

Product Design & Manufacturing
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Lecture - 30
Managing Competitiveness

Welcome to lecture number 30. So, in this lecture we will be focusing towards Managing Competitiveness. So, today what has happened is when you try to develop a product you should be very careful we should look at who are all going to be our competitors around? Who is going to be your customer? And what is the next step competitor will take? So, if he takes this step how am I going to tackle?

So, all these things have to be considered and then what we do is we try to develop a product. So, here in this lecture we will see some of the concepts of managing competitiveness.

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So, here the Content of this lecture is going to be Benchmarking. So, benchmarking is pretty interesting. So, it is like how do I evaluate myself? So, I have to evaluate by myself with respect to a standard. See I might say I am a great teacher. I am a wonderful product or I have developed a wonderful product. But when I compare it to the standard

then I know there am I? Am I a head of the standard or less than the standard? If and if I am less than the standard, so I have to improve. So, what is that? That is called as bench marking.

So, the next one is Outsourcing. Today the world is moving towards the concept of outsourcing. So, what people say rather than manufacturing inside your factory let us try to outsource the manufacturing outside and let us start doing assembly. In fact, the certain companies have gone one step ahead and then they say from, from the raw material to final finished product to packaging everything is done outsourcing.

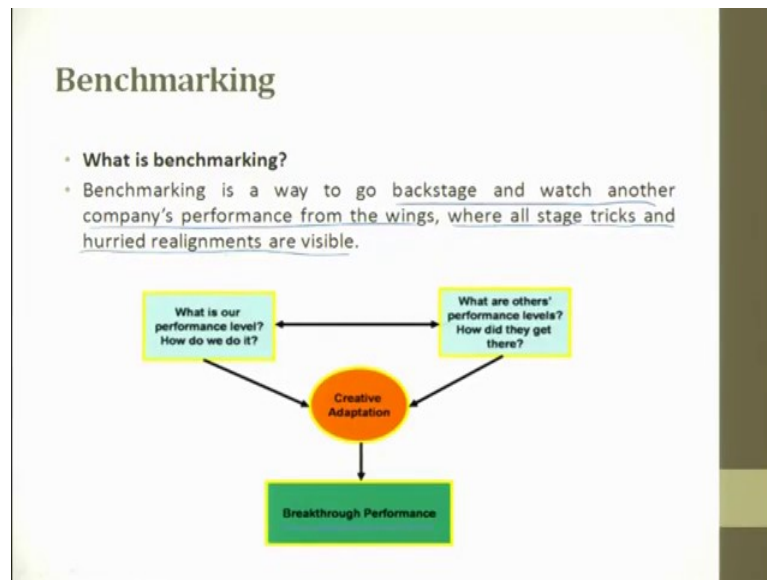
They put a quality manager, there who assess the quality of the product coming out and then the company just puts it is stamp and sends it out. So, outsourcing is one thing which is coming up in a big manner because outsourcing we will try to reduce the cost on the company.

Then Mass customization is a very interesting concept which we are talking today. So, a mass customization will try to help in selling products. Today when you try to buy a car or when you try to buy a pen or when you try to buy a shirt we always look for customizing that shirt for yourself. So, you might be fat, you might be thin. So, many a times what happens when even buy a shoe your huge size will be 6 and a half.

So, you will have a 6 size shoe or you will have a 7 size shoe. Your foot is in between these two guys. So, either you buy a large shoe or you buy a smaller shoe. When you buy a smaller shoe it is going to hamper your body profile. When you buy a loose shoe it is going to slip, it cannot allow you to run.

So, if you see many of the things are not customized, but still we are happy with it. So, but now people have become little more aware and people talk about customization.

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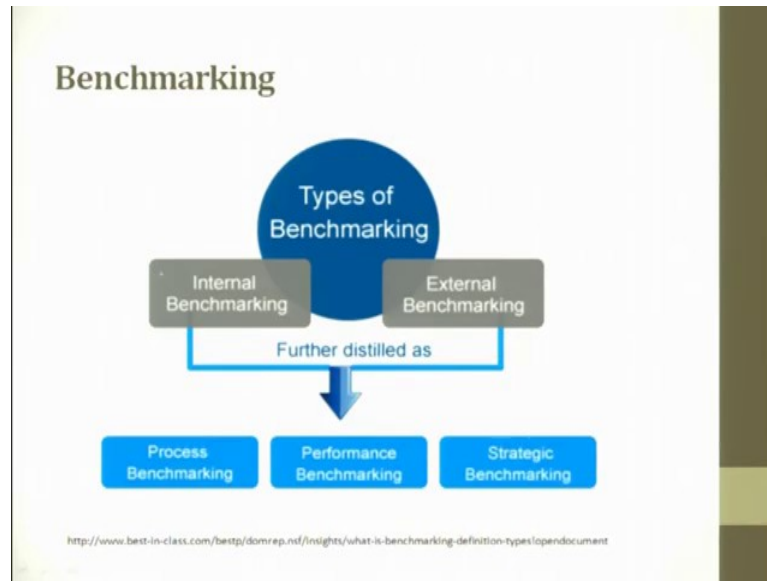


When we talk about benchmarking, benchmarking is the way to go backstage and watch another company's performance from the wings, where all stage tricks and hurried realignments are visible. So, what is our performance level? How do we do it? What are the other performance level? Others performance level? How do they get their done things done? So, first you try to understand where are you? Then you try to understand where the others are? What are they doing? Then what you do is, we try to creatively adapt. And then what you do is we look forward for breakthrough performance.

So, I in a class I always try to rank myself with respect to the topper. So, then I know what is my capability in the class. When I try to talk about a product like a computer, the best computer is x. I will see I have developed computer. If that fellow can solve so much of problems in the fraction of a second, how much can I do?

So, that is how you try to rate yourself and then you try to go back to your design desk, sit down and start correcting the design or the performance whatever it is and comeback compete it with them, put some creativity. Then what you come out is a breakthrough performance. So, benchmarking is the way to go backstage and watch another company's performance from their wings. Where, all stage tricks and hurried realignments are visible.

