Business Models of Vegetable Retailers In India

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Abstract. The aim of this paper is to report the finding from the study on business models of vegetable retailers, in both unorganised and organised retailing. Entry of organised retail in India in vegetable marketing has impacted the whole spectrum of supply chain practices. This research is exploratory and includes research instruments like interviews and survey through questionnaire with players in the vegetable supply chain. Organised retail trade has increased the transport of vegetables from cultivation to ultimate consumption. Measuring food miles is a simplistic concept relating to the distance food travels as a measure of its impact on business. This study focuses on the concept of measuring the food miles in the retail vegetable markets of Chennai.

The Indian retail sector is still in its nascent stage. The economic liberalisation policies and globalisation had ignited country's economy for faster growth. The simultaneous act of liberalisation of the Indian economy and globalisation triggered an accelerated industrial growth across the spectrum of all market segments in India. The Indian industrial growth and liberalised economical policy attracted global players to India in every industrial sector (Saxena and Sahay, 2000). Retail industry as a whole is not an exception because it has witnessed advancement into organised trading. Organised retailing refers to marketing activities undertaker by licensed retailers, that is, those who are registered for sales tax, income tax for whose business is corporate, who implement management techniques managed by professionals as a firm or limited company or cooperative. Traditional retailing refers to those who operate in unorganised markets. The evolution of organised retailing had been initiated in a big way by the entry of corporate, both domestic and global.

Retail sector in India is at the crossroads today. A shift between organised and unorganised retail sector is apparent, especially in the vegetable retailing zone. This shift is a call for transfer of consumerism towards organised retailing. The penetration of organised retail in the field of vegetable retailing will face fierce resistance from traditional retailers with their existing strong foothold. This resistance from the traditional vegetable retail cannot be ignored. The most important thing to note is that the traditional retail format supports a larger population and provides direct employments. So there is no way that government or anyone can discount these foundation stones of Indian economy. The role of government and its policy are vital in supporting, improving, and developing traditional vegetable retailers.

Vegetables, fruits, and grocery play a vital role for the existence of people and also a very influencing role in the economy. Though fresh fruit, vegetable, and grocery retail has been considered as a very low-margin business, the market potential has attracted Indian business houses and corporate, driving the forays through different models like single-format, multi-format or integrated urban-rural models (Sengupta, 2008). To attract the global leaders in vegetable retailing, the government allows foreign direct investment in cash-and-carry type business model to the tune of 100 per cent. The joint ventures of domestic Indian companies with the global players are allowed to operate in India. However, the domestic companies have controlling stake in the vegetable and grocery retail. Currently, organised retailers are

anchoring the metropolitan cities and urban markets. In the near future, corporate retailers will concentrate on the rural markets, which have been uncovered and have untapped potential. The traditional retailers are unorganised small shopkeepers, Kirana (mom and pop) stores managed by families or individuals. There are two classifications of their formats—stores and non-stores. Store formats include stores with permanent and semi-permanent building, ranging around 50 square feet or more in size, corner stores, and paper and cigarette shops. Non-stores format covers street vendors, pavement vendors, cart vendors, mobile vendors (head carrying), and vendors at daily or weekly farmers markets.

An exploratory study has been carried out to understand traditional and organised vegetable retailing and its logistical processes. The area of study was limited to the vegetable retailing in the city of Chennai.

Vegetable Retail Scenario

Traditional Indian retailers account for 12 million retail outlets all over India and more than 40 percent of them sell vegetable and grocery (IBEF, 2008). Indian food retail consists of staple commodities comprising grains, pulses, and vegetables. The Indian food retail business, especially vegetable retailing is witnessing a rapid growth in India's organised retail sectors. The traditional retailing of vegetables is not very much organized, amounts to 97% of the total market (Ernst & Young, 2006), is extremely localised and highly fragmented with large number of intermediaries. The intermediaries between the customers and farmers are traditional retailers with different outlet formats-mom and pop shops, non-permanent shops in the market, pavement vendors, roadside vendors and push cart vegetable sellers, wholesale traders, commission agents and auctioneers.

