

**Course Name: Business Fundamentals for Entrepreneurs – Part 1 – Internal Operations**

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**Week – 03**

**Lecture – 05**

Week 3 Module 5 Part 2

Now, let us look at the types of innovation. Is there only one kind of innovation, or are there many kinds? So broadly, you can look at two or three different types of innovation in terms of scale. The most, the biggest, the most disruptive innovations are new to the world. Nobody has ever seen it before. The examples that I gave, the wheel when it was first invented, the first wheel, the first printing press, the first robot, the first drone. So it's new to the world, and I'll give you some examples later on.

They're usually very disruptive. They disrupt a way of life. Horse riders stop riding horses and drive cars. Human beings learn how to use a mobile phone anywhere, in the train, in the bus, in the class, in the office.

It's a new way of life, and these are typically deep tech. Today, you might think that the wheel was not deep tech, but 5,000 years back, the wheel was deep tech. Maybe 1,500 years back, a few hundred years back, the printing press was deep tech. The light bulb was deep tech when it was first invented. Today, it may not be.

So new to the world, very disruptive, changes the behavior of millions of people around the world, and they're usually deep tech, which means there's a lot of science behind it. It could be not new to the world. It could be new to the country. So, it could be something which is invented and used in China or U.S. or Europe or Japan and used in India or vice versa, invented in India but used abroad, and I'll give you examples of that as well. Typically, they don't change the world's behavior, but they change the behavior in the country. And it's adaptive because an Indian invention can be taken to a Singapore or a Middle East, but it needs to be adapted to that country, so it's adaptive. And it may not be deep tech because it's not the first ever used. It's already been used in some other country, but it's still breakthrough in that country.

So new to the world, new to the country. And then of course you have got new to the company. So someone else is doing it, but we do it; our company does it slightly better, slightly differently. And this is called sustaining innovation because if the companies don't sustain the innovation stream, the company will die. And that has happened.

And there are lots of very famous companies which have struggled as other companies have innovated. In phones there's a company called Nokia. In camera there's a way of taking picture called Polaroid, which you could take and get the print quickly, immediately. There's a famous phone company called Blackberry and they got out invented. So if you do not invent in your company, the company will struggle to survive.

That's why it's called sustaining. But it doesn't change the world or the country's behavior, so it's incremental. It's not disruptive. Let's start looking at a few examples. The best and the newest and probably the most impactful new to the world innovation was when COVID hit us two, three years back and it's devastated the entire world.

And some companies in India, US, China, et cetera, invented the COVID vaccine. And by God's grace today, sitting in 2023, hopefully the pandemic of COVID is controlled because of this COVID vaccine. It was a new to the world innovation. Chat GPT and many of you would have read about it or been using it. And if you have not read about it or not using it, please look it up on the internet.

It's a new to the world innovation, just six, seven months old. And it's taken the world by storm. Now let's look at a few new to the country innovation. The Indian missile called Brahmos. All of you probably know about it.

If you don't, please look it up on the internet. It's a hypersonic missile developed in India. It's innovation for us. But other countries also have similar missiles. Russia may have it.

America, US may have it. Europe may have it. So it may not be new to the world, but it's new to the country. And these are highly innovative missile systems. Here is something which is new to the country, India, but is now going outside of India.

And therefore, in many ways, it is new to the country becoming new to the world, which is the UPI payment system. Today, most of us use an UPI, a G-Pay or, Phone Pay or, Bharat Pay or, Amazon Pay or one of the bank UPI's. We will be using a Rupee card, etc. So this UPI, instant money transfers between people, is an innovation which came out of India. It's new to the country, but it may well become new to the world as more and more countries outside of India adopt it.

It's a brilliant innovation coming out of India, going out of India and may become a new to the world innovation. So what's new to the company? Let's look at this example from Tata Motors. This is from the website and I encourage you to go to the website and read more about it. Tata Motors makes trucks and vehicles, passenger vehicles, now electric vehicles. So new to the company for them is how to make better vehicles, better motors.

