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**SUPPLY CHAIN MANAGEMENT OF MANGOES IN ONLINE
GROCERS - A STUDY AT BIGBASKET BENGALURU AND
HYDERABAD**

by
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(2014-31-135)



MAJOR PROJECT REPORT

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Faculty of Agriculture

Kerala Agricultural University



COLLEGE OF CO-OPERATION, BANKING AND MANAGEMENT

VELLANIKKARA, THRISSUR-680656

KERALA, INDIA

2016

Declaration

DECLARATION

I, hereby declare that this project report entitled “**SUPPLY CHAIN MANAGEMENT OF MANGOES IN ONLINE GROCERS - A STUDY AT BIGBASKET BENGALURU AND HYDERABAD**” is a bonafide record of work done by me during the course of project work and that it has not previously formed the basis for the award to me of any degree/diploma, associateship, fellowship or other similar title of any other University or Society.

Vellanikkara
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Certificate

CERTIFICATE

Certified that this project report entitled “**SUPPLY CHAIN MANAGEMENT OF MANGOES IN ONLINE GROCERS - A STUDY AT BIGBASKET BENGALURU AND HYDERABAD**” is a record of project work done independently by Mr. Alampur Dinesh Kumar Reddy under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship, or associateship to him.

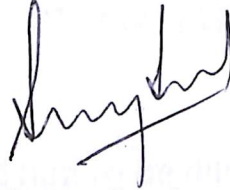
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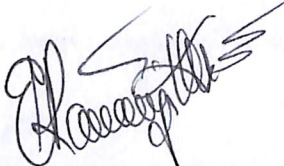
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We, the undersigned members of the advisory committee of Mr. Alampur Dinesh Kumar Reddy, a candidate for the degree of **MBA in Agribusiness Management**, agree that the project work entitled “**SUPPLY CHAIN MANAGEMENT OF MANGOES IN ONLINE GROCERS - A STUDY AT BIGBASKET BENGALURU AND HYDERABAD**” may be submitted by Mr. Alampur Dinesh Kumar Reddy, in partial fulfilment of the requirement for the degree.



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During his internship, we have found him to be diligent and honest in his work and we wish him all the best in all his future endeavours.

For Supermarket Grocery Supplies Pvt. Ltd.



Hari T N
National Head - HR

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Chapter - 1

Design of the Study

Chapter – 1

DESIGN OF THE STUDY

1.1 Introduction

Competition in the 21st century will be across supply chains, not individual companies. A supply chain is a network of facilities and distribution options for the entire network of companies to work together to design, produce, deliver, and service products. Since its inception nearly 10 years ago, the subject area of supply chain management has become hugely important to companies in an increasingly competitive market. Companies focused primarily on manufacturing cost before 70's, quality improvements in 70's, product delivery time in 80's, services in the early 90's, and environmental compatibility in late 90's. Now their efforts extend beyond to optimize the entire supply chain efficiently and intelligently in an information technology based knowledge economy.

The Supply Chain Management is the backbone and a very critical component of Ecommerce. Ecommerce does not just mean trading and shopping on the Internet. It means business efficiency at all operational levels. Supply Chain Management means coordinating, scheduling and controlling procurement, production, inventories and deliveries of products and services to customers. Supply Chain Efficiency means having the right product at the right place at the right time. A significant number of companies in the United States have followed out their Internet platform for Supply Chain Efficiency in the past 2 to 3 years, and the larger of them will fall out in the following few years.

E-commerce of groceries, fresh fruits and vegetables is relatively a new field. Robust Supply chain with minimum intermediaries is the demand of the hour. Food supply chains needed to transfer goods and services from point of production to point of consumption in an efficient and effectual way. Kalidas et al. Says supply chain development not only benefits the private sector, but also creates spin-offs that stimulate social, economic and environmentally sustainable development in the rural regions.

1.2 Statement of the challenge

Big basket has been taking in a fivefold growth in monthly revenues over the final 18 months, supported by supply chain optimization and an increased ratio of private label products. Bigbasket's own brand products currently account for 33 per cent of revenue and are seen to hit 40 per cent by the close of this year. Monthly orders of big basket are around 10,00,000 out of which 3,50,000 orders are from Bengaluru and Hyderabad cities alone. Fresh Fruits and Vegetables forms significant share among the total Gross Merchandising Value.

Mango is a high valued seasonal fruit. In BigBasket on an average per day demand for mangoes is around 2 tonnes in Bangalore and 1.5 tonnes in Hyderabad. At present big basket procuring mangoes through vendors who are mainly commission agents in *Mandi's*. Various challenges faced by BigBasket are Inconsistent Quality, Higher cost of procurement, wastages in the supply chain due to improper Post-Harvest handling, Traceability of product. It was likewise mentioned that some of them are even using calcium carbide as a ripening agent, which is a highly toxic chemical banned long ago. Recent Hyderabad police raids on vendor warehouses proved the role of calcium carbide.

Ace of the missions at BigBasket is to procure directly from farmers and to make farmers realize more share in customers price and to create a Green Supply Chain by reducing overall Food Miles. Mango, being a high value seasonal fruit and highly perishable in nature deserves a robust supply chain.

1.3 Objectives of the study

1. To examine the various mango marketing channels in Ramanagara and Ranga Reddy districts.
2. To design a Green Supply Chain with direct procurement of mangoes from the farmers there by increasing farmers share in customers price and to reduce overall food miles.
3. To implement the designed supply chain, study various constraints and to develop alternate strategies.

1.4 Methodology

1.4.1 Research Design

While addressing the supply chain issues affecting mango as a horticultural commodity, the study adopted 'Farm to Plate' (FTP) approach. The survey centered on various issues involved from harvesting of mango to its marketing and consumption by the families. Various stakeholders in the present supply chain were interviewed. On farm level the field concentrated on the various harvesting practices, recognition of different channels of selling. At the marketing level price spread and the tier of marketing efficiencies in each channel was turned out.

After analysis of marketing efficiencies, a new farmer outsourced supply chain was designed by doing away with all possible intermediaries. Supply chain design was based on Model, Analyze and Optimize approach. The supply chain was implemented and the efficiency of new supply chain was analyzed in terms of merchandise flow, funds flow, information flow and total food miles. Besides a small online customer survey was undertaken in Bangalore and Hyderabad cities to examine the perceptual experience of clients regarding the mangoes delivered through the designing supply chain. SWOC analysis also performed to identify various strengths, weakness, opportunities and challenges of the designed supply chain.

1.4.2 Study Areas and Location Strategy

The study was conducted in Ramanagara district of Karnataka and Ranga Reddy district of Telangana.

Ramanagara district is one of the major mango growing belt near to Bangalore city. In Ramanagara Karnataka alphonso, also known as Badami, is cultivated extensively. Whereas Ranga Reddy district is not a major mango growing belt in Telangana, but it is closer to Hyderabad and can cater the Banginapalli mangoes demand of the Hyderabad Big Basket.

1.4.3 Sample Design

Data was collected from a sample of 120 various stakeholders involved in the mango supply chain. Table 1.1 gives the details of the sampling design

Table 1.1: Sampling design

Stakeholders	Sample size		Sampling technique
	Ramanagara	Ranga Reddy	
Farmer	30	30	Simple Random
Commission agents	5	5	Purposive
Pre-harvest contractors	5	5	Purposive
Customers	20	20	Simple Random
Total	60	60	
	120		

1.4.4 Data Collection Methods**Primary Data**

Primary data from farmers, pre harvest contractors, commission agents and vendors were collected through personal interview. Data from upcountry retailers in Delhi and Mumbai was collected through phone. Customer survey in Bangalore and Hyderabad was done through google forms.

Secondary Data

Secondary data was collected from journals, magazines, e-journals, internet articles, various statistical sites and from other relevant publications.

1.4.5 Data Analysis

Appropriate data analysis tools like simple percentages and tabular analysis were used, keeping in view the suitability of their use in analyzing the data collected.

1.4.6 Time Period

The time period of the project was two months i.e., 20th march to 20th may. First month of the project was based in Bangalore and second month was in Hyderabad.

1.5 Key observations made

1. Various mango marketing channels
2. Role of intermediaries
3. Price spread
4. Marketing efficiency of various channels
5. Efficiency of designed supply chain
6. Product flow
7. Funds flow
8. Information flow
9. Indenting
10. Food miles
11. Customer attitude

1.6 Scope of the study

This study exclusively deals with the supply chain of fresh mangoes in Bigbasket. The supply chain was designed based on the resource availability in BigBasket. Hence cannot be generalized to any other company.

Generally, mango arrivals and prices vary considerably across different markets, even within a given district. Therefore, the findings of the study cannot be generalized across the States and places.

1.7 Limitations of the study

Lack of reliable information from the middle men involved in the supply chain may be the limitation of the subject. Time is one of the major constraint on the project due to which the sample number was cut down.

1.8 Organisation of the Study

The study report was divided into seven chapters. The first chapter introduced the problem, purpose of this study, the method of data collection and sampling method. The second chapter literature review provided concepts that facilitate to design a supply chain. The third chapter industry profile gives a brief prospect of e-commerce industry. Chapter 4 is about the company profile of Bigbasket. It gives details regarding various operations in the company. The fifth chapter is a commodity overview of mango fruit. In sixth chapter data analysis was executed and a supply chain was designed. The last part of the report concluded the findings and recommendations were given.

1.9 Operational definitions of variables

Banginapalli mango:

Banginapalli or Alampur Benishaan mangoes are originated in a village named Banaganpalle 70 km from Kurnool town from where it derives its name. It is large sized fruit with mostly fibreless firm flesh and a relatively small nut. Usually weighs around 300-500 gm but big ones can grow up to 2kg fruits. This fruit, mostly comes from several places of Andhra Pradesh.

Karnataka Alphonso:

Alphonso One of the most popular in India, it is principally produced in Maharashtra and to some extent in parts of south Gujarat and Karnataka. In Karnataka it is also called as Badami. Fruit is medium in size, ovate oblique in shape, orange yellow in colour. Its fruits are medium sized (250g), with attractive blush towards the basal.

Up country traders (UCT):

These are traders from neighboring states and mostly from northern states. Traders from Bangalore, Chennai, Mumbai, New Delhi, Kolkata, Nagpur, Jaipur, Ahmedabad and Hyderabad participate in mango trading. Unlike the PHCs, the UCTs do not take on maintenance of the farm.

Pre harvest contractors (PHC):

The mango orchard owner leases out his orchard as per contract to the PHCs. Both the parties agree to abide by the terms and conditions stipulated at the time of agreement. These contractors also take up the works of required input applications to the leased in orchards, including plant protection to obtain an optimum fruit production. PHCs, after harvesting mango, sell it in the open market.

Indenting:

Indent means order for fruits placed to a farmer under specified conditions of sale, the acceptance of this by farmer constitutes contract of sale.

Benchmarking:

Price of the mangoes are fixed through price benchmarking. Price benchmarking is typically utilized when a company has a competitor-based pricing strategy.

Food miles:

Food miles is a term which refers to the distance fruit is transported from the time of its production until it touches the consumer. Food miles are one of the ingredients utilized for evaluating the environmental impact of food, including the impact on global heating.

Chapter - 2

Review of Literature

Chapter – 2

REVIEW OF LITERATURE

2.1 Supply Chain

The supply chain conception started in the 1980s and it has evolved into a very important business concept. Smart (2008) explains that over this time supply chain has been transformed from primarily an operational activity focusing on distribution to a strategic concept which spans functions and crosses inter organizational boundaries.

Pires (2009) defines “supply chain” as a network of independent or semi-independent companies responsible for obtaining, producing and delivering a determined product or service to the end customer. Slack et al. (2010) affirms that no network exists independently; all operations are part of a larger network, interconnected with other operations. A network consists of a set of relationships between customers and suppliers.

Laudon and Laudon (2011) explain that the supply chain is a network of organizations and business processes to select raw materials to transform them into intermediate and finished products and distribute the finished products to customers. The supply chain connects suppliers, industrial plants, distribution centers, means of transportation, retail stores, and information by means of processes such as selection of raw materials, inventory control, distribution and delivery, for the purpose of providing products and services from the source up to the point of consumption.

The definition of supply chain and its components is the first step toward understanding its importance. Many authors have contributed with ideas and definitions on the subject, using a wide range of terms, such as supply chains, organizational networks, and supply networks (Chopra; Meindl, 2012).

2.2 Supply Chain Management

Supply chain management involves a lot more than just operations since it affects other aspects, such as performance, speed and reliability of deliveries, the quality of the products, and, finally, the flexibility with which the network can adapt (Corrêa, 2010). Thus, supply chain management covers all activities related to the flow and transformation of goods from the raw material stage up to the end user, as well as the respective flows of information. So, involves

integration of these activities through establishment of improved relationships in the supply chain for the purpose of gaining a sustainable competitive advantage. Integration of all activities in the supply chain allows companies to gain sustainable competitive advantages, advantages which may be produced and maintained (Handfield; Nichols, 2002).

Furthermore, supply chain management is management of upstream and downstream relationships with suppliers and customers in order to deliver superior value at the lowest cost for the entire supply chain (Christopher, 2011). According to Ballou (2003), the mission of supply chain management is placing the right products or services in the right time, at the right place, in the desired condition, thus allowing a higher contribution to the company.

2.3 Supply Chain Strategies

Throughout the 20th Century, companies implemented different production strategies, such as agile, responsive, flexible and lean manufacturing (Godinho Filho, 2004). This has meant that, over the last few years, many authors, such as Christopher (2000; 2011) have studied different types of management strategies for these networks, proposing that they are directly related to manufacturing paradigms.

The strategies of supply chains depend on the types of products and services that are traded, and also on their supply and demand conditions. Fisher (1997), creator of the concept of functional and innovative products, says that supply chains suffer from the excess of some products and lack of others, through the inability to forecast demand, and that an effective supply chain strategy goes beyond just considering the nature of demand for company products, but must consider many other aspects, such as the life cycle of the product, predictability of demand, variety of products, standardization of the market in relation to delivery and service time.

Fisher (1997) classify products, based on standards of demand, in two categories:

Functional products: these are products which satisfy basic needs of the consumer and which do not change much over time, having stable and predictable levels of demand and long life cycles. This stability generates competition, which in turn leads to low profit margins.

Innovative products: these are the products which, through innovation and technology, become popular at certain times and generate, for the consumer, an additional attraction to buy these

products. This leads to an increase in profit margins. However, the demand for these products is unpredictable, the life cycle is short (only a few months) and they suffer from imitations from other companies, which reduce or even eliminate the original competitive edge, making the company live in cycles of innovations.

It is necessary to establish if products are functional or innovative, even though this may be done by managers based on the products with unstable and stable demand.