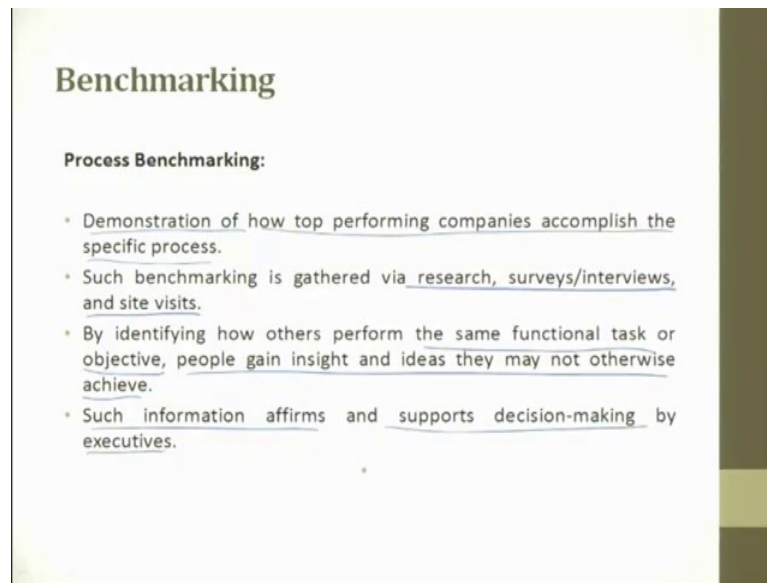
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There are different types of benchmarking. One is called as Internal Benchmarking; the other one is called as External Benchmarking. So, internal is you try to do within yourself, within your factory you try to do is internal benchmarking. External benchmarking is you try to compare yourself with respect to the other company or competitors.

In fact, if you go back and remember your quality function deployment we had a exclusive matrix, where in which we say what are the technical requirements? What are the competitors giving solution to the requirements? So, these are external requirements. Further distilled as Process Benchmarking, Performance Benchmarking and Strategic Benchmarking; These are the three different types of benchmarking which every company does to make their product successful.

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What is process benchmarking? Process benchmarking demonstrates of how top performing companies accomplish the specific process. If somebody can do a job within 2 minutes and if I take 10 minutes, it is always good for me to go and understand how did that person do the job within 2 minutes? Or if so once maybe I have wasted certain things or I did not have lot of data to accomplish the process. So, then one ago I come back standardize a procedure, then ask the input which has come to the process in a standardized fashion. And I also might improve my efficiency in getting the same job done in 2 minutes.

So, that is what this demonstration of how top performing companies understand them stage by stage. Do a micro event analysis. So, understand every stage. If somebody does move his left hand from 10 centimetre top 2 centimetre, he moves at an angle of 8 degrees. So, please note down that. And then when you come back and sit down you will see yes that makes a sense or if a fixture is to be established, please establish a fixture so that you can improve your efficiency.

Such benchmarking is gathering by a research, survey, interview and site visits. By identifying how others perform the same functional task or objective people gain insight and idea they may not otherwise achieved. For example, if you want to start a hotel business, you just have to go to another hotel in the nearby village or in the nearby town, understand its business model, understand his kitchen, understand the skill level of the

cooks, chefs; whatever are there. And then you come back and start doing it in your in your hotel. You will see a success. So, that is what this process benchmarking. Such information, affirms and supports decision making by executives.

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Benchmarking

Performance Metrics:

- Performance metrics give numerical standard against which a client's own processes can be compared.
- These metrics are usually determined via a detailed and carefully analyzed survey or interviews.
- Clients can then identify performance gaps, prioritize action items, and then conduct follow-on studies to determine methods of improvement.

Handwritten diagram: A horizontal line with a smiley face labeled 'myself' on the left and a circle labeled 'A' on the right. A vertical line descends from 'A' with a question mark and the text 'Process; Performance' written next to it.

The next one is performance metrics or performance benchmarking. So, the performance matrix gives number standard against which a client own processes are compared. So, these matrices are usually determined via a detailed and a careful analysis survey or the interview. So, you try to put a value to you and then you say how much percentage are you up or down. Clients can then identify performance gaps, prioritize action items and then conduct follow-on studies to determine the methods of improvement.

So, I know my competitor is here. I am here my competitor is A. I am this is myself. I try to understand what all he does in respect to process and then I also try to understand with respect to performance. And then what do I do is I step back, try to implement in my system and then start doing it. Recently what we did was, we were any paper which was moving inside my institute used to take 6 to 8 working days for me to get back the document whatever I submit for, for signing in the administration.

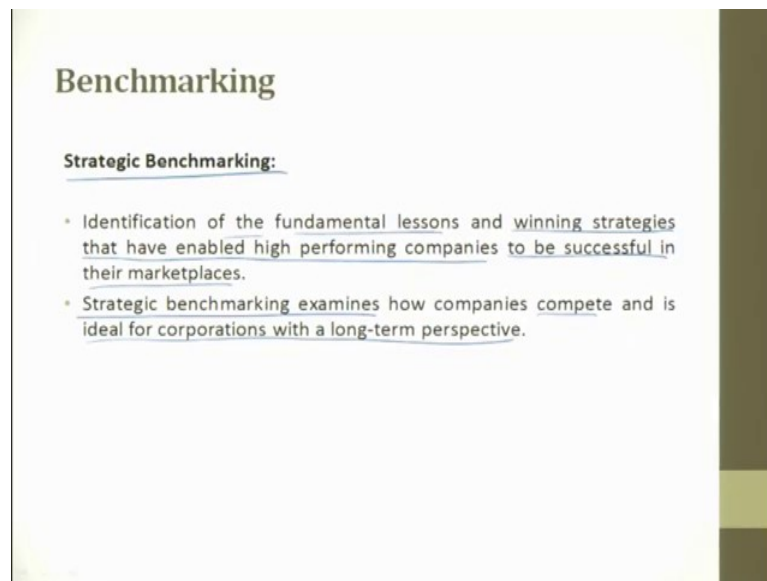
So, the institute saw every paper is taking 6 days and 8 days. They had a statistical data. Then what they did was they, they reorganized the complete structure. They made a process map and then they also saw the flow of the paper to several desks. Then they understood how much time that explained in each desk. And today what has happened as

we have come to the level of complete automation. So, we start and then we get the signed the paper from the administration in the evening itself. So, within 8 hours now we are able to get our document back signed or a response on the letter.

