

Business Data Management
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Indian Institute of Technology, Madras
Presentation of Ledger

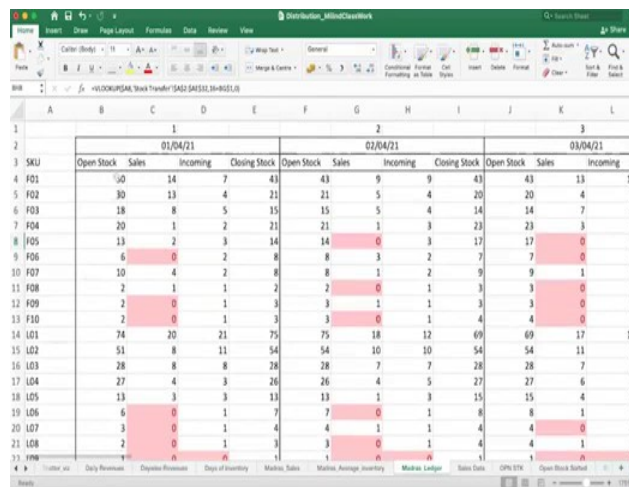
Prof. Milind Gandhe: So, Omkar last time we met, we had, there was this concern specifically about M01. And you were concerned that this SKU was moving, was selling a lot and we were not getting enough supplies.

Prof. Omkar Vinayak Karandikar: Yes.

Prof. Milind Gandhe: So, what we have done is that we have created a ledger sort of sheet. We have tried to forecast on a daily basis, or not, forecast is perhaps not the right word, compute on a daily basis. What is the closing stock in inventory in the Madras godown for all the SKUs? So, I just thought we will share that with you and would be interesting to hear your comments on that.

Prof. Omkar Vinayak Karandikar: Absolutely. Yes.

(Refer Slide Time: 1:12)



	01/04/21				02/04/21				03/04/21			
SKU	Open Stock	Sales	Incoming	Closing Stock	Open Stock	Sales	Incoming	Closing Stock	Open Stock	Sales	Incoming	Closing Stock
F01	10	14	7	43	43	9	9	43	43	13	14	43
F02	30	13	4	21	21	5	4	20	20	4	7	23
F03	18	8	5	15	15	5	4	14	14	7	3	17
F04	20	1	2	21	21	1	3	23	23	3	3	23
F05	13	2	3	14	14	0	3	17	17	0	3	17
F06	6	0	2	8	8	3	2	7	7	0	1	7
F07	10	4	2	8	8	1	2	9	9	1	3	9
F08	2	1	1	2	2	0	1	3	3	0	1	3
P01	2	0	1	3	3	1	1	3	3	0	1	3
P02	2	0	1	3	3	0	1	4	4	0	1	4
P03	74	20	21	75	75	18	12	69	69	17	12	74
P04	51	8	11	54	54	10	10	54	54	11	6	61
P05	28	8	8	28	28	7	7	28	28	7	4	33
P06	27	4	3	26	26	4	5	27	27	6	6	33
P07	13	3	3	13	13	1	3	15	15	4	3	18
P08	6	0	1	7	7	0	1	8	8	1	1	9
L01	3	0	1	4	4	1	1	4	4	0	1	4
L02	2	0	1	3	3	0	1	4	4	1	1	4
L03	1	0	1	2	2	0	1	3	3	0	1	3
L04	1	0	1	2	2	0	1	3	3	0	1	3
L05	1	0	1	2	2	0	1	3	3	0	1	3
L06	1	0	1	2	2	0	1	3	3	0	1	3
L07	1	0	1	2	2	0	1	3	3	0	1	3
L08	1	0	1	2	2	0	1	3	3	0	1	3
M01	1	0	1	2	2	0	1	3	3	0	1	3



Excel spreadsheet showing data for Distribution_MidwestCaseWork. The data is organized in columns A through L, with rows 15 through 33. The data includes numerical values and labels like M01, M02, etc.

