

**DECISION SUPPORT FOR MANAGEMENT SAMPLE
ASSIGNMENT CISM02**

ASSIGNMENT REPORT FOR MSc. PROJECT MANAGEMENT

ASSIGNMENT ON CHEMICAL LABORATORY COMPANY.

A Chemical laboratory company is losing its customer because of lack of equipment the company is lacking in terms of practical work whenever the analysis is been carried out. The laboratory is therefore losing its customer number because of lack of equipment because the customers are not satisfied. At this time, some high operating cost that is required to implement enough space for keeping chemical equipment like Atomic absorpic spectrophotometer, hydrometers etc., and Electricity, security and laboratory technicians.

PROBLEM 1

The chemical laboratory company has finally agreed to create an inventory system which may be important to them in making a good decision in aspect to which equipment and chemicals that will be required by the customer against their analysis or practical work demand. Therefore to enable them avoid arranging there equipment in linear way in which the customers will prefer it in a standard form. During gaff time, the laboratory involve in high need of resources from the customers. However it leads to storage of chemicals which meet the customer requirements to the high. Whenever customers comes in for practical work for their projects or work and realize that some equipment or chemicals are not in stock, they will be very angry and leave the laboratory and search for an option laboratory that have their requirement.

PROBLEM 2

The chemical laboratory company can possibly keep chemicals that may not be in demand between specific length of time may , due to this result it will require to possession of more space for storage and outlay of capital which is idol or not making progress. In the case it has led to cost being which in past time have affected the growth of the business. Because of the competitive gain, it is wise that the business a method for managing decision which will eliminate in the steady state between organisation aim or facts and customer quality that attracts their attention within the company.

QUESTION 1

What are the things the chemical laboratory company needs to purchase that will meet their customers demand and maintain their company productivity.

QUESTION 2

What particular time do the chemical laboratory company need to request for more equipment that in any case affect the minimum level of stock needed by customer within a period of time. It will also make sure that the company cost of storage is less at the rate of profit increasing.

APPLICATION RATIONALE OF THE SYSTEM DYNAMICS

The chemical laboratory company needs to watch and generate its behaviour and gain if the issues are meant to be resolved. Although seldom, which have been a normally rational, in which a system capability must provide analysis for the whole month and yearly account. However, it should leave for a data to be produce within a process within a period of specified time by the organisation for

record use. However, while constructing and designing the data laboratory house, it is necessary to know what data should be useful for decision making. In other hand we have to analyse the problem concern and use system dynamics that will help in identifying significant elements that will help in good control of the laboratory, to enable us to form the basis needed, we need to understand the idea of what information the data laboratory store house must grasp.

Regarding the analysing of use of chemical during practical work, the chemical laboratory company desire to add into deliberation each element which has influences on the usage and sales of chemical in the laboratory. The AAS which is known as Atomic Absorpic spectrophotometer will be used in summing whole information within a substantial report that group will need to analyse and plan a strategy from the data gotten in the data warehouse. According to Dennis Lock (1996), it strives to achieve the customer's performance and quality requirements at lowest total cost, resulting in a deal that benefit both companies. It's useful in knowing the pattern of the system and let the modelling problem of sale or usage analysis, rather than the whole system. Seeing that this relay on usage of equipment and chemical analysis problem, it provides an edge to the modelling method and allow relevant thought for only the system variables that is related to the problem in emphasis. Giving information to the organisation will be needed to know how to design their system, thereafter how this help in representing, analysing data which are meaningful regarding their performance in the laboratory.

BASIC CONCEPTS RELATED TO THE PROBLEM SELECTED.

In the chemical laboratory company, the major components are all indicated on the figures in the Appendix and are well identified on illustrating the organisational general problem in making choices. In various places the components signal are shown and also area of problem that are faced in this study. Many components affects the systems being analysed, to enable this model to be ease, the business performance will be examined by the components relevant which have been use in analysis the usage and already been measured during the study. Few factors which could have recognised such as competitors, cost of items, and strategy in finance, equipment and policy are components which may have effect on usage and sales in the laboratory. Analysing usage and sales of the laboratory, stocks already been identified as inventory, outlet demand, usage data (sale data) and laboratory warehouse data. Its flow constant are made up of usage or swale rate, AAS information, operational data moving in one mass into the data warehouse, organised data from the base and for good performance analysis.

