



International Food and Agribusiness Management Review
Volume 11, Issue 1, 2008

Designing the Last Mile of the Supply Chain in Africa: Firm Expansion and Managerial Inferences from a Grocer Model of Location Decisions¹

Dave Weatherspoon ^a and Anthony Ross ^b

^a *Associate Professor, Department of
Agricultural, Food and Resource Economics,
Michigan State University, East Lansing, MI 48824-1039, USA*

^b *Associate Professor, Marketing & Supply Chain Management,
N321 N Business Complex, East Lansing, MI 48824, USA*

Abstract

The recent interest in the expansion of retail food chains and the perceived problems resulting from competition between these new, sophisticated supply chains and the most basic of food distribution networks in emerging economies have been greatly debated in the literature. This paper is a seminal approach to examining South-South food firm (grocer) foreign direct investment by incorporating data on the informal market into a facility location decision model. There are unique environmental complexities that developing/transitioning economies present. The unique finding of this model is that informal employment patterns, in both Agricultural and non-Agricultural sectors, influence the firm's location. Given the absence of data, South-South foreign direct investment managers perceive avid market transactions as indicators of demand and potential supply availability in formal and informal sectors. For example, Pick n' Pay's CEO stated recently that their growth in the Southern Africa supermarket business is a direct result of the informal market converting to the formal market.

Keywords: Supply Chain, Africa, Informal Markets, Facility Location Model

[Ⓛ]Corresponding author: Tel: + 517-517-353-9850

Email: weathe42@msu.edu

Other contact information: A. Ross: rossant@bus.msu.edu

¹ The authors gratefully acknowledge the assistance from Dr. Laura Donnet for presenting this paper at IAMA and providing feedback and to Ms. Emily Nelson for assisting with data collection.

Introduction

Over the last four years there have been numerous articles explaining the recent investment boom in modern retailing in developing countries and the implication of this investment which has primarily been foreign in its origins (Weatherspoon et al., 2003, Reardon et al., 2003 and Emongor et al., 2006). One of the most surprising results has been the diffusion of supermarkets and restaurant chains in Sub-Saharan Africa which admittedly lags behind other regions. Nonetheless, this literature has opened up vigorous debates among academics, governments, company executives, donor agencies and non-governmental agencies alike. The debates center on the struggle to create attractive investment climates regarding competitive policy, and the cultural and socio-political climate that attracts foreign companies. An attractive investment climate can lead to robust retail activity and other benefits. Modern retail expansion contributes to the economic growth of countries, although certain retail formats (and their supply chain infrastructure) work better than others. To this end, investment in public-private relationships and distribution infrastructure has increased dramatically from the donor agencies and foundations to address the perceived problems resulting from a new set of sophisticated supply chains. These new supply chains are competing against the most basic of food distribution networks and retail formats, and we will refer to them as informal markets throughout the rest of the paper.

In the literature, here are many predictions continued rapid growth in the retail sector. In order to realize such predictions, the agrifood system throughout Sub-Saharan Africa must be transformed into an efficient, responsive, yet highly sophisticated and capitalized agrifood supply chain. That is why this paper is important and timely to the region and to the understanding of how food/grocer companies are making investment decisions which amount to building entire supply chain infrastructure from scratch (i.e. bricks and mortar, transportation, cooling equipment, identifying suppliers and etc.). The second reason this research is germane to the future of the region is that currently, this diffusion and investment is dominated by one country and specifically one retailing firm from South Africa, the southern-most point on the continent. This begs the question of how can the retail sector, with a consumer region whose land area is equivalent to three times the size of the U.S. and contains 66 cities with more than half-million people, be dominated by a single food retailer and its newly minted supply chain? Although it may seem counter-intuitive, Shoprite Holding Ltd.'s supply chain is reportedly price competitive at the point of destination even though the costs of empty backhauling are included (Shoprite Holding Ltd. is located in 17 different countries in Sub-Saharan Africa and is the largest food retailer in Africa).

One key to understanding the growth in these supply chains is to decipher the role of the informal sector. Sean Summers, CEO of Pick n' Pay (the second largest supermarket chain in Africa) stated in a recent interview with CNCB (April 1, 2006)

that: “One of the fantastic growth [opportunities] for us in this market class as formal retailers is that retailing is formalizing a lot, so we [have] a growing market in this country (South Africa) -- just in terms of the sheer number of consumers and the sheer number of consumers that are converting from informal retailing forms to more formal retail patterns.” This includes product that is purchased for resale by street vendors (also commonly known as Hawkers in Southern Africa). From this, we infer that retailers are recognizing the significant market potential in Africa. For some retailers, this market potential outweighs the definite risks, while for others the potential risks may seem insurmountable. Nevertheless, retailers recognize that the race into new markets—with the promise of large wealthy emerging markets—passes through windows of opportunity. Therefore, location and timing are the name of the entry game. Decision-makers targeting emerging retail markets must also weigh the importance of factors which drive personal consumption such as education, living conditions, among others.

