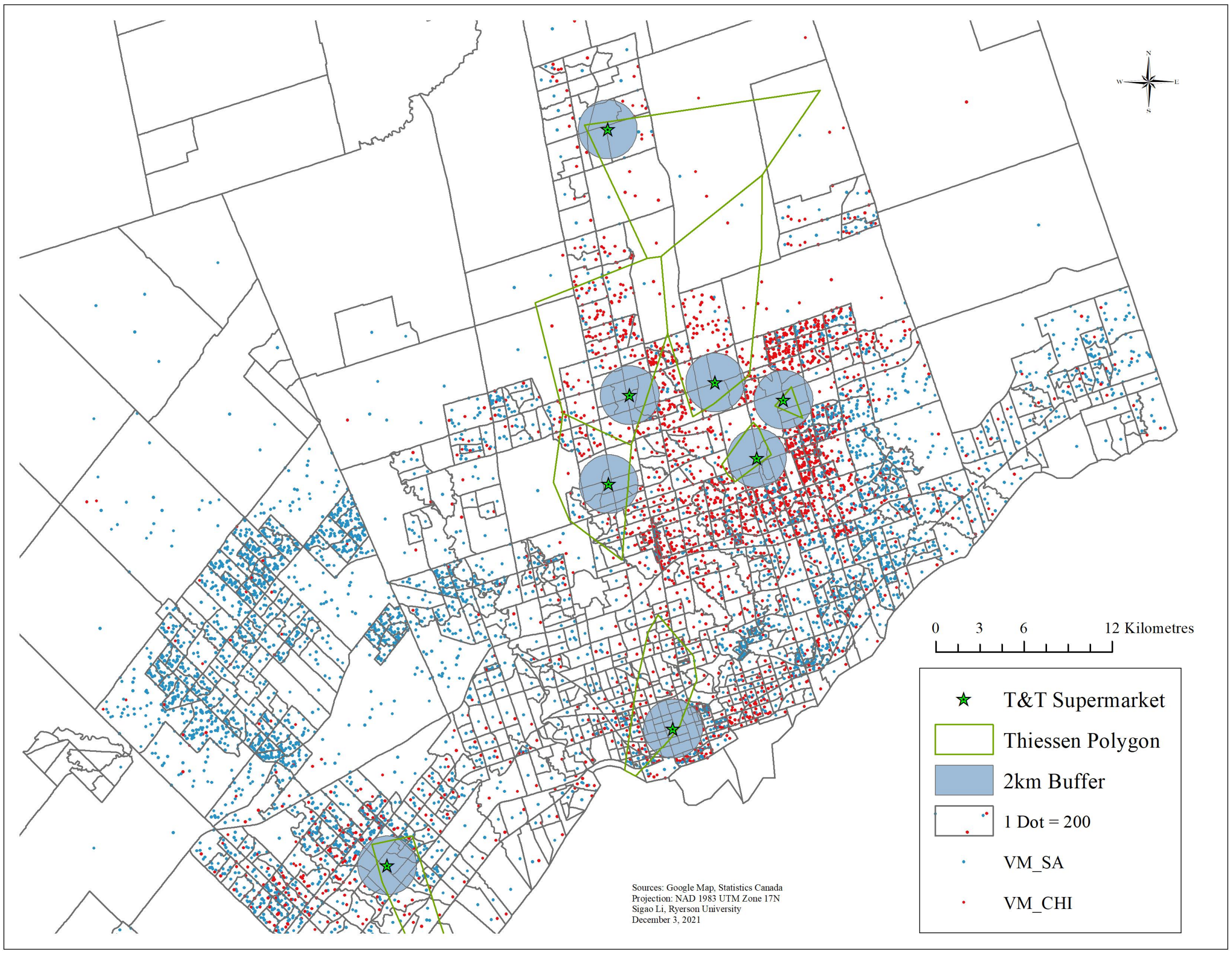
Address	CSD	2km Buffer		Thiessen Polygon	
		No. of Chinese	No. of South Asian	No. of Chinese	No. of South Asian
1 Promenade Cir	Thornhill	4,075	1,794	9,135	5,958
16005 Bayview Ave	Aurora	3,231	1,061	4,379	1,334
297 College St	Toronto	25,497	8,784	17,647	9,903
7070 Warden Ave.	Markham	23,852	2,606	5,941	897
715 Central Pkwy W	Mississauga	6,712	15,412	6,870	17,502
8339 Kennedy Road, Building C, G/F	Markham	14,499	3,103	3,044	536
9255 Woodbine Ave	Markham	15,080	2,150	25,895	3,686
9625 Yonge St	Richmond Hill	7,606	2,357	30,227	9,953
Sum		100,552	37,267	103,138	49,769