And you can read it on the screen. Electric technology, it's there on the website. Go and have a look at it. The first one, top left, is modular car platform. So every car you don't have to probably assemble it from zero, you can build it in modules.

Not that I'm an expert, but I encourage you to understand how Tata Motors is innovating within their own company to build better and better vehicles. And then there are others. IoT, and you can read it yourself. Adaptive light control. New generation infotainment systems.

And so on and so forth. This may be existing in the world, definitely is. This may be existing in the country because other companies may be using it, but for this company Tata Motors, it is an innovation which will lead to that company's products being better, faster, cheaper, or more satisfying. Let's look at another new to the company innovation. Almost all of us use phones, either a Samsung phone or a OnePlus or any of those phone, Motorola, whatever. Some of us are using Apple phones.

So, when you look at different models of the same company phone, in Apple's case it will be iPhone 13 to iPhone 14. It could be a Samsung S23 to 24 to 25, whatever. For the same company, for the same product, newer version. So for the company it is an innovation because it's a newer product with newer features. Maybe faster, better, maybe cheaper.

But it's not new to the world or new to the country. So these are examples of different types of innovation. Some companies build their entire growth and future plans around innovation. And a great example on the screen is Reliance. And if you can read and extract from the website, I encourage all of you to go and have a look at the Reliance website.

It talks of innovation-led growth. And it talks of innovation is a way of life at Reliance. So, it's embedded in everything that the company does. And that's a great example of where the whole corporate strategy and growth strategy is around innovation. So, what does the innovation process look like? You have looked at what is innovation and the types of innovation.

So, how do we innovate in a company? It starts with the customer. Because if there is no customer, there is no business. You can innovate in an academic institute, in a research company, in an R&D organization, in a contract research firm. But for business innovation, which is what this course is all about, business innovation it starts with the customer. And a customer problem and an identification of who the customers are, how many of them are there.

And then it will work backwards to create the solution. So innovation is not in isolation. Innovation is in context of a customer problem. And then you design the product. And then you keep testing it so that it's faster, better, cheaper than what exists today.

A car versus a horse. A printing press versus paper. A cellular phone versus mobile phone. A smart phone versus a keypad phone. A 30-minute delivery service versus a three-day delivery service. Booking the tickets at home versus going out to a movie hall or an airline counter to book the tickets and save money.

So that's the solution, product or service, with the benefits. And then once you have identified the customer and have tested a product, and I'll talk a bit about it later on, and

you've got a solution, then the next step and the last step really is taking it to market. But taking it to market itself has many steps. In the innovation process, you're just doing a problem-solution fit. Then you make probably five pieces, ten pieces, 50 pieces, 100 pieces, 1,000 pieces, 10,000 pieces to test the solution.

But to build a great business, you'll need to build millions of those pieces and sell those millions of pieces to millions of customers across the country or across the world. And that will be later modules like mass manufacturing, mass marketing, quality testing. All those aspects will come in. But it starts with this innovation process. Let's now come to an important question of if you innovate once, is it forever an innovation? No.

Think about it. When you innovate something new, a new phone, a new artificial intelligence program, a new app, or a wheel thousands of years back, it comes as new, and because it's new and novel and better, faster, cheaper, there are benefits, and everybody wants to buy it, and it keeps going, going, going. Till a time comes when everybody who wants to buy it or has a need for it has actually got it and then there's no more demand. And then you go from growth to maturity and then a slow decline because there's no demand in the market. One of the things you can sustain the growth and you can see in the curve there is to add a few features. So in an app, you can add a few additional features to just prolong the life for a few months, a few years, et cetera.

But ultimately it does not sustain because if you look at the pink line in this slide, the next generation of innovation has come in and customers stop using the last generation of innovation and move to the new generation. And in my earlier module I had given an example of music. The invention was recorded, so you don't have to listen live to someone. You could record it in a vinyl record which many of you may not have seen. And that grew, it was new, till the tapes came in.