The farmers themselves sell their produces directly to the end consumers in local markets, regulated and unregulated 'farmer markets', or they sell to intermediaries—agents and organised retailers. The market place is usually in close proximity to the farmland and customers accessing the market live in and around locale. Farmers selling vegetables directly to the customer amount to very small fraction by volume. Farmers sell bulk of their produces to agents and auctioneers. The agents buy small quantities of produces from farmers and transfer it to wholesalers directly or through another agent. The auctioneers are people who enter into buying contract with farmers for whole or partial quantity of the produce and sell the produce to an agent or a wholesaler. Auctioneers also transfer the vegetables to wholesalers directly or through another agent. Wholesalers of vegetables sell to retailers—both traditional and organised retailers, and to customers, who buy in large quantity. Cart vendors, a type of traditional retailers, buy vegetables from wholesalers or organised retailers, sell to customers in mobile carts and deliver to customers at customer's doorsteps.

Wholesale market is a vital link in vegetable supply chain. Both the traditional and organised retailers are dependent on wholesale market with different propositions. Chennai, the geographical area of the study has a wholesale market promoted by Chennai Metropolitan Development Authority (CMDA), a regulator of Tamil Nadu state government. The wholesale market in Chennai, Periyar Vegetable Market at "Koyambedu Wholesale Market Complex (KWMC)" spreads over an area of 295 acres. It is located at Koyambedu, the junction of Poonamalee High Road and Nesapakkam Road and can be easily accessed from all parts of

City of Chennai. In Phase-I, the Wholesale Market for Perishables was developed with 3,194 shops (CMDA 2008). It is one of the largest markets in Asia for fruits, flowers and vegetables with about 2,500 wholesale shops and involving 10,000 daily-wage labourers. The market generates about 100 MT of organic wastes per day, which is being dumped into the landfill.

It is necessary to study the vegetables retail marketing of the conventional retailers as well as the modern retailers who made their entry in the recent past in to Indian market.

Food Mileage

When selling vegetables, the vegetables have to reach the users at the minimum possible time, otherwise it becomes waste. The food mileage of vegetables causes considerable impact on the vegetable due to its perishable nature. The term 'Food Miles' or ' Food Kilometres' refers to the distance the food travels from the location where it is grown or processed to the location where it is consumed, or in other words, the distance food travels from farm to plate. Food miles do not refer to the input material, effort, efficiency or energy of the crop yield. Food miles are a way of attempting to measure how far food has travelled to reach consumer. That includes the journey from farm to processor, then from processor to retailer and finally from retailer to consumer. Studies estimate that processed food in the United States travels over 2080 kilometres (1300 miles), and fresh produce travels over 2400 kilometres (1500 miles), before being consumed (Holly Hill, 2008). In UK, 20 percent of food (by weight) moves more than 200 kilometres (Garnett, 2003).

The food mileage impact is realised by players in the vegetable supply chain, from farmers to customers. “Food Mileage” is an indicator that evaluates impact on economic, social and ecological system and it associates the quality food availability, foods wastage and disposal. 'Food miles' is a factor to understand inefficiency of food supply chain. In economical or business perspective, every food mile is costly. The transportation cost is directly propositional to the food miles. Every mile addition in transport is addition in the cost of the goods and the customer pays for it. The more the vegetables travel in miles, the less fresh they become. This means customers pay for vegetables, which have less initial nutritional value. Alternatively, to retain freshness, conditioning is required while transporting. Conditioned transport again adds cost to goods. When the food travels less; the money is reinvested closer to the farm land community and more financial contribution is provided to local economy. “Plant dollar close to home and watch community grow” (Food Routes Network, 2008). Local farmers who sell directly to consumers receive a larger share of the profit for their food. The local family farmers spend their money with local merchants and build a stronger local economy. The social impact of higher mileage food is the food that comes in from abroad. The different food safety standard is more vulnerable to unsafe food. Vegetables with less mileage are fresh, preserve original taste, retain initial ingredients and more palatable. Less food miles create more sense of closeness and trust. Ecologically, 'food mileage' is a convenient indicator of sustainability and sustainable development; wherein less food miles indicate more sustainability. Reducing food miles is reduction of emissions. Shorter distance travel leads to reduced usage of fossil fuels and thus, conservation. Minimum food travel signifies minimum pollution, environmental degradation and global warming.

