

BALANCING PRODUCTION CAPACITY AND DEMAND THROUGH AGGREGATE PRODUCTION PLANNING (APP) : A CASE STUDY IN BAGHDAD COMPANY FOR SOFT DRINKS , BAGHDAD , IRAQ

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ABSTRACT

Based on the data which researcher collected it from Production processes department in Baghdad company for soft drinks, there were six kinds of soft drink products (pepsi , Miranda , 7up , green apple , shani , lemon) . there were still shortages of production capacity in three products only (green apple , shani , lemon) in 2017. a company produced zero units at several times from the year 2017 for these limit products (3 only). to overcome this problem , the purpose of this research was to make Production planning & control consisting of : Aggregate production planning and forecasting demand by weighted moving average method in 2018 . the tested values show how Baghdad company for soft drinks can balancing between production capacity and demand of customers in the year 2018 through (first quarter only).

KEYWORDS: Aggregate production planning, production, demand.

1. INTRODUCTION

Capacity of production is the maximum rate of output of a process or a production system , managers are responsible for ensuring that the firm has the capacity to meet current and future demand .otherwise the organization will miss out on opportunities for growth and profits . making adjustments to decrease capacity or to increased it. capacity decisions related to process need to be made in light of the role the process plays within the organization and the supply chain as a whole, because changing the capacity of process will have an impact on other processes within the firm and across the chain.

2. LITERATURE REVIEW

2.1 Production capacity and customers demand

The first capacity – related decision faced by any operation is (how much capacity should we have), but is in fact influenced by several factors particular to each operation and its competitive position (slack and lewis , 2015 :119) . capacity planning and control is the task of setting the effective capacity of the operation so that it can respond to the demands placed upon it , this usually means deciding how the operation should react to fluctuations in demand (Slack et.al,2010 : 300). A four steps procedures generally can help managers making sound capacity decisions: (krajewski et.al, 2016 : 162)

- 1- estimate future capacity requirements.
- 2- identify gaps by comparing requirements with available capacity.
- 3- develop alternative plans for reducing the gaps.
- 4- evaluate each alternative , both qualitatively and quantitatively , and make final choice.

The important characteristic of capacity planning and control , as we are treating it here. is that it is concerned with setting capacity levels over the medium and short terms in aggregated terms . some factors influencing the overall level of capacity can illustrates in fig. 1

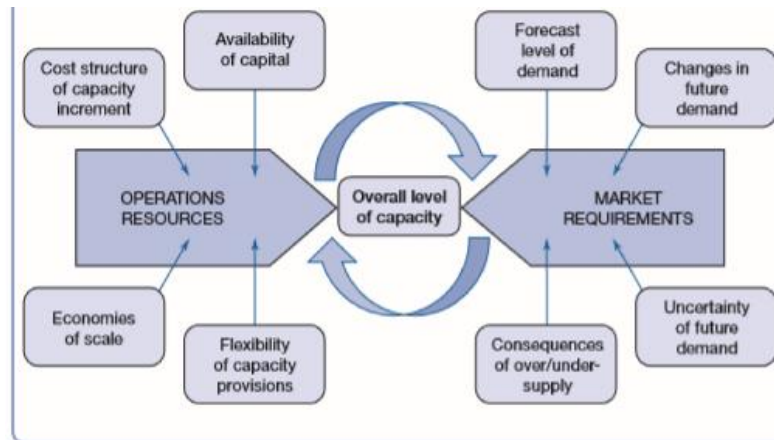


Fig. 1 some factors influencing the overall level of capacity

2.2 Typical objectives of aggregate plan

The many functional areas in an organization that give input to the aggregate plan, typically have conflicting objectives for the resources use of organization. Six objectives usually are considered during development of a production or staffing plan and conflicts among them may have to be resolved: (Krajewski & Ritzman, 1999: 601)

- 1- minimize cost – maximize profits : if customer demand is not affected by the plan, minimizing costs will also maximize profits of the company.
- 2- maximize customer service : improving delivery time and on-time delivery may require additional workforce, machine capacity or inventory resources.
- 3- minimize inventory investment : inventory accumulations are expensive because the money could be used for more productive investments.
- 4- minimize changes in production rates : frequent changes in production rates can cause difficulties in coordinating the supplying of materials and require production line re-balancing.
- 5- minimize changes in work-force levels : fluctuating work-force levels may cause lower productivity because new employees typically need time to become fully productive.
- 6- maximize utilization of plant and equipment : processes based on a line flow strategy require uniformly high utilization of plant and equipment.