So, what has happened is we went to other institutes, we went to several corporate worlds, understood how do they do; Then had several rounds of brainstorming session. We have to figure out is a digital signature good enough? Is a physical signature required? What verification happens? What data he needs? And then finally, we came out with this improvised system. So, what we did was we did benchmarking.

So, performance metrics is also something like that. So, performance metrics gives numerical standards against which the clients own process can be compared.

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So, for example, if that is 100 we try to get 60. So now, we try to improve. The next one is strategic benchmarking; Identification of the fundamental lessons and winning strategies that have enabled a high performance companies to be successful in their marketplace. So, understanding strategies; many a times what happens when you conduct the meeting also, the meeting will have got several agendas like maybe 10 agendas, 20 agendas.

So, people watch generally they do there are two types of strategies; one strategy is people take up the toughest agenda and start discussing. And then they say if we spend

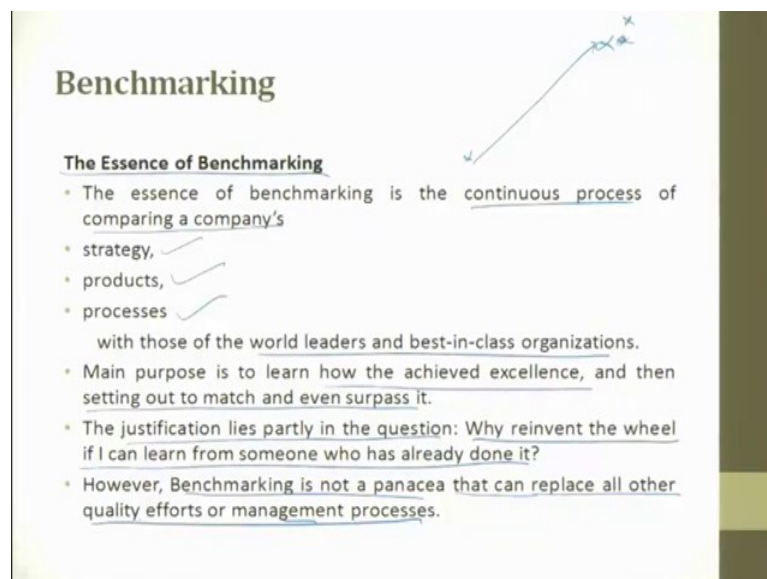
more time rest of the decisions can be taken very fast. So, that is one strategy to do. The other strategy is put all the easy things in the first go and lastly take up a long strategy or a tough decision to be taken, agenda and then we let us deliberate.

So, both strategies are there. So, many companies follow the first strategy and some companies follow the second strategy; So, you as a as a competitor has to look at which strategy to be used for your company or your product development and then choose it.

The strategic benchmarking examines how company compete and is ideal for corporations with a long-term perspective. So, strategy is one such thing. And strategy is many people when they start introducing a product into the market, they try to give the first full year in a very low price, maybe in the throw away price. Once they capture the market then, they slowly start increasing the cost of the commodity. So, that is one strategy.

The other strategy is if people said that you produce in bulk, flood the market with your product. And then when you do that, so you reduce since you have produced in bulk you go at a very economical price and hit at the market. Then you also get popularized. So, that is a strategy. So, strategic benchmarking examines how company compete and it is idle for cooperation with the long-term perspectives.

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Benchmarking

The Essence of Benchmarking

- The essence of benchmarking is the continuous process of comparing a company's
 - strategy, ✓
 - products, ✓
 - processes ✓
- with those of the world leaders and best-in-class organizations.
- Main purpose is to learn how the achieved excellence, and then setting out to match and even surpass it.
- The justification lies partly in the question: Why reinvent the wheel if I can learn from someone who has already done it?
- However, Benchmarking is not a panacea that can replace all other quality efforts or management processes.

The slide includes a small diagram in the top right corner showing a line graph with an upward trend and several data points marked with 'x'.

So, what are the Essence for benchmarking. The essence of benchmarking is continuous improvement. No product is developed ideal. So, what happens is every product you develop there has to be a scope for improvement and there is a scope for improvement ok. So, continuous improvement process is the bottom line.

Changes one thing which is very common which happens and continuous improvement in product has to be done so that you can sustain in the market. So, the essence of benchmarking is a continuous process for comparing a company. So, a strategy, a product, a process has to be compared at regular intervals and try to reset the button fine tune your process and look forward for the better product; With those the world leaders and the best in the class organizations. Main purpose is to learn how the achieved excellence and the set out to match and even surpass them.

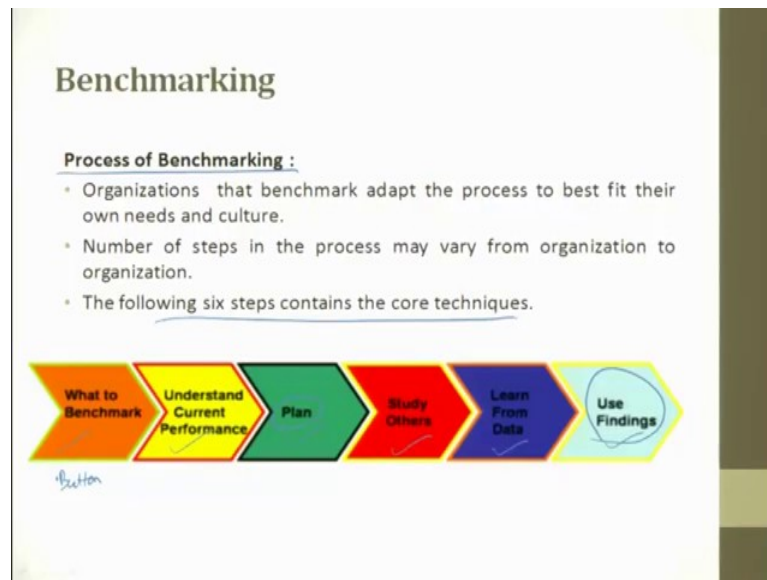
So, you should not say he is doing fine. So, I should do like him. No. You have to now start working on trying to beat him and go ahead of him. See if he is here and you are here, you try to move to this portion and stand here. Then you are you are only just in the same way where your competitor is.