	A	B	C	D	E	F	G	H	I	J	K	L
15	LO2	42.1	9.9	4.24								
16	LO3	16.7	7.3	2.29								
17	LO4	21.9	5.7	3.87								
18	LO5	14.5	2.8	5.19								
19	LO6	10.4	1.2	8.67								
20	LO7	6.5	0.5	12.25								
21	LO8	7.2	0.3	21.60								
22	LO9	2.4	0.1	36.00								
23	LO10	6.7	0.3	25.00								
24	M01	15.7	21.1	0.74								
25	M02	22.5	10.3	2.19								
26	M03	11.8	7.7	1.54								
27	M04	10.1	5.8	1.75								
28	M05	8.5	3.9	2.19								
29	M06	5.8	2.5	2.35								
30	M07	7.9	2.4	3.28								
31	M08	4.9	0.3	14.80								
32	M09	6.4	0.4	16.00								
33	M10	6.4	0.3	24.00								



Excel spreadsheet showing data for Distribution_MidwestCaseWork. The data is organized in columns A through L, with rows 2 through 23. The data includes numerical values and labels like M01, M02, etc. A Revenue Pareto Analysis chart is visible on the right side of the spreadsheet.

	A	B	C	D	E	F	G	H	I	J	K	L
2	Row Labels	Sum of Revenue		Row Labels	Sum of Revenue	Cumulative Re % of cumulative sales						
4	D1	₹2,74,200		M01	₹1,09,08,000	25%	₹1,30,00,000					
5	D2	₹85,800		M07	₹17,33,000	39%	₹1,00,00,000					
6	D3	₹96,280		M03	₹4,72,000	51%	₹80,00,000					
7	D4	₹1,00,010		M04	₹4,40,000	64%	₹60,00,000					
8	D5	₹35,150		M02	₹46,40,000	75%	₹40,00,000					
9	D6	₹39,200		M09	₹22,00,000	80%	₹20,00,000					
10	D7	₹44,800		M10	₹18,00,000	84%						
11	D8	₹11,400		M05	₹15,36,000	88%						
12	D9	₹17,020		M08	₹15,12,000	91%						
13	D10	₹50,949		M06	₹9,52,000	94%						
14	D11	₹1,13,600		LO5	₹1,89,805	94%						
15	D12	₹1,82,800		LO1	₹1,13,600	95%						
16	D13	₹2,66,400		LO4	₹1,07,200	96%						
17	D14	₹3,07,200		FO1	₹2,74,200	97%						
18	D15	₹3,89,805		LO3	₹2,66,400	97%						
19	D16	₹1,32,000		LO7	₹2,62,500	98%						
20	D17	₹2,62,500		LO2	₹1,82,800	98%						
21	D18	₹58,500		LO6	₹1,32,000	98%						
22	D19	₹54,000		FO4	₹1,00,010	99%						
23	D20	₹60,000		FO3	₹96,280	99%						



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Prof. Milind Gandhe: So, this is what we have done. For every day, we have taken the open stock.

Prof. Omkar Vinayak Karandikar: Starting with the first, so first you had an opening stock.

Prof. Milind Gandhe: And then you had given a sales and incoming from Hyderabad.

Prof. Omkar Vinayak Karandikar: That is right.

Prof. Milind Gandhe: This is that we have computed closing stock.

Prof. Omkar Vinayak Karandikar: That is right.

Prof. Milind Gandhe: And open minus sales plus income.

Prof. Omkar Vinayak Karandikar: Yes.

Prof. Milind Gandhe: And this closing stock for 1st of April we have taken as open stock for the 2nd of April.

Prof. Omkar Vinayak Karandikar: Absolutely fine.

Prof. Milind Gandhe: Except in cases where there are back orders. So, in cases where, if the closing stock was minus, was negative, then we have taken the open stock to be 0.

Prof. Omkar Vinayak Karandikar: Perfectly fine. Yes.

Prof. Milind Gandhe: Okay. And then just to make things legible, we have sort of highlighted all the cells which are 0 or lower.

Prof. Omkar Vinayak Karandikar: Sure, sure.

Prof. Milind Gandhe: Okay.

Prof. Omkar Vinayak Karandikar: Absolutely fine.

Prof. Milind Gandhe: So, this is the big picture.

Prof. Omkar Vinayak Karandikar: How is it looking for M01 then?

