

Supermarket Shuttle Programs:

A Feasibility Study for Supermarkets Located in Low-Income, Transit Dependent, Urban Neighborhoods in California

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November 2002

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UNIVERSITY OF CALIFORNIA, DAVIS**

2002

ACKNOWLEDGEMENTS

The authors wish to thank Paul Leigh, Ph.D., Karen Jetter, Ph.D., Michael Hagerty, Ph.D., Cindy Dagher, Jennifer Culp, M.P.H., and Phillippa Savage for their help on this project. A California Nutrition Network Local Incentive Award grant number 01-15625 funded this research.

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Suggested Citation: Mohan V, Cassady D. Supermarket Shuttle Programs:

A Feasibility Study for Supermarkets Located in Low-Income, Transit Dependent, Urban Neighborhoods in California. Center for Advanced Studies in Nutrition and Social Marketing, University of California, Davis, CA, 2002.

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EXECUTIVE SUMMARY

Supermarkets in inner city areas including New York, Savannah, Houston, and Los Angeles operate a shuttle for their customers. Despite the financial success of current shuttle programs around the country, the shuttle concept is not familiar to many storeowners operating in inner city areas who may be searching for means to improve sales. Based on reports and interviews with supermarket managers, it appears that shuttle programs improve customer loyalty; reduce costs from shopping cart loss and retrieval; and win new customers.

The purpose of this report is to investigate the feasibility of shuttle programs sponsored by supermarkets in selected low-income, urban areas in California. Specifically, we investigate programs that operated daily from 8 a.m. to 9 p.m., and offer customers a free ride home if they make a minimum purchase of \$25 at the supermarket. Supermarket shuttles frequently use a 15-passenger van, and use a store employee as a driver. In other cases, the store contracts with a shuttle operator who provides the driver, van, and all other costs associated with the program. Shuttle programs can improve the health of low-income consumers facing transportation barriers to purchasing fresh fruit and vegetables and other healthy foods. Shuttle programs also have the potential to improve the fiscal health of urban supermarkets by increasing their customer base and revenues.

A **market analysis** was conducted to estimate the market demand for supermarket shuttle services in areas with the maximum market potential: high-density urban areas where rates of car ownership is low. Nine zip codes in San Diego, Long Beach, Fresno, Bakersfield, and Oakland were selected for study. The number of households in each zip code not owning a car ranged from 2,141 to 5,940.

An **operational analysis** was conducted to determine start-up and operating costs, and to estimate revenue projections and a break-even point. Shuttle rider-ship was estimated at 5% to 20% of households with no car. At 20% of the target market, annual shuttle rider-ship ranged from 21,828 to 60,588 households. Buying the shuttle bus would incur an initial start-up cost of \$34,868 and \$4,496 in monthly operating expenses. If contracted, there would be a monthly outflow of \$10,200. Revenue estimations at 20% of the target market ranged from \$545,700 to \$1,514,700 annually. A break-even analysis at 20% of the target market revealed that the break-even point could be achieved in all zip codes within two to five months in the case of buying the shuttle bus, and in four to ten months in case of contracting the shuttle.

Based on these results, a supermarket shuttle program would be feasible in all of the zip codes studied. There are 61 zip codes in California with similarly low rates of car ownership and high population density. These areas also should be considered as potential locations for a supermarket shuttle program.

INTRODUCTION

Residents of lower income and minority neighborhoods in many urban areas face a double bind that limits their access to fresh, healthy food. Full service supermarkets are scarce in low-income areas. And residents in low-income, urban areas are less likely to own cars than their suburban counterparts, making it difficult to travel to supermarkets outside of their immediate neighborhoods.

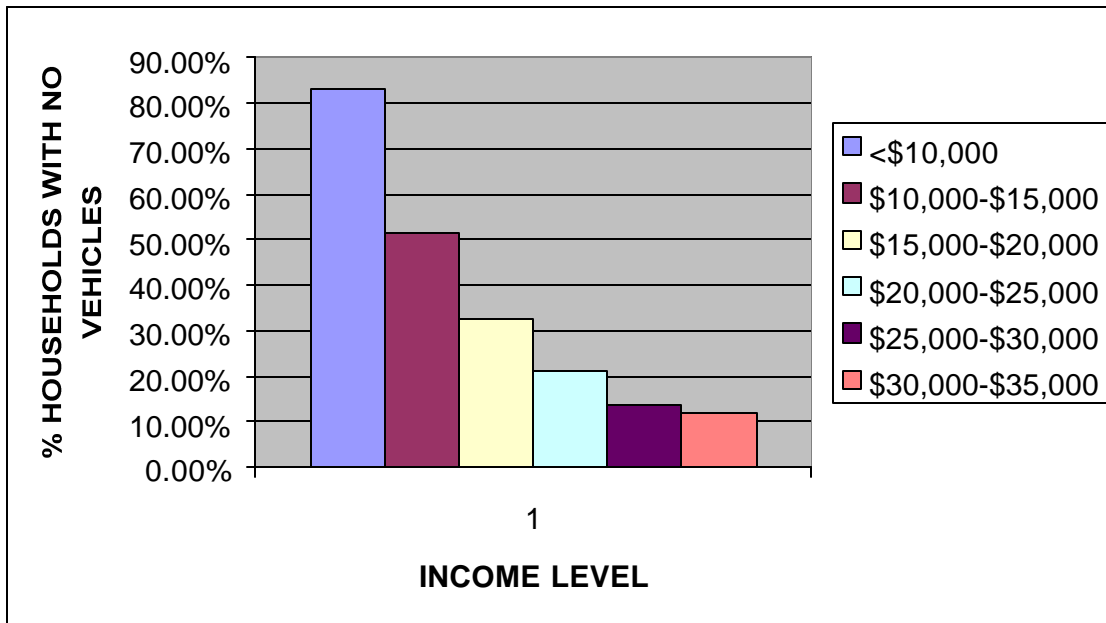
This double bind may be partly responsible for low consumption of fruits and vegetables that protect against the leading causes of death, including heart disease and cancer.¹ Only 24% of consumers from households with a total annual income of less than \$15,000 consumed five or more servings of fruit and/or vegetables daily, the federal recommendation for disease prevention.²

The purpose of this report is to investigate the feasibility of shuttle programs sponsored by supermarkets in selected low-income, urban areas in California. Specifically, we investigate programs that offer customers a free ride home if they make a minimum purchase of \$25 at the supermarket. Shuttle programs can improve the health of low-income consumers facing transportation barriers to purchasing fresh fruit and vegetables. Shuttle programs also have the potential to improve the fiscal health of urban supermarkets by increasing their customer base and revenues.

The grocery gap. Studies have shown that there are fewer supermarkets per capita in neighborhoods with predominately low income, minority, or immigrant residents. For example, in Los Angeles a “grocery gap” persists despite the pledges of retail companies following the 1992 civil unrest to build more markets in depressed neighborhoods. There are three times as many supermarkets per capita in parts of Los Angeles where only 10-20 percent of residents fall below the poverty line than in areas with 60-70 percent of residents living in poverty.³ Examination of census and grocery store information for 21 major metropolitan areas across United States reveal that there were 30% fewer supermarkets in low-income areas than in high-income areas. It also found low-income consumers were less likely to possess automobiles, further limiting their access to food choices.⁴ Also, those zip code areas with the greatest number of persons on public assistance had 20% fewer supermarkets than the zip codes that have a low percentage of persons receiving public assistance.⁵

Transportation barriers. Residents of urban neighborhoods with few supermarkets have to travel farther to shop for food. According to a USDA study, only 22% of food stamp recipients drove their own car to purchase groceries as compared to 96% of non-food stamp recipients.⁶ Transportation planners rarely plan bus routes around community food needs, leaving residents little choice but to carry their groceries long distances, use precious resources on taxi rides or make multiple transfers. Transportation via taxi’s and/or buses or paying for a ride can be costly, reducing a family’s food budget by up to \$400 per year.⁷ Figure 1 presents the level of transit dependency by income level.

Figure 1: Level Of Transit Dependency In Low-Income Households in California

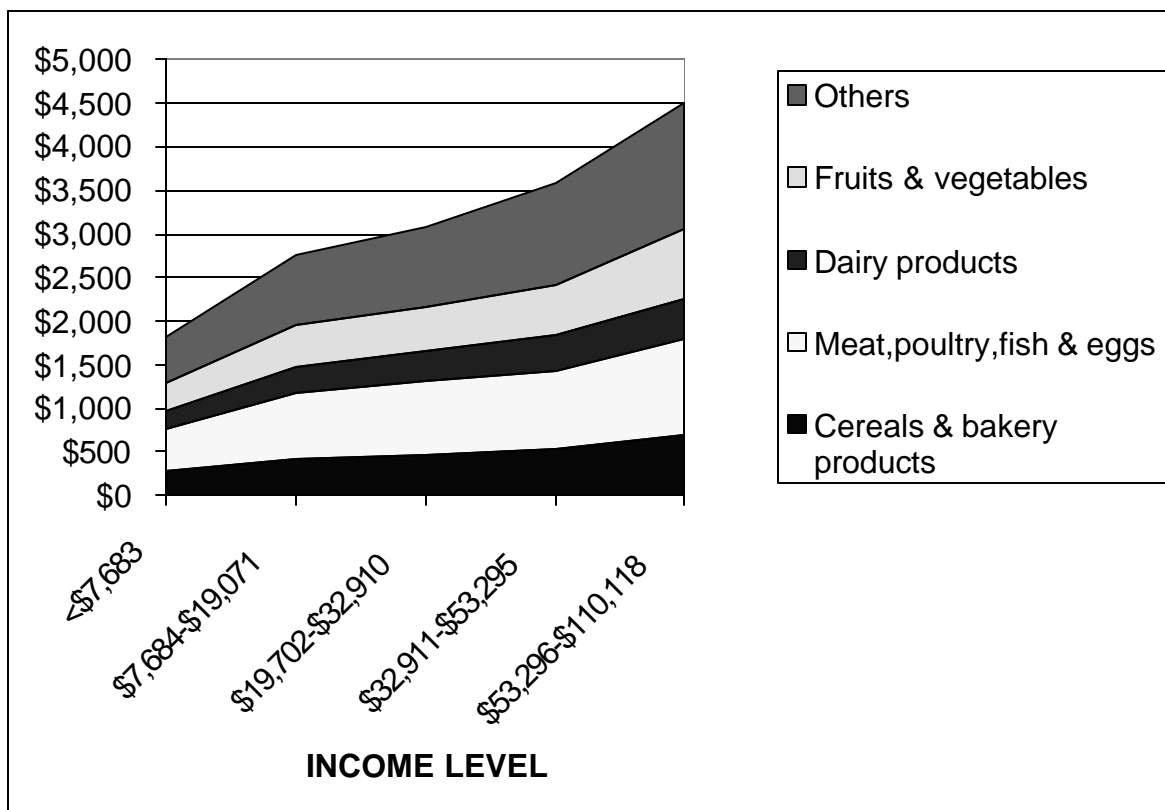


Source: Census 2000

Strong buying power. Americans spend an average of \$3,021 on food at home each year, or \$58.10 each week. The Consumer Expenditure Survey, sponsored by the U.S. Census Bureau, estimates that average weekly household spending on food varies somewhat across regions, with shoppers in the west spending slightly more than in other parts of the United States.⁸

Low-income shoppers have substantial buying power. For instance, a family of four earning less than \$33,485 would fall at 185% of the federal poverty level, and would qualify for food stamps. Yet households earning between \$19,071 and \$32,910 spent \$3,081 on food at home, or about \$59.25 each week – one dollar more each week than the national average.⁸ The annual expenditure on groceries for this income level includes \$514 for fruits and vegetables; \$470 for cereals and bakery products; \$832 for meat, poultry, fish and eggs; \$344 for dairy products; and, \$921 for other foods at home. Figure 2 presents expenditures for food at home by category of food and income level.

It is true that low-income, inner city shoppers have a lower per capita income than other areas and spend somewhat less on groceries than their higher income neighbors. However, the density of the population in urban areas offers concentrated spending power that is comparative or higher than suburban areas. In fact, estimates suggest that nationwide, inner city residents have retail purchasing power of more than \$331 billion.⁹

Figure 2: Food Expenditures At Home By Category Of Food And Income Level

Source: Consumer Expenditure Survey, 2002

And a preference for shopping at supermarkets. Low-income households prefer to shop at supermarkets rather than smaller neighborhood stores such as specialty and convenience stores. When low-income residents were asked what types of stores they *usually* shop at, the USDA's National Food Stamp Program Survey found that most households (90%) in the sample reported that they usually shopped at a supermarket.¹⁰ The rest mainly shopped at neighborhood grocery stores, with a few who shopped at specialty stores, convenience stores, and warehouse or discount stores. However, when asked what other types of stores are used other than their *usual* type, approximately 50% of households reported shopping at neighborhood grocery stores, 42% at convenience stores, and 21% used farmers markets. Due to lack of access to supermarkets in low-income neighborhoods, shoppers may end up purchasing from convenience stores that usually offer poor selection and higher prices compared with supermarkets.