So, what you are supposed to do? When you do benchmarking you do with your competitor and then you are level should be higher than what your competitor is. So, that is what we are saying. Main purpose is to learn how they achieved excellence and then setting out to match. Then even surpass it and go to a higher standard. So that is why the benchmarking is done. The justification lies partly in the question: Why reinvent the wheel if I can learn from someone who has already done it.

So, many a times when we do experiments we always tell it, why do you reinvent the wheel. If my, if somebody comes and says the surface is hot, so why do you go touch it and feel and rehydrate and say yes it is hot. So, if it is hot what strategic measures he has taken, please you also do it. Or do something much better than them. So, that you protect yourself from the heat.

However, benchmarking is not a panacea that can replace all other quality efforts or management processes. So, benchmarking is one of the process in product development. So, it cannot replace all the quality efforts or the management processes which you are doing.

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So, when you look at the processes of benchmarking: so organization that benchmark adapts the process to best fit their own needs and culture. Number of steps in the process may vary from organization to organization. The following are the 6 steps which contains the core technique. First what to benchmark, understand the current performance, plan, study others, learn from data, use findings.

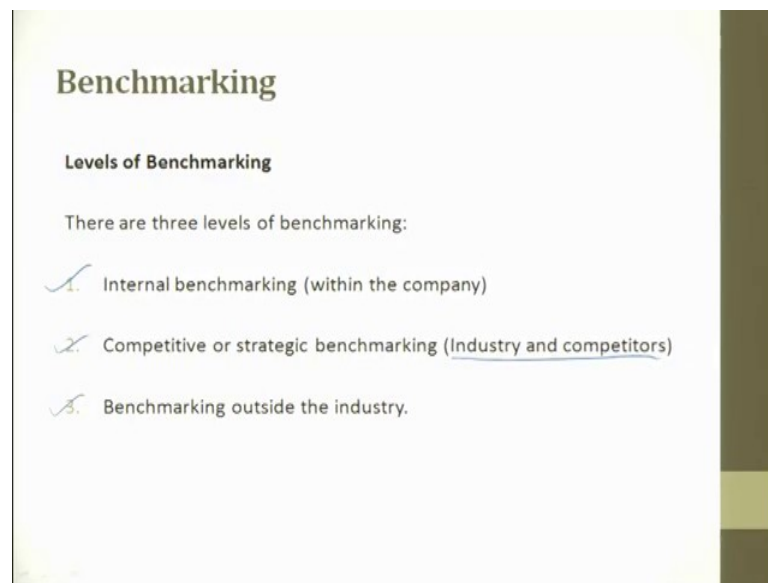
So, first what is to be benchmark you have to know for example, if you are making a wonderful shirt. In the shirt if button is the only person who fails frequently because of that your product is not sold properly.

Then you start looking at companies which produces the button best or companies which produces shirt where the buttons do not fail at all. So, you must see what is to be benchmarked. Then you try to understand your current performance. So, 1 in every 10 buttons break or my button shatters when we put in washing machine.

So, you understand your current performance. Then you plan what is to be done. Then look at the others who are around you and study how what are they done. Maybe the bottom is ok; the stitching is not talking your case. Others do a proper stitching maybe. So, please look into at them, learn from the data. So, you have learnt others. You make an observation sheet, write down all the sheets and then what have you done is, you have generated data.

Now, from the data you converted into an information and then a knowledge and then you write out what is your findings. And once you know your findings start implementing in your product such that you can succeed. So, these are the 6 steps containing core techniques for benchmarking.

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There are three levels in benchmarking: one is internal benchmarking, competitive benchmarking and benchmarking outside the industries. So, within an industry I told you internal benchmarking is within an industry within an organization within a classroom right; so, internal benchmarking.

So, you consider the next person who uses whatever it is your customer ok. Next is competitive or strategic business look at industries and competitors and when you benchmark outside the industry you can also do benchmarking with others.

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Benchmarking

Benefits :
There are three sets of benefits:

1. Cultural Change:

- Benchmarking allows organizations to set realistic, rigorous new performance targets, and this process helps convince people of the credibility of these targets.

2. Performance Improvement:

- Benchmarking allows the organization to define specific gaps in performance and to select the processes to improve.
- These gaps provide objectives and action plans for improvement at all levels of organization and promote improved performance for individual and group participants.

Handwritten notes on the slide:
Product A → 20min.
3x8 = 24
= 20min
= 28min
Product B → 20
20 parts/shift
28 parts/shift

So, what are the benefits? So, there will be a cultural change in your organization. There will be performance enhancement in your organization. So, there will be human resource development in your organization. So, these are the three big benefits of benchmarking.

So, benchmarking allows organization to set realistic, rigorous, new performance target and this process helps in convinced people of the credibility of these targets. So, here benchmarking allows the organization to set realistic data, realistic target, rigorous and new performance targets. So, the company culture has to be change. [FL] culture has been changed. In the today India is going towards professionalism.

So, this happened because of lot of technology got intertwined in our day to day life. So, today digital technology has become part and parcel of our life. Let it be economics, let it be the booking tickets, let be let it be transferring of data, transferring of information, everything has become digital. There is a cultural change which has happened.