Prof. Milind Gandhe: M01, let us look, yeah, so you started with 50, went down to 45, went down to 37, went down to 27, so stock seems to be declining.

Prof. Omkar Vinayak Karandikar: That is a concern in fact. So, what it means is there will be stock out in Madras for this SKU and after that what will happen is immediately the customers will not see a stopper, but...

Prof. Milind Gandhe: Actually that has happened. So, that has happened here. This is on day...

Prof. G. Venkatesh: Sir, you got four.

Prof. Omkar Vinayak Karandikar: So, 10th day there is a stock out in Madras. So, orders will go to Hyderabad now.

Prof. G. Venkatesh: So, there is minus 1 see.

Prof. Omkar Vinayak Karandikar: Okay.

Prof. Milind Gandhe: And it is started becoming worse.

Prof. G. Venkatesh: We record minus 10.

Prof. Omkar Vinayak Karandikar: Yes. Once it goes down it is expected, because there are no supplies for this SKU in the market. This is one of the new launches, one of the bestsellers. So, yeah, I think by the end of the 15 day you have some stock. 2 units are coming in the inventory.

Prof. Milind Gandhe: There are some 2 units are there.

Prof. Omkar Vinayak Karandikar: That is a recovery, yes.

Prof. G. Venkatesh: So, what, so I mean, Omkar, so how, what is the management process that is used here? So, do you have a limit?

Prof. Omkar Vinayak Karandikar: Yes. So, normally what we do is, we track something called days of cover on hand. So, I may be tracking the inventory and see how many days of future sale should be covered with whatever inventory we have. So, typically we see for fast mover mobile FSM that number could be as low as two to three days. But slow mover it should be around 15, 20 days kind of number and that changes from business unit to business unit. For lifestyle that number could be as high as 50, 60 days as well.

Prof. G. Venkatesh: So, this you do on a daily basis.

Prof. Omkar Vinayak Karandikar: Yes. So, this is what normally we do to ensure that there is no stock out. So, anywhere we, so we have a seven days ordering cycle, let us say, anywhere we see that we have less than seven days of stock, we will raise an emergency order and we will get that SKU in stock.

Prof. Milind Gandhe: So, we did do that Omkar as you had suggested, computed Madras average inventory. So, we have not done it on a daily basis maybe the students can try and do it on a daily basis, but what we did was we computed for 15 days for each SKU, we computed the average opening stock and we computed the average sales.

Prof. G. Venkatesh: Average opening stock for that period, 15-day period.

Prof. Milind Gandhe: For the 15-day period, yes.

Prof. Omkar Vinayak Karandikar: Absolutely right.

Prof. Milind Gandhe: And we computed the average sales for the 15-day period. And then we computed as you had suggested average days of inventory.

Prof. Omkar Vinayak Karandikar: Yes. So, yeah, this is what I expected. You can see for the fast mover FSM, fast mover SKU you can see it is as well as two to three days. And this is exactly why we need forward FCs. So, we discussed about why we need forward FCs, one of the reason was inventory holding in forward. So, the reason we created Madras and Cochin is just because of this.

We can operate this FCs at very low BUH Hyderabad can never work on these kinds of numbers. But since there is a daily connection between Hyderabad and Madras and Hyderabad and Cochin, I can still work with these kinds of numbers with your inventory in forward FCs and still be happy with the overall numbers. So, this is an inventory control mechanism.

Prof. G. Venkatesh: So, daily connection basically means that in one day goods will get shipped.

Prof. Omkar Vinayak Karandikar: Yes. Every single day there will be goods ship.

Prof. G. Venkatesh: And it will reach in the same day. Same day or next day it reaches.

Prof. Omkar Vinayak Karandikar: Next day it will reach. Based on the compute time it will take a day or so, but every single day there is a connection. There is an opportunity to finish.

Prof. G. Venkatesh: So, M01 you can see 0.74 here.

Prof. Milind Gandhe: That is a key thing.

Prof. Omkar Vinayak Karandikar: So, this is exactly the point and another good point you can make out of this is the way the averages hide the data.

Prof. G. Venkatesh: The minus 10 is gone.