Grocery stores leave the inner city. While the industry focused its resources in building new stores in suburban locales, it simultaneously began to sell or close down low-income neighborhood stores.¹¹ Lesser availability of land, greater zoning restrictions and contamination of sites that may require remediation before the construction of new stores are the major concerns that lead to fewer supermarkets in low income neighborhoods.¹²

Remaining stores face higher operating costs. Inner city supermarkets tend to have higher operating costs than suburban stores. Greater shrink factor, security costs, high labor costs due to frequent turnover and more inexperienced workers, and bad checks account for a larger percentage of operating expenses.¹³ Shrink is the amount of money lost primarily due to theft by employees as well as shoplifting by customers. An example of a particularly costly form of shoplifting is the theft of shopping carts, which usually occurs because customers have no transportation means back home. The second area deals with security issues. Securing the store is costly not only architecturally by protecting its facilities, but also by making it part of the community and allowing customers to feel safe. Hiring employees, especially from the community, can require intensive training programs, which are costly. Lastly, supermarkets believe that they lose money by receiving bad checks from inner city residents.

Inner city success stories. Despite the financial challenges of operating a supermarket in a low-income area, there are many success stories. A report by a grocery industry trade association identified low-income, urban areas as a potential growth opportunity for the grocery industry because of the combination of large populations and limited competition.¹² The report describes 26 stores located in urban areas throughout the U.S., including two in California, as model supermarkets. Community involvement was a “key component” for success, and the authors highlighted strategies that financially successful stores have used.

- Joining forces with community development corporations.
- Recruitment and training among neighborhood residents.
- Joining local groups, such as business and civic organizations.
- Supporting local schools, churches, and other community organizations.
- Setting up consumer boards.
- Providing a shuttle service for customers.
- Providing nutrition education.

Benefits of shuttle programs. Of the recommendations for success in inner city supermarkets, the shuttle program appears most likely to allow consumers better access to fresh, reasonably priced fruit and vegetables and to increase profits for urban supermarkets. Organizations as diverse as the Food Marketing Institute, the National Academy of Sciences¹⁴, and the Community Food Security Coalition⁷ have documented the success of shuttle services sponsored by supermarkets. Many of the examples are from California. However, published reports and interviews with supermarket managers have not revealed any quantitative studies of the impact of shuttle programs on sales and customer loyalty. Nevertheless, the following examples are suggestive.

- **Increasing fruit and vegetable sales.** About 42% of food stamp recipients conduct a major grocery-shopping trip only once each month,¹⁵ rather than weekly, which may mean limited purchases of fresh produce. It is not a surprise that some supermarkets offering free shuttle services home generate 2-3 times the revenue from produce and perishables compared to the industry standard.¹²

- **Improving customer loyalty.** Nearly all supermarket managers who oversee shuttle programs remark on the goodwill and customer loyalty that shuttle programs create. One dramatic example is Fine's Market in the Boyle Heights section in Los Angeles: during the civil unrest in 1992, customers protected the store from looters.³
- **Garnering new customers.** Transit dependent neighborhood residents may be enticed to switch markets if they were offered a free ride home. The manager at a Fiesta Market in Houston estimated that about half of the 250 passengers each week would shop at another store since "the van passes three other stores on the way."¹⁶
- **Reducing costs from shopping cart loss and retrieval.** The City of Inglewood estimates that 500 shopping carts are abandoned *daily*. Shopping cart loss and retrieval can cost small chains about \$300,000 annually. But, according to one industry analyst, "Shopping carts go AWOL because they are used as wheels for folks who don't have cars."⁷ Shuttle programs are one strategy to reduce the costs from cart loss.

Successful Shuttle Programs: Two Examples

- **Store-operated shuttle program.** Numero Uno Market is a small and growing chain of supermarkets principally located in the inner city areas of Los Angeles. It is a privately owned operation that has bolstered its business and profits through innovative marketing of its products and services. Numero Uno capitalizes on the high concentration of transit dependency in the inner city and its "Shoppers Van Shuttle Service" is the key to its marketing strategy.

For example, one store has nine shuttle vans at one location that operates in a 3-8 mile radius around the store. The usage of the van service is estimated to be 27,000 van trips per year, transporting about 2,298 passengers per week. That's about 4% of the households in the area within a two-mile radius of the store that do not own a car. The cost of the van program, including van operators, maintenance, and operational costs, is less than 1% of the gross revenues for the store. In 1998, gross sales at the store totaled \$25 million, and the supermarket was among the top five grossing supermarkets in Los Angeles.¹⁴

- **Contract shuttle program.** Three Ralph's supermarkets in the Los Angeles area contract with a company to provide a free ride home for their customers. The contract with a shuttle company provides a driver, 15-passenger van, insurance, and all mileage and maintenance costs in return for a monthly fee.

The manager at the Ralph's on West Adams reported that the shuttle had been in operation at his store for about five years. The vans run daily from 8:30 a.m. to 8:00 p.m., and offer a free ride home to any customer with a receipt of \$25 or more. Customers spending less must get approval from the manager for a free ride home. The store started with one van, and added a second van recently.

The manager reports that the van service creates good will for the store, as it is “very popular with customers.” He estimates that the van carries 100 passengers each day. That translates to about 16% of the transit dependent households in the Ralph’s zip code. The manager attributes \$27,000 in weekly sales to the shuttle service.¹⁷

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- ¹⁷ Interview with Leonard Effros, Ralphs Grocery Company # 294, August 14, 2002.

METHODOLOGY

Exploratory Research: An extensive literature review and interviews were conducted in the first phase of this study to answer the following questions:

- What are the unique financial challenges faced by supermarkets located in low-income, urban areas?
- What strategies could be used to increase fruit and vegetable sales in these stores?
- What are the characteristics of successful shuttle programs, such as schedules, ridership, costs, and revenue?

The literature search used the database *ABI Inform* to locate business research on the grocery industry, and the database *Lexis-Nexis Academic Universe* to locate newspaper articles between the years 1990 and 2002. The search for business literature revealed less than five articles, while the search of newspapers revealed less than 20 articles. In addition, reports by industry sources such as the Food Marketing Institute were identified, as were reports and studies by the United States Department of Agriculture, which sponsors the food stamp program.

Interviews were conducted in-person and by telephone to explore in more depth the issues of interest for this study. These interviews included fourteen grocery store executives, five food security advocates familiar with transportation barriers faced by low-income consumers, and twenty-two business experts from the food retail, farming, and transportation industries.

Study Focus: Supermarket Shuttle Programs and Low-Income Consumers

After completing the first phase of the research, the study focused on three key areas defined here.

- **Supermarket:** Full-line self-service grocery store generating a sales volume of \$2 million or more annually. This definition is consistent with industry sources such as the Food Marketing Institute and Progressive Grocer.
- **Shuttle program:** For the purposes of this study, a shuttle program is sponsored by the supermarket and offers customers a free ride home if a customer makes a minimum purchase of \$25 at the supermarket. There are other types of shuttle programs, as discussed in Chapter 3 of this report, but they are not the focus of this research.
- **Low-income consumers:** Households with an income at or below 185% of the federal poverty level. This study uses a family of four with an annual income of \$33,485 or less as the typical low-income household. The table below shows income cut-offs for households with one to eight members.

Table 1: Gross Income at 185% Federal Poverty Level

# OF PERSONS IN FAMILY UNIT	GROSS INCOME			
	ANNUAL	MONTHLY	WEEKLY	HOURLY
1	\$16,391	\$1,366	\$315	\$7.88
2	\$22,089	\$1,841	\$425	\$10.62
3	\$27,787	\$2,316	\$534	\$13.36
4	\$33,485	\$2,791	\$644	\$16.10
5	\$39,183	\$3,266	\$754	\$18.84
6	\$44,881	\$3,741	\$863	\$21.58
7	\$50,579	\$4,215	\$973	\$24.32
8	\$56,277	\$4,690	\$1,082	\$27.06
8+	\$5,700 per added family member	\$475 per added family member	\$110 per added family member	\$2.74 per added family member

Source: <http://www.wicworks.ca.gov/localAgency/search.asp>

Selection of Study Sites

Data from Summary File 3 from the 2000 Census were used to select five low-income, transit dependent, urban areas for study. The geographic unit of analysis is zip code tabulation areas (ZCTA's) developed by the Census Bureau. ZCTA's are intended to follow the same boundaries as zip codes developed by the U.S. Postal Service. The final zip codes were selected using the following criteria.

- 1) A median household income of \$33,485 or less.
- 2) A population of 20,000 or greater to ensure sufficient population density for a shuttle service.
- 3) A vehicle ownership rate of 17.7%, a cutoff established in previous studies of transit dependence.¹
- 4) Of the 67 zip codes that met the selection criteria, final study areas were selected to represent California's large metropolitan areas and the Central Valley, and included nine zip codes located in San Diego, Long Beach, Oakland, Bakersfield, and Fresno. Approximately 370,000 people are included in the nine zip codes. The list of 61 zip codes and their demographic characteristics are included in Appendix 1.

Chapter 1: Market Analysis

The primary market for a supermarket shuttle program is assumed to be households with no vehicle. Data from Summary File 3 of the 2000 Census were used to determine the number of households, the median household income, and the number of households with no vehicle for each zip code. Data from Summary File 3 of the 1990 census were used to compare changes over time in population, income, and vehicle ownership.

Chapter 2: Operational Analysis

Rider-ship Estimates

- **Shift Time:** Those periods in which shuttle bus provision and utilization vary.
- **Shift type:** Peak shifts (evenings and weekends) are based on results from a case study of a shuttle service at Numero Uno Market² and a study of nationwide shopping patterns by Progressive Grocer.³ Refer Appendix 2 for consumer shopping profile.
- **Trips per shift:** Assumes shuttle runs every 45 minutes. Derived from dividing the number of hours (in minutes) in a shift and then dividing by 45 minutes (round trip).
- **Passengers/week:** Conservative average of number of passengers per week during non-peak and peak hours of operation. Results are based on a study of nation wide shopping patterns by Progressive Grocer³ and at 20% target market rider-ship estimate.
- **Total Passengers/week:** The sum of passengers/week.
- **Passengers/year** = passengers/week x 51 weeks (assuming the shuttle does not operate on certain holidays).

Supermarket-operated shuttle program

- **Start up costs: \$34,868.** Includes the price of a 15-passenger van plus 16% for tax, licensing, and other fees. The price for a 15-passenger van is \$30,059, the average of the three top-selling full size vans: Chevrolet Express 3500 Passenger Van, GMC Savana 3500 Passenger Van, and Ford Econoline E350 Super Duty Wagon. All vehicles included standard features such as power windows, automatic transmission, and air conditioning in front and back. Prices were collected from the Kelly Blue Book using retail prices for 2003 models (www.kbb.com).
- **Monthly operating costs: \$4,496.** Assumes 116 trips per week at 10 miles per trip, or 59,160 miles annually. Includes the cost of gas \$7,372 (\$1.62/ gallon x 59,160/13 miles per gallon); maintenance \$4580 (oil changes, tune-ups, tires); insurance \$6,000; driver \$36,000 (includes salary, benefits, other fees). The monthly operating cost of \$4,496 is similar to store operated shuttle programs in the Los Angeles Area reported by Gottlieb.¹ Monthly operating costs could vary as supermarkets already owning a fleet of delivery vehicles reported lower costs for vehicles and insurance.

Contracted shuttle service

- **Monthly operating costs:** \$7,260 to \$13,200 for a 15-passenger van. These costs are all inclusive (driver, vehicle, mileage, maintenance, insurance) and include an 11-hour per day seven day a week shuttle service. Costs per hour are less as hours per day are increased. Length and terms of contracts will vary according to the vendor, and depends primarily on whether they specialize in shuttle services and whether they have vehicles available. Purchase of a new vehicle could require a longer contract (2-3 years), while other companies appeared willing to provide a cancellation clause requiring 30 days notice if rider-ship was not satisfactory to either party. Cost estimates are based on interviews with four transportation companies and ranged from \$22 to \$40 per hour.

Revenue Estimates. Annual revenue potential = annual rider-ship estimate x \$25. This formula assumes that consumers shop weekly and make a minimum purchase of \$25 at the supermarket sponsoring the shuttle.

Revenue Estimates from New Customers. As there are very few studies available on supermarket shuttle programs and none of them provide a quantitative analysis of revenue generated from new and existing customers, two scenarios were developed to estimate new revenue from shuttle program based on various levels of usage by target market.

Scenario 1 deals with the use of transportation savings (by existing customers) for additional food expenditures. Additional revenue from transportation savings is calculated based on the fact that:

1. \$3.26 is one-way transportation cost to reach supermarkets.
2. Only 66.7% of low-income target customers with no vehicles, use the shuttle service
3. 9% of all household expenditures for low-income household are devoted to food at home.

Scenario 2 deals with new revenue generated from existing and new customers. This scenario assumes varying range of existing (95%, 90%, 85%, 80%, 75%) and new (5%, 10%, 15%, 20%, 25%) customers. Revenue from new customers was calculated at \$38 weekly. This figure is derived from the average expenditure for food at home among low-income households is \$3,081 annually or \$59 each week⁴. A study of food expenditures among low-income, urban residents suggests that 64% of the at-home food budget is spent at supermarkets, and remaining is spent at specialty and convenience stores⁵. Sixty-four percent of \$59 is \$38.

