Vertical Integration within the Fresh Fruit Chain

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Abstract

The "fruit trade chain" is a commonly accepted term used in the industry to describe the system of trading fresh fruit. The fruit trade chain includes procurement, production, packaging, shipment and delivery to the consumer. Within this chain, numerous components are involved: picking, grading, packing, terminals, depots, exporters, importers, and more (FPEF Advanced Manual, 2010). Within each component, failure or mismanagement of one element can affect the chain as a whole. Different commodities may contain differing components within the chain. These operations typically involve separate organizations, each accruing some margin, which is inevitably subsidized by the consumer. Even though each operation adds additional cost to the consumer, logistics are coordinated by specialists within in that commodity, allowing for the best quality of fruit to reach consumer outlets.

Recently the market, specifically the fresh fruit trade chain, is encountering the possibility of restructure through the declared intentions of mass retail merchandisers such as Wal-Mart. Through backward integration, a process that will allow for the control of all, or most, of the stages in the production and sales of their products, Wal-Mart is actively increasing its presence while also removing cost accruing players from the chain.

With, potentially, a larger share of the market, one needs to ask whether these mass merchandisers have the capacity to implement a similar process over a variety of commodities. If so, what would be the potential benefits of this channel? If there are possible benefits, are they experienced both up and down-stream? For the local industry, if undertaken successfully, what consequences will this transformed chain have on the existing logistic infrastructure? The question of the frequency of transactions and the effect of significant relationships within the chain amidst these transactions is also explored.

Keywords: *Vertical Integration, South African Citrus, IPL, WalMart*

1 Introduction

The last 20 years have seen an rapid increase in the trade of fresh fruits and vegetables. The estimated value of all fresh horticultural product trade in 1990 was approximately 51 billion USD. This figure increased to 160 billion USD in 2009, an increase of over 200 percent (FAOSTAT). Increased trade in fresh fruits and vegetables can be attributed to a number of factors including improvement in logistics, decreased trade barriers, and increased consumer demand for these products.

South Africa has become a major player in the world market for fresh fruit. Exports of fresh fruit from South Africa increased from 1.1 MMT in 1990 to 3.1 MMT in 2009, an increase of almost 200 percent (FAOSTAT). Fresh citrus has played an important role in South Africa's increased participation in world fresh fruit trade. South Africa is now the second largest exporter of fresh citrus in the world, following only Spain, with exports of approximately 1.5 MMT in 2010 valued at over 5.8 billion rand[1] (DAFF, 2010).

[1] Approximately 720 million USD

2 Problem Statement

The “fruit trade chain” is a commonly accepted term used in the industry to describe the system of trading fresh fruit. The fruit trade chain includes procurement, production, packaging, shipment and delivery to the consumer. Within this chain, numerous components are involved: picking, grading, packing, terminal, depots, exporters, importers, and more (FPEF Advanced Manual, 2010). Within each component, failure or mismanagement of one element can affect the chain as a whole. Different commodities may contain differing components within the chain. These operations typically involve separate organizations, each accruing some margin, which is inevitably subsidized by the consumer. Even though each operation adds additional cost to the consumer, logistics are coordinated by specialists within in that commodity, allowing for the best quality of fruit to reach consumer outlets.

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3 Objectives

Through a case study on South African citrus we attempt to answer these questions primarily through interviews, based upon theory proposed by new institutional economics (NIE), with local farmers and exporters. With their assistance, we attempt to attain a broader perspective into reasons why some suppliers might find the newly proposed supply chains preferable, and the potential outcomes for the rest of the industry.

The idea of NIE can be traced back to Coase’s analysis of the firm (Coase, 1937). It attempts to explain the institutions of social, political and commercial life through dimensions such as economics, law, organization theory, political science, sociology and anthropology (Klein, 1999). Joskow (1994) explains that before, firms were seen as black boxes that inherited only two dimensions, namely its production functions with some underlying technological attribute that ultimately explained its expansion. Through Williamson’s four levels of social analysis (Williamson, 2000), we are able to allow for greater consideration regarding why firms would consider to engage in vertical integration. These four levels can broadly be classified as social theory, economics of property rights, transaction cost economics, and neoclassical economics.