This paper is a seminal approach to examining retail location expansion in the context of formal and informal sectors in a developing/transitioning economy. The challenges are enormous with respect to identifying and obtaining the appropriate data to help suggest where (consumer product) food firms should locate in Sub-Saharan Africa. To do this, we utilize the experience of South African food retailer, the Shoprite Holding Ltd. Company. The objectives of this paper are to: 1) understand the role that the informal market plays in firm location decision making within developing countries; 2) determine which socio-economic factors influence supply chain development in developing countries; and 3) compare the prescribed supermarket and related retailing growth in Zambia to actual growth. The next section outlines the context in which grocers are operating in Sub-Saharan Africa followed by the methodology and data. Model development, estimation results and then management implications sections conclude the paper.

Contextualization of the Problem

Historically, there has been a lack of foreign direct investment (FDI) flowing into countries of Sub-Saharan Africa in comparison to other developing regions of the world (Weatherspoon et al. 2001; Jenkins and Thomas, 2002; Roemer, 1996). In fact, South Africa has been one of the largest investors in the rest of Africa throughout the 1990’s and early 2000’s. One of the primary reasons for this is the fact that existing supply chains are disjointed or broken, and to build new supply chains is costly and terribly risky¹. Shoprite Holding Ltd. was and remains one of the few food firms that believes it is profitable to market food and other accessories to poor people in Africa, having proven their point by generating 10% of its sales

¹ There are some new Southern African efforts to harmonize border crossings in terms of requirements and paperwork which include the [Trans Kalahari Highway](#), [Trans Caprivi Highway](#) and the [Trans Cunene Corridor](#) www.wbcg.com.na/wbcg/corridor/thecorridor.htm

volume outside of South Africa through more than 200 stores (Reed, 2006). Other food firms that help boost South Africa as the leader in FDI in the rest of Africa are: restaurant chains such as Steers, Nandos, Chicken Licken and Debonairs (www.southafrica.info/doing_business/investment/africainvest.htm, 2006), and numerous beverage companies (South African Breweries, KWV, Ceres and etc.) (Aykut, and Ratha, 2003).

When considering South-South FDI, retailers face a daunting task of determining where to locate their stores and distribution centers in Sub-Saharan Africa, given that there are no models to follow and little data to base sound business decisions upon.² Any existing competition is in the form of informal markets with no legacy information and very little current information on prices, quantities and consumer demographics. Hence, firms like Shoprite Holding Ltd. send their most seasoned people to the countries of interest to observe the food production levels, environmental conditions, demand for food and other products and preferences of the people. Therefore, the reality appears to be that practicing managers develop mental theories derived from their empirical observation. These mental theories then drive business decision-making. We hope to provide new insights to compare these past decisions to our prescriptive approach.

This paper is unique in that we attempt to factor the informal market into predictions of where a retailer should locate. Our field observations show that retail food firms consistently inquire about the prices of fresh produce that are being marketed on the side of the road by informal traders. The retailers know that they must keep their prices close to the street value since the supermarket's "higher quality" argument has yet to become generally accepted among consumers in this transitioning economy. By comparison, the recent experiences of Wal-Mart and Carrefour in Japan's retail sector provide empirical evidence that a one-size-fits-all decision can lead to failure, especially in retailing.

Retailing can spur a market economy through productivity improvements that have broad supply chain implications. Brazil and China are two recent anecdotal examples where the wave of market entry by retailers (Brazil) and manufacturers (China) contributed to productivity growth. The rationale is that as retailers experience market growth, their supply chains must then become more efficient and responsive to consumers. Local businesses and competitors then mimic these routines and practices which can lead to modernize distribution, efficient storefronts and other practices which drive down the transaction costs of doing business. In turn, savings from lower acquisition costs are passed on to consumers as lower retail prices. Opponents argue that it promotes the monopolistic power of large retailers and erects barriers to, for example, the informal sector and local

² In the automotive industry, for example, several studies have emphasized environmental munificence, technology and innovation-related variables (Drake and Caves, 1992).

retailers. We leave discussion of these important policy dynamics to work appearing elsewhere, given our stated objectives.