Break-even point is in terms of number of shuttle trips and is calculated using the formula:

$$\begin{aligned} \text{Break-even point} &= (\text{Annual Fixed Cost}) / (\text{Selling Price/Unit} - \text{Variable Cost/Unit}) \\ &= (\text{Annual Fixed Cost}) / (\text{Contribution Margin/Unit}) \end{aligned}$$

In case of **buying the shuttle bus**, the initial start-up cost of \$34,868 is amortized over a period of three years at an annual interest rate of 7% and the average annual capital recovery amount is calculated using the formula:

$$\text{Annual Capital Recovery} = \frac{(\text{Purchase Price Of Van} - \text{Salvage Value}) * \text{Interest Rate}}{(1 - (1 + \text{Interest Rate})^{-\text{Life of van}})} + (\text{Salvage Value} * \text{Interest Rate})$$

The salvage value of the 15-passenger van at the end of three years is assumed to be \$12,200 and is based on Kelly Blue Book value for a 15-passenger Chevrolet express van, with 177,000 miles of usage after 3-year period. Using the above formula, the annual capital recovery amount is \$9,492. The monthly operating cost is \$4,496. Thus the annual fixed expenses are \$63,444 (\$9,492 + \$4,496* 12 months)

Based on the assumption that each round trip would last 45 minutes there are 5,916 shuttle trips per annum. According to food marketing institute gross margin for supermarkets is 26.4% of sales. Thus only 26.4% of sales are what that is left to cover fixed costs and profits. But at break even, profits are zero and thus the gross margin is used to cover only fixed costs. There are no variable costs. Thus contribution margin per unit would be 26.4% of estimated sales divided by 5916. There are 499 shuttle trips per month based on the assumption that each round trip would last 45 minutes. Thus break-even point in months is break-even point in number of shuttle trips divided by 499.

In case of **contracting the shuttle services** the average monthly operating cost ranges from \$7,260 to \$13,200. Hence an average amount of \$10,200 ($\$7,260 + \$13,200 / 2$) is used in break-even calculations. The annual fixed cost is \$122,400 ($\$10,200 * 12$ months). Contribution margin is calculated as in buying the shuttle bus option and is 26.4% of estimated sales divided by 5916.

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³ Progressive Grocer. *69th Annual Report of the Grocery Industry*. April 2002, P-27, 30.

⁴ U.S. Department of Labor. *Consumer Expenditures in 2000*. Bureau of Labor Statistics, Report No. 958. April, 2002.

⁵ Kaufman P, MacDonald JM, Lutz SM, Smallwood D. *Do the Poor Pay More? Item Selection and Price Differences Affect Low-Income Household Food Costs*. Food and Rural Economic Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 759, November 1997.

REPORT OVERVIEW

This feasibility study has two objectives:

To study the market demand for running a shuttle bus around supermarkets in selected low-income, urban neighborhoods in California.

To determine the commercial viability, both operational and financial, of a supermarket providing free shuttle service home to customers who make a minimum purchase.

Chapter 1 addresses the first objective of the feasibility study, the market analysis. This chapter estimates the market demand for shuttle services in five areas where there is maximum market potential to establish the shuttle service around supermarkets in California.

Chapter 2 addresses the second objective of the feasibility study, the operational analysis. This chapter discusses the organizational and technical issues surrounding the shuttle operation. This chapter also analyzes the start-up and operating costs involved in a shuttle service, ridership estimates and revenue projections, and presents the results of a break-even analysis.

Chapter 3 offers conclusions and recommendations for shuttle services operated by supermarkets.

CHAPTER 1: MARKET ANALYSIS

Households that do not own a vehicle are the primary market for a supermarket shuttle program. Dependent upon public transportation, rides from friends, or taxis, these shoppers face either the high cost of a taxi or the inconvenience of carrying multiple shopping bags home from the supermarket or bus stop.

This chapter estimates the market for shuttle programs in selected low-income, urban areas where car ownership rates are low. Specifically, this chapter examines the market potential in nine zip codes located in five cities throughout California: San Diego, Long Beach, Fresno, Oakland, and Bakersfield. These areas were chosen because at least half of the households had an income below 185% of the federal poverty level, and 17.7% or more households did not own a car. The methodology section provides a detailed explanation of the target market selection and analysis.

1.1-AREA 1- SAN DIEGO, CALIFORNIA

1.1.1-Description of the Study Area

The San Diego study area includes the zip codes 92113, 92102, and 92101. The zip codes are contiguous, and include downtown and the region immediately south along the waterfront until the border of National City.

The key economic indicators for this area are summarized in Tables 1 and 2. These are based on 1990 and 2000 Census data.

Table 1: Key Economic Indicators, San Diego, CA, 1990

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
92113	44,741	11,498	\$16,212	3,180
92102	45,265	13,595	\$18,741	3,658
92101	20,265	8,344	\$13,652	4,486

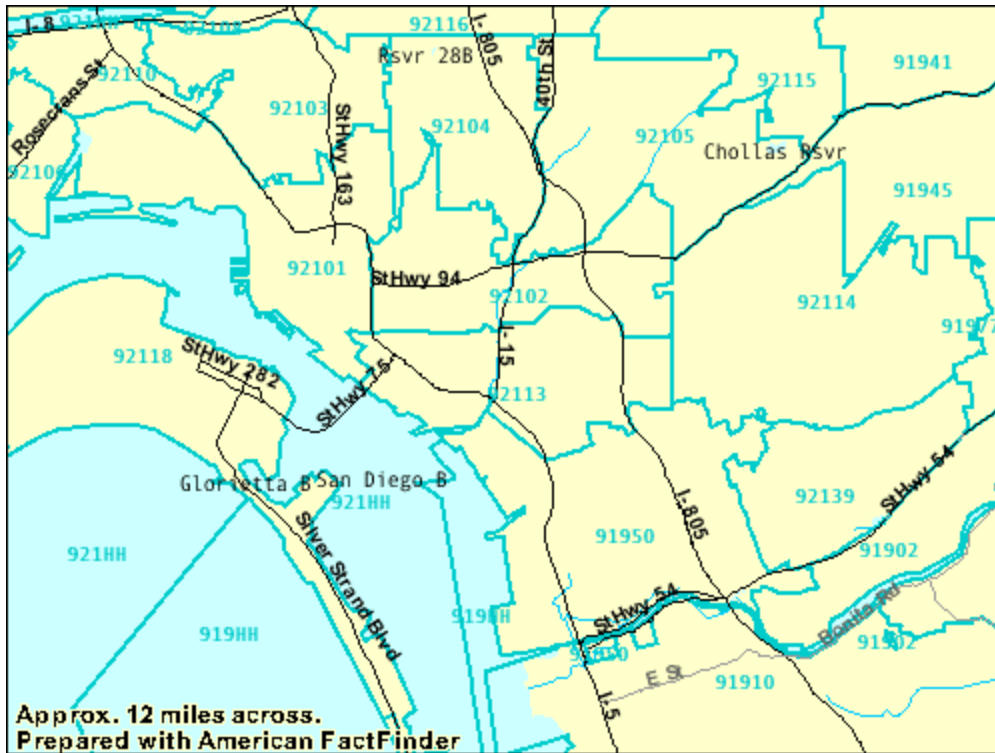
Source: Census Bureau, 1990

Table2: Key Economic Indicators, San Diego, CA, 2000

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
92113	47,417	11,932	\$23,841	2,953
92102	47,123	14,212	\$26,505	3,019
92101	27,494	11,411	\$23,762	4,797

Source: Census Bureau, 2000

Map 1: Zip Codes 92113, 92102, and 92101 in San Diego, CA



1.1.2-Key Findings:

Zip Code: 92133

- This zip code has a total population of 47,417. Total population increased from 44,741 residents in 1990 to 47,417 residents in 2000, a 5.9% increase over ten years. This represents 2,676 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 11,498 to 11,932. This represents 434 new households between 1990 and 2000.
- There are 2,953 households without any vehicles in this zip code area. This constitutes 24.7% of total households (i.e., 24.7% of households in this area do not own a vehicle).
- The share of zero vehicle households decreased from 27.6% in 1990 to 24.7% in 2000.
- The median household income in this zip code area is \$23,841.

Zip Code: 92102

- This zip code has a total population of 47,123. Total population increased from 45,265 residents in 1990 to 47,123 residents in 2000, a 4.1% increase over ten years. This represents 1858 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 13,595 to 14,212. This represents 617 new households between 1990 and 2000.
- There are 3,019 households without any vehicles in this zip code area. This constitutes 21.2% of total households (i.e., 21.2% of households in this area do not own/possess a vehicle).
- The share of zero vehicle households decreased from 26.9% in 1990 to 21.2% in 2000.
- The median household income in this zip code area is \$26,505.

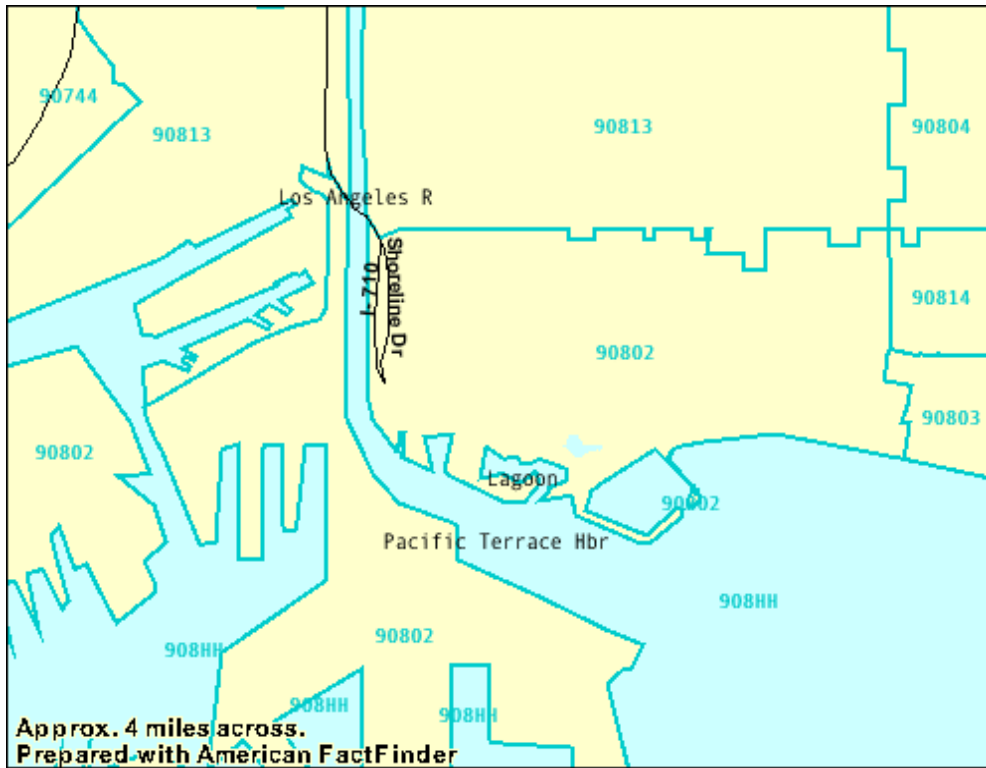
Zip Code: 92101

- This zip code has a total population of 27,494. Total population increased from 20,265 residents in 1990 to 27,494 residents in 2000, a 35.6% increase over ten years. This represents 7,299 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 8,344 to 11,411. This represents 3,067 new households between 1990 and 2000.
- There are 4,797 households without any vehicles in this zip code area. This constitutes 42% of total households (i.e., 42% of households in this area do not own a vehicle).
- The share of zero vehicle households decreased from 53.7% in 1990 to 42% in 2000.
- The median household income in this zip code area is \$23,762.

1.2-AREA 2-LONG BEACH, CALIFORNIA***1.2.1-Description of the study area***

The Long Beach study area includes zip codes 90802 and 90813. The Port of Long Beach borders the Long Beach study area on the south and west. It includes downtown Long Beach and the area north of downtown until the border of the city of Signal Hill.

Map 2: Zip Codes 90802 and 90813 in Long Beach, CA



The key economic indicators for this area are summarized in the Table 3 and 4. These are based on 1990 and 2000 Census Data.

Table 3: Key Economic Indicators, Long Beach, CA, 1990

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
90802	33,906	17,290	\$21,396	5,058
90813	58,109	15,438	\$18,110	4,943

Source: Census Bureau, 1990

Table 4: Key Economic Indicators, Long Beach, CA, 2000

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
90802	38,419	18,873	\$25,860	5,647
90813	63,129	16,455	\$20,015	5,940

Source: Census Bureau, 2000

1.2.2-Key findings:**Zip Code: 90802**

- This zip code has a total population of 38,419. Total population increased from 33,906 residents in 1990 to 38,419 residents in 2000, a 13.3 % increase over ten years. This represents 4,513 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 17,290 to 18,873. This represents 1,583 new households between 1990 and 2000.
- There are 5,647 households without any vehicles in this zip code area. This constitutes 29.9% of total households (i.e., 29.9% of households in this area do not own a vehicle).
- The share of zero vehicle households increased from 29.2% in 1990 to 29.9% in 2000.
- The median household income in this zip code area is \$25,860.

