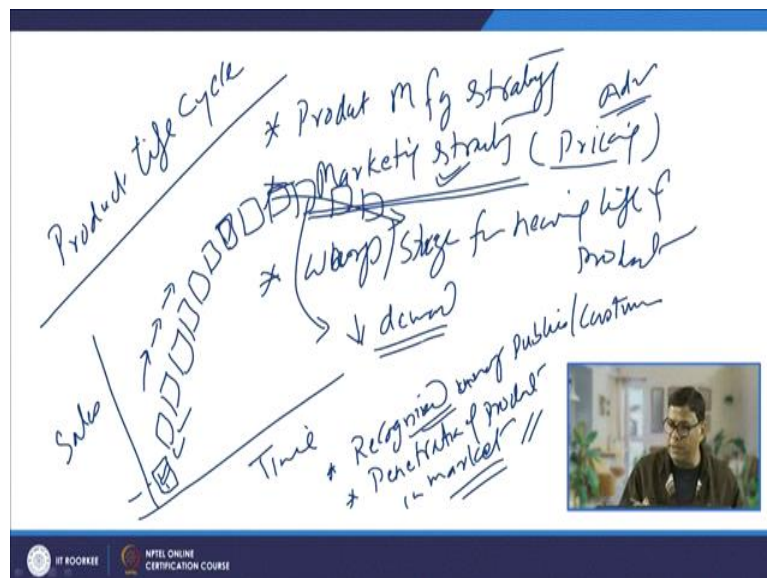


Principles of Industrial Engineering
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Lecture no. 09
Organizational Structures: Process & Product Organization

Hello, I welcome you all in this presentation related to the subject Principles of Industrial Engineering. We have talked about that there are various types of the products and since, the different types of the products made of the different materials designs and very different number of quantities these are produced. So, each one requires the different manufacturing a strategy and accordingly organizations need to develop the organizational structure and deploy the manpower with the different roles and responsibilities.

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In addition to that, we have also seen that the productive goes through the different stages during its life from the entry stage to the growth stage then maturity and decline. So, this product life cycle, product life cycle affects a number of things. The one thing that affects directly about which you have talked is the product manufacturing strategy. In addition to that it also affects the marketing is strategy, the kind of the marketing to be done which means the way by which pricing of the products will be done.

And the third one, it also affects, suggests the ways and stages, stage for renewing the life of product in the market. So, if you see this the product life cycle and here we have sees. So, when the product is introduced and it is new, being manufactured, very few in numbers and

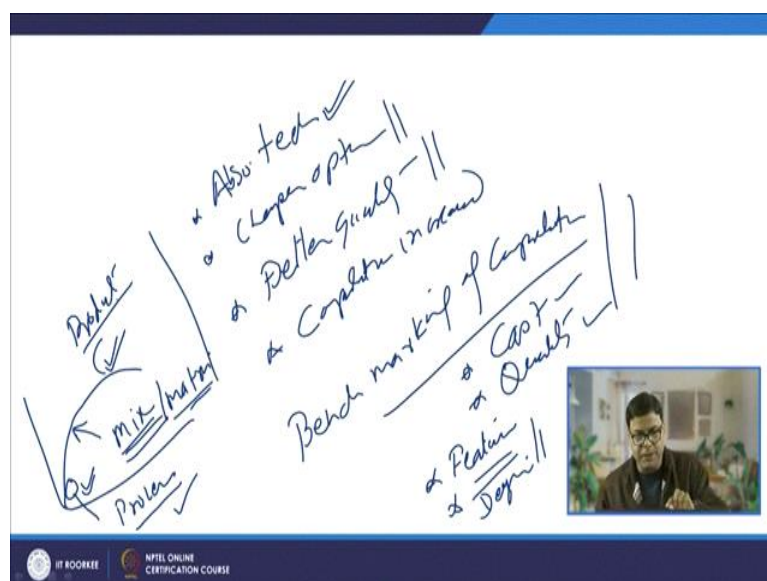
the variety is a more. At this stage it is required that the product is recognised among the public or the customers.

So, it is important that the product reaches to the customers and for that the penetration of the production in the market, its pricing is done suitably. So, that initially the customers take it on the trial basis and if they find the product is good then subsequently they would like to reuse. So, as far as the marketing is strategy is concerned the pricing, advertising. All those things are done in such a way that the product, presents of the product is recognised and the customers are able to get that product on trial basis for to see the kind of the product is.