Performance improvement: benchmarking allows the organization to define a specific gap in performance and to select the process to improvement. So, these gaps provide objectives and action plans for improvement at all levels of organization and promote improved performance for individuals and group participation. So, the performance improvement is that provides the objective and the action plan for improvement, at all levels of your organization it does not happen again the top level or the bottom level at

all levels. And you promote improved performance for individuals as well as group participants.

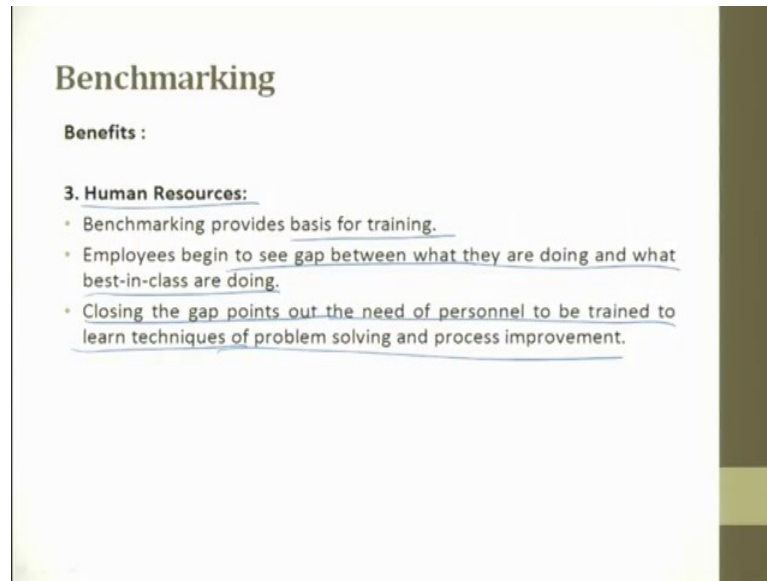
So, what happens is generally suppose you are making a product, Products A ok. So, you take 20 minutes in producing this product. So, naturally in an hour you produce 3 and then in 8 hours approximately you will produce 24. So, putting all these critic allowance, then lunch break allowance and other things you might be set a target of please produce 20 parts in a shift. Suppose in case you produce 28 parts.

Now what has happened? You are supposed to produce 20. Because of your skill, because of your capabilities you are producing 28 parts instead of 20. So, you have produced 8 parts more. So, now there has to be an incentive given to you saying that you have produced eights; so, that is what we are talking about here. So, instead of 20 you produce 28. So, you have produced 8 more. So, you we have to say that your performance is high so you will get an incentive of more salary. In the same way if there is a product B has to be produced by three people, four people product B.

So, then what happens? So, again let us assume it takes 20 minutes and now, you have to produce 20 parts in a shift. So, you have produced 28 from the group. So, now you see here that 8 parts are produced more and now you see because of this group participation you have produced 8 more. So, you have shown an enhancement in your performance. You would have rewrite and change the tool, put a fixture, then or material handling you have enhanced something like that so you have ensured.

Now, you have to be given that the incentive. So, that is what we are trying to say for improvement at all levels of the organisation, I will perform and promote improved performance for individuals as well as groups participants is the big benefit of benchmarking.

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Benchmarking

Benefits :

3. Human Resources:

- Benchmarking provides basis for training.
- Employees begin to see gap between what they are doing and what best-in-class are doing.
- Closing the gap points out the need of personnel to be trained to learn techniques of problem solving and process improvement.

The next one is human resource. So, human resource is the existing people will be send for training. The employer begins to see a gap between what they are doing and what best in that class is doing. For example, earlier many of the bank accounting was done manually. Today everything has become digital.

So, now when they go for a training program they look at those see the advantages whatever it is because of this digital. So, then they have been taught, they have now improved. So, when you do this benchmarking only you can do that. Closing the gap point out the need of the personnel to be trained to learn techniques of problem solving and process improvement happens because of human resource in benchmarking.

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Outsourcing

- In business, outsourcing is an agreement in which one company contracts-out a part of their existing internal activity to another company.
- It involves the contracting out of a business process (e.g. payroll processing, claims processing) and operational, and/or non-core functions (e.g. manufacturing, facility management, call center support) to another party.



<https://newtheory.com/fantastic-2017-growth-hack-34-of-companies-are-outsourcing/>

The next discussion is going to be an Outsourcing. In business outsourcing is an agreement in which one company contracts out a part of their existing internal activities to the other company. For example, you can have a part time ca, you can have a part time machinist, you can have a part time teacher, you can have a part time librarian. So, I cannot manage it.

So, what I have done is I have given my job to another person or to a or a group of person. I can also have outsource my mess, I can outsource my canteen. So, here basically I cannot run the business. So, I have given it to somebody who can run it on my behalf ok? So, it is internal activity to it. It involves the contract out of a business process; example payroll processing, claim processing, operational and non-core functions like manufacturing, facility management, call centre support to other parties. So, outsourcing is another thing because it works out to be economical.

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Outsourcing

Different Outsourcing Categories

- Nowadays, most freelancers or outsourcing providers will fall into one of the following categories, in regards to the services that they provide their clients.
- Some will even offer several of these:
 - Inbound Customer Service
 - Outbound Telemarketing
 - Web Design & Development
 - SEO and Online Marketing
 - Back Office / Admin Support
 - Virtual Assistant Services
 - Accounting and HR Management
 - Marketing & Sales Support

Handwritten diagram: A vertical list of seven horizontal lines. The top three lines are grouped by a bracket on the right labeled 'Design'. The bottom four lines are grouped by a bracket on the right labeled 'manufacturing'. To the left of the lines, the text '7 Steps' is written above the top three lines, and 'Cost to Product to customer' is written vertically along the left side of the diagram.

Different outsourcing categories: most freelancer or outsourcing provider will fall into one of the following categories, in regard to the service that they are provided to the clients. So, some will even offer several bound customer service, Outbound Telemarketing, Web Design and Development, SEO and Online Marketing, Back Office or Administrative Support, Virtual Assistant Service, Accounting and HR Management, Marketing and Sales Support.