KEY ASPECTS OF SYSTEM DYNAMICS MODELLING TO THE PROBLEM STATED.

It is necessary and important that system dynamics identify stocks and flow. The flows are beyond the boundary of the circle and the elements have an impact on the system balance. To analyse sales or usage, its consumption demand is examined as stock because it appearance show that chemical laboratory company show concern on its business. The requirements are the basic effectiveness usage or sales the chemical laboratory gets. The present stock of chemicals and equipment the laboratory has is identifying the inventory. However it described the level of stock which they have and be look as a collection. The laboratory data house would take every data that might in any case be important to chemical laboratory company in making choice and strategies plan. Meanwhile the flow gives illustration of influence rate. It have order rate ,usage or sales rate, the demanding rate which all of them have impression on the ability of balance of usage or sale, inventory and the sales

or usage in which their rate are been create. The issue on chemical usage or sales consist of the issues the chemical laboratory company are having, and already been mapped out in illustrating how to use system dynamics in the aspect of analysing a system. Conclusion, the sale or usage chemicals are part of the different problems the laboratory will encounter in its operation, and while decision making is the problem.

SYSTEM DYNAMICS METHOD OF APPLICATION IN THE PROBLEM

System dynamic methods need hypothesis be formulated and a models generated to symbolize the excepted system components performance. However, it also needs to perform simulation and test the model for it to be correct. This system dynamics method that have been chosen for this issue shows that typical plan always is the best contest for leaders .They have to evaluate its system in which is always control with comprehensive approaches. If been applied correctly it doesn't have any disadvantage on the system and when not applied correctly it result will be wrong.

DECISION VARIABLES

DEMAND RATE- This refers to the daily sales recovered from running of a project in the laboratory.

HOLDING COST- money use for storing equipment and chemical

SET UP COST & LEAD TIME- Indicates time in which it takes in planning an order and when exactly the order is actually received.

OBJECTIVE

To reduce organisation amount spend developing another storage room in the laboratory.

Knowing how to maximize gain and at the end the customers to be satisfied and be happy.

CONSTRAINT

DEMAND RATE: minimum equipment average is put in place in the laboratory that is not to be passed its valid purpose (if we assume it is 60 units, and then let it be 60 units which will be the re-order level.

ASSUMPTION

The amount of a particular collection to be brought is secured between a given period of time, therefore, no vary in level should influence the sales.

To enable eliminate the high storage cost; orders must be put month by month.

Holding cost for one item is place as 0.02

Lead time is given as 30days with 25 days rotation

NOTATIONS TO BE USED BELOW IN THE GIVEN MODEL.

B= Daily sale rate of demand from work in the laboratory.

H= Holding cost.

K= Set up cost.

Y= Order quantity

Day by Day requirement in the laboratory are given as 300units with £200 as fixed cost anytime the order is placed. However we need to get the cost of units to order when the lead time is given as 30 days with 25days rotation.

SIMPLE MODEL

$$\text{Amount to order}(Y) = \sqrt{\frac{2KB}{H}}$$

$$= \sqrt{\frac{2 * 200 * 300}{0.02}}$$

$$= 2449$$

TCU EACH DAY

$$= \frac{K}{Y} + B + H * Y = \frac{200}{2449} + 300 + 0.02 (2449/5)$$

$$= \frac{K}{Y} + B + H * Y = \frac{200}{2449} + 300 + 0.02 (489.8)$$

$$= £34$$

EVALUATION

The above calculated provide and shows amount in which the laboratory have to order between a limit times. However the calculation helps the laboratory in keeping good and correct amount of chemical and equipment within a specific duration, and will help the minimum cost of equipment or chemical to be maintained without reducing below their needed items and also avoid increasing above needed equipment or chemical to be use.

