Feasibility Study for the Implementation of a Logistics Network for Distribution of Dry Food to Low Income People

by

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B.S., Civil Industrial Engineering

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Submitted to the Department of Civil and Environmental Engineering

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Abstract

This study explores the feasibility of reducing the purchasing costs of dry food by improving current logistic channels and aggregating demand. The value proposition is to reduce the purchase cost of dry food by 20% by setting up a logistic model to connect end customers with food manufacturers through a central coordination operation. This coordination unit will manage supply and demand using the Internet and a "cross-docking" system. Chile was chosen to evaluate the feasibility of a pilot project to test the model, in particular the capital city of Santiago and southern regions of the country.

Results show that the proposed model is economically and technically viable if located in regional areas outside Santiago where there is a high density of low-income communities and no large chains of supermarkets. The project's return on investment is 18.5%, based on a 5-year period, a 15% discount rate, and CH$87 million of initial investment. Results of the urban model for Santiago demonstrate that it is not economically feasible due to the low-density market potential and high supermarket penetration rate. The financial model for rural areas shows that, even though transportation costs are higher than in urban Santiago, it is economically feasible and only 26 sites are required to make the project break even, representing 9% market penetration.

Thesis Supervisor: Yossi Sheffi
Title: Co-director, MIT Center for Transportation and Logistics

Dedication

To the poor communities in Latin America, who have always been behind in technological development. The time has come to consider their needs and provide them with solutions.

To my father and mother.

To my wife Pilar, who always encouraged me to keep working hard. It was easy with her.

Table of Contents

Chapter 1: Introduction

1.1 Background

This research studies the economic, social, and technical feasibility of setting up a food distribution system to increase the current budget of poor people in Latin America. The system will reduce the logistics costs along the supply chain, via the implementation of a cost-efficient distribution model and by increasing community-buying power. Different studies have demonstrated that implementing an efficient logistics system tailored to poor communities and increasing their bargaining power can reduce the costs of a basic food basket by 20%1. This is equivalent to increasing these communities' purchasing power by 10% to 15%. The opportunity is due to the target market's attractiveness, characterized by its low bargaining power for buying food and its current dependence on expensive and low-variety "mom and pop" stores. These incumbent retailers' competitive advantages lie in location, flexibility in the terms and amount of sales, and often in credit provided to customers.

This thesis proposes a logistics model to exploit the possibilities of "lean", and up-to-date food distribution. The model will achieve low costs (and provide low prices) by consolidating the highly stable demand in order to have greater bargaining power with food and transport-services providers. The model is based on a logistic system that allows producers and distributors to improve their communication with the communities, using a central coordination unit. The latter can match supply and demand for the different products, reducing current distribution costs, and thus improving poor communities' purchasing conditions. The model uses the Internet, and specialized software for the operation of "cross docking" logistics systems.

The value proposition for large and medium-sized suppliers is having a reliable partner to determine demand for distribution and help sell their products, so that they can minimize their inventories, maximize sales opportunities, reduce the complexity and the costs of their outbound logistics, and improve their poor bargaining position relative to large supermarkets.

The economic, political, and social stability of Chile provides a suitable location for the pilot. Taking into account appropriate regional differences, the model could later be transferred to other countries in Latin America, which currently has 220 million people (43% of its total population) living in poverty.

Finally, this thesis investigates both the role of local and central governments as potential major stakeholders smoothing the implementation of the system through information, communication, support, real estate, and, eventually, access to funding. Local schools, parishes, and non government organizations (NGOs) could also play a key role in building trust with communities, managing local operations and delivery, and educating consumers as they migrate to the new purchasing model.

1.2 Objectives

The main objective of this thesis is to study the feasibility of a food distribution system for poor people in Latin America using data from Chile. The scope is limited to the study of two models: Santiago's model and a regional model. The study analyses technical, economic and social aspects for both models based on market research tools, site investigation, existing information, and public data.

1.3 Structure of Thesis

The remainder of this thesis is divided into five chapters. Chapter 2 contains a literature review of related logistics systems studied or implemented for the distribution of goods to poor people in developed and developing countries as well as additional information obtained and collected during site visits in order to evaluate the existing logistics and operational alternatives, and the potential competition for the project.

Chapter 3 studies the market potential based on the results obtained from a market survey conducted in 2001 (Netfood Field Study, Harvard Business School, 2001). This survey used market research polls in areas where there is a lack of available information or its quality is

[1] Netfood Field Study, Harvard Business School, December 2001.

poor, in addition to interviews with experts and discussions with people from poor communities.

Chapter 4 describes the current industry structure, and presents a detailed discussion of the potential competitors and their expected reactions.

Chapter 5 introduces the technical proposal and the assumptions considered in the technical and economic evaluation.

Chapter 6 presents a financial breakeven analysis used to assess the economic feasibility of the project based on a 5-year projection of operations and its associated incomes and expenses. It also discusses the economic evaluation results and presents the major economic considerations to implement a feasible pilot project.

Chapter 7 provides an overall conclusion based on the analysis of the results of Chapter 6.

Chapter 2: Review of related experiences

2.1 Introduction

This section gives an overview of related experiences of food and basic good distribution systems in the U.S.A and Latin America. All of the cases studied are not-for-profit organizations that based their operations on donations and other subsidies. Although this research is aimed at studying a self-sustainable solution to distribute goods to low income people, other international experiences presents how not-for-profit organizations have faced the same problem though different models. Figure 1 describes and compares the financing, marketing and operational aspects of each model.

2.2 Related Experiences

U.S. government data indicate that at least 9.2 million households in the United States were food-insecure in 1999, and that 3 million had experienced hunger at some point in that year[2]. The food-insecure households contained an estimated 27 million people, of whom 11 million were children. American Second Harvest, the largest charitable hunger-relief organization in the US, assisted 23.3 million Americans nationwide in the year 2001. This is nearly two million more people than sought similar services in 1997 and this, on the heels of one of the longest periods of economic growth in recent history.

An examination of the literature of not-for-profit organizations shows that they use logistics intensively as a strong operational component. The study explored American Second Harvest, Self Help and Resources Exchange (SHARE), UNICEF, Society of Saint Andrew and Mercasol as representative models for this research.

The majority of these not-for-profit organizations operate on the basis of food donations and governmental aid and some have developed web-based food donation processing. All these models have implemented operational competitive advantages to leverage their services with low purchasing and operational costs. Most of the models take advantage of existing charity

[2] American's Second Harvest. "Hunger in America 2001 National Report". October 2001.

organizations and infrastructure for distributing food to poor people. Large organizations have their own supply chain divisions with elaborate technical support and their own infrastructures such as distribution centers.

Despite the clear success achieved by most of the organizations in channeling food to poor communities, Mercasol's model has not worked because of its lack of management and logistics support.

Figure 1: Review of Major Social Food Distributors

Organization	Location	Description	Finance	Suppliers	Customers	Supply Chain
1. American Second Harvest	USA/Mexico	Largest charitable hunger-relief organization. In 2000 it merged with Foodchain, the national leader in food-rescue programs.	Incomes (2000): MM$21, without considering food donations.Revenues:individual contributions, grants, corporate contributuions, food bank fees. Expenses. $13 million($4.5 affiliate services, $2.25 product distribution ($0.6 salaries, 0.7 transportation, $1.4 product solicitation, $1.4 m General &administrative, $2.5 m fund development).	Surplus food donation from manufacturers and farm suppliers. Transportation industry also participate in Relief Fleet, companies donate the transportation of food and grocery products while working within their pre-existing transportation routes.	50,000 Local community charities with feeding programs for the needy in USA serving 23 million people/year in USA.	Operates through 191 affiliate Food Banks. A Food Bank is a charitable organization that solicits, receives, inventories, stores, and distributes donated food and grocery products to charitable agencies such as churches and qualifying organizations that directly serves needy clients. They have implemented technology for improving inventory tracking and web-based food donation processing. 1 billion pounds/yr, $1.67 value/pound.
2. SHARE	USA, Mexico, Guatemala	Self Help And Resource Exchange is a nonprofit organization based on food stamps and volunteer service.	Revenues by charging $15 in cash or food stamps to receive a monthly, supplemental food package containing about 30 pounds of groceries worth $25 to $30. Each participant is responsible for providing two hours of volunteer service sometime during the month.	Receive donation and also buy food from manufacturers	29 SHARE affiliates distributes over 350,000 monthly food packages.	Operates through a network of host organizations such as places of worship, schools, tenant groups and community centers. 126 million pounds/year
3. UNICEF	Worlwide	Provides essential supplies for children including vaccines and immunization equipment, essential drugs, micronutrient supplements, therapeutic foods, medical equipment and educational supplies, transport and IT equipment.	Incomes: $1.139 million, expenditure was $1,111 million. 92% on programmes, 7%management and administration and 1% write-offs and other charges.	64 % income from governments, 36% from direct fund-raising and through the sale of greeting cards and products (P&G: $1.2 M marketing program, Pier 1 Imports, Master Card, Mobil, etc). It purchased 502 million worth of supplies in 2000,	Operaters in 162 countries and territories. Some 85 per cent of the organization's 5,554 posts are located in the field	Supply Division. Based in Copenhagen, Denmark, with offices in New York, Pretoria and Turkey. In addition to purchasing essential commodities for children, the Division provides procurement, logistical and technical expertise to UNICEF headquarters and field offices. $288 of products are procured by it Supply Division, and $214 by it field offices.
4. Society of Saint Andrew	USA	Redirects products often rejected by commercial markets or potato chip factories due to slight imperfections in size, shape, sugar content, or surface blemishes	Main cost is transportation and packaging of the food. It has agreements with tranportation companies which allow to have very low serving costs.	Products are donated	Distribution through Soup Kitchens, Native American reservations, food pantries, low income housing areas, local churches, and other hunger agencies for distribution to the poor in 48 US states.	Direct transportation from donators (manufacturers, supermarkets, farms) to hunger agencies. 17 million pounds of food per year
5. Mercasol	Colombia	NGO wholesale market place for a huge low income neighborhood in Bogota, distributing textiles, leather, dry food, groceries and construction materials. After 3 years, management could not cope with inventory control, information systems, complexity of buying, and co-ordinating 10 centers.	Microlending company Corposol financed working capital. It offered prices at 10% less than other places.	Products were bought to a producers	50% grocers who had difficulties in building inventory and poor people who buy in small quantities at a very high prices. City of Bogota.	Central distribution center and 10 smaller centers.

Sources:

UNICEF Annual Report, 2001, http://www.unicef.org/ar01/AnRep01eng_part1.pdf

Food and Agriculture Organization of the United Nations (FAO), 2001, http://www.fao.org/UNFAO/e/wdev-e.htm

The Poor People's Guide, 2001, http://www.poorpeoplesguide.org/guide/index.html

Share,2002,http://www.volunteerinfo.org/share.htm

Chapter 3: Market Research and Analysis

The following sections analyze the market potential for the proposed business model in Chile, in particular the Santiago Metropolitan Area and the southern region of the country.

3.1 Economic, Social, and Political Realities

3.1.1 Area and Population

Chile is a country located in the southern cone of South America, bordering Argentina and Bolivia in the east, Peru in the north, (See Figure 2) and the Pacific Ocean to the west. Continental Chile is a long and narrow strip of land, with a total length of over 2,500 miles and an area of 292,260 square miles.

The total population in 2000 was 15.2 million inhabitants, concentrated in the central part of the country, which includes Santiago, the capital city. Chile's population is highly urbanized, with approximately 86% living in cities. Approximately 40% of the country's urban dwellers reside in the Santiago metropolitan area. The country is politically divided in twelve regions in addition to the capital district of Greater Santiago

Figure 2: Map of Chile

3.1.2 Government and Political System

Chile is a country organized as a republic and has a democratic political system. The country's Constitution provides for a system of government composed of the executive branch headed by the President with a non-renewable six-year term, a legislative branch consisting of a two-chambered Congress, and a judicial Supreme Court as its highest authority.

Chile is a country with a long democratic tradition. Since the country's independence from Spain in 1810 until 1971 (with the exception of short intervals from 1925 to 1926 and 1931 to 1932), it had democratically elected governments. In 1973, a military junta assumed power. In 1990 a civilian government was reinstated, which has helped to increase political and economic stability.

3.1.3 Economic Development

Very often highlighted as Latin America's star economy, during the 1990's the Chilean economy experienced a period of sustained growth and increasing levels of integration into the global economy. This process was partially interrupted in 1999 when GDP declined by 1.1% as a consequence of an international financial crisis that affected Brazil and Russia, coupled with a tight fiscal and monetary policy implemented by the Chilean Central Bank. The economic expansion was renewed in 2000, reaching a GDP growth rate of 5.4%. The annual average growth rate from 1990 to 2000 was 6.3%. Projected GDP growth for 2001 has been set at 3.1%.

This continued period of economic growth favorably impacted per capita income, which increased by 66.3% during the 1989 to 2000 period. Per capita income in 2000 reached US$4,603. When adjusted for the purchasing power parity, per capita income in Chile is US$8,410.

Table 1: Per capita income in Latin America

	Brazil	Chile	Mexico	Venezuela	USA
Per capita income (1)	US$6,840	US$8,410	US$8,070	US$5,420	US$33,910
Life expectancy (in years)	67	75	72	73	77
Infant mortality (as % of live births) (2)	3.3%	1.0%	3.0%	2.1%	0.7%
Adult literacy rate	85%	96%	91%	92%	97% (3)

(1) Adjusted for purchasing power parity

(2) Infant mortality per 1,000 live births

(3) CIA World Fact book.

As Table 1 shows, the country has the highest per capita income in Latin America and has the best health indicators in the region.

3.1.4 Socio-economic Conditions

Chile's Ministry for Planning and Cooperation conducts a thorough study of poverty in the country every two years. This study, known as CASEN[3], considers a certain individual poor if his or her income is below a minimum level that would allow him or her to satisfy their basic needs; and he or she would be considered extremely poor if his or her income does not allow the individual to satisfy his or her food needs. Thus, a person is considered poor when his or her monthly income is below the value of two basic food baskets[4], or Ch$42,000 (approximately US$61.76). A person is considered to live in extreme poverty conditions when his or her monthly income is below the value of one basic food basket.

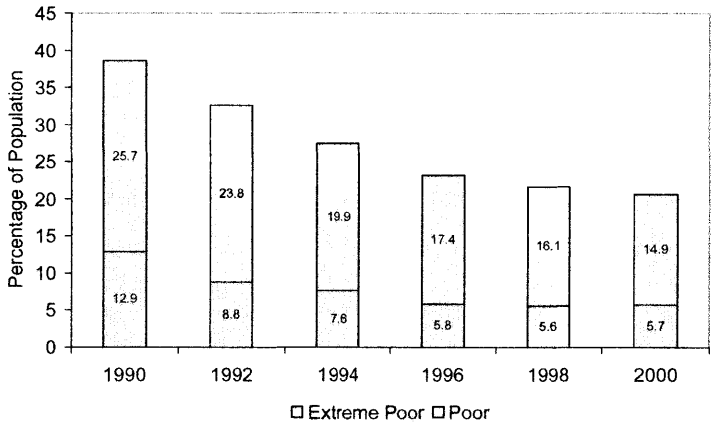
The number of people living in poor conditions has been significantly reduced in the last decade. Figure 3 shows that during the 1990 – 2000 period, the proportion of people living in poverty decreased from 38.6% to 20.6% of total population. People living in extreme poverty decreased from 12.9% to 5.7%. This reduction in poverty was achieved in all of the country's regions, and in both urban and rural areas.

[3] CASEN: Caracterización Socioeconómica Nacional, or *National Socioeconomic Characterization.*

[4] The Basic Food Basket is valued at US$30.88 in urban areas, and at US$22.9 in rural areas. CASEN 2002.

The 20.6% of the population living in poor conditions equates to 3.1 million people, and corresponds to approximately 643,000 households (16.6% of total). In 2000, 850,000 people – 178,000 households (4.6% of total) lived in extreme poverty conditions.

Figure 3: Population Living In Poverty in Chile



Although 83.6% of poor people live in urban areas, the incidence of poverty is higher in rural areas. In fact, 23.8% of people living in rural areas fall under the definition of poverty, while in urban areas this figure reaches 20.1%.

The reduction in the number of poor people is not only explained by the economic growth that the country has experienced for more than a decade, but also by increasing government transfers to low income groups. The government's social programs allocate funds based on degree of need and public social expenditure as a percentage of the total public expenditure increased from 60.6% in 1991 to 69.1% in the 2000 budget. In addition, government spending in the social sector has increased 96% in real terms from 1991 to 2000.

3.2 Customer Study

3.2.1 Introduction

The proposed model assumes that customers would need to make a major trade-off to obtain lower prices on dry food purchases. In order to have a lean logistics system, and thus low costs, the model relies on using existing infrastructure in schools or other community organization to distribute orders to customers. This reliance imposes a restriction on the frequency with which food could be distributed in the different neighborhoods, as food distribution activities can only be done during days and times in which the facilities are not used for other purposes. Therefore, under the proposed model, customers would need to purchase with a lower frequency (different from daily frequency). These constraints enable suppliers to aggregate and consolidate more products to reduce logistics cost. Though this model increases some customer's costs (for warehousing at their own homes and financing a higher expense), it also results in an overall reduction of purchasing costs. Based upon the nature of the proposed model, this study has chosen to target in poor people who live in sites without supermarket access.

In addition, since the model also assumes aggregated demand by purchasing directly from selected food manufacturers, people would be offered a lower variety of brands and items. The model forces customers to trade-off frequency of purchase and variety of brands and items for lower prices. The benefit from the reduction of the number of items is based on the "risk pooling" concept, which reduces average inventories 37% by diminishing the number of SKU (Stock Keeping Units) per product from 5 to 1. Risk pooling is explained in Chapter 7.