Vegetables travelled in different routes log different mileages. Effects of the 'Food Mileage' on the players of the vegetable food chain can be traced. The food mileage has been expressed in kilometers; "minimum" mileage is the shortest distance travelled by a vegetable and "market" mileage is the average mileage of the same vegetable. The minimum mileage distance is contributed by very small quantity, which is less than 0.5 % of the daily transactional volume. The food mileage values are for customer's destination at Chennai. The food mileage calculated for the vegetables routed through organised retailing is based on the organised retailer's outlets at Chennai. The food mileage is the Weighted Average Source Distance (WASD) (Pirog and Benjamin, 2003). The formula for the WASD is:

$$WASD = \frac{\sum \{(\text{Vegetable weight in Kg}) \times (\text{Distance travelled in Km})\}}{\sum (\text{Vegetable weight in Kg})}$$

Business leaders have adopted food miles as a model for understanding efficiency in a food supply chain. Ecologists consider food miles as indicators of sustainability and different segments of people and different agencies perceive food miles differently. There is a need felt to study the food mileage for vegetables in India with current infrastructure and market condition. As time taken between any two points was not observed, speed at which vegetable reaches its destination has not been studied. The comparison of different businesses models by efficiency, mode of transport system and infrastructure facilities are beyond the scope of this study. This is the limitation of this study and it provides scope for further future research.

Method

The primary objectives of this study are to outline the underlying logistical supply chain routes of vegetables both for traditional and organised retailers and calculate the food mileage. Hence, there is a need to assess the current status of Indian vegetable market. As the Indian vegetable market is very huge, the study has been carried out to explore the logistical practices of vegetable marketing at Chennai taking into consideration the resource and location constraints the researchers have to satisfy.

This study is an exploratory study. Nine people from organised retail, 27 wholesalers from Periyar vegetable market, 20 commission agents, 52 traditional retailers and 115 customers were interviewed for collecting data. The instruments used were personal interview and questionnaire. The questionnaire consists of open-ended questions and interview is semi-structured. Five vegetables—onion, potato, tomato, egg plant and okra have been selected based on the volume of transaction (rough estimate of Koyambedu Market Vegetables Merchants Association) at Koyambedu Wholesale Market for the study.

Vegetable Retail Models

Distinct and primary routes adopted in the retail vegetable marketing have been revealed by this exploratory study. The study found three business models of vegetable

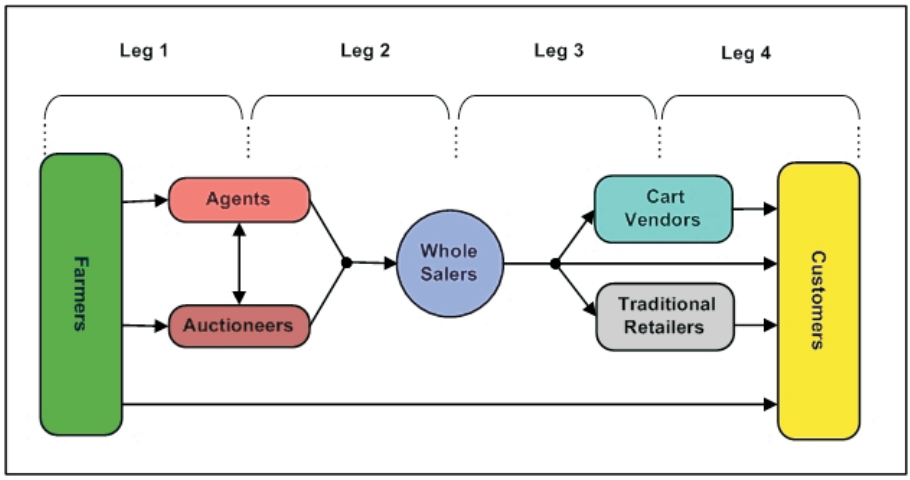
retailing. Traditional retailers follow "Traditional Retail Model"(TRM) and organised retailers implement two different business models—"Hub and Spoke Model" (HSM) and "Value Chain Model" (VCM). "Reliance Fresh" (Reliance Retail Ltd.) strategically deployed value chain model and rest of the organised players in the industry go with Hub and Spoke model with minor modifications to fit in to their marketing and logistical strategies.