REVISED MODEL

ORDER QUANTITY=£34

LEAD TIME=25-30DAYS

MINIMUM USE PER DAY=250

NORMAL USE PER DAY= 280

MAXIMUM USE PER DAY=300

REORDER LEVEL= MAXIMUM USAGE * MAXIMUM LEAD TIME

$$= 300 * 30 = 9000$$

MINIMUM LEVEL= Reorder level – Average usage for average lead time

$$= 9000 - (300 * 27.5)$$

$$= 750$$

MAXIMUM LEVEL = Reorder level + Order quantity – minimum anticipated usage over lead time

$$= 9000 + 2449 - 250 * 25$$

$$= 9000 + 2449 - 6250$$

$$= 5,199 \text{ units}$$

EVALUATION

Using this revised model will always help the chemical laboratory company in having the correct and accurate number to be kept each time to avoid item overrun. Here the minimum equipment and chemical which is to be retained each time is given as 750, and the laboratory must not be below that, and will help them in managing their items by avoiding wastage of good which comes in (much order to be made and notice of low order in the laboratory should be exempted). The maximum cost to be reliable at each given time is indicated as 5199, due to this the laboratory will have a reproductive amount in their account of maximum equipment or chemical necessary at each time and leading the company to low reduction of loss of items in the organisation, therefore helping the chemical laboratory company in making high profit and reducing its storage cost.

SIMULATION MODEL

CONSTRAINT

DEMAND RATE: Laboratory will ensure its less stock level have been placed, which will not to exceed at any particular point (if its 60 units, it should be the re-order level).

ORDER LEVEL: this is the aspect in which the company need to control the item to avoid surpass in minimum quantity.

ORDER QUANTITY i.e., Amount of items the laboratory is required to get for the interest of their customer.

ASSUMPTION

LEAD TIME= 8wks

AVERAGE DEMAND= 900

UNIT PRICE= £10

DEMAND PROJECTIONS=200

CALCULATION

$$\begin{aligned}\text{STOCK LEVEL} &= \text{average lead time} + 2 * \sqrt{\text{average lead time demand}} \\ &= 200 * 8 + 2 * \sqrt{200 * 8} \\ &= 5648\end{aligned}$$

$$\begin{aligned}\text{REORDER QUANTITY} &= 40 * \sqrt{\text{Average lead time demand/Unit price}} \\ &= 405500 / 10 = 938\end{aligned}$$

EVALUTATION

Simulation model can be defined as a techniques use in determining the system behaviour during business operation in locating contest which may affect the objective in business achievement. Its simulation model requirement for this problem basically point at analysing its circumstance by applying analytical model and using different parameters need by integrating simulation approach to grasp its problem in order to help technicians in decision making. The above figures given, speak a real figure of a method that shows the organisation saving many money during storage of goods. Reduction throughout storing of goods will help reducing amount involved. In this case, incomes from business will be increased constantly.