3.2.2 Socio-economic Conditions for the Area Under Study

The thesis studies two models: the Santiago's model, based on the capital city of Chile; and the southern regional model, which includes five of the seven southern regions: Region del Libertador Gral, Bernardo O´Higgins, Region del Maule, Region del Biobio, Region de la Araucania, and Region de Los Lagos. They are also referred as the VI, VII, VIII, IX and X Region respectively. Figure 2 shows these regions located between Santiago and Puerto Montt. Santiago represents the major concentration of people and also poverty in the country.

The combined four chosen southern regions have the same population size and almost double the poverty rate of Santiago. Besides these features, the regions present a higher population density and better logistics infrastructure than other parts of the country.

Customer behavior was studied based on Netfood Field Study (Harvard, 2001), which conducted a market research poll in three neighborhoods in Greater Santiago (Pudahuel, Cerro Navia, and Puente Alto). The areas were selected by consideration of both socioeconomic indicators and the availability of contacts with a local organization that could administer the poll. Although regional cities are smaller than Santiago, they are similar in neighborhood structure and culture. Conducting the survey in areas with different levels of poverty should allow comparisons in customer behavior as incomes vary. Exhibit 1 shows the percentage of population below the poverty line for the counties of Santiago. Cerro Navia, with 24%, has the 5^{th} highest concentration of poor people, while Pudahuel with 19% ranks 9^{th}. Puente Alto, although close to Santiago, lies outside the Metropolitan region. As a whole, 18% of Puente Alto's residents live in poverty.

3.2.3 Customer Behavior Background

The fundamental assumption was that people were buying their food needs, particularly dry food, from Mom & Pops stores due to their convenient location and their payment credit. Mom & Pops are widely spread in poor communities in Santiago, and therefore it is easy and cheap to go. From conversations with the different interviewees, and also from our own experience, it was assumed that people were buying with a relatively high frequency, i.e. primarily on a daily basis. There are three reasons for this behavior. First, poor people do not have a stable source of income, and therefore, they prefer to buy as they earn money. Even if they had a stable source of income, many prefer to keep money in their pockets because this provides them with some feeling of security if any uncertain or sudden event required them to spend money.

Second, many poor people may not know how to manage a budget. In addition, there is an educational hurdle that prevents them from having the ability to plan for their food needs, and therefore, they cannot buy once a month. Finally, they do not have sufficient physical space at home to store food products.

Poor people are only buying in supermarkets when they are close to them or have convenient access, e.g. close to work. Nevertheless, three additional and contradictory hypotheses were also tested. Poor people like to purchase at the supermarket because this represents a leisure activity for them, they purchase from supermarkets because they provide more flexibility in terms of business hours, and they do not like to go to supermarkets because they feel discriminated.

Therefore, a survey was designed to understand the following key customer behavior issues: where people are buying their food needs today, and why; whether people are willing to change their purchasing behavior; how much discount to offer customers to attract them; what would be the minimum frequency that people are willing to buy at; and if there are any brand preferences or loyalties to a particular brand. The full questionnaire is presented in Exhibit 2.

3.2.4 Poll Results and Conclusions

The poll was conducted over three weeks in three counties in Santiago: Cerro Navia, Pudahuel and Puente Alto, from November 10 to December 5 of year 2001. Of the people interviewed, 40% were poor as defined by CASEN in the sample.

- Poll results indicate that people are price sensitive, price being the dimension they care most about. Any new distribution channel should be as competitive as supermarkets in terms of prices.
- Results from the poll also suggest that poor customers in the surveyed areas are more sophisticated than expected, as they appreciate variety of brands and flexibility in business hours.
- Results also suggest that customers can plan for their food needs.
- Supermarkets are the channels where people spend the most. When only considering the poor segment, Mom & Pops are the channels where people spend the most for their dry food purchases.
- It is not clear if having access to credit would be a differentiation factor for a dry food distributor.

- In terms of brand loyalty, there are certain brands that are clearly preferred by customers, but it is not clear the level of loyalty that people actually have to those brands.

From the data gathered with the poll, it is possible to conclude that people are mainly purchasing from supermarkets. In the case of the poor segment, results show that although people from this segment are spending mainly in Mom & Pops, but in terms of visits, they are mainly going to supermarkets. It is also clear that people are purchasing at Mom & Pops for their daily and small purchases, local markets for their weekly purchases, and supermarkets for their monthly purchases. The alleged benefit of mom & pops providing credit facilities to their customers proved not to be significant at a consolidated level, but it is not clear whether or not is important in the poor segment.

3.3 Market Potential and Growth

The potential market size is defined by three attributes of customers: level of income, location of their household, and primary channel for food purchases. By considering each attribute in turn, then combining them, there is a clear definition of who will buy from this service.

3.3.1 Definition of Target Customer by Income Bracket

According to the latest version of the CASEN study, released during 2001, there are 3,081,000 poor people in Chile, representing 20.6% of the country's population. As mentioned before, a poor person is defined as someone whose monthly per capita income is two times the basic food basket, or the equivalent to Ch$42,000[5]. Extremely poor people are those with per capita monthly income under one basic food basket, and therefore, are not able to satisfy their basic food needs. This latter group of people represents 5.7% of Chile's population. It was assumed that extremely poor people don't have the income levels to purchase their food needs in advance unless some sort of subsidy is provided. Consequently, the maximum size of the potential market is equivalent to the number of poor people whose income is between one and two times the cost of the basic food basket. People with income above two basic food baskets are technically not

poor, and as the results from the poll suggest, they are purchasing their food mainly from supermarkets.

In the Greater Santiago area, as of 2000, 12% of the population lies in the target income segment, whereas the average poor population of the four southern regions under the study is 15.4%. It was assumed that these people are evenly distributed within each county. For example, if the target market is 16% of Cerro Navia's population, then it is expected that 16% of the population lie within the market, wherever a site is located within Cerro Navia. There may be some people whose income is above two food baskets who can buy from the project, but the exact proportion is unknown. Hence the market size has been slightly underestimated by excluding these people.

3.3.2 Definition of Primary Market

The next factor that defines the market is whether or not customers currently have access to a supermarket. From interviews and information on the food industry (see Section 4.3), supermarkets serve approximately 80% of the people within Santiago. Twenty percent of the low-income segment therefore do not have access to supermarkets and buy mainly from Mom & Pops, or ferias. That percentage is lower in the southern regions, reaching only a 50% penetration rate.

People purchasing in supermarkets will most likely continue to do so, since this channel provides them with high levels of service at a low cost. Hence the project's primary market is the people who buy at Mom & Pops. Thus sites will be set up first in areas not under the influence of supermarkets.

The market size by number of households is 37,000 for Santiago's model, which was calculated as follows: 1,538,000 households *12% in target income segment * 20% with no access to supermarkets. For the southern regions the market size is 110,000 households, calculated following the same methodology of Santiago's model.

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[5] Ch$: Chilean Pesos. 1 US$ is equivalent to Ch$700 (December 2001)

The number of orders likely placed at each delivery location (site) was estimated according to the area of influence of each site. For example, the catchments area for a supermarket has a radius of 10 blocks. If the number of houses per block edge is 10, then there are 10,000 households in the catchment's area. However, for the project, which does not offer such variety of food, the area of influence is likely to be reduced. It is assumed that the area of influence is 5 blocks by 5 blocks, i.e. 2,500 households. For Greater Santiago' s model, 12,000 people per site were assumed (2,500 households * 4.8 people per household), thus, there are 615 potential sites in total. Of these, 20% have no access to supermarkets, so 123 sites are available for the project. The regional model considered the same household distribution. There are 518 potential sites, 50% with no supermarket access. Therefore, there are 284 potential sites considered for the project. Table 2 presents details for both models.

The Project will not capture the total target market, however, so the estimation of the people who will actually use the Project (% target market penetration) is factored in. This has been assumed to be 30%, since the operation would only be set up in a site if a significant proportion of the local community is supportive of the enterprise. In addition, it was assumed that any one household is unlikely to buy 100% of their dry product requirements from the project. Occasionally they will run out before delivery and have to purchase from the Mom & Pops store. Hence the volume per household is assumed to be 80% of the theoretical food basket per day.

Table 2: Size of the Primary Market

	Total Households (000')	Poor Households (000') (%)	Indigents Households (000') (%)	Market Target (000') (%)	Potential POS (# sites)
Southern Regions					
VI Region	201	34.3 17%	7.6 3.8%	26.7 13.3%	40
VII Region	233	48.6 21%	13.1 5.6%	35.5 15.3%	47
VIII Region	499	109.8 22%	32.5 6.5%	77.3 15.5%	60
IX Region	216	57.4 27%	17.5 8.1%	39.9 18.5%	43
X Region	273	55.9 21%	15.9 5.8%	40.0 14.7%	55
Total Southern Regions	1,421	306.0 22%	87 6.0%	219 15.4%	284
Santiago Area	1,538	197.0 12.7%	52.9 3.4%	185 12.0%	123

3.4 Price Analysis

It is intended to improve the logistics system by considering high turnover products and carrying a low number of items. In order to achieve low logistic costs in the distribution process, only dry products, which are easier to handle, have been considered. Dry products have the following advantages that reduce logistic costs:

- They do not need refrigeration, reducing the need for infrastructure;
- They have long shelf-lives, thus reducing possible product damage;
- Product spoilage is minimal, and therefore, handling costs can be kept low.

In order to achieve a simple and low cost model, basic dry products were chosen from the original Basic Food Basket to define a new basket that includes 19 relevant basic products. The average daily cost of this food basket of selected products, as shown in Table 3, is Ch$292, which represents approximately 26% of the cost of the complete basic food basket. The "Basic Food Basket"[6] (Exhibit 3), which defines the basic composition of products consumed by poor people every day, shows that more than 52% of the volume are dry products, and 70% including eggs, potatoes and long life fresh milk (box) could be managed as if they were dry products.

Table 3: Prices for Selected Food Basket

Product	Unit	Price (Ch$ / Unit)		
		Average	Minimum	Maximum
Beans	1 Kg	528	442	620
Detergents	1 Kg	1,481	1,249	1,800
Eggs	Half dozen	393	300	500
Lentils	1 Kg	317	300	349
Mayonnaise	1000 cc	1,239	1,057	1,800
Meal	1 Kg	406	350	490
Milk – Long Life	1 Lt	455	380	499
Milk – Powder	1 Kg	1,848	1,600	2,000
Oil	1 Lt	709	529	890
Pasta	400 gr	263	220	320
Rice	1 Kg	503	384	598
Salt	1 Kg	141	94	200
Soap	200 gr	405	320	450
Soft Drinks	3 Lt	1,024	933	1,170
Sugar	1 Kg	406	324	500
Tea	20 bags	154	141	180
Toilet Paper	8 rolls	919	660	1,500
Tomato Sauce	200 gr	195	147	230
Toothpaste	100 gr	505	422	589
Daily Average Cost of Food Basket (1)		**292**	**249**	**349**

Each product has a different percentage weight in the overall basket based on volumes, which are in turn based on daily consumption. Using the corresponding consumption and prices it is possible to estimate the daily price of the basic food basket and compare different points of sale: supermarkets, stores, and Mom and Pops. Consequently the maximum price differences can be very significant. In fact, as Table 3 suggests, the average price for the daily selected food basket ranged from Ch$249 to Ch$349, which represents a difference of 40%. This assumes that one could buy each product at the cheapest possible price.

[6] Mideplan Chile, 1999

In order to investigate the prices that the different existing channels are charging their customers, prices for the products comprising the selected basic food basket were measured in seven different locations in Greater Santiago. These locations included low and high-income counties in order to detect possible practices of price discrimination between different segments of the market. Important price differences were found among different food distributors. Table 4 illustrates that the average price of the daily selected basic food basket in Mom and Pops is 20% higher than the average price of distributors, while the average price of supermarkets is 8% higher than distributors' prices. In terms of prices by products, the differences between the maximum and minimum prices are also important, with an average difference of 82% and a maximum of 1049% in the case of toilet paper. Within each distribution channel, price differences proved not to be significant. Furthermore, within supermarket chains, price variations attributable to location turned out to be negligible. Exhibit 8 shows detailed information about each product, price and channel.

Table 4: Price comparison among food distributions channels

Channel	Average Price a day (Ch$)	Index	Average Price Ranges (Ch$)
Supermarket	292	108	285 – 296
Mom and Pop	324	120	323 – 326
Distributor	271	100	271

Chapter 4: Analysis of Current Industry Structure

4.1 Introduction

The existing food distribution chain is complex and competitive because of the number of participants involved and the interactions among them. Food producers and manufacturers distribute their food through large supermarkets and wholesalers. Supermarkets distribute directly to the end consumer. Wholesalers, in turn, distribute to medium supermarkets, medium/large stores (including convenience stores), "Ferias" and local Mom and Pops[7]. The "Ferias" are local popular food markets supplied from different sources, such as wholesalers, medium/large stores, supermarkets and/or small local food producers.

Figure 4: Type of company and number of competitors in the food distribution chain

Type of Company	Number of Competitors/Locations
Food Producers[8]	450 competitors
Large Supermarkets	250 locations
Wholesalers	15 competitors
Medium Supermarkets	400 locations
Medium/Large Stores	5,000 locations
Mom & Pops	50,000 competitors
Ferias[9]	100,000 competitors

Source: INE, 1999.

The markups of different players are dependent on their position in the value chain. Large volumes and bargaining power account for important price differences. On average, food sold by Mom and Pops is priced 51% higher than food producers and 18% higher than supermarkets. Dry food markups are lower than the overall food average markup. Industry experts[10] estimate

[7] Small local business run by a family, many times in the back room of house.
[8] Representative dry food producers.
[9] Ferias are popular local food markets. There are 100,000 Ferias' participants, those are independent sellers at ferias. Note that the number of ferias (locations) is much smaller
[10] Francisco Alessandri, ex CEO of MAS (Multialianza Supermercados; a medium-size supermarkets association that aggregates buying power to get better prices with food producers) and Guillermo Iturrieta, ex VP of Sales and Marketing of Watts, one of the largest food producers in Chile.

these markups around 18% instead of the 28% average markup that supermarkets with more than 3 checkouts have for all food. See Table 5 for more details.

Table 5: Economics of Value Chain

(100 Index)	Manufacturers	Supermarkets[1]	Wholesalers	Mom& Pops[2]
Cost Price	N/A	100.0	107.0	121.0
Markup	N/A	28.0%	13.0%	25.0%
Sale Price	100.0	128.0	121.0	151.0
Gross margin	N/A	21.9%	11.5%	20.0%
Net margin	5.0%	5.0%	2.5%	1.0%
Total Sales ($bn.)	N/A	4.76	N/A	1.56

[1] Considers 642 supermarkets (large and medium) with more than 3 checkouts

[2] Includes small and medium stores

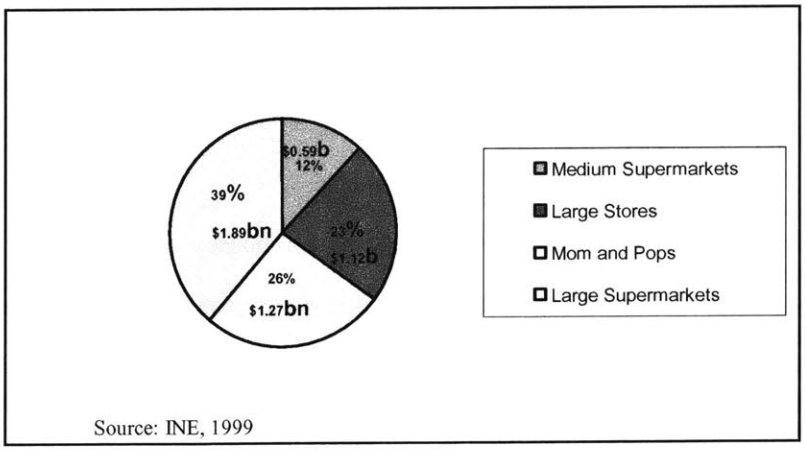
Source: INE, 1999 and authors' estimates

4.2 Value Chain Participants

4.2.1 Food Producers/Manufacturers

Food producers have been struggling to compete with the power of large supermarkets. In recent years, their bargaining power waned as large supermarkets grew and developed large economies of scale. Most food producers sell to supermarkets, making them a key channel. In 1999, food distributors' purchases from suppliers totaled US$4.9 billion, most of them to food producers, under the following distribution pattern:

Figure 5: Food distributors' purchases from suppliers



Source: INE, 1999

4.2.2 Large Supermarkets

Supermarkets, probably the most important competitor to the model proposal, have become efficient and highly competitive. Hypermarkets with low prices have been the primary investment of large supermarket chains over the last few years. Having increased their bargaining power vis-à-vis food distributors, large supermarket chains have changed the terms and conditions of doing business unilaterally in their favor. These changes have affected all food producers. For example, a small food producer that used to receive payment 90 days after delivery, is currently being paid in 120 days and a very large food producer that used to receive payment within 30 days, is currently being paid in 45 to 60 days.

Although supermarkets have developed in the last years, the industry still has growth potential. In the US the penetration rate of supermarkets is about 80%, in Chile it is only 50% and the ratio of people to supermarkets is three times the ratio in the US. Supermarkets as distribution channels for food and cleaning and hygienic products account for approximately 80% of the sales in Santiago. Nevertheless, they only represent 50% in other regions of the country.
The market penetration is also very high in the medium-high and high socioeconomic levels, and therefore the medium and low segments are the markets with major growth opportunities.

There are two important issues going on the industry: own-labeled products[11] and logistic and distribution cost reductions. Own-labels have relatively low market share, 2.4% of total sales in Chile, in comparison with countries like Switzerland where they represent 40% of total sales. All major supermarkets are developing generic brands with relative success. The pressure for lower logistic and distribution costs paved the way for centralized distribution centers, substantially reducing inventories, reducing product obsolescence and assuring the cold chain for fresh products. Centralized distribution centers also reduce the warehouses in each location maximizing the space use and reducing the inventories to a minimum level. The commercial relations with suppliers also get better as supermarkets receive their products in one single place.