To further complicate this retail location problem, transport modes (namely rail, air, sea and most roadways) do a poor job of connecting the various African countries. This minimizes intra-regional trade opportunities (Onyeiwu and Shrestha, 2004). Several initiatives by the Southern African Development Community, the Common Market for Eastern and Southern Africa (COMESA) and other regional bodies have focused on synchronizing border standards to dramatically speed up border crossing. These efforts are resulting in formalized trading routes for distribution activities.

Despite all of these encumbrances, which result in numerous transaction costs, the agrifood supply chain is certainly becoming more organized with each new day. This study is a first step in identifying factors that influence food firms to invest in supply chains within a developing country context.

Theoretical Motivation and Data

In this section, we discuss firm location theory, describe the data collected and motivate our use of the selected methodology. The theory of locating manufacturing plants or various types of service facilities (such as retail stores, fire stations, airports, warehouses, etc.) is concerned with selecting the best site(s) in a specified region. There are many different kinds of location problems, so our goal is not to review these classes of problems. Many of these studies usually seek to optimize transportation costs or delivery time, and response time, among others, based on the locations of demands (Dearing, 1985). Many problem variants and solution methods have been proposed for the location of facilities, and they face a variety of computational performance challenges. The problem variety has included fixed operating costs (construction, overhead, etc.) and variable operating costs (maintenance, purchasing, and direct labor), in many instances. In other marketing channels scenarios, scholars have used data on trade areas (i.e. number of dwelling units, profiles of local/transient/commercial traffic, profiles of residential/commercial/industrial markets, income levels, and the number of automobiles, traffic counts on primary and secondary thoroughfares, extent of competition from major competitors, and bait-type factors which measure proximity to shopping centers) (Stern et al., 1989). Unfortunately, nearly all of the impressive work in this area has been focused on the industrialized world where the supply chain environment differs significantly from that of the emerging economies. As a result, the international business literature characterizes the challenge faced by the multinational enterprise as one of mastering the complexities of multiple markets (e.g. local tastes and local content) while leveraging resources and capabilities on a global scale. In today's environment, it is no longer prudent for decision makers to either judge foreign markets in terms of cultural "distance" from a focal country, or

in terms of classification as an emerging or transitioning economy. Such a view runs the risk of injecting a certain bias and limiting the consideration of the unique capabilities of the environment. Therefore, this highlights the relevance of considering endogenous variables of culture, economics and living standards, and represents an emerging lens with which to explore locating of facilities, or design of supply chains across borders.

The focal firm is Shoprite Holding Ltd. a large, global retailer that is expanding operations through acquisition and greenfield investment in Sub-Saharan Africa. We narrow our focus to the country of Zambia, given our access to operational data and the fact that Shoprite Holding Ltd. has more stores in Zambia (17 supermarkets and 1.5 distribution centers) than any other country outside of South Africa.³ In fact, there is at least one Shoprite Holding Ltd. in each of the nine provinces in Zambia. During the course of recent research on the company, the researchers' experiences formed the basis of this line of academic inquiry. We became interested in exploring executive management's rationale for expansion decisions into other districts of Zambia as well as the rest of Africa. Such a study could lead to the development of models of retail facility location decisions that account for environmental conditions. Environmental, institutional, and cultural contexts are thought to be key drivers of doing business in developing/transitioning economies (Cavusgil et al., 2003; Brouthers, 2002).

The data gathered for this study comes from reports of the 2002-03 edition of the Living Conditions Monitoring Survey© (LCMS) of Zambian households, with the exception of the distance to the distribution center data which was calculated using an estimator located at www.mapcrow.info/cgi-bin/cities_distance.cg. These data were used to assess the attractiveness of the provincial districts of Zambia⁴ to a food firm looking to establish a retailing unit there. It may be possible, then that one district may have such different operating or environmental conditions that traditional location models built for one province or district may not hold in others. Thus building a model for each individual district or province would be cumbersome, if not insurmountable. Another salient point of this study is that models built for one African country, may or may not hold for another country. Such is often the case when there are sizable informal markets, poorly developed utilities grids, wide disparities in income and education levels, and other environmental issues (Ghosh and Craig, 1984). Table 1 summarizes the variables identified from the Zambian LCMS for this research at the provincial district level. The means, standard deviations, minimums and maximums are given for each variable.