Table 2.1 – Functional versus innovative products

Features	Functional	Innovative
Aspects of demand	Predictable	Unpredictable
Product life cycle	More than 2 years	3 months to 1 year
Contribution margin	5% to 20%	20% to 60%
Product variety	Low (10 to 20 variants per category)	High (often millions of variants per category)
Average margin of error in the forecast	10%	40% to 100%
Average stock out rate	1% to 2%	10% to 40%
Average forced end-of-season markdown as percentage of full price	0%	10% to 25%
Lead time required for made-to-order products	6 months to 1 year	1 day to 2 weeks

Source: Adapt of Fisher 1997

Fisher (1997) says that companies must be sure determine whether their products are functional or innovative to be sure the right approach about supply chain strategy. In his vision we are able to apply two types of strategy: Efficient Supply Chain Strategy and Responsive Supply Chain Strategy.

Christopher and Towil (2000), Pires (2009) classify supply chain strategy in Lean Supply Chain and Agile Supply Chain. They made a comparison of attributes between Lean and Agile Supply Chain (Table 2.2).

Table 2.2 – Comparison of lean supply chain and agile supply chain

Distinguishing Attributes	Lean Supply Chain	Agile Supply Chain
Typical Products	Commodities	Fashion Goods ...
Marketplace Demands	Predictable	Volatile
Product Variety	Low	High
Product Life Cycle	Long	Short
Customer Drives	Cost	Availability
Profit Margin	Low	High
Dominant Costs	Physical Costs	Marketability Costs
Stock out Penalties	Long Term Contractual	Immediate And Volatile
Purchasing Police	Buy Goods	Assign Capacity
Information Enrichment	Highly Desirable	Obligatory
Forecasting Mechanism	Algorithmic	Consultative

Source: Adapt Christopher and Towil (2000)

Lee (2002) connected this study in a matrix that consider supply and demand uncertainties related to supply chain strategies and also to types of products. Subsequently, authors such as Corrêa (2010) lent great prominence to this contribution.

According to the model proposed by Lee (2002), supply chains are divided up into four types: lean or efficient supply chains; responsive supply chains; supply chains with minimum or flexible risk, treated as flexible supply chains; and agile supply chains.

Table 2.3: Uncertainties and Supply Chains Strategies.

		Demand Uncertainty	
		Low (Functional Products)	High (Innovative Products)
Supply Uncertainty	Low (Stable Process)	Grocery, basic apparel, food, oil and gas (Efficient or Lean Supply Chains)	Fashion apparel, computers, pop music (Responsive Supply Chains) ...
	High (Evolving Process)	Hydro-electric power, some food produce (Risk-Hedging or Flexible Supply Chains)	Telecom, high-end computers, semiconductors (Agile Supply Chains)

Source: Adapt Lee (2002)

2.4 Agricultural Supply Chain Management

Agricultural Supply Chain are complex decision making systems comprising network of organizations carrying processes and activities from production to distribution bringing agricultural / horticultural products from farm to the table (Aramyan et al., 2007). Increased competitiveness and frequent changes in customer requirements are creating pressure on Agricultural Supply Chain thus altering the production and distribution activities of the chain (Barnard et al., 2012), necessitating the application of Supply Chain Management (SCM) concept in Agriculture.

It is the supply chain through which all the products reach the consumer but there exists a poor interaction, commitment, and efficiency in delivering the final product. Intermediaries in Agricultural Supply Chain add to the wastages and increase the per unit consumption price (De Boer and Pandey, 1997). There is an absence of an integrated transportation and information infrastructure, demand forecasting, improper inventory management, improper product handling

by farmers (Reddy et al., 2009), improper production planning, poor buyer- supplier relationship and e-commerce resulting in fragmented approach in supply chain (Jharkharia and Shukla , 2010).

To overcome these challenges, there is a need for an appropriate intervention with well-defined objectives at various stages of ASC. By bringing in transparency, accountability, proper harvest scheduling, inclusion of real consumer demand at the planning stage could help solve agricultural issues.

Ayers (2010) integrated PM knowledge areas with Supply,Chain Management (SCM) knowledge and practice areas for directing change company-wide, where supply chain improvements could be achieved through the PM knowledge areas. Quality management influenced the food quality and performance. It was claimed that the Communication Management influenced the flexibility of supply chains (Rao, 2007) which aids the collaboration (Gunasekaran, 2006) among the players and thus the responsiveness of the chain (Bahinipati, 2014).

Buyer-supplier collaboration was emphasized for fruits and vegetables supply chains for successful procurement (Bahinipati, 2014). Collaborative procurement influenced quality, operational effectiveness and thus the performance of the supply chain. The food and grocery segment of Indian retail has a low maturity in supplier integration processes (Retail Operations Benchmarking and Excellence Survey, 2015).

Jabir Ali and Sushil Kumar (2011) presented the paper on “understanding the contractual agreements in the mango value chain” identifies factors affecting the design and management of contract arrangements in mango value chain using data from survey of 83 contractors involved in mango production and marketing in Uttar Pradesh, India. Contract partner’s responses on various aspects of contractual arrangements such as contract structure and negotiation process were recorded with the help of a structured questionnaire administered personally.

2.5 E-Commerce

The Internet has allowed customers to price and choose the most diverse services and products around the world, instantly. E-commerce and global competition has made companies think strategically about their processes in order to manage relationships with customers and suppliers. Customers can use the web to make prices comparisons and check sales conditions, and

suppliers can easily be exchanged (Laudon; Laudon, 2011). However, the most important part of the process is physical distribution.

Nowadays e-commerce has the potential to revolutionize the way a business is run (Sharifi et al., 2012). In fact, e-commerce has evolved in the last few years into a wide range of relationships known as e-business, making it possible to increase the speed of the order cycles. As a result, customers can do business more easily than ever, particularly when a mix of price, quality, and speed of response represents an important requirement. ...

Customers want assurances that their products will arrive safely and on time. Thus, to enter in this electronic market it is necessary to analyze supply chain management in a more detailed manner, to understand how products, information and funds are transferred.

Companies have had to make an appraisal and establish a position within their supply chains, including their product and service flows within these chains for the purpose of meeting all the requirements of their customers. Many researchers are studying the challenges of supply chain management in the business environment (Chopra; Meindl, 2012).

2.6 E-Commerce in Indian FMCG

In a study across different product categories in FMCGs, Siji (2015) found that there is a difference in sales proneness, prestige sensitivity, value consciousness and purchase decision involvement. But it was not the different for variables like price consciousness, coupon proneness, and loyalty to local retailers across various product categories. According to the study, the consumer is more value consciousness with respect to personal care products and cosmetics, and can pay a higher price if feels getting more value. The cosmetics category is influenced by price quality schema more than the household fabric and the personal care products.

Banerjee and Shivani (2015) found that the modern organized retail outlets like MTR outlets had increased the consumption expenditure of customers towards grocery. With respect to apparel, it was found that high value retrieving was being done from organized outlets. The author also mentioned that FDI in multi brand retail will bring in supply chain efficiencies and benefit the existing players in grocery and apparels.

Zaini et al. (2011) highlighted the three main factors impacting online buying of grocery, that is, convenience, time available, and cost & charges. The results of their study showed differences in the perception and preferences towards online grocery buying among the three ethnic groups of Malaysia. The authors recommended how the online grocery retailers can grow their business. The recommendations were to spend time, build brand equity, and repeat purchases and also, enter into alliances with the regular supermarket retailers.

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Chapter – 3
E-Commerce - Industry Profile

Chapter - 3

E-COMMERCE - INDUSTRY PROFILE

3.1 Introduction

E-commerce or electronic commerce, deals with the buying and selling of goods and services, or the transmitting of funds or data, over an electronic platform, mainly the internet. These business transactions are categorized into either business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), consumer-to-business (C2B) or the recently evolved business-to-business-to-consumer (B2B2C). E-commerce processes are conducted using applications, such as email, fax, online catalogues and shopping carts, electronic data interchange (EDI), file transfer protocol and web services and e-newsletters to subscribers. E-travel is the most popular form of e-commerce, followed by eTail which essentially means selling of retail goods on the internet conducted by the B2C category.

The rapid emergence of e-commerce is radically transforming the business landscape. Start-up firms are capturing new opportunities in the electronic market place through existing or innovative business models. Established firms are racing to transform and adapt their old business models to the new environment.

3.2 E-Commerce business models

Based on the type of relationship between different sides of a transaction, a transaction can be categorized in different types. There exist different transaction schemes that are forked from different types of e-commerce. Some of the more popular ones have been given below;

A. Business-to-Consumer (B2C) - Business-to-consumer describes activities of businesses serving end consumers with products and/or services.

E.g., Makemytrip, Paytm (One97), Bigbasket

B. Consumer-to-Consumer (C2C) - Consumer-to-consumer electronic commerce involves electronically facilitated transactions between consumers usually through some third party.

E.g., eBay

C. Business-to-Business (B2B) - Business-to-business (B2B) describes commerce transactions between businesses, such as between a manufacturer and a wholesaler, or between a wholesaler and a retailer.

E.g., Snapdeal

D. Consumer-to-Business (C2B) - Consumer-to-business (C2B) is an electronic commerce business model in which consumers (individuals) offer products and services to companies and the companies pay them.

E.g., Roundone (Referral)

3.3 E-commerce revenue models

The revenue model is a key component of the business model. It primarily identifies what product or service will be created in order to generate revenues and the ways in which the product or service will be sold. Since there are possibilities of multiple variations, many companies do not use one single revenue model. Some of the commonly used models have been enumerated below;

A. Advertising revenue model

The advertising revenue model is based on contacts (Cost per Click) making it one of the indirect sources of revenue.

E.g., Google, Facebook

B. Subscription revenue model

Users are charged a periodic (daily, monthly or annual) fee to subscribe to a service.

E.g., e-journals, Media.

C. Transaction fee revenue model

A company receives commissions based on volume for enabling or executing transactions. The revenue is generated through transaction fees by the customer paying a fee for a transaction to the operator of a platform.

E.g., Snapdeal, eBay

D. Sales revenue model

Wholesalers and retailers of goods and services sell their products online. In terms of online sales there are different models such as market places as common entry points for various products from multiple vendors.

E.g., Flipkart, Urbanladder, BigBasket

3.4 E-commerce world scenario

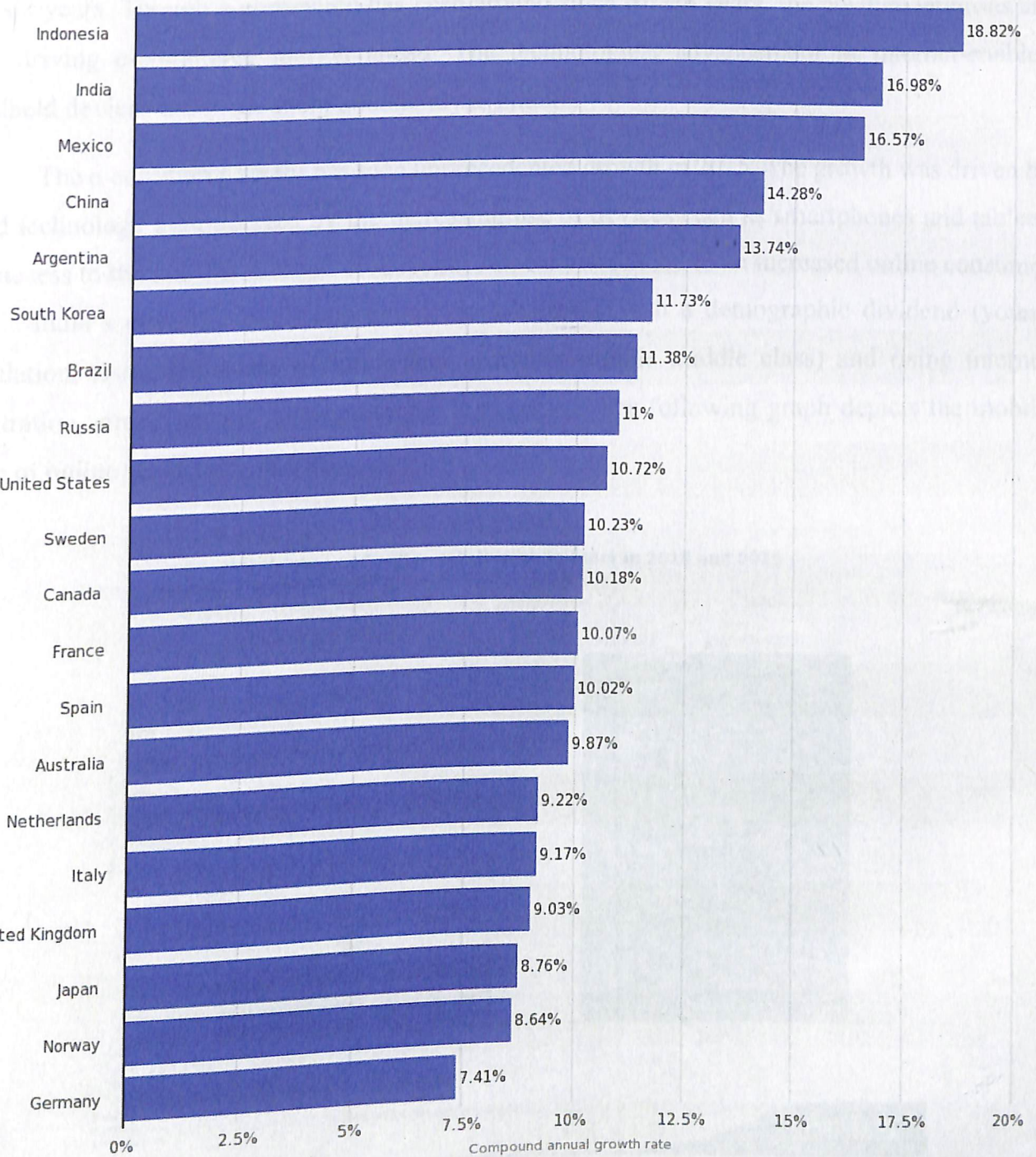
The past year brought a continuation of the impressive growth of retail e-commerce around the world. Sales increased more than 20 percent worldwide in 2015 to almost \$840 billion, as online retailers continued expanding to new geographies and physical retailers entered new markets through e-commerce. The biggest expression of this growth was in the stock markets, which gave e-commerce companies high valuations. This was highlighted by Alibaba's record-setting \$25 billion initial public offering in September, which valued the China-based company at about \$170 billion.

A worldwide study regarding shopping behavior shows that as of 2015, some of the most popular product categories to be shopped online are electronics, fashion and apparel or home appliances. Regional differences exist, as groceries for example are bought online by 90 percent of Chinese internet users, but only 26 percent of Americans, while sports and outdoor purchases are more popular in Germany than Japan.

3.4.1 Retail e-commerce worldwide sales forecast

Retail e-commerce sales compound annual growth rate from 2016 to 2020 in selected countries. According to Statista calculations, Indonesia will rank first in terms of e-retail development with a growth rate of 18.82 in the projected period. India is ranked second with a retail e-commerce CAGR of 16.98 percent, followed by Mexico and China. The figures are depicted in following graph.

Retail e-commerce sales CAGR forecast in selected countries from 2016 to 2020



Additional Information:
Worldwide, Statista, 2015

statista

1: Graph Showing Retail E-Commerce CAGR

Source: Statista (Digital Market Outlook)

3.5 E-commerce Indian scenario

The e-commerce market in India has enjoyed robust growth of almost 55 per cent for the last six years. Though e-commerce has been around since fifteen years, the positive environs are now driving e-commerce market ahead. The technological advancement in Internet-enabled handheld devices has made them abundantly available.