[11] Own-labeled products are private products sold with supermarkets own brand

4.2.3 Wholesalers

Wholesalers and food distributors' main competitive advantage is the distribution network that connects their warehouses with medium-size stores and almost every Mom and Pop in the country. They do not distribute to supermarkets.

Among many food distributors in the country, there are 20 large food distributors, and of those only a few have concentrated the bulk of volume sales and have national distribution capabilities, such as Rabbie, Dipac and Adelco. Because of their capacity to aggregate demand they can get good buying terms from food producers, although not as good as large supermarkets. Also wholesalers' gross margins are typically the lowest in the industry, averaging 11.5%.

4.2.4 Medium Supermarkets and Medium/Large stores

These participants have serious problems in competition against the low prices, service and coverage offered by large supermarkets. Their major competitive advantage is based on service and/or food specialization.

In 1999, the medium supermarkets[12], Korlaet, Montserrat, Las Brisas, San Francisco, Rendic, and Montecarlo had more than 90 locations, buying US$0.6 billion from food manufacturers.[13] The same year, large stores[14] such as Cadena Economax, Cadena Cugat, Cadena Puerto Cristo, El Loro, and others accounted for 400 stores buying US$1.1 billion from food manufacturers.[15]

Different initiatives to increase bargaining power and margins have been promoted by these players. MAS[16] is an initiative by medium-size supermarkets aimed at aggregating demand to increase bargaining power vis-à-vis food manufacturers and by this way improve the price and payment terms of their purchases.

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[12] For market segmentation and definitions, see Table 4.
[13] Instituto Nacional de Estadisticas, 1999
[14] Large stores are smaller than medium supermarkets and have less products variety
[15] Instituto Nacional de Estadisticas, 1999
[16] Multi Alianza de Supermercados

4.2.5 Mom and Pops

This industry has historically been very fragmented with low level of coordination among member of the supply chain. Mom and Pops are spread all over Santiago, particularly in the poorest areas. There are more than 55,000 nationally. It is common to find several of them in one block, most often within their owner's house. Mom and Pops have high markups and sometimes sell small quantities of goods (spear tea bags, a cup of sugar), which represent an advantage for poor people as they can buy different food products in smaller portions with less money. Mom and Pops tend to concentrate on dry food products and commonly have slow turnovers.

The large advantage of Mom and Pops are their locations, as they are immediately accessible for local people (this advantage becomes more important, as distance to the closest supermarket is farther and the location of the Mom and Pops makes it more convenient than the supermarket. This is particularly true for poor people with limited means of transportation).

Mom and Pops often give credit to their customers with whom they build relationships and that helps them develop customer loyalty. These elements are important when explaining customer behavior.

4.2.6 Ferias

Ferias are popular markets that sell a large variety of products such as vegetables, rice, and fruit, among others. Ferias are typically held once a week utilizing public space, such as streets and sidewalks. They are based on informal transactions and they offer no services. Ferias commonly do not charge value added taxes[17]. They pay a yearly royalty to their respective municipalities to be able to sell in a specific place under municipal oversight. They are spread all over the country, in almost every neighborhood, community or county. In Chile there are almost

[17] In Chile, IVA, Impuesto de Valor Agregado. VAT equivalent =18% of the sale price.

100,000 registered[18] Ferias' participants who generate around 550,000 jobs, or the equivalent to the employment generated by the whole public sector.

At the beginning Ferias only had animal and vegetal products but over time they started to become centers of distribution for food, clothes, and home products. The change was based on the need for access to products, the low disposable income of some neighborhoods and the lower prices that ferias offer. Ferias have developed particularly in areas where shopping malls, commercial centers and supermarkets are not easily accessible.

Ferias' dry food competition with the proposed relevant basic food basket is only about 5%[19] and most likely product volumes are consistent with these weighted percentages of types of Ferias[20]. Ferias commonly have more than one type of business present at each site. Regarding product prices, Ferias' sellers fix prices mostly without rule by a simple personal estimation. Other participants add a fixed margin to the costs of goods sold.[21]

4.3 Competitive Analysis for the Project Model

This section presents the considerations, risks, and reactions of the main potential competitors for the project.

4.3.1 Supermarkets

The strong position of large supermarkets makes their retaliation very powerful. Supermarkets' sizes enable them to maintain long price wars in order to shut down undesired competitors. The project should avoid direct competition with supermarkets, develop large sites that discourage retaliation, and choose sites beyond the supermarkets' areas of influence.

[18] Ferias' participants must be registered at municipalities.
[19] This is extrapolating San Joaquin county information as representative data.
[20] Unfortunately there is a lack of information about Ferias and their businesses.
[21] Matias Pulido et al.

Given the entry of experienced competitors and the high level of competition, players are most likely to continue to locate their stores in strategic locations and maintain the investment in technology, distribution systems and inventory management, in order to continue improving their current efficiency rates. In fact investment is estimated to peak at US$300 million in 2001, up from US$125 million in 2000 and US$430 in both 1998 and 1999. An important risk for the sector is associated with over expansion and saturation of some geographic markets. ASACH forecasts store growth of 1.75% a year for the next 8 years, equivalent to opening an average of 12 stores a year.

Since the food distribution industry is highly competitive, it may be risky and demanding for any venture that intends to enter. In this sense it is key to understand the competitive advantage that a new player would bring to the current distribution chain. It is particularly important to consider the highly efficient operations of the industry that makes it hard to compete based only on low prices.

4.3.2 Mom & Pops

Some social considerations must be taken into account when competing against Mom & Pops as a model of food distribution. Dis-intermediation that affects them directly is likely to put them out of business and many of these stores are the fabric of a neighborhood's economic system and the livelihood of poor families.

Mom & Pops owners could eventually lobby against the project initiative with county and government authorities. Although they are dispersed and not well organized, they could eventually organize at a neighborhood level and question the project's usefulness to the community and boycott its products and/or operations.

Chapter 5: Technical Evaluation

5.1 Introduction

This chapter introduces the technical proposal and the assumptions considered in the economic evaluation model. The first two sections provide an overview of the existing distribution channel operations and their main inefficiencies. Then, it introduces the conceptual model based on a direct-business-system, which enables customers to order products over the Internet[22] and, thus, allows manufacturers to sell their products without relying on third-party distributors, Mom and Pops, or supermarkets. The model is based on a pull strategy that aggregates demand across different points of sale (POS). Lower distribution costs will be achieved since operations will be coordinated through a cross-docking operational system and inventories will be reduced by pooling lead time risk. This chapter demonstrates how a risk pooling strategy reduces average inventory levels across the supply chain by diminishing the number of brands per product offered to customers, and therefore, reduces the number of SKU's managed in the system. Finally, it presents the operational assumptions considered in the economic evaluation.

5.2 Description of Operations in Existing Distribution Channel

The existing supply chain in Chile is well described by the analysis of five large manufacturing and distributor companies: Watt's, Carozzi, Unilever, and Tucapel and, one of the leading distributors, Dipac. Companies' information was gathered though interviews scheduled and conducted over a period of time of two months, from October to November 2001. On average, their annual sales are US$150 million, and their annual volume within Chile ranges between 50,000 and 120,000 tons. Their current logistics costs represent between 5.5% and 14% of annual sales. Watts produces milk, oil, mayonnaise, tomato sauce, and soft drinks. Carozzi manufactures pasta, meal, soft drinks, oil, cookies, and candy. Unilever is the main manufacturer of oil, tomato sauce, mayonnaise, ketchup, tea, butter, canned fruit, and detergent. Finally, Tucapel controls 56% of the rice market.

[22] Customers will indirectly place an order on the Internet, since at the beginning there will be specialized people in charge of that operation.

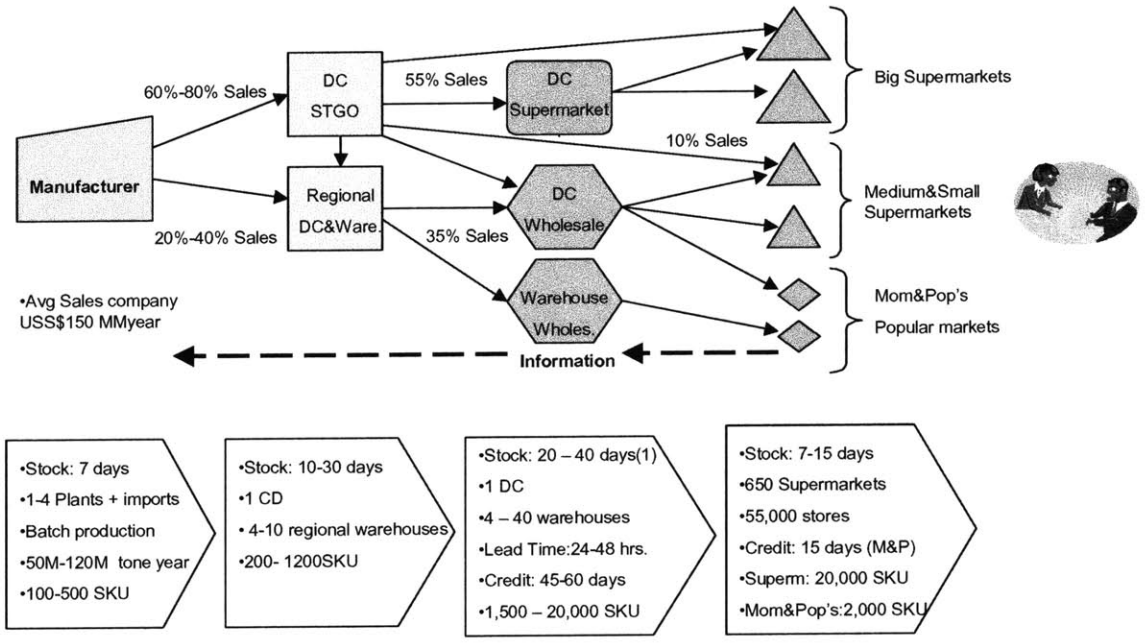
The current distribution network follows a traditional supply chain system. It is composed of manufacturers as the main goods suppliers, and supermarkets and distributors (wholesalers) in charge of distributing to the final supermarkets, stores, Mom and Pops, and popular markets (*Ferias*). Orders, approvals, credit, capacity, and availability flow from the stores, supermarkets and Mom and Pops to wholesalers. Manufacturers and distributors manage their operations through regional warehouses and a central distribution center (DC). They distribute from their own DC's directly to the supermarkets and tend to concentrate and increase their distribution through large and medium supermarkets. On the other hand, distributors are also distributing to small supermarkets, Mom and Pops and popular markets, due to their logistics and technological know how for serving complex networks of more than 55,000 points of sale (POS). Most manufacturers outsource the transport of their goods from their plants to their own facilities and final customers to truck companies. These costs are included in the selling price. Figure 6 illustrates the existing supply chain in Chile.

Despite third party logistics provider growth worldwide, these providers have not yet entered Chile aggressively, and thus, have not integrated their technologies into the local industry. The low third party logistics penetration is due to the small size of the market for foreign companies. Most of the manufacturers and supermarkets have invested in their own facilities and technologies to manage their logistics. The most advanced and efficient logistics operations are owned and managed by large supermarkets. Some large manufacturers also have effective logistics operations, which enable them to integrate into supermarket information systems. However, medium and small supermarkets as well as Mom and Pops lack the technology and management expertise to integrate to manufacturers. This has impacted the integration of information technology and communications among all agents participating in the supply chain, as it is too expensive to invest in individually.

One of the main concerns manufacturers have is the strong buying power of supermarkets and their loss of visibility across the channel to know and better understand their final customers. For instance, supermarkets have pushed manufacturers to increase their accounts receivable from 30 to 45 or 60 days. Furthermore, supermarkets as well as distributors typically charge an additional fee called "rappel cost," for the use of their selling channel. In addition, the increase in the

variety of goods and brands demanded by customers has increased the complexity of managing and coordinating suppliers and over 20,000 SKUs , increasing operational costs even more.

Figure 6: Existing Supply Chain in Chile



(1) For the most efficient supermarket chain, stocks are less that 1 week

5.3 Inefficiencies Across the Distribution Channel and Global Initiatives

Most of the inefficiencies in the supply chain are due to the lack of communication, collaboration, and lack of buying power among the agents involved. The majority of the manufacturers as well as small and medium supermarkets and Mop and Pops forecast demand based only on historical information and don't share information with their customers and suppliers. In addition, there is low information technology penetration in Mom and Pops and service companies. Therefore, there is a huge uncertainty in demand, lead times, and operational coordination. It is known as the "Bullwhip Effect," and explains the increase of demand variability as we travel up in the supply chain. These inefficiencies increase inventories across the channel up to 50 to 90 days.

The Bullwhip Effect can be reduced by controlling the increase in variability within the supply chain. The main factors that contribute to the increase in variability are the demand forecasting, lead time, batch ordering, price fluctuation, and inflated orders. These factors have been controlled in large supermarkets by the recent incorporation of EDI technologies and better management coordination. However, these cases are considered exceptions and apply only to some leading manufacturers. Furthermore, these systems are implemented only for a few brands and types of products and inefficiencies remain for the majority of products.

At the present, most collaboration efforts in supply chain management revolve two adjacent member of a supply chain that are mutually dependent. Examples of such efforts include Vendor Management Inventories (VMI), Efficient Consumer Response (ECR), and Collaboration, Planning, Forecasting, and Replenishment (CPFR) models. Some of these models have demonstrated huge benefits for both parties, such as increased revenue by diminishing stock-outs, reducing inventories and its costs, reducing cost optimizing shipping and fulfillment execution and faster replenished response and product introduction. The VMI model was developed in 1980 to reduce inventories and stock-outs at retail stores. It was first implemented by Wall-mart and P&G in the late 80's. ECR is a movement based on the principle of just-in-

time inventory management[23]. It aims to expand the benefits observed from quick response initiatives. ECR has four key areas: efficient replenishment, efficient promotion, efficient introduction, and efficient assortment. P&G built a successful model in the 90's. CPFR is a initiative aimed at creating common language standards and standardized processes to facilitate inter-company coordination. It was introduced in 1995 by an industry group led by Wal-Mart, SAP, Manugistics, Benchmarking partners, and Warner Lambert through the Voluntary Inter-Industry Commerce Standards Association (VICS). Results from three CPFR pilots in Nabisco and Wegmans, Kimberly Clark and Kmart, and Wall –Mart and Sara Lee Branded Apparel, showed a sale growth at 16%, reduction of days of inventories by 18%, and increase of in-stock by 2.7%.

Theses model are difficult to implement in most of the industry. The major difficulties for implementing theses collaborative models are the following:

- Each company tries to take away some business from each other, causing tension over which party will perform what value added activities in the supply chain,
- Difficulties to cede some of the control to other parties,
- Lack of trust to collaborate,
- Difficulties to generate the required organizational changes,
- Lack of incentives within each firm to collaborate.

Unfortunately, there are just a few collaborative initiatives in the Chilean industry. Most initiatives are based on implementing software packages that enable better visibility, establish communication standards, and automate the process of exchanging information among companies. As it was mentioned in section 5.2, the initiatives are limited to the largest companies and in a few items. Therefore, there is not relevant effect yet in the industry.

On the other hand, poor cities' point of sales channels are controlled by Mom and Pops since there is not enough density for a large supermarket to be profitable, thus, there is a low

[23] JIT is a management philosophy that strives to eliminate sources of manufacturing waste by producing the right part in the right place at the right time.

supermarket penetration. At the same time, poor communities are not well organized and lack the professional support to aggregate demand among various neighborhoods. Therefore, they do not have the opportunity to increase their buying power and reduce intermediary costs across the supply chain.

5.4 Operational Model

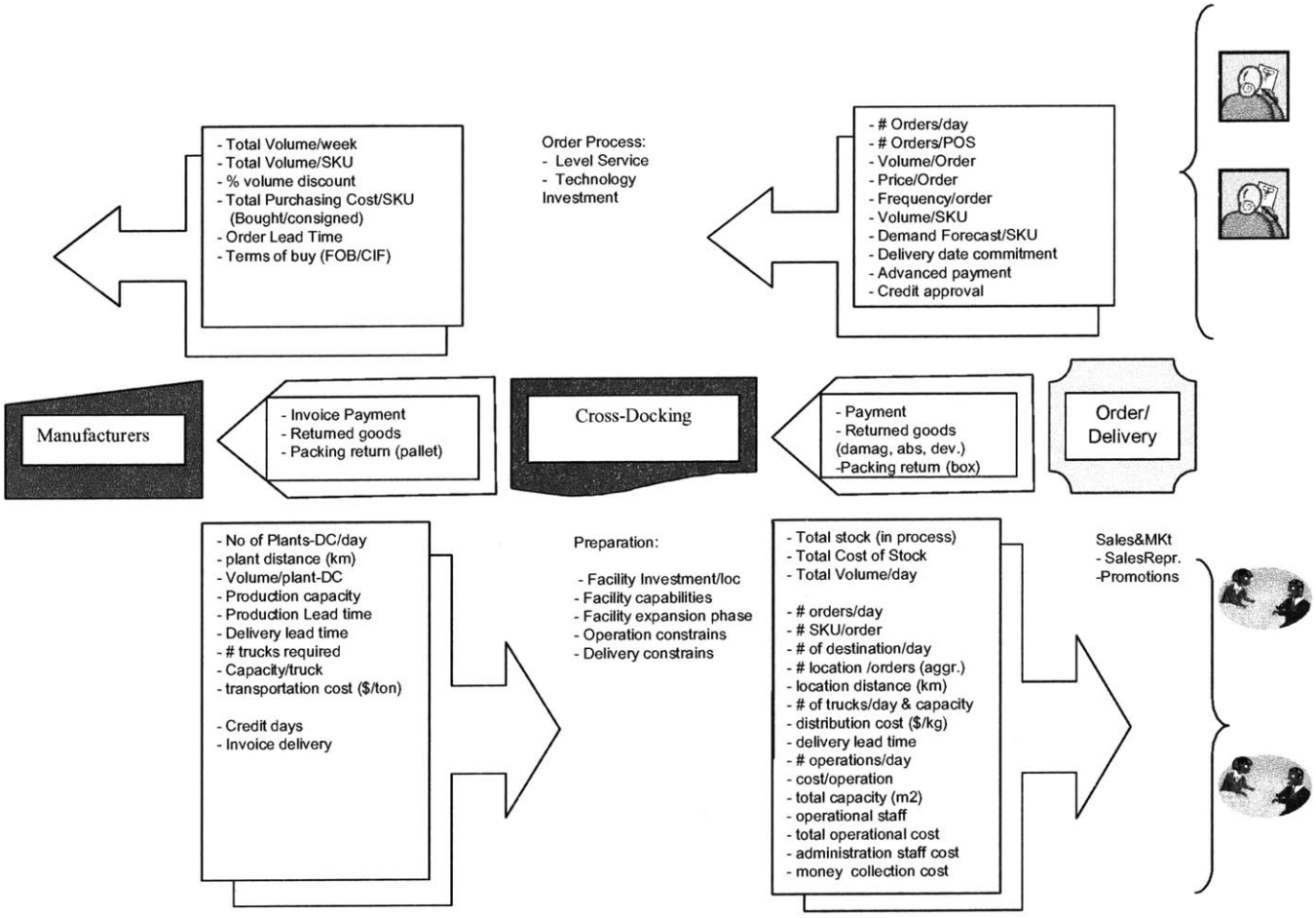
This thesis proposes an operational model that aims to reduce purchasing costs for food in poor communities by considering a collaborative system. This collaborative system is based on logistics and information technology tools and operational management across the supply chain. The value proposition is to reduce logistics cost at least by 20% by implementing a logistics system and aggregating the demand. The model proposes to connect the final customer directly with the manufacturer, through a central coordination unit. This coordinator should have the capability to manage the demand and supply on time, using simple technologies such as the Internet and a "cross-docking" system. An effective coordination across the distribution chain allows significant logistics cost reductions, and thus product purchasing price reduction.

