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Market Share Model & Analysis: Determining parameters effect on Market Share

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Abstract

Market share is the parameter often looked at by the companies at the time of valuation, buyout, competitive response, economic profit, and determining profitability. Companies invest a huge amount of funds in their marketing budgets to increase market share. Companies often forget there are various parameters beyond the marketing mix decision which impact market share. The purpose of this analysis is to propose a model which calculates the market share of a company. In order to simplify the analysis, the model has been formed on basis of a fixed number of companies operating in different markets and can expand into each other regions through their various decisions whose impact will be visible in determining market share. The market share model proposed in this analysis considers various internal parameters such as companies performance on pricing, research & development of the product, product technological impact, product ecological impact, advertising impact, sales and promotion effectiveness impact, production impact in terms of stock out, company knowledge in the market, company image in the market, company supplier in the market, priorities of final product transferred within a company and previous performance impact. This analysis also takes into account the external environment impact on market share in terms of market sizing impact. The parameters used to determine the potential market share of the company are subjective but for simplicity of analysis, they will be assigned methodical value and would be converted into numbers, ratings wherever necessary. The model has made a certain assumption about consumer behaviour in the different markets and how they respond to the company's activity of different parameters. Consumer in a specific market has been assumed to be homogenous while in the different markets they are heterogeneous. The response of consumers to the company's decision on different parameters has been shown by the success factor and impact factor of a particular parameter. These parameters have been assigned different units depending on the market economic factor and general consumer behaviour. The mathematical model mentioned in this analysis is applicable to a product-based company though with certain variations it can be applied to a service-based company as well.

Keywords

Market Share, Marketing Mix, Production, Economics, Market Model

Introduction

The Herfindahl–Hirschman Index takes market share into account to measure monopoly, oligopoly and perfectly competitive market giving the market share parameter utmost importance. The HBR carried an article that reported on Phases 1 and It of a project sponsored by the Marketing Science Institute and the Harvard Business School mentions the linkage of market share with profitability. The market share reflects

the business performance and company's economic profit and makes the most sense to start-ups at the time of valuation. In order to simplify the model following starting point has been considered:

- Five markets have been taken into consideration namely X_1, X_2, X_3, X_4 and X_5.
- The companies C_1, C_2, C_3, C_4 and C_5 are only companies operating in the market.
- This companies currently are performing operations in all five markets but can exit a market as and when they require
- The companies start with equal market share in the model and it changes as per their decisions on various parameters indicated in the model.
- Consumer price elasticity varies in the market as per their behaviour which is been indicated as, $X_1 << X_2 << X_3 << X_4 << X_5$, X_1 being least elastic.
- The product technology and ecology responses also vary across the markets which are been indicated as, $X_5 << X_4 << X_3 << X_2 << X_1$, X1 being most responsive.
- The advertisement and promotion responses also vary across the markets which are been indicated as, $X_1 << X_2 << X_5 << X_3 << X_4$, X_4 being most responsive.

Understanding consumer behaviour and their response to various activities in the market is of utmost importance to assign the numbers for success and impact factors. The analysis here wants to represent how one can make the decisions on different parameters and finds out the impact on market share.

Parameters of Model

Market Share: It is the percentage of total units sold by a specific company in the market expressed as total units sold in the market. In the model, it would be denoted by M_s.

Market Volume: It is the total potential demand in the market for a particular product at a particular time period of one financial year. In the model, it would be denoted by M_v.

Price: The amount asked and given by consumers for your specific product. In the model, it would be denoted by P.

Technology Level: The technology employed on a product by a company will be visible in terms of feature, design and performance level. In the model, it would be denoted by T_l.

Ecological Level: The work done on a product by a company to make it more environmentally friendly. In the model, it would be denoted by E_l.

Advertising: The expense done by a company on various media to promote its product in order to increase awareness and thereby increase sales. In the model, it would be denoted by A.

Sales expense: The expense done by a company on sales personnel and discounts to increase product sales in the market. In the model, it would be denoted by S_e.