³ Shoprite Holding Ltd.'s first investment outside of South Africa was in Zambia in 1995. At that time they acquired a retailing firm called Sentra, a central buying organization for 550 owner-manager supermarket members.

⁴ There are a total of 9 provinces which consist of 72 districts.

Many of these variables have been linked to FDI when selecting among countries but we are not aware of an empirical study of FDI within a single country. The categories of data represented in Table 1 include population density (PopPropn), employment conditions (Empld, Infmlag and Infmlnoag), household food-related expenditures (FoodExp and PropGrProd), intensity of poverty conditions (Hcnt, Pvgap and Sevpo), access to basic utilities (ElecGrid1 and ElecGrid2), secondary education (Educ8-12), household incomes (Mincome and TotInc), and finally distance to the company's regional distribution center (DistDC) as a supply source to a Zambian district. Population density, household food-related expenditures and household incomes are indicators of the market size for the demand for food related products (Morrisset, 2000; Jenkins and Thomas, 2002). The level of infrastructure investment has always been debated concerning FDI when selecting among countries. Within Zambia, the infrastructure does vary and we have included these variables (access to basic utilities) for that reason (Jenkins and Thomas, 2002; Onyeiwu and Shrestha, 2004; Longo and Sekkat, 2001). Human capital levels are important when attracting FDI; we use secondary education as a proxy for human capital (Lindauer and Roemer, 1994; Roemer, 1996). As retailers explore market entry options, the labor pool deserves equal consideration, and each target market presents its own unique challenges and opportunities for companies. For example, one human capital issue in India is the availability of experienced senior managers, while China and Africa require the infrastructure to train and develop people. The distance to the company's distribution center, delivery lead time to consumer markets, and demand volume have commonly been used in marketing channels and supply chain-related studies (Dobson and Karmarker, 1987). We have included a group of variables that factor in the importance and magnitude of Zambia's informal sector. Those variables are included in the workforce variables, and the intensity of poverty variables.

Data on detailed demographics and consumption patterns are not available; hence firms must make decisions based on the data that exists such as the LCMS data and abstractions of managers' mental decision models. We believe these variables and data represent a reasonable set to use in this exploratory study. The next section describes the overarching approach to the analysis, presents our methodology of choice, guides the reader through our model building process, and concludes with a discussion of our results.

Logistic Regression

In the final analysis, the chosen methodology should support a two-level hierarchy of decision-making. In the first stage, a go/no-go decision process must evaluate the attractiveness of particular Zambian districts, as described in Table 1 for Shoprite Holding Ltd.'s expansion. This requirement makes traditional approaches to facility location less appropriate for our consideration in this study. Therefore, stage one of the analysis compares the provincial district living conditions and data

on existing Shoprite Holding Ltd. store locations with identical living conditions data collected for all other districts where there are no Shoprite Holding Ltd. supermarkets. Therefore, our outcome/decision variable is a discrete, dichotomous variable for predicting attractiveness of a district for a Shoprite Holding Ltd. supermarket operation. Thus logistic regression is used.

A binary logit regression technique was then selected because the dependent variable is dichotomous; locate store in Zambian district X, yes or no (Cox and Snell, 1989; Stokes et al., 2000). Logit analysis has been widely applied to assess competitive interaction in facility location scenarios (Green et al., 1977; Dobson and Karmarker, 1987; Robinson and Satterfiled, 1998). Left unaddressed in this related work is the exploration of environmental complexities that are unique to transitioning economies. We attempt to address this gap in the literature using logit analysis because the technique allows the analyst to tailor the approach to the specific environment (emerging country) being investigated.

The logit model then is specified as:

$$\pi(x) = \frac{e^{\beta_0 + \sum_i \beta_i x_i}}{1 + e^{\beta_0 + \sum_i \beta_i x_i}} \quad (1)$$

where

- $\pi(x)$ = the estimated decision of locating (not locating) a store in district X.
- β_0 = logit model intercept.
- β_i = beta coefficient describing the district's overall attractiveness on attribute i .
- x_i = value of the attribute i for district x .

A transformation of equation (1) that is central to our use of logistic regression is the logit transformation (Collett, 1991; Allison, 1999). It is defined as:

$$g(x) = \ln \left[\frac{\pi(x)}{1 - \pi(x)} \right]$$

or let

$$X_0 = \beta_0 + \sum_i \beta_i * x_i \quad (2)$$

Table 1: Zambia Variables from the Living Conditions Monitoring Survey Data Set and the Distance Calculator with the Mean, Standard Deviation, Minimum and Maximums.

