Operation management case study examples

Business, Company

Introduction

Managerial ethics requires that a proper management system should always aim at reducing the cost of production to maximize on their profits. This is the most possible way of enlarging on the profit margin, even though other companies would use other methods to increase on their profits. Linear programming model is a tool used in operation management to be able to maximize on production subject to certain constrains. In the case study; Nissan battery electric vehicle, we target to use these managerial models to determine on the achievable managerial targets by the company.

Discussion and calculation

Taking into consideration the production capacity for the new Nissan plant in Smyrna, Tennessee, and we assume that the plant has enough regular capacity to produce 3200 electric Nissan leafs per week.

The plant can also produce an additional of 1000 cars on overtime.

Cost of assembling and inspecting cars during regular time = $1, 900 per car

Cost of holding a car in the inventory for future delivery = $100

Cost of producing a car during overtime = $2, 600

Nissan Company targets to meet all its customers' needs in terms of demand in a six week production schedule as below.

Objective function becomes

Let the number of cars produced during regular time be represented by x and the cars produces during the overtime be represented by y.

Suppose the cost of producing cars during regular time is = $1, 900, then total amount used used to produce x number of cars will be given by; X x 1, 900.

Similarly, if its cost $2, 600 to produce a single car during overtime, then total production cost of cars at overtime periods will be given by;

Overtime = Y x 2, 600

Total production function can then be given by;

Q= 1, 900x + 2, 600y

Therefore, the objective function becomes;

Maximize Q= 1, 900x + 2, 600y

X≤ 3200

y≤ 1000

x> 0

y> 0

Section 2

Maximizing Concept

Nissan’s production cites in Barcelona, Spain will be producing NV 200 and its new version e-NV200. Suppose the production of the car is segregated into limiting factors such as time and task, for instance;

For general assembly, only 80 hours per day are available and for engine and motor battery, installation has only 112 hours of work per day.

If producing one e-NV 200 gives a profit of $3000 and requires 14 hours for engine and battery installation and 4 hours for assembly while NV 200 gives

$7000 in profit for each produced subject to 10 hours of assembly and 8 hours of engine installation.

We can determine the quantity of each model produced that will maximize the company's profits. This is therefore a maximizing linear problem and the above information can be summarized in the table below for simplicity and building understanding of the problem.

Let us assume the total number of e-NV 200 cars that can be produced within that time limit is represented by x and the total number of NV 200 car produced to be represented by y.

Therefore, if one e-NV 200 car gives a profit of $3000, then total profit for e-NV 200 cars will be given by (x)x3000= 3000x

For NV 200 cars, total profit will be given by; (y) x7000 = 7000y

Total profit can then be got by summation of the two profit equations

Such that; 3000x + 7000y. This function therefore gives us the maximizing problem for Nissan battery Electric vehicles Company.

Objective function

Maximize ∏= 3000x + 7000y

14x + 8y ≤112

x> 0

y> 0

Using graphical method to solve this linear equation, we first get at least two coordinate points for each constraint. This can be using a tabular method as below. Similarly, the sign as the equations are also change.

4x + 10y ≤ 80

4x + 10y = 80

10y = 80 – 4x

Y= 8 – 0. 4x

14x + 8y= 112

8y = 112 – 14x

Y= 14 – 1. 75x

Section three

Nissan battery electric vehicle company had an earlier option of producing their Nissan Leafs in Japan and the then transport their products to use to their various dealers. To be able to manage their procurement schedule, the company opened a production plant in Smyma , Tennesee that would produce cars and sell direct to the compamy’s U. S. dealers. Making an a choice as to which company choice would favour the company, requires an inventory check on the company’s procurment or product chain. We can then divide its production into two parts; production in Japan and production in Smyma, Tennessee, U. S.

Smyma expected to produce; 150, 000 vehicles and 200, 000 batteries

22, 610 leafs sold in US in 2013

Estimation of inventory related costs

The cost of shipping one car from Japan to the US sis 1000 dollars.

The cost of holding one car in inventory for future deliveries is 100 dollars per car per week.

If the demand for vehicles doubles in 2014, then the number of vehicles sold is 22610*2 = 45220 vehicles. Given that it costs 1000 dollars to import a

vehicle from Japan, the costs incurred for inporting 45220 vehicles is given below.

45220 x 1000 = 45, 220, 000 dollars.

It takes 5 weeks to import vehicles from Japan (4 weeks shipping and 1 week distribution).

The assumption is that it costs 100 dolars per car per week to hold a car in inventory for delivery. For 45220 vehicles, held for five weeks, it would cost

45220 x 100 x 5

= 22, 610, 000

The estimated inventory costs total up to:

22610000 + 45220000

= 67, 830, 000 dollars

Lets assume that the number of vehicles produced in 2014 in Smyma, Tennessee, was 45220. If this is done in regular time, it will cost 45220 x 1900

= 85, 918, 000

The inventory costs for the one week the vehicls are held in inventory for delivery is given below:

45220 x 100

4, 522, 000

Thus, the total costs incurred are 85918000 + 4522000

= 90, 440, 000

In comparing the two options, it is evident that importing the vehicles from Japan is cheaper than producing them in the US by 22, 610, 000 dollars.

Section 4: Bonus Question

The othe reasons why why Nissan built the Smyrna plant was because of the potential market in the United States and Canada. Additionally, by building the plant in USA, the dealerhsip was hoping to tap into the large market of environmetnally concious people in the American market.