



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2020; 6(5): 361-364
www.allresearchjournal.com
Received: 10-03-2020
Accepted: 12-04-2020

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Estimating supply chain length: A study on biscuit companies

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Abstract

Estimating the length of the supply chain is vital to manage surplus or shortage situation at the point of sale. Managing change in demand is linked with the performance of firms. One method to estimate the length of the supply chain is by summing up the number of days taken to transit raw material, work-in-process, and finished goods. The other method of estimating the length is via data collected from retailers (Shah, 2016). In this research, a survey on three brands of biscuits (Parle, Britannia, and Cadbury) was conducted at 18 grocery shops located in Ahmedabad city to estimate the length of the supply chain using stock of the biscuits available and monthly average units sold. This method helps in estimating supply chain length when data about days of raw material and work-in-process from suppliers and manufacturers are not available. The result shows that the average length of the supply chain for Parle, Britannia, and Cadbury was 48, 45, and 46 days respectively. The study will be useful to the supply chain managers in moving faster in the competition and making stock available at the right time for the buyers.

Keywords: Supply chain length, inventory management, procurement, FMCG, evaluating purchasing performance

1. Introduction

Supply chain management is the key to business processes from the initial point of raw material procurement to the final point of making goods available in the hands of end-users. It also includes such intermediate processes as inbound logistics, material handling, storage, packaging, and outbound logistics. In India, the supply chain is bound to revolution and it is trying to connect internally as well as externally. Its network is growing regional integration along with the rapid impact on trade. With the help of a modernized and efficient supply chain, it reduces manufacturing cost and can increase in consumption growth due to better access. The supply chain has become a cornerstone for the industry as it is bringing a revolution in the business and giving new solutions with great efficiency and cost-effectiveness which drive towards tremendous value for the business.

The major transformation in the supply chain has been impacted by technology, digital platform, and artificial intelligence. Earlier, there were stockists who bought a large volume of material from manufacturers and stored it in warehouses. The stockists would only plan supply chain and warehousing. They then sell to sub-distributors, who sell to city level distribution or retailers and which in turn sell to the customers when there is demand. It was a 3-4 step process, wherein every level the cost is to be paid for supply chain service. With the help of artificial intelligence, digital transformation, and technological advancements, the process has now become simple and easy, eliminating middlemen, which also helps in cost-effectively delivering the products. One of the major challenges in the supply chain in India is investors' isolated interest and focus on transportation. The way to flourish the supply chain industry in India is to make investors aware of multiple opportunities available for them in investment and innovation. India is the second-largest economy in the world, highly contributing Fast Moving Consumer Goods (FMCG) sector in the country's Gross Domestic Product and in employing more than three million people (Saqib, 2017) [14]. Presence of multinational companies, tough competition, both the form (organized and unorganized) of retailers, ingrained network of distribution, and low operation cost are some of the characteristics of the FMCG sector in India. Fast Moving Consumer Goods is the fourth largest sector in the Indian economy.

The main segments are food and beverages, healthcare, and household, and which 19% sector is covered by food and beverages; 31% by household and 50% by personal care. The FMCG sector has grown from US \$ 31.6 billion in 2011 to US \$ 52.75 billion in 2017-18. The sector is further expected to grow at a compound annual growth rate of 27.86 percent to reach US \$ 103.7 billion by the year 2020. India is the third-largest producer of biscuits in the world. Around 33% of the Indian bakery industry is of biscuits. According to India Biscuit Market Overview 2017-2023, "Organized Biscuit market revenues will surpass the mark of INR 400 billion by 2023". Biscuits manufacturers in India do not manufacture only for the domestic market but also export to many countries. Consumers demand more variety of biscuits, which leads to diversity in their choice. Biscuit making companies are trying to segment their products by introducing different varieties so that the consumers have more options to choose from. This has created competition among brands to make their biscuits better than their competitors. Nagarajan and Sheriff (2013)^[10] presented emerging challenges and prospects in the marketing of newly launched FMCG products in India. The study also focused on the mindset of consumers, towards Fast Moving Consumer Goods products. The authors suggested pondering upon three questions to understand consumers' expectations – 1) what more? 2) what next? and 3) what else?

1.1 Parle

Parle was established in 1929. It is the world's largest selling biscuit brand today. Parle guarantees nutrition, quality, and superior taste. It has a deeper understanding of the Indian consumer market, which helps them in developing marketing philosophy targeting the need of Indian mass. In terms of price, it has a varied range allowing customers from all classes to buy Parle. It has a varied product range which the customer or consumer can enjoy to its fullest.