So, at the entry stage especially, we need to use the suitable marketing strategy and as the volumes grow. Thereafter, it may not be necessary to go for aggressive pricing, aggressive pricing means the pricing at which the intentionally putting the product in the market at the lower price than the competitors price or the price at which it is being manufactured. So, aggressive marketing or the pricing can be done in the initial stages as soon as customers use the product, they would like to use it in future also.

So, the growth of the product increases and then it can be, then the price of the product subsequently can be increased it. So, as per the stage of the product in its life cycle, suitable marketing strategy can be adopted and once it reaches to the maturity stage, it suggests now, what are the variables leading to the decline in the demand of the product. So, it becomes the subject of the market research to find out why customers are not buying that product.

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It may be the absolute technology, it may be the cheaper options available or the better quality products are available or you can say competition increased in the market. So, we need to modify or renew the product through the incorporation of the suitable technology, design models, providing the product at the competitive price of the reasonably good qualities, good quality products as per the kind of the products, the quality products which are available in the market from the competitors.

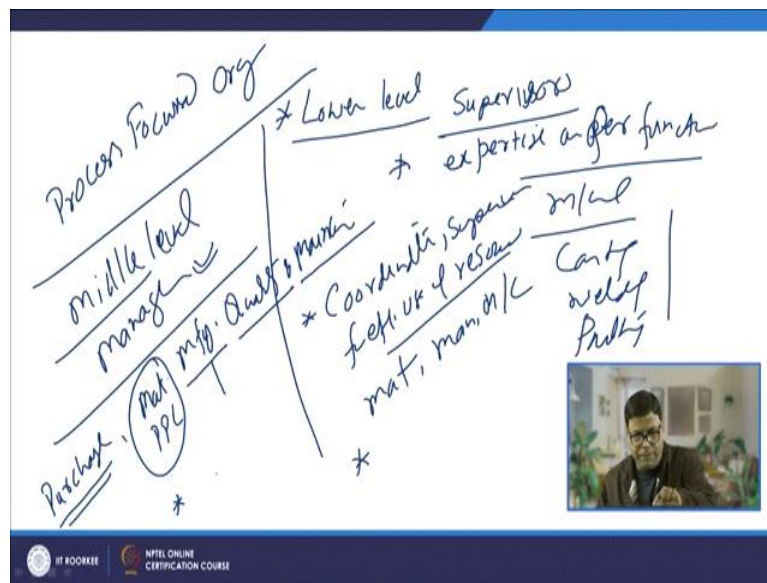
So, for this purpose suitable benchmarking of the competitors can be done with the regard to the cost at which they are making it available, the kind of the quality characteristics that competitors product as and the kind of the features although that will be covered in the quality. So, the cost, quality and the features which are available, the designs of the competitions which are available.

So, the, it becomes the role of the management is to find out where the, their own product is lacking now, as compared to the competitors product. And accordingly the inputs can be given, technological inputs or the cost quality features whatever is to be done then suitable steps are taken. But inputs for these like the time to identify these steps are suggested by the product lifecycle with regard to the growth of the product from the entry to the maturity and thereafter decline stage.

Now, we have also seen that the product lifecycle suggests that initially we may have to follow the process focussed organizationally structure at the maturity stage or when it reaches to the, when the growth volumes increase significantly or the volume of the sales increase significantly then we have to go for the product focussed organizational structure and in between them, when the varieties and the numbers both are moderate, then we have to follow the mixed product strategy.

So, in the initial stage it is custom designed and in the maturity stage or near the maturity stage it is the standard product and in between it is a mixed product strategy. So, we will be using the process focussed organization for the initial stages, then mixed or the metrics type of the organizational structure for the mixed productive strategy and then product focus organizational structure for the standard products. So, these are the three types of the organizational structures with regard to the manufacturing strategies.