The third level, transaction cost economics (TCE), plays a fundamental role in explaining and predicting the choice of governance structure. In summary, transaction cost economics

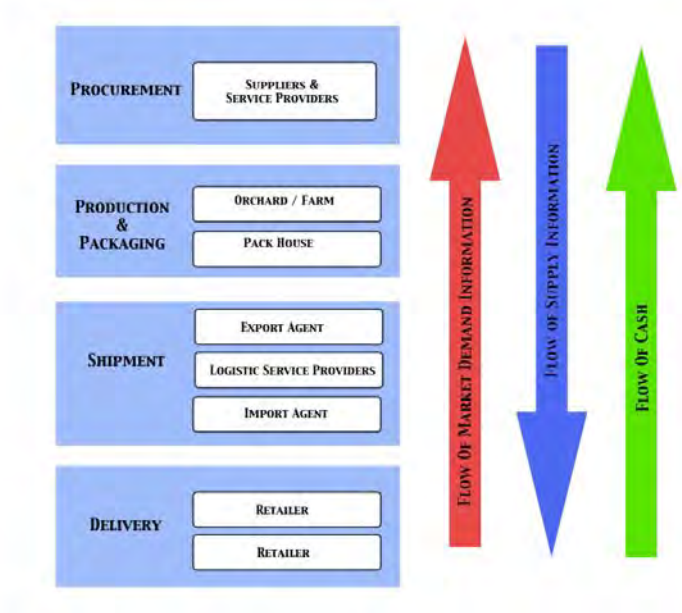
examines trading partners and the measures they use to protect themselves against dangers or vulnerabilities during their relationship (Shelandski and Klein, 1995). TCE is able to recognize potential contractual and asset specificity issues that add to the central idea of market imperfections, and its role in vertical integration. Joskow continues to explain that while internal organizations can assist in better coordination while being less likely to allow potential conflicting interests, it could also result in losing benefits associated with outside sources through repeated contracting. Considering both arguments, Joskow states:

> "The decision whether or not to vertically integrate then becomes a tradeoff between the costs of alternative governance arrangements. Vertical integration is favored when the benefits of mitigating opportunism problems by moving the transaction inside the firm, by reducing ex ante investment and ex post performance inefficiencies, are greater than other sources of static and dynamic inefficiency associated with resource allocation with bureaucratic organization" (1994 p. 22).

With empirical evidence from various authors as support, Laili, Madunic and Mahoney (2007) present a list of propositions wherein vertical integration becomes most likely. Central to this research are the following propositions: 1) There is a high frequency of transacting, 2) There is small number of potential trading partners and 3) There is an interaction of high uncertainty and asset specificity amongst other choices. Attempting to employ the theory set out by NIE, and specifically, TCE, we utilize this framework in constructing our questions for the citrus exporters of South Africa.

4 The Traditional Marketing Channel for SA Fresh Citrus

The traditional channel is typically broken up into four key elements namely procurement, production and packaging, shipment and delivery. This process is represented in the figure below which shows the main players through the chain in relation to money and information flow.



Source: FPEF Advanced Manual, 2010

Figure 1. Citrus supply chain with significant processes and player involvement

4.1 Picking and Packaging

During any transaction, the trade chain will start on the farm where the fruit is grown and harvested. Fruit is produced in almost every province within South Africa; however, the majority is grown in the Western Cape, Eastern Cape, Mpumalanga and Limpopo regions. Due to its variety of climates that range from Mediterranean in the Western Cape to subtropical within Mpumalanga, South Africa is successful in producing fruit on a large scale. The availability of land for farming, well-developed infrastructure, and readily available labor across the country are also key instruments for successful production within the country (FPEF Basic Manual, 2007).

Picking of the fruit occurs when the fruit reaches its optimum or best quality, which is determined based on its taste, texture and appearance. Citrus is classified as a non-climacteric fruit (as opposed to climacteric), as its ripening process ends as the fruit is picked. Typical equipment used during the picking process includes picking bags, baskets, ladders, trimming shears and trailers.

The packaging house is where the fruit is graded, cleaned and packaged ready for export. The flow of activities within the pack house includes a) cooling – typically done soon after the picking, b) pre-sorting – to sort products for local and export markets, c) washing – the first stage in disinfecting the fruit, d) first drying – to prevent fungus growing, e) pre-grading – to remove damaged and poorly colored fruit, f) post-harvest treatments – remaining fresh market goes through a second disinfecting treatment, g) second drying, h) waxing – to protect the fruit from losing moisture, i) third drying, j) grading – fruits are graded as category one, two or three according to their color and blemishes, k) sizing, l) labeling, m) making and sealing cartons, n) packaging and finally, i) stacking on pallets where these pallets are readily available for transportation (FPEF Basic Manual, 2007, pg. 48). Although possibly varying according to the fruit, this process does provide a general overview of what typically occurs during the packing procedure.