1.2 Britannia

Britannia is more than a hundred and twenty-five years old FMCG company. Britannia currently owns about 40% of the market share in bread, cakes, biscuits, rusk, and other products. It is amongst the most trusted biscuit brands in India. This company has reached over 50% of Indian homes. Britannia Industries boasts that they have stayed true to their company tagline - "Eat Healthy, Think Better". According to their estimates, they have removed over 8,500 tons of trans fats from their products, becoming India's first Zero Trans Fat company. It is one of the most trusted brands in the Indian market. Their range of biscuits includes Marie Gold, Little Hearts, Nice Time, Tiger biscuits, and Good Day. Britannia has a very varied product line.

1.3 Cadbury

Cadbury started its operations in India in 1948. On 21 April 2014, Cadbury India changed its name to Mondelez India Foods Limited. Cadbury India said, "The introduction (of Oreo) marks the entry into a new category in India, which aims to make the World's favourite biscuit, Oreo, one of India's favourite biscuits". Cadbury introduced Oreo in the Indian market in 2011 with an estimation of 1.8 billion dollars.

2. Measuring Supply Chain Performance

There are a few studies showing ways of measuring demand and supply related data. For example, Wang, Fan, and Gong (2018)^[17] proposed a new method to estimate market demand based on sales data to optimize purchasing strategies. The authors suggested optimizing purchase strategies for retailers using sales data from FMCG retailers based in Guiyang, China. Time is a resource, which must not be wasted else the time between products' manufacturing and delivery would increase. Aljunaidi and Ankrah (2014)^[1] examined universal applicability of the claim whether lean manufacturing is applicable to the Fast Moving Consumer Goods Industry. The authors used via interviews and multiple case-studies of three FMCG operations in Saudi Arabia. It was concluded that lean could be implemented in FMCG operations too. The authors identified such conditions that were required for the successful implementation of lean. The conceptual framework for implementing lean in the FMCG industry was presented.

In this study, the marketing information approach is used to estimate supply chain length. Supply chain performance is highly related to the length of the supply chain. The lesser the days of supplier lead time, raw material, inbound logistics, work-in-process (w.i.p.), outbound logistics, and outbound logistics; the better the supply chain performance. There are two ways to measure or estimate the supply chain length (Shah, 2016)^[15]:

(i) Using production side information

Production information includes summing up days of raw material, days of w.i.p, and days of finished goods.

(ii) Using market information

Market information calculation includes the manufacturing date of the product printed on the label of the products, date of data collection, stock available at retailers, and average monthly sales at that point of sales.

3. Literature Review

Chinna (2016)^[5] explained Supply Chain Management as an important strategy for business organizations and gave an overview of the FMCG sector in India in the study. The study described a few challenges in this sector as complex distribution set up, entry of national-level players, tax structure, counterfeiting, channel dynamics, and infrastructure issues. The study also mentioned examples of popular Mumbai's *Dabbawala* and HUL's Project Shakti. Third Party Logistics and modern retailing were also discussed. The authors concluded that there was a need for improvements in supply chain performance in India. One of the ways to measure supply chain performance is to calculate the length of the supply chain as used in the study by Ghosh (2015)^[6]. With an aim to understand supply chain opportunities in organized and unorganized sectors in Indian, Ghosh (2015)^[6] estimated the length of the supply chain of FMCG companies using manufacturing date and expiry date mentioned on the packaging of the FMCG products. The author also noted that products' rate of use and shelf life are also important to measure the supply chain length. The study consists of such objectives as to estimate the length of the supply chain for packed goods, to compare

the supply chain lengths of the large firms with that of small firms, and to compare the length of the supply chain for fast-moving products with slow-moving products. Products taken for the study were biscuits brands such as ITC Marie Light, Britannia Marie Gold, and Parle Marie along with other FMCG products such as noodles, toothpaste, and soaps. Descriptive statistics showed that Marie Gold biscuits had shorter supply chain length followed by Marie Light and Parle Marie. The author concluded that with large data, manufacturers can understand supply chain length better, which helps them to manage operations smoothly. To reduce the supply chain length in a diverse market, product distribution and logistics must be strengthened. A similar emphasis on operations in the supply chain was given in the recent study on supply chain management in a highly growing FMCG Sector in Bangladesh, conducted by Ray, *et al.* (2016) [13]. The study notes that supply chain management is needed to optimize the speed and efficiency of operations, which are important for the quality and delivery of products; and for gaining global competitive advantage. The study encompassed such concepts as KPI, SWOT analysis, value chain, lean Supply Chain Management, and push-pull strategy. Poranki, Perwej, and Akhtar (2015) [12] studied the use of supply chain information technology in FMCG companies in India, particularly, in certain towns of Tamil Nadu state. The authors discussed the scenario in India, the dynamic business model with reference to traditional supply chains, and measures to enhance the delivery process. 250 retailers, out of 500 and 50 distributors out of 120 were studied using the simple random technique. The study focused on how information technology was the strength of the selected FMCG companies in making the supply chain more suitable to the needs of the companies. The study found that the use of information technology in selected FMCG companies (HLL and Dabur) was sparse in small towns of Vellore and Ranipet, Tamil Nadu.