Zip Code: 90813

- This zip code has a total population of 63,129. Total population increased from 58,109 residents in 1990 to 63,129 residents in 2000, an 8.6% increase over ten years. This represents 5,020 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 15,438 to 16,455. This represents 1,017 new households between 1990 and 2000.
- There are 5,940 households without any vehicles in this zip code area. This constitutes 36% of total households (i.e., 36% of households in this area do not own a vehicle).
- The share of zero vehicle households increased from 32% in 1990 to 36% in 2000.
- The median household income in this zip code area is \$20,015.

1.3 -AREA 3-FRESNO, CALIFORNIA

1.3.1-Description of the study area

The Fresno study area includes zip code 93702. It includes the area east of downtown, and is bounded on the north by State Highway 180 and on the west by State Highway 41. The key economic indicators for this area are summarized in Table 5 and 6. These are based on 1990 and 2000 Census Data.

Table 5: Key Economic Indicators, Fresno, CA, 1990

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
93702	44,477	11,652	\$16,396	2,343

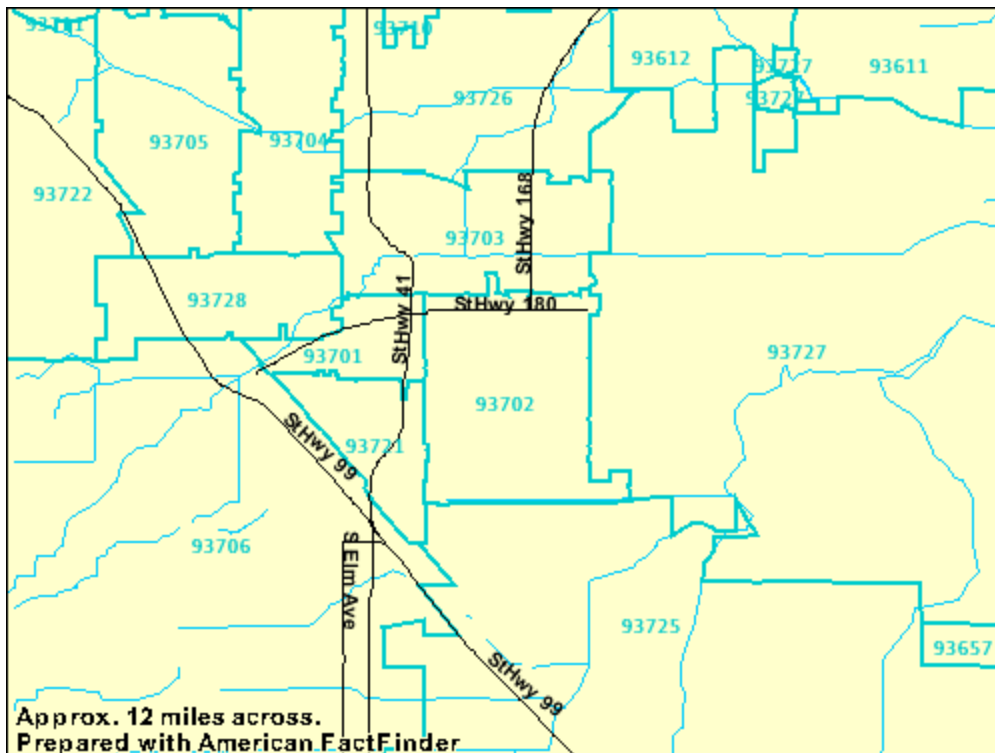
Source: Census Bureau, 1990

Table 6: Key Economic Indicators, Fresno, CA, 2000

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
93702	47,997	11,794	\$21,514	2,750

Source: Census Bureau, 1990

Map 3: Zip Code 93702 in Fresno, CA



1.3.2-Key findings:

Zip Code: 93702

- This zip code has a total population of 47,997. Total population increased from 44,447 residents in 1990 to 47,997 residents in 2000, a 7.9% increase over ten Years. This represents 3,520 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 11,652 to 11,794. This represents 142 new households between 1990 and 2000.
- There are 2,750 households without any vehicles in this zip code area. This constitutes 23.3% of total households (i.e., 23.3% of households in this area do not own a vehicle).
- The share of zero vehicle households increased from 20.1% in 1990 to 23.3% in 2000.
- The median household income in this zip code area is \$21,514.

1.4-AREA 4-OAKLAND, CALIFORNIA

1.4.1-Description of the study area

The Oakland study includes zip codes 94607 and 94606. These zip codes are continuous and are bordered on the north by Interstate 880. The study area includes parts of downtown, and areas to the northwest and southeast of downtown.

Map 4: Zip Codes 94607 and 94606 in Oakland, CA



The key economic indicators for this area are summarized in Table 7 and 8. These are based on 1990 and 2000 Census Data.

Table 7: Key Economic Indicators, Oakland, CA, 1990

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
94607	21,294	7,325	\$12,163	3,492
94606	38,555	13,790	\$22,385	4,221

Source: Census Bureau, 1990

Table 8: Key Economic Indicators, Oakland, CA, 2000

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
94607	21,048	7,494	\$21,124	3,160
94606	41,872	15,080	\$32,273	3,620

Source: Census Bureau, 1990

1.4.2-Key findings:

Zip Code: 94607

- This zip code has a total population of 21,048. Total population decreased from 21,294 residents in 1990 to 21,048 residents in 2000, 1.1% decrease over ten years. This represents 246 fewer residents between 1990 and 2000.
- The number of households residing in this zip code increased from 7,325 to 7,494. This represents 169 new households between 1990 and 2000.
- There are 3,160 households without any vehicles in this zip code area. This constitutes 42.1% of total households (i.e., 42.1% of households in this area do not own a vehicle).
- The share of zero vehicle households decreased from 47.6% in 1990 to 42.1% in 2000.
- The median household income in this zip code area is \$21,124.

Zip Code: 94606

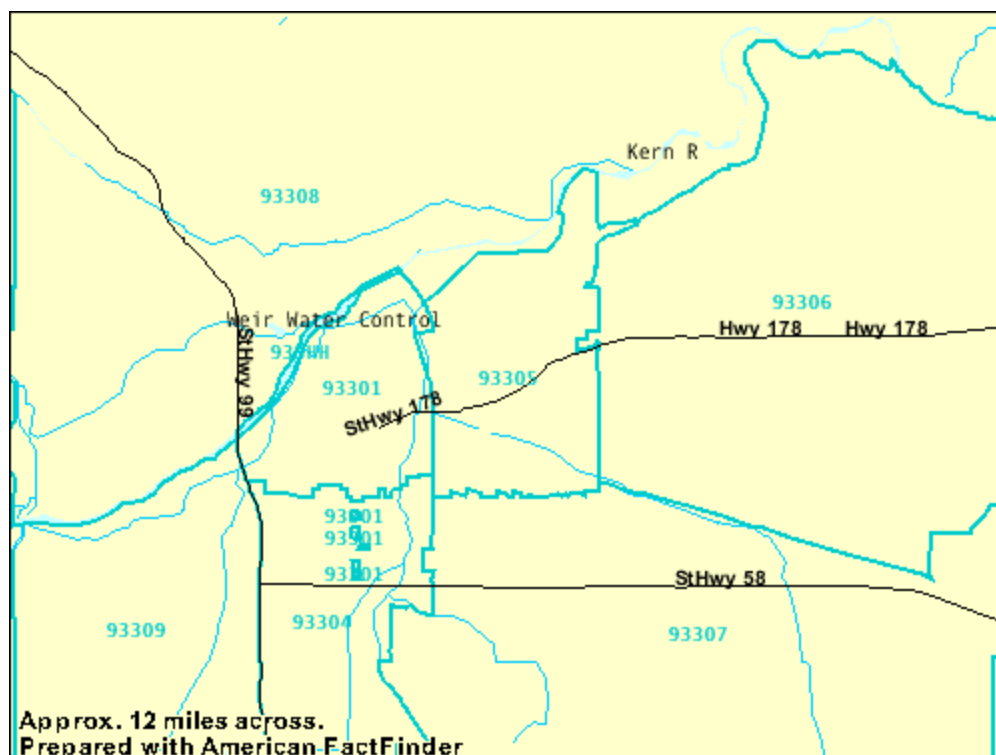
- This zip code has a total population of 41,872. Total population increased from 38,555 residents in 1990 to 41,872 residents in 2000, 8.6% increase over ten years. This represents 3,317 new residents between 1990 and 2000.
- The number of households residing in this zip code increased from 13,790 to 15,080. This represents 1,290 new households between 1990 and 2000.
- There are 3,620 households without any vehicles in this zip code area. This constitutes 24% of total households (i.e., 24% of households in this area do not own a vehicle).
- The share of zero vehicle households decreased from 30.6% in 1990 to 24% in 2000.
- The median household income in this zip code area is \$32,273.

1.5 -AREA 5-BAKERSFIELD, CALIFORNIA

1.5.1-Description of the study area

The study area includes zip code 93305. It is bordered on the north by the Kern River and is dissected by State Highway 178.

Map 5: Zip Code 93305 in Bakersfield, CA



The key economic indicators for this area are summarized in Tables 9 and 10. These are based on 1990 and 2000 Census Data.

Table 9: Key Economic Indicators, Bakersfield, CA, 1990

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
93305	34,046	10,955	\$20,475	1,783

Source: Census Bureau, 1990

Table 10: Key Economic Indicators, Bakersfield, CA, 2000

ZIP CODE	POPULATION	TOTAL NO. OF HOUSEHOLDS	MEDIAN HOUSEHOLD INCOME	TOTAL HOUSEHOLDS WITH NO VEHICLE
93305	35,623	10,448	\$24,114	2,141

Source: Census Bureau, 2000

1.5.2-Key findings:

Zip Code: 93305

- This zip code has a total population of 35,623. Total population increased from 34,046 residents in 1990 to 35,623 residents in 2000, a 4.6% increase over ten years. This represents 1,577 new residents between 1990 and 2000.
- The number of households residing in this zip code decreased from 10,955 to 10,448. This represents 507 fewer households between 1990 and 2000.
- There are 2,141 households without any vehicles in this zip code area. This constitutes 20.4% of total households (i.e., 20.4% of households in this area do not own a vehicle).
- The share of zero vehicle households increased from 16.2% in 1990 to 20.4% in 2000.
- The median household income in this zip code area is \$24,114.

CHAPTER 2: OPERATIONAL ANALYSIS

The operational analysis section examines the capability of supermarkets to meet the shuttle program requirements in terms of choosing the type of shuttle program; organizational requirements like staffing needs; technological requirements; cost analysis based on type of shuttle program; and, revenue analysis based on the target market rider-ship patterns. This section also assists the owners or management of supermarkets in their decision-making process by providing a break-even analysis that determines the profitability of a shuttle operation.

The literature review and telephone interviews revealed the following information about the operational and technical feasibility of setting up a shuttle service around supermarket in low-income neighborhoods in California.

2.1-TYPE OF SHUTTLE PROGRAMS

Based on literature search and discussions with experts in the field, we built up two scenarios. The supermarket has the following two options.

1. Buying the shuttle bus.
2. Contracting the shuttle bus with a shuttle operator.

The pros and cons associated with each option are discussed below.

2.1.1-Buy the Shuttle Bus

Pros

- Can own the shuttle bus and get to keep it until the life of the bus.
- Need not depend on second or third party shuttle operators. Gives independence and flexibility in terms of using the vehicle.
- Can drive as many miles as necessary.

Cons

- Large capital expenditure. Up-front costs include the cash price or down payment, taxes, registration and other fees and charges. If the shuttle bus is purchased using any loan then the monthly loan payments are usually higher than monthly contract lease payments because you are paying for the entire purchase price of the shuttle bus, plus interest and other finance charges, taxes, and fees.
- Maintain the shuttle, insure and pay for driver salary.
- The grocery store has the responsibility of checking the driver's license and driving record.
- In case of early termination of the shuttle service, the supermarket is liable and responsible for any pay-off amount. Also incur additional responsibility of selling or trading the vehicle if the supermarket decides to change the vehicle size or type.
- The grocery store may be required to produce the shuttle operation authority from the state (Federal Highway Administration-FHWA)

- Before purchasing the shuttle bus has to pass a complete mechanical inspection within the previous 12 months. Most states will issue reports or decals to be placed on the coach indicating the date of a successful inspection. If in case the state does not require a periodic inspection, a decal issued by the commercial vehicle safety alliance (CVSA) or at a minimum, a copy of the operator's own annual inspection form for the bus is required.
- In case of emergency and breakdowns, the grocery store should bear the responsibility of contacting the state or national professional associations or emergency aid organizations that would assist in the case of a mechanical breakdown or other complication during the trip.