Traditional Retail Model

'Traditional Retail Model' is a complex route for the logistical flow of vegetables, which is predominantly followed currently in traditional retail marketing. Figure 1 outlines the logistical route of TRM of vegetable retail marketing. Players involved in this model are agents (commission agents), auctioneers, wholesalers, traditional retailer of all type of formats family run 'mom and pop' stores, roadside shops, pavement shops and cart vendors apart from farmers and customers. Agents, auctioneers, and wholesalers are traders in vegetable marketing. Farmers are the cultivators of produce and source of vegetable supply. They are small by land holding and yield volume of crop and are highly fragmented across geographical areas. In this traditional retail model, farmers sell their produces to customers and to agents intermediately. Agent and auctioneers are first level of middlemen in vegetable supply chain and transfer vegetable from customers to wholesalers. Numbers of transfers of ownership as well as transhipments of vegetable depend upon the number of agents present in between farmers and wholesalers. An agent operates from shops of small space, works for one or more wholesalers and normally deals with a particular range of vegetables. Most of the wholesalers at Periyar Vegetable Market, Koyambedu deal with specific vegetable(s) only and there are very few exceptions in the range of products. Normally wholesalers do not get involved in transportation of vegetables, both inward and outward transportation. The traditional retailers buy vegetables from wholesalers and sell directly to customers. The families-run 'mom and pop' type stores sell staple products including vegetables. Customers constitute small domestic customers who buy vegetables for household consumption from traditional retailers. Hoteliers who buy for commercial consumption procure their vegetables form the wholesale market.

Vegetable logistics in TRM have four phases producers (farmers) to (commission) agents, agents to wholesalers, wholesalers to traditional retailers and traditional retailers to customers. In the first phase, vegetables are transported from farmland to agents. Farmers are responsible to bring the vegetables to agent's premises. In case of contract, the auctioneers take care of the transportation of vegetables from farmland to his premises and transportation is seller's responsibility for the transaction of vegetable between the agents and auctioneers. Agents arrange to pickup vegetables directly form farming locations to deliver at wholesaler's premises for huge volume of produce and cost of transport is on farmers account. The second phase of vegetable movement starts with outward transportation form agents to wholesalers. Agents handle the transportation from agents to wholesalers. During the third phase, Traditional retailers, cart vendors and commercial customers buy vegetables and make their own arrangement for transport from wholesale market to their destinations. The retailers jointly hire a truck to share the transportation cost. Customers and retailers are the player in the fourth phase. Domestic customers shop for their vegetables at traditional retailers stores that are conveniently located closer to their residence and walk down. Vegetables are delivered at door steps of the customers by cart vendors who sell vegetables in push carts, tricycles, and bullock carts.

Figure 1: Traditional Retail Model.



Cane baskets and jute or gunny bags are used in handling vegetables. Loading and unloading are carried out manually. Vegetables are not cleaned and washed of dirt and soil. Sorting, grading and packaging of any kind is being done. No temperature controlled storage or warehousing is used across the TRM route. Information technology and advanced management techniques are not deployed. Movement of vegetables in this Traditional Retail Business Model has four legs. Food Mileage values for the selected vegetables for this study are shown in Table 1.

Table 1: Food Mileage in Traditional Retail Model

Vegetable	Leg 1		Leg 2		Leg 3		Leg 4		Total Mileage (Km)	
	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market
Onion	2	10	40	365	3	30	NA	1	45	406
Potato	NA	NA	600	1500	3	30	NA	1	—	1531
Tomato	2	10	40	120	3	30	NA	1	45	161
Egg Plant	2	15	40	170	3	30	NA	1	45	216
Okra	2	15	40	170	3	30	NA	1	45	216

Source: Calculated from survey data ('NA' – Not applicable, * No Data available)

Leg 1: The first move in vegetable journey starts with the transportation of vegetables from farmland to agent. Farmers are responsible for bringing the vegetables to agent's premises. In case of contract, the auctioneers take care of the transportation of vegetables from farmland to his premises and transportation is seller's responsibility for the transaction of vegetable between the agents and auctioneers. Mode of transports are mini truck, farm tractor, bullock cart, bicycle, tricycle, motorcycle and head carrying.

Leg 2: Mode of transport is unconditioned trucks and for shorter distance farm tractors are used. Agents make arrangement to pickup vegetables directly from farming locations to deliver at wholesaler's premises for huge volume of produce.

