Business Data Management
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Introduction to the Case Study

Professor G Venkatesh: So, this case, Milind that you are going to do, can you describe what this case is? And I hope a number of things that Omkar highlighted, are going to get illustrated via that case that we are going to do.

Doctor Milind Gandhe: Yes, sure. So let me just start sharing my screen GV.

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So this case is about a fictitious e - Commerce Company called Fab Mart. So Fab Mart is a company and has recently entered India, largely focused on the south Indian market. So right now, given their demographic trends are rare and so on, they have decided to concentrate on South India, but they definitely plan to expand in other parts of India. Intention is to offer some of the best trends to the customers and best in class service, both before and after purchase.

So, this is the sort of proposition of the company and Omkar is going to represent this company in our conversation today.

Professor G Venkatesh: Okay.

Doctor Milind Gandhe: So, he is going to tell us what are some of the problems that people within the company has faced? And what kind of challenges what kind of data challenges. So, before we get into the case of Omkar, a company like this, that is handling multiple kinds of goods. it could be selling mobile phones, it could be selling maybe some oil, some FMCG, some, it may also be selling clothes, so many different sorts of goods are being sold. what kind of distribution challenges and what kind of data challenges do you think we are going to see today?

Mister Omkar Vinayak Karandikar: Okay, so we will be focusing on that supply chain and distribution network on customer side, in the case today. In e - commerce, the problem that we have is lot of data. We have lots and lots of data coming every single minute for every customer for every purchase for every page view that a customer is doing. The question is how do we, how do we get story out of that?

How do we understand the data patterns and how do we build when our actions around what is required, which is coming up with the data. You will see a lot of times there are some structures which are put in place, which are typically certain structures, which actually make analyzing a little bit difficult, we will have a flavor of that today, where there will be a single tier structure, two tier structure of the solution.

The second thing is there will be some inventory, there will be some sale which is happening, the supply chain is worried about how do I maintain the stock at right levels so that the customers will never stock up. Because this is a very competitive world, if I do not have something in stock, I am sure there are plenty of other options available in the market.

So, the customer is just going to switch and losing customer is going to cost me a lot. So I do not want to do that at any cost. Third thing is, I want to operate at an efficient level because I am in the business of making money at the end of the day. I do not want to just build inefficiencies build piles of stocks, and make it inefficient for my investors and my own company, because I need that cash flow for making sure I grow at a decent and faster rate, which is good enough for my investors to keep pumping money or putting faith in me for my future work.

This is a landscape that we are trying to look at today and example as Milind was saying is a platform company that we typically talk about, which is not specialized only in one particular vertical. There are ecommerce companies who specialize only in a particular vertical. There

are companies who specialize in clothing, there are companies who are specialized in let us say cosmetics, is their supply chains become relatively simple as compared to a platform company. Because if I am dealing with one kind of product.

Professor G Venkatesh: Explain what you mean by platform company.

Mister Omkar Vinayak Karandikar: Yes. So, when I am talking about platform company, the company that we have here is Fab mart, so Fab Mart has different service offerings it is offering a range of goods for sake of simplicity, for sake of discussion on this case, what we have done here is we have taken three representatives, one is lifestyle, which is your clothes men's and women's clothing. The second is FMCG, which is nothing but your soap, shampoos and beauty and grooming kits and lipsticks and all that stuff.

And third is a relatively niche category, mobile phones, which is actually one of the first entrance into this ecommerce. So, there are three different categories that we are representing, you might have seen Flipkart, we deal with, I think, complete range of product offerings, we deal with something as big as a multi door refrigerator to as simple thing as a stationary kit or needles, safety pins.

So, we offer a complete range of products on our platform, we have fruits and vegetables, we have faster service deliveries we deal in books and we deal in media. So, there is a complete offering, which we have. So in this case it is what makes a company as a platform company.

And when I am talking about niche company, niche company will have only one service offering. They will be dealing only in let us say cosmetics. In a lot of names, which are there in cosmetics. There will be a lot of companies who are dealing only in, say lifestyle products, we have a sister company called Myntra, you would have heard of that. They used to focus only on high end clothing.

