

Mapping of Value Chain of a Local Biscuit Industry

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Abstract—Value chain analysis is a very important tool in determining the maximum possible value a company can offer to their customers. There are many ways by which values are added in every phase for a product transforming from raw material to the final product till it reaches the customers. There are many agents who help in value addition of that product during its transformation from raw material to its consumption. The study for this paper was carried out in a local biscuit industry at Jorhat, Assam. Various agents involved, from manufacturing to sales, are identified with the help of value chain mapping in order to determine the role of each actors and their relation between them. Reviews were also taken from the customers to find out factors and ranking them as per the response of the customers. Among these factors emphasis must be given to increase the value of the product.

Keywords—Value Chain Analysis, Value Chain mapping, value addition, biscuit factory.

I. INTRODUCTION

The term value chain analysis was first popularized by Michael Porter in 1985[1]. Value chain is a concept of strategically determining the activities involving in a business and assessing the cost and their differentiation with their competitors. The difference between what the customers are willing to pay for the product/service and the cost involved in creating the product/service determines the profit.

There are various activities involved in a value chain. In industries there are suppliers provide important resources to the industry so that they can create their required product. These products are then passed on to the distributors along the value chain to the customers. To gain competitive advantage and maximise profit the industry must understand every element of their value chain.

Like any industry, a biscuit industry also has various sets of activities in their value chain. They includes procurement of the raw materials like wheat flour, sugar, palm oils, flavours etc. for manufacturing of the products and also wrappers, cartons etc. for packing purposes. Marketing of the finished products and selling them to the distributors or wholesalers depending on their locations. The distributors further sales the product to the wholesalers/retailers. The wholesalers may sell these products to the retailers or directly to the customers according to their convenient. The customers may buy the product from the retailers as well as wholesalers.

Everybody in this chain adds value to the product till it reaches the customers.

The local biscuits industries face though competition from the branded companies as nowadays the products of the branded are easily available at nearly every shop even in rural areas. To gain competitive advantage these companies must adopt strategies and improve their value chain.

II. LITERATURE REVIEW

Faße, A. et al. (2009) suggested different methodology related to value chain analysis. They identified four major fields of methodologies: - input output flowaccounting, equilibrium models, econometrics, and analysis of global commodity chain [10].

Trienekens, J.H (2011) suggested that the framework of developing countries value chain consists of three components. The first one is identifying the major constraints for upgradation of value chain like restriction to market access, weak infrastructure, resources lacking and institutional voids. Second one he suggested is the three elements they the value addition, horizontal and vertical network structure and value governance mechanisms. Finally upgrading option is defined in the area of value addition [5].

Demont, M. and Ndour, M (2014) carried out an experimental evidence of the hypothesis that the domestic rice can compete with the imported rice by upgrading its value chain. The experimental results suggested that if the intrinsic and extrinsic quality attributes are tailored as preferred by the urban customers than the domestic rice can compete with the imported rice [7].

Irawati, R. H. et al. (2009) tried to identify the problems faced by small and medium furniture enterprises (SME). SME furniture faces unfair value added distribution due to imbalance information in the value chain. This results in uneven distribution of profits among the actors. Applying value chain analysis not only helps to improve small scale producer but also helps in better value added distribution among the actors [3].

Jacinto, E. R. (2004)analysed the small scale fisheries taking the top three exports of Philippines – tuna, shrimps and seaweeds. Using value chain analysis tried to know about seeks arrangements of the chain and the outcomes distributed along the value chain [11].

Hellin, J. et al. (2010),while trying to find the effect of contamination of aflatoxin, suggested using

the combination of market map and network mapping in order to visualize the movement of maize and ground nuts along the value chain. Using the mapping process would allow them to find out the actors and their roles in the value chain. They also tried find out about their awareness regarding the problems like health issue caused by aflatoxin [12].