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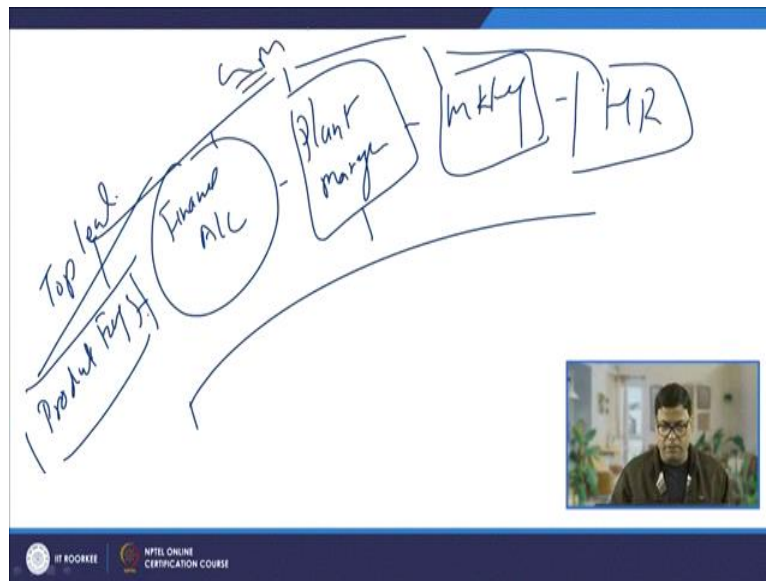
So coming up with the process, focussed organizational structure. Process focussed organizational structure like there are the different levels say lower level. At the lower level in this organizational structure, basically we have the supervisors. Supervisors, these are, these have the expertise as per the function, like the supervisors having expertise in machining, then in casting, in welding, in painting likewise.

So, they are, they will be having the expertise in the different functions. So one thing is that they have the specialisation and expertise in a particular field. And then another thing that they are expected to do is like coordinate and supervise, the supervise for effective use of resources. Supervisors will be coordinating the efforts of staff and workers for effective use of resources in terms of the material, man and machines.

So that they can really, we can give the output as per the targets of the organisation. So, at the middle level, we primarily have the managers, managers of the different domains like purchase. Then material control, production planning control, manufacturing, quality control, maintenance.

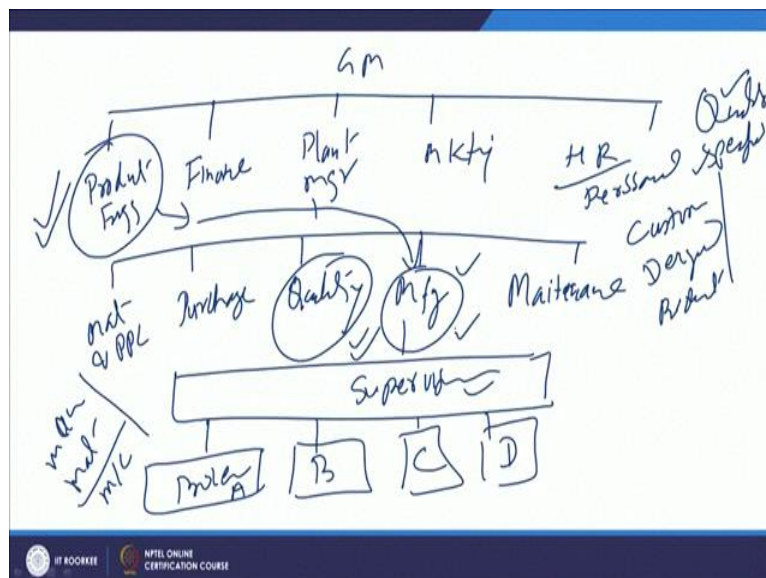
So, this is the middle level thing, managers looking after the purchase material and the production planning control, manufacturing, quality control, maintenance, etc. Under the manufacturing only they are very, so in each of the categories there will be supervisors who will be having the expertise in their domain. Apart these managers will also be acting as a link between the supervisors and the top level management.

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Apart from this, we have the further the top level management in this kind of the organizational structure, where there will be a product engineering, a separate function, then finance and accounts, then plant manager, then marketing and then HR like this. So, under the plant manager only there will be the different functionalities or functional groups like the purchase or the marketing or the quality, maintenance, etc., and efforts of all means. So, these are the different functional groups and then at the top there will be, all these will be reporting to the GM, at the top.

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So, here if we see the entire link, at the top we have GM, then there is the top level management involving like the product engineering, finance, plant manager, then marketing,

then HR and personnel. Under the plant manager there will be so many functional groups like the material control and the production planning control, there will purchase, there quality control, there will be manufacturing, there will be maintenance.

And under the manufacturing there will be so many shops and functions with the different every specialisation in the different fields. So here this is that like say the supervisory level, supervisor for process A, supervisor for process B, supervisor for process C, supervisor for process D. So these A, B, C, D are the special realise the processes in which these supervisors will have the expertise. And they will be supervising and coordinating the resources in form of man, material and machines.