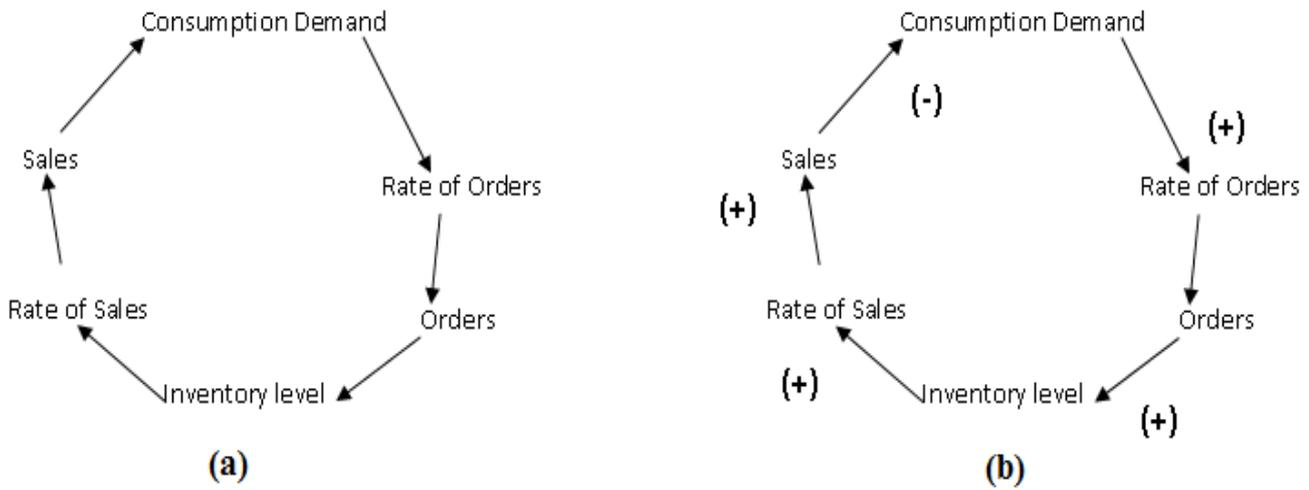
CONCLUSION

This work shows that inventory model can be essentially use in organisation to make the business not be active in acquiring its aim. Analytical model analyses the way of proceeding current conditions so that it will show some area that need enrichment. Simulation model help to grasp the behaviour meaning of the system and give the future life setup that can beused in changing the work effectiveness and making a better managerial in decision making.

REFERENCE

Dennis Lock.,(1996)', Nature and Organisation of Project Management; Project Management Organisation: *Project Management*.

APPENDIX



FEEDBACK AND CAUSAL LOOP DIAGRAM Using Mathematical Method.

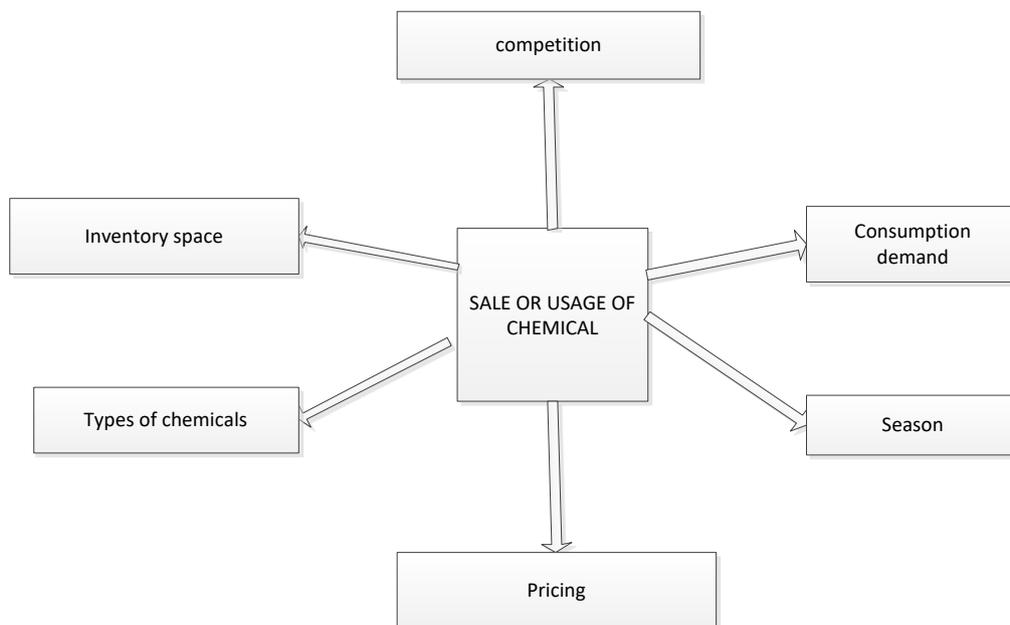


Figure 2b: System sales components.