Tchale, H. and Keyser, J. (2010), studied the value chain of the agricultural commodities (tobacco, maize, cotton and rice) of Malawi in order to determine the competitiveness of these products. They used the prices and costs of 2007/08 but found that it does not have any competitive advantage for which the importing is a better option. According to them high input cost, high trade margin in the value chain might be the reason of such low competitiveness [13].

Xaba, Bongwiwe G. and Masuku, Micah B. (2013), identified the marketing channels of the vegetable value chain. The market channels used by the vegetable farmers were identified and the analysis of market margins was done. They found that producer receive more price and highest share if sold directly to the consumers. The channels which has restaurants has highest gross marketing margin but low producer share. They discouraged the idea of commercialising the production of vegetable and suggested that farmers should be production oriented rather than market oriented [6].

Dashore, K. and Sohani, N. (2013), identified 14 barriers which prevented the implementation of the green supply chain management (GSCM). These barriers are complex and interdependent and structural model was developed using the technique Interpretive Structural Modelling (ISM). Ranking was given to the specific barriers so that it helps the policy makers and the top level management system of the industry can focus on which barrier should be eliminated based on priority [8].

III. OBJECTIVE

The objective of the present work was to map the value chain of a local biscuit industry at Jorhat, Assam and to identify the different actors in the chain. By mapping the value chain the flow of product can be trace from source till it reaches its destination. Secondly, customers view towards the product was analysed to see on which factors the industry has to emphasize to increase in their value.

IV. METHODOLOGY

Data collected was based on questionnaire survey of all the actors of the biscuit value chain. Analysis of the value chain network of the biscuit factory was done by applying the methods describe below.

A. Value chain mapping

Value chain mapping is an important process which helps to determine the activities taking place in an industry. Value chain mapping is the visual representation of the relation of the industry and the

other market players involved in the chain. It gives a clear picture of the important inputs and outputs along the value chain.

B. Value addition analysis

The methodology used for the analysis of the value chain can be done through financial analysis at product level. Financial analysis is done from the viewpoints of individual agents. Their financial cost and benefits are determined with the help of this methodology. Financial analysis is based on actual market price. So if there is any price distortion financial analysis helps to reflect those distortions [10].

The main point for value chain analysis is the value addition. The end-customer's willingness to pay decides the size of value added [5]. For each step as well as the overall value addition is calculated to determine the economic wealth which occurs due to one or more productive activity. The value addition can be calculated as [10]:

$$VA_{ij} = Y_{ij} - II_{ij}$$

Where,

VA_{ij} = Value Addition of individual agents j

Y_{ij} = Value of output product i

II_{ij} = Value of intermediate inputs

Thus all the cost and sales of the relevant stages must be calculated in order to measure value addition.

The overall value addition of the chain is [10]:

$$VA_{chain} = Y_{chain} - II_{chain} = \sum VA_{agents}$$

C. Marketing margin

Marketing margin is an important index for evaluating the performance of a market. The difference between price or value can be termed as margin [2]. Marketing margin can be calculated for various actors using the formulas [9]:

$$TGMM = \frac{\text{Consumer Price} - \text{Producer Price}}{\text{Consumer Price}} \times 100$$

$$GMM_i = \frac{\text{Selling Price}_i - \text{Purchasing Price}_i}{\text{Consumer Price}} \times 100$$

Where,

TGMM = Total Gross Marketing Margin

GMM = Gross Marketing Margin

NMM = Net Marketing Margin

i = agents (producer, distributor, wholesalers, retailers)

D. Relative Importance Index

An ordinal scale was used to determine the effects of factors like quality, taste, cost etc. The customers were asked to choose any of the ranks from 1 to 5 (5 denotes excellent, 4 denotes above average,

3denotesaverage, 2denotesbelow average,1 denotes very poor).