Production: The number of goods produced by a company in order to sell the stock in the market for a current financial year. In the model, it would be denoted by P_r.

Capacity Available: To produce goods a company can invest/disinvest in plants, machinery & equipment's, and, buildings this combination will decide the capacity available. In the model, it is denoted by C_a.

Capacity utilization: It determines the capacity company wants to utilize out of the available capacity it has currently. In the model, it is denoted by C_u.

Number of Employees: The number of people a company needs to work in a plant to achieve its desired production capacity. In the model, it is denoted by N_e.

Employee Efficiency: The amount of work an employee in a plant can accomplish in a certain period of time. In the model, it is denoted by E_e.

Employee training: The expense done by a company to train their employees over organisational goals & objectives or towards upskilling to increase efficiency. In the model, it would be denoted by E_t.

Inventory: The number of goods produced by a company in order to sell in the current year but they were not able to do or extra goods produced over the company-specific demand of the market is called Inventory. In the model, it would be denoted by I.

Cost efficiency: The expense done by a company to improve the production efficiency of plants and machines. In the model, it would be denoted by C_e.

Special projects: The expense done by a company on different projects in order to increase company image, company knowledge and company supplier effect in the market. In the model, it would be denoted by S_p.

Sales Expansion: Any company can expand its sales office in any market with three methods.

- Direct Sales: Opening up its own sales office.
- Indirect Sales: Opening up its office with cooperation with a local company.

Competitive index: The competitive index is been formed by summation of three different parameter:

Competitive index(C_I) = Company Knowledge(C_k) + Company Image(C_i) + Company Supplier(C_s)

Company knowledge: The company knowledge is been formed by parameters like sales of the company in last year, special projects pertaining to company knowledge, the effect of company knowledge of previous year, production by the plant in previous year if any.

Company image: The company image is been formed by parameters like special projects pertaining to company image, effect of company image of previous year, the production plant in the specific market, type of sales office in the market.

Company supplier: The company supplier is been formed by parameters like special projects pertaining to company supplier, the effect of company supplier of previous year, supplier image in the specific market.

Logistic priorities: The company having a plant in a certain market and wants to transfer its stock into another market can be set through the logistics priorities of the company. It is denoted in the model by L_p.

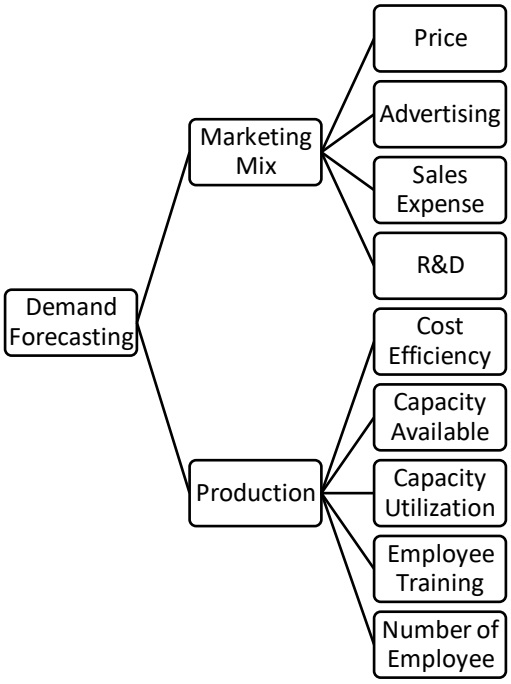
Consumer responsiveness: The consumer in each market behaves differently to the parameter of price, advertising, sales expense and special projects. The responsiveness of them in the model is been denoted by C_r.

Success factor: The success factor is a mathematical term used in a model to express the success effect of the market on specific parameter price, technology level, ecological level, advertising and sales expense. It is denoted in the model by S_f.

Impact factor: The impact factor is a mathematical term used in a model to express the responsiveness of specific parameter price, technology level, ecological level, advertising, sales expense, cost-efficiency, change in a number of employees and employee training on market. It is denoted in the model by S_I.

