

Financial Management for Managers
Professor Anil K. Sharma
Department of Management Studies
Indian Institute of Technology, Roorkee
Lecture 34
Estimation of Project Cash Flows Part 6

Welcome all. So, in the process of learning about the estimation of the cash flows, in the previous class we did one problem, which was just initial say beginning of learning about the estimation of the cash flows practically, where we assumed that everything is constant that the say your cost is also the cash outflows means the cost of the projects in terms of the cash outflow, they are also constant and the cash inflows are also constant and then we try to means say workout the other related expenses like non-cash expenses, depreciation and taxes, and then we arrived at the net cash flow.

So, similarly, we will move forward now with one more problem. So, the problem which we did yesterday that was solved here it was done and this means the problem was also given in the say in the form of the PPT and then the solution was also given in the form of the PPT.

(Refer Slide Time: 1:26)

India Pharma Ltd. is engaged in the manufacture of pharmaceuticals. The company was established in 1998 and has registered a steady growth in sales since then. Presently, the company manufactures 16 products and has an annual turnover of Rs. 2200 million. The company is considering the manufacture of a new antibiotic preparation, K-cin, for which the following information has been gathered:

- K-cin is expected to have a product life cycle of five years and thereafter it would be withdrawn from the market. The sales from this preparation are expected to be as follows:

Year	1	2	3	4	5
Sales (Rs. in million)	100	150	200	150	100

- The capital equipment required for manufacturing K-cin is Rs. 100 million and it will be depreciated at the rate of 25 percent per year as per the WDV method for tax purposes. The expected net salvage value after five years is Rs. 20 million.
- The working capital requirement for the project is expected to be 20 percent of sales. At the end of 5 years, working capital is expected to be liquidated at par, barring an estimated loss of Rs. 5 million on account of bad debt. The bad debt loss will be a tax-deductible expense.
- The accountant of the firm has provided the following cost estimates for K-cin:

Raw material cost:	30 percent of sales
Variable labour cost:	20 percent of sales
Fixed annual operating and maintenance cost:	Rs. 5 million
Overhead allocation (excl. depreciation, maintenance and interest):	10 percent of sales

While the project is charged an overhead allocation, it is not likely to have any effect on overhead expenses as such.

- The manufacture of K-cin would also require some of the common facilities of the firm. The use of these facilities would call for reduction in the production of other pharmaceutical preparations of the firm. This would entail a reduction of Rs. 15 million of contribution margin.
- The tax rate applicable to the firm is 40 percent.

Based on the above, work out the cash flows for the project.

But now, today I have another problem with me, which is given here in the PPT. So, you can understand, you can read the problem first well, you can understand it well, and then I will now solve it means practically on the sheet here. So, that we can learn it that how different type of the information given here in this problem in the second problem, how we have to say workout the or the estimate the cash flows based upon the information given in the second problem.

So, this we will be doing here as means the previous one was done and it was only explained by me that how it has been done and how the cash flows have been estimated or worked out. But in this case, in the second problem, only the problem will be given to you. And its solution. I will work out here and I will show that how the cash flows are practically estimated in case of the say different kinds of the projects.

And here the problems which are going to take care of are like that the cash inflows over the number of years are not going to be stable. They are not going to be constant. The cost may be same that is going to remain in the beginning of the year that may be the same, but as far as your cash inflows are concerned, they are changing over the period of time sometimes they are increasing, sometimes they are decreasing.

And that happens practically also that cash flows never remain stable, because of number of factors. Sometimes we sell more, sometimes we sell less. So, accordingly your revenue is going to increase or decrease and that practical aspect we are going to address in this particular product in the problem number 2.

So, let us first, first of all understand the problem given here in the PPT, let us first understand the problem well, and then we will now say move forward for calculating or estimating the cash flows based upon the information given in this problem.

So, the problem here given here is that India Pharma limited is engaged in the manufacturing of pharmaceuticals. It is a pharmaceutical manufacturing company and the company is engaged in the manufacturing of the different pharmaceutical products, different drugs, they are manufacturing.

The company was established in 2008 and has registered a steady growth in the sales since then. It was registered in 2008. And it has grown over a period of time since then it is working well and it is growing. Presently the company manufactures 16 products and has an annual turnover of 2200 million rupees, annual turnover of the 2200 million rupees.