Note. Adapted from Google Map and Statistics Canada.

However, Thiessen Polygon encompasses a larger area than the 2km buffer zone. The T&T supermarket serves 103,138 Chinese and 49,769 South Asians in the Thiessen Polygon method. The Toronto CMA had 631,080 Chinese and 973,145 South Asians in 2016, and according to Thiessen polygon calculations, T&T supermarket covers 16.34 percent and 5.11 percent of China and South Asia's populations, respectively. As can be seen, T&T supermarkets serve customers at a higher rate than the average. What's more interesting is that, while T&T as a whole serves a more significant proportion of Chinese customers, the T&T store at 715 Central Pkwy W in Mississauga also covers nearly three times the South Asian population.

Figure 5

Map of T&T Supermarket Sites in Toronto CMA

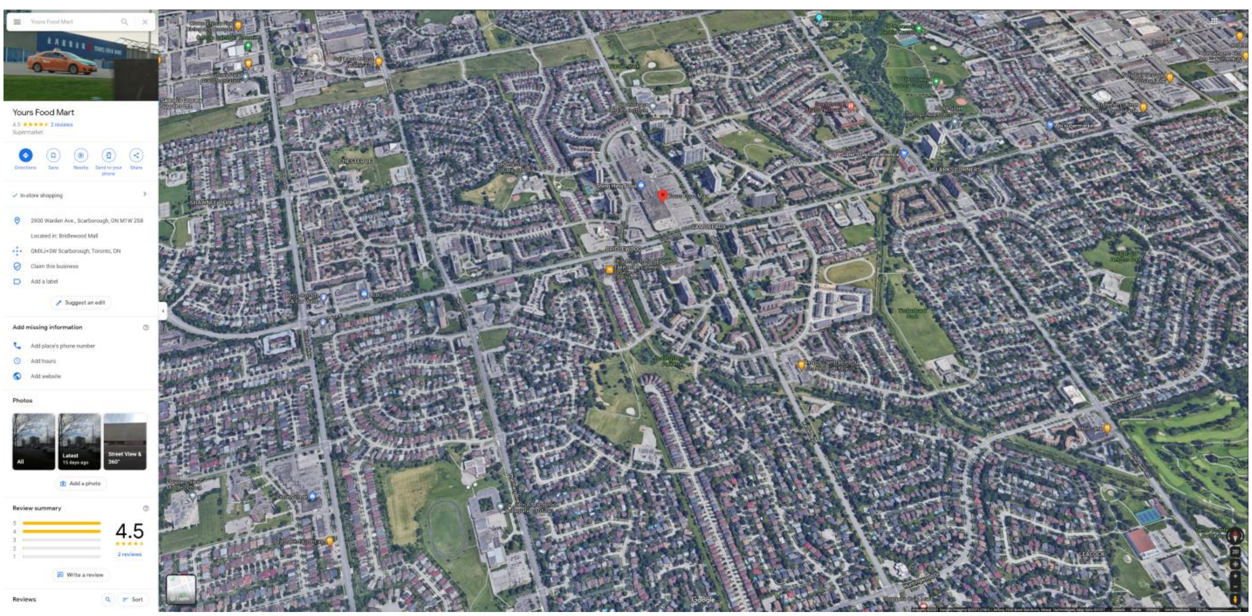


Extended Research

In the acquired Toronto CMA Chinese ethnic supermarket list, a new supermarket (Yours Food Mart) is undergoing construction. Therefore, this study includes it as a case to infer its location strategy, used ArcMap to estimate the market before and after the supermarket's completion. Yours Food Mart is located in Bridlewood Mall, on the corner northwest of Finch Avenue East and Warden Avenue (see Figure 6). While several apartment buildings near the shopping center, the surrounding houses are primarily villas and townhouses. Yours Food Mart is not the only supermarket in the area, and there are five ethnic Chinese supermarkets within a distance of about 2 km from the store. There is also a local mainstream supermarket "Metro" in the same mall. However, as in Lo (2009), the Chinese believe that ethnic supermarkets and local mainstream supermarkets are two different choices and complementary. For this reason, it can be speculated that the main customers of the Chinese ethnic supermarket should be the immigrant group in the region.