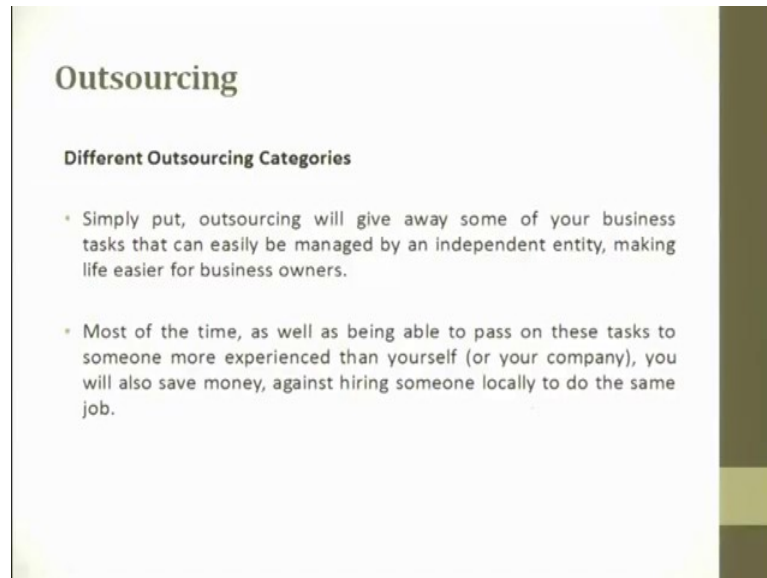
So, these are some of the things which happens in an industry and we are now trying to look at first outsourcing. Why is this all talked about in product development courses? Because I told you there are seven steps in seven steps in product development.

So, the first three steps are more focused towards Designing. So, customer voice and then you try to work on engineering solutions that conceptual thing. You choose the best one and then you try to work on engineering solutions. Afterwards the next four is more towards manufacturing. So, manufacturing we talk about process, layout then it will be sales and marketing and the last step is going to be how do I recycle? So, if you look at it the outsourcing comes in these two. Why because finally, when I sum up all these things this becomes as cost to product or cost to customer.

So, all these strategies of outsourcing also plays a very important role today. What is happening is companies have a strategy that they just called the two hours before the

product is to be delivered, the caller is sub assembly fellow, he delivers it to the spot. They do an assembly of the entire product and then they give it to the customer.

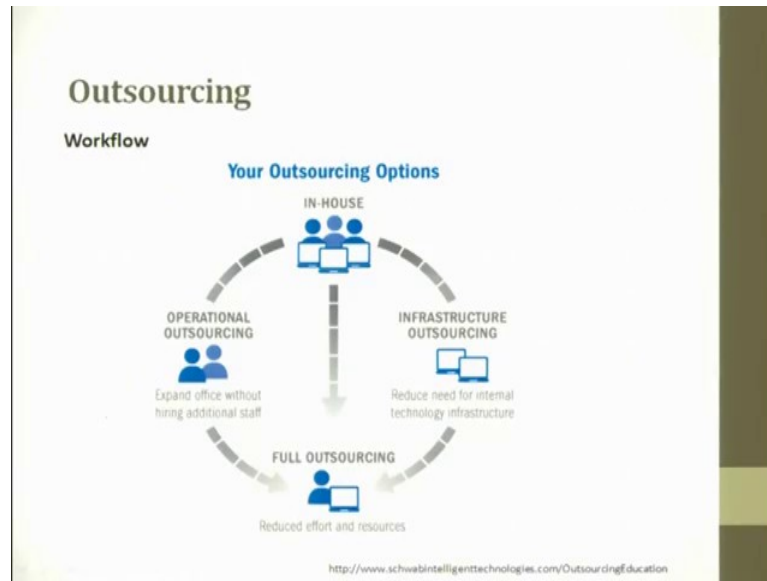
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So, different outsourcing categories: one is simply put outsourcing will give away some of your business tasks that can easily be managed by an independent entity making life easier for a business owner; Most of the time as well as being able to pass on these tasks to someone more experienced than yourself. So, that is also outsourcing.

For example, I used to outsource my kitchen to my wife, so she does wonderful cooking. So, she is more experienced than me that is why it is and she does it in a much faster time, quicker time and in a tastier manner. So, you will also save money, against hiring someone locally to do the same job.

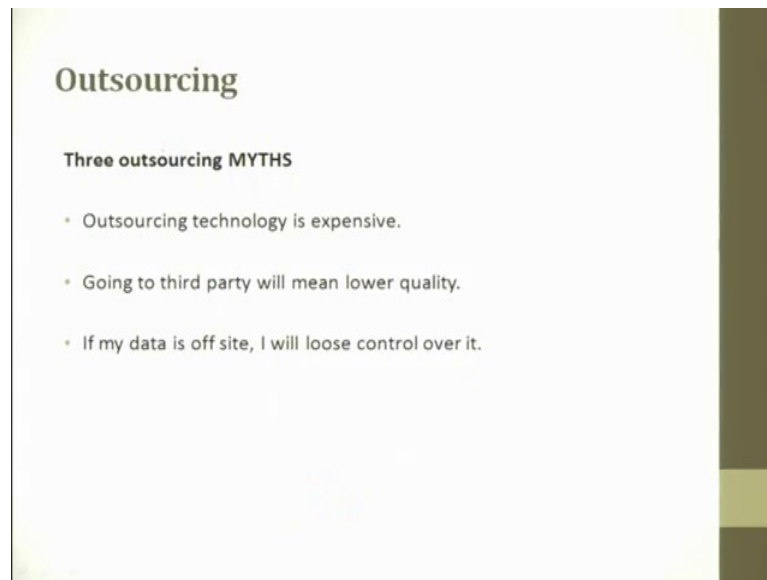
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So, when you look at outsourcing you see a workflow. Your outsourcing option will be in house. Then you will go to infrastructure outsourcing; reduce the number of internal technology infrastructure. Then full outsourcing; reduce efforts and resources.