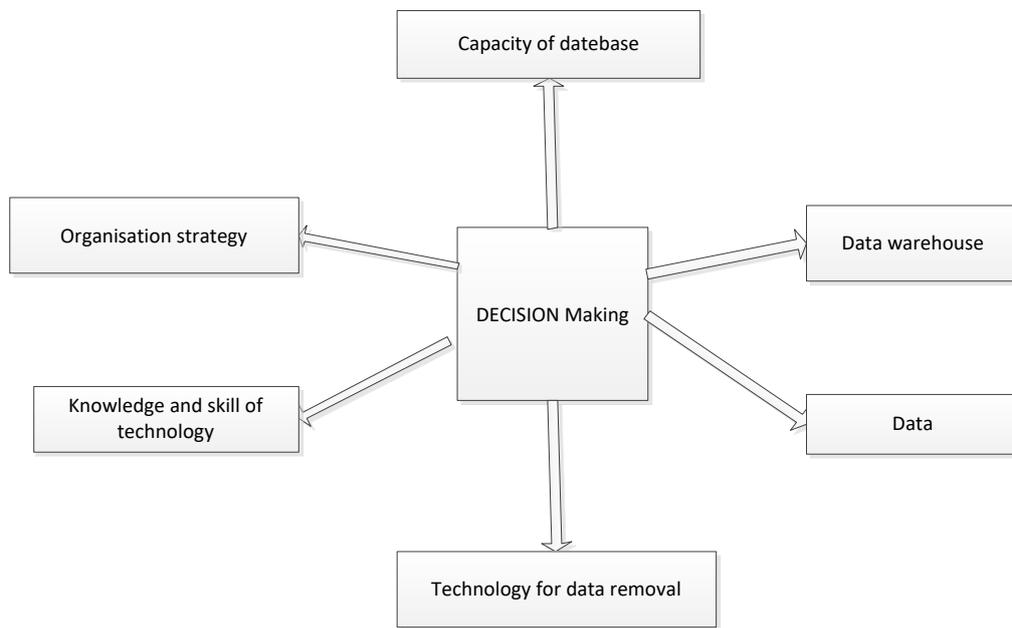


Figure 2a: General system data components.