Figure 6

Map of Yours Food Mart in Three-Dimensional Perspective

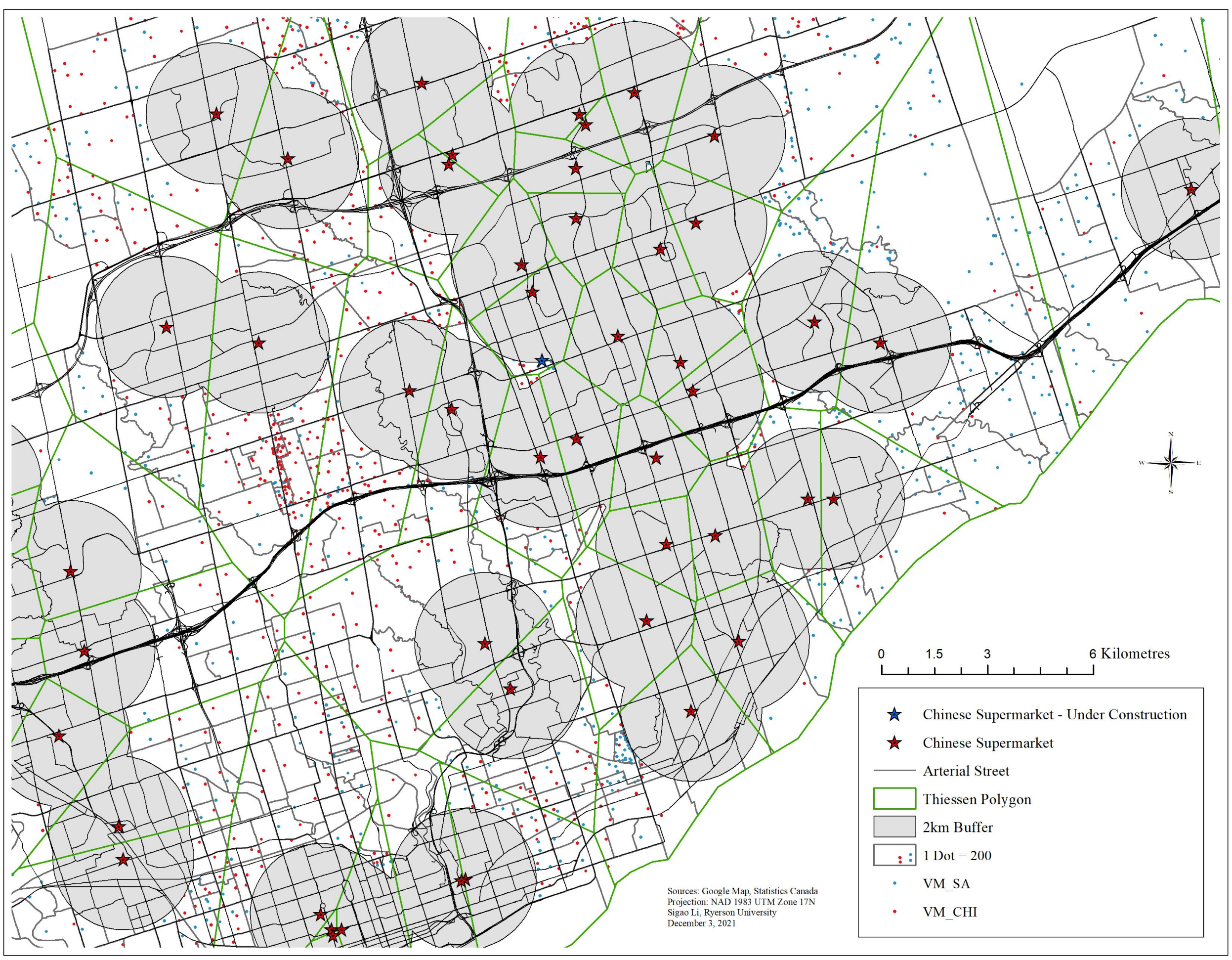


Note. Adapted from Google Map.

According to calculations, when the new store in the 2km buffer zone is completed, the entire Toronto CMA Chinese Ethnic Supermarket group will serve 1,429 more Chinese and 644 more South Asians. According to Thiessen polygon calculations, the store will have a potential customer base of 11,352 Chinese and 4,989 South Asians. It serves a significantly higher proportion of Chinese people than the average service provided by the Toronto CMA Chinese Ethnic Supermarket (4,041), and also significantly more than the average (6,569) in the Scarborough area in which it is located. Additionally, What's interesting is that the store is located just outside the 2km buffer zone established by this research institute and very close to the Thiessen polygon's intersection, which serves as the coverage boundary for the surrounding Chinese ethnic supermarket (see Figure 7).

Figure 7

Map of Yours Food Mart Sites in Toronto CMA



After establishing a buffer zone of 1km and 2km around the supermarket, this study analyzed and compared nine census variables that can be used to represent the market situation, and calculated the sales potential (see Table 5).

Table 5

"Yours Food Mart" Trade Area Comparison

Trade area characteristics	1km Buffer	1-2km Ring	2km Buffer
Number of Census Tract	8	14	22
Total Population Size	42,090	59,725	101,815
Chinese Population Size	16,775	30,370	47,145
Number of Households	15,060	20,480	35,540
Average Household Income ($)	76,313.29	83,831.36	80,645.59
Prevalence of Low Income (Based on After-tax Low-income Measure, in %)	22.62	21.84	22.17
Unemployment Rate (%)	7.74	7.33	7.50
Average Value of Dwellings ($)	578,634.88	657,054.90	623,824.58