Prof. Omkar Vinayak Karandikar: It is gone.

Prof. G. Venkatesh: Yeah.

Prof. Omkar Vinayak Karandikar: So, as long as I see this number at average at 15 days average, I will not know that there were cases of stock out. I would never know what went wrong in between.

Prof. Milind Gandhe: Correct.

Prof. Omkar Vinayak Karandikar: The classic example how...

Prof. Milind Gandhe: But already you would probably get a clue, because if it is 0.74 then there is clearly something is a problem.

Prof. Omkar Vinayak Karandikar: Correct. But that is actually the reason we do not want that 0.74 to come on stage. That is the reason we track this every single day. Every single day we track this number and that is the reason we correct it make sure that it does not fall below a certain threshold which could be two to three days for forward, seven days for deep FCs.

Prof. Milind Gandhe: Correct.

Prof. G. Venkatesh: So, in this particular case M01 would have triggered, should have triggered a purchase on which day, I mean.

Prof. Omkar Vinayak Karandikar: Absolutely, yes.

Prof. G. Venkatesh: But it did actually, I mean, there is some reason why it did not get triggered but.

Prof. Omkar Vinayak Karandikar: So, M01 I know that there is a supply constraint.

Prof. G. Venkatesh: There was a supply constraint you mentioned it.

Prof. Omkar Vinayak Karandikar: So, this is a new launch.

Prof. G. Venkatesh: So, on that day on column AK we have four, so already four should have cause a trigger. It should have triggered, because.

Prof. Omkar Vinayak Karandikar: Absolutely.

Prof. Milind Gandhe: That is Ninth of April.

Prof. G. Venkatesh: ninth of April, but even both.

Prof. Omkar Vinayak Karandikar: In fact, if you can just go back and look at average sale for M01 that should be the indicator number.

Prof. Milind Gandhe: So, it is about 20, sorry, this is 15.

Prof. Omkar Vinayak Karandikar: minus 20.

Prof. Milind Gandhe: 20.

Prof. G. Venkatesh: So, the minute it goes below 20 you should get trigger, right?

Prof. Omkar Vinayak Karandikar: 20 is one day. So, at least I will go for two days of cover, because then we will be replenishment of a day and transit of a day.

Prof. G. Venkatesh: So, 40 days unit.

Prof. Omkar Vinayak Karandikar: I should get a trigger on the first, very first day. I think only first day the inventory was 50, after that.

Prof. Milind Gandhe: Yes, actually.

Prof. G. Venkatesh: So, it should have triggered there itself.

Prof. Omkar Vinayak Karandikar: Yeah.

Prof. G. Venkatesh: But in this particular case you are saying that there was nothing, is not available. Even it was triggered nothing could have been done.

Prof. Omkar Vinayak Karandikar: That is where we depend on, we are dependent on external supplies and we can function as good as what they can. So that is what is happening here.

Prof. G. Venkatesh: Any other negatives that are there, Milind, in this chart besides M01?

Prof. Milind Gandhe: I do not think so. Let me see.

Prof. Omkar Vinayak Karandikar: In using stock, I do not expect too many except this one.

Prof. Milind Gandhe: No, does not seem to be GV.

Prof. Omkar Vinayak Karandikar: So, maybe as an exercise, people can look at the other FC and see whether similar problem exists in that FC.

Prof. G. Venkatesh: In terms of, it may not have gone negative, but it could have gone below this average inventory level that you mentioned.

Prof. Milind Gandhe: So, maybe students can do that for Cochin.

Prof. Omkar Vinayak Karandikar: Yes. And another piece that probably you want to ponder upon is, is the distribution of days of cover on hand. Look at this L01, 02, 03 series these are my fast movers SKUs. Typically, they will die between two to three days in forward FC. When you go to 3, 4, 5 these are my medium movers which we call torso, they will be around 5 to 8 days. And when we move to the tail 6, 7, 8, 9, 10, actually the number will start shooting above 10 days. Now, the question is why do not we control the inventory in forward FC?