2.1.2-Contract the Shuttle Bus

Pros

- Avoids capital expenses and preserves capital to the extent of \$34,868 (The cost of purchasing a 15 passenger van). Upfront costs may include the first month's payment, a refundable security deposit, a capitalized cost reduction (like down payment), taxes, registration and other fees, and charges. The monthly lease payments are usually lower than monthly loan payments accrued when buying the bus.
- Operating or Maintenance lease contracts are cancelable during the contract period at the option of lessee (supermarket). Cancellation options are valuable and short-term leases are convenient.
- Maintenance and other operating expenses (Capital cost, Driver's salary, Gas, Insurance etc.) of the shuttle are provided by the shuttle operator
- Standardization leads to lower monthly operational costs for grocery store (Due to economies of scale achieved by the shuttle operator who has the expertise of running shuttle services)
- Contract leasing can be off balance sheet financing. So there is no restriction on future borrowing.
- In case of emergency and breakdowns, the grocery store does not bear the responsibility of contacting the state or national professional associations or emergency aid organizations to assist in the case of a mechanical breakdown or other complication during the trip. The shuttle company is responsible for providing substitute buses.

Cons

- Most of the contracts may limit the number of miles that are driven. Negotiations for a higher mileage limit are usually accompanied by higher monthly payment.
- Contracting the shuttle service with a third party shuttle operator does not give independence and flexibility in terms of using the vehicle for any other purpose.

2.2- ORGANIZATIONAL / TECHNOLOGICAL ISSUES

2.2.1- Store Type

The store must be a conventional supermarket offering a full line of groceries, meat, and produce so that low-income customers are provided a one-stop shopping experience.

2.2.2- Staffing Needs & Supervision

If a supermarket chooses to buy its own shuttle bus, then it should appoint an experienced driver with a valid license and good driving record. The driver can be assigned the responsibility for maintaining¹ the bus in good working condition and tracking rider-ship patterns. The shuttle bus driver should also decide the route for each trip as they load their customers, bags and other family members.

The owner or supermarket manager should be in charge of monitoring and supervising the shuttle operation if the supermarket opts for a contract with a shuttle operator who would provide the driver and maintain records. If it is a large supermarket chain, then selection of shuttle operator can be done at headquarters or the corporate level.²

2.2.3-Technological Requirements

Technological requirements would include a telephone system (probably a walkie-talkie) in the bus for the driver to contact the supermarket or its customers, who might call for a pick up. If the shuttle bus is purchased, then the supermarket can make sufficient modifications inside the bus to create shelf space for the groceries.

2.3- RIDER-SHIP PATTERN

The following sections estimate the target area rider-ship potential on a weekly and annual basis. Interviews conducted with supermarket managers and literature survey on supermarkets reveal that a member of a household would visit the supermarket at least 2.2 times during a week. However in calculations regarding estimation of rider-ship potential, a conservative figure of one visit to the supermarket per week is used.

The shuttle bus usage (frequency and time) can be classified as peak and non-peak hours of operation. Peak hours are Monday through Friday 4pm to 9pm and weekends from 10 am to 9 pm. This is based on customer shopping patterns³ in supermarkets and existing rider-ship profiles in supermarket operated shuttle services. It is also assumed that 30% of riders would shop during non-peak hours and 70% of riders during peak hours. The time for an average round trip is assumed to be 45 minutes.

2.3.1- AREA 1- SAN DIEGO, CALIFORNIA

Zip Code: 92113

There are 2,953 households in this zip code area that are transit dependent. Table 11 gives the shuttle rider-ship profile for a 20% target market (591 households). Table 12 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 11: Estimated Shuttle Rider-ship at 20% Target Market for San Diego, 92113

DAY	SHIFT TIME	SHIFT TYPE	TRIPS / SHIFT	PASSENGERS / WEEK	TOTAL PASSENGERS / WEEK	PASSENGERS / YEAR
Mon	8am-4pm	Non-Peak	10.5	25	83	4,233
	4pm-9pm	Peak	6.5	58		
Tue	8am-4pm	Non-Peak	10.5	21	71	3,621
	4pm-9pm	Peak	6.5	50		
Wed	8am-4pm	Non-Peak	10.5	19	65	3,315
	4pm-9pm	Peak	6.5	46		
Thu	8am-4pm	Non-Peak	10.5	19	65	3,315
	4pm-9pm	Peak	6.5	46		
Fri	8am-4pm	Non-Peak	10.5	25	83	4,233
	4pm-9pm	Peak	6.5	58		
Sat	8am-10am	Non-Peak	2.5	28	94	4,794
	10am-9pm	Peak	13	66		
Sun	8am-10am	Non-Peak	2.5	39	130	6,630
	10am-9pm	Peak	13	91		
				TOTAL	591	30,141

Table 12: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for San Diego, 92113

RIDERSHIP	5%	10%	15%	20%
Weekly	148	295	443	591
Annual	7,548	15,045	22,593	30,141

Zip Code: 92102

There are 3,019 households in this zip code area that are transit dependent. Table 13 gives the shuttle rider-ship profile for a 20% target market (604 households). Table 14 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 13: Estimated Shuttle Rider-ship at 20% Target Market for San Diego, 92102

DAY	SHIFT TIME	SHIFT TYPE	TRIPS / SHIFT	PASSENGERS / WEEK	TOTAL PASSENGERS / WEEK	PASSENGERS / YEAR
Mon	8am-4pm	Non-Peak	10.5	25	85	4,335
	4pm-9pm	Peak	6.5	60		
Tue	8am-4pm	Non-Peak	10.5	22	72	3,672
	4pm-9pm	Peak	6.5	50		
Wed	8am-4pm	Non-Peak	10.5	20	66	3,366
	4pm-9pm	Peak	6.5	46		
Thu	8am-4pm	Non-Peak	10.5	20	66	3,366
	4pm-9pm	Peak	6.5	46		
Fri	8am-4pm	Non-Peak	10.5	25	85	4,335
	4pm-9pm	Peak	6.5	60		
Sat	8am-10am	Non-Peak	2.5	29	97	4,947
	10am-9pm	Peak	13	68		
Sun	8am-10am	Non-Peak	2.5	40	133	6,783
	10am-9pm	Peak	13	93		
				TOTAL	604	30,804

Table 14: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for San Diego, 92102

RIDERSHIP	5%	10%	15%	20%
Weekly	151	302	453	604
Annual	7,701	15,402	23,103	30,804

Zip Code: 92101

There are 4,797 households in this zip code area that are transit dependent. Table 15 gives the shuttle rider-ship profile for a 20% target market (959 households). Table 16 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 15: Estimated Shuttle Rider-ship at 20% Target Market for San Diego, 92101

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	40	134	6,834
	4pm-9pm	Peak	6.5	94		
Tue	8am-4pm	Non-Peak	10.5	34	115	5,865
	4pm-9pm	Peak	6.5	81		
Wed	8am-4pm	Non-Peak	10.5	32	106	5,406
	4pm-9pm	Peak	6.5	74		
Thu	8am-4pm	Non-Peak	10.5	32	106	5,406
	4pm-9pm	Peak	6.5	74		
Fri	8am-4pm	Non-Peak	10.5	40	134	6,834
	4pm-9pm	Peak	6.5	94		
Sat	8am-10am	Non-Peak	2.5	46	153	7,803
	10am-9pm	Peak	13	107		
Sun	8am-10am	Non-Peak	2.5	63	211	10,761
	10am-9pm	Peak	13	148		
TOTAL					959	48,909

Table 16: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for San Diego, 92101

RIDERSHIP	5%	10%	15%	20%
Weekly	240	480	720	959
Annual	12,240	24,480	36,720	48,909

2.3.2- AREA 2-LONG BEACH, CALIFORNIA**Zip Code: 90802**

There are 5,647 households in this zip code area that are transit dependent. Table 17 gives the shuttle rider-ship profile for a 20% target market (1,129 households). Table 18 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 17: Estimated Shuttle Rider-ship at 20% Target Market for Long Beach, 90802

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	47	158	8,058
	4pm-9pm	Peak	6.5	111		
Tue	8am-4pm	Non-Peak	10.5	41	136	6,936
	4pm-9pm	Peak	6.5	95		
Wed	8am-4pm	Non-Peak	10.5	37	124	6,324
	4pm-9pm	Peak	6.5	87		
Thu	8am-4pm	Non-Peak	10.5	37	124	6,324
	4pm-9pm	Peak	6.5	87		
Fri	8am-4pm	Non-Peak	10.5	47	158	8,058
	4pm-9pm	Peak	6.5	111		
Sat	8am-10am	Non-Peak	2.5	54	181	9,231
	10am-9pm	Peak	13	127		
Sun	8am-10am	Non-Peak	2.5	74	248	12,648
	10am-9pm	Peak	13	174		
TOTAL					1,129	57,579

Table 18: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Long Beach, 90802

RIDERSHIP	5%	10%	15%	20%
Weekly	282	565	847	1,129
Annual	14,382	28,815	43,197	57,579

Zip Code: 90813

There are 5,940 households in this zip code area that are transit dependent. Table 19 gives the shuttle rider-ship profile for a 20% target market (1,188 households). Table 20 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 19: Estimated Shuttle Rider-ship at 20% Target Market for Long Beach, 90813

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	50	166	8,466
	4pm-9pm	Peak	6.5	116		
Tue	8am-4pm	Non-Peak	10.5	43	143	7,293
	4pm-9pm	Peak	6.5	100		
Wed	8am-4pm	Non-Peak	10.5	39	131	6,681
	4pm-9pm	Peak	6.5	92		
Thu	8am-4pm	Non-Peak	10.5	39	131	6,681
	4pm-9pm	Peak	6.5	92		
Fri	8am-4pm	Non-Peak	10.5	50	166	8,466
	4pm-9pm	Peak	6.5	116		
Sat	8am-10am	Non-Peak	2.5	57	190	9,690
	10am-9pm	Peak	13	133		
Sun	8am-10am	Non-Peak	2.5	78	261	13,311
	10am-9pm	Peak	13	183		
TOTAL					1,188	60,588

Table 20: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Long Beach 90813

RIDERSHIP	5%	10%	15%	20%
Weekly	297	594	891	1,188
Annual	15,147	30,294	45,441	60,588

2.3.3- AREA 3- FRESNO, CALIFORNIA

Zip Code: 93702

There are 2,750 households in this zip code area that are transit dependent. Table 21 gives the shuttle rider-ship profile for a 20% target market (550 households). Table 22 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 21: Estimated Shuttle Rider-ship at 20% Target Market for Fresno, 93702

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	23	77	3,927
	4pm-9pm	Peak	6.5	54		
Tue	8am-4pm	Non-Peak	10.5	20	66	3,366
	4pm-9pm	Peak	6.5	46		
Wed	8am-4pm	Non-Peak	10.5	18	60	3,060
	4pm-9pm	Peak	6.5	42		
Thu	8am-4pm	Non-Peak	10.5	18	61	3,111
	4pm-9pm	Peak	6.5	43		
Fri	8am-4pm	Non-Peak	10.5	23	77	3,927
	4pm-9pm	Peak	6.5	54		
Sat	8am-10am	Non-Peak	2.5	26	88	4,488
	10am-9pm	Peak	13	62		
Sun	8am-10am	Non-Peak	2.5	36	121	6,171
	10am-9pm	Peak	13	85		
TOTAL					550	20,050

Table 22: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Fresno, 93702

RIDERSHIP	5%	10%	15%	20%
Weekly	138	275	412	550
Annual	7,038	14,025	21,012	28,050

2.3.4-AREA 4 –OAKLAND, CALIFORNIA

Zip Code: 94607

There are 3,160 households in this zip code area that are transit dependent. Table 23 gives the shuttle rider-ship profile for a 20% target market (632 households). Table 24 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 23: Estimated Shuttle Rider-ship at 20% Target Market for Oakland, 94607

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	26	88	4,488
	4pm-9pm	Peak	6.5	62		
Tue	8am-4pm	Non-Peak	10.5	23	76	3,876
	4pm-9pm	Peak	6.5	53		
Wed	8am-4pm	Non-Peak	10.5	21	70	3,570
	4pm-9pm	Peak	6.5	49		
Thu	8am-4pm	Non-Peak	10.5	21	70	3,570
	4pm-9pm	Peak	6.5	49		
Fri	8am-4pm	Non-Peak	10.5	26	88	4,488
	4pm-9pm	Peak	6.5	62		
Sat	8am-10am	Non-Peak	2.5	30	101	5,151
	10am-9pm	Peak	13	71		
Sun	8am-10am	Non-Peak	2.5	42	139	7,089
	10am-9pm	Peak	13	97		
TOTAL					632	32,232

Table 24: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Oakland, 94607

RIDERSHIP	5%	10%	15%	20%
Weekly	158	316	474	632
Annual	8,058	16,116	24,174	32,232

Zip Code: 94606

There are 3,620 households in this zip code area that are transit dependent. Table 25 gives the shuttle rider-ship profile for a 20% target market (724 households). Table 26 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 25: Estimated Shuttle Rider-ship at 20% Target Market for Oakland, 94606

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	30	101	5,151
	4pm-9pm	Peak	6.5	71		
Tue	8am-4pm	Non-Peak	10.5	26	87	4,437
	4pm-9pm	Peak	6.5	61		
Wed	8am-4pm	Non-Peak	10.5	24	80	4,080
	4pm-9pm	Peak	6.5	56		
Thu	8am-4pm	Non-Peak	10.5	24	80	4,080
	4pm-9pm	Peak	6.5	56		
Fri	8am-4pm	Non-Peak	10.5	30	101	5,151
	4pm-9pm	Peak	6.5	71		
Sat	8am-10am	Non-Peak	2.5	35	116	5,916
	10am-9pm	Peak	13	81		
Sun	8am-10am	Non-Peak	2.5	48	159	8,109
	10am-9pm	Peak	13	111		
TOTAL					724	36,924

Table 26: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Oakland, 94606

RIDERSHIP	5%	10%	15%	20%
Weekly	181	362	543	724
Annual	9,231	18,462	27,693	36,924

2.3.5- AREA 5- BAKERSFIELD, CALIFORNIA

Zip Code: 93305

There are 2,141 households in this zip code area that are transit dependent. Table 27 gives the shuttle rider-ship profile for a 20% target market (428 households). Table 28 gives the annual rider-ship profile for 5%, 10%, 15% and 20% of target market.