Model

When a company plans for a financial year it takes certain decisions in the market after analysing economic parameter. The parameter on which decision is taken relates to the demand forecasting, marketing mix, production, investment in technology and ecology, logistics priorities, employee training and cost-efficiency.



Planning is one of the foremost steps of any company where they forecast their demand and sales in the market. Though actual demand will depend on the connection of the functional components of a company.

To determine production for a company impact of different parameters on production has to be considered. Actual production can be as simple as $C_u * C_a$ but C_u will depend on parameters such as number of employees, employees training, employees efficiency and cost-efficiency

$$C_u = C_{up} * S_i(N_e - Ne_0) * E_e * S_i(E_t) * S_i(C_e)$$

Where,

C_{up} = Capacity utilisation of plant in the previous year
$N_e - Ne_p$ = Change in the number of employees from the previous year.

Hence,

$$P_r = C_a * C_{up} * N_e * E_e * S_i(E_t) * S_i(C_e)$$

Once goods are produced in the plant a company has to supply stocks at all operating markets. A company performs this task via logistics to distribute goods which can be given by the parameter $L_p(P_r(X_n))$ where n = 1 to 5. The expression means transferring a certain amount of produced goods as estimated by a company to a specific region. The remaining goods in a market having production capability would be $P_r - \sum L_p(P_r(X_n))$

where n = 1 to 5. The impact of production decisions will be visible at the time of stockout condition or sales opportunity loss on the market share.

To determine market share lets revisit our first condition that each company in a specific region starts with equal market share. From here on for simplification we will consider only market X_1 and all companies from C_1 to C_5 operating here. The total market share expressed is expressed as 100% means each company from C_1 to C_5 has a 20% market share.

$$\text{i.e., } M_s(C_{n0}) = 20\%$$

The first impact on market share would be determined with the competitive index where

$$C_{In} = C_{kn} + C_{in} + C_{sn}, \text{ where n = 1 to 5}$$

After determining the value of competitive index its impact on market X_1 can be found out with responsiveness of the market to company knowledge, company image and supplier image.

$$S_i(C_{In}) = S_i(C_{kn}) + S_i(C_{in}) + S_i(C_{sn}), \text{ where n = 1 to 5}$$

Market share of each company is $S_i(C_I)*C_1$ …….. $S_i(C_I)*C_5$, normalization has to be applied in order to express the total market share of 100%. Hence the market share of Cn after impact is:

$$M_s(C_{n1}) = S_i(C_{In})* M_s(C_{n0}) \; / \sum S_i(C_{In})* M_s(C_{n0}), \text{ where n = 1 to 5……..(1)}$$

The second impact on market share obtained after the competitive index is an investment in research and development which in our model is expressed by technology level and ecological level of the company. The technology level impact on market share can be determined as:

$$M_s(C_{n1})*S_f(T_{ln})*S_i(T_{ln}), \text{ where n = 1 to 5}$$

Again normalization has to be applied to express market share as 100%

$$M_s(C_{n2}) = M_s(C_{n1})*S_f(T_{ln})*S_i(T_{ln}) /\sum M_s(C_{n1})*S_f(T_{ln})*S_i(T_{ln}), \text{ where n = 1 to 5……(2)}$$

After the impact of technology, the third impact on market share has been applied further by ecological parameter can be applied in the same way to find $M_s(C_n)$.

$$M_s(C_{n2})*S_f(E_{ln})*S_i(E_{ln}), \text{ where n = 1 to 5}$$

Again normalization has to be applied to express market share as 100%

$$M_s(C_{n3}) = M_s(C_{n2})*S_f(E_{ln})*S_i(E_{ln}) / \sum M_s(C_n)*S_f(E_{ln})*S_i(E_{ln}), \text{ where n = 1 to 5…..(3)}$$

The market share obtained till now takes into consideration competitive index and research effect. This market share will change after the effect of the pricing decision of a company. The effect of price cannot be applied simply, research shows that consumer compares average price in the market and then intents to purchase a product.