Percentage of Population Aged 25-64 Years, with University Certificate, Diploma, a Bachelor, or Above-Bachelor Level of Education (%)	35.51	38.46	37.23
Percentage of Recent Immigrants (%)	8.62	7.50	7.97
Sales Potential (in Million $ / Year)	242.46	438.96	681.42

Note. Adapted from Statistics Canada.

In terms of income and expenditure, the average household income and the average value of dwellings of the 1km buffer zone are $76,300 and $578,600, respectively, which are lower than the average household income ($83,800) and the average value of dwellings ($657,000) that in the 1-2km buffer zone. Residents of the 1-2km buffer zone are slightly wealthier than the 1km buffer zone. This could be related to the proportion of adults with a high level of education. Within a 1-2km buffer zone, 38.46% of the population aged 25-64 have a university certificate, diploma, bachelor's degree, while the 1km buffer zone is 35.51%.

According to the data, unemployment and poverty rates are trending in opposite directions. The low-income rate is 21.84 % in the 1-2km buffer zone and 22.62 % in the 1km buffer zone. Unemployment rates are also lower in the 1-2km buffer zone than in the 1km buffer zone, at 7.33 % and 7.74 %, respectively. The percentage of new immigrants follows the same trend, at 7.50 % for the 1-2km buffer zone and 8.62 % for the 1km buffer zone.

Finally, the 1km and 1-2km buffer zones' sales potentials are calculated (Chinese Population * Individual actual final consumption (2016): Food and non-alcoholic beverages). The 1km buffer zone has a sales potential of $242.46 million, while the 1-2km buffer zone has a sales potential of $438.96 million. Although the sales potential of the 1km buffer zone appears to be less than that of the 1-2km buffer zone, the 1-2km buffer zone is three times the size of the 1km buffer zone. As a result, the sales potential decreases as the distance gets farther.