So, the question always is that why do you want 10, 9, 7, 8 those kinds of SKUs in FCs. The answer is this is because of selection. People will not come to any platform if they get only one mobile. Maybe they will do if the brand is too big. Apple can do that maybe, but not otherwise, not a generalized platform that we are talking about.

People need selection and there will be different kinds of people who will need different kinds of selection and this last tail selection is essentially meant for those people who want variety. Very few people who want mobile worth let us say 1.5 lakh, 2 lakh rupees also and this is exactly to cater to that kind of requirement. So, we need to keep the inventory for even the tail SKUs, the tail SKUs, but what we sell normally is the head SKUs. So, it is cross and match.

Prof. Milind Gandhe: I see. And so this every business line has this pattern, is it.

Prof. Omkar Vinayak Karandikar: More or less it will be there. We, if we want to relate to the 80, 20 that we had, the first discussion we talked about 80, 20.

Prof. Milind Gandhe: Correct, Pareto.

Prof. Omkar Vinayak Karandikar: Pareto. So, this relates to the Pareto. So, that 90 is your top and then those SKUs will be the ones who are having a lower inventory.

Prof. Milind Gandhe: So, if I can see that, actually, we are seeing that most of the Pareto need to come really from mobiles itself.

Prof. Omkar Vinayak Karandikar: That is a reality unfortunately, especially if you do the Pareto on GV, the value, it will be mobiles which leads, because if you look at the average selling price again, a mobile is equivalent to maybe 10 lifestyle products or 100 FMCG products. So, definitely mobiles will lead in terms of Pareto for revenue.

Prof. Milind Gandhe: Correct. But otherwise, you see it is M01, M07, M03, M04, M02 at the most M09 those are the ones that are really contributing.

Prof. Omkar Vinayak Karandikar: That is right.

Prof. Milind Gandhe: And then if we go back and look at the sort of days of inventory for these, so we said M01 was one that we had.

Prof. Omkar Vinayak Karandikar: That is the outlier, but otherwise if you see the inventory will be one to two days only.

Prof. Milind Gandhe: Then there was M07 and M10 now.

Prof. Omkar Vinayak Karandikar: M09. M09 is typically a high price mobile. So, look at the average sale, it is just 0.4 units per day. We are not selling too many of them, but whenever we are selling one, it is giving a big buck.

Prof. Milind Gandhe: And this is what you were saying that you need to keep it in stock because you want to give that option for the high-end consumer.

Prof. Omkar Vinayak Karandikar: Absolutely, yes.

Prof. G. Venkatesh: So, in this case the Ms explained head is a torso body.

Prof. Omkar Vinayak Karandikar: So, we normally got head, tail and torso.

Prof. G. Venkatesh: Torso. So, which are the head, which is the head which is the torso...

Prof. Omkar Vinayak Karandikar: Head will be typically will be the ones which are giving you more units. So, your M01 will be head, M02 will be head, M03 will be head, M04 is also head, your M05, M06 are torsos, and your tail will be M10 and M07 kind of, M08 kind of example. And this will be more evident if you would go to let us say lifestyle or FMCG.

Prof. Milind Gandhe: Okay. At FMCG...

Prof. Omkar Vinayak Karandikar: It will be clear demarcation. If you look at around to, less than five, then 5 to 10 days and 10 days and above that will be kind of demarcation you can clearly see that.

Prof. Milind Gandhe: So, these will be your head I am seeing.

Prof. Omkar Vinayak Karandikar: 3 to 4 maybe your head...

Prof. Milind Gandhe: And maybe these.

Prof. Omkar Vinayak Karandikar: Last three will be your tail and whatever this in between will be your torso.

Prof. Milind Gandhe: I see, like this.

Prof. Omkar Vinayak Karandikar: Yeah.

Prof. G. Venkatesh: So, you are saying that the head is basically the things are moving fast. You keep a lower number of days of inventory, but you keep track of it very closely.

Prof. Omkar Vinayak Karandikar: That is right.

Prof. G. Venkatesh: And then the torso is kept, tail is kept mainly just for variety per se.

Prof. Omkar Vinayak Karandikar: That is right.

Prof. G. Venkatesh: And the torso is, what to do with torso.