The implementation of an effective supply chain model aimed at reducing dry food distribution costs depends upon five elements: demand and product management, technology, infrastructure, the right transportation and distribution strategy, and the level of service. As a result, logistics costs will decrease as a consequence of the following effects:

- Increase of buying power due to demand aggregation;
- Safety stock and average inventory reduction;
- Economies of scale in transportation operations;
- Procurement improvement among customers, manufacturers and distribution;
- Increase of sales.

Figure 7 presents the proposed operational model.

Figure 7: Logistics Operational Model



5.3.1 Demand and Product Management

Demand and product management will be managed by implementing a pull demand and risk pooling strategy. The pull demand strategy will enable the project to know the demand in advance, and therefore, reduce inventories across the distribution chain. The risk pooling strategy will reduce demand and supply uncertainty by diminishing the number of suppliers and brands managed by the project. Although these strategies will reduce the level of service, they will also reduce significantly the logistics costs. Both concepts are explained in detail below.

5.3.1.1 Pull Demand Strategy

A "pull demand strategy" is defined as ordering from manufacturers only when final customers order. In a pull supply chain, distribution is demand driven so that manufacturers coordinate with true customer demand rather than forecast demand. The reduction of demand variability enables the company to avoid excess inventory and have only the immediate stock necessary for coordinating and preparing all the orders. This management strategy would transform the distribution facilities from storage points to coordinators of flows. Because each household orders what product and quantity they require one week in advance, the demand is known exactly.

This strategy requires an effective technology for a faster information flow mechanism and coordination of processes. Otherwise, it would be impossible to coordinate all operations in order to not hold safety stocks due to the long lead times between order requests and order delivery. The model was simplified to 19 SKU, equivalent to operating, at the most, with 19 different suppliers. This simplification increases the benefit of centralizing the distribution by pooling the risk (see below), aggregating demand across products, and meeting customer demand as the target segment is defined as poor people who need to satisfy their basic "food basket." The selected food basket is comprised of approximately one-third of the basic food basket.

Although the model is supposed to work effectively following a pull strategy, it has the disadvantage of reducing economies of scale, as it is necessary to meet demand with more frequency and without any demand forecast. Therefore, it is not possible to keep inventories to take the advantage offered by purchasing large quantities. However, since the products are part of the basic food basket that people need to eat daily and there is no significant variability in their behavior for those products, it is assumed that the system allows leverage in purchasing and transportation costs by increasing stocks for some basic dry products, e.g., toilet paper rolls.

5.3.1.2 Risk Pooling Strategy

The Risk Pooling strategy suggests that demand variability is reduced if one aggregates demand across locations so that it becomes more likely that high demand from one customer will be offset by low demand from another. This reduction in variability allows us to reduce safety stock and therefore reduce average inventory. In a centralized distribution system, whenever demand from one market area is higher than the average while demand in another market area is lower than average, items in the warehouse that were originally allocated for one market can be reallocated to the other. The process of reallocating inventory is not possible in a decentralized distribution system where different warehouses serve different markets. The higher the coefficient of variation (Coefficient of Variation = Standard Deviation/Average Demand), the greater the benefit from risk pooling. The benefits from risk pooling depend on the behavior of demand from one market relative to demand from another. Thus, the benefits increase when the correlation between demand from two markets becomes more negative. Demand from two markets is negatively correlated if it is very likely that whenever demand from one market is greater than average, demand from the other market is lower than average. This thesis applies the risk pooling concept by aggregating demand across product, rather than across customers, since demand from customer is known. By reducing the number of brands or types of products offered to customers, the lead time variability from manufacturers to the distribution facilities is reduced. Therefore, safety stocks across the supply chain decrease.

The rest of this section demonstrates that risk pooling reduces average inventory by over 30% by reducing the number of SKU's. It was assumed that distributors manage the same number of products that the project will distribute, but carry five more brands per product. Hence, the model compares inventory management for 19 SKUs instead of 95 SKUs managed by distributors and Mom and Pops.

The demonstration assumes a steady-state scenario reached after year four, as described in the financial model for Santiago's case. (See Exhibit 6). Demand is known and represents a steady state situation reached after the fourth year. Thus, weekly demand is 3,060 orders for both cases. Demand is determined multiplying 90 order/sites per week time 34 sites, which is equivalent to

58,140 units per week. The purchasing cost of each order is $7,849. Inventory costs are calculated as the sum of the holding cost and capital cost. The holding cost was calculated considering the variable costs related to the cross-docking facility, which includes annual variable warehouse costs and operational labor costs. The total holding cost is Ch$150 per order, almost 15% of the total costs. Capital cost was calculated assuming 8% as the annual cost of capital.

The average inventory in stock consists of two components. The first is the average inventory during lead time, which is the product of average daily demand and the lead time. This ensures that there will be enough inventory to last until the next order arrives. Thus, the average demand during lead time is:

(1) L*AVG

where, L is the replenishment lead time from the suppliers to the distributor in days, and AVG is the average daily demand faced by the distributor, in this case, the project.

The second component represents the safety stock, which is the amount of inventory that the distributor needs to keep at the warehouse and in the pipeline to protect against deviations from average demand during lead time. Since in this case, delivery lead time from manufacturers to the distributor warehouse varies with the uncertainty of the day on which manufacturers will deliver the order, it will be assumed to be normally distributed with average lead time denoted by AVGL and standard deviation denoted by STDL. Therefore, the safety stock component is:

(2) $$Z^* \sqrt{L * STD\text{^}2 + AVG\text{^}2 * STDL\text{^}2}$$

STD indicates the standard deviation of daily demand faced by distributors and Z is a constant associated with the service level. The constant Z is chosen from statistical tables to ensure that the probability of stockouts during lead time is exactly 1- α:

$$\textbf{Prob}\{\textbf{demand during lead time} > \textbf{AVGL*AVG} + \textbf{Z*}\sqrt{L * STD\text{^}2 + AVG\text{^}2 * STDL\text{^}2}\} = \textbf{1-}\alpha$$

For this demonstration, it was considered z=1.65, that ensured a service level of 95%.

Since demand is known, there is no demand variability, but only from suppliers' lead time. Therefore, STD=0.

The analysis focuses on how to diminish lead time variability by reducing the number of SKUs. According to the proposed model described in Figure 9, lead time is 4 days, i.e., 0.57 weeks. Based on the industry analysis, transportation and manufacturers' lead time vary by 20% as an average. It means that half of the time manufacturers arrive 20% before the scheduled arrival time, and half of the time there is a 20% delay after the scheduled arrival time. Increasing from 1 to 5 brands per product, assuming that each brand comes from different manufacturers, simulates how lead time varies over 4 weeks.

Lead time standard deviation STDL was calculated assuming that demand for each product and brands are dependent. Therefore, the variance is calculated as a sum of two dependent random variables. Intuitively, if demand of one brand increases, demand of the other brands will be affected. The general formula of the variance of the sum of two dependent variables is:

$$\sigma\text{^}2\,(x+y) = \sigma\text{^}2(x) + \sigma\text{^}2(y) + 2COV(x,y)$$

In order to calculate the variance of the lead time of the sum of 5 brands to compare to the variance of the lead time having only one brand per product, the variance formula was extended as follows:

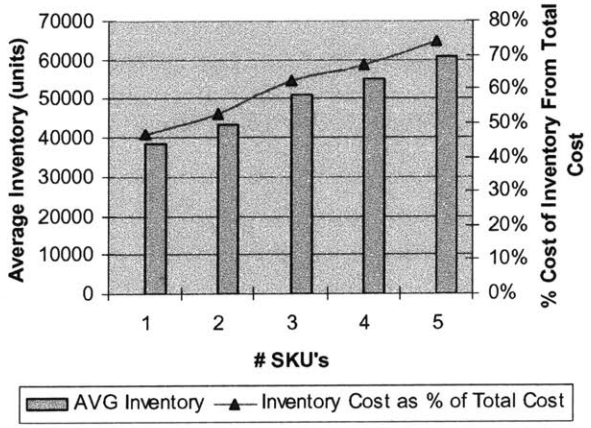
$$\sigma \text{ ^2 (S1+S2+S3+S4+S5)} = \sum_{i}^{5} \sigma \text{ ^2(Si)} + 2^* \sum_{i}^{5}\sum_{j}^{5} COV(i,j), \text{i} \neq \text{j}$$

where Si = SKUi or brand i of one of the 19 products considered to be distributed. Then, STDL is calculated by knowing that

$$\text{STD}=\sigma$$

From (1) and (2), it was calculated that for 5 SKU per product, the average inventory for the total number of products offered by a distributor would be 60,740 units, whereas for a distributor that only offers 1 SKU, the average inventory for all the products would be 38,539. Thus, it is feasible to reduce average inventory by 37%, which is equivalent to reducing inventory cost as a percentage of total cost from 74% to 47%. Figure 8 presents a graph showing how average inventory and total inventory costs are reduced by diminishing the number of SKUs.

Figure 8: Average Inventory and Inventory Cost versus Number of SKUs



5.3.2 Technology

Information technology is a critical factor in implementing effective management of logistic information. The project is based on Internet technologies and supply chain software to allow a fast information exchange and coordination between customers and manufacturers. The Internet is used as a cheap integrator system to collect orders from different locations and to send orders to manufacturers. Supply Chain software will be used to analyze data, especially in a way that takes the global supply chain system into account, from operational decisions involving the way to fulfill a customer order to which manufacturers can meet the demand on time. Using a catalog system, order information will be obtained weekly in each local community. In the first stages of the project, there is no software application considered to process the orders in each POS. Open interfaces will allow external access to the functionality of the system in the near future. Windows Application Programming Interface (API) and open interfaces for databases applications, such as the Open Data Communication (ODBC), would allow each POS to enter the orders directly to the centralized database management systems.

The information technology infrastructure will be supported by personal computers as interface devices, electronic mail for communication, and relational databases for databases. Representatives in each local community will collect and organize the orders in an Excel Spreadsheet using a personal computer, taking advantage of the network of computers located in public schools.[24] Most of the communications between POS, the central coordinator, manufacturers and service providers will be through e-mail applications, which allow for communication across time zones and transfer of information and data. Data will be organized in relational databases that allow the storage of related data in such a way that standardized reporting and querying of this data is facilitated. An alternative is to use Structured Query Language (SQL), designed only for relational databases. Databases will be centralized on a personal computer in the central coordination unit. Therefore, the system will be based on an electronic commerce level to allow one-way communications (E-mail, ftp, browsing) and

[24] Telefonica, a Spanish telephone company, has installed computers and Internet connections in all public schools in Chile. A formal agreement between the Project and the Government must be signed to ensure public technology.

database access (inquires, forms, tracking) from the central unit and from each POS in a second stage. Order processing procurement will reduce administration costs and inefficiencies, and will increase the speed of placing an order directly to the manufacturer through the project. Finally, a better information and procurement system will reduce returns and obsolescent products to stores and distributors.

There are many technical challenges in having a simple online procurement system. For large volumes, some companies will demand integration with their enterprise applications, such as ERP systems. These procurement systems enable companies to have on-time information, payments, document exchange, approvals, and bidding. The project does not need a standard format at the beginning to integrate ERP systems. However, there are very standard and simple solutions to consider as an on-line system to send orders to our facility and manufacturers in an SML format (e-mail) in order to be translated to a standard procurement order within each company.

5.3.4 Infrastructure

As mentioned above, pull demand strategy requires the implementation of a coordinating facility rather than storage. The most advanced concept for this requirement is the "cross docking" facility technology. Cross docking is a distribution system in which merchandise received at a warehouse or distribution center is not stocked, but immediately prepared for onward shipment. In other words, cross docking is the transfer of inward deliveries from the point of reception directly to the point of delivery with limited or no interim storage. Cross docking is characterized by very short lead times. As close synchronization of all inbound and outbound shipments is crucial, the model has stocks for a maximum of seven days, making allowances for the difficulties of coordinating among manufacturers. Although this concept works quite well to reduce inventory cost for high value products, it enables the model to meet fast response times and deliver in less than seven days.

The cross docking type to be used in our model is Intermediate Handling. In this system, packages or pallets are received, broken down and re-labeled by the distribution center into new

packages for delivery to the different points of sale within the counties in Santiago. These new packages are then moved to the outbound dock for consolidation with similar packages from other suppliers on delivery vehicles.

The common operational technology system used in a cross docking facility is EDI. However, due to the reduced number of suppliers and SKUs to coordinate in this model, EDI is not considered necessary. Moreover, not all the products will be cross-docked, as there are some products such as cleaning and hygienic paper that can be directly shipped from manufacturers to the cross-docking facility, but then not sorted because of volume.

The main advantages of cross docking can be summarized as reduction in:

- Cost due to a decrease in handling;
- Cycle times because products move faster;
- Damaged merchandise due to less handling;
- Inventory cost;
- Rent because less volume is stored.

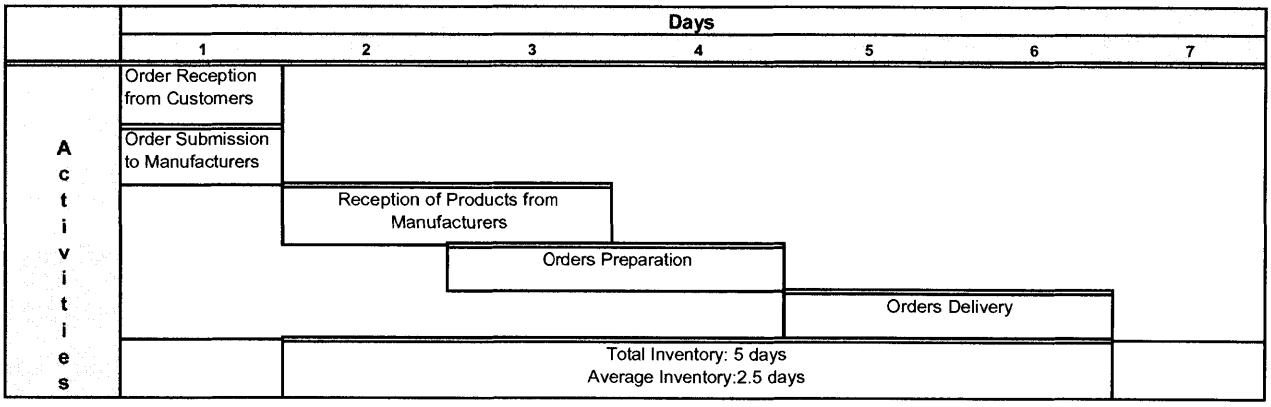
The cross docking facility will have 0.28 pallets capacity per every square meter of warehouse facility, or equivalent to 0.20 tones capacity per m2. According to a standard pallet specification (1.2 * 1.0 square meters) and its weight resistance capacity (1 tone/pallet), pallets can be stacked. However, steel racks were also considered for the warehouse in order to facilitate handling and operations. Every pallet was considered a rack cell position investment and the facility capacity was calculated as twice the average inventory for 7 days. In practice, every pallet stored in the warehouse requires an empty space to allow for access and handling. Thus, considering this space as well as space for aisles, picking, sorting, and processing facilities, the required storage space is multiplied by a factor, typically 3.

The warehouse will be operated with two types of handling equipment: a pallet-lifter and a forklift, depending on the number of pallets needed to be moved per month.

Regardless of the use of the cross-docking concept, the centralization of distribution has some additional advantages besides cost reduction. It improves communication and coordination among suppliers, customers, and service companies, as centralization reduces the number of information sources, thus diminishing demand variability, errors, and stocks. It also reduces fixed costs associated with the administration and number of facilities across the channel, paid by final consumers. In addition, fewer intermediaries reduce handling, damage, and operational costs.

Equally important, there are economies of scale with increased numbers of sites and volume to final destinations. The cost per site is reduced with higher densities of sites. Cross docking operation program is shown in Figure 9.

Figure 9: Cross Docking Operational Program



5.3.5 Transportation and Distribution

Since transportation costs are included in the cost of goods bought from manufacturers, it is assumed that the cost efficiency achieved by the project is lower than the manufacturer. Therefore, in Santiago's model, it was assumed that an additional cost of 10% was paid to

manufacturers for not having high volumes in the first two years of operations. For the regional model, it was assumed that manufacturers would deliver every week to the regional facility located in the city of Chillan, equidistant to the other four southern regions. Table 6 presents the transportation and distribution cost considered in the evaluation of both models.