Table 27: Estimated Shuttle Rider-ship at 20% Target Market for Bakersfield, 93305

DAY	SHIFT TIME	SHIFT TYPE	TRIPS/SHIFT	PASSENGERS/WEEK	TOTAL PASSENGERS/WEEK	PASSENGERS/YEAR
Mon	8am-4pm	Non-Peak	10.5	18	60	3,060
	4pm-9pm	Peak	6.5	42		
Tue	8am-4pm	Non-Peak	10.5	16	52	2,652
	4pm-9pm	Peak	6.5	36		
Wed	8am-4pm	Non-Peak	10.5	14	47	2,397
	4pm-9pm	Peak	6.5	33		
Thu	8am-4pm	Non-Peak	10.5	14	47	2,397
	4pm-9pm	Peak	6.5	33		
Fri	8am-4pm	Non-Peak	10.5	18	60	3,060
	4pm-9pm	Peak	6.5	42		
Sat	8am-10am	Non-Peak	2.5	20	68	3,468
	10am-9pm	Peak	13	48		
Sun	8am-10am	Non-Peak	2.5	28	94	4,794
	10am-9pm	Peak	13	66		
TOTAL					428	21,828

Table 28: Estimated Shuttle Rider-ship at 5% to 20% of Target Market for Bakersfield, 93305

RIDERSHIP	5%	10%	15%	20%
Weekly	107	214	321	428
Annual	5,457	10,914	16,371	21,828

2.4- FINANCIAL ISSUES

2.4.1- Start-Up Cost

The average cost structures for the different operational options are as follows. Both options use a 15-passenger van as the shuttle vehicle.

- Buying a shuttle bus: An initial start up cost of \$34,868 and monthly operating cost of \$4,496
- Contracting the shuttle bus: There will be a monthly outflow varying from \$7,260 to \$13,200 per month.

Industry standard for contracting a bus is usually based on miles or hours whichever is greater. The local service shuttle operators, however, charge their customers based on hours because it is not profitable for them to charge on the basis of miles.

2.4.2- Revenue Generation

2.4.2.1-Total Revenue Generation From Shuttle Passengers

It is assumed that a person using the shuttle service would at least spend \$25/week at the grocery store. Because we set the minimum purchase for supermarket shuttle passengers at \$25 in order to receive a free ride home, it is relatively straightforward to calculate the minimum expenditures from shuttle passengers. Based on the estimated rider-ship projections discussed in section 2.3, the Table 29 gives the estimated expenditure from shuttle riders at 5%, 10%, 15% and 20% of targeted rider-ship (households not owning a vehicle).

These results may be underestimates, since the average weekly food expenditure among low-income urban residents at supermarkets is \$38 weekly. This figure is based on research indicating that households earning between \$19,071 and \$32,910 spend \$3,081 annually on food at home, or \$59 each week⁴. A study of food expenditures among low-income, urban residents suggests that 64% of the at-home food budget is spent at supermarkets, and remaining is spent at specialty and convenience stores⁵.

Table 29: Estimated Expenditures From Shuttle Riders at 5% to 20% of Target Market

ZIP CODE	5%	10%	15%	20%
92113	\$188,700	\$376,125	\$564,825	\$753,525
92102	\$192,525	\$385,050	\$577,575	\$770,100
92101	\$306,000	\$612,000	\$918,000	\$1,222,725
90802	\$359,550	\$720,375	\$1,079,925	\$1,439,475
90813	\$378,675	\$757,350	\$1,136,025	\$1,514,700
93702	\$175,950	\$350,625	\$525,300	\$701,250
94607	\$201,450	\$402,900	\$604,350	\$805,800
94606	\$230,775	\$461,550	\$692,325	\$923,100
93305	\$136,425	\$272,850	\$409,275	\$545,700

2.4.2.2- Revenue From New And Existing Customers

While calculating the expenditures from shuttle passengers is straightforward, estimating new revenue is not. Supermarket managers will want to know whether the shuttle program can generate new revenue to support the shuttle before making a decision to invest in start up and operating costs.

Unfortunately there are few studies available on supermarket shuttle programs, and none of them provide a quantitative analysis of the sources and amounts of new revenue resulting from these programs. There are no existing models on which to base estimates for new revenue. Therefore, we developed two scenarios to estimate new revenue from a shuttle program based on various levels of usage by the target market.

Scenario 1: Existing Customers use transportation savings for new food expenditures.

In this conservative scenario, we assume that supermarket shuttle program brings no new customers and the shuttle users are existing shoppers at the grocery store. We assume new revenue is the result of savings from transportation, and that only a portion of this savings is devoted to new grocery purchases. Out of pocket cost for food stamp participants to get to grocery store (transportation cost) is \$3.26 for a one-way trip.⁶ Also, 9% of all household expenditures for low-income households are devoted to food at home. Finally, 66.7% of low-income target customers with no vehicle would use the shuttle service.

For instance, for zip code 92113 at 5% target market level, there are 7,548 riders per annum. Thus additional revenue from existing customers based on transportation savings is \$1,477 ($\$3.26 * 0.09 * 7,548 * 66.7\%$). Table 30 gives the savings from transportation that existing customers spend on purchasing additional food, which is source of additional revenue for supermarkets.

Table 30-Estimated Additional Revenue From Existing Customers at 5 to 20% Target Market

ZIPCODE	ADDITIONAL REVENUE FROM TRANSPORTATION SAVINGS			
	5%	10%	15%	20%
92113	\$1,477	\$2,944	\$4,421	\$5,899
92102	\$1,507	\$3,014	\$4,521	\$6,028
92101	\$2,395	\$4,791	\$7,186	\$9,571
90802	\$2,815	\$5,639	\$8,454	\$11,268
90813	\$2,964	\$5,928	\$8,893	\$11,857
93702	\$1,377	\$2,745	\$4,112	\$5,489
94607	\$1,577	\$3,154	\$4,731	\$6,308
94606	\$1,806	\$3,613	\$5,419	\$7,226
93305	\$1,068	\$2,136	\$3,204	\$4,272

Scenario 2: New Revenue Generated From Existing And New Customers.

This scenario is less conservative in that it assumes varying ranges of shuttle users for new and existing customers. It assumes these new customers spend 64% of their food budget at the supermarket, or \$1,972 annually, based on research on the amount and location of food expenditures among low-income, urban consumers. The existing customers spend on food at supermarkets as described in section 2.4.2.1 plus their savings from transportation as described in scenario 1.

Table 31: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, San Diego 92113

ZIP-CODE 92113		5%	10%	15%	20%
Rider-ship/Annum		7548	15045	22593	30141
Existing customers	95%	\$1,403	\$2,797	\$4,200	\$5,604
New Customers	5%	\$14,594	\$29,090	\$43,684	\$58,278
TOTAL	100%	\$15,997	\$31,887	\$47,884	\$63,881
Existing customers	90%	\$1,329	\$2,650	\$3,979	\$5,309
New Customers	10%	\$29,188	\$58,179	\$87,367	\$116,555
TOTAL	100%	\$30,518	\$60,829	\$91,346	\$121,864
Existing customers	85%	\$1,256	\$2,503	\$3,758	\$5,014
New Customers	15%	\$43,782	\$87,269	\$131,051	\$174,833
TOTAL	100%	\$45,038	\$89,771	\$134,809	\$179,847
Existing customers	80%	\$1,182	\$2,355	\$3,537	\$4,719
New Customers	20%	\$58,376	\$116,358	\$174,734	\$233,110
TOTAL	100%	\$59,558	\$118,713	\$178,271	\$237,829
Existing customers	75%	\$1,108	\$2,208	\$3,316	\$4,424
New Customers	25%	\$72,970	\$145,448	\$218,418	\$291,388
TOTAL	100%	\$74,078	\$147,656	\$221,734	\$295,812

Table 32: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, San Diego 92102

ZIP-CODE 92102		5%	10%	15%	20%
Rider-ship/Annum		7,701	15,402	23,103	30,804
Existing customers	95%	\$1,432	\$2,863	\$4,295	\$5,727
New Customers	5%	\$14,890	\$29,780	\$44,670	\$59,560
TOTAL	100%	\$16,322	\$32,643	\$48,965	\$65,286
Existing customers	90%	\$1,356	\$2,713	\$4,069	\$5,425
New Customers	10%	\$29,780	\$59,560	\$89,339	\$119,119
TOTAL	100%	\$31,136	\$62,272	\$93,408	\$124,545
Existing customers	85%	\$1,281	\$2,562	\$3,843	\$5,124
New Customers	15%	\$44,670	\$89,339	\$134,009	\$178,679
TOTAL	100%	\$45,951	\$91,901	\$137,852	\$183,803
Existing customers	80%	\$1,206	\$2,411	\$3,617	\$4,823
New Customers	20%	\$59,560	\$119,119	\$178,679	\$238,238
TOTAL	100%	\$60,765	\$121,530	\$182,296	\$243,061
Existing customers	75%	\$1,130	\$2,261	\$3,391	\$4,521
New Customers	25%	\$74,449	\$148,899	\$223,348	\$297,798
TOTAL	100%	\$75,580	\$151,159	\$226,739	\$302,319

Table 33: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, San Diego 92101

ZIP-CODE 92101		5%	10%	15%	20%
Rider-ship/Annum		12,240	24,480	36,720	48,909
Existing customers	95%	\$2,276	\$4,551	\$6,827	\$9,093
New Customers	5%	\$23,666	\$47,332	\$70,998	\$94,566
TOTAL	100%	\$25,942	\$51,883	\$77,825	\$103,658
Existing customers	90%	\$2,156	\$4,312	\$6,467	\$8,614
New Customers	10%	\$47,332	\$94,664	\$141,996	\$189,131
TOTAL	100%	\$49,488	\$98,976	\$148,464	\$197,745
Existing customers	85%	\$2,036	\$4,072	\$6,108	\$8,136
New Customers	15%	\$70,998	\$141,996	\$212,994	\$283,697
TOTAL	100%	\$73,034	\$146,068	\$219,102	\$291,832
Existing customers	80%	\$1,916	\$3,833	\$5,749	\$7,657
New Customers	20%	\$94,664	\$189,328	\$283,992	\$378,262
TOTAL	100%	\$96,580	\$193,161	\$289,741	\$385,919
Existing customers	75%	\$1,797	\$3,593	\$5,390	\$7,179
New Customers	25%	\$118,330	\$236,660	\$354,991	\$472,828
TOTAL	100%	\$120,127	\$240,253	\$360,380	\$480,006

Table 34: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Long Beach 90802

ZIP-CODE 90802			5%	10%	15%	20%
Rider-ship/Annum			14,382	28,815	43,197	57,579
Existing customers	95%		\$2,674	\$5,357	\$8,031	\$10,705
New Customers	5%		\$27,808	\$55,714	\$83,521	\$111,329
TOTAL	100%		\$30,481	\$61,071	\$91,552	\$122,034
Existing customers	90%		\$2,533	\$5,075	\$7,608	\$10,141
New Customers	10%		\$55,615	\$111,428	\$167,043	\$222,658
TOTAL	100%		\$58,148	\$116,503	\$174,651	\$232,799
Existing customers	85%		\$2,392	\$4,793	\$7,186	\$9,578
New Customers	15%		\$83,423	\$167,141	\$250,564	\$333,987
TOTAL	100%		\$85,815	\$171,935	\$257,750	\$343,565
Existing customers	80%		\$2,252	\$4,511	\$6,763	\$9,014
New Customers	20%		\$111,230	\$222,855	\$334,086	\$445,316
TOTAL	100%		\$113,482	\$227,366	\$340,848	\$454,330
Existing customers	75%		\$2,111	\$4,229	\$6,340	\$8,451
New Customers	25%		\$139,038	\$278,569	\$417,607	\$556,645
TOTAL	100%		\$141,149	\$282,798	\$423,947	\$565,096