The company is considering the manufacturing of a new antibiotic preparation or a new antibiotic drug which is named here for the sake of simplicity, it is named here is K-cin, this drug they want to manufacture for which the following information has been gathered, for which the following information has been gathered. So, as I told you in the previous class also that manufacturing drugs is very very expensive business.

Especially in case of say identifying a new molecule, especially the new drug, completely a new drug including the molecule as I told you that it requires minimum 10 years period of time and 10,000 crores of Indian rupees. So, huge investment is required to be done when we have to identify the molecules.

But if you have to go for say manufacturing the drug out of already manufacture, already identified molecule in that case also the cost is very high and in itself means introducing a new drug in the market in itself is a full-fledged project, because investment requirements are very high.

And once the project comes into the picture, it takes the shape and the drugs start manufacturing, then the outcome is going to be excellent is going to be good. Because it may be possible that the drug is already tested in the market and the demand and the market for the new product for the new drug is say well assured in advance.

So, in this case, we are say going to find out now, that they want to introduce a new drug which is called as K-cin and they want to start manufacturing it, they want to introduce it and the different information the data which has been gathered in the detailed project feasibility report for this product is given here as under.

Number 1, K-cin is expected to have a product lifecycle of 5 years, product lifecycle of 5 years, after 5 years it will phase out, only it will exist in the market for 5 years. And thereafter, it could be withdrawn from the market, maybe some improved version of this drug may come in the market or maybe it becomes ineffective or some alternative say remedies also available in the market. So, this drug is only going to be there in the market for 5 years.

The sales from these preparations are expected to be as follows, the sales from this preparation are expected to be as follows. Years are given to us, 1 to 5 years 1, 2, 3, 4, 5 and sales in million rupees are also given to us. First year the sales are going to be the revenue is going to be 100 million rupees, then 150 million rupees, then 200 million rupees, then 150 million rupees and 100 million rupees.

Number 2, now, after this estimation of the sales and revenue, now, we talk about the say the cost part and the point number two says the capital equipment required for manufacturing K-cin is rupees, worth rupees 100 million, the capital equipment required for manufacturing K-cin is worth rupees 100 million.

And it will be depreciated at a rate of 25 percent as per the WDV method. As per the WDV method it will be depreciating at the rate of the 25 percent but WDV is basically for the tax purpose, we all know it that they are the different methods of charging depreciation. So, but in the practice they are only two, state line method or you call it as a fixed installment method and the written down value method.

But in India for the tax purpose compulsorily the WDV method has to be followed by the corporates, by the companies. And for the other purposes companies follow the straight line method or the fixed installment method. So, it is given clearly here that depreciation will be charged at the rate of 25 percent. And since we are going to prepare this balance sheet for the text purpose, so the, this method followed for charging the depreciation will be written down value method.

The expected net salvage value after 5 years is going to be 20 million rupees means, they are making investment of 100 million rupees and after 5 years using that plant and machinery all the occupants we will be left with the salvage value of the one fifth of the investment which we are making now that is 20 million rupees.

Number 3 the working capital requirement for the project is expected to be 20 percent of the sales. Now, as I told you in the previous class that working capital is a very-very important component and it should be carefully analyzed, it should be carefully worked out and as I told you, there are the three methods of say estimating the working capital requirement, it may be say worked out as a percentage of the fixed investment or the investment we are going to make in the fixed assets or it may be worked out as a percentage of the sales.

And third method is that on the basis of the operating cycle approach or sometimes we call it as the cash cycle approach, say investing cash for the working capital and again converting the cash into the cash. So, means after following that complete cycle. So, that will be the third approach. Practically firms follow the say operating cycle approach for the estimation of the working capital requirements.

But in some projects for the simplicity, it may be say estimated on the basis of or as a percentage of the estimated or projected sales. So, in this case, the assumption taken here is the assumption taken here is that it will be say estimated as a percentage of the sales. So, the working capital requirement here it is 20 percent of the sales at the 20 percent of the sales at

the end of the 5 years. At the end of the 5 years working capital is expected to be liquidated at par.

Means as we know we discussed in the previous class also that fixed assets give us back only the salvage value that is only the leftover value because technical value goes down to 0, because we depreciate it and we assume it that over the given number of years of 5 years, 10 years, the technical value the useful value of that asset will become 0. And only we will be left with some structural, structural value, the value of that plant which is only the value of that structure and that will be means say expected to be of certain amount which is called as a salvage value.