Variables	Description	Mean	Std. Dev.	Min.	Max.
PopPropn	Proportion of total population living in the district	0.1289	0.105	0.0136	0.779
Empld	Log of Total size of employed workforce	4.523	0.308	3.436	5.203
Infmlag	Log of Size of workforce in informal agricultural sector	4.378	0.379	2.851	5.167
Infmlnoag	Log of Size of workforce in informal, non-agricultural sector	3.810	0.365	2.911	5.063
FoodExp	Proportion of household income for food expenditures	0.70	0.095	0.460	0.790
PropGrProd	Proportion of households that grow and consume their own produce	0.410	0.174	0.070	0.620
Hcnt	Number of Head of Livestock	0.681	0.072	0.563	0.805
Pvgap	Poverty Gap	0.279	0.051	0.216	0.377
Sevpov	Severity of Poverty	0.144	0.033	0.109	0.211
ElecGrid1	Proportion of households using electricity for cooking	0.107	0.140	0.01	0.450
ElecGrid2	Proportion of households using electricity for other utilities (light)	0.142	0.156	0.030	0.470
Educ8-12	Proportion of children attending secondary school	0.252	0.111	0.140	0.470
Mincome	Log of Mean Income for the District	4.915	0.157	4.775	5.343
TotInc	Log of Total Income for the District	1.962	0.348	1.262	3.79
DistDC	Log of Distance from Main Distribution Center in Km (we assume this would be Lusaka)	2.526	0.411	0.301	3.00

Supply Chain Expansion Results

Using the variables in Table 1, our response decision variable is coded as 0 or 1, representing the absence or presence of at least one Shoprite Holding Ltd. store location in each Zambian district (72 in total). Fitting the logistic regression model in equation (1) to the data set described in Table 1 requires an estimation of the

beta-coefficients. To specify the model, we evaluated the Pearson correlation matrix and eliminated those variables that were nearly perfectly correlated and we utilized stepwise regression in SAS™ (version 9.1) programming. This produced estimates of beta-coefficients for those variables that agree most closely with the observed Shoprite Holding Ltd. data for Zambia in linearized form according to equation (2). We specified a step-wise regression model with a required significance level of 0.3 for entering a variable into the model, and a required significance level of 0.35 for a variable to remain in the model. These tolerances represent our strategy for assessing the adequacy of the model both in terms of its individual variables and its overall fit using a maximum likelihood estimation approach. More importantly, our strategy behind this stepwise approach is to focus our attention on a subset of the variables presented earlier, and to do so with some statistical support for their use. After twelve stepwise iterations, the results of the first-stage regression results appear in Table 2. The goodness of fit using the Hosmer-Lemeshow Test (Hosmer and Lemeshow, 2000) for the model was 0.8594.

Table 2. Results for Fitting the Logistic Regression to Shoprite Holding Ltd. Data and LCMS Data*

Variable	Coefficient	Std. Error	Wald Chi-Sq	p-value	Exp(β)**
Intercept	-98.598	32.319	9.307	0.0023	
Infmlag	6.359	3.444	3.408	0.0649	2.330
Infmlnoag	12.5	5.331	5.497	0.019	2.994
PropGrProd	23.55	10.764	4.788	0.0287	3.943
SevPov	-42.104	24.17	3.304	0.0815	0.0001
Educ8-12	49.169	18.605	6.984	0.0082	5.429
DistDC	0.007	0.005	2.254	0.13	0.1159

*Hosmer/Lemeshow Test statistic for fit: Chi-square=3.974 p=0.8594

**Data transformation included

Table 2 reports the results of the locate – no locate binomial logistic regression model. Five of the independent variables were significant: 1) the size of the workforce in informal agriculture (Infmla) at .06; 2) the size of the workforce in informal non-agriculture (Infmlnoag) at .01; 3) the proportion of households that grow their own food (Propgrprod) at .02; 4) the severity of poverty (Sevpov) at .08; and 5) the proportion of children attending secondary school (Educ8-12) at .00. All of the variables selected had signs as expected based on previous literature and will be discussed in detail later.

The unique finding of this model is that the informal sector, both Agricultural and non-Agricultural employment influence the firm’s location. The direct interpretation is that as the size of the activities of the informal sector increases the more likely it is for Shoprite Holding Ltd. to locate in that district. This may be counter-intuitive to many economists; however, if a firm’s manager observes avid market transactions in the street, then they may perceive that as an opportunity to offer a better product at the same price. In a recent interview with Pick n’ Pay and

Shoprite Holding Ltd.'s (the two largest grocers in Africa representing 80% of Chain store business) CEOs, it was stated that much of their growth in the supermarket business has been due to the informal market converting to the formal market (CNCB, 2006). Given Zambia's large informal sector this result is encouraging that the model is working well.