Prof. Omkar Vinayak Karandikar: Torso is mixed back in between. So, torso is, it is basically going either towards head or tail.

Prof. G. Venkatesh: You move it to head or tail.

Prof. Omkar Vinayak Karandikar: New set of SKUs normally it is a new trial and all those things. So, it run with average inventory and then based on the performance, let us say, over a week or two weeks or three weeks, a long time performance maybe we move them into the right zone.

Prof. G. Venkatesh: Okay, interesting.

Prof. Milind Gandhe: Very interesting. So, this is GV we had done this earlier, Omkar, we had discussed this ABC analysis right?

Prof. Omkar Vinayak Karandikar: Yes.

Prof. Milind Gandhe: This is really some form of ABC, is not it.

Prof. Omkar Vinayak Karandikar: This is ABC only, yes. Head, tail, torso is another name of ABC, nothing else.

Prof. Milind Gandhe: I see. And so, your strategies are different for A, B and C.

Prof. Omkar Vinayak Karandikar: Yes, that is right. So, replenishment needs lot of resources. It is not easy to run replenishment. I need to monitor each and every SKU in portfolio, make sure the stock is there in the all-stocking points, for example, we are talking about three stocking points here. But I think the stocking points could be a huge number. So, for each SKU, for each stocking point if you want to keep a track, then you cannot do it for the whole portfolio for sure.

So, if you want to be precise and you want to make sure that things which are not, which are definitely not going out of stock you can do it only for the head SKUs. So, it is again that is another use of your Pareto analysis. So, top 20 percent giving you 80 percent benefit is what we

are looking at. (not audible) proportionate what you say effort to benefit ratio and hence we focus on normally the head SKUs.

Prof. Milind Gandhe: And those that head SKUs you will ensure that you do not have a stock out.

Prof. Omkar Vinayak Karandikar: Absolutely. That is what the endeavor is always. As we can see that that is the reason this M01 is part of this discussion. So, the endeavor is to make sure that these SKUs do not go out of stock. However, there could be external factors which will force you to control or word off stock in some cases, but we try to minimize that. And there is a specific term also which is used for specifically for lifestyle. We call this head portfolio as NOS portfolio, never out of stock portfolio.

Prof. G. Venkatesh: Never order stock.

Prof. Milind Gandhe: Never out of stock.

Prof. G. Venkatesh: Never out of stock.

Prof. Omkar Vinayak Karandikar: So, the best example is what you can see on the screen right now all three of us are wearing white shirt. That is another example. Another example will be black shoes or blue jeans. These kinds of SKUs will be always into that. Yes, lifestyle is a selection mean. There will be new varieties of clothing, new varieties of let us say apparel, especially in women's portfolio will be coming up every time. However, there are some basic items which are never out of date and that is what we call NOS portfolio.

So, we make sure that these SKUs are always available to customer and they are always available close to customer. I may not be able to post all my slow mover, all my selection SKUs very close to customer. For this example when we are talking about, if my FC or if my (not audible) goes up in Madras and Cochin, what will happen is, I will not immediately hire a bigger FC there.

But what I will do is typically I will take out my tail selection out of that FC and I will still run the business, I will still sale 80% of the demand at a better speed. Rather than making a

investment call immediately, I will start focusing on the head selection, focusing on everything. So, that is another way in which we use this credit analysis or credit classification.

Prof. Milind Gandhe: So, this has been very, very interesting Omkar, to my mind the biggest learning I have out of this is, of course, out of this ledger exercise is that it is important to not just look at a one day picture, but to keep creating pictures on a daily basis and keep monitoring.

Prof. G. Venkatesh: Or Milind even average is misleading.

Prof. Milind Gandhe: And average, yes.

Prof. G. Venkatesh: Cannot even do average, you have to do everything on a daily basis. If I actually these, if you look at this good, well mannered kirana shops, those guys every, end of every day, that guy will balance his books, every day.

Prof. Omkar Vinayak Karandikar: Absolutely, yes.

Prof. G. Venkatesh: Yeah. So, that is a good practice. That is what was being said. I mean, you have to balance. You have to know at least for the products that are very important you got to know where you stand on that product at the end of every day.