Table 35: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Long Beach 90813

ZIP-CODE 90813			5%	10%	15%	20%
Rider-ship/Annum			15,147	30,294	45,441	60,588
Existing customers	95%		\$2,816	\$5,632	\$8,448	\$11,264
New Customers	5%		\$29,287	\$58,573	\$87,860	\$117,147
TOTAL	100%		\$32,103	\$64,205	\$96,308	\$128,411
Existing customers	90%		\$2,668	\$5,336	\$8,003	\$10,671
New Customers	10%		\$58,573	\$117,147	\$175,720	\$234,294
TOTAL	100%		\$61,241	\$122,483	\$183,724	\$244,965
Existing customers	85%		\$2,520	\$5,039	\$7,559	\$10,078
New Customers	15%		\$87,860	\$175,720	\$263,581	\$351,441
TOTAL	100%		\$90,380	\$180,760	\$271,139	\$361,519
Existing customers	80%		\$2,371	\$4,743	\$7,114	\$9,486
New Customers	20%		\$117,147	\$234,294	\$351,441	\$468,588
TOTAL	100%		\$119,518	\$239,037	\$358,555	\$478,073
Existing customers	75%		\$2,223	\$4,446	\$6,670	\$8,893
New Customers	25%		\$146,434	\$292,867	\$439,301	\$585,734
TOTAL	100%		\$148,657	\$297,314	\$445,970	\$594,627

Table 36: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Fresno 93702

ZIP-CODE 93702		5%	10%	15%	20%
Rider-ship/Annum		7,038	14,025	21,012	28,050
Existing customers	95%	\$1,308	\$2,607	\$3,906	\$5,215
New Customers	5%	\$13,608	\$27,117	\$40,627	\$54,235
TOTAL	100%	\$14,916	\$29,725	\$44,533	\$59,450
Existing customers	90%	\$1,240	\$2,470	\$3,701	\$4,940
New Customers	10%	\$27,216	\$54,235	\$81,253	\$108,469
TOTAL	100%	\$28,456	\$56,705	\$84,954	\$113,410
Existing customers	85%	\$1,171	\$2,333	\$3,495	\$4,666
New Customers	15%	\$40,824	\$81,352	\$121,880	\$162,704
TOTAL	100%	\$41,995	\$83,685	\$125,375	\$167,370
Existing customers	80%	\$1,102	\$2,196	\$3,290	\$4,391
New Customers	20%	\$54,432	\$108,469	\$162,507	\$216,939
TOTAL	100%	\$55,534	\$110,665	\$165,796	\$221,330
Existing customers	75%	\$1,033	\$2,058	\$3,084	\$4,117
New Customers	25%	\$68,040	\$135,587	\$203,134	\$271,173
TOTAL	100%	\$69,073	\$137,645	\$206,218	\$275,290

Table 37: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Oakland 94607

ZIP-CODE 94607		5%	10%	15%	20%
Rider-ship/Annum		8,058	16,116	24,174	32,232
Existing customers	95%	\$1,498	\$2,996	\$4,494	\$5,992
New Customers	5%	\$15,580	\$31,160	\$46,740	\$62,321
TOTAL	100%	\$17,078	\$34,156	\$51,235	\$68,313
Existing customers	90%	\$1,419	\$2,838	\$4,258	\$5,677
New Customers	10%	\$31,160	\$62,321	\$93,481	\$124,641
TOTAL	100%	\$32,580	\$65,159	\$97,739	\$130,318
Existing customers	85%	\$1,340	\$2,681	\$4,021	\$5,362
New Customers	15%	\$46,740	\$93,481	\$140,221	\$186,962
TOTAL	100%	\$48,081	\$96,162	\$144,242	\$192,323
Existing customers	80%	\$1,262	\$2,523	\$3,785	\$5,046
New Customers	20%	\$62,321	\$124,641	\$186,962	\$249,282
TOTAL	100%	\$63,582	\$127,164	\$190,746	\$254,328
Existing customers	75%	\$1,183	\$2,365	\$3,548	\$4,731
New Customers	25%	\$77,901	\$155,801	\$233,702	\$311,603
TOTAL	100%	\$79,083	\$158,167	\$237,250	\$316,334

Table 38: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Oakland 94606

ZIP-CODE 94606		5%	10%	15%
Rider-ship/Annum		9,231	18,462	27,693
Existing customers	95%	\$1,716	\$3,432	\$5,148
New Customers	5%	\$17,848	\$35,696	\$53,544
TOTAL	100%	\$19,564	\$39,129	\$58,693
Existing customers	90%	\$1,626	\$3,252	\$4,878
New Customers	10%	\$35,696	\$71,393	\$107,089
TOTAL	100%	\$37,322	\$74,644	\$111,966
Existing customers	85%	\$1,536	\$3,071	\$4,607
New Customers	15%	\$53,544	\$107,089	\$160,633
TOTAL	100%	\$55,080	\$110,160	\$165,240
Existing customers	80%	\$1,445	\$2,890	\$4,336
New Customers	20%	\$71,393	\$142,785	\$214,178
TOTAL	100%	\$72,838	\$145,675	\$218,513
Existing customers	75%	\$1,355	\$2,710	\$4,065
New Customers	25%	\$89,241	\$178,481	\$267,722
TOTAL	100%	\$90,596	\$181,191	\$271,787

Table 39: Total New Revenue Generated From Existing And New Customers at 5% to 20% Target Market, Bakersfield 93305

ZIP-CODE 93305		5%	10%	15%	20%
Rider-ship/Annum		5,457	10,914	16,371	21,828
Existing Customers	95%	\$1,015	\$2,029	\$3,044	\$4,058
New Customers	5%	\$10,551	\$21,102	\$31,653	\$42,204
TOTAL	100%	\$11,566	\$23,131	\$34,697	\$46,263
Existing Customers	90%	\$961	\$1,922	\$2,883	\$3,845
New Customers	10%	\$21,102	\$42,204	\$63,307	\$84,409
TOTAL	100%	\$22,063	\$44,127	\$66,190	\$88,253
Existing Customers	85%	\$908	\$1,815	\$2,723	\$3,631
New Customers	15%	\$31,653	\$63,307	\$94,960	\$126,613
TOTAL	100%	\$32,561	\$65,122	\$97,683	\$130,244
Existing Customers	80%	\$854	\$1,709	\$2,563	\$3,417
New Customers	20%	\$42,204	\$84,409	\$126,613	\$168,818
TOTAL	100%	\$43,059	\$86,118	\$129,176	\$172,235
Existing Customers	75%	\$801	\$1,602	\$2,403	\$3,204
New Customers	25%	\$52,756	\$105,511	\$158,267	\$211,022
TOTAL	100%	\$53,556	\$107,113	\$160,669	\$214,226

2.5 BREAK EVEN ANALYSIS

Break-even analysis is used to determine the shuttle operation level at which it is profitable for the grocery store to run its shuttle program. Break-even analysis uses a simple mathematical formula to determine the shuttle operation level at which there is neither loss nor profit for the grocery store. Break-even analysis determines the number of shuttle trips to be made by the shuttle program beyond which it is profitable for the store.

Break-even analysis thus, examines the cost tradeoffs (cost of shuttle operation) associated with revenue generation from the shuttle service. Break-even point determines the approximate number of shuttle trips required to just cover costs, below which the shuttle operation would be unprofitable and above which the shuttle operation would be profitable. Break-even point is calculated as follows.

$$\begin{aligned} \text{Break-even point} &= (\text{Annual Fixed Cost}) / (\text{Selling Price/Unit} - \text{Variable Cost/Unit}) \\ &= (\text{Annual Fixed Cost}) / (\text{Contribution Margin/Unit}) \end{aligned}$$

2.5.1 Buying The Shuttle Bus

The break-even point for 92113 zip codes at 5% target market, in case of buying the shuttle bus is calculated as follows.

Annual Fixed Cost: The initial start up cost of buying a 15 passenger shuttle van is \$34,868. The operating expenses are \$4,496 per month. Thus annual operating expenses are \$53,952 (\$4,496 * 12 months). It is assumed that the initial start up cost is amortized over three years at an annual interest rate of 7%. The salvage value of the passenger van at the end of three years is assumed to be \$12,200⁷. Annual capital recovery for the initial start up cost is calculated as follows.

$$\text{Annual Capital Recovery} = \frac{(\text{Purchase Price Of Van} - \text{Salvage Value}) * \text{Interest Rate}}{(1 - (1 + \text{Interest Rate})^{-\text{Life of van}})} + (\text{Salvage Value} * \text{Interest Rate})$$

Using the above formula,

$$\text{Annual Capital Recovery} = [(\$34,868 - \$12,200) * 7\%] / [1 - (1 + 7\%)^{-3}] + [\$5,000 * 7\%] = \$9,492$$

Thus, the total fixed expenses per annum is Annual capital recovery costs plus the annual operating expenses, which is equal to \$ 63,444 (\$9,492 + \$53,952).

Selling Price: Sales is equal to selling price times the number of units sold. \$188,700 is the estimated sales revenue (Section 2.4.2.1) for the zip code 92113 at 5% target market. According to Food Marketing Institute gross margin for supermarkets is 26.4% of sales. Thus only 26.4% of sales are what is left to cover fixed cost and profits. However at break-even point, there is neither profit nor loss. Also there are 5,916 shuttle trips per annum. Thus, $(26.4\% \times \$188,700)/5916$ is the contribution margin.

Variable Costs: There are no variable costs.

Break-even point for 92113 zip-code at 5% target market is calculated as follows:

$$\begin{aligned} \text{Break-even point} &= (\text{Annual Fixed Cost})/(\text{Contribution Margin}/\text{Unit}) \\ &= [(\$63,444) / [(\$188,700 * 0.264)/5,916]] = 7,534 \text{ shuttle trips} \end{aligned}$$

After 7,534 trips the shuttle operation will be profitable for the supermarket in the 92113 zip-code area at 5% target market level. Table 41 gives the break-even calculations for all the nine zip code areas at 5% to 20% target market levels if the supermarket were to contract the shuttle operation. Thus, after 15 months of operation the shuttle program would be profitable in the 92113 zip-code area at 5% target market level.

Table 41: Break Even Analysis At 5% to 20% Of Target Market When Buying The Shuttle Bus

Zip Code		5%	10%	15%	20%
92113	BEP (trips)	7,534	3,780	2,517	1887
	BEP (months)	15	8	5	4
92102	BEP (trips)	7,385	3,692	2,462	1,846
	BEP (months)	15	7	5	4
92101	BEP (trips)	4,646	2,323	1,549	1,163
	BEP (months)	9	5	3	2
90802	BEP (trips)	3,954	1,974	1,317	988
	BEP (months)	8	4	3	2
90813	BEP (trips)	3,754	1,877	1,251	939
	BEP (months)	8	4	3	2
93702	BEP (trips)	8,080	4,055	2,706	2,027
	BEP (months)	16	8	5	4
94607	BEP (trips)	7,057	3,529	2,352	1,764
	BEP (months)	14	7	5	4
94606	BEP (trips)	6,161	3,080	2,054	1,540
	BEP (months)	12	6	4	3
93305	BEP (trips)	10,421	5,211	3,474	2,605
	BEP (months)	21	10	7	5

2.5.2- Contracting the Shuttle Bus

The break-even point for 92113 zip codes at 5% target market, in case of contracted shuttle service is calculated as follows.

Annual Fixed Cost: The monthly operating expense for grocery store varies in between \$7,260 to \$13,200. Hence in break-even calculations an average figure of \$10,200 $(\$7,260 + \$13,200) / 2$ is used. The total fixed expenses per annum is \$122,400 $(\$10,200 * 12)$.

Selling Price: Sales is equal to selling price times the number of units sold. \$188,700 is the estimated sales revenue (Section 2.4.2.1) for the zip code 92113 at 5% target market. According to Food Marketing Institute gross margin for supermarkets is 26.4% of sales. Thus 26.4% of sales are what remains to cover fixed cost and profits. However at break-even point, there is neither profit nor loss. Also there are 5916 shuttle trips per annum. Thus, $(26.4\% \text{ of } \$188,700) / 5916$ is the contribution margin.

Variable Costs: There are no variable costs.

$$\begin{aligned} \text{Break-even point} &= (\text{Annual Fixed Cost}) / (\text{Contribution Margin} / \text{Unit}) \\ &= [(\$122,400)] / [(\$188,700 * 0.264) / 5,916] = 14,536 \text{ shuttle trips} \end{aligned}$$

After 14,536 trips the shuttle operation will be profitable for the supermarket in the 92113 zip-code area at 5% target market level. Table 42 gives the break-even calculations for all the nine zip code areas at 5% to 20% target market levels if the supermarket were to contract the shuttle operation. Thus, after 29 months of operation the shuttle program would be profitable in the 92113 zip-code area at 5% target market level.

