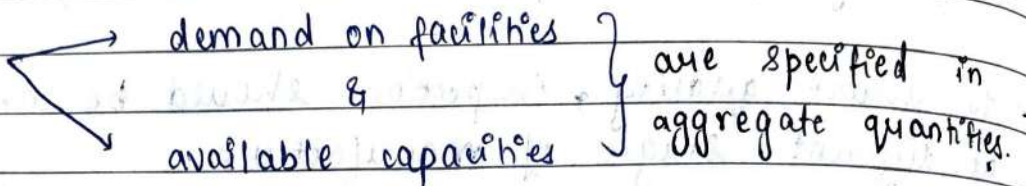


2.4 Resource Aggregate Planning

Aggregate Planning → intermediate range of time

→ Process of planning quantity and timing of output over the intermediate time horizon (3 months to one year)

→ It is called because  demand on facilities & available capacities } are specified in aggregate quantities.

* Steps In Aggregate Planning :-

1) Development of some logical overall unit for measuring output → 2) Forecast of demand for the planning period → 3) Identification & measurement of Relevant cost.

(gallons of paint in paint industry, rooms occupied in hotels)

* Aggregate Planning answers to following type of questions:-

1) To what extent should inventory be used to absorb the fluctuations in demand that will occur over the next 6 to 12 months?

2) Why not maintain a fairly stable work force size and absorb the fluctuations by changing activity rates by varying work hours?

3) Why not maintain a fairly stable work force and let subcontracts be engaged for demand fluctuations?

* If demand $\Rightarrow$ stable over time / resources are unlimited, the aggregate planning is trivial.

Under this case

- $\rightarrow$ Demand forecast are converted to resource requirements.
- $\rightarrow$ Resources necessary to meet demand over the time horizon are acquired.
- $\rightarrow$ Minor variations in demand are handled with OT or UT.

* When demand fluctuates over the planning horizon.

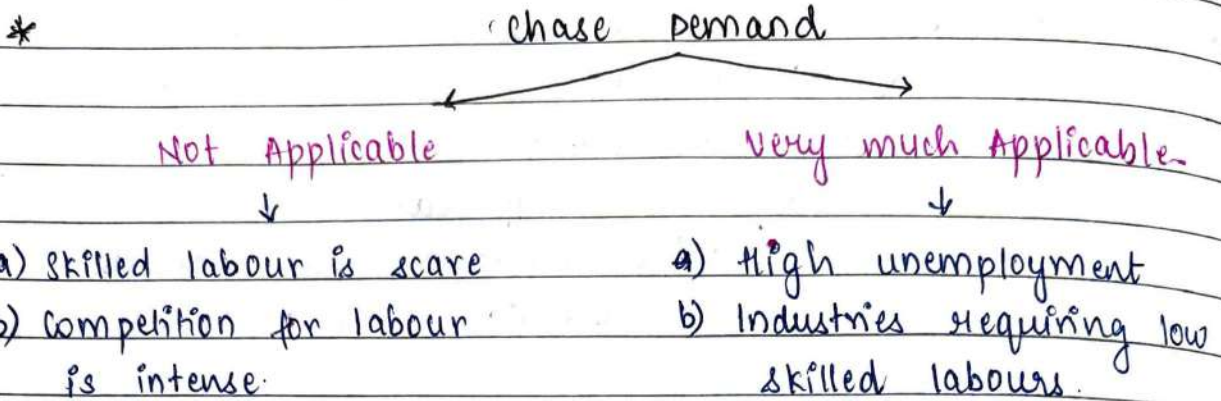
Alternatives are :-

- 1 $\rightarrow$ Producing at a constant rate and using inventory to absorb fluctuations. (level of prodⁿ)
- 2 $\rightarrow$ Hiring & firing workers to match demand. (Chase demand)
- 3 $\rightarrow$ Maintaining resources for high demand levels.
- 4 $\rightarrow$ Increasing / decreasing working hours (OT or UT)
- 5 $\rightarrow$ Subcontracting work to other firms
- 6 $\rightarrow$ Using part time workers.
- 7 $\rightarrow$ Providing service / product at a later time period. (backordering)

When one of these is selected $\rightarrow$ Pure strategy

When two or more are selected $\rightarrow$ Mixed strategy.

Note :- Level production sets production at a fixed rate (usually to meet avg demand) and uses inventory to absorb variations in demand.



Maintaining resources for high demand levels ensures high level of customer service.

↓
But

very costly when extra workers & machines remain idle during low demand period.

strategy most suited when

superior customer services are required

Customers are ready to pay extra.