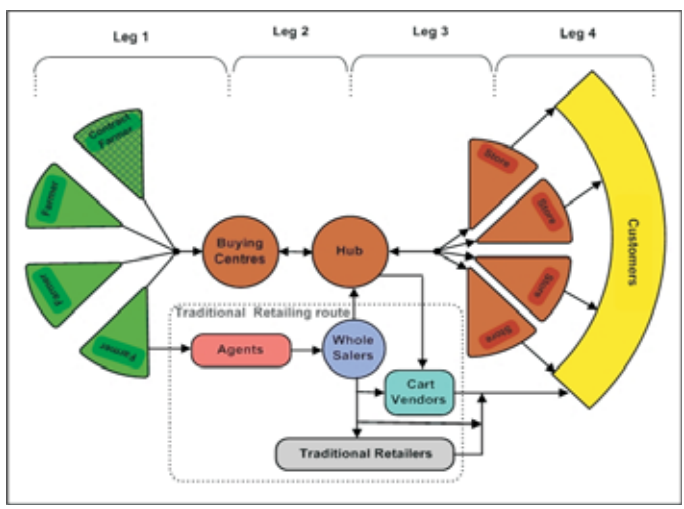
Leg 3: Buyers of wholesalers make their own arrangement for transport from wholesale market to their destinations. The regular modes of transport for them are mini truck, motorcycle, bicycle, tricycle, and push cart.

Leg 4: Domestic customers who reach the vegetable retail shop by walk. The average distance is less than half a kilometre (average distance has been rounded off as 1 kilometre in Table 1).

Hub and Spoke Model

At present, organised retailers including prominent players like Spencer's Retail, More (Trinethra Superretail Ltd.) and Food Bazaar (Pantaloon Retail (India) Ltd) are adopting 'Hub and Spoke' business model of retail vegetables marketing. Figure 2 illustrates the Hub and Spoke business model of retail vegetable marketing. Fewer players are involved in this model compare to the traditional retailing model. Farmers, organised retailers, wholesalers and customers form this chain. Buying centres, hub and stores (retail outlets) are operational units of the organised retailers. Small farmers and contract farmers who executed a trade contract with the organised retailers are the primary source of supply of vegetables to the organised retailers. The buying centres make the vegetable purchases directly from the farmers and transport to the hubs. A hub is served by one or more buying centre and a buying centre serves one or more hubs. Hub infrequently buys small volume of vegetables from the local wholesale market to balance demand supply gap. Hub in turn distributes vegetables to stores attached to it. A store is served by only one hub. Store sells vegetable in retail quantity to the customers.

Figure 2: Hub and Spoke Model.



Vegetables travel in four phases, namely farmers to organised retailer's buying centres, buying centre to hubs, from hub to retail stores and retail outlet to customer. Farmers transport vegetables from farming location to the buying centres. The transport of vegetables in the second phase from buying centres to hub is arranged by buying centre. Mode of transport is unconditioned trucks. Fresh vegetables are transported in the third phase from hub to stores and shelf life-expiring vegetables are returned from stores to hub. The shelf life-expired vegetables

are sold to cart vendor. Customers buy and pick up vegetables from the organised retail stores. The stores offer home delivery for a shorter coverage area and high value of purchases.

Vegetables are handled in stackable plastic crates and corrugated fiberboard boxes. The loading and unloading are carried out manually. Vegetables are cleaned and washed at the hub on arrival. The sorting and grading is done at the hub without packaging. The space available for temperature-controlled storage is very less, but warehousing is used for it. Information technology and advanced management techniques are deployed partially. Connectivity between hub and corporate office is established. Transportation of procured vegetables has four legs and food mileage values for the selected vegetables for this study are shown in Table 2.

Table 2: Food Mileage in Hub and Spoke Model

Vegetable	Leg 1		Leg 2		Leg 3		Leg 4		Total Mileage (Km)	
	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market
Onion	5	15	NA *	520	NA	30	NA	5	NA	570
Potato	5	15	NA	2200	NA	30	NA	5	NA	2250
Tomato	5	15	NA	180	NA	30	NA	5	NA	230
Egg Plant	5	15	NA	350	NA	30	NA	5	NA	400
Okra	5	15	NA	350	NA	30	NA	5	NA	400

Source: Calculated from survey data ('NA' – Not applicable, * No Data available)

Leg 1: Farmers transport vegetables from farming location to the buying centres. Modes of transport are mini truck, farm tractor, bullock cart, bicycle, tricycle, motor cycle and baskets. Buying centres arrange to pick up vegetables in a truck from the farm gates of the contract farmers.