So, these are the niche companies. From supply chain perspective, what I was coming up with is for niche companies, it is relatively easy to develop supply chains, because it is a homogeneous product, which is going to flow. However, when it comes to a platform company, it becomes little tricky and little difficult because there are different kinds of products altogether.

Some will need speed, for example, someone is buying an apple mobile phone, in Chennai, that person is not going to wait for two days or three days for that phone to be delivered. That

person has option to go out and walk in into Apple store and buy the phone. Why am I buying in some e - commerce company, if I do not get it on time, that person will leave, that customer will be lost.

So, there is a there is one category which needs speed. There is other category like lifestyle. I when I am buying clothes I am buying clothes for sake of it.

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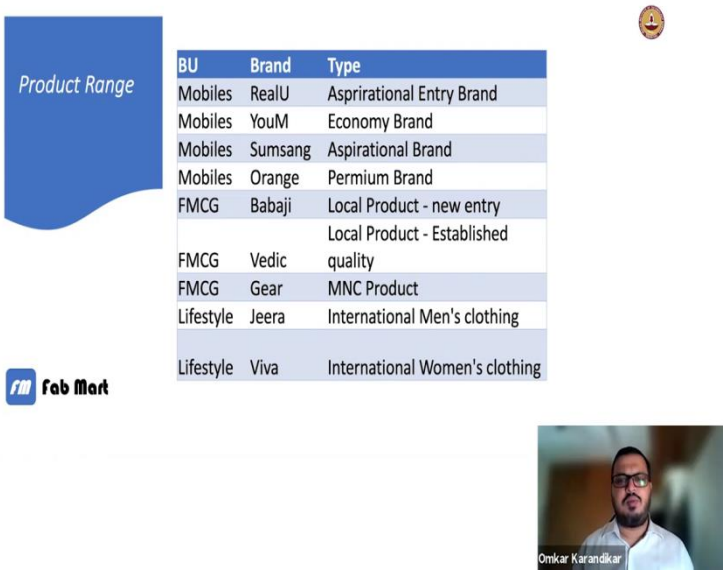

BU	Brand	Type
Mobiles	RealU	Aspirational Entry Brand
Mobiles	YouM	Economy Brand
Mobiles	Sumsang	Aspirational Brand
Mobiles	Orange	Permium Brand
FMCG	Babaji	Local Product - new entry
FMCG	Vedic	Local Product - Established quality
FMCG	Gear	MNC Product
Lifestyle	Jeera	International Men's clothing
Lifestyle	Viva	International Women's clothing

So, I do not, mind waiting for products. So that is what Fab mart is going to show you. So, in fact, Fab mart as I said, we have multiple brands and multiple service offerings. So typically, we have four mobile brands, then there are three FMCG brands, and two lifestyle brands. this is the data. And this is a product mix that you will see each brand has a different price point. And it has a different value proposition.

So, for example, a real new brand in mobiles is aspirational entry brand, which is a cheaper mobile phone, which is meant for, let us say, a professional so I have just started working or college students or maybe the kids who wanted to go online for their classes now for online education. Whereas there is a brand orange, which has premium brand, is for working professionals, the CXOs of the companies and all that they will probably find it difficult to get something apart from this.

So, there is a range of service offerings, there are different products and there are different brands. And each and every one will behave differently. Each and every one of these brands will have a different expectation from customer. We will talk about that. There are different

price points. And there are different sale rates, DRS that we talked about, which makes it more difficult for a platform to organize the whole supply chain.

The main problem is how is the best way to let us say deploy in particular inventory, how much inventory I should keep for each one of them. These are the questions that we will talk about. And we will try to find out…

Professor G Venkatesh: Though there are four brands, so that represents that kind of targets four different consumer segments, I suppose in terms of you know, income profile, or whether the young or old , but all these four mobile brands, they all want their phones quickly. I mean, you said Apple, people will not wait for most of the days but that is true for mobiles in general.

Mister Omkar Vinayak Karandikar: Absolutely because mobile prices are so high. What is a high intensity purchase? Providing a customer will not buy mobiles in a shot. I go to let us say a mall I like a shirt I will buy I will not think twice like that. mobiles is something that I will probably think about I want to buy something I will search for that brand, I will search for reviews, I will talk to people who are using that and then only I will make up my mind to get into this, but when I make up my mind when I commit, it is a high cost purchase. So, when I commit myself on buying a particular brand of mobile or a particular model of a mobile I wanted right then and there.