The e-commerce sector has seen unprecedented growth in 2015. The growth was driven by rapid technology adoption led by the increasing use of devices such as smartphones and tablets, and access to the internet through broadband, 3G, etc., which led to an increased online consumer base. India's overall e-retail opportunity is substantial with a demographic dividend (young population, rising standards of living and upwardly mobile middle class) and rising internet penetration, strong growth in e-commerce is expected. The following graph depicts the mobile share of online retail sales in India.

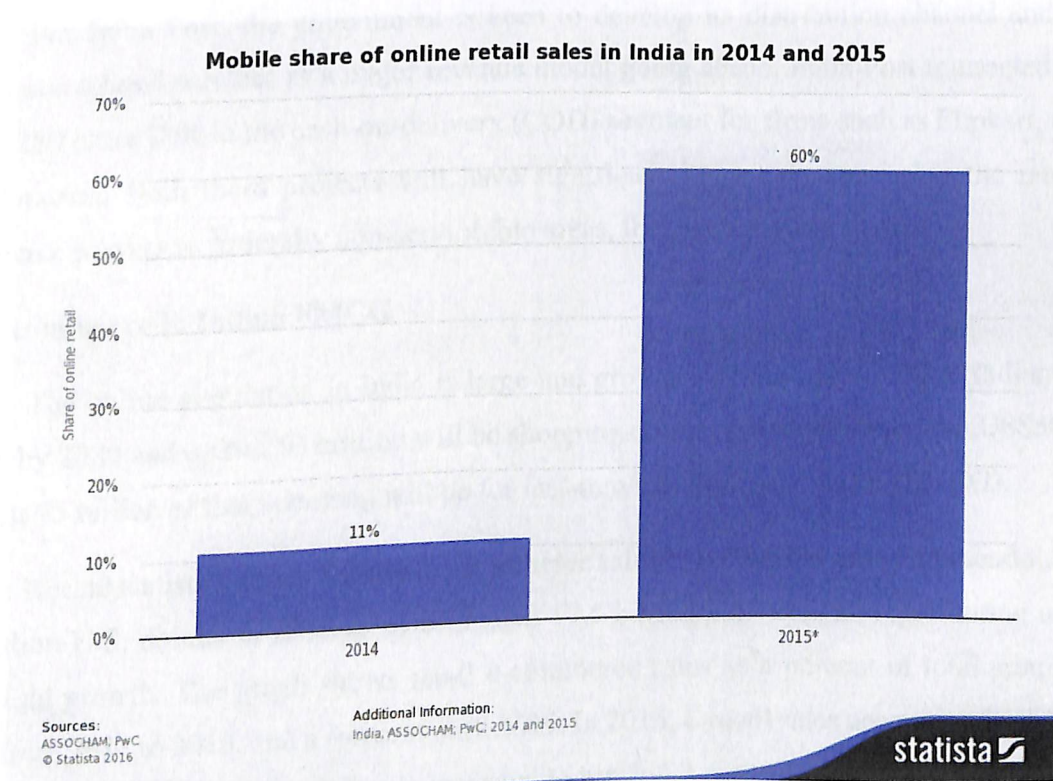


Fig 3.2: Graph representing mobile share of online retail sales

Source: Statista

In terms of highlights, the growth shown by homegrown players such as Flipkart and Snapdeal and the huge investor interest around these companies displayed the immense potential of the market. With the entry of e-commerce giants such as Amazon and Alibaba, the competition is further intensified. Both these international players came with huge investments and the strategies to drive the Indian e-commerce market. Competition is expected to continue, with these e-commerce companies experimenting with different ways to attract customers and increase online traffic.

The Indian government's ambitious Digital India project and the modernisation of India Post will also affect the e-commerce sector. The Digital India project aims to offer a one-stop shop for government services that will have the mobile phone as the backbone of its delivery mechanism. The programme will give a strong boost to the e-commerce market as bringing the internet and broadband to remote corners of the country will give rise to an increase in trade and efficient warehousing and will also present a huge market for goods to be sold.

For India Post, the government is keen to develop its distribution channel and other e-commerce related services as a major revenue model going ahead. India Post transacted business worth 280 crore INR in the cash-on-delivery (COD) segment for firms such as Flipkart, Snapdeal and Amazon. Both these projects will have significant impact on increasing the reach of e-commerce players to generally non-serviceable areas, thereby boosting growth.

3.6 E-commerce in Indian FMCG

The online population in India is large and growing rapidly: 650 million Indians will be online by 2020 and up to 250 million will be shopping online, spending more than US\$50 billion. At least \$5 billion of that spending will be for fast-moving consumer goods (FMCG).

Recent statistics show that retail e-commerce sales in India have grown tremendously, from 2.3 billion U.S. dollars in 2012 to an estimated 17.5 billion U.S. dollars, representing an almost eight-fold growth. The graph shows retail e-commerce sales as a percent of total retail sales in India from 2014 to 2015, and a forecast until 2019. In 2015, e-retail sales accounted for 1.7 percent of all retail sales in India, this figure is expected to reach 4.4 percent in 2019.

The implications for FMCG e-commerce are greater, with online sales of FMCG set to grow at a faster pace, reaching \$5 billion by 2020 under conservative estimates. Digitally

influenced FMCG sales, in turn, could be as high as \$35 billion, based on a forecasted \$100 billion FMCG total market size.

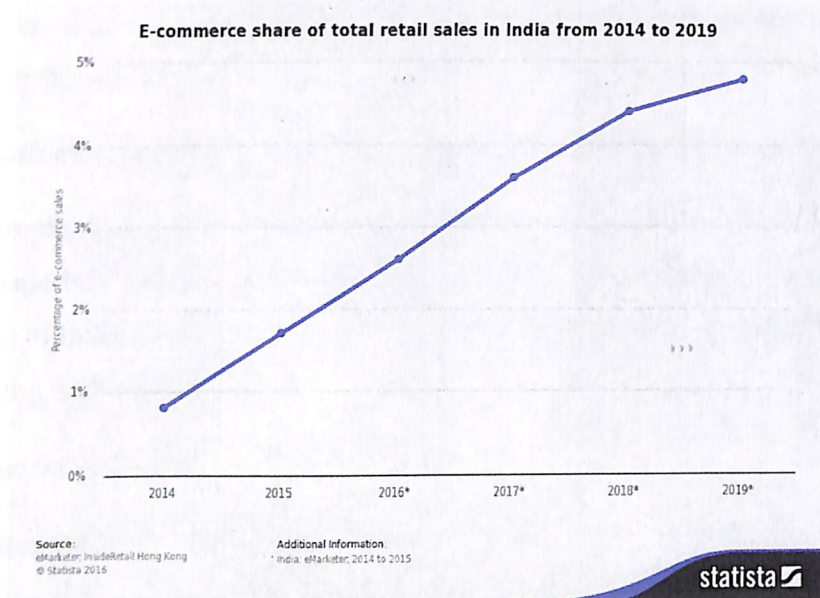


Fig 3.3: Graph representing the growth of retail in e-commerce

Source: Statista eMarketer

3.6.1 FMCG e-commerce business models

FMCG e-commerce in India is witnessing the emergence of four online retail business models:

A. Pure online generalists:

Such as Flipkart, Snapdeal and Amazon are leading the charge with their multi category models. Flipkart has captured a substantial portion of the e-commerce market through its unique services and delivery and payment options.

B. Pure-play online-only companies:

Focused on groceries, such as BigBasket and AaramShop, are competing by offering consumers a wider assortment of grocery products than normal—from imported merchandise, such as gourmet cheeses, to locally sourced spices. In addition, they offer consistent quality, such as cleaned, cut and packed vegetables; and convenience, including shopping lists and guaranteed delivery with fixed time slots.

C. Traditional brick-and-mortar retailers:

That have developed an e-commerce portal, including Big Bazaar Direct and Nature's Basket. However, these are still in the early stages and traditional retailers have just begun experimenting with such omnichannel business models for enhancing their competitive edge.

D. FMCG brands that have launched e-commerce sites to sell directly to consumers:

For example, Indian ethnic-drinks brand Paper Boat, from Hector Beverages, has an online shop at shoppaperboat.com to make its products more accessible to consumers. Similarly, Aashirvaad, one of India's leading brands of food and kitchen staples, has launched an e-commerce portal at shopping.aashirvaad.com.

3.6.2 Main barriers of FMCG e-commerce in India:

A. Economic and logistical challenges:

Economics and logistics are important challenges for FMCG companies wishing to move into e-commerce. As a result, these companies have found it difficult to meet consumers' top-up demands and to cost-effectively trial personal-care products. In addition, experts estimate that a delivery cost of Rs 60 to Rs 70 (or less) is needed to make the economics of digital commerce work. As the current costs of residential delivery are anywhere from Rs 150 to Rs 200—or 15% to 20% of the average online FMCG basket—this effort is economically unfeasible.

B. Lack of relevant metrics:

Most of the FMCG companies using traditional metrics such as reach and frequency. When it comes to digital, although many metrics are available that can be tracked in real time, such as views, comments, "likes" and time spent, there is a need for simple metrics that demonstrate the effect of digital exposure on the opinions of end consumers, on brand image and on sales.

C. Lack of appropriate talent:

Lack of skilled labour for various operations in the FMCG e-commerce is another barrier.

D. Lack of infrastructure support:

Poor infrastructure facilities especially in case of fruits and vegetables in farm and market level is the biggest hinder back in F&V sector.

Chapter – 4

Bigbasket – Company Profile

Chapter – 4

BIGBASKET – A PROFILE

4.1 Introduction

BigBasket.com is India's largest online supermarket and allows a customer to walk away from the drudgery of grocery shopping and welcome an easy relaxed way of browsing and shopping for groceries. In 1999, Mr. V. S. Sudhakar, Mr. Hari Menon, Mr. Vipul Parekh, Mr. Abhinay Choudhari and Mr. V. S. Ramesh started one of the first online businesses in India called Fabmart.com. In 2001, they started an online groceries business as a part of Fabmart. In spite of the market being in its infancy then, Fabmart.com did exceedingly well. They then went on to setup a physical retail chain called Fabmall which was a chain of grocery supermarkets in the South of India. This business was sold in 2006, and eventually renamed More by the buyers, the Aditya Birla Group. The founders however were always enamoured by online grocery and in 2011, the same team recoupled and launched Bigbasket.com.

Today Bigbasket.com is one of the leading online grocers in India. The company bases its success on the three pillars namely exceptional customer focus, Bigbasket offers same-day delivery across a city, 99.3% on time delivery, 99.5% order fill rate and a no questions asked customer return policy, all of which has contributed to high customer loyalty and excellent customer feedback. On top of it all, BigBasket compensates a customer every time it is not able to deliver on its promise thus ensuring that there is consistent focus on raising the bar higher. Wide range and variety of products, more than 40% of sales coming through own brands. BigBasket has further innovated by offering products such as cut fruits and vegetables, a range of recipe mixes and have recently launched their own bakery in Bangalore that delivers bread baked to order and continuous innovation with the help of technology. BigBasket has both android and iOS mobile apps which allow customers to order groceries on the go. Features such as "Smart-basket" predicts what a customer needs more often and reduces the time-to-order to "within 5 minutes".

Bigbasket is headquartered in Bengaluru and serves customers across India. It is currently operating in eight metro cities and 10 Tier II cities. The company sells over 18,000 products across 1,000 brands, including fruits, vegetables, meat, beverages and personal care products and fulfilling over one million orders per month.

Bigbasket had earlier raised Rs 200 crores led by Helion Ventures and Zodiuss Capital in September 2014. Then in June 2015, it acquired Delyver, a Bengaluru-based hyperlocal delivery startup in a cash and stock deal. Then a few months later, it announced that it had raised \$50 million from existing investors led by Bessemer Venture Partners.

Now in 2016, Bigbasket has been seeing a five-fold increase in monthly revenues over the last 18 months, supported by supply chain optimization and an increased proportion of high margin private label products. Bigbasket's own brand products currently account for 33 per cent of revenue and are projected to reach 40 per cent by the end of this year.

4.2 Green Bigbasket

Being green is part of the culture at BigBasket. An offline grocery store requires stocks to move from a regional distribution center to the individual stores, and then someone from each family has to make multiple trips to the store to do their shopping. Supermarkets consume a lot of energy for lighting, air-conditioning and powering their refrigerators and freezers. BigBasket bypass these stages, bringing products to customer straight from the wholesaler to doorstep which cuts down on a lot of carbon emissions generated by the traditional supply chain and also reduces the number of cars on roads.

Bigbasket minimize the usage of paper and plastic bags while delivering products, all products are delivered in crates which are taken back and reused. Fruit and vegetable trays are recyclable and requests customers to return back them, so that they can reuse them.

4.3 Time line of events

Dec 2011: Commenced operations

Dec 2011: Bangalore launched with metro sign up

Feb 2012: Series A funding 60 Cr

Sep 2012: Launched of Fresho Brand

Nov 2012: Launched in Mumbai and Hyderabad with metro sign up

Feb 2013: Launched of Royal and Popular brands

May 2013: Android and iOS Apps launched

Aug 2013: Imported and gourmet category launched
Nov 2013: New DC in Bangalore with 28000 sq. ft. capacity started
Dec 2013: Mumbai DC launched 21000 sq. ft.
Mar 2014: Cut vegetables launched
Apr 2014: Series B funding 180 crores
Jun 2014: Crossed 1000000 cumulative orders
Oct 2014: Hyderabad DC launched 26000 sq. ft.
Dec 2014: Pune DC launched 17000 sq. ft.
Feb 2015: Chennai DC launched 20000 sq. ft.
May 2015: Delhi DC launched 18000 sq. ft.
Jun 2015: Fresho Pani Puri, Fresho Coffee, Happy Chef Gourmet launched
Jun 2015: Delyver Acquisition
Jul 2015: Mysore DC launched 10000 sq. ft.
Aug 2015: Shahrukh khan as brand ambassador
Dec 2015: Express Delivery launched
Mar 2016: BigBasket Specialty Store launched
Apr 2016: raised \$150M led by Arbaaj group
May 2016: introduced happy chef ready-to-eat meals and desserts

4.4 Cities serving:

Currently BigBasket offer services in Bangalore, Hyderabad, Mumbai, Pune, Chennai, Delhi-Noida, Mysore, Madurai, Coimbatore, Vijayawada-Guntur, Kolkata, Ahmedabad-Gandhinagar, Nashik, Lucknow-Kanpur, Gurgaon, Vadodara, Visakhapatnam, Surat, Nagpur, Patna, Indore and Chandigarh Tricity city limits.

4.5 Product range

Fruits, Vegetables, Bread, Eggs, Dairy, Groceries, Staples, Beverages, Branded Food, Personal Care, Household, Imported and Gourmets.

4.6 Brands

Fresho: Fresho is a well renowned fruits and vegetables brand offered by BigBasket.