Table 6: Transportation and Distribution Costs

Origin	Destination	Region	Distance (kilometers)	Transportation Costs (Ch$/ton-km)	Regional Costs (Ch$/ton-km)	AVG Rates (Ch$/trip)
Santiago	Chillan	VII Region	407	16.9	16.9	200,000
Santiago	Santiago	Metropolitan Area	50	83.3	83.3	50,000
Chillan	Santiago	Metropolitan Area	407	20.5	20.5	100,000
	Rancagua	VI Region	320	23.7	23.7	91,000
	San Fernando	VII Region	275	25.8	32.6	72,825
	Curico	VII Region	216	29.6		
	Talca	VII Region	150	37.8		
	Linares	VII Region	103	49.8		
	Los Angeles	VIII Region	110	47.3	47.0	62,550
	Concepcion	VIII Region	112	46.7		
	Temuco	IX Region	270	26.0	26.0	84,200
	Valdivia	X Region	434	20.4	19.0	351,900
	Osorno	X Region	500	19.2		
	Puerto Montt	X Region	609	17.8		

In the way that the volume increases, this cost will be reduced due to economies of scale. In the regional model, it can be leveraged by economies of scope, since the transportation costs of moving product from the project facility to the final customers may be reduced by a bidding process, using trucks that already have other freight to move from those destinations.

In both models it was assumed that 12-ton trucks cannot distribute to more than 4 sites per day. Despite the longer distances existing for the regional model, it was assumed that trucks distribute to the same number of sites since there is less congestion and better highways than in Santiago.

The regional expansion will start where the market is larger, the VIII Region, and will continue to other markets closer to the cross-docking facility and the base market. Therefore, in the first

year of operations, the project will operate in 4 sites located in the VIII Region, the same region where the cross docking facility will be located. Then, in the second year, the business will expand its operations to the VII Region. Finally, during the fifth year, operations will be in the X Region, the furthest region from the cross-docking facility location.

In section 6.1 is presented details of assumptions and operational costs considered for the economic evaluation of the two models.

5.3.6 Level of Service

The project considers a trade-off between purchasing cost and level of service. The level of service would be lower than that offered by supermarkets and Mom and Pops since there will be a reduced number of SKUs, low customized service in order to standardize operations, less delivery frequency, and less marketing expenses at the point of sale.

However, besides cost savings, the proposed model offers a better service by always having the required product, increasing accurate delivery time and reducing time for household buying at Mom and Pops.

The initial hypothesis was that consumers usually buy on a daily basis and it would be a significant shift in behavior to buy once a week. For many of the reasons stated in Section 4, it seemed unlikely that consumers would want to purchase on a monthly basis. However, the prevalence of supermarkets in most areas of Santiago has resulted in many purchasing their food on a weekly or monthly basis. In addition, interviews told us that people with permanent employment are paid weekly. It was decided therefore to offer deliveries once a week.

5.4 Location of Network and Cross-docking facilities

The location of the cross- docking facility depends on three variables. First, it depends on the location of a representative customer for each target city shown by the results of the demand aggregation methodology, as well as the expected growth of the business and expected target of its expansion. Second, it depends on the location of potential suppliers (manufacturers). Finally, it depends on the transportation cost from the suppliers to the representative customer location.

Some of the constraints to be considered are urban transportation restrictions for large trucks and industrial activities. Therefore, in Santiago's model, the facility is likely to be located outside the urban area of Santiago.

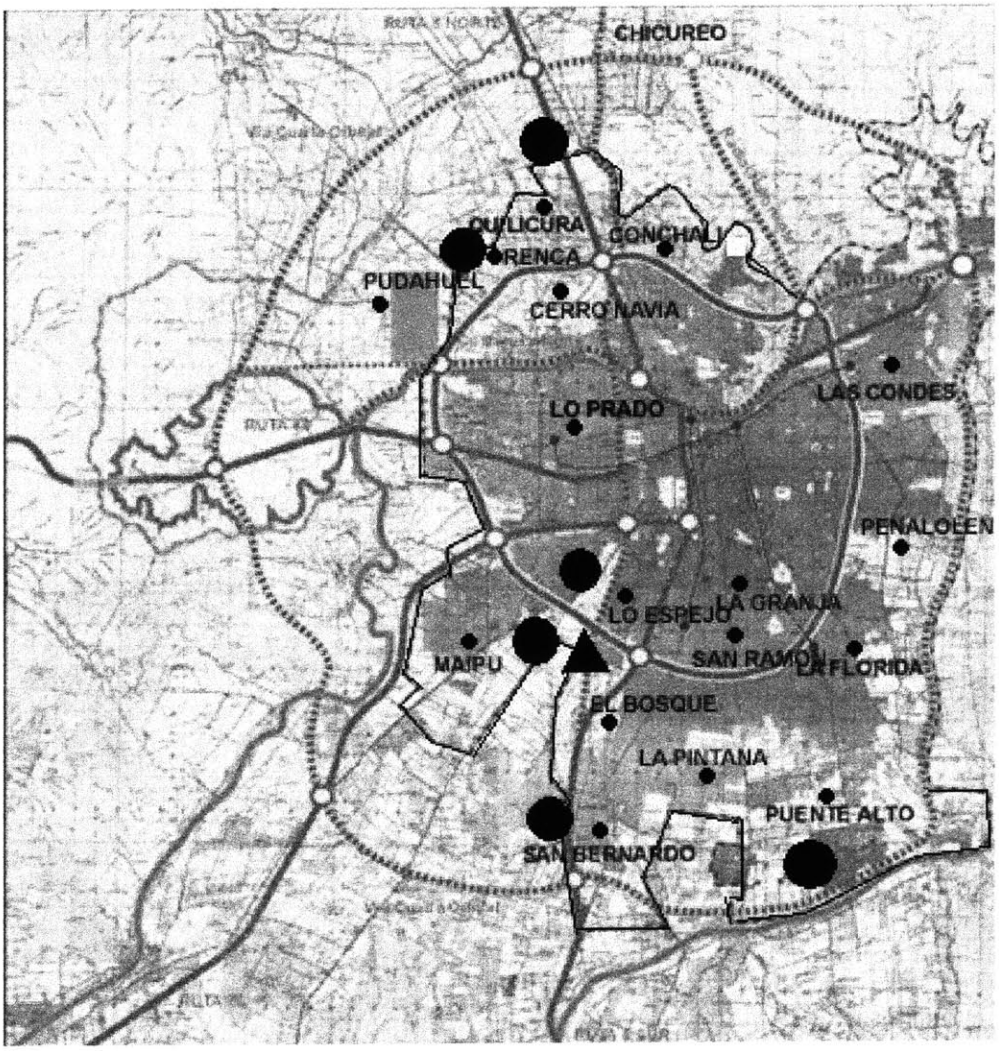
The logistics network was designed based on the current location of the poorest counties and on the location of the relevant food manufacturers in Santiago. The potential market in Santiago is 147,000 people. The areas of operations are the counties with the highest penetration of the target market. There are two main areas: The first and most representative area is in the south of the region. It holds 45% of the target population, and includes the counties of Maipu, Lo Espejo, El Bosque, la Pintana, San Bernanrdo, La Granja, San Ramon, Puente Alto, La Florida, and Penalolen. The other area is located in the northeastern region of Santiago (Pudahuel, Lo Prado, Cerro Navia, Renca and Conchali), representing 15% of the total low-income population of the Santiago Metropolitan Area. The project considered starting a pilot operation in four sites, likely to be located in the south area of the region. The expansion will be concentrated in the south in order to leverage economies of density and scale with customer and manufacturer locations.

There are two industrial areas in Santiago, one located in the northeast and the other in the southeast. Food manufacturers such as Carozzi, Watts, Tucapel, and Coca-Cola, among others are more concentrated in the southern area.

The optimal Cross-Docking facility location was found based on the weighting of potential customer populations and manufacturers' size and the distances. In addition, some constraints such as the urban orbital highway, the distance to highway and railroad access, and industrial urbanization prices were considered. There are government regulations forbidding the entrance of trucks of more than 12 tons inside the urban orbital during the day. Importers and other relevant producers are also located in the south of Santiago. Therefore, it is essential to have access to main ports, airports, highways and railroads. The logistics network configuration indicates that the optimal location is in the south of Santiago, where there are a large number of warehouse facilities available for lease. Figure 10 illustrates the optimal location for the cross-docking facility in Santiago

In the regional model, the location of the cross-docking facility will be determined by the distance from customers in order to have a quicker response. In addition, it will be close to the biggest potential market, the VIII Region, and also equidistant from the other potential regional markets. The city of Chillan is a good candidate for the cross-docking location, since it has good access, skilled labor, and logistics infrastructure. Figure 11 illustrates the cross-docking facility location in the southern region.

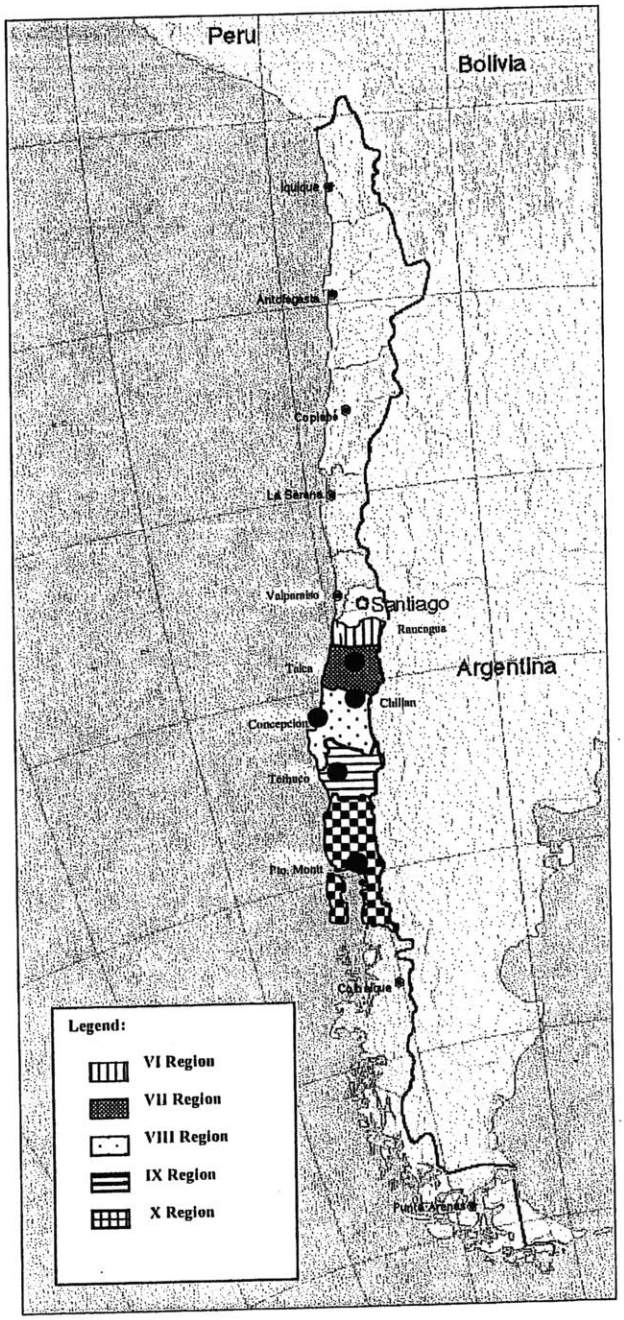
Figure 10: Cross-docking location in Santiago's model



Legend:

- Potential Customer Location
- Potential Supplier Location
- Potential Cross-Docking Facility Location

Figure 11: Cross-docking facility in the southern region



Chapter 6: Economics and Financials

A financial model was constructed in order to evaluate the feasibility of both Santiago's proposed model and the regional model. Exhibit 4 shows the operational model and Exhibit 5 is the resulting profit and loss statement.

6.1 Revenues

Revenues from years 1 to 5 are derived from the targeted market: volume of dry food sold in each site. The intention is to provide dry food at prices 20% lower than those at local convenience stores in order to attract potential customers, as demonstrated in the customer behavior survey explained in Chapter 3. The dry food would be sold at supermarket prices, and the cost to the project is equivalent to the rates that supermarkets obtain from food manufacturers. This fact is assumed since manufacturers can reasonably be expected to be interested in opening new channels, having more visibility, and promoting their products to low-income niches. The average margin is assumed to be 15%, much lower than current average margin obtained in supermarkets, since dry food has lower margin than other products. The cost of the standard dry food basket is Ch$228, while the selling price is Ch$292. A detailed calculation is presented in Exhibit 8. It was assumed that supermarket and Mom and Pops prices are the same in Santiago and regional cities. Although prices should be higher in regional markets, it was assumed that higher prices would be compensated for by other low-price products provided by regional suppliers.

Orders will be equivalent to 13.37 kilograms each, assuming that a person consumes 0.48 kilograms of dry food basket per day[25], an average family is 4.8 persons and customers would buy 80% of dry food through the proposed system. The total weekly demand that Santiago's model will face is 4,813 kilograms in the first year and 40,914 in the fifth year. Regional model faces a weekly demand of 6,195 kilograms and 52,654 kilograms in the first and fifth year, respectively. Table 7.1 and 7.2 present the assumptions and projections of volume for Santiago and southern regions, respectively.

Table 7.1: Assumptions and Volume Forecast for Santiago

Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5
- # People per household	4.8	4.8	4.8	4.8	4.8
- # Households per site	2,500	2,500	2,500	2,500	2,500
- # Deliveries per week	1.0	1.0	1.0	1.0	1.0
Volume					
- # Sites	4	10	18	26	34
- Market segment (%)	12%	12%	12%	12%	12%
- Market penetration (%)	30%	30%	30%	30%	30%
- Share of dry food purchase (%)	80%	80%	80%	80%	80%
- # Order/site/delivery	90	90	90	90	90
- Demand per week (kg)	4,813	12,034	21,660	31,287	40,914

Table 7.2: Assumptions and Volume Forecast for the southern region

Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5
- # People per household	4.8	4.8	4.8	4.8	4.8
- # Households per site	2,500	2,500	2,500	2,500	2,500
- # Deliveries per week	1.0	1.0	1.0	1.0	1.0
Volume					
- # Sites	4	10	18	26	34
VI Region	0	0	2	3	4
VII Region	0	2	4	7	8
VIII Region	4	8	10	13	15
IX Region	0	0	2	3	4
X Region	0	0	0	0	3
- Market segment (%)	15.4%	15.4%	15.4%	15.4%	15.4%
- Market penetration (%)	30%	30%	30%	30%	30%
- Share of dry food purchase (%)	80%	80%	80%	80%	80%
- # Order/site/delivery	116	116	116	116	116
- Demand per week (kg)	6,195	15,486	27,876	40,265	54,654

[25] CASEN 1999

6.2 Fund and Timing

The project is estimated to capture a market share of 30% in Santiago and 9% in the regional market by year 5.. Revenues from subsequent years will increase due to gradual expansion into other sites. It will start with 4 sites in the first year to reach 34 sites during the fifth year. Annual growth is estimated to be 10% after year 5. It was assumed that there would be no growth within each site, because population growth and market penetration will be limited by Mom and Pops, competition, and by the reduction of poverty levels.

The project needs to raise Ch $88 million initially to launch the business in Santiago. The Ch$88 million will sustain the operation for 2 years as well as the Ch$4 million per year required for investment. The money will be used to build technology infrastructure, hire personnel, sales efforts, and operations. In the third year, another round of financing will be required for Ch$25 million. This round of money will continue to fund the four areas as mentioned above until they break even in the fifth year. . In the regional model similar amounts of money are required in the first round of financing. However, in the second round Ch$17 million will be required, less than for Santiago, and just to sustain operations for year 3, since break even is achieved in year 4.

6.3 Cost Model

Santiago and the regional model have similar cost structures. Unlike Santiago's model, the regional one presents higher transportation costs from manufacturers to the cross-docking facility located in southern Chile.

Costs can be grouped into five types: warehouse operations, distribution to sites, transportation, fixed costs per site, and overhead. The warehouse operations, fixed costs per site, and overhead are largely fixed, while the distribution and transportation costs are mainly variable. Transport costs to the warehouse are negligible since the food manufacturer pays for these in urban areas. For rural areas, a transportation model was used to determine rates in function of ton-km.

Table.8.1 and 8.2 show the variation of non-cogs costs break down with number of sites for Santiago and regional model, respectively. Both tables show that the costs associated with entering each additional site are fixed, therefore, the operations require high volumes per site in order to break even. In fact, in a steady state situation, about 30% of total costs must sign up to just cover the costs associated with each site.

Table 8.1: Variations of Cost in Santiago's model (% of total costs)

Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Warehouse	26.5%	25.4%	25.0%	28.1%	27.5%
Distribution	3.6%	8.4%	11.0%	12.2%	13.4%
Transportation	0.34%	0.33%	0.36%	0.37%	0.4%
Fixed Cost/Site	9.4%	18.5%	26.3%	30.0%	33.5%
Overhead	60.2%	47.3%	37.3%	29.4%	25.2%
Total Cost	100.0%	100.0%	100.0%	100.0%	100.0%
Net Income	**-34.7%**	**-10.3%**	**-2.8%**	**-0.6%**	**1.0%**

Table 8.2: Variations of Cost in the Southern model (% of total costs)

Cost	Year 1	Year 2	Year 3	Year 4	Year 5
Warehouse	24.9%	23.5%	22.4%	25.4%	24.8%
Distribution	4.0%	9.7%	15.7%	16.1%	16.6%
Transportation	9.0%	9.5%	10.4%	10.7%	11.6%
Fixed Cost/Site	8.5%	16.3%	21.5%	24.3%	27.1%
Overhead	53.5%	41.0%	30.1%	23.5%	20.0%
Total Cost	100.0%	100.0%	100.0%	100.0%	100.0%
Net Income	**-27.8%**	**-7.4%**	**-1.9%**	**0.0%**	**1.5%**

6.4 Financial Analysis

6.4.1 Santiago's Model

The analysis shows that the model is not economically feasible. Even though it beaks even in the fifth year, its terminal value is too low to make it feasible in the long term. Additionally, break even would be reached over 30 sites, which implies over 30% market share. Since supermarket penetration is high in Santiago and still growing, it is even unlikely to reach 30 sites market share. The following is a summary of the income statement for years 1 to 5.