Leg 2: The transport of vegetables from buying centres to hub is arranged by buying centre and mode of transport is unconditioned trucks.

Leg 3: Fresh vegetables are transported from hub to stores and shelf life-expiring vegetables are picked up from stores to hub. Mode of transport is unconditioned small trucks

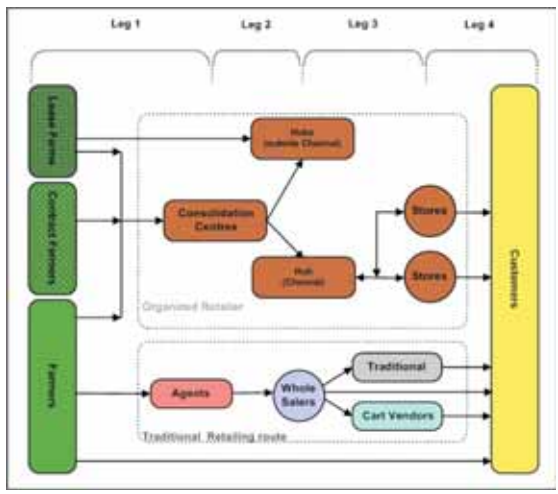
Leg 4: Customers buy and pick up vegetables from the organised retail stores. The modes of transport are motorcycle, car and public transport vehicles.

Value Chain Model

Currently, organised retailer Reliance Fresh (Reliance Retail Ltd) follows a Value Chain business model (VCM). Organised retailers who adopt VCM procure the produces directly from farmers and sell to customers by avoiding intermediaries. This model is based on its core growth strategy of backward integration and progressing towards building an entire value chain starting from the farmers to the end consumers. Very fewer players are involved in this model compared to the traditional retailing model or organised retailer's hub and spoke model. Farmers, organised retailers, and customers are the players who form this value chain. In this practice, farmers, organised retailer's operational units, consolidation centres, hub

(distribution centres) and retail outlets stores, and customers are players. Small farmers, contract farmers and lease farmers are the primary source of supply of vegetables to the organised retailers. Contract farmers and lease farmers are farmers who execute a trade agreement with the organised retailers for sale of vegetables. Figure 3 illustrates the VCM business model of vegetable retailing. Vegetables move from farm locations to customers in four phases farmers to consolidation centres, consolidation centres to hub, hub to retail outlets (stores) and stores to customers. Independent farmers supply their produces to the consolidation centres; contract farmers and lease farmer's produces are picked up by consolidation centres. One consolidation centre supplies vegetables to multiple hubs, depending upon the product. Hubs get direct delivery from the contract farming locations.

Figure 3. Value Chain Model



The hub takes care of supply of vegetables to retail outlets. It has supply coverage to all stores of a specific geographical area. A hub is served by one or more consolidation centres and a consolidation centre serves one or more hubs. A store is served by only one hub. Store sells vegetable in retail quantity to the customers and is the last phase of distribution in VCM business model. The hub disposes off the shelf life-expiring vegetables and do not sell to cart vendors. Value chain business model differs from hub and spoke business model in dependency on wholesale market and supply link between hubs. The hub in the VCM disposed off the shelf life-expired vegetables, but hubs in HSM sell off to the cart vendors.

Stackable plastic crates, pallets and corrugated fiberboard boxes are used in handling vegetables. The loading and unloading are done with semi-automatic platform trolleys and hydraulic stackers. Vegetables are cleaned and washed at the hub on arrival. Preliminary sorting and grading are done at the consolidation center without packaging. The weight sorting and size sorting is done at the hub itself. Wrapping machine and film packing machines are used at the hubs. Every hub has warehouse and space is available for temperature-controlled storage. Implementation of information technology and advanced management techniques are in progress. Connectivity between stores (retail outlets), hub and back offices is established.Vegetable transportation has four legs and food mileage values for the selected vegetables for this study are shown in Table 3.