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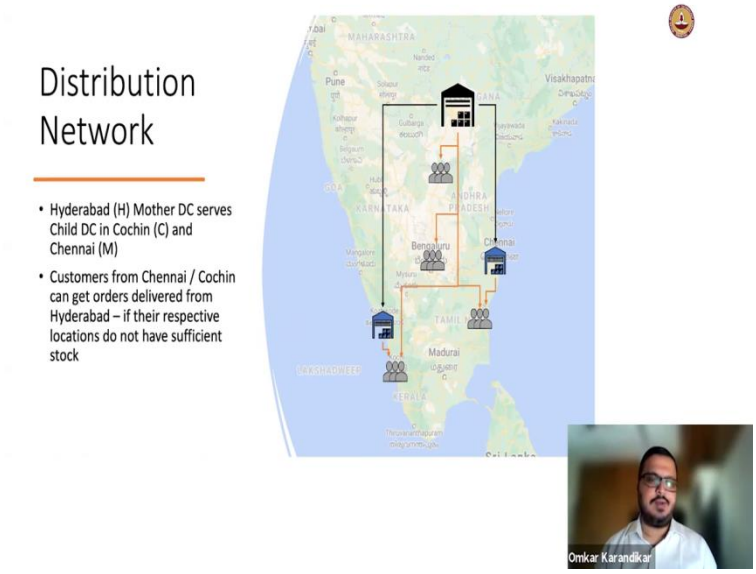

Mister Omkar Vinayak Karandikar: Alright. So, now coming to the distribution network, we talked about this Fab mart being a company which is focused on South India right now,

definitely there are plans for pan India expansion and maybe expansion beyond India as well. But it all needs money.

So, right now, what fab India, Fab mart is doing is going to focus only on the south geography and to start with they have opened three distribution centers. Fulfillment center, distribution centers are the terminologies which are interchangeably used in this context. But what we have here is that typical two-tier network of distribution.

Hyderabad is the mother DC. Hyderabad is a buying point; it is a sourcing point. Then there are two child DCs or forward DCs as we call it, one in Chennai and one in Cochin.

Professor G Venkatesh: So, DC is a distribution center?

Mister Omkar Vinayak Karandikar: Yes, for sake of simplicity, let us call Chennai as Madras and Cochin as C and Hyderabad as H. That is the terminology we will see in all the data and all. Now, the question will be why do we need three decision centers and why not only one distribution center? The answer is very simple. Since the customer wants speed, I need to be as close to the customer as possible.

So, I am trying to serve three states here rather four states here Hyderabad will be serving the north part of South India, for Kerala and Tamil Nadu there are specific customer requirements for speed which will be addressed only when we have a Madras and Cochin as a distribution center as a stopping point. Hyderabad may not be able to serve because Hyderabad to Chennai or Hyderabad to Cochin itself will take, I do not know one day of transit time after the order is placed.

So, to ensure that the customers in these two geographies get better speed, we need a server, we need a fulfillment center, there are DCs there. But the problem is opening multiple DCs

Doctor Milind Gandhe: Omkar, just so that I understand a little better, if I am a farmer living in Tirunelveli and I order a phone.

Mister Omkar Vinayak Karandikar: yes.

Doctor Milind Gandhe: How will the phone come to me?

Mister Omkar Vinayak Karandikar: I will come to that, a very good question. So, typically, what we have is we have something called promise engine for each pin code, where a customer belongs to, every single DC out of this will be mapped. Typically, what we do in

two tier networks is there will be some catchment area which is attached to Madras and there will be some catchment area which is attached to Cochin but the backup will be given in Hyderabad.

So, a PIN code of Tirunelveli will be attached to for example, Chennai or Cochin based on which of these two will be able to offer best possible speed for the customer. It is all about speed. Even if they are not expecting speed since I am also selling mobiles, I need to gear myself up for speed. That will be the first FC. So, say that customer is linked to Madras FC.

But Madras FC may or may not have all the assortment that we are going to say. So, what we will have is we will have a backup FC which goes up into mother FC in this case it is Hyderabad. In case the product is not available in Madras in M, the product will be delivered from H, yes at a slower speed but the product will be definitely offered to the customer. That is the idea.