Figure 12: Financial Projections

	YEAR				
	1	2	3	4	5
Summary P&L					
Revenue	146,932,531	367,331,328	661,196,390	955,061,453	1,248,926,515
COGS	-124,892,652	-312,231,629	-562,016,932	-811,802,235	-1,061,587,538
GM	15%	15%	15%	15%	15%
Gross Profit	22,039,880	55,099,699	99,179,459	143,259,218	187,338,977
Costs					
Transportation to warehouse	-246,960	-305,760	-423,360	-552,720	-693,840
Warehouse	-1,622,648	-2,166,596	-3,129,598	-4,163,922	-5,269,567
Equipment	-287,779	-287,779	-287,779	-7,589,899	-7,731,019
Maintenance	-2,752,000	-2,752,000	-2,752,000	-2,752,000	-2,752,000
Direct Labor	-13,968,000	-16,560,000	-20,016,000	-22,608,000	-26,064,000
shortage	-734,663	-1,836,657	-3,305,982	-4,775,307	-6,244,633
Distribution to sites	-9,485,714	-25,014,286	-43,985,714	-62,957,143	-81,928,571
Overhead	-39,912,200	-39,912,200	-39,912,200	-39,912,200	-39,912,200
Investment	-4,016,916	-4,016,916	-4,016,916	-4,016,916	-4,016,916
Total	-73,026,880	-92,852,193	-117,829,549	-149,328,107	-174,612,746
Net Income	-50,987,001	-37,752,494	-18,650,091	-6,068,889	12,726,231
	-34.7%	-10.3%	-2.8%	-0.6%	1.0%

6.4.2 Regional Model

From the financial results, the regional model is economically feasible. The project's return on investment is 18.5%, based on a 5 year period, a 15% discount rate, and CH$16 million of initial investment. Only 26 sites are required to make the project break even, which represents 9% of market penetration. In addition, there are more opportunities than in Santiago due to the low supermarket penetration. Figure 13 summarizes the financial projections and results.

Figure 13: Financial Projections for Regional Model

	YEAR				
	1	2	3	4	5
Summary P&L					
Revenue	189,093,174	472,732,934	850,919,282	1,229,105,629	1,607,291,977
COGS	-160,729,198	-401,822,994	-723,281,389	-1,044,739,785	-1,366,198,180
GM	15%	15%	15%	15%	15%
Gross Profit	28,363,976	70,909,940	127,637,892	184,365,844	241,093,796
Costs					
Transportation to warehouse	-7,299,310	-10,080,000	-14,946,207	-19,812,414	-25,026,207
Warehouse	-1,366,366	-2,066,750	-3,191,967	-4,317,183	-5,499,811
Equipment	-287,779	-287,779	-287,779	-7,589,899	-7,731,019
Maintenance	-2,752,000	-2,752,000	-2,752,000	-2,752,000	-2,752,000
Direct Labor	-14,832,000	-17,424,000	-21,744,000	-26,064,000	-29,520,000
shortage	-945,466	-2,363,665	-4,254,596	-6,145,528	-8,036,460
Distribution to sites	-10,138,314	-27,506,386	-53,640,814	-74,451,743	-94,322,771
Overhead	-39,332,600	-39,332,600	-39,332,600	-39,332,600	-39,332,600
Investment	-4,016,916	-4,016,916	-4,016,916	-4,016,916	-4,016,916
Total	-80,970,752	-105,830,096	-144,166,880	-184,482,283	-216,237,784
Net Income	-52,606,776	-34,920,156	-16,528,987	-116,439	24,856,012
	-27.8%	-7.4%	-1.9%	0.0%	1.5%

Chapter 7: Conclusions

Logistics technologies, and in particular the Internet, have created huge opportunities to revolutionize traditional distribution models. Today, sophisticated Internet based supply chain strategies have been implemented in many areas to increase logistics competitiveness. However, benefits are not perceived directly by the whole population. This thesis demonstrated the feasibility of integrating low-income people into a lean and up-to-date distribution system based on the latest technology. The proposed model demonstrated that it is feasible to implement a self-sustainable distribution system to share technology benefits with the most needy people, reducing their dry food purchasing prices by 20%. The project offers compelling reasons to add more value to low-income people: lean distribution and logistic costs, demand certainty and aggregation.

Results show that the proposed model is economically and technically viable if located in regional areas, outside Santiago, which have a high density of low-income communities and where large supermarket chains are not present. The project's return on investment is 18.5%, based on a 5- year period, a 15% discount rate, and CH$87 million of initial investment to launch and sustain operations for the first two years. Results of the urban model for Santiago demonstrate that it is not economically feasible due to the low-density market potential and high supermarket penetration rate. From the financial model run for rural areas, even though transportation costs are higher than in urban Santiago, it is economically feasible and only 26 sites are required to make the project break even, which represents 9% market penetration. This finding is explained by the better opportunities in regional southern areas due to the existence of even bigger inefficiencies in the distribution chain, poor access to large supermarkets and more low-income density. Results also indicate that poor people, despite being price-sensitive customers, buy in Mom and Pops because of the advantages of proximity. They also reported to plan for their food needs in advance and can manage budgets. Other services could be bundled with food distribution in order to build greater loyalty, such as new products, advertising channel services, etc.

Government and other non-government institutions would play a key role in providing further operation advantages and ensuring permanent access to public infrastructure and technology located in potential sites. In addition, they are relevant agents to develop trust among communities. There is not a high political risk involved in the project since the country is politically stable and government authorities are opened to new private ventures aimed at reducing the technological gap in poor neighborhoods. This is also important to bear in mind as a potential technological platform to provide other service such as the development of local consolidators of raw materials for suppliers (paper, tires, iron, bottles, etc) taking advantage of returned empty trucks/trains, credits and loans for families, new job opportunities, and technological education through the use of the Internet at schools, among others.

Reverse Auctions and bidding systems with suppliers located anywhere can be implemented in a near future. Having a relevant volume to order from suppliers, these technologies may provide important savings by bidding systems.

Further studies are recommended in order to reduce fixed management costs at points of sale by taking advantage of existing charitable organization networks and by incorporating customers as responsible participants for providing volunteer service. Different models to ensure lower food purchasing costs should also be studied, such as partnering with supermarkets that enable them to reach new areas without investing in new stores (since there is not enough volume and income in these locations). Finally, further studies should examine the feasibility of purchasing products that are soon to expire as well as previously rejected products, in addition to donations from manufacturers (assuming tax savings for them).

Bibliography

America's Second Harvest (2000). *Annual Report*. Chicago, Illinois, U.S.A.

Arriagada, C. (2000). "Pobreza en America Latina: Nuevos escenarios y desafios de politicas para el habitat urbano." *ECLAC*. Santiago, Chile.

ASACH. (2001). "Chilean Supermarket Overview." *Chilean Association for Supermarkets*. Santiago, Chile.

Bowersox, D., Closs, D. and Stank, T. (2000). "Ten Mega-Trends that will Revolutionize Supply Chain Logistics." *Journal of Business Logistics*, Vol. 21, N02, pp 1-15.

CASEN National Socioeconomic Characterization Survey. (2000). *MIDEPLAN*. Chile.

Dell, M. and Fredman, C. (2000). "Direct from Dell: Strategies that Revolutionized an Industry." *Harper Collins*, USA.

EAN International. (2000). "Cross Docking: How to use the EAN-UCC Standards." Brussels, Belgium.

ECLAC. (2000). "La Brecha de la Equidad." Santiago de Chile.

Feller Rate. (2001). "La Industria de Supermercados en Chile: en busca de mejores margenes." Santiago, Chile.

Fontanella, J. (2000). "The Web-Based Supply Chain." *Supply Chain management Review*, Winter, pp.17.

Gattorna, J. and Berger, A. (2001). "The synchronized Supply Chain." *Supply Chain Management Review Global Supplement*, Vol. January – February.

Green, James H. (2000). "The Irwin Handbook of Telecommunications." McGraw-Hill, 4th ed. USA.

Gomez-Ibanez, J., William B. T. and Winston, C. (1999)."Essay in Transportation Economics and Policy." *The Bookings Institutions*, USA.

Harvard Business School Case. (1993). "Frito-Lay: The Backhaul Decision." Boston, USA.

INE Institute of National Statistics. (2000). Santiago, Chile.

Lewis, I. and Talalayevsky, A. (1997). "Logistics and Information Technology: A Coordination Perspective." *Journal of Business Logistics*, Vol. 18, USA.

Murray, F. Gerald. (1996). "El Colmado." *FONDOMICRO*, Dominican Republic.

Neter, J. Wasserman, W. and Whitmore. (1988). "Applied Statistics." *Allyn and Bacon Inc*, 3rd Edition, U.S.A.

Shapiro, R. and Heskett, J. (1985). "Logistics Strategy." *West Publishing Co*, USA.

Simchi-Levi, David., Kaminsky, P. and Simchi-Levi, E. (2000). "Designing and Managing the Supply Chain." Mc Graw-Hill, USA.

Exhibits

Exhibit 1: Poverty in Santiago's Counties

District	Population			
	Total	Below Poverty Line		Indigenous
	Number	Number	%	%
La Pintana	250,922	77,952	31.1	10.5
San Ramón	101,975	29,598	29.0	8.2
Lo Espejo	115,320	31,185	27.0	9.1
Renca	157,499	40,439	25.7	12.8
Cerro Navia	170,826	40,910	23.9	8
La Granja	155,181	34,174	22.0	5.7
El Bosque	196,581	42,191	21.5	8.4
Huechuraba	65,559	14,037	21.4	4.8
Pudahuel	169,782	31,722	18.7	4.4
Conchalí	148,636	27,527	18.5	2.8
Quinta Normal	104,870	19,219	18.3	4.1
Quilicura	57,415	9,191	16.0	3.9
San Joaquín	103,222	16,226	15.7	3
Peñalolen	212,901	33,402	15.7	3.5
Pedro Aguirre Cerda	114,904	18,005	15.7	3.2
Recoleta	163,665	25,078	15.3	5.2
Lo Prado	116,813	17,341	14.8	2
Macul	125,646	17,238	13.7	5.2
Estación Central	130,469	16,735	12.8	2.9
La Cisterna	91,327	11,679	12.8	2.9
Puente Alto	425,281	76,741	18.0	4.6
Total Santiago	**4,719,704**	**671,092**	**1.2**	**4.0**

Source: CASEN 2000, except for access to electricity, CASEN 1998

Exhibit 2: Customer Poll

Who lives in your house?

	Age	Education				
		Without Education	4 years	8 years	12 years	Higher
Husband						
Wife						
Complete: Son / Grandson						
Other						

2) How much do the following people make a month?

	Salary per Job Type ($)	
	Employed	Independent
Husband		
Wike		
Son		
Complete: Son / Grandson		
Other		

3) How much do you spend in food?
(mark where appropiate)

Money ($)	
	Daily
	Weekly
	Monthly

4) Who at home does the dry food purchases? (e.g., rice, pasta, sugar, oil, etc.)

Husband	
Wife	
Sons	
Grandsons	
Other	

5) How often do you do dry food purchases and where?

	Place where dry food purchases are made			
	Supermarket	Local Market	Mom & Pop	Other
Everyday				
Every ____ days				
Once a week				
Once every 15 days				
Once a month				

6) Where do you spend the most money? 1 = Highest amount / 2 = Intermediate / 3= Least amount

	Place where most money is spent			
	Supermarket	Local Market	Mom & Pop	Other
Importance in Purchase $				

7) If purchases are made avery day o several times a week, why they are not made once a week / every 15 days / once a month?
Sort by order of importance: 1 = Highest Importance / 2 = Intermediate / 3 = Least Importance.

No tiene plata suficiente	
No puede / sabe planificar comidas para toda la semana	
No almacena los alimentos	

8) If in the previous question food products are not stored, the main reason for that is:

Don't have space	
Don't have a locked space where to store	
Food gets damaged	
Other reason	

9) Why do you buy in the place mentioned in question 6?

Cheaper prices	
Greater variety of products	
Close to home / work	
Convenience in business hours	
Payment facilities	
Supermarket membership card	
Always have made food purchases in the place	
It is fun	
Feel bad in other places	
Other	

10) For the following products, answer purchased quantity and preferred brand:

	Purchase Quantity (Kg / Lt. / Unit)	Purchase Unit	Consumed Brand	Would you another brand of same quality but cheaper
Oil		Liter		
Rice		Kilogram		
Sugar		Kilogram		
Pasta / Noodles		Grams		
Powder Milk		Kilogram		
Mayonnaise		Grams		
Toilet Paper		Rolls		
Toothpaste		Grams		
Tomato Sauce		Grams		
Tea		Bags		

11) Assuming that you spend $40, 000 in food a month, would you be willing to buy once a week if this meant to only spend:
(assume that you purchase in the same place, brands, etc.)

35,000	
30,000	
25,000	
20,000	
I wouldn't change	

10) If the previous answer was No, with which frequency would you be willing to buy?

Number of days	

11) Would you be willing to pay $1000 a year to beling to a club and thus purchase food at much lower cots?

Yes	
No	

12) If No, why?:

Doesn't have enough money	
Other reason	

13) Would you be willing to pay half in advance when placing the order and the balance at the pick up moment if this allows you to buy dry food much cheaper?

Yes	
No	

14) If No, why?:

Doesn't have enough money	
Other reason	

Source: Netfood Field Study, Harvard Business School, 2001.

Exhibit 3: Basic Food Basket

Goods	Physical Quantity		Cost	
	(Grs)	(%)	US$	(%)
1.1 Bread and Cereals	**362.872**	**29%**	**0.498**	**30%**
Bread	291.389	23%	0.385	23%
Cookies	3.579	0%	0.022	1%
Rice (Grade 2)	36.073	3%	0.042	3%
Meal	11.234	1%	0.012	1%
Pasta	20.597	2%	0.037	2%
1.2 Meat	**80.748**	**6%**	**0.304**	**18%**
1.3 Fish	**11.979**	**1%**	**0.022**	**1%**
1.4 Milk and Eggs	**164.237**	**13%**	**0.168**	**10%**
Cheese	1.364	0%	0.009	1%
Yogurt	10.113	1%	0.024	1%
Eggs	19.714	2%	0.041	2%
1.5 Oils	**37.073**	**3%**	**0.086**	**5%**
1.6 Fruits	**92.734**	**7%**	**0.053**	**3%**
Lemons	5.974	0%	0.002	0%
Oranges	16.208	1%	0.010	1%
Apples	54.014	4%	0.028	2%
Bananas	16.538	1%	0.012	1%
1.7 Vegetables, Leguminous	**312.574**	**25%**	**0.273**	**16%**
Tomatoes	57.603	5%	0.062	4%
Lettuce	4.449	0%	0.006	0%
Cabbage	7.734	1%	0.006	0%
Pumpkin	31.880	3%	0.022	1%
Red Pepper	3.631	0%	0.009	1%
Beans (dry)	8.839	1%	0.018	1%
Lentil	2.960	0%	0.005	0%
Tomato Sauce	4.519	0%	0.018	1%
Garlic	3.699	0%	0.007	0%
Others Vegetables	1.274	0%	0.004	0%
Potatoes	116.918	9%	0.075	5%
Onions	53.625	4%	0.032	2%
Carrots	15.443	1%	0.008	1%
1.8 Sugar, Coffee, Tea, Caramels, etc	**82.896**	**7%**	**0.116**	**7%**
1.9 Drinks	**106.412**	**8%**	**0.109**	**7%**
Soft Drinks	98.320	8%	0.086	5%
Wine	8.092	1%	0.022	1%
1.10 MEALS	**7.121**	**1%**	**0.028**	**2%**
Hot dogs	1.542	0%	0.009	1%
Other drinks	5.579	0%	0.020	1%
Total (day)	**1,258.646**	**100%**	**1.658**	**100%**
TOTAL (month)	**37,760**	**100%**	**50**	**100%**
Dry Products		**70%**		**65%**

Source: MIDEPLAN CHILE, 1999

Exhibit 4: Operational Model for Santiago

Operations						
Warehouse						
Frequency/order (# times/week)	[#]	1.0	1.0	1.0	1.0	1.0
Tones/Pallet (1 tone=1,000 kg)	[tonnes/kg]	1	1	1	1	1
# Pallets/week [1]	[#]	21	26	36	47	59
# Cells (racks)	[#]	21	26	36	47	59
Stock (days)	[kg]	5	5	5	5	5
Average Stock in Inventory (pallets/day)	[#]	11	13	18	24	30
Average Stock in Inventory (kg/day)	[kg]	2,407	6,017	10,830	15,644	20,457
% over warehouse requirement / position	[%]	300%	300%	300%	300%	300%
# pallet high	[#]	2	2	2	2	2
mths per pallet life	[#]	4	4	4	4	4
# pallet required	[#]	32	39	54	71	89
Area per pallet	[m2]	1.2	1.2	1.2	1.2	1.2
Warehousing area (m2)	[m2]	76	94	130	169	212
Transportation						
destinations / truck	[#]	4	4	4	4	4
Urban Truck capacity	[tonnes]	12	12	12	12	12
Transportation Capacity Use (from manufacturers to DC)	[%]	9%	11%	16%	21%	26%
Urban Truck capacity	[m3]	25	25	25	25	25
Truck Unload (hr/truck)	[hrs/truck]	1.0	1	1	1	1
Total Unload Time/month (hrs)	[hrs]	7.4	7.4	7.4	7.4	7.4
Truck Load (hr)	[hrs]	1	1	1	1	1
Total Load Time/month (hrs)	[hrs]	7.4	7.4	7.4	7.4	7.4
Warehousing Forklift Use (hr/POS)	[hrs]	0.50	0.50	0.50	0.50	0.50
Warehousing Forklift Use (hr/POS/month)	[hrs]	8.40	21.00	37.80	54.60	71.40
Total ForkLift Use (hrs/month)	[hrs/mth]	23.1	35.7	52.5	69.3	86.1
Minimum forklift lease (hrs/month)	[hrs/mth]	100	100	100	100	100
# forklift	[#]	0	0	0	1	1
# transpallets	[#]	1	1	1	1	1