BB Royal: In house brand which offers a wide variety of staples, dry fruits, nuts, raisins etc.

Happy chef: An exclusive brand which offers a quality conserves, salad dressings and sauces

BB Popular: In house economy range of staples which offers great quality and variety at consistently low prices.

4.7 Bigbasket Specialty Store

The online grocery market is divided into two models- inventory based model and market place model. Bigbasket gone a step ahead by merging two models. In March 2016 BigBasket launched its hyperlocal business in top eight metro cities- Mumbai, Delhi, Bangalore, Hyderabad, Chennai, Kolkata, Ahmedabad and Pune. Bigbasket is tying up with different stores in every city. These are typically small stores which are famous for a particular category of food products and have a loyal brand following.

4.8 Order process

Step 1 Registration:

Customers can surf and add products to the cart without registration but only registered shoppers will be able to checkout and place orders. One can register by clicking on the "Sign Up" link at the top right corner of the homepage. Provide the information in the form that appears. Review the terms and conditions, payment mode details and submit the registration information. Registration on BigBasket is absolutely free.

Step 2: Browse various products available in Bigbasket

Step 3: Add item to Shopping Basket

Step 4: Choosing convenient delivery time from among 4 Slots a day

Once done selecting products and click on checkout customer will be prompted to select delivery slot. Order will be delivered on the day and slot selected. Delivery slots are time slots during which customer will receive order. BigBasket currently offers 4 delivery slots each day. They are:

- i. Slot 1 - 7:00 am to 9:30 am
- ii. Slot 2 - 10:00 am to 12:00 pm
- iii. Slot 3 - 5:00 pm to 7:30 pm
- iv. Slot 4 - 7:30 pm to 10:00 pm

Step 5: Payment

Customer can pay using the following modes of payment:

- a. Cash on delivery
- b. Credit and debit cards (VISA / MasterCard / American Express)
- c. Sodexo passes on delivery (only for food items).

The VAT is included in the MRP of products. There are no additional taxes added by BigBasket. There is a delivery charge of Rs. 20 on orders below Rs. 1000.

4.9 Customer service

Customer service team is available throughout the week, all seven days from 7 am to 10 pm. They can be reached at +18601231000 or via email at customerservice@bigbasket.com.

4.10 Operations in BigBasket

A. Receiving materials:

Just like any other warehousing, the very first step is Purchase order check and material match. For every order placed, vendor supplies the required inventory with 3 bills. Each one for Warehouse, QC staff and his own copy. Once goods are checked for quantity and tampering GRN (Goods received note) is prepared which has be submitted to the team which looks towards storage of inventory in the system.

B. Stacking:

When scanned through a pre-designed machine, the bar codes tell the personal about which rack to the material belong to. If any material is first time introduced to the warehouse, it is then have to be first stored in the systems and then stacked. Both heavy and light good are kept shortly.

C. Picking:

When customer orders through mobile app or website, each customer order will be given a unique RFID code. These order details are shared to RFID devices held by pickers. Pickers will pick items ordered by customer and collects in a customer basket. For every order placed, there can be multiple carets required for the delivery. There are total nine categories of material in which sorting is done. Almost all of them need to be separately packed.

For example: If you have ordered a soap, a flower cleaner and a pack of meat then you will get each of them in a separate caret as three of them belong to different categories.

D. Packing:

Packing is done at this stage in 2 types of carets, depending upon the category of material to be packed. A basic caret is used to pack almost all FMCG goods. Another small caret is used for the storage of perishable goods which need to stabilize its temperature.

Fruits and Vegetables are chopped separately and stored in one of the deep freezers at the temperature of -5 degree.

E. Picking area:

After collecting all the items ordered by customer in customer basket, picker will place the basket in the picking area according to the delivery location. All of orders are delivered in carets only. And each caret cannot contain any more than 9 item. All the carets are sealed with plastic ribbons which are removed by customers only. Customer baskets are sent to dark stores through outward logistics.

F. Delivery:

Every delivery men is provided with a Motorola E device which have an application installed (acting kind of POS device), an Easy Tab and a bill. Easy Tab is a roughly 10x5 cm

device which is used for accepting Cashless payments. It is not amazing because of its size but also because of its acceptance to both chip based and Magnetic band based cards in real time basis.

All delivery boys, called as customer executives, get a van full of multiple orders, pertaining to the route to be followed. If any order gets discarded by the customer for any reason, it goes to the RTV account (Return to Vendor) account and same is reported by Customer Executive to the hub.

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Chapter – 5

Mango – A Commodity Overview

Chapter – 5

MANGO – A COMMODITY OVERVIEW

5.1 Introduction

Mango is the national fruit of India, known as the 'King of Fruits'. It is one of the most important and popular Asian fruits. Cultivation of Mangoes is deeply embedded in Indian history. Mangoes thrive in tropical regions, and are cultivated throughout India. It is believed that Mangoes originated in northeast India, northwestern Myanmar and Bangladesh. They, later spread to the rest of Asia by themselves and with the help of humans.

5.2 Botanical description

Mango (*Mangifera indica*), family Anacardiaceae, is a large, branched perennial erect tree with wide evergreen crown which attains a great height. Flowers appear in large terminal inflorescences producing fruit. The skin of the fruits may be green, yellow, or red, depending upon the variety of the fruit. The fruits have a small point at one end, known as the beak. The seed within the fruit is large and flattened.

Mangoes vary in shape (nearly round, oval, ovoid-oblong), size and color, depending upon the variety. Ripe Mangoes may be greenish, greenish-yellow, yellow, red, orange, or purple and weigh from a few ounces to more than 5 pounds (2.3 kg). The skin is smooth and leathery, surrounding the fleshy, pale-yellow to deep-orange edible portion. The fruits possess a single large, flattened, kidney-shaped seed that is enclosed in a woody husk.

5.3 Production

Mango is commercially grown in more than 80 countries. Main Mango producing countries are Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, Philippines, Thailand and Vietnam.

India is the major Mango growing country, contributing nearly 46.74 per cent of world's area and 40.48 per cent of world's production respectively. The share of China in world's area and production is 9.4 per cent and 11.72 per cent while the share of Thailand in world's area and production is 6.29 per cent and 6.87 per cent respectively. These three important countries contribute more than 56 per cent of world area and production.

5.3.1 Area

During 2010-11, total area under Mango cultivation was 2296.80 thousand hectares. During this period, area of Mango in Andhra Pradesh was the highest in the country i.e. 17.02 per cent (391.09 thousand ha.), followed by Uttar Pradesh 11.63 per cent (267.22 thousand ha.), and 8.27 per cent in Orissa (190.08 thousand ha.). More than forty per cent of acreage of the Mango was under these three states. State-wise area under Mango is given in table no. 4

Table 5.1: State-wise area under Mango

States	Area In '000 HA, Production In '000 MT And Productivity = MT/HA					
	2013-14			2014-15		
	Area	Production	Productivity	Area	Production	Productivity
Uttar Pradesh	274.03	4386.99	16.0	262.16	4300.98	16.4
Andhra Pradesh	489.66	4406.92	9.0	304.11	2737.01	9.0
Karnataka	178.80	1795.10	10.0	180.53	1755.56	9.7
Telangana	-	-	-	190.88	1717.88	9.0
Maharashtra	482.00	633.00	1.3	485.00	1212.50	2.5
Gujarat	141.26	1003.71	7.1	142.69	1125.61	7.9

Source: National Horticultural Board Database, 2015

5.3.2 Major producing states

Mango is grown in India in tropical and subtropical regions from sea to an altitude of 1500 meters. It is grown almost in all states of India. However, it is mainly cultivated in, Andhra Pradesh, Bihar, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal.

Table 5.2: Major Mango Producing Belts

State	Mango Producing Belts
Andhra Pradesh	Chittoor, Kadapa, Anantapur, Kurnool, Mahabubnagar, Rangareddy, Medak, Nizamabad, Karimnagar, Warangal, Adilabad, Khammam, Nalgonda, Srikakulam, West Godavari, Guntur, Nellore, Prakasam.
Uttar Pradesh	Lucknow, Pratapgarh, Allahabad, Bulandshahar, Saharanpur, Faizabad, Varanasi, Moradabad, Meerut.
Karnataka	Kolar, Bengaluru, Tumkur, Mysore, Belgaum, Hassan, Dharwad
Maharashtra	Ratnagiri, Sindhudurg, Thane, Raigad, Mumbai, Aurangabad, Beed, Hingoli, Jalna, Latur, Nanded, Osmanabad, Parbhani
Tamil Nadu	Coimbatore, Dharmapuri, Dindigul, Krishnagiri, Madurai, Salem, Theni, Tiruvallur, Tirunelveli, Vellore
Gujarat	Junagadh, Bhavnagar, Amreli, Valsad, Navsari, Surat
Kerala	Palakkad (Muthalamada), Alappuzha (Cherthala, Chengannoor), Thiruvananthapuram (Varkala)
Bihar	Darbhanga, Bhagalpur, Muzaffarpur, East Champaran, West Champaran, Sitamarhi, Sheohar, Vaishali, Saharsa

Source: National Horticultural Board Database, 2015

5.4 Varieties

More than thousand varieties of Mangoes are grown in India. However, only about 30 varieties are grown on commercial scale in different states.

5.4.1 Alphonso (*Happus, Badami*)

Alphonso One of the most popular of India, it is mainly grown in Ratnagiri area of Maharashtra and to a small extent parts of south Gujarat and Karnataka. Fruit is medium in size, ovate oblique in shape, orange yellow in colour. Juice is moderate-abundant, excellent keeping

quality, good for pulping and canning. Its fruits are medium sized (250g), with attractive blush towards the basal end. Pulp is firm, fibreless with excellent orange color. It has good sugar: acid blend. Keeping quality is good. It is susceptible to spongy tissue. Mainly exported as fresh fruit.

5.4.2 Banganapalli (Alampur Baneshan, Safeda)

Banganapalli or Alampur Benishaan mangoes are originated in a village named Banaganpalle 70 km from Kurnool town from where it derives its name. It is largesized fruit with mostly fibreless firm flesh and a relatively small nut; this is why the Nizam's popularised it with the name Benishaan that means 'without a trace' or 'without a sc̄ar'. The fruit is sweet and aromatic, obliquely oval in shape, golden yellow in colour; good keeping quality; also good for canning. Usually weighs around 300-500 gm but big ones can grow up to 2kg fruits. This fruit mostly comes from several places of Andhra Pradesh.

5.4.3 Dashehari

Best varieties of the country. Fruit size is small-medium, shape is elongated with yellow fruit colour. Flesh is fibreless. Good keeping quality. Mainly used for table purpose.

5.4.4 Neelum

Fruit is medium ovate-oblique in shape and saffron yellow in colour. Good keeping quality. High yielding and regular bearing. Ideal variety for transporting to distant places. This variety is mostly used for table purpose.

5.4.5 Suvernarekha

Fruit is medium ovate oblong fruit, green in colour with prominent red blush on the shoulders. Good keeping quality. Bearing is heavy.

Table 5.3 State Wise Important Varieties Grown

States	Important Varieties
Andhra Pradesh	Banganpalli, Bangalora, Cherukurasam, Himayuddin, Suvarnarekha, Thothapuri, Kesar, Dhasseri, Himayat, Peddarasam, Chinnarasam, Manjeera, Neeleshan, Amarapali, Mallika, Ratana, Arkapuneet, Sindhu, K.M.H.-1
Gujarat	Alphonso, Kesar, Rajapuri, Vanraj
Karnataka	Alphonso, Bangalora, Mulgoa, Neelum, Pairi, Totapuri, Raspuri, Baneshan, Kesar, Mallika, Dasherri, Sindhura, Hybrid 10, Hybrid 13
Maharashtra	Alphonso, Kesar, Mankurad, Mulgoa, Pairi, Rajapuri, Neelam, Totapuri
Uttar Pradesh	Bombay Green, Dashehari, Fajri, Langra, Safeda Lucknow, Chausa, Ratual, S.Saurabh, Amarpalli, Malihabadi, Bombay yellow

Source: National Horticultural Board Database, 2015

5.5 Post harvest practices

Post-harvest management means the handling of an agricultural product after harvest to prolong storage life, freshness and an attractive appearance. In order to deliver a quality product to the market and ultimately to the consumer to command buyer attention and gives the grower a competitive edge, proper post-harvest management is the need of the hour.

5.5.1 Pre-harvest factors influencing quality

The pre-harvest cultural practices like use of fertilizers, pest control, growth regulators, climatic conditions like wet and windy weather and tree conditions influence the fruit potentiality for storage by modifying physiology, chemical composition and morphology of fruits.

5.5.2 Maturity

External colour, appearance, pulp colour and soluble solids content are the reliable indicators for judging the fruit maturity. At the time of maturity, stone becomes hard and pulp colour changes from white to cream. In few varieties, at maturity stage, fruits sink in water.

As the Mangoes mature, the skin colour changes from green to yellow. Normal size fruit that have started to turn yellow are ripe and ready for immediate harvest. The shoulder area swells

and rises above the stem end. This is accompanied by the stem end sinking and forming a small pit around the stem.

5.5.3 Harvesting

Harvesting is the most important factor, governing the post-harvest management. The harvesting of the fruit is done, either by hand picking, or plucking with a harvester at green mature stage. When the Mangoes are fully-grown and ready for picking, the stem will snap easily with a slight pull. It is a common practice to harvest fruits early in the season (premature stage) to capture early market. But, fruits should be harvested, when there is some yellow colour on the tree on the fruits. Fruits should also not be harvested by stick, which may cause injury / bruises due to impact, resulting in decay, poor quality and attract low price.

5.5.4 Ripening

Fruits are plucked early in the season (premature stage) to capture early market, traders use carbide treatment for artificial ripening of the fruits, which is a toxic chemical and extremely hazardous. It is the most economical way to ripen a mango, but a banned chemical, and should not be used for ripening of fruits. It would be better to treat the fruits with ethylene gas (100 ppm) in airtight room by exposing them for 24 – 48 hrs under controlled conditions of temperature and humidity, for ripening purpose. These treatments ripen the fruits uniformly with attractive colour.

5.5.5 Grading:

Grading of agricultural produce as per accepted quality standards helps farmers, marketing functionaries, processors, traders and consumers in efficient marketing. The fruits graded according to their size, weight, colour and maturity benefits both the producer and consumer. It has been observed that bigger size fruits take 2-4 days more time in ripening than smaller ones and hinder to achieve uniform ripening. Therefore, grading according to size play an important role in packaging of the fruits. During grading, the immature, overripe, damaged and diseased fruits should be discarded.

The grades vary with variety. For Alphonso the commercially accepted grades are as under:

- A+ grade >300 g
- A grade 250-299 g
- B grade 200-249 g
- C grade 150-199 g
- D grade <150 g

Chapter – 6

*Designing and Analysing Supply
Chain of Mangoes*

Chapter – 6

DESIGNING AND ANALYSING SUPPLY CHAIN OF MANGOES

6.1 Introduction

This chapter is divided into two parts. First division begins with the general description of data collected from mango growers of Ramanagara district of Karnataka and Ranga Reddy district of Telangana followed by marketing aspects, the role of various actors in the supply chain, price spread and marketing efficiency.