Professor G Venkatesh: Okay, when the time of ordering a product, customer knows the speed I presume.

Mister Omkar Vinayak Karandikar: Yes, the customer gets a promise if you, are ordering you put in a pin code, as soon as you put the pin code, the system at back end will check where is the inventory for that product and inform if it can be delivered

Doctor Milind Gandhe: So, that is why sometimes I see you know, a book is going to be delivered in two days and sometimes it takes 10 days

Mister Omkar Vinayak Karandikar: Books is a very tricky category as well. So, there are books which are actually printed on order. In that case, you can expect things like 10 days. This advancement of technology here the quantity of 1000 or 10,000 copies of each book, but now, much easier.

Doctor Milind Gandhe: Understood, yeah, this is it is an incentive.

Mister Omkar Vinayak Karandikar: Yeah. Now, on this topic of MOQ, a minimum order quantity. But this MOQ is the one which actually mandates this two-tier network. Now, if I want to buy let us say, all the books in all of these three FCs, Hyderabad, Madras and Cochin, what will happen is my MOQ's will make my inventory note. Let us say MOQ for a particular SKU is 100 units. Yeah, and I need 30, 30, 30 units in three FCs.

Professor G Venkatesh: So MOQ is minimum order quantity…

Mister Omkar Vinayak Karandikar: Minimum order quantity, yes. And that who gives that the quantity, that is dictated by the suppliers. So typically, in case of FMCG, it will be a box.

Professor G Venkatesh: Okay.

Mister Omkar Vinayak Karandikar: Yes. For mobiles, typically, there is no MOQ minimum order quantity. Because it is a high value item. I cannot ask anyone to buy 10 Mobile at one point of time. For high value items, typically MOQs are not there. But for smaller value items, there will be an MOQs. Again, coming back to example, let us say I need 30 units in all three FCs. And my mock size, in this case, MOQ which we are hoping was 100 units.

If I want to buy in all three locations, I will have to buy 100, 100, 100, 300 units in general, which is a typical load of inventory. Whereas my room in Hyderabad, what I will do is I will buy 100 units in Hyderabad and distribute 60 units between Madras and Chennai and keep remaining 40 units for own consumption. So, to keep the inventory in control, especially in the starting phase of your venture, when the economies of scale are still not kicking in, typically we look at this two-tier network.

Even if you match your, even when the new match or if you want to control the inventory it is not like you have infinite money. So, to control inventory, what you will have to do is you will have to play around with all these neighbors and hence there is a talent of two-tier network in this supply chain.

Professor G Venkatesh: Okay. Interesting.

Mister Omkar Vinayak Karandikar: There will be.

Professor G Venkatesh: Orders, there is something about this business of breaking down a big box into small units it occurred, something like that needs to be done, but Yes, I can.

Mister Omkar Vinayak Karandikar: Yes, So, just since we are talking about inventory, I invented something I deal with, it is not only the MOQ's which dictate this. It will also be a function of your replenishment frequencies. So, if I want to ask replenishment in all the three zones, I need a lot more inventory.

Instead of that I buy only in one zone I am buying only in Hyderabad. I can daily replenish my Madras and Cochin FCs. So, the inventory required in these two FCs become very less,

my variability on supply side are taken care only in Hyderabad, which can be a frequency of 7 days, 14 days, whatever that number, but that number crashes down to one day for Madras and Cochin because I am going to have a daily truck running from Hyderabad to these two FCs. It is all about managing unit, it solves, balancing of working capital and working capital is a critical thing. We will talk about that when we talk about the data.

Doctor Milind Gandhe: One question, so you did not mention. So, let us say that I am a customer in Tirunelveli. I order a phone. It is not available in the Chennai area; it will get delivered from Hyderabad. Now it could also be available in Cochin but you will never send it to me from Cochin.

Mister Omkar Vinayak Karandikar: So that is, again, nice question because that is the simplicity I want to bring into my network. What happens is when I am talking about the Tirunelveli one example, in South India, I will have at least my guess will be around 3000 odd pin codes and people from 3000 odd pin codes are going to order.