So, for the fixed assets be calculate the salvage value, but for the current assets, for the working capital, we expect that the whatever the investment is made in the working capital or fulfilling the working capital requirements or current assets requirements, current assets never depreciate and they are eligible at the end of that say life of the project in the full amount.

So, it is a same thing given here also, that at the end of 5 years working capital is expected to be liquidated at par. Bearing an estimated loss of 5 million rupees, bearing an estimated loss of 5 million rupees on account of bad debts, there must be some bad debts maybe, because different components of the working capital are what?

Number one first component is inventory that for buying up the raw material and say, supporting the finished goods in the store, we need to make some investment. So, that investment in the inventory is the first component of the working capital.

Second component is the credit sales sundry debtors. So, sundry debtors when we sell on the credit, we sell today, or in the current period and we expect to realize those sales in the time to come. So, that is called as the sundry debtors and sundry debtors are say expected to be realized over a period of time, but it may be possible as it is given here that all the sundry debtors has been not realizable, and there will be the expected bad debt of 5 million rupees. So, that loss will be there.

So, it means whatever the investment we are making in the working capital, how much investment we are making in the working capital that is the 20 percent of sales. So, at the last year, at the end of the life of the project in the fifth year, out of the 20 percent of the sales, which we have invested in the working capital 5 million rupees will not be reliable, they will turn into the bad debts, the bad debt loss will be tax deductible. The bad debt loss will be tax

deductible, so, it means the final loss will not be much it will be something that total loss of 5 millions minus the tax payable on that value of the 5 million rupees. So, it means the actual loss will be total loss minus the percentage of the tax.

Point number 4 given here is the accountant of the firm has provided the following cost estimates for the K-cin. The accountant of the firm has provided the following cost estimates for the K-cin, raw material cost is 30 percent of sales, variable cost is 20 percent of sales, fixed annual operating and maintenance cost is 5 million rupees, fixed annual operating and maintenance cost is 5 million rupees.

And overhead allocation, excluding depreciation, maintenance and interest are 10 percent of the sales. Overhead allocations are the 10 percent of the sales. While the project is charged on, charge and overhead allocation, it is not likely to have any effect on the overhead expense as such. While the project is charged and overhead allocation, it is not likely to have any effect on the overhead expense as such.

Point number 5, the manufacturer of K-cin or the manufacturing of the K-cin would also require some of the common facilities of the firm. The use of these facilities would call for reduction in the production of other pharmaceutical preparations of the firm. This would entail a reduction of the 15 million rupees of the contribution margin. The use of these facilities would call for reduction in the production of other pharmaceutical preparation of the firm. This would entail a reduction of rupees 50 millions of the contribution margin.

So, I discussed with you our concept of the opportunity cost in the previous class. So, opportunity cost means that when we introduced a new product, we will have to carefully account for that because of the say introduction of the new product is there any possibility of reduction of the sales of the existing products.

We discussed the concept of that cannibalization, product cannibalization effect and in that product cannibalization effect, we have discussed this thing that it should be very carefully estimated that because of the introduction of the new product are the sales of the existing products going to be get affected and negatively or going to get say eroded or reduced.

In this case it is going to happen that when we are going to introduce a new, say antibiotic K-cin, then certainly it is going to affect the sales of the existing products and that loss of the sales could be amounting to rupees 15 million rupees. So, we have to adjust this as a opportunity cost.

Point number 6 is the tax rate applicable to the firm is 40 percent. The tax rate applicable to the firm is 40 percent. So, it means in this case, when we have to now say estimate the cash flows, we have to keep all these factors in mind. The total information given here we have to keep in mind and we will have to be careful here that since cash inflows that is a basically as a source of the cash inflows as a means the revenue is the source and the cash flow is coming from the revenue, they are not constant, they are fluctuating, they are changing over a period of time, they are increasing, then decreasing over a period of time.

So, it means we have to be very careful that estimating the cash flows, that is the opportunity cost also, there is some overhead cost also, we have to see whether it will be allocated to the product or a new product or not allocated. So, means overall it is a interesting problem. And if you are able to estimate the cash flows out of this information given then I think, then I think to a larger extent, you are clear with the concept of the estimation of the product cash flows because it is a very tedious task practically it is a very tedious task.