Relative Importance Index was used to analyse the data. It can be mathematically stated as given below [4],

$$RII = \frac{\sum P_i \times U_i}{N(n)}$$

Where,

RII = Relative Importance Index

P_i = Rating given by the respondents

U_i

= Number of respondents placing identical Rating

N = Number of respondents

n = Highest attainable score

V. ANALYSIS AND DISCUSSION

The data collection was done based on questionnaire survey. The data were collected from the biscuit factory and the distributor, wholesalers and retailers.

The agents involved in the value chain are producer, distributor, wholesalers and retailers. The producer collects the raw materials such as wheat flour, sugar, cartoons etc. from the local market at a factory delivery price. The other materials such as palm oil, wrappers, chemicals, and flavours are purchased from outside Assam.

The producer has distributor in approximately all districts of Assam. Only in local market the producer themselves act acts as the distributor. From the

distributor wholesaler as well as retailer collects the products. The customers can buy the product from either retailers or wholesalers.

The fig 1. below shows the value chain mapping of the biscuit factory. The continuous arrow line shows the flow of the product from the producer till it reaches its customers. The dotted arrow lines represent the information of the demands from the customers till it reaches the producer.

From fig 1.it is seen that the producer transport its products to the distributor. In local market the option of distributor is eliminated and the distribution is done directly by the producer. They sell their product directly to the wholesalers and the retailers. Apart from the local market all other distribution is done by the distributor. The wholesalers buy their product from the distributor. Their customers are both the retailers and the consumers. Retailers have the option to buy the product from the wholesaler as well as distributor. Their profit margin is high when they purchase the product from the distributor. The customer if want product in huge amount can buy from the wholesalers at cheaper rate than buying at the maximum retail price from the retailers.

The information of the demand of the product required starts from the customers which go to the wholesalers and the retailers. From them the information of the demand goes to the distributor from whom the producer can collect the information of the required demand and thus they can supply the amount of product required to be transported next time.