So, man material machine resources will be utilised with the coordination of the supervisors. If we see in this entire structure, the product engineering is at the top level. There is a reason behind this, while the manufacturing is at the manufacturing and the quality control is at the lower level. The reason for this is that, since the process focussed structures are primarily used for the custom designed products.

Where quality and specification, is manufacturing of the product as per the requirement of the quality and specifications of the customer. So, as per the requirement of the customers with regard to quality and specifications products will be designed. And once this is designed then according to manufacture accordingly will be the job of the manufacturing, managers at the lower level and the functions at the lower levels.


So, they will not be able to influence the kind of the design which has been developed by the product engineering group. Because many times the quality control and manufacturing people try to influence the things because of the difficulties associated with the manufacturing and quality control. So, the product engineering function is kept at the higher level as compared to the manufacturing function. So, these are some of the features.

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Policy of Org. for manufacturing

- Manufacturing
 - To order: custom designed, low volume and high variety
 - To stock: standard products, high volume and low variety

As per manufacturing strategy, Organizations need to develop suitable organization structure:
product, process focused, matrix/mix



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Process focussed Organization

- Bottom to top organizational representation
- Top: Plant manager including support functions
 - Materials control
 - Quality control
 - Industrial engineering
 - Maintenance
 - Manufacturing
 - Purchase
- Middle: Manager
 - Wider span of control
 - Interacts with top management
- Lower: primarily supervisory structure, department wise
 - Expertise as per function
 - Supervise, coordinate use of resources man, m/c, material

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So, if we see, this is about the policy of the organizational structures, will first of all, we will see the process focussed organisation. At the lower level, the job is at the supervisor level, the supervisors are there, according to the function and department, they have expertise as for the function and these supervise, coordinate the use of the resources men like man, material and machine.

Then there is a middle level structure, where we have managers, they have wider span of control and they act as a link between the supervisory level and the top management. At the top management there is a plant manager and other managers involving the support functions like the material control, quality control, industrial engineering, product engineering, maintenance, manufacturing, purchase, etc? So, about these I have already talked in detail.

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The slide is titled "Policy of Org. for manufacturing" in a large, bold, black font. Below the title, there is a bulleted list. The first bullet is "Manufacturing". Under it, there are two sub-bullets: "To order: custom designed, low volume and high variety" and "To stock: standard products, high volume and low variety". Below these, there is a paragraph: "As per manufacturing strategy, Organizations need to develop suitable organization structure:". This paragraph is followed by a list of three options: "product, process focused, matrix/mix". The slide has a blue header and footer. The footer contains the IIT Kharagpur logo, the text "IIT KHARAGPUR", the NPTEL logo, the text "NPTEL ONLINE CERTIFICATION COURSE", and the number "2".

Policy of Org. for manufacturing

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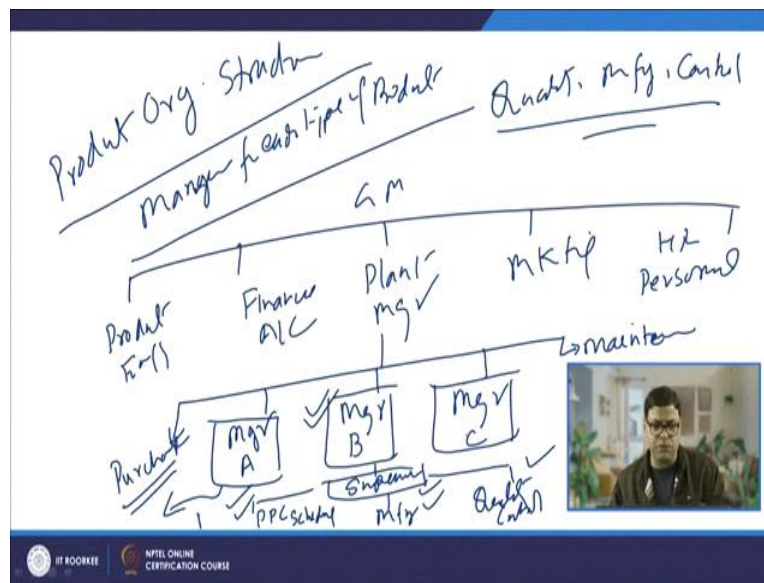
- ✓ product, process focused, matrix/mix

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Now, we will see the one additional aspect, the different organizational structures may adopt the different manufacturing strategies. As for the kind of the product which is to be manufactured, they can manufacture against the order, which is normally adopted for the custom designed products. And these are normally produced in very limited volume and very large in variety.