4.2 Transportation

Four typical modes of fruit transport include: refrigerated road motor transport (RRMT), trucks with refrigerated containers, non-refrigerated curtain-sided truck, and reefer trains. RRMTs transport individual pallets of fresh produce which have come from pre-cooled pack houses or inland cold stores while non-refrigerated trucks are used for short distances (no more than two hours). Reefer trains typically travel straight to the export port where the refrigerated containers are either stacked to be shipped, or are off-loaded directly onto the ship.

Fruit port terminals allow for a collection point for loading and offloading fruit cargo onto ships. Either privately owned or operated by the government, there are three types of terminals that are used to store fresh fruit on its way to an export market; these include: conventional fresh fruit terminals, container terminals and airport terminals. Conventional fresh fruit terminals handle non-containerized pallets of fruit that are individually stored in a cold store, transported, and loaded onto the refrigerated hold of a cargo-carrying ship. Container terminals store sealed refrigerated containers while a very small percentage of fruit is exported by airfreight (FPEF Basic Manual, 2007).

4.3 Quality and Logistics

Quality controls are initiated throughout each stage of the chain to ensure the food's safety and quality to its destination. The Department of Agriculture (DoA) and the Perishable Products Export Control Board (PPECB) are mostly responsible for developing and assuring a minimum quality standard that is aligned to the standard set by importing countries. Some of these responsibilities for the DoA include: regulating exports, issuing phytosanitary certificates, and setting marking requirements. Some of the PPECB duties involve performing food safety audits, approving export certification, inspecting products, and minimum residue levels sampling (FPEF Basic Manual, 2007).

During the export process, a service provider is responsible for the coordination of logistical procedures. In specific these include: facilitating documentary procedures to allow cargo to leave a port or airport, co-coordinating the payment of costs that need to be made in this process, and communicating information to clients. These documents can be classified into customs, port authorities, agricultural authorities, terminals, shipping lines, and origin documents.

All of these elements allow an exporter to initiate and complete a transaction within the export market. A purchase and sales agreement with a supplier (which could be a producer, pack house or fellow exporter) will be signed under a fixed price or under an agency agreement. Once a loan agreement with a supplier is authorized to assist for preparation of the fruit, an exporter will sign an agreement with a service provider to assist in the transportation of the fruit. These service providers include; for example, trucking companies and shipping lines. The transaction arrangements are complete once an importer agrees upon the terms set out by the exporter.

Source: FPEF Advanced Manual, 2010

Figure 2. A simplistic sequential view of the traditional logistics chain

5 V. Asda/Walmart model for the marketing channel

Retailers have recently become more independent regarding distribution by purchasing goods directly from suppliers, as well as a greater involvement in shipments to distribution centers. Buyers such as Wal-Mart have been shifting their focus from purchasing produce to a smaller number of larger, preferred suppliers. By doing so, these suppliers would be able to understand their specific needs while contributing to the mutually beneficial growth of their relationship (Cook, 2004).

In 2004, a joint venture was initiated by companies Bakkavor and Thames in an attempt to create a unique supply chain model for fresh produce, entitled International Produce Limited (IPL). In an attempt to control more of the supply chain, some recognized benefits included: reduced costs to the consumer, improved shareholder return, and greater sustainability for the growers. The success of this model led to Asda/Wal-mart's buying the right to the model that is currently operated under their franchise name. A direct benefit of their vertically integrated model is the quality control of their produce. Asda quality control presence at each distribution center has added to the success of this channel. This process allows 90% of IPL products to be inspected before shipment where other suppliers would normally have 2% checked. With higher quality produce getting sent out, and lower rejections returned from stores, IPL has offered Asda/Wamart greater control of their produce while removing "traditional" players from the chain (Scott, Lundgren, and Thompson, 2011). Supplying some US, as well as Japanese Wal-mart stores, IPL has been able to use its scale advantage that ultimately has an international level effect (Seth and Randall, 2011).