Now, what it will mean is I will have to have a network in between there has to be someone who is going from Chennai to Tirunelveli every day to deliver our orders in Tirunelveli. Now, what I am saying is a backup from Hyderabad, what is going to happen is the order will be routed to Chennai, and Chennai a person again is going to go to Tirunelveli to deliver that order.

Tomorrow, if I want to allow even Cochin to start Tirunelveli there will be additional person to go from Cochin to Tirunelveli, I can do it for one pin code. But for 1000s of pin code, it will just bloat up my cost. And hence to simplify this network. I will draw these lines.

Doctor Milind Gandhe: Got it. And that is why you have drawn some of these orange lines there.

Mister Omkar Vinayak Karandikar: Correct that is right. For the orange lines, it represents direct fulfillment from Hyderabad. So Hyderabad, will be serving all the customers, however, not going to go directly from Hyderabad to that pin code, lot of drops in between it is a hub and spoke model. So from Hyderabad, it will actually go to Chennai and Chennai will deliver it to Tirunelveli

Doctor Milind Gandhe: Got it.

Mister Omkar Vinayak Karandikar: This is a simple story that we are talking about in case of my company Flipkart. We service all pin codes which are available in India. And we have around 19,000 civilian pin codes and plus military pin codes available. So, it is a huge complex network. So typically, we have a hub and spoke model, where we have sorting centers, what we call mother hubs.

So, the way the network will work is, a customer will be attached to a delivery hub based on the pin code that customer entered, so each pin code will have one delivery hub attached. Now this delivery hub will have a mother of attached, multiple delivery hubs will be attached to a mother and the mother hub will sort the deliveries for all the delivery hubs, and then from delivery hub it will go to customer.

Doctor Milind Gandhe: So, this is a little bit like the Postal Service.

Mister Omkar Vinayak Karandikar: It is Postal Service, it is Postal Service. Thankfully, in India, we have the best postal service, which we can think of the pin code network, which is defined is fabulous. And we all ride on that.

Doctor Milind Gandhe: Wonderful, wonderful. Okay, should I go to the next screen?

Mister Omkar Vinayak Karandikar: Yes, please.

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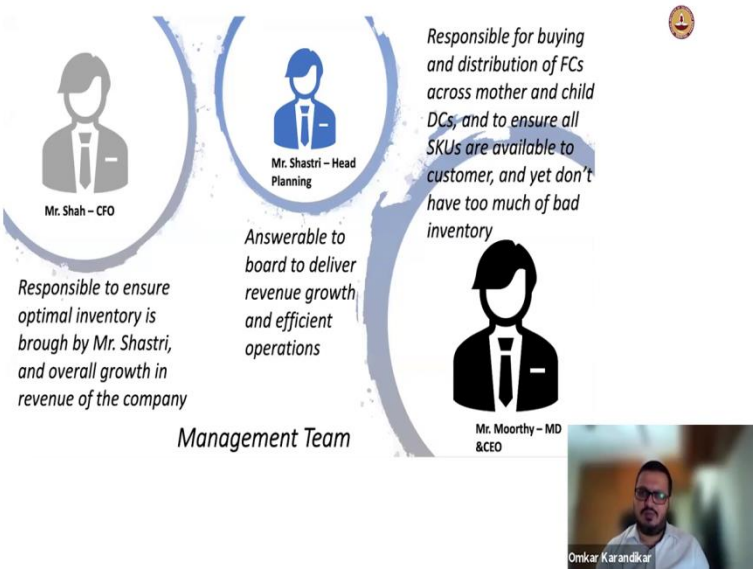

So, let us talk about the role play that we have, or the set of rows that we are going to talk about today. So, we have Mr. Moorthy, who is the MD and CEO of the company, who is responsible for overall wellbeing of this company making sure that the company runs and not

only that, he is also responsible for making sure that the company sustains the expectations from both which are run by, which in this case for fab Mart will be expansion in pan India geographies as well as expansion beyond India.

So, Mr. Murthy is responsible for delivery of that, then we have Mr. Shastri, who is head of planning who is responsible for making sure the hygiene in the system is maintained. All the linkages have enough inventory and there are no stock outs. We are not buying too much of anything

Professor G Venkatesh: Stockout, sorry to interrupt.

Mister Omkar Vinayak Karandikar: Yeah. stockout. So, stock out is a very bad thing in ecommerce where a customer wants to buy something and you do not have it.