Let P_w be the average price of the market calculate after taking the average of $P(C_n)$, where n = 1 to 5. The deviation in company-specific price to market price can be given as $P_w - P(C_n)$. So the impact of elasticity of price into the equation can be expressed as:

$$M_s(C_{n3})*S_f(P_w - P(C_n))*S_i(P_w - P(C_n))$$

Again normalization has to be applied to express market share as 100%

$M_s(C_{n4}) = M_s(C_{n3})*S_f(P_w - P(C_n))*S_i(P_w - P(C_n)) / \sum M_s(C_{n3})*S_f(P_w - P(C_n))*S_i(P_w - P(C_n))$, where n = 1 to 5……..(4)

The fifth impact on market share is of advertisement, this parameter shows its effect for a long period of time which can be fairly assumed as 2 years for calculation. The effect of advertisement on the current period is 80% spend of this year and 20% spend from the previous year(Pareto effect). Total effect of advertisement on current period is given by:

$A_m(C_n) = 80\%*A(C_n) + 20\%*A(C_{np})$, where $A_m(C_n)$ is a cumulative effect of advertisement on company C_n, where n = 1 to 5.

$$M_s(C_{n4})*S_f(A_m(C_n))*S_i(A_m(C_n))$$

Again normalization has to be applied to express market share as 100%

$M_s(C_{n5}) = M_s(C_{n4})*S_f(A_m(C_n))*S_i(A_m(C_n)) / \sum M_s(C_{n4})*S_f(A_m(C_n))*S_i(A_m(C_n))$, where n = 1 to 5……..(5)

The sixth impact on market share is of personnel expense and discount which is given by sales effect. This parameters constitutes of salary given to employee and discount given on product by different company. The parameter in particular have pareto effect and display same properties as advertisement.

$S_{em}(C_n) = 80\%*S_e(C_n) + 20\%*S_e(C_{np})$, where $S_{em}(C_n)$ is cumulative effect of advertisement on company C_n, where n = 1 to 5.

$$M_s(C_{n5})*S_f(S_{em}(C_n))*S_i(S_{em}(C_n))$$

Again normalization has to be applied to express market share as 100%

$M_s(C_{n6}) = M_s(C_{n5})*S_f(S_{em}(C_n))*S_i(S_{em}(C_n)) / \sum M_s(C_{n5})*S_f(S_{em}(C_n))*S_i(S_{em}(C_n))$, where n = 1 to 5……..(6)

So $M_s(C_{n6})$ is the final market share for a company C_n operating in region X_1.

The market share $M_s(C_{n6})*M_v$ will provide potential demand generated in the market. The potential demand is then compared with production stock.

$L_p(P_r(X_n)) > M_s(C_{n6})*M_v$, where n = 1 to 5, then potential demand is the actual demand of the market.

If $L_p(P_r(X_n)) < M_s(C_{n6})*M_v$, where n = 1 to 5, then potential demand is less than actual demand and hence production stock i.e. $L_p(P_r(X_n))$ is the actual demand. In this case, your market share is been given by $L_p(P_r(X_n)) / M_v$ expressed as a percentage. The difference between $M_s(C_{n6})*M_v - L_p(P_r(X_n))$ is called stock out or sales opportunity loss.

Redistribution**:** The cost of stock out is much more than the cost of holding inventory. If the planning demand and actual demand has mismatch while company operating in multiple regions than redistribution of stocks happen if possible when inventory is present in certain region.

The model can be extended to find out the market share of companies competing against each other in multiple regions. Only consideration has to be maintained about impact factor and success factor which changes according to consumer responsiveness of market.

Limitations and Further Research

This analysis is a suggestion to find out the effect of different activities done by the company on market share. Further empirical research is required by collecting data of the various company and finding out if this method creates an accurate result.

Summary

This market share model can be applied to find out the impact of marketing activities, projects, research and development efforts carried out by any company in the market. The analysis here takes into account the external as well as internal parameters of the company. If a company has different types of products the impact factor and success factor can be adjusted in the same way. This method can be applied to service-based company as well though the production division would be formed by human-intensive division and parameters related to employee will play a higher role. The marketing activities are not only one which creates an effect on market share but all divisions have to be connected to find an actual market share of the company.

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