The proportion of households that grow and consume their own produce is positively related to Shoprite Holding Ltd. locating in that district. Once again, this may seem counter-intuitive to many economists but as a manager surveys the landscape with nothing but traditional (informal) supply chains in existence, then they must start piecing together how to manage the first couple of years of operation with some imports and some local purchases until the local procurement/sourcing program is put into place. Hence, observing lots of production, no matter who is consuming it (informal market or own consumption) is encouraging to a firm expanding to a new region.

The severity of poverty is negatively related to Shoprite Holding Ltd. locating in a particular district as we would expect. As the level and severity of poverty increases, Shoprite Holding Ltd. and other food firms would choose to find other regions to locate.

The most significant variable for firm location was the proportion of children attending secondary school. On the demand side, Shoprite Holding Ltd. in South Africa markets their products to lower-middle to lower-upper classes and may be using the same relative approach in Zambia. In Zambia, as in most developing countries, those with higher levels of educational attainment have a tendency to try new food products as well as purchase their food from supermarkets versus open markets. On the supply side, Shoprite Holding Ltd. needs an educated work force for the management level jobs so this is another reason why this variable may be so significant.

Although not significant, the distance to the distribution center and total income for the district warrant a short discussion here. One reason why total income may not be an indicator is that the informal sector is so large in Zambia that official statistics cannot reliably capture the dynamics of this sector. We believe the distance to a distribution center will become significant in stage II of our research which is discussed briefly in the conclusions.

To further interpret the results, the significant explanatory variable odds ratios are calculated. The odds ratio for each effect parameter, estimated by exponentiating the corresponding parameter coefficient (β), is shown to equal $\text{Exp}(\beta)$. As the variable changes by one unit, the probability of the Shoprite Holding Ltd. locating in that district changes by a factor of $\text{Exp}(\beta)$. The general guideline is that if the odds ratio is greater than (less than) one, then we will experience an increase

(decrease) in the probability of targeting that district as a Shoprite Holding Ltd. expansion prospect. Our results warrant this interpretation of the regression from the view of odds ratios for the variables, as a form of robust sensitivity analysis. In estimating these odds ratios, we observe several findings in Table 2. First, severity of poverty seems to have no significant impact on the probabilistic decision. Further, proximate distance from a re-supply distribution center also had little influence. We did find that informal employment measures, agricultural (Infmlag) and non-agricultural (Infmlnoag), both increased the probability by factors of 2.33 and 2.994, respectively. As measures of economic activity in the informal sector of the economy, we infer that Infmlag and Infmlnoag reflect the intensity of agricultural and non-agricultural commerce in a given district and that they may indicate retail market potential in the region. We also found that the extent to which households “grow their own produce for consumption” (PropGrProd) increases the probability of a location decision by a factor of 3.943. As an indicator of produce consumption, PropGrProd also seems to resemble traditional measures of market potential. Finally, education levels (Educ8-12) also increase this probability by a factor of 5.429. As stated earlier, formal supply chains rely on some level of sophisticated consumption such that their retailing outlets are instantly adopted by consumers. In general, the relationships we discovered here for variables Infmlag, Infmlnoag, PropGrProd and Educ8-12 correspond with the discussion appearing in the traditional market diffusion and market entry literatures in business research (Bucklin, 1966), in that demographic factors seem to have a profound influence on predicting the viability of Zambian districts as potential sites for market expansion through the locating of retail facilities.

Market Entry Issues and Managerial Implications

Based upon the initial results presented in the preceding section, we find that when there are no formal or organized supply chains it is clear that the informal market matters. The informal market is a source of competition and supply. These findings are unique and are a direct result of where, demographically, the analysis was conducted. In comparison, it may be prudent in a future study to examine how companies such as Wal-Mart (USA) or Carrefour (EU and Asia) wrestle with similar location decisions in emerging economies. This is a South-South investment analysis, which we propose is different from a North-South managers’ investment decision making process. For example, some of the excluded variables we analyzed such as degree of electrification, total income and distance from the distribution center⁵ were not found to be significant in the South-South analysis but would most likely be key factors for North-South investment managers.