Professor G Venkatesh: Customer is trying to order something. Yes. and it is unavailable..

Mister Omkar Vinayak Karandikar: That is a stock out situation. So, we really do not want to go into stock situation because that is a possibility of loss of customer. So, one good thing about e commerce is typically what we show is what we have rather what we have is what we show.

So, it is not like there is a random list. In offline that might happen. A customer might walk into a store and ask for whatever brands, whatever model or whatever. Whatever SKU that he wants or she wants. Thankfully, in e commerce that happens and that does not happen because customer is still free to you have to.

Professor G Venkatesh: Other jargon that you have introduced this SKU Omkar.

Mister Omkar Vinayak Karandikar: Yes, yes. Sorry, I am using Yes. So, SKU is essentially a stock keeping unit that is what a typical unit of picking and sale will be. So, single mobile will become a SKU.

Professor G Venkatesh: One brand of a mobile phone would be. Like we said orange is a brand of mobile phone.

Mister Omkar Vinayak Karandikar: Yes. So, orange will have let us say two or three different SKUs, I think we have a slide on that Milind next, there will be SKUs which are defined, okay. So, stock keeping unit is essentially a level at which we keep inventory.

Professor G Venkatesh: And then SKU for an SKU, there will be a price single price.

Mister Omkar Vinayak Karandikar: There is something in between also the model is Moto G. What converts it into SKUs is attributes. Moto G, fifth generation, red color, 8 GB RAM with 128 GB of ROM, that uniquely defines the product that the customer is buying. And hence will be attached to that particular SKU. The price could be similar for multiple SKUs because they are similar variants like a color variant, a red color phone, a white color phone, a blue color phone will have all same price but they are different SKUs.

Professor G Venkatesh: Okay. Understand. Yes.

Mister Omkar Vinayak Karandikar: Yes. So that was a SKU. So, what we are talking about is the stock out situation. So, customer might actually search for, let us say, a particular phone. Again, Moto G, fifth generation red, 128 GB, 6 GB RAM. That may be a search criterion. And if customer searches for that search criteria, and if I do not have it, it is a stock out situation. I do not want to be in that. How we will recover is exactly the way offline retail recovers. If you go to a shopkeeper and you ask for a particular thing.

Let us say if you ask for, I want fevicol, that person will say I do not have fevicol, but look at this, there is a Camel gum, which is better than fevicol, and it is cheaper, do you want to buy it? That is what an offline shopkeeper will do. We will do exactly the same thing. If the customer wants something you do not have it, will push for something else that is typically a role of merchant. So, a missed SKU is not really missed sale, thankfully. But it is an opportunity which we would gain, which we have lost now. So that is something that we fear about in e commerce.

Professor G Venkatesh: So, this is the job of Mr. Shastri.

Mister Omkar Vinayak Karandikar: This is the job of Mr. Shastri. So, Mr. Shastri have to ensure that all items that the customer is likely to buy are there, for he or she to buy, available in stock that is that is what the job of Mr. Shastri is. There is a additional complexity to that it should not be available, it should be available in right place. There will be uncertainties because of the demand, the demand might come in Madras, the demand might come in Chennai, sorry in Coimbatore, it might come in Cochin, it might come in Hyderabad, I need to guess where the demand is going to come from.

And I need to keep inventory in the closest possible FC of the customer. So that the customer gets best possible way, looks simple. But it is not. In this case, we will be talking about 30 different SKUs if I am right. We handle close to 10 lakh SKUs

Professor G Venkatesh: in Flipkart you have 10 lakh SKUs?

Mister Omkar Vinayak Karandikar: Yes. 10 lakh SKUs which are sold in last one month.

Doctor Milind Gandhe: See GV from a database perspective and you can figure out now that beyond the point excel will not help you. May be SKU, but you can manage with excel but if it is 10 lakh SKUs, then I do not think you can manage in excel?

Professor G Venkatesh: You need a database, you need software, you need Python's scripts and so on. Which is why this course is created, we are teaching that okay. In this program.

Mister Omkar Vinayak Karandikar: Python and R are our bread and butters. That is something we use daily. As Milind was saying we will just not be able to do anything even access, SQL, all of them are done. So just to the, just to have a little bit beat over. If I remember last year, I attended some session on data. And they were talking about Flipkart generating something like five pentabytes of data per day.