Table 42: Break Even Analysis At 5% to 20% Of Target Market When Contracting The Shuttle Bus

Zip Code		5%	10%	15%	20%
92113	BEP (trips)	14,536	7,292	4,856	3,640
	BEP (months)	29	15	10	7
92102	BEP (trips)	14,247	7,123	4,749	3,562
	BEP (months)	29	14	10	7
92101	BEP (trips)	8,964	4,482	2,988	2,243
	BEP (months)	18	9	6	4
90802	BEP (trips)	7,629	3,808	2,540	1,905
	BEP (months)	15	8	5	4
90813	BEP (trips)	7,243	3,622	2,414	1,811
	BEP (months)	15	7	5	4
93702	BEP (trips)	15,589	7,823	5,222	3,911
	BEP (months)	31	16	10	8
94607	BEP (trips)	13,616	6,808	4,539	3,404
	BEP (months)	27	14	9	7
94606	BEP (trips)	11,885	5,943	3,962	2,971
	BEP (months)	24	12	8	6
93305	BEP (trips)	20,105	10,053	6,702	5,026
	BEP (months)	40	20	13	10

REFERENCES

¹ Maintenance of the shuttle bus includes periodic mechanical inspection, cleaning, tracking rider-ship patterns and maintaining fuel, mileage and shuttle trip records.

² Results in economies of scale.

³ Refer Appendix 2 for Supermarket shopping patterns.

⁴ U.S. Department of Labor. *Consumer Expenditures in 2000*. Bureau of Labor Statistics, Report No. 958. April, 2002.

⁵ Kaufman P, MacDonald JM, Lutz SM, Smallwood D. *Do the Poor Pay More? Item Selection and Price Differences Affect Low-Income Household Food Costs*. Food and Rural Economic Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 759, November 1997.

⁶ Source: 1996, National Food Stamp Program Survey, weighted data.

⁷ Source: Kelly Blue Book value for Chevrolet Express van, with 177,000 miles.

CHAPTER 3: CONCLUSIONS & RECOMMENDATIONS

The particular model of a supermarket shuttle service investigated in this study appears to be feasible in low-income, urban areas where rates of car ownership are low. The model investigated is a free transportation service offered by supermarkets to its low-income transit dependent customers. The program offers a free ride to supermarket customers who make a minimum purchase of \$25. Customers arrive at the store by their own means.

Revenue estimations at 20% of the target market ranged from \$545,700 to \$1,514,700 annually. At 20% of the target market, the break-even point can be achieved in all zip codes within two to five months time in the case of buying the shuttle bus, and in four to ten months time in case of contracting the shuttle bus.

In addition, a shuttle service provides a direct marketing opportunity that can be expanded (by establishing additional buses if there is demand in other areas surrounding the store), and that can be made feasible in part by the transit dependency in low-income urban areas. The shuttle program would also provide tangible and intangible benefits to supermarkets like

- Additional shopping trips from new and existing customers.
- Creation of customer and community good will.
- Free publicity to the supermarket
- Increase sales from larger purchases
- Reduce shopping cart loss.

Study Limitations

The study is exploratory in nature and therefore has certain limitations. It is based on a handful of interviews with professionals selected by convenience. Although shuttle programs do exist, they are few in number and little data is collected regarding their costs and revenue generation. What limited information is available is proprietary. Therefore, most business owners were reluctant to disclose cost and profit estimates of their shuttle programs.

This study may present underestimates for rider-ship and revenue. For instance, study estimates include only households with no vehicle. It is possible that households with one car and several adults may find a supermarket shuttle service convenient to use when the sole family car is being used for other purposes such as commuting to work.

On an average 2.2 trips/week are made by consumers to supermarket.¹ However in rider-ship calculations a conservative estimate of one trip per week by consumers to supermarkets is used in this research study.

In addition, revenue may be underestimated. The study used \$25 as the average weekly expenditure among potential shuttle users since this is the common minimum purchase required by existing programs. However, low-income customers spend an average of \$59.25 each week on groceries. Therefore, revenue estimates are conservatively calculated at less than 50% of weekly consumer expenditures on food at home.

RECOMMENDATIONS TO ESTABLISH A SHUTTLE SERVICE

Operational Design: The operation of the shuttle service can be fully integrated in to the supermarket operational plans as follows.

1. A shopper arrives at the supermarket by walking, being dropped off by automobile/public transportation or picked up by supermarket shuttle at specific (limited) bus stops.
2. When a customer purchases \$25 or more of groceries, he/she can take the supermarket/grocery store shuttle bus directly to his/her front door, at no cost.
3. The shuttle bus driver would decide the route for each trip as they load their customers' bags and other customer family members.
4. The shuttle bus driver can be in communication with the supermarket/ grocery store or another shuttle bus driver²
5. Peak periods of shuttle use are usually 4-9 pm Monday through Friday. Saturday and Sunday afternoons are also heavy.
6. Average distance for each trip can vary between a 3-8 mile radius from the store.

Ensure Adequate Public Transportation: Supermarkets with easy access to local bus lines have had success with the free ride home model of shuttle service. This is because customers with no car can easily reach the store by bus, perhaps walking several blocks to catch the bus or walking from the bus stop to the supermarket. Once burdened with multiple bags of groceries, and then will receive a ride directly to their doorstep from the supermarket shuttle.

Publicity: Supermarkets can use the shuttle program as a promotional tool. Promotional tools for retailers constitute a large expense, particularly in highly competitive supermarket industry, where store differentiation (by product mix, price, service etc.) is critical to success of such promotion and advertising. The publicity generated with the shuttle program (achieved through shuttle schedule information, community news letter, word of mouth, media coverage) can have significant bearing for the supermarket.

Evaluation: The quantification of additional supermarket sales after the implementation of the shuttle program is a straightforward evaluation task. Information for such evaluation could include the number of new customers using the service, estimated sales receipts, average profit margin on sales and increased purchases from long term customers due to participation in using the shuttle service. An evaluation of reduced cart loss can also be directly translated in to information about decreased costs. Shopping cart loss can be quantified in terms of costs from cart loss, retrieval costs for carts returned and labor costs associated with handling retrieval and replacement.

Parking requirements: Lack of sites of adequate size is a unique challenge facing supermarket construction in low-income urban areas. The land scarcity provides an opportunity for running a supermarket shuttle program. Decreasing parking lot requirements could save supermarkets a substantial amount in land acquisition, paving, landscaping and maintenance.

With a 20% reduction, a 40,000 square foot store could reduce its parking lot size by 13,000 square foot. At a conservative price of about \$8 per square foot in inner city, a store could save a total of \$85,200 in land costs³. The concept of reducing parking requirements to help establish a food access/ transportation program could be most effectively implemented through a supermarket shuttle program, where a public good (food access through transportation) is established simultaneously with a private benefit.

Modifying the Shuttle Model to Reduce Costs:

- ***Limited Shuttle Service:*** As an initial test market study, supermarkets can provide shuttle services twice a week to assess the demand in the neighborhood. Limited hours would reduce the cost, but will also limit revenue.
- ***Share Expenses with a Public Entity:*** Another approach to resolving transportation barrier to supermarkets is to form a joint venture with a government or non-profit organization to collaboratively fund the supermarket shuttle operation. For example, with a community development corporation (CDC), the supermarket shuttle program is likely to enjoy the support of community members, enhancing its potential for success. Community input can help supermarkets in deciding the shuttle routes and stops.
- ***Senior Citizen Groups:*** There is also an opportunity for establishing store operated shuttle services in and around senior citizen complexes, communities with senior population, and residential centers such as retirement communities.

REFERENCES

¹ Sources: U.S. Department of Labor, U.S. Department of Agriculture, Progressive Grocer Magazine, U.S. Census Bureau and Food Marketing Institute.

² In case if the supermarket/grocer store has more than one shuttle bus in operation at a given time. For example, Numero Uno supermarket located in the South Central area of the city of Los Angeles operates nine shuttle vans from this location. The nine vans that operate from this location are providing complementary transportation services to the Los Angeles County Metropolitan Transportation Authority, boosting Numero Uno sales and profits, employing scores of people that might otherwise be unemployed and at no expense to public tax payers.

³Gottlieb R, Fisher A., Dohan M, O'Conner L, Parks V. *Homeward Bound: Food-Related Transportation Strategies in Low Income and Transit Dependent Communities*. Venice, CA: Community Food Security Coalition, 1996. P-63

Appendix

Low-Income, Transit Dependent Neighborhoods in California

Zip Code	Population	Households	Median Household Income	Households with No Vehicle (Number)	Households with No Vehicle (Percent)
90001	54,481	12,513	\$24,207	3,136	25
90002	44,584	10,821	\$22,872	2,821	26
90003	58,187	14,552	\$22,346	3,840	26
90004	67,850	23,142	\$27,591	5,795	25
90005	43,014	15,337	\$21,998	6,163	40
90006	62,765	18,512	\$20,593	6,964	38
90007	45,021	12,607	\$17,644	4,312	34
90008	30,840	13,510	\$30,472	3,012	22
90011	101,214	21,813	\$23,851	7,081	32
90012	30,577	7,955	\$20,152	3,206	40
90016	46,968	16,340	\$29,079	3,193	20
90018	47,127	15,232	\$23,797	3,934	26
90019	67,510	24,286	\$31,501	4,960	20
90020	42,383	16,993	\$24,208	4,229	25
90022	68,688	17,077	\$27,471	3,775	22
90023	47,468	10,826	\$26,884	2,591	24
90026	73,671	24,500	\$28,651	6,130	25
90027	48,715	22,251	\$31,820	4,574	21
90028	30,562	14,975	\$21,893	5,214	35
90029	41,697	13,460	\$22,043	4,283	32
90031	38,409	10,266	\$25,300	2,610	25
90033	49,418	12,377	\$22,429	4,413	36
90037	56,691	15,071	\$20,275	4,826	32
90038	32,557	12,106	\$23,306	3,823	32
90044	87,366	24,570	\$22,091	6,759	28
90057	43,986	14,874	\$19,736	6,830	46
90059	38,123	9,277	\$22,151	2,371	26
90062	29,279	8,789	\$26,901	2,082	24
90063	55,666	12,993	\$30,174	2,783	21
90201	105,275	23,937	\$30,029	3,966	17
90222	29,823	7,126	\$29,520	1,213	17
90255	78,104	18,572	\$30,375	4,105	22
90270	28,083	6,482	\$30,480	1,163	18
90301	37,507	12,013	\$31,306	2,194	18

Low-Income, Transit Dependent Neighborhoods in California (contd)

Zip Code	Population	Households	Median Household Income	Households with No Vehicle (Number)	Households with No Vehicle (Percent)
90304	28,679	6,431	\$29,036	1,304	20
90744	53,308	14,017	\$30,259	2,394	17
90802	38,419	18,873	\$25,860	5,647	30
90804	43,466	15,369	\$29,872	2,557	17
90806	49,641	14,641	\$31,488	2,793	19
90813	63,129	16,455	\$20,015	5,940	36
91205	41,381	14,057	\$27,701	3,167	23
91402	66,241	17,571	\$32,496	3,086	18
91731	30,206	7,558	\$30,942	1,356	18
91950	62,335	15,401	\$29,942	2,842	18
92101	27,494	11,411	\$23,762	4,797	42
92102	47,123	14,212	\$26,505	3,019	21
92104	47,688	21,512	\$31,139	3,622	17
92105	72,994	21,411	\$25,593	4,263	20
92113	47,417	11,932	\$23,841	2,953	25
92173	28,481	7,341	\$27,943	1,375	19
92410	44,540	11,877	\$23,538	2,434	20
93305	35,623	10,448	\$24,114	2,141	20
93702	47,997	11,794	\$21,514	2,750	23
93703	31,168	9,686	\$26,116	1,632	17
93706	35,781	9,644	\$21,991	2,076	22
94102	28,991	15,713	\$22,351	11,064	70
94601	54,857	15,112	\$33,152	3,220	21
94606	41,872	15,080	\$32,273	3,620	24
94621	30,744	8,861	\$29,181	2,166	24
95205	34,120	9,749	\$26,109	1,657	17
95815	25,350	9,293	\$25,970	1,706	18
TOTAL	2,922,654	870,604	----	223,932	26

Source: Census 2000.

CONSUMER SHOPPING PATTERN IN SUPERMARKETS

Average Per-Person Weekly Grocery Expenses

Gender		Type of Household	
Men	Women	Children	No Children
\$ 43	\$ 33	\$ 29	\$ 40

Average (All Groups)	\$36
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Source: Food Marketing Institute, Trends in United States:
Consumer Attitudes and the Supermarkets, 2002, pg.59

When Consumers Shop?

Day of the Week	All Shoppers	Under 35 Years	35-54 Years	Over 55 Years
Monday	14%	19%	17%	6%
Tuesday	12%	10%	11%	14%
Wednesday	11%	13%	8%	15%
Thursday	11%	8%	12%	12%
Friday	14%	12%	11%	20%
Saturday	16%	14%	13%	21%
Sunday	22%	24%	28%	12%

Source: Progressive Grocer, 69th Annual Report of the Grocery Industry, April 2002,P-27,30



A publication of the
Center for Advanced Studies in Nutrition and Social Marketing
University of California, Davis

<http://socialmarketing-nutrition.ucdavis.edu>