You from in house you can go for full outsourcing, from in house you can go for infrastructural outsourcing. Then you can also do operational outsourcing; expand office without hiring additional staff. So, you can also do this. So, you have several outsourcing options which are there today and this is how our workflow happens in the outsourcing model.

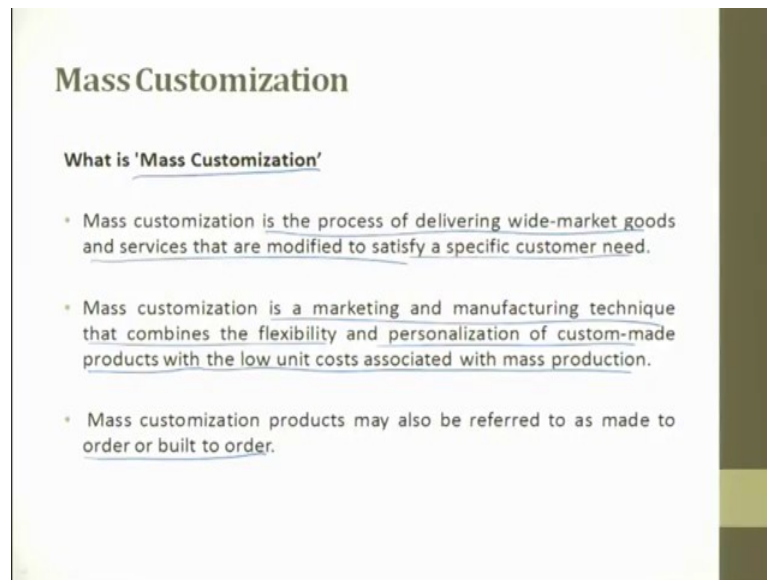
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The three outsourcing MYTH: outsourcing technology is expensive it is a myth. Going to third party will mean lower quality it is again a myth. If my data is off site, I will lose control over it is also a myth. So, these are three myths which you should kill. Because you should you can make it more legally and you can legally accountable for this outsourcing companies.

Today, there are wonderful legal teams on legal documents which tries to put everything black and white. So, it is not expensive, it is not low quality and it is also not loose control over the data. So, these three are mix.

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Mass Customization

What is 'Mass Customization'

- Mass customization is the process of delivering wide-market goods and services that are modified to satisfy a specific customer need.
- Mass customization is a marketing and manufacturing technique that combines the flexibility and personalization of custom-made products with the low unit costs associated with mass production.
- Mass customization products may also be referred to as made to order or built to order.

The last point of discussion is going to be mass customization. Mass customization is I would like to customize my product to my expectation. For example, I buy a pen for 10 rupees in the market. So, the pen whatever I buy, maybe my neighbour also comes and buys the same pen at 10 rupees from the market.

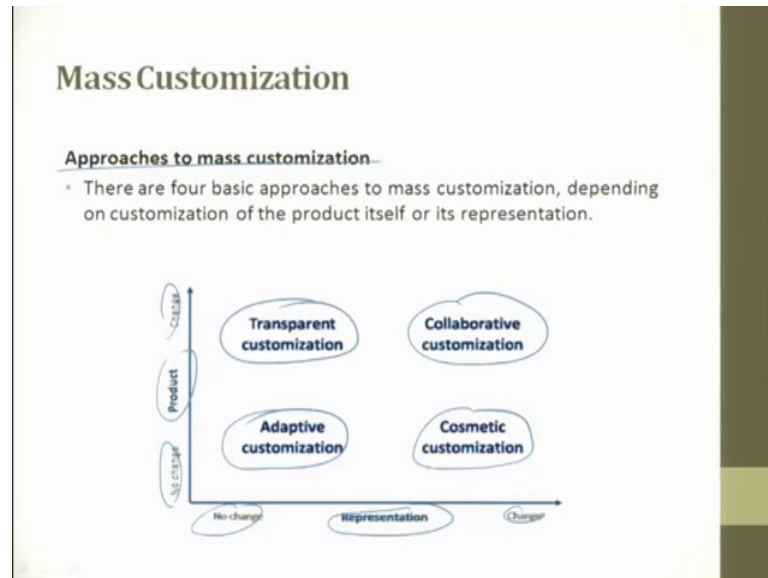
So, we both are sitting besides each other in a classroom. So, I keep my pen on my desk and he also keeps. Now we do not know whose pen is who what? So, then the immediate thing what we get out of it as we tried to engrave on our names on the pen. So, what have you done? You have customize the pen to your requirement ok.

So, mass customization is a process of delivering wide market goods and services that are modified to satisfy a specific customer need. Mass customization is a marketing and a manufacturing technique that combines the flexibility and personalization of a custom-made product with the low unit cost associated with the mass production. So, mass production means low cost. Now you do mass customization for low cost ok. I try to buy a cloth and stitch my shirt customized shirt for yourself ok.

Mass customization products may also be referred to as made to order or built to order. For example, when you try to go to an architect and tell your idea that, I want my house to be like this that is mass customization. So, here it can be made to order or built to order, so build. So, you try to tell the architect that this is how my building. So, it is built

order. Made to order is you go to a carpenter and say please make that the furniture to according to my taste ok.

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So, there are several approaches to mass customization, there are four basic approaches to mass customization depending on customization of the product itself or it is representation. So, you have no change, change it is a product ok. You have no change, change, representation, transparent customization, collaborative customization, cosmetic customization and adaptive customization.

So, when there is no change in the product and if you want to do customization that is called as Adaptive customization; so, transparent customization, collaborative customization and cosmetic customization cosmetic your superficial customization.

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Mass Customization

- 1. Collaborative Customization**
 - Collaborative customizers talk to the clients to help them recognize what they need, to recognize factors that will fulfill those needs and to create customized products following those guidelines.
- 2. Adaptive Customization**
 - Businesses that follow the approach of adaptive customization offer one standard product to the customers along with a few customization options.
 - This approach makes sure that the product is designed in a manner that it can be customized by the end client with absolute ease.