Again, most of you would not have seen it. But the tapes replaced the records. And then MP3 was invented which is digital music and then they came in CDs and then DVDs. The difference being a DVD could store as much music as 10 or 20 CDs. So you get different curves. And then it went to streaming music, as I said in the previous module.

It went through some of the Amazon music or Gana or whatever music app that we're using. And you neither need a record nor a tape nor a CD nor a DVD. All you need is a phone. So that is the typical cycle, and every innovation goes through this. And if you go to the net and you look for internet cycles, the companies like Gartner which show the technology cycles, they call it the hype cycle, and that encourages you strongly to go and look it up.

And you'll see different products in different waves or parts of that wave. So if you look at the year 2022, and remember Gartner is only capturing some very recent technology. There's something which is completely on the left side, still on the innovation side. Things like digital twins, look it up, digital twins.

Or open telemetry, look it up. These have not even come to mainstream. Or sophisticated things like 3D printing of human organs, 3D print the liver. And today, as I'm taping it,

there's a news of neuro, of brain implant with which if you implant the chip in the brain, the neural link, you can actually talk to the computer. It's still at the innovation phase, very early phase.

And then it'll get commercialized. But then, 10, 15 years later, that will also mature and that will also decline till the next thing comes in. So that's an innovation cycle. So how do you convert an innovation into a new product? And this is where things like proof of concepts, et cetera, comes in. So you start again with the customer insights. The best companies co-create the products with the customer.

It's not a bunch of company employees sitting in a room and brainstorming and say, okay, let's create this product. No. The best companies don't do that. In that room where the company employees are there, they'll invite the customers. And the company employees will ask the customer, what's your problem? Are you happy with my product? How can I improve it? How can I make it faster? How much will you pay for it? That's customer insights.

And the customers give the ideas. And the customer says, yeah, I want it like that. And I'm willing to pay that much for that. And then the company employees will probably develop what's called a prototype. It's a very early version.

And then again show it to the customer. And the customer says, no, no, no, this is not what I wanted. I had actually wanted something else. And the employees go back to the lab and build it slightly differently. And again, they come back to the customer and say, is this what you wanted? And the customer says, no, please, you're almost there, but change it.

And they again go back. And the cycle goes up. So, on the right side, you see what is called plan, act, check. So as you're getting the feedback from the customer, the company employees, the researchers, the developers, the engineers in the company, they're planning how to create the prototype based on the customer insights. But once they plan, then they act, which means they create a prototype, a 3D-printed prototype, a wireframe prototype, on a Raspberry Pi prototypes, or both prototypes. There are many of these toolkits which are available where you can do fast prototyping. And once a prototype is accepted by the customer, then you do testing with the customer.

And you go to the customer and say, OK, here's the prototype. Please use it and give us your feedback. And the customers use it for a day, for five days, five weeks, sometimes a year, sometimes two years.

And they say, OK, this works. This doesn't work. It's too heavy. It's too slow. It's too thick. The battery runs out. And based on the customer feedback, you keep changing it and developing it. Every stage you're talking to the customer and you're going through the plan, act, check.

Check means you're measuring it and adjusting it. And it's a cycle. You co-create it with the customer. Once the customer says, OK, I've used it for a sufficiently long time, and that may

be ten customers or, 100 customers or 1,000 customers. They are your lead customers. And you've given them ten samples or 100 samples or 1,000 samples.

Then, you have to do the quality testing. And there are many kinds of quality testing, which I'll talk in my next module. Is it dust proof, waterproof, drop proof? These are some physical testing. If it's a food, does it comply with the food grade material? If it's a drug, does it comply with the drug guidelines? Does it spoil over time? Does it bend? Does it break up? Does it tear? So these are the quality testing. Once you have quality tested some of the prototypes, then you start thinking about, OK, I have made about 1,000 pieces, 100 pieces, 500 pieces, 5,000 pieces. I now need to make a million pieces or 10 million pieces, one crore pieces, so that I can sell it to the market.