The second section of this chapter deals with designing mango supply chain exclusively for Big Basket. Later supply chain efficiency was studied in terms of merchandise flow, funds flow, information flow, price benchmarking, food miles and customer satisfaction. At last SWOC analysis was also performed to know various strengths, weaknesses, opportunities and challenges of the designed supply chain.

PART – A

6.2 General Description of Data

6.2.1 Age

Age may be a factor influencing adoption of better cultivation practices. The work showed that young farmers are taking better and modern cultivation practices and switching to a commercial style of cultivation. The results in table 6.1 show the sample structure according to age groups. As can be understood, in Ramanagara and Ranga Reddy majority of respondents belongs to the age group of 30-40, 36.7 percent and 43.3 percent respectively.

Table 6.1: Age wise distribution of respondents

Age	No.of farmers	
	Ramanagara	Ranga Reddy
20-30	3 (10)	4 (13.3)
30-40	11 (36.7)	13 (43.3)
40-50	10 (33.3)	8 (26.7)
>50	6 (20)	5 (16.7)
Total	30 (100)	30 (100)

Source: Compiled from primary data

Note: Figures in bracket indicates percentage to the total

6.2.2 Education

Education is seen as a factor influencing favorably to adoption of modern and better cultivation practices. The analysis indicated that all mango farmers were literate. The data regarding the educational background of respondents were analyzed. The results are presented in table 6.2. In Ramanagara Majority of the respondents are SSC holders (46.7 %) followed by Intermediate (33.3%), UG (16.7%) and PG (3.3%). Same trend follows in Ranga Reddy, majority of the respondents are SSC holders (50%) followed by Intermediate (6%), UG (7%) and PG (6.6%)

Table 6.2: Educational Background of Respondents

Education	No.of farmers	
	Ramanagara	Ranga Reddy
SSC	14 (46.7)	15 (50)
Intermediate	10 (33.3)	6 (20)
Graduate	5 (16.7)	7 (23.3)
PG	1 (3.3)	2 (6.6)
Total	30 (100)	30 (100)

Source: Compiled from the primary data

Note: Figures in bracket indicates percentage to the total

6.2.3 Size class of mango orchards

The size of sample mango orchards varied from 2.5 to 70.0 acres. The distribution of sample mango orchards according to size is presented in table 6.3. As can be seen, in Ramanagara majority of farmers hold 5-10 acres of land (36.7%) followed by 10-15 acres (30%). Same follows in Ranga Reddy about 26.7 percent of the farmers belong to 5-10 acre group followed by 10-15 acres (23.3%).

Table 6.3: Size class of mango orchards

Land area	No. of farmers''	
	Ramanagara	Ranga Reddy
<5	5 (16.6)	6 (20)
5-10	11 (36.7)	8 (26.7)
10-15	9 (30)	7 (23.3)
15-20	3 (10)	5 (16.7)
>20	2 (6.6)	4 (13.3)
Total	30 (100)	30 (100)

Source: Compiled from the primary data

Note: Figures in bracket indicates percentage to the total

6.2.4 Age-wise distribution of mango orchards

The age of sample mango orchards varied from 3 years to 60 years. Table 6.4 gives the Orchard age details of farmers. As can be seen in Ramanagara majority of the orchards falls under the age group of 10-20 years (33.3%) followed by 3-10 years (30%). Whereas, in the Ranga Reddy majority of plantations are under the age group of 3-10 years (33.3) followed by 10-20 years (30%).

Table 6.4: Age-wise distribution of mango orchards

Orchard age	No.of farmers	
	Ramanagara	Ranga Reddy
3-10	9 (30)	10 (33.3)
10-20	10 (33.3)	9 (30)
20-30	6 (20)	8 (26.7)
>30	5 (16.7)	3 (10)
Total	30 (100)	30 (100)

Source: Compiled from the primary data

Note: Figures in bracket indicates percentage to the total

6.2.5 Nature of farming

Table 6.5 gives the details of farming method adopted by mango growers. In Ramanagara majority of farmers are practicing conventional farming, about 90% percent and only 10 percent of farmers are practicing natural farming. In Ranga Reddy to the bulk of farmers are using conventional farming (70%) and a respectable number of farmers are embracing organic agriculture (30%) when compared to Ramanagara. This demonstrates the efforts of Telangana government towards organic farming.

Table 6.5: Nature of farming practiced by farmers

Type of farming	No.of farmers	
	Ramanagara	Ranga Reddy
Conventional farming	27 (90)	21 (70)
Organic farming	3 (10)	9 (30)
Total	30 (100)	30 (100)

Source: Compiled from the primary data

Note: Figures in bracket indicates percentage to the total

6.3 Marketing Aspects

A healthy marketing system for a particular commodity has to provide required information, technology, marketing linkages for better price realization by farmers. Marketing efficiency of a particular commodity is evaluated by looking at the producer's share in the consumer's rupee.

6.3.1 Marketing channels

Based on the discussions with the farmers, traders, pre harvest contractors and retailers, it was observed that fresh mango reaches to the consumer through five channels, i.e.

1. Grower to Pre-Harvest Contractors (PHC)
2. Grower to Up-Country Trader (UCT)
3. Grower to Village Trader/Commission Agent (VT/CA)
4. Grower to Retailers
5. Grower to customer

From the farm, mango fruit reaches the plate through any of these five channels. A comprehensive chart depicting different channels/sub-channels are depicted in Fig 6.1.

Overall, mango reaches to the consumer through five different channels (Table 6.6). Nevertheless, it is really hard to come away with a clear cut demarcation of channels as some PHCs also act as CAs, some CAs act as dealers. They themselves also act as local wholesalers. Many of the CAs/Traders are also mango orchard owners and contribute substantially to the mango production. Discussions with different players in the market as mentioned above revealed the following cases of potential marketing channels.

Table 6.6: Share of different marketing channels in marketing of fresh mangoes

No.	Marketing Channels	Channel Share (%)	
		Ramanagara	Ranga Reddy
1	Grower → CAs/VTs → wholesalers → Retailers → Consumer	43	47
2	Grower → PHCs → CAs → Retailers → Consumer	36	26
3	Grower → UCTs → Retailers → Consumer	10	7
4	Grower → Retailers → Consumer	7	13
5	Grower → Consumer	4	7
	Total	100	100

Source: Compiled from the Primary Data

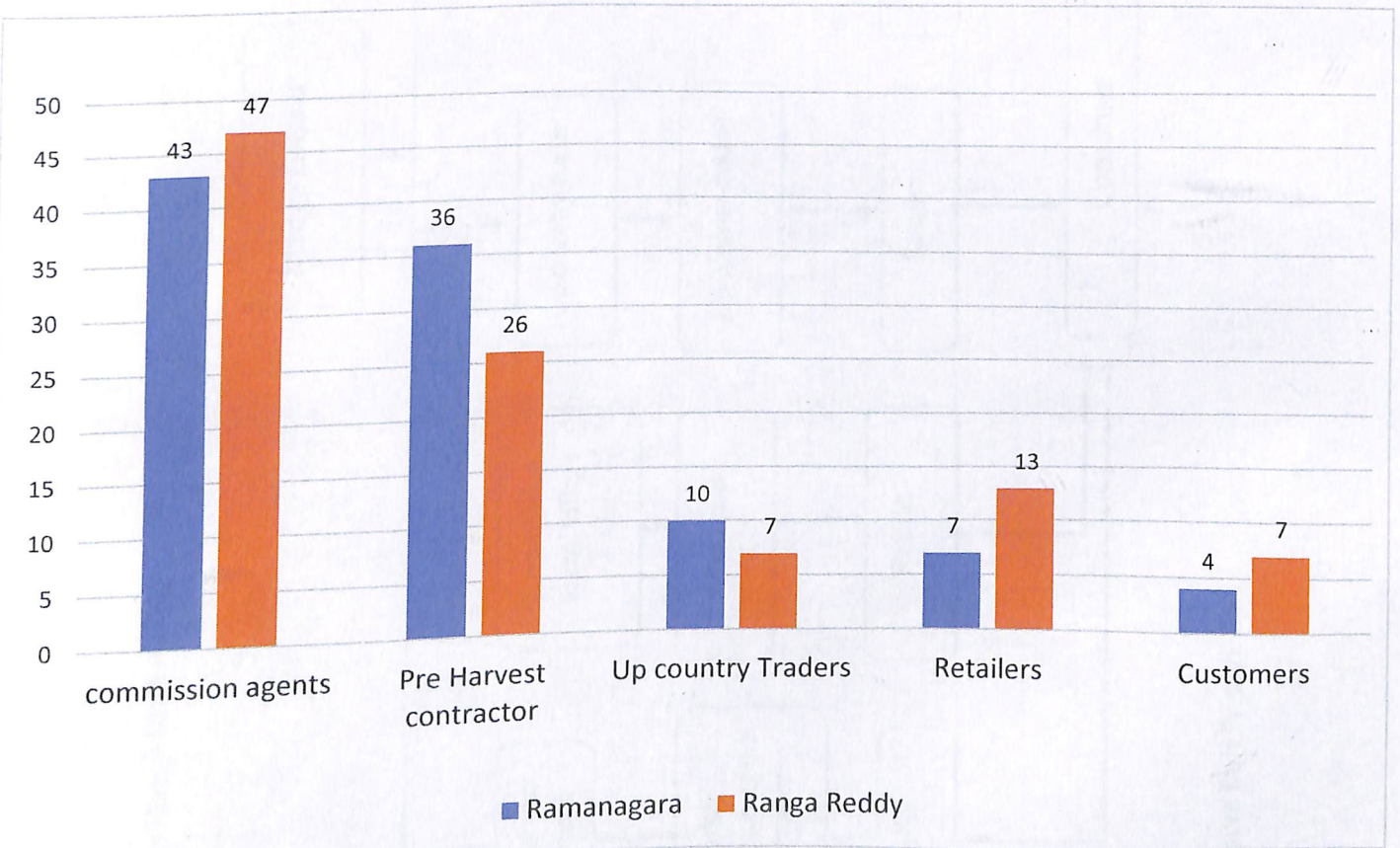
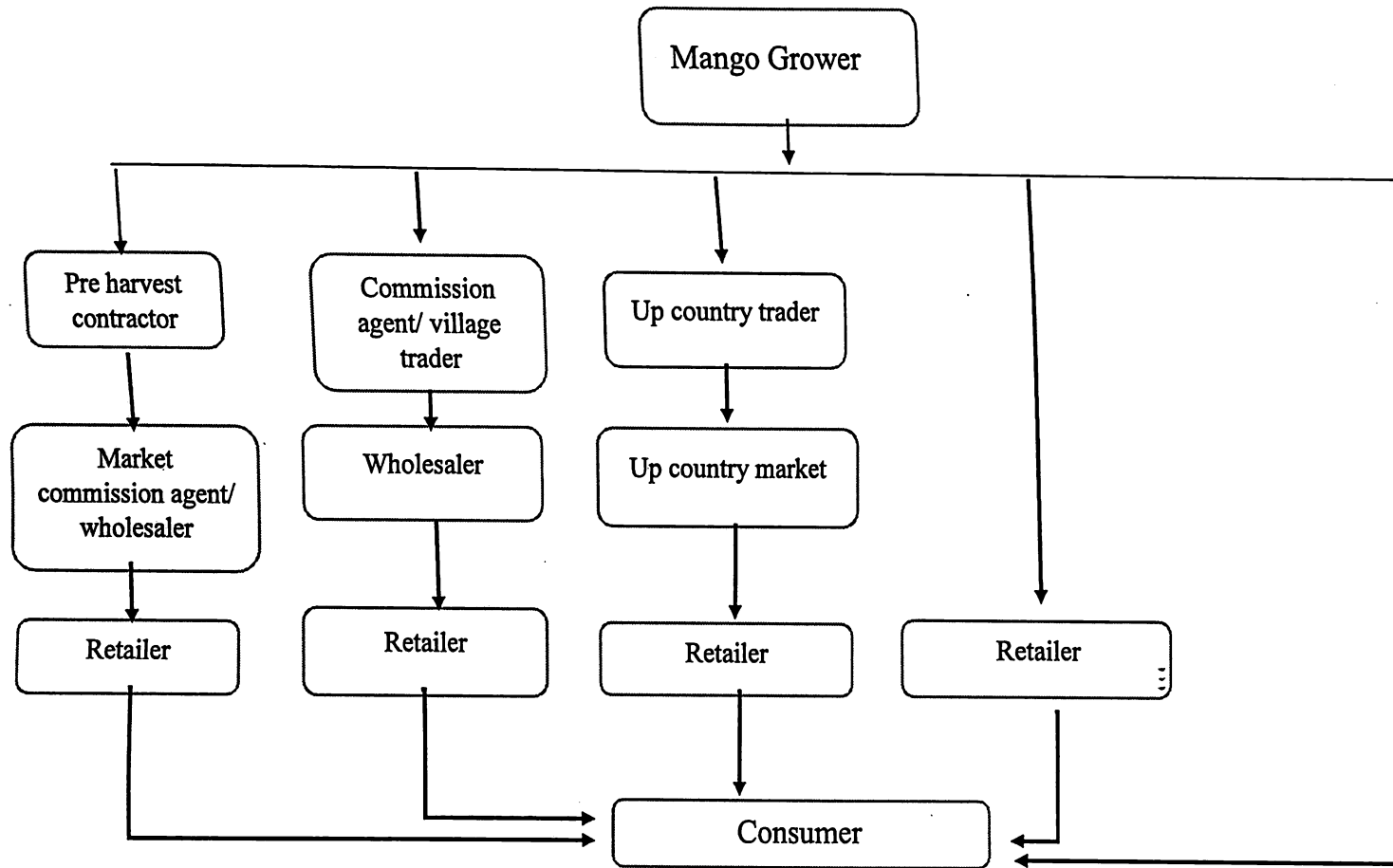


Fig 6.1: Share of different marketing channels in marketing of fresh mangoes

Source: Compiled from the Primary Data

Fig 6.2: Various Mango Marketing Channels

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Source: Compiled from Primary Data

6.3.2 Role of Different Channels

A. Village Traders/Commission Agents

Close to 43 per cent and 47 per cent of mango growers transact through village trader/commission agent (VT/CA) in Ramanagara and Ranga Reddy respectively. VTs often provide advance to the farmer with the condition that the grower has to sell his produce to them. They resell mangoes to Up Country Traders/ Mango Processing Units/retailers. But VT collects 10 per cent of the volume of trade amount towards commission charges. If, due to any unforeseen situations (pests, cyclones, and so on) the grower fails to patch up the advance, the same gets adjusted from the next year sale proceeds. Nevertheless, inadequate information on prices and lack of weighing facilities are a few limitations of this channel.