In general, the gap is not significant in the two buffer zones, and the overall level of living consumption is relatively stable. It is more obvious that the closer one is to the central business district, the higher the proportion of immigrants. While this is accompanied by increased unemployment, poverty, and low incomes, this area undoubtedly has the immigrant market that ethnic supermarkets require(47,145 Chinese within the 2km buffer zone).

Conclusions

According to research, the geographical pattern of Chinese ethnic supermarkets relocating to the suburbs does exist in the Toronto CMA, with the majority concentrated in the Inner suburbs and Fringe. Scarborough, North York, and Markham have the highest concentration of ethnic Chinese supermarkets. In contrast, Markham and its surrounding areas have the highest sales potential, a typical example of an agglomeration economy. However, the study discovered that some areas with the most significant sales potential lack ethnic Chinese supermarkets. Approximately half of the ethnic Chinese supermarkets are located outside of these areas.

Further research revealed that, while many Chinese ethnic supermarkets' primary business objectives remain Chinese, a sizable portion of Chinese ethnic supermarkets' target market has shifted to other minority groups. Numerous Chinese ethnic supermarkets serve South Asian consumers concurrently or exclusively. This could result from the intense market competition that has prompted some Chinese ethnic retail companies to expand beyond their ethnic group.

To ensure accuracy, this research established a 2km buffer zone around all ethnic Chinese supermarkets and further analyzed the data in the area. The findings indicate that only 4 of the 17 CSDs covered by these Chinese ethnic supermarkets are primarily serving Chinese customers. Additionally, the study discovered that approximately half of China's and South Asia's populations are unserved by existing Chinese ethnic supermarkets. Opening new locations in these areas will have a good chance of seizing the existing market.

Then, using T&T supermarket as an example, this research examines the trade area using two distinct calculation methods: buffer zone and Thiessen Polygon. It turns out that the existing T&T supermarkets serve a proportionately more significant number of Chinese customers than the average Chinese ethnic supermarket. The Chinese customers served by T&T are similar under these two methods, while there are some differences to South Asian customers.

Finally, this research conducted additional research on the existing findings and analyzed a Chinese ethnic supermarket currently under construction. The results indicate that the supermarket's chosen location is outside the coverage area of numerous nearby Chinese ethnic supermarkets. Additionally, compared to other areas of the Toronto CMA, this location can serve a more significant proportion of Chinese consumers than the average. This also demonstrates that, while companies entering the market later lose their site selection advantage, they can still achieve their objectives by sharing high-potential markets.

In short, it is a fact that the Chinese ethnic retail industry in the Toronto CMA will expand into the suburbs. Chinese ethnic supermarkets currently exist in two distinct directions. One party decided not only to target the Chinese customer. These companies no longer prioritize communities with a high proportion of Chinese residents when selecting locations for new stores and instead incorporate other population groups (such as South Asia) into their location selection strategies. The other party will continue to target Chinese customers, but in light of the intense competition in the existing market, these companies will build stores in areas with a sizable Chinese population and near the borders of other ethnic Chinese supermarkets. However, regardless of the development path chosen by the company, diversification appears to be a common objective of these businesses.

This research demonstrates that when it comes to location selection, Chinese ethnic supermarkets prioritize communities identical to or similar to their race. However, the population data used in this study are from Statistics Canada's 2016 Census. On the one hand, the data has a time difference of 5 years, and there is a certain degree of inaccuracy. In addition, along with a sizable Chinese and South Asian immigrant population, the Toronto CMA also has a sizable international student. In Canada, there are 140,000 Chinese students. In the 2019-2020 academic year alone, the Toronto CMA had over 27,000 Chinese students enrolled in universities or colleges (Fisher, 2020; Government of Ontario, 2021). However, international students are not included in Canada's census data. In the future, groups of international students can be incorporated into the calculation process to increase the accuracy of the research. It will undoubtedly be particularly beneficial to understand the distribution of the Chinese student group at the Toronto CMA and their influence on the location of the Chinese national enterprise.

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