So, what is collaborative customization the collaborative customization customizer talks to the client to help them recognize what they need, to recognize factors that will fulfil those needs and to create customized product following those guidelines. Where is collaborative? Collaborative is here extreme end.

So, collaborative customizer talks to the client to help them recognize what they need. Many a times we do not know what to ask so, that is what is what they need to recognize factors that will fulfil those needs and create customized product following those guidelines is collaborative customization.

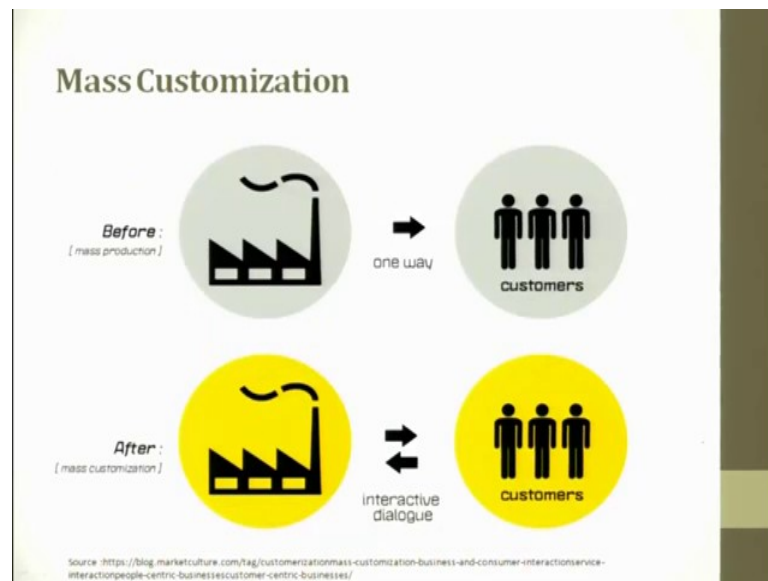
What is adaptive customization? Where is adapt to customization? Adaptive customization is here so where there is no change, product. Businesses that follow the approach of adaptive customization offer one standard product to the customer along with a few customization options.

So, what it does is it gives you a standard. For example, I go to the market and buy a mixer, kitchen mixer. So, he gives you a machine which is standard and then he gives you three or four different types of jars where in which it can customize to your need. Each jar is like 1.5 litres, 1 litre, 0.3 litres and maybe a juicer. So, he gives four jars.

So, these are the options to customize to your requirement. This approach makes sure that the product is designed in a manner that it can be customized by the end client with

absolute ease. Ok this is adaptive customization we have seen collaborative is they come and tell you what you want and how do you fulfil your wants by the requirements and then they will try to give you try to suggest the company that this is our product has to be done guidelines. Adaptive is only to have a one standard and gives them give attachment so that they can be happy.

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So, you can see mass customization. Mass customization before and today it is one way customers. So, it is mass customization, is mass production. So, today what has happened? After mass customization you have customers and it is an interactive dialogue between the customer and the factory.

So, the earlier it was mass, mass, production so, company produces, they will just dump it to the customer, the customer will buy. Today what has happened after mass customization the company starts interacting with the customer and then they try to do. So, this is what is a difference between; mass customization and mass production.

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Next going to cosmetic: Cosmetic Customization advertise, a standard product differently to different groups of clients. This approach works well when clients use the same product but want them to be presented differently. For example, you are trying to sell a scooter. So, you try to look at age group of 15 to 25, then 25 to 35, 35 to 45 and then you try to put for male separately, female separately.

Then what you do is, you try to make the advertisements in such a manner such that it caters to exactly to their needs. So, that is what is talk about advertise, a standard product differently to different groups of people. When the same model is shown to a college going kid, so they said you can it has a sleet colour for a female and for a male what they say they say it has a power ok.

So, and then when they show at an age group of 50 males, so they say it is safer. Women they say you can wear a sari and drive the scooter. So, a same product has been advertised different differently such that it tries to tell us talk about customization. This approach works very well when the clients use the same product, but want them to be presented differently. So, transparent: where is this coming customization. So, this customization comes here where there is representation change, but the product does not change.

And the last one is going to be a transparent customization. Transparent customization deals with providing customized product to individual clients without telling them that

the product are exclusively produced for them. So, this approach is there is a change in the product, the representation is not changed. So, here what does it mean is you are trying to produce a product for a customer, but without telling the customer that we have produced it and then just give it to him to enjoy the product and then you see that customization.

So, transparent customization deals with providing customized product to individual clients without telling them that the products are exclusively produced for you. Moment you start using the product you feel so happy that it is done for you. This approach works in the case where the customer does not want to repeat what he; she is needs incessantly or when the client needs are predictable or obvious.

So, only here it can be used. Mass customization is the talk of the town. When you make a product today please keep in mind you do must customize the product to your requirement. So that means, to say your product should have standards and that should be small add ones such that, it tries to meet the requirement of the customer and you can do mass customization.

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Advantages	Disadvantages
1. Customer participation is more.	1. Requirement of highly flexible production technology.
2. Customers are more pleased.	2. Difficulty in achievement of efficiency.
3. Stronger relation between company and customers.	3. Requirement of strong direct to customer logistics system.
4. Elimination of scrap quantity.	4. High warehousing costs.

So, advantage and disadvantages: so, the mass customization. The customer participation is more, the customer are more pleased, strongly relation between the company and the customer, elimination of scrap quantities are happening in a big way. Disadvantage: It requires a very high flexibility in the production technology it is easy to say, but you are

machine whatever you are doing has to have very much flexibility. The difficulty in achieving the efficiency, the requirements of strong direct to customer logic system, then it is high warehouse cost. All these things are there because if you do not get a customer you have to put it in a warehouse and wait for the customer to come.

So, with this I come to an end to this lecture and to this course. Thank you very much for joining this course. I am sure by going through this course material you will now try to have a holistic view about product, development and manufacturing. So, you will see how to develop a product, how to manufacture a product such that you keep your customer happy.

Thank you.