* When demand fluctuations are not extreme, Overtime/Under time are common strategies.

Under this strategy :-

- Competent staff is maintained.
- hiring and firing cost are avoided.
- demand is met temporarily without investing in permanent resources.

Disadvantage → Premium paid for overtime.

Note :- OT alone may not be sufficient to meet the peak demand and OT premium may be enjoyed by less efficient and tired workforce.

* Subcontracting / Outsourcing

→ feasible when reliable supplier is available, both in terms of quality and time for supply.

→ Very common strategy, when demand exceeds expectations and required components are to be made ready through outsourcing.

→ This strategy needs a strong tie with possible subcontractors and first-hand knowledge of their work.

Disadvantages

- a) Reduced profit.
- b) loss of control over production
- c) long lead times
- d) potential that the subcontractor may become a future competitor.

* Part time workers :-

when feasible ?

- unskilled jobs or
- areas with large temporary labour pools (eg. students, home makers).

Part time workers are less costly than full time workers and they have more flexibility so far as working hours and time are concerned.

* Backordering :-

Viable alternative only if customer is willing to wait for the product / service.

* The most effective strategy depends upon :-

demand distribution

competitive position

cost structure of firm or product line.

(One aggregate planning strategy is not always preferable to another.)

* Each strategy has a cost factor associated with it, such as :-

- 1) Payroll cost
- 2) Cost of overtime, second shift & subcontracting.
- 3) Cost of hiring and laying off workers.
- 4) Cost of excess inventory and backlog.
- 5) Cost of production rate changes.

Note :- Cost items that are to be included in the strategy should vary with changes in the decision variables. If it does not vary, exclude from consideration.

* Aggregate Planning guidelines :-

- Determine corporate policy regarding controllable variables.
- Use a good forecast as basis for planning.
- Plan in proper units of capacity.
- Maintain the stable workforce.
- Maintain needed control over inventories.
- Maintain flexibility to change.
- Respond to demand in a controlled manner.
- Evaluate planning on a regular basis.

* Properties of Aggregate Planning :-

- 1) Both output and sales should be expressed in a logical overall unit of measuring.
- 2) Acceptable forecast for some reasonable planning period, say one year.
- 3) Method of identification & fixing relevant cost.
- 4) Availability of alternatives for meeting objective of orgn.
- 5) Facilities that are considered fixed to carry out the objective.

21-14 :- Different pure strategies are :-

Plan 1 → Actual demand is met by varying the work force size.

Quarter	Demand	Cost of increasing production level (₹)	Cost of decreasing production level (₹)	Total cost of plan (₹)
1	270	-	-	-
2	220	-	50 × 200	10,000
3	470	250 × 150	-	37,500
4	670	200 × 150	-	30,000
5	450	-	220 × 200	44,000
6	270	-	180 × 200	36,000
7	200	-	70 × 200	14,000
8	370	170 × 150	-	25,500
Total				<u>1,97,000</u>

Plan 2 :- Co. computes average demand and sets its production capacity to this average demand.

Qtr	Demand forecast	Cumulative demand	Production level Avg demand $2920 \div 8$	Cum. Prod ⁿ level	Inventory (Cum Prod ⁿ - Cum demand)	Adjusted Inventory (255)	Cost of holding inventory
1	270	270	365	365	95	355	17,500
2	220	490	365	730	240	495	24,750
3	470	960	365	1095	135	390	19,500
4	670	1630	365	1460	-170	85	4,250
5	450	2080	365	1825	-255	0	0
6	270	2350	365	2190	-160	95	4,750
7	200	2550	365	2555	5	260	13,000
8	370	2920	365	2920	0	255	12,750
Total							96,500

Plan 3 :- Subcontracting :-

Quarter	Demand forecast	Prod ⁿ units	Subcontract units	Incremental cost @ ₹100/ units.
1	270	200	70	$70 \times 100 = 7000$
2	220	200	20	$20 \times 100 = 2000$
3	470	200	270	$270 \times 100 = 27,000$
4	670	200	470	$470 \times 100 = 47,000$
5	450	200	250	$250 \times 100 = 25,000$
6	270	200	70	$70 \times 100 = 7000$
7	200	200	0	0
8	370	200	170	$170 \times 100 = 17000$
			Total	1,32,000.

Total cost of Pure strategies :-

Plan 1 $\rightarrow$ 197000

Plan 2 $\rightarrow$ 96,500

Plan 3 $\rightarrow$ 1,32,000

Hence, Plan 2 has the least cost.