Kannan and Tan (2010) [8] presented an insight about engaging and integrating the supply chain by examining the span of supply chain integration, patterns of integration practice, and implications for performance. The aim of the study was to explore span of integration with reference to proximity and location of the supply chain partners. The authors also explored whether or not the performance differences is affected by the span of integration, impact of culture, individual versus group orientation, and partner engagement. The study found that span of integration was related with supply chain practice. With reference to the span of integration, the study posed an important question regarding inter-firm linkages and supply chain perspective. Cluster analysis was applied in this research to analyse the survey data.

Bala and Kumar (2011) [2] identified performance attributes and other issues of the supply chain in the Fast Moving Consumer Goods industry, via survey consisting of 11 variables. The authors compared three supply chain operational models – The Resource Event Agent model, the balanced scorecard, and the SCOR (Supply Chain Operations Reference). Five criteria were applied to compare these models based on strength of criteria – 1) Suitability for the FMCG industry, 2) Defining standard supply chain activities, 3) Capability of analyzing and supply chain performance measurement at all levels and activities, 4) Benchmarking, and 5) Suggesting best

practices within the supply chain environment. The authors found that SCOR was best suited for the FMCG industry.

Une and Sangle (2014) [16] conducted a survey and interviews to explore how supply chain management in the FMCG industry in Maharashtra, India affects profitability. Reliability, responsiveness, flexibility, cost, asset management, usage of IT tools and extent, the scope of IT application, etc. were used as performance parameters. Other indicators such as procurement lead time, finished goods stock, raw material inventory, freshness index, and customer service level were used. The study found 90-95 % SCM reliability and 5-7% scope for improvement there. Supply chain responsiveness was found to be 7-15 days. Supply Chain Cost was 5-8% of the cost of production.

Ogunlela and Lekhanya (2016) [11] conducted an exploratory study on how integrated supply chain management promotes competitiveness in the Nigerian FMCG industry. The study also highlighted critical factors affecting the implementation and use of various models. The authors collected survey responses from 80 Lagos based FMCG companies. Taking departments as strata, stratified random sampling was used. The results show that 58% of the respondents agreed or strongly agreed that staff members were encouraged to produce more through effective training schemes using integrated supply chain management. However, staff members lacked adequate training relevant to their roles. Authors suggest that in future, large-scale studies should be conducted in FMCG on integrated SCM models using mix-method and an investigation should be made on whether supply chain integration strategy helps in gaining a sustainable competitive advantage or not.

Observing a shift from traditional supply chain to green supply chain and to the green message to consumers in the present business, Mahendra and Williamson (2016) [9] used case study approach to assess the development of green supply chain management in FMCG industry to assess the implementation of green supply chain management through the chain. The authors presented the framework and benefits of green supply chain management. Green procurement, green materials, green packaging, and green logistics were discussed. Authors note that collaborative approaches, Life Cycle Management, and continuous improvement are essential for the success of green supply chain management and some of its benefits are enhanced corporate image, improves efficiency, and gaining competitive advantage.

4. Analysis and Finding

The comparison among three biscuits brands has been made using market information. 18 stores were visited to collect data about manufacturing dates printed on the product label, average monthly sales in the store, and available stock of the selected biscuit brands. The length of the supply chain (in days) for each biscuit brand was calculated adding A and B, where A is the difference between the date of data collection and the manufacturing date printed on the label of products. B is available stock units / sales units / 2. Supply chain length in months was then converted in days. Supply chain lengths were found to be 48 days, 45 days, and 46 days for Parle, Britannia, and Cadbury respectively. Britannia could manage a faster supply chain while Parle faced a 3-day longer supply chain length. The supply chain length of Cadbury was one day longer compared to Britannia and two days faster than that of Parle.

5. Conclusion

Supply chain performance affects business performance. Supply chain performance is highly associated with the length of the supply chain. Supply chain managers can calculate and compare the length of their products' supply chain with that of competitive brands. Because in such products as biscuits; brand loyalty, availability of substitutes, and online shopping preference are low, customers are less likely to wait in the situation of out of stock. To stay ahead in the competition, it is very important for the supply chain managers to monitor the length of the supply chain by watching the level of stock in hand and average monthly sales. Until the presence of greater competitive advantage in the products like biscuits, availability of the product in the store remains the criteria for purchasing. The established method of calculating supply chain length presented here with empirical market data saves managers' time to collect factory level data such as lead time of inventory.

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