And then you start thinking about, OK, how do I mass manufacture it? And how do I mass market it to millions of users? And that gets you to what is called the new product launch. And it's a very iterative process. And depending on how novel, how sophisticated, how complicated, how deep tech the innovation is, it can take a few days.

You're just changing the packaging. It takes a few days. Just changing the name, color of the brand takes a few days. To where you're developing a whole new chip, a computer chip, designing a whole new phone or a computer or a robot or a drone, it can take years. That's the innovation cycle, taking the innovation to the product. Let's do a case study very quickly with a company called 3M.

It's a multinational company, also works in India. And I would strongly encourage you to go to the website of 3M and look it up for yourself. And I'd like to first start with the purpose, which you can see right on the top left, science applied to life. And this is a company which is very innovative in terms of products, innovation to products. They've got 60,000 products in a portfolio, 60,000.

And they've got products, as they've said, across 51 technology platforms. And you can look it up yourself, those of you who are in science or engineering. They're materials, they're in processing. And I'll show, I'll give some examples of brands and so on. In terms of capabilities, digital applications. So these are the 51 technology platforms that they have and they've got 60,000 products.

So, what are some of the brands and how do they sustain so much of innovation? Because innovation is at the heart of this company called 3M, I've already talked about the 51,000 technology platforms. Look at how many new patents that they're developing just this year. These are screenshots from the website as of now.

They've got labs in 50 countries. And they've got 8,000 scientists. And look at the budget that they have for innovation, research and development, \$1.9 billion. That's almost 15 to 16,000 crores of rupees. And what are the brands? So after all of this work, how do you or I as a customer see these brands? So all of those people and innovation and technology platforms comes to us as usable products which solves a problem that you and I may have.

And some of the brands you may be very familiar with. Post-it, those yellow tags which you post which comes with gum and you stick it in a piece of, in a notebook or on the wall and make a note, post it. A lot of technology and innovation, but we see it as a brand called Post-it. Scotch-Brite, in your kitchen someone will be cleaning the utensils with something called Scotch-Brite. Same with Scotch tape and so on and so forth. So here's the process of where technology platforms, scientists, R&D labs, billions of research funding ultimately comes to the user as brands and products.

You can look that up yourself. Also it is important that as you create these new technology platforms and new brands, good companies are also aware of the environment and society. That's why they talk about sustainable processes which is good for the environment. Starting from the way they develop and design the products. And I encourage all of you to go to the website and read more about it or any other company which is building a lot of products and go to the website and look it up.

And, in fact, that's the next reflection point. Think of a company you'd like to work for, or you already work for. It could be a dream company if you're a student. Please study the innovation strategy. You can do it by thinking about the products that you use. Next time you go to a store, a Kirana store, or a supermarket, look up for their products, see how many of the products are there, or you go to an electronic shop or go to the website or do a search on the internet and think about the innovation strategy and look and think about the questions that are there on the screen.

What are the current brands and products? What are the new brands and products? So current brands and products may be something which you have been seeing for the last three years, four years, five years, ten years, but something new has come to the market. Maybe you have seen it on an e-commerce site or a store. Think about new products. Which company is bringing the newest products to you? It could be your phone.

It could be a wearable. It could be a phone. It could be a pen. And how innovative are their products? If it's a earphone, is it the same as 1,000 other earphones in the e-commerce site or is there something new and exciting? It's just one more earphone. If it's a smart watch, is it the same smart watch that already exists for the last few years or is it something really new and exciting? And when you look at that product, think about whether you think it's the best and the first in the world or is it just new to the country? It was always there in US or Europe or Japan and it's just come to India. Or an Indian product which has been there in India for four or five years like UPI and is now going out of India. And then think about how are the products that you see superior? What are the benefits? Are they cheaper? Are they faster? Are they better? Are they more satisfying? Are they easier to use? So as you do this exercise, again you'll be sharpening your innovation skills and your innovation thought process which is very important for you in your own careers.

And as I said for each of these reflection points, write down in your journal your reflections.

Thank you. So, with this we come to the end of the module. Thank you very much and look forward to having you with me in the next module. Thank you.