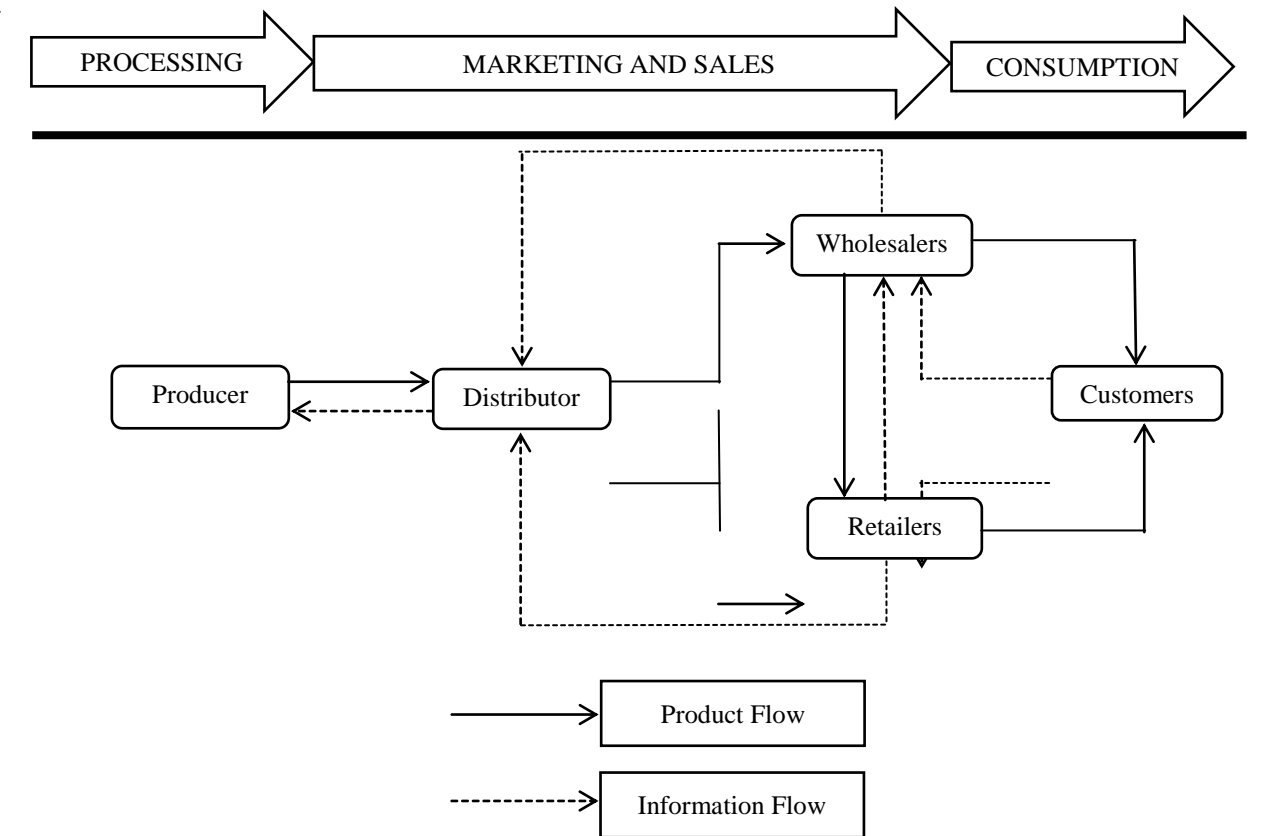


Fig 1. Mapping of the value chain of the biscuit industry

TABLE I
MARKETING MARGIN AND PROFIT MARGIN OF EACH ACTORS

Item	Producer	Distributors	Wholesalers	Retailers	Summation
Purchase Cost		Rs. 4,466.00	Rs. 6,060.00	Rs. 8,115.00	Rs. 18,641.00
Production Cost	Rs. 2,443.30				Rs. 2,443.30
Marketing Cost					
Labour	Rs. 144.50	Rs. 100.00	Rs. 222.22	Rs. 102.56	Rs. 569.28
Transport	Rs. 71.42	Rs. 75.00	Rs. 66.67	Rs. 25.64	Rs. 238.73
Others		Rs. 50.00	Rs. 184.72	Rs. 12.82	Rs. 247.54
Total Marketing Cost	Rs. 215.92	Rs. 225.00	Rs. 473.61	Rs. 141.02	Rs. 1,055.55
Total Cost	Rs. 2,659.22	Rs. 4,691.00	Rs. 6,533.61	Rs. 8,256.02	Rs. 22,139.85
Selling Price	Rs. 4,453.00	Rs. 6,060.00	Rs. 8,266.67	Rs. 10,000.00	Rs. 28,779.67
Value Added	Rs. 2,009.70	Rs. 1,594.00	Rs. 2,206.67	Rs. 1,885.00	Rs. 7,695.37
% of V.A.	26.12%	20.71%	28.68%	24.50%	100%
Profit	Rs. 1,793.78	Rs. 1,369.00	Rs. 1,733.06	Rs. 1,743.98	Rs. 6,639.82
%of profit	27.02%	20.62%	26.10%	26.27%	100%

From the above table (Table I) it is seen that the overall value addition in the value chain is Rs.7695.37. The producer contribution in value addition is Rs.2009.70 which is 26.12% of the total value addition. The distributor contributes Rs.1594.00 which is 20.71% of the total value chain, the wholesaler contributes Rs.2206.67 i.e. 28.68% and retailer contributes Rs.1885.00 is 24.50% of the total value addition in the value chain.