Table 3: Food Mileage in Value Chain Business Model

Vegetable	Leg 1		Leg 2		Leg 3		Leg 4		Total Mileage (Km)	
	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market	Minimum	Market
Onion	5	15	NA	700	NA	45	NA	5	NA	765
Potato	5	15	NA	2800	NA	45	NA	5	NA	2865
Tomato	5	15	NA	310	NA	45	NA	5	NA	375
Egg Plant	5	15	NA	345	NA	45	NA	5	NA	410
Okra	5	15	NA	300	NA	45	NA	5	NA	365

Source: Calculated from survey data ('NA' – Not applicable, * No Data available)

Leg 1: Farmers transport vegetables from farming location to the consolidation centres. The modes of transports are mini truck, farm tractor, bullock cart, bicycle, tricycle, and motorcycle. Consolidation centres arrange to pick up vegetables in a truck from the farm gates of the contract farmers and lease farmers. Consolidation centres also arrange to pick up vegetables from farmers if the volume is considerably high.

Leg 2: The transport of vegetables from consolidation centres to hub is arranged by consolidation centres and both temperature-conditioned and unconditioned trucks are used. The hubs get direct delivery form the contract farming locations.

Leg 3: Fresh vegetables are transported from hub to stores twice a day and collection stores return shelf life-expiring vegetables to hub for disposal once a day in unconditioned small trucks.

Leg 4: Customers buy and pick up vegetables from the organised retail stores. The stores for a shorter coverage area and high value of purchase provide home delivery.

Conclusion

Presently, different business models of fresh vegetable marketing are tested by the organised retailers and they are rapidly evolving. They are likely to adopt practices that have inherent strength of local values and global practice advantages. Compared to traditional retailers, modern retailers are evidently cutting themselves off from the clutches of middlemen in different ways. This study finds that organised retailers offer significantly higher prices for the vegetables than their traditional counterparts to the farmers and payments is faster or payment is on delivery. This is one of the benefits of selling to organised retailers. Organised retailer's buying centres are closer to the farm locations. Farmers save on travel time to the mandi (traditional wholesale market) and on the hours spent waiting for auctions. They do not have to pay for transport and offloading, which is borne by the retailer. The electronic scales of organised retailers are more reliable than the local mandi's mechanical scales. The middlemen tend to round-off the weights, which organised retailers never do.

In the traditional business model, wholesalers are intermediaries and a predominant link in the retail vegetable logistical chain. In general, all the retailers are inevitably dependent on the local wholesales market. Currently, traditional retailers are protected from the competition

from the global retail leaders either directly or indirectly by the government policy. The expanding retail markets require a parallel expansion of infrastructure and market related technologies at least to match their speed and economies of scale. The survey respondents, especially vegetable retailers presented their feedbacks on constraints, which are having adverse effect on the retail vegetable marketing. The major constraints are poor transport facilities, non-availability of large scale cold storage, no clear policy guidelines from the government, and fragmented and small farmers.

This study being an early work in the area of food mileage of vegetable in Indian context, there is no reference data available related to food mileage. The speed at which vegetable reaches its destination has not been studied as time taken between any two points was not observed. This is the limitation of this study and also scope for any further research. The research study does not find factors related to the food mileage. Measuring food miles is a complex task. The distance food travels has a huge impact on economical, environmental and social issues associated with transportation cost, pollution, energy conservation and nutritional vale of food products. Organised retail trade has resulted in more and more vegetables travelling ever-increasing distances from cultivation to ultimate consumption. There is a paradigm shift from local food system to the global food system. Less food mileage refers to more of local and greater mileage refers to more of global foods in our dietary habits. Of the five vegetables assessed, model wise comparison of mileage is depicted in Table 4. and Figure 4.