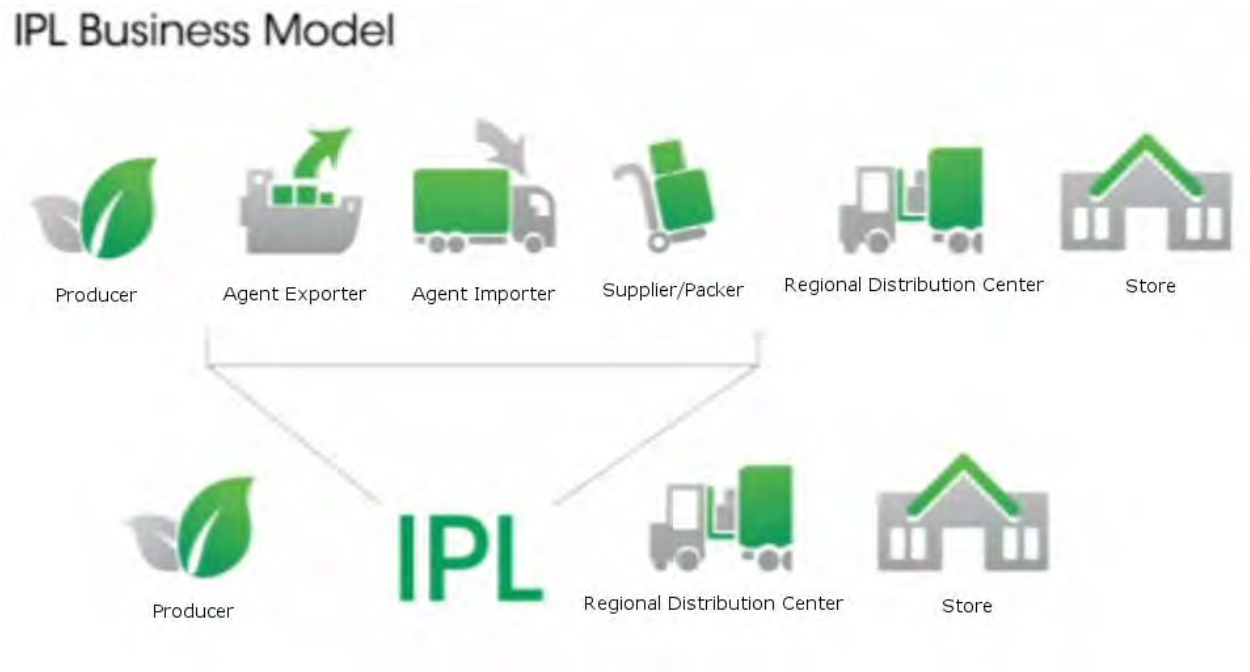


Figure 3. IPL Business Model

Figure 4 displays the cost chain summary of a carton of navel oranges. These oranges were sold on consignment to a European retailer from South Africa in 2008, constituting a traditional transaction. Three scenarios are included for production values of 40, 60, and 80 tons per hectare.

During this transaction, an exporter will speak with a foreign (e.g. France) representative to announce the produce available for delivery. A cost, insurance, and freight (CIF) offer (equivalent to R92.88 in our example) is then made in Euros (Pounds when operating with UK importers, Euros with European and Dollars with United States, Russia, East, and Eastern Europe importers). The dollar freight cost (equivalent to R25.93) is deducted from the CIF to obtain a free on board (FOB) price. The FOB amount is exchanged into Rands where items such as transport, warehouse, credit insurance, and government levies are deducted. The final amount (R53.01), determined at a price-per-carton, and delivered in South African Rands to the farmer. It is from this amount that packaging and on-farm costs will be deducted to obtain a net-farming pre-tax income per carton for the farmer.

During a consignment shipment, the fruit remains the property of the owner until the exporter's overseas agent makes the final sale, and then accounts backwards by means of a sales account. In this traditional channel, the overseas agent would retain an approximate 7% of the final sales price while the local agent would receive 7% of the FOB price.

If operated under IPL, Wal-Mart would obtain the product at the pack house (R53.01) and control it to their stores (R159.25). Retail profit aside, this would allow Wal-Mart to control an additional R58 [pack house price to free on truck (FOT) price] during the transaction. Although they have increased control of the product, there are still required transaction costs; for example, Sea Freight, Port Costs, and so forth. Larger profits should be obtained through increased rebates of shipments, and through the removal of import and exporter commissions. With close to 100 million cartons of citrus exported each year, thus R5800 million[2] at stake, there is understandably a large incentive for Wal-Mart to control more of the chain, and in turn, obtain larger profits from doing so ("South African Citrus Exports", 2011).