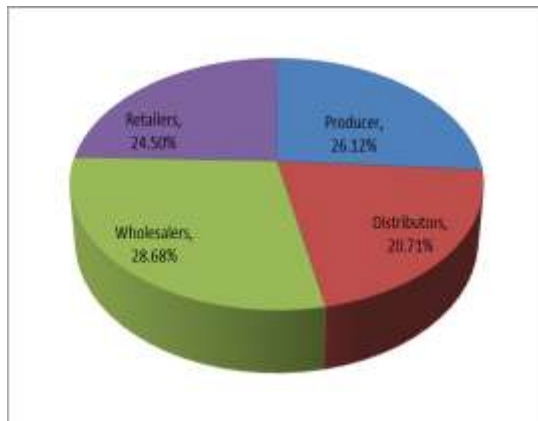


Fig 2. Pie chart for the distribution of value addition by individual agents

The pie chart (fig 2) shows that highest value addition is contributed is done by the wholesalers. The reason might be because the wholesalers sell the product both to retailers as well as the customers, who are the ultimate consumer of the product. Instead of buying the product in a single piece which cost them the maximum price they can purchase it at lesser price by buying large quantity from the wholesalers thus getting more value on the products.

The distributor contributes the lowest value as they target only the wholesalers and the retailers from whom the customers purchase the product. The

customers cannot purchase directly from the distributor as they sell large quantity of the product which is not economical from customer's point of view.

The producer and the retailers contribution is between the contributions of that of wholesalers and the distributor. The reason may be that the producer is not directly selling the product to the customers and the retailers though they directly sell the product to the customers but they also have to buy the product at a price for which they get less margin on the product. Also, sometimes there may be occasions where some items of the product may turn out to be defective. In that case the customers refuse to buy the product and also the wholesalers or the distributor refuses to take back the product. Thus in such cases the retailer has no option but to either consume the product himself or has to throw away the product.

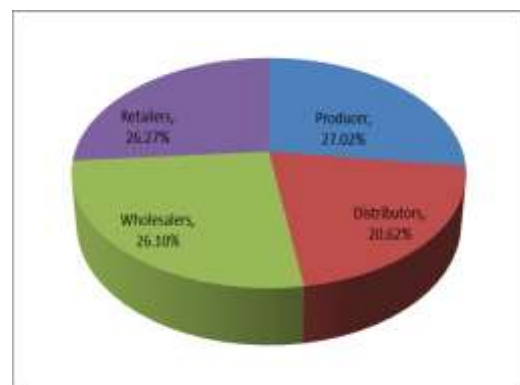


Fig 3. Pie chart showing profits of the individual agents

The above pie chart (fig 3.) gives the distribution of profit margins of all the actors in the value chain. It is seen that the producer gets the highest profit margin (27.02%). The wholesalers sell to both the retailers and the customers at the exact same price and in same quantity. They earn profit of 26.10%.

The retailers selling the product at the maximum retail price to the customers earns the profit of 26.67%. The distributor has the profit margins of 20.62% which is the lowest among all. The profit margin is low as the distributor sells the product to the wholesaler. But if he sells the product directly to the retailer at margin higher, than what he gives to the wholesalers, the chances of rise in his profit margin will grow.

TABLE II
MARKETING MARGIN OF VARIOUS ACTORS

TGMM	75.57%
GMMp	20.23%
GMMd	15.94%
GMMw	22.07%
GMMr	18.85%

The above table (Table II) gives the total gross marketing margin of the whole channel which starts from producer doorstep to the distributor than to the wholesaler than to the retailer than finally to the end customers. The total gross marketing margin of the whole channel is 75.75%.

Gross marketing margin of all the actors are shown in the above graph (fig. 4). Wholesaler has the highest gross margin (22.07%) followed by producer (20.23%) than by retailers (18.85%). Distributor has the lowest gross marketing margin (15.94%).