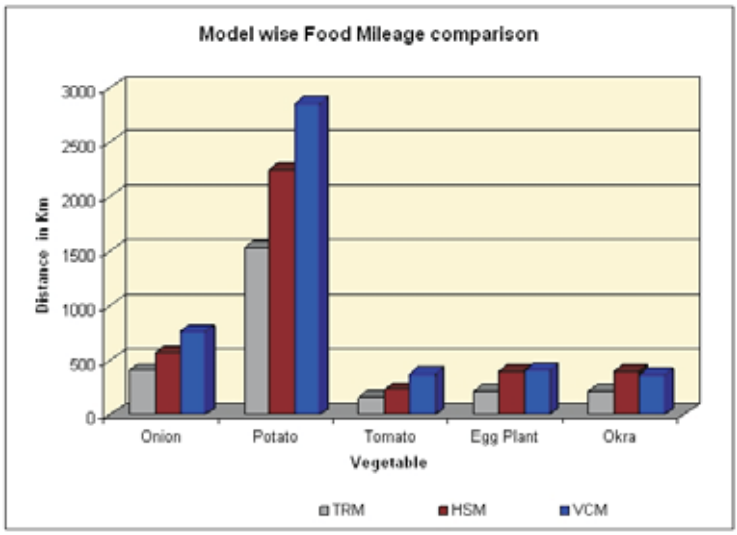
Table 4: Model Wise Food Mileage

Model	Vegetable Mileage in Km				
	Onion	Potato	Tomato	Egg Plant	Okra
Traditional Retail Model	406	1531	161	216	216
Hub and Spock Model	570	2250	230	400	400
Value Chain Model	765	2865	375	410	365

Source: Calculated from survey data

One of the many factors that have contributed to higher 'food miles' for organised retailer is the result of wider sourcing of supplies closer to the vegetable harvest which are located far away from retail hubs. Other reasons for increase in food miles are: greater product availability at the retail outlets, particularly for seasonal items which consumers now want to buy all year round and consumers are exposed to wider range and higher quality vegetables. The strategy of organised retailers is to reduce overall cost than distance travelled. Food mileage is one of the factors along with value density (ratio of product value to weight), utilisation of vehicle capacity, average payload weight to calculate the efficiency and profitability of the business.

Figure 4: Model Wise Food Mileage Comparison



The present trend indicates 'food mileage' is traded off for better utilisation of cheaper manpower available in the rural area where major cultivation of vegetables is located, continued business opportunity to marginal farm owners, persistent job availability to farm workers, indirect job creation for professions associated with transportation and agriculture. Diverse agro-climatic regions, untapped huge rural resources, sharply rising food demand, wide market, growing modern market mechanisms, government's agricultural sector initiatives, expected investments in agribusiness and infrastructure are tilting factors of rural market integrating into global supply chain. A unified market and integration of rural and urban markets pave a way for free movement of goods across the boundaries. Free movement induces longer travel of goods without restrictions. Shorter food mile is an indicator of near sourcing or rural sourcing and longer food mile of vegetables is an indicator of agricultural outsourcing. It should be noted that the study concentrates on only one dimension, “Food Mileage”, which makes us conclude that more food mileage is an indication of agricultural outsourcing.

References

Chennai Metropolitan Development Authority (CMDA). (2008).Retrieved September 9, 2008, from http://www.cmdachennai.gov.in/koyambedu_wholesale_market.html

E.Y. (2006). The Great Indian Retail Story, Ernst & Young's report, April, 2006.

Food Routes Network. (2008). Plant your dollars close to home and watch your community grow. Retrieved June 4, 2007, from http://www.foodroutes.org/whycare3.jsp

Garnett, Tara. (2003). Wise Moves: Exploring the relationship between food, transport and CO2. London: Transport 2000 Trust.

Hill, Holly. (2008). Food Miles: Background and Marketing. Retrieved September 19, 2008, from http://www.attra.ncat.org/attra-pub/PDF/foodmiles.pdf

Indian Brand and Equity Foundation (IBEF), (2008). *Retail Industry, update April-June* Retrieved October 1, 2008 from www.ibef.org

IGD. (2008). Locally produced foods are a key ingredient to making shopping better, Institute of Grocery Distribution, Watford, United Kingdom. Retrieved October 21,2008, from http://supplychainanalysis.igd.com

Pirog, Rich and Benjamin, Andrew. (2003). Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions, Iowa State University.

Saxena, K.B.C., & Sahay, B.S. (2000).Managing IT for world class manufacturing: the Indian scenario. *International Journal of Information Management, 20,* 29-57.

Sengupta, Anirban. (2008). Emergence of modern Indian retail: an historical perspective. *International Journal of Retail & Distribution Management, 36* (9), 2008, 689-700.