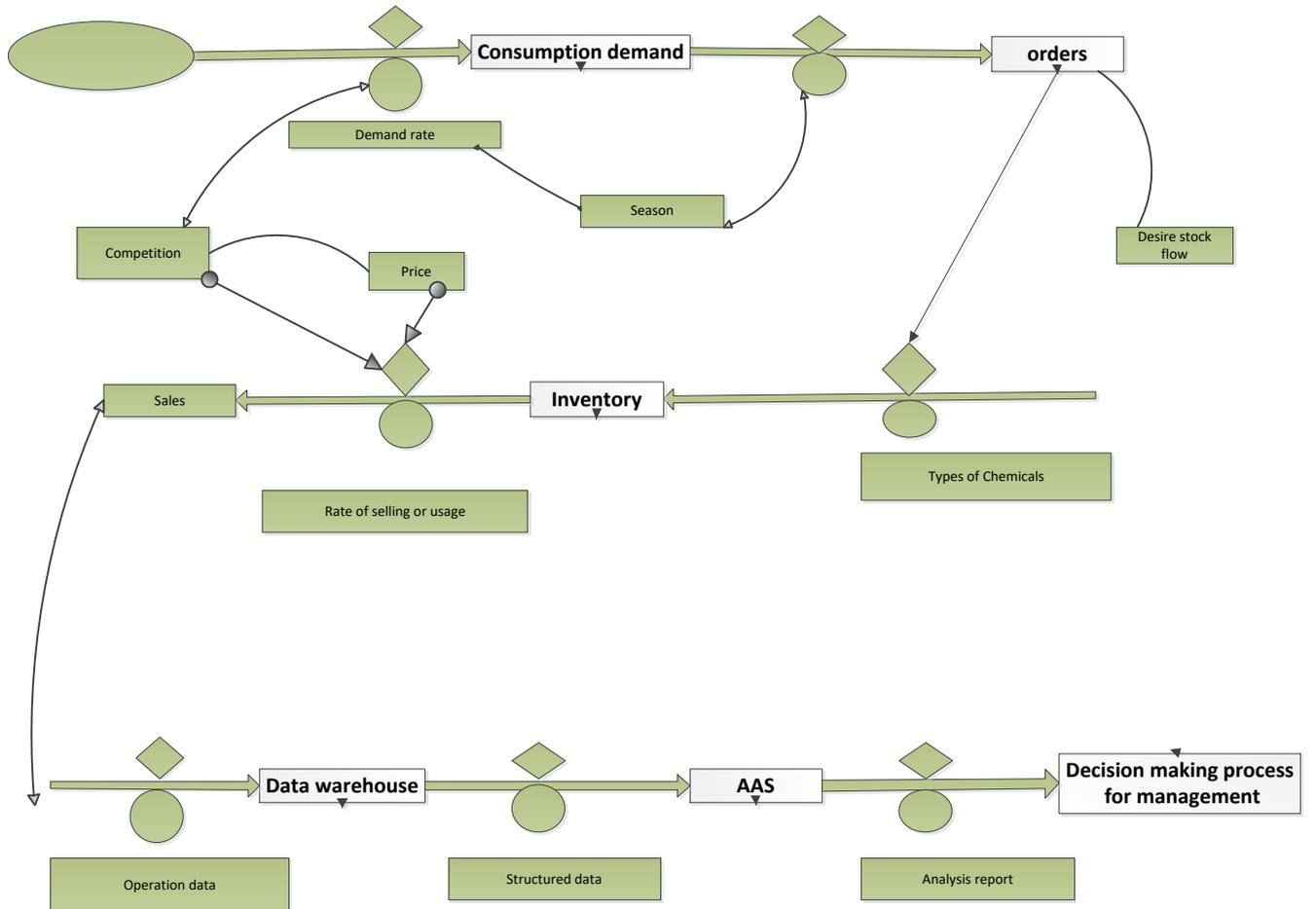


Figure1a: Stock and Flows Diagram.

Feedback and Causal Loop Diagrams

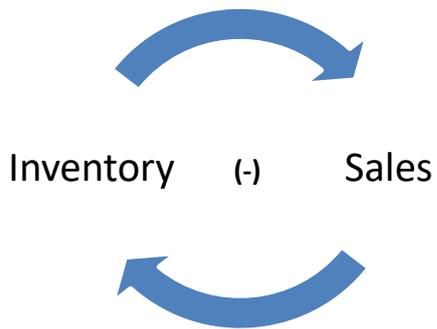


Fig.3a

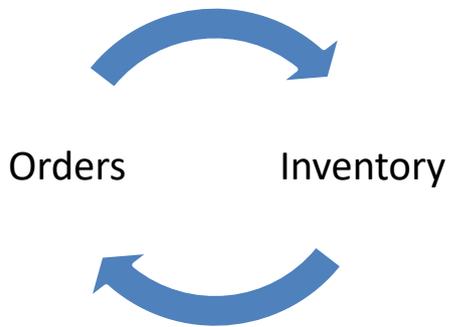


Fig.3b

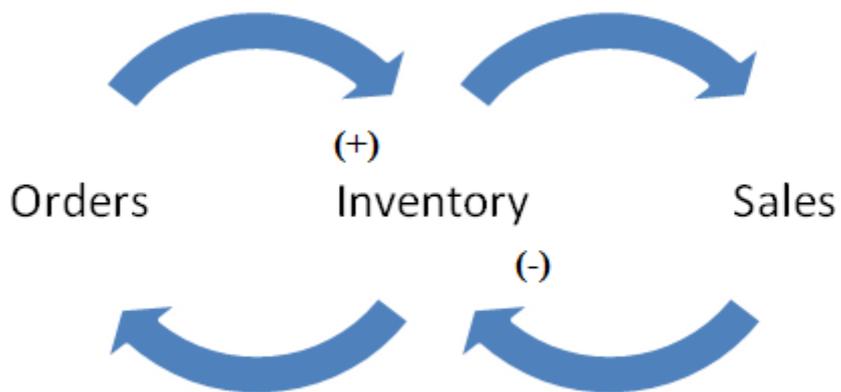


Fig. 3c