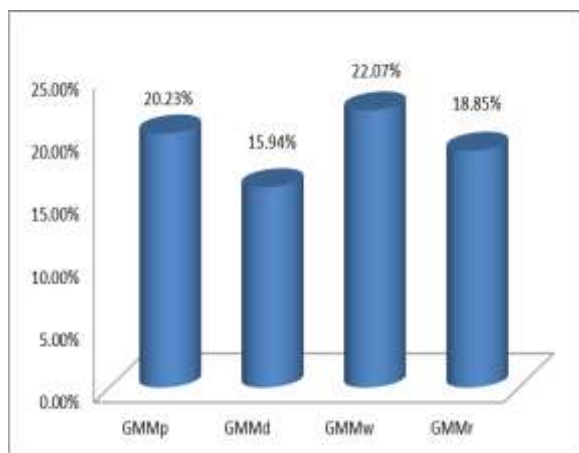


Fig. 4 Comparison of Gross Marketing Margin of Different Actors

TABLE III
CUSTOMERS RESPONDING TO A PARTICULAR RANK

	1	2	3	4	5
Availability	11	12	12	6	1
Looks	1	7	30	4	0
Taste	0	10	23	8	1
Quality	0	12	22	7	1
Defects	1	13	17	11	0
Advertisement	20	17	3	2	0
Storage	7	15	16	4	0
Healthy	0	5	29	8	0
Cost	0	5	19	18	0

The above table (Table III) depicts the response of the customers to a particular rank for a particular factor. Each cell denotes the number of customers selecting a particular rank against a particular factor like availability, looks, taste etc. From these responses from the customers relative importance index can be calculated which helps in determining the ranks of all the factors above.

TABLE IV
RELATIVE IMPORTANCE INDEX

	Relative Importance Index	Rank
Cost	66.19%	1
Healthy	61.43%	2
Taste	60.00%	3
Quality	58.57%	4
Defects	58.10%	5
Looks	57.62%	6
Storage	48.10%	7
Availability	47.62%	8
Advertisement	33.81%	9

The above table (Table IV) gives the ranking between the factors of an item of a product as given by the customers. The cost gets the highest ranking as the customers receive more quantity by buying the item at exact same price as that of the other brands. The second in ranking is the health followed by taste and quality. The percentage of defects is found to be above average. The higher defects may be due to the breakage of the product during transportation. Also there a shortage of availability of the product as well as there is only fewer advertisements carried out by the company.

From the above graph (fig 5), of relative importance index based on customers review, it is

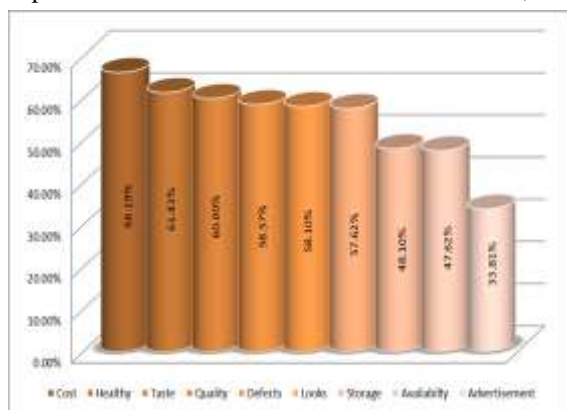


Fig 5. Relative Importance Index of all the factors

seen that all the factors except advertisement, availability and storage is more than the average level. Advertisement, availability and storage are below the average level. Also the percentage of defects is also higher than average. These four factors of the products are very vital so that the customers like the product. So by increasing their importance will increase the value of the product.

VI. CONCLUSION

The purpose of the study was to determine the flow of product along the value chain of a local biscuit industry. The actors along with the industry were also found out. Their role of how much value they add to a particular product was also found out. It was found that highest value is added by wholesalers 28.68% followed by the producer 26.12%, than the retailer of 24.50%. The lowest value addition is by distributor 20.71%.

Also from the survey it was also seen that the producer does a little in promoting their product. From the customers point of view it was proved that they give only 33.81% importance to advertising. Advertising is a very important factor for promoting a product. The product is also unavailable is most of the outlets. The availability is 47.62%. The storage is 48.10% also the defects is high about 58.10%. Defective products hamper the sale of the product. The breakage of the product may be due to improper storage and also during transportation. So, proper care should be taken while carrying out the above two operations.

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