While the organizations may also follow the manufacturing strategy in such a way that the things are manufactured for the stock, so that they maintained the inventory of the items being manufactured, which is primarily adopted for the standardised products, which are produced in very high volume and the limited variety. And accordingly as per the manufacturing strategies adopted, the organisations need to develop the suitable organizational structure, product process focussed or the metrics or the mixed organizational structure.

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Now, we will see the next type of the organizational structure that is the product organizational, product focussed organizational structures. Most of the things in case of the productive focussed organizational structure are same as that of the process focussed except that there is a separate manager for each type of product, for which is being manufactured and he will be responsible for the quality manufacturing and all types of the controls that are required for the production of that type of the product.

So, if we see this at the top we have GM, then like the process focussed organizational structure, again we have the product engineering here, then finance and accounts, then the plant manager, then marketing, then HR or personnel. Under the plant manager only there are, there is a difference in organizational structure with the process focussed organizational structure that difference is like the plant manager responsible for the maintenance of all facility, maintenance of the facilities.

Then on the other hand there is a purchase making available all the resources needed for the manufacturing. And then we have the managers for product A, manager for product B, manager for product C likewise as for the size and the kind of the diversity of the organisation, it may manufacture a variety of the products. And then under the manager there will be supervisory level and they supervisor, at the supervisory level, the supervisors are responsible for a range of functions like they will be looking after the production, planning and control, scheduling, then manufacturing quality control.

So, what will be the quality of product? How do you manufacture? What kind of schedules will be followed? All that will be under the control of that particular type of product manager. And each product manager or the facilities are related with the each of the product will be acting and working like an independent department. So, likewise there will be for the, likewise the structure will be there for the manager product A, manager product C and number of products which will be there.

So, this is the kind of the organizational structure which is there. So, here under the particular product managers, there will be supervisory staff, they are responsible for the quality control, production planning control and the manufacturing. And then under the supervisory level they will be further staff which will be facilitating the production through the use of the resources.

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Process focussed...

- At top level of plant managers also there is
 - Product design
 - Finance
 - Plant Manager
 - Marketing
 - Personnel
- Large organization with number of plants, plant manager takes care of all these functions also.

Product design is separate at the top : not to get influenced by manufacturing for quality and specification

Coordination across functions is an issue
Time, cost are not on priority

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So, that is what now we will see the product focussed, it is a typical example of the process focussed organizational structure and we will see the product focussed organizational structure. So, if we see here at the top level, plant managers, at the top level of the plant managers there is product design finance, plant manager, marketing and the personnel. So, this is the top level management and the in large organizational structures, they having the number of plants, the plant manager takes care of all these functions.

Here product design is a separate at the top not to get influenced by the manufacturing, not to get influenced by the manufacturing for the quality and the specifications. So, here it involves the coordination of the functions, coordination across the, these are the problems basically in

case of the process focussed organizational structure, there is a problem related with the coordination across the functions and the time, cost, etc., are not in a priority. So, these are the features of the process focussed on a structure.

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Product focus organization

- Less control on cost, time, quality
- Decentralized authority
- Each product managers work like independent department
- Supervisor: Responsible for execution of plan through staff under
 - production planning, quality, scheduling, inventory
 - Reports to product manager
 - Less influence on decision making

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And in case of the product focussed organizational structure because the things work continuously, there is a system, there is a procedure and things will be done in continuation. So, that is why there is a less possibility for control over the cost, time and the quality. The authority in this case is decentralised. So, the decisions will be taken even at the lower level, at the supervisory level also.

Each product manager works, like the independent department and in this case supervisors are responsible for execution of plan through the staff. And they are responsible for production planning, quality control, scheduling and inventory. And the managers, and the supervisors will be reporting to the managers. However, the supervisory staff has less control over the decision making.

Now, let us summarise this presentation. In this presentation, basically I have talked about the role of the product manufacturing is strategies in the pricing, in use of the suitable manufacturing strategy at the stage when that the some kind of intervention is needed to renew the life of the product. And according to the stage of the product in its growth cycle, which type of the manufacturing strategies should be used.

And there are two types of, there are three types of the organizational structures based on the manufacturing strategies. One is like process focussed organizational structure, product focussed organizational structure and the mixed organizational structure which is also called metrics organizational structure. In this presentation I have primarily talked about the features of the process and product focussed organizational structures. Thank you for your attention.