Cost & Investment		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
1. Warehouse						
1.1 Racks						
Cost of Cells	*[$/unit]*	20,000				
Annual Cost ($,5 years, 10%)	*[$]*	100,723	124,704	172,667	225,427	282,983
1.2 Cost of warehouse rent						
Monthly Cost	*[UF/m2]*	0.09				
Annual Cost ($)	*[$]*	1,314,533	1,627,517	2,253,485	2,942,050	3,693,211
1.3 Insurance						
Annual Cost	*[% COGS]*	0.1%				
Annual Cost ($)	*[$]*	124,893	312,232	562,017	811,802	1,061,588
1.4 Cost of pallets						
Unit Cost	*[$/unit]*	5,000				
Annual Lease ($, 2 years, 10%)	*[$]*	82,500	102,143	141,429	184,643	231,786
Total Warehouse Cost	*[$/annum]*	1,622,648	2,166,596	3,129,598	4,163,922	5,269,567
2. Equipment						
2.1 Forklift lease rate						
Rate	*[US$/hr]*	8	8	8	8	8
Annual Lease ($)	*[$]*	FALSE	FALSE	FALSE	6,720,000	6,720,000
Gas Cost ($/15 kg. tank)	*[$/tank]*	7,000	7,000	7,000	7,000	7,000
Tank performance	*[hr / tank]*	10	10	10	10	10
Operational Costs ($/year)	*[$ / year]*	0	0	0	582,120	723,240
2.2 Transpalets Equipment						
Investment Cost per transpallet	*[$]*	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Annual Lease ($,5 years, 10%)	*[$]*	287,779	287,779	287,779	287,779	287,779
Total Equipment Cost		287,779	287,779	287,779	7,589,899	7,731,019
3. Transportation Costs						
Stgo-Stgo ($/25 m3 truck.)	*[Pesos]*	28,000	28,000	28,000	28,000	28,000
Urban Distribution Rate ($/day 25 m3 or 12 tone truck)	*[Pesos]*	50,000	50,000	50,000	50,000	50,000
Transportation rate	*[Pesos]*	2,469,600	3,057,600	4,233,600	5,527,200	6,938,400
Delivery from mfr fee - % of truck cost/wk	*[%]*	10%	10%	10%	10%	10%
	[Pesos]	246,960	305,760	423,360	552,720	693,840
4. Maintenance Cost						
- Information Systems	*[% annual]*	10%	10%	10%	10%	10%
- Transpallet Equipments	*[% annual]*	10%	10%	10%	10%	10%
- Communicational Services	*[UF / mth]*	10	10	10	10	10
- Information Systems	*[pesos]*	700,000	700,000	700,000	700,000	700,000
- Transpallet Equipments	*[pesos]*	120,000	120,000	120,000	120,000	120,000
- Communicational Services	*[pesos]*	1,932,000	1,932,000	1,932,000	1,932,000	1,932,000
5. Operational Labor						
Number of staff						
Administration	*[#]*	1	1	1	1	1
Warehouse Chief	*[#]*	1	1	1	1	1
Warehouse Assistant	*[#]*	1	1	1	1	1
Picking Personal	*[#]*	2	5	9	12	16
Distribution Salesmen	*[#]*	0	0	0	0	0
Wages per mth						
Administration	*[pesos]*	250,000	250,000	250,000	250,000	250,000
Warehouse Chief	*[pesos]*	400,000	400,000	400,000	400,000	400,000
Warehouse Assistant (also equipment operator)	*[pesos]*	200,000	200,000	200,000	200,000	200,000
Picking Personal	*[pesos]*	60,000	60,000	60,000	60,000	60,000
Distribution Salesmen	*[pesos]*	360,000	360,000	360,000	360,000	360,000
Rate of social service requirements	*[ratio]*	1.2	1.2	1.2	1.2	1.2
Labor costs						
Administration	*[pesos]*	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Warehouse Chief	*[pesos]*	5,760,000	5,760,000	5,760,000	5,760,000	5,760,000
Warehouse Assistant (also equipment operator)	*[pesos]*	2,880,000	2,880,000	2,880,000	2,880,000	2,880,000
Picking Personal	*[pesos]*	1,728,000	4,320,000	7,776,000	10,368,000	13,824,000
Distribution Salesmen	*[pesos]*	0	0	0	0	0
Total	*[pesos]*	13,968,000	16,560,000	20,016,000	22,608,000	26,064,000

6. Distribution		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Delivery						
Total vol per delivery/week	[m3]	23	56	101	146	191
Truck capacity	[m3]	25	25	25	25	25
Trucks required	[#]	1.0	3.0	5.0	7.0	9.0
Truck rate per day	[$]	50,000	50,000	50,000	50,000	50,000
Number of days	[$]	52	52	52	52	52
Annual truck cost	[$]	2,600,000	7,800,000	13,000,000	18,200,000	23,400,000
POS Fee	[$/mth]	50,000	50,000	50,000	50,000	50,000
Annual POS Fee	[$]	2,400,000	6,000,000	10,800,000	15,600,000	20,400,000
Deliverymen						
Number of delivery men per site	[#]	1	1	1	1	1
Wages	[$/mth]	50,000	50,000	50,000	50,000	50,000
Total cost - all sites	[$]	2,400,000	6,000,000	10,800,000	15,600,000	20,400,000
Security						
payment per delivery per person	[$]	10,000	10,000	10,000	10,000	10,000
number of security guards	[$]	1	1	1	1	1
Security ($/Delivery)		10,000	10,000	10,000	10,000	10,000
Annual Security Cost($)		2,085,714	5,214,286	9,385,714	13,557,143	17,728,571
7. Shortage Costs (obsolescence, damage, returned)						
% of Sales unsaleable	[%]	0.5%	0.5%	0.5%	0.5%	0.5%
8. Administration Cost ($/year)						
General Expenses	[UF /mth]	20	20	20	20	20
Annual	[pesos]	3,864,000	3,864,000	3,864,000	3,864,000	3,864,000
Office Leasing (150 m2)						
Area leased	[m2]	150	150	150	150	150
leasing rate	[pesos]	0.09	0.09	0.09	0.09	0.09
total cost	[pesos]	2,608,200	2,608,200	2,608,200	2,608,200	2,608,200
Marketing	[pesos]	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Staffing - number of staff - not variable						
Manager	[#]	1.0	1.0	1.0	1.0	1.0
Administration Personal	[#]	1.0	1.0	1.0	1.0	1.0
Accounting	[#]	1.0	1.0	1.0	1.0	1.0
Staffing - wages						
Manager	[$]	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Administration Personal	[$]	250,000	250,000	250,000	250,000	250,000
Accounting	[$]	100,000	100,000	100,000	100,000	100,000
Staffing - total cost						
Manager	[$]	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
Administration Personal	[$]	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Accounting	[$]	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000
Total staffing	[$]	26,640,000	26,640,000	26,640,000	26,640,000	26,640,000
Lawyer Assistance per mth	[$]	400,000	400,000	400,000	400,000	400,000
total	[$]	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000
10. Other Investment						
Warehouse improvements	[Pesos]	2,500,000				
Furniture	[Pesos]	2,000,000				
Software						
in US$	[US$]	10,000	10,000	10,000	10,000	10,000
	[Pesos]	7,000,000	7,000,000	7,000,000	7,000,000	7,000,000
Leasing Computers						
# computers	[#]	5				
cost per computer	[US$]	1,500				
Total cost in pesos	[$]	5,250,000				
Total investment	[$]	16,750,000				
Lease cost per year	[$]	4,016,916	4,016,916	4,016,916	4,016,916	4,016,916

Exhibit 5: Operational Model for Regions

Operations						
Warehouse						
Frequency/order (# times/week)	*[#]*	1.0	1.0	1.0	1.0	1.0
Tones/Pallet (1 tone=1,000 kg)	*[tonnes/kg]*	1	1	1	1	1
# Pallets/week [1]	*[#]*	21	29	43	57	72
# Cells (racks)	*[#]*	21	29	43	57	72
Stock (days)	[kg]	5	5	5	5	5
Average Stock in Inventory (pallets/day)	*[#]*	11	15	22	29	36
Average Stock in Inventory (kg/day)	*[kg]*	3,097	7,743	13,938	20,132	26,327
% over warehouse requirement / position	*[%]*	300%	300%	300%	300%	300%
# pallet high	*[#]*	2	2	2	2	2
mths per pallet life	*[#]*	4	4	4	4	4
# pallet required	*[#]*	32	44	65	86	108
Area per pallet	*[m2]*	1.2	1.2	1.2	1.2	1.2
Warehousing area (m2)	*[m2]*	76	104	155	205	259
Transportation						
Intercity Transportation						
Truck Capacity	*[tonnes]*	**29**	29	29	29	29
Truck Capacity	*[m3]*	**60**	60	60	60	60
Urban Transportation		1.000000				
Maximum destinations / truck	[#]	4	4	4	4	4
Urban Truck capacity	*[tonnes]*	12	12	12	12	12
Urban Truck capacity	*[m3]*	25	25	25	25	25
Truck Unload (hr/truck)	*[hrs/truck]*	1.0	1	1	1	1
Total Unload Time/month (hrs)	*[hrs]*	7.4	7.4	7.4	7.4	7.4
Truck Load (hr)	*[hrs]*	1	1	1	1	1
Total Load Time/month (hrs)	*[hrs]*	7.4	7.4	7.4	7.4	7.4
Warehousing Forklift Use (hr/POS)	*[hrs]*	0.50	0.50	0.50	0.50	0.50
Warehousing Forklift Use (hr/POS/month)	*[hrs]*	8.40	21.00	37.80	54.60	71.40
Total ForkLift Use (hrs/month)	*[hrs/mth]*	23.1	35.7	52.5	69.3	86.1
Minimum forklift lease (hrs/month)	*[hrs/mth]*	100	100	100	100	100
# forklift	*[#]*	0	0	0	1	1
# transpallets	*[#]*	1	1	1	1	1

Cost & Investment		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
1. Warehouse						
1.1 Racks						
Cost of Cells	*[$/unit]*	20,000				
Annual Cost ($,5 years, 10%)	*[$]*	100,723	139,093	206,242	273,390	345,335
1.2 Cost of warehouse rent						
Monthly Cost	*[UF/m2]*	0.07				
Annual Cost ($)	*[$]*	1,022,414	1,411,906	2,093,515	2,775,125	3,505,421
1.3 Insurance						
Annual Cost	*[% COGS]*	0.1%				
Annual Cost ($)	*[$]*	160,729	401,823	723,281	1,044,740	1,366,198
1.4 Cost of pallets						
Unit Cost	*[$/unit]*	5,000				
Annual Lease ($, 2 years, 10%)	*[$]*	82,500	113,929	168,929	223,929	282,857
Total Warehouse Cost	*[$/annum]*	1,366,366	2,066,750	3,191,967	4,317,183	5,499,811
2. Equipment						
2.1 Forklift lease rate						
Rate	*[US$/hr]*	8	8	8	8	8
Annual Lease ($)	*[$]*	FALSE	FALSE	FALSE	6,720,000	6,720,000
Gas Cost ($/15 kg. tank)	*[$/tank]*	7,000	7,000	7,000	7,000	7,000
Tank performance	*[hr / tank]*	10	10	10	10	10
Operational Costs ($/year)	*[$ / year]*	0	0	0	582,120	723,240
2.2 Transpalets Equipment						
Investment Cost per transpallet	*[$]*	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Annual Lease ($,5 years, 10%)	*[$]*	287,779	287,779	287,779	287,779	287,779
Total Equipment Cost		287,779	287,779	287,779	7,589,899	7,731,019
3. Transportation Costs						
Stgo-Regional Cross Docking Facility ($/60 m3 truck.)	*[Pesos]*	200,000	200,000	200,000	200,000	200,000
Transportation Costs	*[Pesos]*	7,299,310	10,080,000	14,946,207	19,812,414	25,026,207
4. Maintenance Cost						
- Information Systems	*[% annual]*	10%	10%	10%	10%	10%
- Transpallet Equipments	*[% annual]*	10%	10%	10%	10%	10%
- Communicational Services	*[UF / mth]*	10	10	10	10	10
- Information Systems	*[pesos]*	700,000	700,000	700,000	700,000	700,000
- Transpallet Equipments	*[pesos]*	120,000	120,000	120,000	120,000	120,000
- Communicational Services	*[pesos]*	1,932,000	1,932,000	1,932,000	1,932,000	1,932,000
5. Operational Labor						
Number of staff						
Administration	*[#]*	1	1	1	1	1
Warehouse Chief	*[#]*	1	1	1	1	1
Warehouse Assistant	*[#]*	1	1	1	1	1
Picking Personal	*[#]*	3	6	11	16	20
Distribution Salesmen	*[#]*	0	0	0	0	0
Wages per mth						
Administration	*[pesos]*	250,000	250,000	250,000	250,000	250,000
Warehouse Chief	*[pesos]*	400,000	400,000	400,000	400,000	400,000
Warehouse Assistant (also equipment operator)	*[pesos]*	200,000	200,000	200,000	200,000	200,000
Picking Personal	*[pesos]*	60,000	60,000	60,000	60,000	60,000
Distribution Salesmen	*[pesos]*	360,000	360,000	360,000	360,000	360,000
Rate of social service requirements	*[ratio]*	1.2	1.2	1.2	1.2	1.2
Labor costs						
Administration	*[pesos]*	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Warehouse Chief	*[pesos]*	5,760,000	5,760,000	5,760,000	5,760,000	5,760,000
Warehouse Assistant (also equipment operator)	*[pesos]*	2,880,000	2,880,000	2,880,000	2,880,000	2,880,000
Picking Personal	*[pesos]*	2,592,000	5,184,000	9,504,000	13,824,000	17,280,000
Distribution Salesmen	*[pesos]*	0	0	0	0	0
Total	*[pesos]*	14,832,000	17,424,000	21,744,000	26,064,000	29,520,000

Cost & Investment		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
1. Warehouse						
1.1 Racks						
Cost of Cells	*[$/unit]*	20,000				
Annual Cost ($,5 years, 10%)	*[$]*	100,723	139,093	206,242	273,390	345,335
1.2 Cost of warehouse rent						
Monthly Cost	*[UF/m2]*	0.07				
Annual Cost ($)	*[$]*	1,022,414	1,411,906	2,093,515	2,775,125	3,505,421
1.3 Insurance						
Annual Cost	*[% COGS]*	0.1%				
Annual Cost ($)	*[$]*	160,729	401,823	723,281	1,044,740	1,366,198
1.4 Cost of pallets						
Unit Cost	*[$/unit]*	5,000				
Annual Lease ($, 2 years, 10%)	*[$]*	82,500	113,929	168,929	223,929	282,857
Total Warehouse Cost	*[$/annum]*	1,366,366	2,066,750	3,191,967	4,317,183	5,499,811
2. Equipment						
2.1 Forklift lease rate						
Rate	*[US$/hr]*	8	8	8	8	8
Annual Lease ($)	*[$]*	FALSE	FALSE	FALSE	6,720,000	6,720,000
Gas Cost ($/15 kg. tank)	*[$/tank]*	7,000	7,000	7,000	7,000	7,000
Tank performance	*[hr / tank]*	10	10	10	10	10
Operational Costs ($/year)	*[$ / year]*	0	0	0	582,120	723,240
2.2 Transpalets Equipment						
Investment Cost per transpallet	*[$]*	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Annual Lease ($,5 years, 10%)	*[$]*	287,779	287,779	287,779	287,779	287,779
Total Equipment Cost		287,779	287,779	287,779	7,589,899	7,731,019
3. Transportation Costs						
Stgo-Regional Cross Docking Facility ($/60 m3 truck.)	*[Pesos]*	200,000	200,000	200,000	200,000	200,000
Transportation Costs	*[Pesos]*	7,299,310	10,080,000	14,946,207	19,812,414	25,026,207
4. Maintenance Cost						
- Information Systems	*[% annual]*	10%	10%	10%	10%	10%
- Transpallet Equipments	*[% annual]*	10%	10%	10%	10%	10%
- Communicational Services	*[UF / mth]*	10	10	10	10	10
- Information Systems	*[pesos]*	700,000	700,000	700,000	700,000	700,000
- Transpallet Equipments	*[pesos]*	120,000	120,000	120,000	120,000	120,000
- Communicational Services	*[pesos]*	1,932,000	1,932,000	1,932,000	1,932,000	1,932,000
5. Operational Labor						
Number of staff						
Administration	*[#]*	1	1	1	1	1
Warehouse Chief	*[#]*	1	1	1	1	1
Warehouse Assistant	*[#]*	1	1	1	1	1
Picking Personal	*[#]*	3	6	11	16	20
Distribution Salesmen	*[#]*	0	0	0	0	0
Wages per mth						
Administration	*[pesos]*	250,000	250,000	250,000	250,000	250,000
Warehouse Chief	*[pesos]*	400,000	400,000	400,000	400,000	400,000
Warehouse Assistant (also equipment operator)	*[pesos]*	200,000	200,000	200,000	200,000	200,000
Picking Personal	*[pesos]*	60,000	60,000	60,000	60,000	60,000
Distribution Salesmen	*[pesos]*	360,000	360,000	360,000	360,000	360,000
Rate of social service requirements	*[ratio]*	1.2	1.2	1.2	1.2	1.2
Labor costs						
Administration	*[pesos]*	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Warehouse Chief	*[pesos]*	5,760,000	5,760,000	5,760,000	5,760,000	5,760,000
Warehouse Assistant (also equipment operator)	*[pesos]*	2,880,000	2,880,000	2,880,000	2,880,000	2,880,000
Picking Personal	*[pesos]*	2,592,000	5,184,000	9,504,000	13,824,000	17,280,000
Distribution Salesmen	*[pesos]*	0	0	0	0	0
Total	*[pesos]*	14,832,000	17,424,000	21,744,000	26,064,000	29,520,000