B. Pre-Harvest Contractors

Close to 36 per cent and 26 per cent of mango growers transact through Pre-Harvest Contractors (PHCs) in Ramanagara and Ranga Reddy respectively. The mango orchard owner leases out his orchard as per contract to the PHCs. Both the parties agreed to abide by the terms and conditions stipulated at the time of agreement (which is almost oral in nature). The PHCs visit the mango orchards just after the mango-harvesting season (during August, September) to survey the orchards after which the negotiation takes place between the cultivator and the contractor. These contractors also take up the works of required input applications to the leased in orchards, including plant protection to obtain an optimum fruit production. PHCs, after harvesting mango, sell it in the open market or to processing units like a grower who undertakes self-selling.

C. Up Country Traders

Up country traders constitute 10 per cent and 7 per cent in Ramanagara and Ranga Reddy respectively. Many traders from neighboring states visit mango markets in Ramanagara and Ranga Reddy districts during mango season. Traders from Bangalore, Chennai, Mumbai, New Delhi, Kolkata, Nagpur, Jaipur, Ahmedabad and Hyderabad participate in mango trading. UCTs visit mango orchards during the months of January-February and survey the orchards at flowering stage and estimate the turnout for the forthcoming harvesting season. Based upon the estimated, UCTs fix the prices for the purchase of mango production from the orchard owners. Unlike the PHCs, the UCTs do not take on maintenance of the farm. Under an informal agreement, UCTs pay an

advance (10 to 20 %) to the orchard owner. The monetary value is decided before the harvest and payment are fixed shortly after the completion of marketing.

D. Retailers

7 per cent of farmers in Ramanagara and 13 per cent of farmers in Ranga reddy transact with retailers. Now a day many retailers started the direct procurement of mangoes from farmers. Brick and mortar retailers like More, Reliance Fresh, Namdhari, Heritage fresh etc. setup their collection centers in mango growing areas. Traceability of the mangoes and good quality are key benefits of the model. This model offers good price to the farmers.' Generally, payment is done immediately or within two days. However, strict grading practices followed by retailers and inadequate supply from farmers are some of the restrictions.

E. Consumers

4 per cent of farmers in Ramanagara and 7 per cent of farmers in Ranga reddy sell their produce directly to customers. Some of the growers went a step ahead and set up their own temporary outlets in Bangalore and Hyderabad. Generally growers form Farmers Producers Organisation (FPO) and market their produce under a specific brand name. Scalability and marketing are the main deficiencies of this model.

6.3.3 Price spread

Price spread is the difference between the retail price paid by the consumer and the price received by the farmer/producer for the same quantity of the product. Price spread in the marketing of mango is analyzed by following the product movement from the mango grower to the consumer. Various marketing costs and margins together with the farm gate price constitute the consumer price of mango.

There is a direct relationship between the consumer price and the length of the marketing channel. Consumer price is the lowest when the marketing channel is the shortest, i.e., when the mango grower directly sales to the consumer. The magnitude of the sale takes place through this direct channel is negligible. In the absence of direct linkage between the mango grower and the consumer, it is the middlemen who have been taking advantage of the situation. The producer's

share in the consumer price is high when the marketing efficiency is high. The price spread in different channels of mango marketing is presented in the table beneath.

Table 6.7: Price Spread for Kilogram of Karnataka Alphonso Mango in Ramanagara (Rs/kg)

No.	Particulars	Channels				
		1	2	3	4	5
1	Mango Grower					
	Sale price	55	45	50	70	100
	Marketing costs				5 (4.2)	20 (20)
	Net price received	55 (40.7)	45 (34.6)	50 (34.4)	65 (54.2)	80 (80)
2	VT/CA/PHC					
	Purchase price	55	45			
	Marketing costs	10 (7.4)	15 (11.5)			
	Net margin or profit	5 (3.7)	5 (3.8)			
3	Local wholesaler					
	Purchase price	70	65			
	Marketing costs	25 (18.5)	25 (19.2)			
	Net margin or profit	5 (3.7)	5 (3.8)			
4	UCTs/Distant wholesaler					
	Purchase price			50		
	Marketing costs			35 (24.1)		
	Net margin or profit			10 (6.8)		
5	Retailer					
	Purchase price	100	95	95	70	
	Marketing costs	15 (11.1)	15 (11.5)	25 (17.2)	30 (25)	
	Net margin or profit	20 (14.8)	20 (15.3)	25 (17.2)	20 (16.6)	
	Gross marketing margin	80	85	95	55	20
	Consumer's price	135 (100)	130 (100)	145 (100)	120 (100)	100 (100)

Note: figures in parentheses indicate percentages to consumer's purchase price.

Table 6.8: Price Spread of Banginapalli mango in different Marketing Channels (Rs/kg)

No.	Particulars	1	2	3	4	5
	Mango Grower					
	Sale price	35	30	40	50	75
	Marketing costs				5 (5.5)	15 (20)
	Net price received	35 (32)	30 (26)	40 (32)	45 (50)	60 (80)
2	VT/CA/PHC					
	Purchase price	35	30	...		
	Marketing costs	15 (13.5)	20 (17.3)			
	Sale price	55	60			
	Net margin or profit	5 (4.5)	10 (8.7)			
3	Local wholesaler					
	Purchase price	55	60			
	Marketing costs	15 (13.5)	15 (13)			
	Sale price	75	80			
	Net margin or profit	5 (4.5)	5 (4.3)			
4	UCTs/Distant wholesaler					
	Purchase price		40			
	Marketing costs		35 (28)			
	Sale price		90			
	Net margin or profit		15 (12)			
5	Retailer					
	Purchase price	75	80	90	50	
	Marketing costs	15 (13.5)	15 (13)	15 (12)	20 (22.2)	
	Sale price	110	115	125	90	
	Net margin or profit	20 (18.2)	20 (17.3)	20 (16)	20 (22.2)	
	Gross marketing margin	75	85	85	45	15
	Consumer's purchase price	110 (100)	115 (100)	125 (100)	90 (100)	75 (100)

Source: Compiled from the Primary Data

Note: Figures in parentheses indicate percentages to consumer's purchase price.



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6.3.4 Marketing efficiency

The Marketing Efficiency (ME) is arrived through the concept of 'price spread'. In the absence of direct linkage between the mango grower and the consumer, it is the middlemen who have been taking advantage of the situation. An indicator of the efficiency of any supply chain is the extent of the price spread between the producer and the consumer. A higher price spread would indicate a lower efficiency. Conversely, a lower price spread would indicate a high efficiency. The producer's share in the consumer price is high when the marketing efficiency is high.

The analysis indicates that the share of the grower in the consumer price was 100 per cent when the transaction was direct without the involvement of the middlemen. The marketing efficiency was the highest under this channel. Yet, in both the districts direct transactions between the grower and consumer constituted the negligible share (>5%) of the total transactions.

Table 6.9: Share of different marketing channels in marketing of fresh Karnataka Alphonso mangoes

No.	Marketing Channels	Producer share in consumer Price (%)	Marketing Margins (%)	Market Efficiency
1	Grower → CAs/VTs → wholesalers → Retailers → Consumer	40	60	Low
2	Grower → PHCs → CAs → Retailers → Consumer	35	65	Lowest
3	Grower → UCTs → Retailers → Consumer	35	65	Lowest
4	Grower → Retailers → Consumer	55	45	High
5	Grower → Consumer	80	20	Highest

Source: Compiled from the primary data

Table 6.9 shows the share of different marketing channels in the marketing of fresh Karnataka Alphonso mangoes in Ramanagara. Channels 3, 2 and 1 depicted the lowest market efficiency in terms of the highest marketing margins (65%) (65%) and (60%) respectively. Indicating exploitation of the producers under the supply chain involving commission agents, up country traders and pre harvest contractors. The total negative impact is real and significant as most of the mangoes (89%) are transacted through this channels. Whereas, even though channel 4

and 5 showed low marketing margins and high producer share in consumer price, the volumes transacted through these channels are low, i.e., 11%.

Table 6.10: Share of different marketing channels in marketing of fresh Banginapalli mangoes

No.	Marketing Channels	Producer share in consumer Price (%)	Marketing margins (%)	Market Efficiency
1	Grower → CAs/VTs → wholesalers → Retailers → Consumer	32	68	Low
2	Grower → PHCs → CAs → Retailers → Consumer	26	74	Lowest
3	Grower → UCTs → Retailers → Consumer	32	68	Low
4	Grower → Retailers → Consumer	50	50	High
5	Grower → Consumer	80	20	Highest

Source: compiled from the primary data

Table 6.10 shows the share of different marketing channels in the marketing of fresh Banginapalli mangoes. More or less the same trend follows in Ranga Reddy. Channels 2, 3 and 1 depicted the lowest market efficiency in terms of the highest market margins (74%), (68%) and (68%) indicating exploitation of the producers under the supply chain involving pre harvest contractors, commission agents and up country traders. Whereas, channel 4 and 5 showed lowest marketing margins (50%) and 20 %. When compared to Ramanagara (7%) the number of growers transacting with retailers in Ranga Reddy (13%) are more eminent.

Part – B

5.4 Designing supply chain

The primary objectives of designing a green supply chain are to dilute the overall food miles and eliminate the possible middlemen there by increasing producers share in customer's price. Beside the discussions with various stakeholders in present supply chain of mangoes, the analysis of various selling channels and resources of Big Basket it was resolved that an e-tailer should enter into the supply chain at farm level itself to avoid possible marketing costs. Based on this a supply chain with the farmer outsourced model is designed, implemented, analyzed and optimized for betterment.

The designed supply chain includes only three stake holders i.e., grower, e-tailer and consumer. The supply chain is split into five levels based on the movement of mango i.e., orchard, ripening chamber, e-tailer distribution center, dark store and consumer. For ease of analyzing, all operations in the supply chain are identified under three headings, Product flow, funds flow and data flow. The product flow, funds flow and information flow of supply chain are depicted in Fig 5.3 various operations involved in the supply chain are elaborately described below.

5.4.1 Product flow

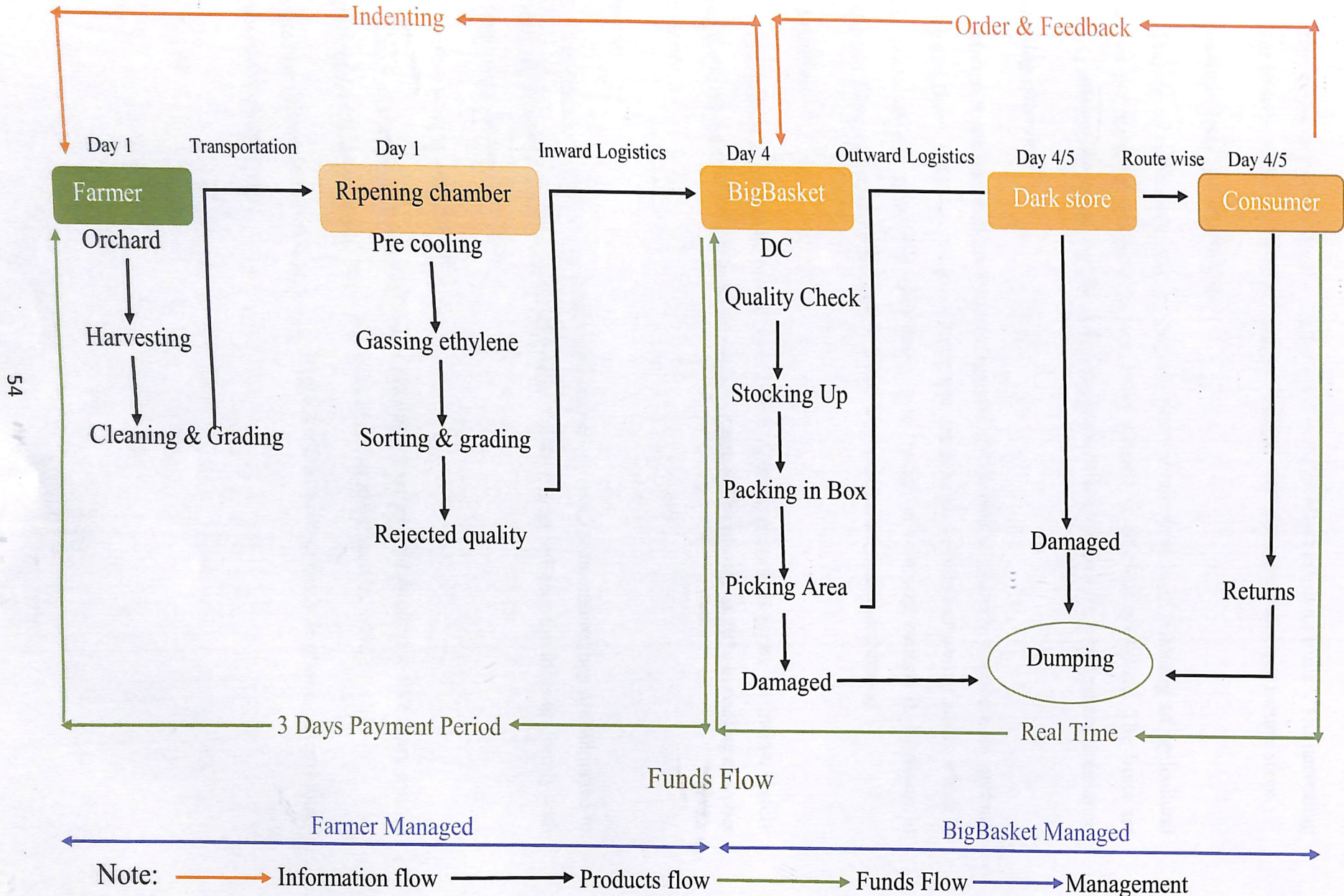
The product flow starts right from the orchard. After receiving the indent from e-tailer the grower selects the plants to harvest based on the agreed quality specifications. Farmer manages the supply chain from the initial harvesting stage to delivery to BigBasket distribution center. All the costs incurred in these stages are borne by farmers. Various operations involved in this are:

1. **Orchard:** the product flow starts right from the orchard. Various operations involved in this stage are described below

Harvesting:

Harvesting is the most important factor, governing the fruit quality. On day 1 farmer assessed the fruit maturity level of several trees. Maturity level of fruits is assessed by External colour, appearance, pulp colour and soluble solids content. At the time of maturity, the stone becomes hard and pulp color changes from white to cream.

Information Flow



Source: Compiled from Primary Data

Mostly harvesting is done in the morning hours to avoid sun burn effect on fruits. The harvesting of the fruit is done, either by hand picking, or plucking with a harvester at green mature stage.

2. Preliminary cleaning and grading:

This is a preliminary grading process done at the field level. Grading of agricultural produce as per accepted quality standards helps farmers in efficient marketing. The fruits are graded according to their size, weight, color and maturity benefit both the producer and consumer.

B. Ripening chamber:

Mangoes are harvested at unripe stage and are ripened in ripening chambers for uniform maturity and flavor retention. Most of the traders use calcium carbide as ripening agent, which is a toxic chemical and extremely hazardous, even though government banned it. Ripening in ethylene gas filled chambers is safe and healthy. Various operations are as follows;

1. Pre cooling:

The harvested mangoes retains heat as the ripening process is going on inside. Before gassing the mangoes are brought down to room temperature by placing at 20*c in cooling chamber for an hour.