Doctor Milind Gandhe: per day?

Mister Omkar Vinayak Karandikar: Yeah.

Doctor Milind Gandhe: I think it is 1 million gigabytes. Okay. No, no, no. 1 billion gigabytes?

Professor G Venkatesh: Yeah. Okay. my largest number relies on okay. So let us, discuss Mr. Shah's role now.

Mister Omkar Vinayak Karandikar: So Mr. Shah is a CFO. He is the one who says no, in the system.

Mister Omkar Vinayak Karandikar: He is the one who will not let anyone indulge for sake of customers, he is the one who control the inventories, he is the one who will control the expansion. He is the one who will ensure that there is a return on investment on whatever, wherever we are investing money. Simplest way in which ecommerce company can go grow

fast, it just put the money and then just expand or buy additional by parallel companies and do organic inorganic expansion.

But that is not always the best way. For typical company to sustain and survive for, let us say, a long-term period. What is important is we ourselves are efficient, we are generating money from our own business, so as to invest it back for my growth. I do not want investors' money to come in and sale my growth. It is a good thing. Yes. I am not saying it is a bad thing. But at the end of the day, when we are talking about sustenance of industry, it is important that I would I generate my own cash flows, I generate my own money.

So, Mr. Shah's responsibility will be on that angle. And we will see what kind of patients Mr. Shah will ask.

Professor G Venkatesh: Okay. Sure. We will go to the next slide, yeah.

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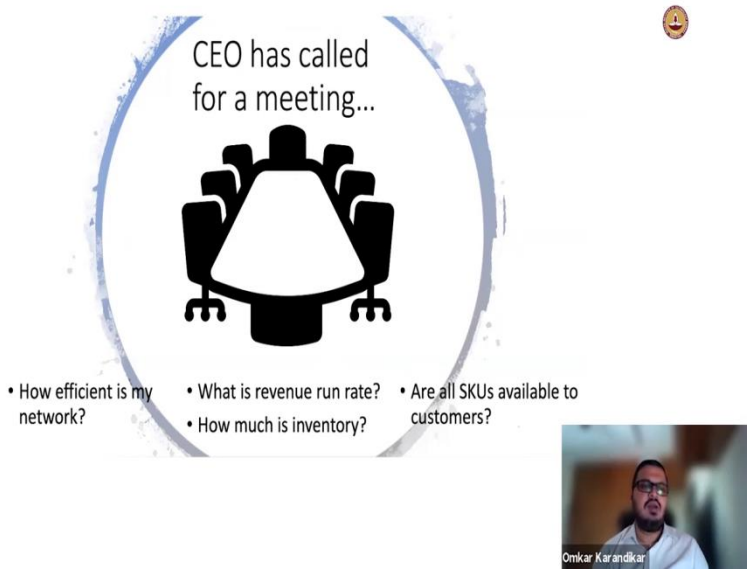

Mister Omkar Vinayak Karandikar: Yes, so here we are. The CEO has called for a meeting, the CEO has to make a presentation to board and the board and ask money for the board for expansion. And the board is going to expect "n" number of things, board is going to expect all kinds of data to pick an decision on whether or not the company is ready for expansion in North India. So, the CEO has to form a view and create a presentation on broadly the themes like how efficient is my network?

Am I getting enough return on investment on the money that I am going in right now or not? How is the revenue? Am I going in revenue? Or is it stagnant? Or is it falling? How is it

moving? How much is the inventory? How much I am investing in my stocks, whether or not I am making investment in the right locations, or it is just random allocation of money which is happening.

So, good I am at putting the money in inventory and doing so, doing all of these things for home for the final customer and hence, you need to know whether or not what all of these SKUs that we are talking about are available to customer or not, or are there cases of stock outs? And if there are stock outs, what are we doing about that?

What are the reasons that there are stocks? And how do we ensure that if stock outs are at minimal possible level? How do we make sure the customers are happy so that they will bring us more and more customers? So, that is what we need to prepare our board meeting or prepare for our board meeting. And that is what the data should talk about from whatever is available in information. And that is what we need to prepare a CEO for his meeting.