⁵ Distance from the distribution center may be significant in a second stage analysis when locating the store relative to a distribution center, however, we are focusing on a macro level decision of selecting the target district. The next logical step is to look at cost, distance, time, and estimates of market share in a traditional facility location analysis.

Our first level of analysis, however, has yielded some interesting results. Shoprite Holding Ltd.'s managers, who have experience operating in poor regions and in fact specialize in marketing food products to the poor, appear to have made decisions based on other factors, factors that pertain to the demand side and the supply side simultaneously. When little data exists and the markets are primarily informal, one must make investments based on the basics, such as: are there clientele, suppliers, and skilled and unskilled workforce available. Once that set of criteria has been satisfied, and the go decision has been made, then the firm turns its attention to developing the rest of the supply chain over time. This management decision is intuitive but not without risks. For Shoprite Holding Ltd., the risks have been rewarded to the tune of 10% of sales volume a year originating from outside of South Africa and they have dominated formal food retailing in Sub-Saharan Africa since their initial investment outside South Africa in 1995 (www.Shoprite.co.za).

We believe that these preliminary results will be of use in the development of sourcing strategies for the last mile of the supermarket supply chain in Zambia and other regions of the world. Store formats (e.g. supermarkets, cash and carry) will certainly be of consequence as company managers time their entry into new markets and expand within their existing markets. Entering a declining or closing market means increased international competition, yet choosing the right format during the correct opportunity window could still result in reasonable opportunities.

Conclusions and Extensions

Most of the literature on retail facility location has been focused on the industrialized world where the supply chain environment differs significantly from that of the developing/transitioning economies. Zambia and other Sub-Saharan Africa countries represent challenging environments for firms interested in foreign direct investment. Although, in this paper we assumed that the firm is able to appropriately identify the governmental red tape for establishing a business in the country, experienced firms in the South still face unexpected delays. Firms like Shoprite Holding Ltd. send their most seasoned people to the countries of interest to observe the traditional supply chains and these practicing managers develop mental theories derived from their empirical observation.

The key finding of this study is that the informal (traditional) markets matter in determining where new firms locate their operations in developing/transitioning economies. Firm managers observe avid market transactions in the street and perceive that as an opportunity to offer a better product at the same price. The most important factors appear to be that the managers must ensure that there is adequate demand for their products and that the supply logistics for those products are not too onerous initially. Shoprite Holding Ltd. has been criticized for importing too many food products that can be produced locally in the first few years of

operation in the new countries of operation. However, it is fairly common to import product for the first couple of years until the local supply chain can be pieced together over a period of time.

This analysis informs managers, policy makers, and the donor community on the factors food firms consider when evaluating FDI in developing/transitioning economies. We believe this study could lead to the development of models of retail facility location decisions that account for environmental conditions, a key driver of doing business in developing/transitioning economies. This approach is generalizable to other countries and regions of the world where companies wrestle with the challenges of market entry.

Our results have some limitations, but offer several opportunities worthy of pursuit. The first limitation concerns the data. The analysis was guided by the specific data that was accessed. Other types of data may be available, and should be considered as it materializes. Second, we did not have free access to Shoprite Holding Ltd. data. This was a limited view of data. Third, this study stops short of proposing precisely where in each district Shoprite Holding Ltd. should locate. Our approach can be extended to this decision scenario, but will depend upon access to other operational data. Having chosen a logit modeling strategy and calibrated a predictive model, one useful extension would be to predict a Zambian district and store format combination. Though not our primary focus here, this would require additional market information and internal company data. Our results need to be viewed with these limitations in mind.

References

- Allison, P.D. 1999. *Logistic Regression Using the SAS System: Theory and Application*, Cary, NC: SAS Institute Inc.
- Aykut, Dick and Dilip Ratha. 2003. "South-South FDI flows: how big are they? Transnational Corporations", *UNCTAD/ITE/III*, Volume 13 Number 1, April
- Brouthers, K. 2002. "Institutional, Cultural and Transaction Cost Influences on Entry Mode Choice and Performance," *Journal of International Business Studies*, Vol. 33, No. 2.
- Bucklin, Louis. 1966. *A Theory of Distribution Channel Structure*, Berkeley, Calif.: IBER Special Publications.
- Cavusgil, S. T., K. Chan, and C. Zhang. 2003. Strategic Orientations in Export Pricing: A Clustering Approach to Create Firm Taxonomies, *Journal of International Marketing* Vol.:11, Spring, Issue 1, pgs. 47-59.