2.3 The steps of capacity planning and control

A sequence of capacity planning and control decision which need to be taken by operations manager is illustrated in fig.2, typically operations managers are faced with a forecast of demand which is unlikely to be either certain or constant. They will also have some idea of their own ability to meet this demand. Nevertheless, before any decisions are taken, they must have quantitative data on both capacity and demand. So the first step will be to measure the aggregate demand and capacity levels for the planning period. The second step will be to identify the alternative capacity plans which could be adopted in response to the demand fluctuations. The third step will be to choose the most appropriate capacity plan for their circumstances. (Slack et al., 2010: 301)

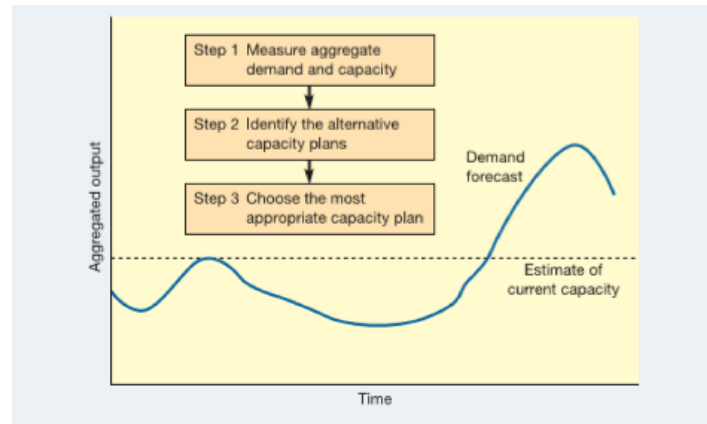


Fig 2: the steps in capacity planning and control

3. RESULTS AND DISCUSSION

3.1 Reliability analysis

In Baghdad company for soft drinks , there are six main types produced . this company stopped for producing (three products) . tables 1,2 summarized production and demand data for each products . it can be analyzed that the company has a problem in forecasting the demand . it is seen from the error rate in every type of six products . moreover , the table 3 shows the biggest error rate comes from (green apple soft drink) . the lack of production is due to the poor control that mainly lies in production planning and control . it is difficult for the quantity of production to meet the demand from customers

Table 1: demand from jan.2017- dec.2017

Month	Products (packages)					
	pepsi	Miranda	7 up	Green apple	shani	lemon
January	6078.382	465.5091	1727.209	572.7727	467.4091	108
February	9121.1	1050.936	2416.436	202.0818	800.4636	72.03636
March	9157.655	873.0727	3171.818	2.381818	1033.118	0.418182
April	5145.164	806.7818	1770.618	955.1091	675	333
May	9105.082	1024.836	2441.3	557.0091	799.5545	309.0091
June	7503.2	607.1	2098.209	292.0455	845.0455	191
July	9749.055	1240.045	3392.164	682	860.1273	218.2455
August	10344.14	1180.091	2897.173	533.0091	1227.009	321
September	5923.055	917.2818	2414.082	619.5	462.7091	280.5909
October	7581.618	1010.109	2768.691	722.0273	1285.036	146.7455
November	4879.9	280.8273	1504.164	387	591	92.01818
December	5611.564	982.5091	1403.955	184	558	86.26364

Source :sales dept. data in Baghdad company for soft drinks .

Table 2 : production capacity from jan.2017- dec.2017

Month	Products (packages)					
	pepsi	Miranda	7 up	Green apple	shani	lemon
January	5472.536	361.2636	1816.645	456.7273	288.5727	108.5455
February	9178.245	1214.618	2292.664	204	801.2364	71.90909
March	9069.491	725.2636	3394.618	0	1028.218	0
April	6785.591	1268.518	2105.509	1309.082	1194.536	630.9545
May	8110.491	750.2273	1879.445	553.3636	383.2727	357.2727
June	6763.218	603.9727	2200.164	63.95455	803.4273	0
July	9733.445	1130.145	3285.264	729.2636	796.4091	291.0545
August	10338.15	1139.373	2896.782	364.4182	1292.9	728.3
September	6313.045	946.3455	2413.873	618.5909	396.8182	0
October	7957.8	934.7636	2986.882	1095.745	1889.073	0
November	4108.518	277.8	1285.973	367.3636	602.0091	362.5545
December	5593.427	1270.091	1564.291	0	0	0

Source :sales dept. data in Baghdad company for soft drinks .

Table 3 error rate for production capacity during 2017

Products	Gross demand packages	Gross production packages	Production vs demand	Error rate (%)
Pepsi	90199.92	2550.591	- 87949.329	97.5
Miranda	10439.1	9476.473	- 962.627	9.22
7 up	100639	5762.509	-94876.491	94.27
Green apple	2158.327	28122.11	25963.783	1202.95
shani	9604.472	10622.38	1017.908	10.6
lemon	11762.8	89423.96	77661.16	660.22

Source : prepared from researcher .

Production planning and control studied in this research are for six products . pepsi soft drink has the biggest production deficiency level in all months for 2017 . it is about (97.5 %) .

4. CONCLUSIONS

Based on the research has been done , there are several conclusions

1- Baghdad company for soft drinks should apply the method of forecasting using additive decomposition (average of all data) it can overcome the problem of production shortages . this method can result in more accurate forecasting .

2- Baghdad company for soft drinks can be using one or more of strategies in aggregate production planning (chase strategy , level strategy and mixed strategy) and compared cost for each one to select the best method .

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