2. Gassing:

After bringing down temperature of mangoes to room temperature they are subjected to Ethylene gas treatment @ 100 ppm for 48 hours. This treatment will reap the fruits uniformly with attractive colors, aroma and flavor.

3. Secondary sorting and grading:

Ripened mangoes after taking out of ripening chamber are subjected to secondary sorting and grading. Grading was based on quality specifications mentioned by e-tailer.

After grading farmer delivered mangoes to Bigbasket Distribution center in plastic crates through his transportation network.

Harvesting and Ripening

Pic 6.1 Harvesting



Pic 6.2 Ripening Chamber



Pic 6.3 Packaging in Ripening chamber



Pic 6.4 Dispatching to distribution center



C. Distribution center

Once the product reaches distribution center, Bigbasket manages the supply chain until customer home delivery. Various operations involved are:

1. Quality check:

The vehicle bringing mangoes are parked in material receiving bay. The quality control team will test each and every fruit. The accepted quality is weighed and an invoice prepared on farmers' name. Rejected quality fruits and empty crates are handed over to the farmer.

2. Stock up:

Just like any other warehousing, the very first step is Purchase order check and material match. For every order placed, the farmer supplies the required inventory with 3 bills. Each one for Warehouse, QC staff and his own copy. Once goods are checked for quantity and tampering GRN (Goods received note) is fixed, which has been put forward to the team which looks towards storage of inventory in the organization. The received produce stocked up in the place allotted for mango fruits with the help of in house material handling equipment

3. Packing:

The mangoes are packed in cardboard boxes. Boxes are labelled with BigBasket home brand, "fresho". The mangoes are weighed with weighing cum barcode generator machine. The machine generates a label containing the details of the product, i.e., product name, net weight, packing date, best before date, *fssai* license number and unique barcode. The Karnataka Alphonso mangoes are packed 6 pieces per box, weighs 1.2 – 1.5 kilogram. Whereas Banginapalli mangoes are packed in one kilo box. When a customer orders through mobile app or website, each customer order will be rendered a unique RFID code.de. These order details are shared with RFID devices held by pickers. Pickers will pick mangoes along with all other items ordered by the customer and collect in a customer's basket. All orders are delivered in carets only. And each caret cannot contain any more than 9 items. All the carets are sealed with plastic ribbons which are removed by customers only.

Receiving and Packaging

Pic 6.5 Receiving at distribution center



Pic 6.6 Quality checking



Pic 6.7 Weighing



Pic 6.8 Stocking in distribution center



4. Picking area:

After collecting all the items ordered by the customer in the customer's basket, the picker will place the basket in the picking area according to the delivery location. Customer baskets are sent to dark stores through outward logistics.

D. Dark stores:

Dark stores are also known as dotcom stores or dark supermarkets. Dark stores refers to mini distribution center that are located at specific places of the city where cross docking takes place between large vehicles coming from distribution center and the route wise small vehicles.

E. Delivery:

From the dark stores baskets are sent route wise and delivered to customer home. Delivery personnel will verify the items ordered by customer and provides a bill. In case if any item is missing 50 percent value of the missing item will be paid back. Big basket offers no question asked return back policy if the customer was not gratified with quality of products delivered. Every delivery man is provided with a Motorola E device which have an application installed (acting kind of POS device), an Easy Tab and a bill. Easy Tab is a roughly 10x5 cm device which is utilized for accepting Cashless payments.

All delivery boys, called customer executives, take a van full of multiple orders, concerning to the route to be pursued. If any order gets discarded by the customer for any reason, it goes to the RTV account (Return to Vendor) account and the same is reported by Customer Executive to the hub.

6.4.2 Funds flow

A. Customer to BigBasket:

Funds flow between customer and Big Basket occurs in real time. Customer can pay using the following modes of payment:

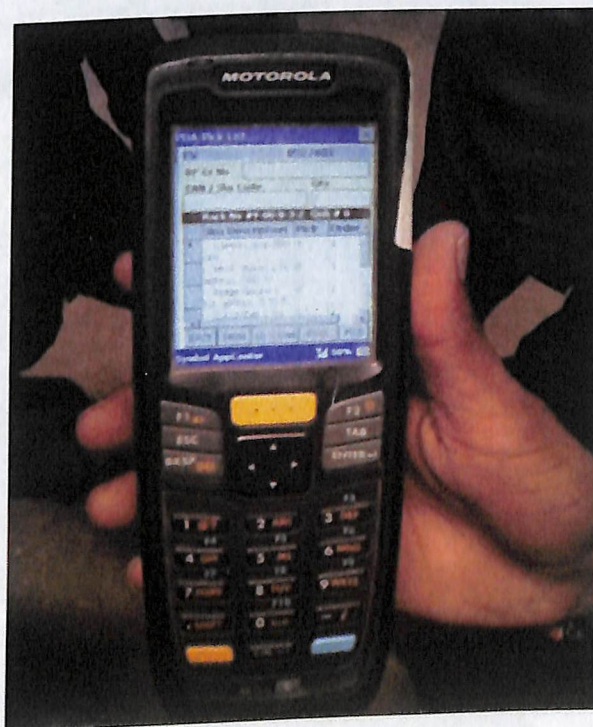
- a. Cash on delivery
- b. Credit and debit cards (VISA / MasterCard / American Express)
- c. Sodexo passes on delivery (only for food items).

Customer order and Delivery

Pic 6.9 Product as seen by customer in mobile app



Pic 6.10 Receiving customer order in distribution center



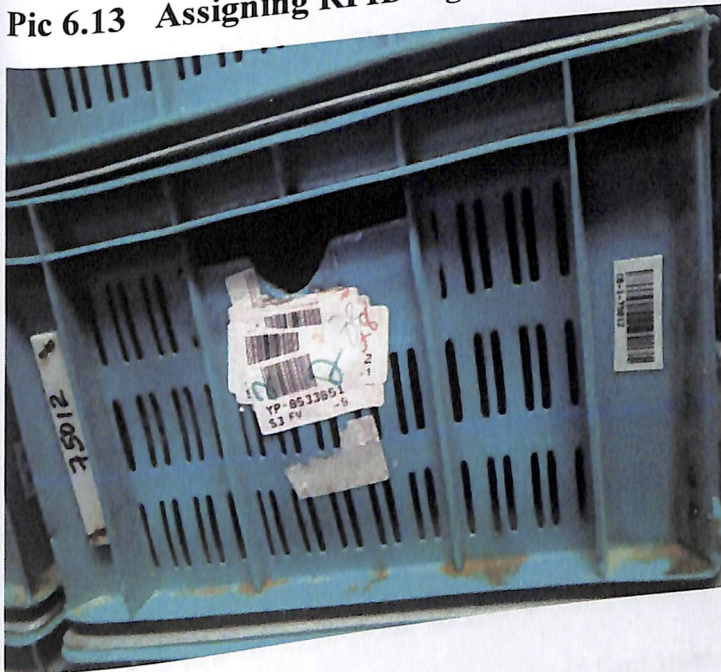
Pic 6.11 Packaging



Pic 6.12 Collecting items in customer basket



Pic 6.13 Assigning RFID tag



Pic 6.14 Dispatching to customer home



The VAT is included in the MRP of products. There are no additional taxes added by BigBasket. There is a delivery charge of Rs. 20 on orders below Rs. 1000.

B. Bigbasket to farmer:

After receiving produce in the distribution center, an invoice is provided to farmer. Payment will be made within three days from the date of delivery through NEFT (National Electronic Fund Transfer) to the bank account listed on the farmer registration form.

6.4.3 Information flow

A. Bigbasket to farmer:

Bigbasket's ERP provides real time data regarding the customer demand. Based on previous days sales and present prevailing prices indent will be given by the buyer to the farmer. Indent means order for fruits placed to a farmer under specified conditions of sale, the acceptance of this by farmer constitutes contract of sale. Indenting was generally done through mobile phone or even in WhatsApp.

B. Customer to BigBasket:

Information flows between customer and BigBasket occurs in two ways. First is through order and second is through feedback or Redressal. The customer will place the order by seeing the available products, prices and various promotional offers either in mobile App or in the website. After fulfilment of order by BigBasket customer can share his views through e-mail or phone. In case of any clarifications or complains customer can call BigBasket customer care. The customer service team is available throughout the week, all seven days from 7 am to 10 pm. They can be reached at +18601231000 or via email at customerservice@bigbasket.com.

6.5 Analyzing designed supply chain efficiency

An indicator of the efficiency of any supply chain is the extent of the price spread between the producer and the consumer. A higher price spread would indicate a lower efficiency. Same way, a low level of price spread would indicate a high efficiency of the supply chain mechanism.

Also the added advantages of fruit quality and traceability, the designed supply chain as well offers a descent price to the farmer and consumer. In Ramanagara farmers share in customers'

price and retailers' margin is increased by Rs.10/kg and Rs.3/kg respectively. Consumer price decreased by Rs.20/kg. Table 6.11 shows the comparison between the existing supply chain and the designed supply chain of Karnataka alphonso in Bangalore BigBasket.

Table 6.11 supply chain efficiency of Karnataka Alphonso

	Vendor supply chain		Designed supply chain		Remarks
	Price (Rs)	Share (%)	Price (Rs)	Share (%)	
Cost break down					
Consumer pays	145	100	125	100	Consumer price reduced by Rs.20/kg
Retailers margin	26	18	29	23	The retailers margin increased by Rs. 3/kilo
Retailers wastage	7.25	5	9	7	Wastage in DC increased by Rs.1.75/kg
Retailers rejection	7.25	5	9	7	Retailers rejection increased by Rs. 1.75/kg
Inward logistics	1.5	2	6	4	Inward logistics from farm to Bigbasket DC
Vendor margin	14.5	10	-	-	Vendor eliminated
Vendor wastage	7.25	5	-	-	Vendor eliminated
Transit cost	6	4	-	-	NA
Transit wastage	3	2	2.5	2	Transit wastage decreased by Rs. 1/kg
Ripening cost	5	4	6	4	Ripening cost increases by Rs. 1/kg
Village trader/ commission agent	14.5	10	-	-	No Village trader/ commission agent
Net to farmer	53	37	63	50.5	Increased farmer earnings by Rs.10/kg

Source: Compiled from the primary data

Table 6.12 Supply chain efficiency Banginapalli mangoes

	Vendor supply chain		Designed supply chain		Remarks
	Price (Rs)	Share (%)	Price (Rs)	Share (%)	
Cost break down					
Consumer pays	110	100	100	100	Consumer price reduced by Rs.10
Retailers margin	18	20	25	25	Retailers margin increased by Rs. 7
Retailers wastage	4.5	5	4	4	Wastage in DC remains same
Retailers rejection	4.5	5	7	7	Retailers rejection increased by Rs. 2.5
Inward logistics	2.7	3	5	5	Inward logistics from farm to Bigbasket DC
Vendor margin	9	10	-	-	Vendor eliminated
Vendor wastage	4.5	5	-	-	Vendor eliminated
Transit cost	3.6	4	-	-	NA
Transit wastage	1.8	2	2	2	Transit wastage remains same
Ripening cost	7.5	8	8	8	Ripening cost remains same
Village trader/ commission agent	9	10	-	-	No Village trader/ commission agent
Net to farmer	45	40	50	50	Increased farmer earnings by Rs.5/kg

Source: compiled from the primary data

In Ranga Reddy farmers share in customer's price and retailer's margin is increased by Rs.5/kg and Rs.7/kg respectively. Consumer price decreased by Rs.10/kg. Table 6.12 shows the comparison between the existing supply chain and the designed supply chain of Banginapalli mangoes in Hyderabad BigBasket.

6.5.1 Benchmarking

Price of the mangoes is fixed through price benchmarking. Price benchmarking is typically utilized when a company has a competitor-based pricing strategy. Benchmarking was done triweekly by collecting prices of mangoes from various online and brick and mortar retailers. To gain competitive advantage the prices of BigBasket was kept either first lowest or second lowest.

6.5.1 Food miles

Food miles is a term which refers to the distance fruit is transported from the time of its production until it reaches the consumer. Food miles are one of the factor used for assessing the environmental impact of food, including the impact on global warming. The designed supply chain effectively reduces the distance travelled by mango fruit until it reaches the consumer. Table 6.13 gives the details of several moves and total distance travelled by mango fruit before reaching customer home. It was assumed that the customer is from Jayanagar 4th block in Bangalore. The mangoes travelled a distance of only 87 km in designed supply chain when compared to existing supply chain which is 155 km.

Table 6.13: Total distance travelled by mango fruit before reaching customer in Bangalore

Vendor supply chain		Designed supply chain	
Movement	Distance travelled (km)	Movement	Distance travelled (km)
Orchard to RMC	15	Orchard to ripening chamber	2
RMC chennapatana to Srinivasapura fruit market, Bangalore	100	Ripening chamber to BigBasket DC	70
Market to ripening chamber	5	DC to customer home	15
Ripening chamber to vendor warehouse	10		
Vendor warehouse to BigBasket DC	10		
DC to customer home	15		
Total	155		87

Source: Compiled from the primary data

Table 6.14 gives the details of several moves and total distance travelled by mango fruit before reaching customer home. It was assumed that the customer is from Jubilee Hills, Hyderabad. The mangoes travelled a distance of merely 80 kms in designing supply chain when compared to existing supply chain which is 337 kilometers. The vast difference in the food miles in Hyderabad is mainly because of sourcing of mangoes from Vijayawada market.

Table 6.14: Total distance travelled by mango fruit before reaching the customer in Hyderabad

Vendor supply chain		Designed supply chain	
Movement	Distance travelled (km)	Movement	Distance travelled (km)
Orchard to RMC Vijayawada	30	Orchard to ripening chamber	60
RMC Vijayawada to Dilsukhnagar fruit market, Hyderabad	280	Ripening chamber to BigBasket DC	10
Market to ripening chamber	0	DC to customer home	10
Ripening chamber to vendor warehouse	2		
Vendor warehouse to BigBasket DC	15		
DC to customer home	10		
Total	337		80

Source: Compiled from the primary data

6.5.2 Customer satisfaction

The Supply Chain Management system of a company can directly influence the customer satisfaction and hence the profitability of the company. In recent years companies have realized that the SCM can be leveraged as a big differentiator in providing customer satisfaction. A company having great customer service has an obvious advantage over the competition.

In case of E-commerce companies, who are selling products online, the Supply Chain Management is an inherent part of the business. Companies which are creating additional value by

exceeding customer expectations are a source of delight for the customer and can ensure their publicity through reviews and feedbacks which they get from the customers.

An online customer survey was undertaken in Bangalore and Hyderabad cities. Customers who ordered mangoes are randomly selected and a questionnaire with seven closed end Likert scale questions was sent through mail. The results are as follows:

A. Bangalore

Table 6.15 gives the satisfaction details of various customers who ordered Karnataka alphonso mangoes in Bangalore. As can be seen, the majority of customers are satisfied with the quality of the product and service offered by Big Basket. Six out of total twenty customers are not satisfied with the pricing and offers offered by Big Basket. This indicates the price consciousness of the consumer. Table 6.16 presents the future buying opinion of the customer.