- Central Statistical Office of Zambia, Living Conditions Monitoring Survey Report 2002-03.
- CNCB_AFRICA_REPORT. Viewed September 12, 2006. http://www.ShopriteHoldingLtd.co.za/files/19204235/News%20Clips/20060401_CNCB_AFRICA_REPORT_20H43.wmv
- Collett, D. 1991. *Modeling Binary Data*, London: Chapman and Hall.
- Cox, D.R. and E.J. Snell. 1989. *The Analysis of Binary Data*, Second Edition, London: Chapman and Hall.
- Dearing, P. 1985. "Review of Recent Developments—Location Problems," *Operations Research Letters*, 4(3), pp. 95-98.
- Distance data source: http://www.mapcrow.info/cgi-bin/cities_distance.cg Viewed August 10, 2006.
- Dobson, G., and U. Karmarkar. 1987. "Competitive Location on a Network," *Operations Research*, 35(4), 565-674.
- Drake, T. and R. Caves. 1992. "Changing Determinants of Japanese Foreign Direct Investment in the United States," *Journal of Japanese and International Economics*, Vol. 6, 228-246.
- Emongor, Rosemary A., André Louw, Johann F. Kirsten. Viewed August 2006. "Regoverning Markets-Zambia," http://www.regoverningmarkets.org/regions/southern_africa/zambia.html
- Ghosh, A. and C. Craig, 1984. "A location allocation model for facility planning in a competitive environment," *Geographical Analysis*, Vol. 16, 39-51.
- Green, P, F. Carmone, and D. Wachpress. 1976. "Consumer Segmentation via Latent Class Analysis," *Journal of Consumer Research*, Vol. 3, 170-174.
- Hosmer, D.W, Jr. and S. Lemeshow. 2000. *Applied Logistic Regression*, Second Edition, New York: John Wiley & Sons, Inc.
- Jenkins, Carolyn and Lynne Thomas. 2002. Foreign Direct Investment in Southern Afroca: Determinants, Characteristics and Implications for Economic Growth and Poverty Alleviation, CSAE CREFSA, University of Oxford London School of Economics, Manor Road Bldg, Manor Rd, Oxford OX1 3UL Houghton St., London WC2A 2AE.

- Lindauer, David and M. Roemer. 1994. *Asia and Africa: Legacies and Opportunities in Development*, ICS Press, San Francisco, CA.
- Longo, Robert and Khalid Sekkat. 2001. Obstacles to Expanding Intra-African Trade, *OECD DEVELOPMENT CENTRE*, Working Paper No. 169, March.
- Morrisset, P. 2000. "Foreign Direct Investment to Africa: Policies also Matter." *Transnational Corporation* 9: 107–125.
- Onyeiwu, S. and Hemanta Shrestha . 2004. "Determinants of Foreign Direct Investment in Africa," *Journal of Developing Societies*, Vol 20(1–2): 89–106
- Reardon, T., C.P. Timmer, C.B. Barrett, J. Berdegue. 2003. "The Rise of Supermarkets in Africa , Asia , and Latin America," *American Journal of Agricultural Economics* , 85 (5), December: 1140-1146.
- Reed, J., April 13, 2006. "Discussion Rumours boost Shoprite Holding Ltd.," *Financial Times*, www.news.ft.com
- Roemer, Michael. 1996. "Could Asian Policies Propel African Growth?," *Harvard Institute for International Development*, Harvard University, Development Discussion Paper No. 543
- Satterfield, R., and P. Robinson. 1998. "Designing Distribution Systems to Support Vendor Strategies in Supply Chain Management," *Decision Sciences*, 29(3), 685-706.
- Stern, L.W., A. El-Ansary, and J. Brown. 1989. *Management in Marketing Channels*, Prentice Hall, Englewood Cliffs, New Jersey.
- Stokes, M.E., Davis, C.S., and Koch, G.G. (2000), *Categorical Data Analysis Using the SAS System*, Second Edition, Cary, NC: SAS Institute Inc.
- Weatherspoon, D., J. Cacho and R. Christy. 2001. "Exploring the Links Among Globalization, Economic Growth, and Poverty: Private Sector Initiatives," *American Journal of Agricultural Economics*, Vol. 83 number 3 August, pp. 722-729.
- Weatherspoon, D.D., Thomas Reardon. 2003. "The Rise of Supermarkets in Africa: Implications for Agrifood Systems and the Rural Poor," *Development Policy Review*, 21(3): 333-355.
- www.southafrica.info/doing_business/investment/africainvest.htm. Viewed May 2, 2006. "SA sets up shop in Africa.