6. Distribution		YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Delivery						
Total vol per delivery/week	[m3]	29	72	130	188	246
Truck capacity	[m3]	25	25	25	25	25
Trucks required	[#]	2.0	3.0	5.0	7.0	9.0
Truck cost per week	[$]	62,550	197,925	435,675	571,050	688,350
From Regional Distribution Center($/day 25 m3 or 12 tone truck) to:						
- VI Region		0	0	91,000	91,000	91,000
- VII Region		0	72,825	72,825	145,650	145,650
- VIII Region		62,550	125,100	187,650	250,200	250,200
- IX Region		0	0	84,200	84,200	84,200
- X Region		0	0	0	0	117,300
Number of days	[$]	52	52	52	52	52
Annual truck cost	[$]	3,252,600	10,292,100	22,655,100	29,694,600	35,794,200
POS Fee	[$/mth]	50,000	50,000	50,000	50,000	50,000
Annual POS Fee	[$]	2,400,000	6,000,000	10,800,000	15,600,000	20,400,000
Deliverymen?						
Number of delivery men per site	[#]	1	1	1	1	1
Wages	[$/mth]	50,000	50,000	50,000	50,000	50,000
Total cost - all sites	[$]	2,400,000	6,000,000	10,800,000	15,600,000	20,400,000
Security						
payment per delivery per person	[$]	10,000	10,000	10,000	10,000	10,000
number of security guards	[$]	1	1	1	1	1
Security ($/Delivery)		10,000	10,000	10,000	10,000	10,000
Annual Security Cost($)		2,085,714	5,214,286	9,385,714	13,557,143	17,728,571
7. Shortage Costs (obsolescence, damage, returned)						
% of Sales unsaleable	[%]	0.5%	0.5%	0.5%	0.5%	0.5%
8. Administration Cost ($/year)						
General Expenses	[UF /mth]	20	20	20	20	20
Annual	[pesos]	3,864,000	3,864,000	3,864,000	3,864,000	3,864,000
Office Leasing (150 m2)						
Area leased	[m2]	150	150	150	150	150
leasing rate	[pesos]	0.07	0.07	0.07	0.07	0.07
total cost	[pesos]	2,028,600	2,028,600	2,028,600	2,028,600	2,028,600
Marketing	[pesos]	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Staffing - number of staff - not variable						
Manager	[#]	1.0	1.0	1.0	1.0	1.0
Administration Personal	[#]	1.0	1.0	1.0	1.0	1.0
Accounting	[#]	1.0	1.0	1.0	1.0	1.0
Staffing - wages						
Manager	[$]	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
Administration Personal	[$]	250,000	250,000	250,000	250,000	250,000
Accounting	[$]	100,000	100,000	100,000	100,000	100,000
Staffing - total cost						
Manager	[$]	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
Administration Personal	[$]	3,600,000	3,600,000	3,600,000	3,600,000	3,600,000
Accounting	[$]	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000
Total staffing	[$]	26,640,000	26,640,000	26,640,000	26,640,000	26,640,000
Lawyer Assistance per mth	[$]	400,000	400,000	400,000	400,000	400,000
total	[$]	4,800,000	4,800,000	4,800,000	4,800,000	4,800,000
10. Other Investment						
Warehouse improvements	[Pesos]	2,500,000				
Furniture	[Pesos]	2,000,000				
Software						
in US$	[US$]	10,000	10,000	10,000	10,000	10,000
	[Pesos]	7,000,000	7,000,000	7,000,000	7,000,000	7,000,000
Leasing Computers						
# computers	[#]	5				
cost per computer	[US$]	1,500				
Total cost in pesos	[$]	5,250,000				
Total investment	[$]	16,750,000				
Lease cost per year	[$]	4,016,916	4,016,916	4,016,916	4,016,916	4,016,916

Exhibit 6: Financial Model for Santiago

Income Statement					
Revenue					
Orders					
# Order/site/delivery	90	90	90	90	90
# sites	4	10	18	26	34
total orders per delivery	360	900	1,620	2,340	3,060
Price per delivery					
% share of abarrotes purchase	80%	80%	80%	80%	80%
Price per person per day	292	292	292	292	292
persons per household	4.8	4.8	4.8	4.8	4.8
Number of deliveries per week	1.0	1.0	1.0	1.0	1.0
Total price per order	7,849	7,849	7,849	7,849	7,849
Total revenue	146,932,531	367,331,328	661,196,390	955,061,453	1,248,926,515
Costs					
COGS					
Margin	15.0%	15.0%	15.0%	15.0%	15.0%
COGS	-124,892,652	-312,231,629	-562,016,932	-811,802,235	-1,061,587,538
Gross Profit	22,039,880	55,099,699	99,179,459	143,259,218	187,338,977
Direct					
Transportation to warehouse	-246,960	-305,760	-423,360	-552,720	-693,840
Warehouse					
Racks	-100,723	-124,704	-172,667	-225,427	-282,983
rent	-1,314,533	-1,627,517	-2,253,485	-2,942,050	-3,693,211
insurance	-124,893	-312,232	-562,017	-811,802	-1,061,588
pallets	-82,500	-102,143	-141,429	-184,643	-231,786
Total	-1,622,648	-2,166,596	-3,129,598	-4,163,922	-5,269,567
Equipment					
forklift	0	0	0	-7,302,120	-7,443,240
transpalet	-287,779	-287,779	-287,779	-287,779	-287,779
Total	-287,779	-287,779	-287,779	-7,589,899	-7,731,019
Maintenance					
info systems	-700,000	-700,000	-700,000	-700,000	-700,000
equipment	-120,000	-120,000	-120,000	-120,000	-120,000
communication	-1,932,000	-1,932,000	-1,932,000	-1,932,000	-1,932,000
Total	-2,752,000	-2,752,000	-2,752,000	-2,752,000	-2,752,000
Operational Labor	-13,968,000	-16,560,000	-20,016,000	-22,608,000	-26,064,000
Distribution					
Transportation	-2,600,000	-7,800,000	-13,000,000	-18,200,000	-23,400,000
Delivery men	-2,400,000	-6,000,000	-10,800,000	-15,600,000	-20,400,000
POS fee	-2,400,000	-6,000,000	-10,800,000	-15,600,000	-20,400,000
Security	-2,085,714	-5,214,286	-9,385,714	-13,557,143	-17,728,571
Total	-9,485,714	-25,014,286	-43,985,714	-62,957,143	-81,928,571
Shortage	-734,663	-1,836,657	-3,305,982	-4,775,307	-6,244,633
Overhead					
Overhead Labor	-26,640,000	-26,640,000	-26,640,000	-26,640,000	-26,640,000
Rent	-2,608,200	-2,608,200	-2,608,200	-2,608,200	-2,608,200
Marketing	-2,000,000	-2,000,000	-2,000,000	-2,000,000	-2,000,000
General	-3,864,000	-3,864,000	-3,864,000	-3,864,000	-3,864,000
Lawyer	-4,800,000	-4,800,000	-4,800,000	-4,800,000	-4,800,000
Total	-39,912,200	-39,912,200	-39,912,200	-39,912,200	-39,912,200
Investment	-4,016,916	-4,016,916	-4,016,916	-4,016,916	-4,016,916
Change in working capital	0	-50,987,001	-37,752,494	-18,650,091	-6,068,889
TOTAL COSTS	-73,026,880	-92,852,193	-117,829,549	-149,328,107	-174,612,746
Net Income	-50,987,001	-37,752,494	-18,650,091	-6,068,889	12,726,231
Net Cash Flow	-50,987,001	-88,739,495	-56,402,585	-24,718,980	6,657,342
Discount Rate (%)	**15.0%**				
Growth Rate	**10%**				
Discount Cash Flow	**-44,336,522**	**-67,099,807**	**-37,085,615**	**-14,133,157**	**3,309,875**
Terminal Value (Ch$)	**72,817,259**				
NPV (Ch$)	**-86,527,966**				
ROI (%)	**0.00%**				

Exhibit 7: Financial Model for Regions

Income Statement (CH$)					
Revenue					
Orders					
# Order/site/delivery	116	116	116	116	116
# sites	4	10	18	26	34
total orders per delivery	463	1,158	2,085	3,011	3,938
Price per delivery					
% share of abarrotes purchase	80%	80%	80%	80%	80%
Price per person per day	292	292	292	292	292
persons per household	4.8	4.8	4.8	4.8	4.8
Number of deliveries per week	1.0	1.0	1.0	1.0	1.0
Total price per order	7,849	7,849	7,849	7,849	7,849
Total revenue	189,093,174	472,732,934	850,919,282	1,229,105,629	1,607,291,977
Costs					
COGS					
Margin (%)	15.0%	15.0%	15.0%	15.0%	15.0%
COGS	-160,729,198	-401,822,994	-723,281,389	-1,044,739,785	-1,366,198,180
Gross Profit	28,363,976	70,909,940	127,637,892	184,365,844	241,093,796
Direct					
Transportation to warehouse	-7,299,310	-10,080,000	-14,946,207	-19,812,414	-25,026,207
Warehouse					
Racks	-100,723	-139,093	-206,242	-273,390	-345,335
rent	-1,022,414	-1,411,906	-2,093,515	-2,775,125	-3,505,421
insurance	-160,729	-401,823	-723,281	-1,044,740	-1,366,198
pallets	-82,500	-113,929	-168,929	-223,929	-282,857
Total	-1,366,366	-2,066,750	-3,191,967	-4,317,183	-5,499,811
Equipment					
forklift	0	0	0	-7,302,120	-7,443,240
transpalet	-287,779	-287,779	-287,779	-287,779	-287,779
Total	-287,779	-287,779	-287,779	-7,589,899	-7,731,019
Maintenance					
info systems	-700,000	-700,000	-700,000	-700,000	-700,000
equipment	-120,000	-120,000	-120,000	-120,000	-120,000
communication	-1,932,000	-1,932,000	-1,932,000	-1,932,000	-1,932,000
Total	-2,752,000	-2,752,000	-2,752,000	-2,752,000	-2,752,000
Operational Labor	-14,832,000	-17,424,000	-21,744,000	-26,064,000	-29,520,000
Distribution					
Transportation	-3,252,600	-10,292,100	-22,655,100	-29,694,600	-35,794,200
Delivery men	-2,400,000	-6,000,000	-10,800,000	-15,600,000	-20,400,000
POS fee	-2,400,000	-6,000,000	-10,800,000	-15,600,000	-20,400,000
Security	-2,085,714	-5,214,286	-9,385,714	-13,557,143	-17,728,571
Total	-10,138,314	-27,506,386	-53,640,814	-74,451,743	-94,322,771
Shortage	-945,466	-2,363,665	-4,254,596	-6,145,528	-8,036,460
Overhead					
Overhead Labor	-26,640,000	-26,640,000	-26,640,000	-26,640,000	-26,640,000
Rent	-2,028,600	-2,028,600	-2,028,600	-2,028,600	-2,028,600
Marketing	-2,000,000	-2,000,000	-2,000,000	-2,000,000	-2,000,000
General	-3,864,000	-3,864,000	-3,864,000	-3,864,000	-3,864,000
Lawyer	-4,800,000	-4,800,000	-4,800,000	-4,800,000	-4,800,000
Total	-39,332,600	-39,332,600	-39,332,600	-39,332,600	-39,332,600
Investment	-4,016,916	-4,016,916	-4,016,916	-4,016,916	-4,016,916
Change in Working Capital	0	-52,606,776	-34,920,156	-16,528,987	-116,439
Total Costs	-80,970,752	-105,830,096	-144,166,880	-184,482,283	-216,237,784
Net Income	-52,606,776	-34,920,156	-16,528,987	-116,439	24,856,012
Net Cash Flow	-52,606,776	-87,526,932	-51,449,143	-16,645,426	24,739,573
Discount Rate (%)	**15.0%**				
Growth Rate	**10%**				
Discounted Cash Flow (CH$)	**-45,745,023**	**-66,182,935**	**-33,828,647**	**-9,517,077**	**12,299,940**
Terminal Value (CH$)	**270,598,684**				
NPV (CH$)	**127,624,943**				
ROI (%)	**18.50%**				

Exhibit 8: Relevant Dry Products of basic Food basket

OUTPUT for assumptions page		Comments
Volume per person per day	0.497	
Prices per kg	298	Average for 4 supermarket locations
average markup per dry product	17.6%	need also margin per product
# SKUs	19	

Product Sample						Supermarkets				Mom&Pop's	
Product	Features	Volume	Consumption (gr/day)[1]	% (volume)	% ($)	Ekono (Las Condes)	Economax (LoPrado)	Ekono (Nunoa)	Ekono (S.Bernardo)	Almacen (Lo Prado)	Almacen (Pudahuel#1)
1. Rice	Tucapel G2 large	1 Kg	36.1	7.25%	4.7%	$384.00	$460.00	$598.00	$598.00	$500.00	$530.00
	Aruba G2	1 Kg				$439.00	$460.00			$480.00	$460.00
	Banquete G2	1 Kg						$598.00	$598.00		
2. Sugar	own brand	1 Kg	55.9	11.2%	8.0%	$419.00	$440.00			$500.00	
	IANSA	1 kg			8.0%	$419.00	$440.00	$339.00	$339.00	$500.00	$500.00
3. Oil (vegetal)	Brand (Belmont, others)	1 Lt	15.7	3.1%	3.8%	$709.00	$760.00	$648.00	$648.00	$780.00	$780.00
	Imported (Sao)						$545.00			$580.00	$650.00
	Brand (Belmont, others)	1/2 Lt					$400.00			$500.00	
	own brand	1/4 Lt				$559.00	$250.00			$250.00	
4. Pasta	Carozzi	400 gr.	20.6	4.1%	4.7%	$269.00	$220.00	$245.00	$245.00	$300.00	$300.00
5. Tomato Sauce	Malloa	200 gr.	4.5	0.9%	1.7%	$222.00	$180.00	$184.00	$184.00	$220.00	$220.00
6. Beans	own brand	1 Kg	15.7	3.1%	2.5%	$469.00	$600.00	$469.00	$497.14	$600.00	$500.00
	Selecta Tortola	1 Kg						$1,179.00	$1,179.00		
7. Lentil	No Brand	1/2 kg (6mm)	3.0	0.6%	0.7%	$329.00	$300.00	$329.00	$348.74	$300.00	$250.00
	Selecta	1 Kg (6mm)						$599.00	$599.00		
	Campo Lindo	1 Kg (6mm)						$638.00	$608.00		
8. Tea	Supremo /Club	40 bolsitas	1.0	0.2%	1.3%	$149.00	$160.00	$149.00	$149.00	$180.00	$140.00
9. Detergents	Omo matic	1 Kg	8.3	1.7%	3.6%	$1,249.00	$1,470.00	$1,298.00	$1,398.00	$1,700.00	$1,600.00
	own brand	1 kg				$1,289.00	$590.00			$500.00	
	Not known brand	600 cc					$385.00			$520.00	
10. Higenic paper	Noble	4 rolls [2]	57.1	11.5%		$419.00	$460.00			$520.00	$450.00
	Maxi	8 rolls				$709.00	$920.00			$1,280.00	
	Noble	8 rolls			1.7%	$709.00	$900.00	$668.00	$698.00	$1,000.00	$900.00
11. Tooth paste	Pepsodent	130gr	1.4	0.3%		$549.00	$520.00			$580.00	$570.00
		100 gr			2.1%	$422.31	$520.00	$440.00	$440.00	$580.00	$570.00
12. Soap	Lesancy	200 gr	1.4	0.3%	1.0%	$409.00	$320.00	$415.00	$415.00	$450.00	$460.00
	Lux (Riviera)	90 gr.				$190.00	$240.00			$260.00	$250.00
13. Powder Milk	Calo	1 Kg	41.6	8.4%	27.1%	$1,899.00	$1,600.00	$1,950.00	$1,955.00	$1,830.00	$2,000.00
14. Meal	No brand	1 Kg	11.2	2.3%			$400.00			$430.00	$420.00
with powder	Carozzi	1 Kg			1.5%	$398.00	$400.00	$398.00	$376.00	$430.00	$420.00
15. Eggs	White eggs	6 units/340gr.	19.7	4.0%	7.1%	$359.00	$500.00	$370.00	$370.00	$500.00	$450.00
16. Soft Drinks	Coke/Fanta	3Lt	98.3	19.8%	11.1%	$989.00	$997.00	$989.00	$989.00	$1,170.00	$1,100.00
							$700.00			$780.00	
17. Salt	own brand/Lobos	1 Kg	10.9	2.2%	0.4%	$99.00	$160.00	$158.00	$119.00	$200.00	$180.00
18. Mayoness	Hellmann's	250 cc	3.5	0.7%		$479.00	$280.00			$350.00	$500.00
	Hellmann's	1000 cc			1.3%	$1,098.00	$1,120.00	$1,098.00	$1,098.00	$1,400.00	$1,500.00
29. Milk (liquid long	Loncoleche Blanca	1 Lt	91.4	18.4%	15.6%	$499.00	$380.00	$485.00	$485.00	$450.00	$420.00
Basic Food Basket Price			497	100%	100%	$292	$285	$295	$296	$324	$320
						AVERAGE Supermarket: $292				AVERAGE M&P's: 3	

(1) Source: MIDEPLAN CHILE, 1999.

(2) Considers weigh as a volume equivalent (1 roll = 1 equivalent - kg; 0.4 roll/per/week, order 8 rolls/home/month)