Table 6.15: Customer attitude towards mango in Bangalore

	Freshness	Size	Taste	Packaging	Pricing	Availability	Offers
Excellent	4	3	6	2	0	6	2
Good	14	15	12	16	16	14	15
Bad	2	2	2	2	4	0	3
Worse	0	0	0	0	0	0	0
Total	20	20	20	20	20	20	20

Source: compiled from the primary data

Table 6.16: Future buying opinion of the customer

Future buying	Frequency
Yes	20
No	0
Total	20

Source: compiled from the primary data

B. Hyderabad

Table 6.17 indicates the satisfaction details of various customers who ordered Banginapalli mangoes in Hyderabad BigBasket. As can be seen, the majority of customers are satisfied with the quality of the product and service offered by Big Basket. The same trend followed regarding pricing and offers. Six out of total twenty customers are not satisfied with the pricing and offers offered by Big Basket. This shows the price consciousness of the consumer is same across the cities. Table 6.18 presents the future buying opinion of the customer.

Table 6.17: Customer attitude towards mango in Hyderabad

	Freshness	Size	Taste	Packaging	Pricing	Availability	Offers
Excellent	4	2	3	3	0	4	0
Good	14	15	16	15	17	14	16
Bad	2	3	1	2	3	2	4
Worse	0	0	0	0	0	0	0
Total	20	20	20	20	20	20	20

Source: compiled from the primary data

Table 6.18: Future buying opinion of the customer

Future buying	Frequency
Yes	18
No	2
Total	20

Source: compiled from the primary data

6.5.3 SWOC analysis of the designed Supply Chain

SWOC analysis or SWOC matrix is an acronym for strengths, weaknesses, opportunities, and challenges, is a technique used to evaluate those four elements of a project or business venture. In any strategic planning process, two factors, namely internal and external environmental factors play an important role. A scan of these factors is important for future planning. The environmental factors, which are internal to the Bigbasket, can be classified as strengths and weakness. The factors, which are external, can be opportunities and challenges. The strategic analysis of environmental factors is referred as SWOC analysis. In this study the strengths, weaknesses, opportunities, and challenges of the designed supply chain are analyzed. The results of SWOC analysis are presented in the table 6.20.

A. Strengths: Qualities that give an advantage

These are internal environmental factors which adds strength to the project. The main core advantages of this farmer outsourced supply chain are availability of good quality fruits, traceability of products. Safe and healthy ripening procedures are adopted by farmers. Most of the vendors use calcium carbide, an extremely hazardous, toxic chemical for ripening, which was banned in India long ago. Due to elimination of middlemen there was a substantial growth in the net farm price received by farmer and retailers margin. The customers' price was also cut down considerably. The product quality combined with customer satisfaction increases the "Fresho" brand equity. Utilization of new technologies like RFID and Internet of Things are the added advantages to the supply chain. Besides all, a considerable portion of the produce wastage was reduced due to minimal handling.

B. Weaknesses: Lacunae internal to the system which therefore can be changed

The first and foremost weakness in this model is the improper supplies and the late deliveries from the farmer. Due to which replenishment time was increased considerably. Time lag in payments to farmer by Big Basket is another drawback. Lack of infrastructure and trained, motivated manpower remains one of the main weaknesses.

C. Opportunities: Windows of possibility to do or achieve something

There are a plethora of opportunities in this model, as there are only very few players in this sector. Product development through Value addition, improving packing styles, and introducing assorted variety packs poses a good opportunity in metro cities. The buying price can be further reduced by procuring directly from farmers. The improper supply problem can be overcome by forming farm clusters and farm aggregation methods. Usage of zero emission electric vehicles to deliver customer orders will further reduce the carbon emissions in cities. There are huge price and demand variability between cities. These variances in prices can be exploited by Big Basket through national sourcing.

D. Challenges: External factors, beyond one's control that limits or restricts

The primary challenge in every fresh produce retailing is the perishability nature. Other considerable challenges are the reluctance of customer to buy fruits online, Price consciousness of consumer and increasing operational costs.

Table 6.19: SWOC Matrix

	Rank
A. Strengths:	1
Traceability of the mangoes	2
Good quality	3
Safe and healthy ripening procedures	4
Increase in net farm price	5
Increase in Retailers' margin	6
Reduction in customers' price	7
"Fresho" brand image	8
Technologies like RFID and Internet of Things	
B. Weakness:	1
High Replenish time	2
Improper supply from farmers	3
Time lags in payment period for farmers	4
Product perishable in nature	

Lack of infrastructure	5
Lack of trained and motivated manpower	6
Lack of awareness in farmers	7
C. Opportunities:	
Product design and development	1
Value addition	2
Use of zero emission electric vehicles	3
To form farmer clusters & collection centers	4
Set up of ripening chamber and pack house	5
“Fresho” Brand mango product line can be increased	6
Direct farm procurement	7
National sourcing	8
100 per cent FDI allowed in food processing sector will create rural infrastructure	9
D. Challenges:	
Reluctance of customers to buy fruits online	1
Increasing No.of players in the segment	2
Price conscious consumer	3
Increasing operational costs	4

Source: Compiled from the primary data

Chapter – 7

Summary of Findings and Suggestions

Chapter – 7

SUMMARY OF FINDINGS AND SUGGESTIONS

7.1 Major findings

The major findings of the study were as follows:

7.1.1 Marketing aspects of farmers

Overall, mango reaches to the consumer through five different channels

1. Grower to Pre-Harvest Contractors (PHC)
2. Grower to Up-Country Trader (UCT)
3. Grower to Village Trader/Commission Agent (VT/CA)
4. Grower to Retailers
5. Grower to customer

In Ramanagara about 89 percent and in Ranga Reddy about 80 percent of the farmers transact through middlemen i.e., Pre-Harvest Contractors or Up-Country Trader or Village Trader/Commission Agent. The present commission charged by the commission agents is nearly 4-10 per cent of the total value. But the commission charges fixed under the APMC Act of State are only 1 to 1.5 per cent.

7.1.2 Price spread and marketing efficiency

The price spread for a kilogram of Karnataka Alphonso and Banginapalli mangoes are worked out. In Ramanagara and Ranga Reddy channels, involving middlemen depicted the highest price spread, indicating the low marketing efficiency and exploitation of the producers under the supply chain involving commission agents, up country traders and pre harvest contractors. The total negative impact is real and significant as most of the mangoes (89%) are supplied through

this channel. In both the districts the farmers transacted through retailers realized above 50 percent of share in consumers' price.

7.1.3 Designed supply chain

A. Product flow

The product flow starts from orchards and ends in the customer home. After harvesting mangoes were sent to the ripening chamber on the same day. Mangoes were treated with ethylene gas for 48 hours. On day four the mangoes were graded and shipped to the distribution center in Bangalore. Until this point farmer managed the supply chain and from here onwards supply chain was managed by Big Basket. On the same day the mangoes were dispatched to customer home. The only flaw observed in the product flow is the late delivery of fruits by the farmers.

B. Funds flow

Funds flow between customer and BigBasket occurs in real time. Bigbasket pays farmers within three days after receiving delivery. It was observed that payment to farmers was delayed sometimes.

C. Information flow

Information flow between customer and BigBasket was through mobile app or website. Whereas BigBasket communicated with farmers through phone and WhatsApp. There were no flaws in information flows.

7.1.4 Supply chain efficiency

The newly designed farmer outsourced supply chain was compared with the existing vendor managed supply chain. It was observed that, in Ramanagara the price received by farmers for one kilogram of Karnataka Alphonso increased by Rs. 10 per kilogram when compared to other marketing channels. The consumer price was reduced by Rs.20 per kilogram. Substantially the retailer's margin is increased by Rs.3 per kilogram

In Ranga Reddy farmers share in customers' price and retailers' margin is increased by Rs.5 per kilogram and Rs.7 per kilogram respectively. Consumer price decreased by Rs.10 per kilogram

7.1.5 Food miles

The designed supply chain effectively reduced the distance travelled by mango fruit until it reaches the consumer. In Bangalore, it was assumed that the customer is from Jayanagar 4th block. The total distance mangoes travelled before reaching the customer is only 87 kilometers in the planned supply chain when compared to existing supply chain which is roughly 155 kilometers.

In Hyderabad It was assumed that the customer is from Jubilee Hills. The mangoes travelled a distance of only 80 kilometers in designed supply chain when compared to existing supply chain which is 337 kilometers. The vast difference in the food miles in Hyderabad is mainly because of mangoes in the vendor sourced supply chain comes from Vijayawada market.

7.1.6 Customer satisfaction

An online customer survey was undertaken in Bangalore and Hyderabad cities. Majority of customers are satisfied with the quality of the product and service offered by BigBasket. In Bangalore three out of the total twenty customers are not satisfied with the pricing and offers provided by Big Basket. All the customers were willing to buy mangoes through Big Basket in the future.

In Hyderabad too majority of customers are satisfied with the quality of the product and service offered by BigBasket. It was also observed that a 30 percent of customers are not satisfied with existing offers and promotions. In future nineteen out of the total twenty customers are willing to buy mangoes in BigBasket.

7.2 Recommendations

1. Farm aggregation:

It was observed that there are issues in the supply from the farmers' side. Farm aggregation would be a better solution to tackle this problem. Instead of depending on single farmer a group of farmers should be clustered and a lead farmer will be selected among them. The role of the lead farmer is to aggregate the indented demand from the cluster. This model ensures seamless supply from farmers.

2. Infrastructure:

It is recommended to start a temporary collection center one each in Ramanagara, Chittoor and Ranga Reddy. And ripening chambers with pack house facilities in both Bangalore and Hyderabad. In off season ripening chamber and pack house can be used for other fruits. This will likewise serve to supply northern states, where there's a good demand for southern varieties.

3. Faster payment to farmers:

It was also observed that lapses in payment to farmers are making a dent in a supplier - retailer relationship. Hence, it is recommended to make arrangements to pay farmers without any delays.

4. Offers and promotions:

Through customer survey, it was observed that 30 per cent of customers are not satisfied with existing offers and promotions.

7.3 Suggestions

1. Product design and development:

It's time for BigBasket to concentrate on the mango product line. There's a market for value added premium products in metro cities. In house value addition in packaging could serve this purpose. An assorted pack of various fruits or various varieties of single fruit can be launched.

The packaging of this premium product can be done in a bamboo basket surrounding with fresh mango leaves along with a greeting card. This gives customer a natural and fresh feel.

2. National sourcing team:

BigBasket now present in pan India. It has a great opportunity of exploiting price variations across cities. A national sourcing team should be put up in every major city. This also ensures continuous product availability at competitive price.

3. Trained and motivated personnel:

Trained and motivated personnel should be employed at all levels of operations to adapt to the fast changing e-commerce sector.

4. Fresho brand development:

More emphasis can be given to *fresho* brand in order to increase brand visibility and brand awareness. So that *fresho* will become a familiar brand in fruits and vegetables and will attract more customers to BigBasket.

7.4 Conclusion

Creation of proper fruits supply chain system will ensure the availability of quality produce at competitive price to consumers at a convenient time and place. The supply chain can be made efficient by reducing the length of the chain and improving infrastructure facilities at all levels. Disintermediation and participation of organized players like BigBasket enables modern supply chain with a view to benefit both farmers as well as ultimate consumers. All these initiatives will ensure consistency in supply and provide recorded and demonstrated traceability of products. This will benefit the farmers with good remunerative price and consumers with good quality produce and also will reduce the losses incurred due to poor post-harvest management and thereby ensuring adequate supply to the consumers.

The issues for the BigBasket lies in tackling the time-based competition and volatile customer demand and developing a responsive and flexible supply chain. BigBasket dealing with the supply of fresh farm produce fruits should focus more on tactical and operational issues instead

in alignment of the strategic business issues. The BigBasket - farmer supply network uses the concept of preferred supplier, which requires a reduced governance costs related to handling practices and transport through a dedicated farmers or farmer producer organisations. This requires lead time reduction for the centralized coordinated ordering and deliveries while maintaining good relations with farmer and FPO's. The study reveals that the implementation of direct farm procurement supply chain of mangoes has increased the farmer's net price, retailer's margin and reduced the customer's price, which contributes to a good image of the Bigbasket.

The farmers may be encouraged to pursue quality controls at the farm level through relation specific investments. The BigBasket can also focus on the introduction of new varieties of fruits and technologies, including the development of organic farm produces, oriented towards specific consumer demands. This would enable the branding of fruits through close partnership of the farmers and the Bigbasket. This partnership would have some direct implications for the trust in delivery relationships. Further, pooling of the farmers and FPO's would represent a business model to allow small and marginal farmers to have direct link with organized retailer.

Further, the present study is based on the perspectives of fresh mango fruits, thus a single supply chain. So, future studies should focus on several supply chains and/or networks to provide deep insights about the patterns of vertical and horizontal collaboration.

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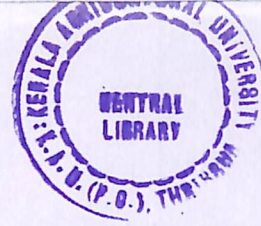
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Appendix

APPENDIX

KERALA AGRICULTURAL UNIVERSITY
COLLEGE OF CO-OPERATION, BANKING & MANAGEMENT
VELLANIKKARA, THRISSUR



TOPIC: SUPPLY CHAIN MANAGEMENT OF MANGOES IN ONLINE GROCERS- A
STUDY OF MANGO SUPPLY CHAIN IN BIGBASKET: BENGALURU AND HYDERABAD

QUESTIONNAIRE FOR CONSUMERS

Dear consumer we are conducting an online survey regarding the purchase of mangoes from BigBasket. Please mark your responses duly and click '*submit*' button below. Thank you.

No.	Parameters	Excellent	Good	Bad	Worse
1	Freshness				
2	Taste				
3	Size				
4	Packaging				
5	Pricing				
6	Availability				
7	Offers and promotions				

Any suggestions:

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INTERVIEW SCHEDULE FOR FARMERS

- 1. Name:**
- 2. Gender:**
- 3. Age:**
- 4. Education:**
- 5. Orchard area and land holding:**
- 6. Age of mango orchard:**
- 7. Varieties of mango growing:**
- 8. Nature of cultivation:**
- 9. Present marketing channel:**
- 10. Price received per kg:**
- 11. Constraints in present marketing channel:**
- 12. Procedure of present marketing:**
- 13. Did you ever transacted through organized retailers earlier:**
- 14. Are you aware of BigBasket?**
- 15. Are you ready to supply for BigBasket:**
- 16. Is the business model of BigBasket is ok for you? If not any requirements and suggestions?**

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INTERVIEW SCHEDULE FOR MIDDLE MEN

1. Name
2. Age:
3. Education:
4. Commission agent/ pre harvest contractor/ up country agent
5. Experience in this field
6. Any other profession in off season:
7. What are various marketing channels of mango?
8. What are the terms of contract?
9. What are various costs incurred in marketing?
10. What is your marketing margin?
11. What are various varieties of mangoes you transact?
12. To whom you will supply?
13. What are the constraints faced by you