[2] Approximately 720 million USD

Cost chain summary of a consignment of navel oranges (15kg carton equivalents) produced inland and exported to a European retailer during week 27 in 2008. Production costs are applied to 3 orchard production situations. 40, 60 and 80/tons/ha

EXCHANGE RATE		FOREIGN	EUROPE WEEK 27
$10.00	Retail Price	€ 12.25	
€13.00	Wholesale Price (FOT)	€ 8.58	
£15.50			

		RAND % OF RETAIL PRICE	BILLING CURRENCY	RAND VALUE
	Retail Selling Price	**100%**	Euro	**159.25**
	Retail Profit / Gross Margin	26.98%	Euro	42.97
	Europe Transport	3.02%		4.81
	Gross Price (FOT)	**70%**		**111.48**
	Less Costs	**11.68%**		**18.60**
	Importer's commission (7% FOT)	3.52%	Euro	5.60
	European logistics	8.16%	Euro	13.00
	Europe duties (16% after mid Oct)	0.00%	Euro	
	Cost Insurance Freight (CIF) value	**58.32%**		**92.88**
	Less Costs 1	**6.28%**		**25.93**
	Sea Freight	15.89%	USD	25.30
	Insurance	0.39%	USD	0.63
	Free on board (FOB) value	**42.04%**		**66.95**
	Less Costs	**6.65%**		**10.39**
	Exporter's commission (SA)	3.36%	ZAR	5.36
	Port cost	3.14%	ZAR	5.00
	Port costs (cargo dues)	0.14%	ZAR	0.23
	Delivered in port (DIP) value	**35.39%**		**56.36**
	Less Costs	**2.11%**		**3.35**
	Transport to port	1.20%	ZAR	1.91
	Finance charges & Interest advances	0.57%	ZAR	0.90
	CGA levies	0.20%	ZAR	032
	PPECB	0.14%	ZAR	0.22
	Ex pack house value	**33.29%**		**53.01**
	Less Costs	**11.34%**		**18.06**
	Packaging materials	6.94%	ZAR	11.08
	Packing Charges (Tipping Cost)	4.38%	ZAR	6.98
Scenario A	**Back to Farm 40 Tons/Ha**	**21.95%**		**34.96**
	Less Costs of Production	**10.06%**		**16.01**
	Fertilizers & other Cost of Sales	9.57%	ZAR	15.24
	On-Farm costs excluding cap & fin. Costs	0.49%	ZAR	0.78
	Net Income %			
	Net Farming pre-tax income per ctn	**11.89%**	ZAR	**18.94**
Scenario B	**Back to Farm 60 Tons/Ha**	**21.95%**		**34.96**
	Less Costs of Production	**7.44%**		**11.85**
	Fertilizers & other Cost of Sales	6.96%	ZAR	11.08
	On-Farm costs excluding cap & fin. Costs	0.49%	ZAR	0.78
	Net Income %			
	Net Farming pre-tax income per ctn	**14.51%**	ZAR	**23.10**
Scenario C	**Back to Farm 80 Tons/Ha**	**21.95%**		**34.96**
	Less Costs of Production	**6.17%**		**9.82**
	Fertilizers & other Cost of Sales	5.98%	ZAR	9.04
	On-Farm costs excluding cap & fin. Costs	0.49%	ZAR	0.78
	Net Income %			
	Net Farming pre-tax income per ctn	**15.78%**	ZAR	**25.14**

Figure 4. Cost Chain Summary-Navel Oranges

6 Advantages of new channel

Interviews were initiated with leading South African citrus exporters. In an attempt to understand the current social structure surrounding the industry, personal interviews were presented with broad questions, allowing for a greater possibility of nonconformity among thoughts and ideas. Based on their responses, the following were seen as possible advantages of the new channel.

Purchasing Power

Wal-Mart is able to improve returns, not only through the elimination of players within the chain, but also through their purchasing power. Large margins are attained through sea freight rebates, especially by means of the long lasting relationship between Wal-Mart and Maersk Shipping Lines. Along with inland transport rates, cold storage costs and forwarding service charges, Wal-Mart is able to provide larger incentives for producers purely though potential rebates.

Security and returns

Farmers are attracted to larger buyers as they provide financial stability, presenting a lower risk for farmers with respect to payments. Farmers are also typically able to receive a firm payment, usually every fortnight, which is often viewed as more desirable than an open-consignment system. Farmers potentially also experience a greater "control over their destiny," in that exporters have a variety of buyers, and a variety of destinations, while this alternative channel provides greater clarity of the product's final destination.

Management and efficiency

In terms of pooling and quality, exporters would typically pack and deliver fruit to bulk vessels where results would be pooled on a per shipment basis. Wal-Mart allows for an effective averaging out of quality of shipments which does not operate under the pooling system.

With effective teams placed around South Africa, Walmart is able to assist in the transactions of commodities while building and sustaining relationships in the market. With disciplined quality controls, programs are well managed— the grower is well informed on reasons for penalization versus allegations that exporters often handle claims very lackadaisically.

Quality arrival

Suppliers will face the possibility of huge discounts if the quality control detects any deviation from the specifications required. In such a case, fixed price deals are then reverted as the contract has been broken. This will result in the importer opting to a consignment deal to achieve the best alternative to the price initially agreed upon.

Supply and Demand

There is typically little coordination between grower-exporters, exporters and suppliers such as Wal-Mart though the traditional channel. This can result in over-supply from the supplier and thus, less than expected returns from their product. As previously mentioned, the direct channel offers more security in this regard as farmers are usually well informed on required specifications.

Frequency of transactions

Category managers for Wal-Mart are based within the head office environment abroad. They are typically rotated as relationships between them and the suppliers are not required. Regional procurement managers from Wal-Mart could be placed within South Africa; however, they are generally not rotated. Doing so would negate the requirement to build a firm relationship with the supplier.

Frequency of transactions and its role in relationships are highly correlated in many instances. It becomes increasingly important to adapt and adhere to local traditions and culture, for instance in China, that allows for successful long-term relationships and increased transactions.

7 Disadvantages of new channel

The disadvantages of the Asda/Walmart model include its inability to account for the inherent uncertainty associated with the production and distribution of perishable products. Weather not only affect yields, but also fruit quality including fruit size. Therefore, if unusually cold weather results in a lack of adequate fruit size, the traditional system would re-allocate fruit across export markets with larger fruit being sold at premium relative to smaller fruit. Under a fixed price system, it is possible that shortages of desired sized fruit would appear.

A second disadvantage deals with the complexity that exists across various fruits. In the traditional system, importers and exporters tend to specialize in particular crops. For example, citrus handlers tend to deal with only citrus. This specialization occurs because there are peculiarities associated with handling citrus fruit including insects and diseases that might be subject to phytosanitary barriers in importing markets. Under the Asda/Walmart model, experts must be available across each type of fruit to deal with pest and disease issues, thereby mitigating economies of scope.

A third issue relates to the smaller retailers and other outlets for fresh fruit including institutional outlets. If the Wal-Mart model is successful, there are only a handful of other retail chains with sufficient size that might consider replicating their own system. That leaves a substantial portion of the remaining fruit that still needs to be packed and shipped, so that a scaled-down version of the present system would likely survive.

A fourth point is that the Wal-Mart approach favors large farms over small and medium-sized enterprises (SMEs). For a small farm to participate in the new chain, it must do so through a cooperative or some other intermediary. This bias towards SME fruit farmers poses equity concerns.

8 Concluding comments

ASDA/Wal-Mart appears to be successfully employing its new strategy not only within the citrus industry of South Africa, but also across the globe and a range of commodities. Without access to proprietary Wal-Mart data, however, it is not possible to measure this success in terms of company performance. Although different commodities possibly require different operations within their respective supply chains, IPL expands its services not only

though out fresh produce, but also into other products including fresh foods, meats, and wines. They are also actively developing trade within Africa as part of their commitment to the UN millennium development goals. Whether benefits from the producers operating under this channel are attained through increased returns of their products, or if they are purely psychological— less uncertainty and greater economic security, this direct channel has proven itself successful during the past few years for both producer and seller.

While Wal-Mart has shown it can operate successfully under the control of its own supply chain, further consideration of smaller retailers incapable of operating under this channel must take place. Under their model, traditional players within the chain are still responsible for the delivery of the fruit to their stores. While the existence of these players becomes less and less significant through Wal-Mart, what are the possible consequences for the future export infrastructure, and its ability to operate with alternate/smaller retailers?

While it seems top producers will continue to operate under some direct channel to large retailers, relationships and transactions between smaller growers, specifically co-ops, and local exporters will become increasingly imperative for the sustainability of, not only the export industry, but also the small-scale farmer. While this paper is more concerned with the social structure and shedding some light onto the possible future direction of the market, we hope to open additional avenues for future research.

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