Capital budgeting process will be complete only or will be possibly means completed if we have the say right estimation of the cash flows. If the cash flows are not rightly estimated, then there is going to be a problem and without proper estimation of the cash flows, both cash outflow and cash inflow problems are going to be there. So, on the basis of this information, we have to learn how to estimate the cash flows.

So, for now, this purpose we will be not doing it practically we will be learning that how to estimate the cash flows and how to means work it out both the cash outflows and the cash inflows. And finally, at the end of this entire exercise, how much net cash flow is going to be available with us, how much net cash flow is going to be available with us that we are going to work out here.

So, let us calculate it and learn how to work out the cash flows for the say different problems. This problem is quite comprehensive because it takes into account number of things, number of factors. And those factors which I theoretically, conceptually discussed with you. Practically now we are going to deal with this all the factors or all the assumptions. So, now we will prepare the say estimation of cash flows.

(Refer Slide Time: 18:08)

Particulars	Years					
	0	1	2	3	4	5
1. Capital equipment	(100)	-	-	-	-	-
2. Develop & test W.C.	(20)	30	40	30	20	-
3. Revenues	-	100	150	200	150	100
4. Raw Mat. cost	-	-	30	45	60	45
5. Labour cost	-	-	20	30	40	30
6. op. exp. cost	-	-	05	05	05	05
7. Dep. of Equip.	-	-	15	15	15	15

So, we write here estimation of cash flow for this product which is called as K-cin. This is K-cin, so, we are going to estimate the cash flows for this product K-cin. So, this is a new antibiotic which we want to introduce, company is already manufacturing the 16 products and this product is going to be the new in the row. So, we are going to learn about that how to manufacture the say this product and what cash flows are going to be there.

So, in this case, the estimation of the cash flows for this product are going to be a very interesting phenomena for all of us. So, what we are going to do here is? We are going to write here is the particulars, you write here as the particulars and then we will put here the years and this amount is going to be in the rupees millions, this is going to be in the rupees millions. So, this is the particulars, this is years and then we are going to estimate this entire process.

So, particulars we will be taking up here and years are given to us are 0, 1, 2, 3, 4 and it is 5 and it is given to us in the case that the product only has the 5 years lifecycle after 5 years it will be phased out, it will be going out of the market. So, it means you have to estimate the cash flows only for the 5 years. So, we will start with the say entire means factoring for the all the information given to us and taking this into account for estimating the cash flows.

So, first is the, let us estimated that in the 0 years, what kind of the cash flows will be there? In the 0 period, in the current period only cash outflows will be there. And in the case it was given that the say investment on the equipment is means that is the major cause of the cash

outflow. So, investment in the capital equipment is going to be the first thing and that is the we will write here capital equipment, capital equipment.

So, how much is going to be required for the capital equipment? 100 million rupees, all the cash flows we are going to take in the million rupees. So, it is the 100 million rupees, this is the one. Here in this case there is no other cash outflow is going to be there. Next thing is the, next thing required to be done here is the level of net working capital. So, level of net working capital, we have to work out here. So, in this year we require, in the beginning we required the net working capital of this one, 20 million rupees that is a requirement for the net working capital.

And over the years, over the years from the first year to 5 years, the working capital requirement will be, means it is estimated as a percentage of the sales. And you are looking at the percentage of the sales this was estimated as 20 percent of the expected sales, the net working capital was expected to be 20 percent of the sales.

So, here, one important point to be borne in mind is we should be very clear about this point because it is very interesting and very-very useful point here, we should be very clear about that point. That look that it is given to us is that the working capital will be the 20 percent of the sales. And here the point of say importance is that these cash flows when we are going to show here, maybe whatever the cash inflow now because for first year there is a inflow, outflow is only in the current period.

But first year is the inflow, second year is the inflow, third year is the inflow, fourth year is the inflow, fifth period is the inflow, but all these inflows are going to be estimated at the end of the year. We assume it that the cash flows are not going to be, we are showing here the cash flow at the means against the year 1, they are going to be there with us at the end of the year, not in the beginning of the year.

So, when you are going to estimate the working capital requirement, whatever the capital, working capital I will be showing here against the year 1, against the year 1 that will be presumed to be useful for or that will be calculated for the year 2. And working capital shown here will be that is a figure basically relevant for the year 3, and the working capital shown against the year 3 will be relevant for the year 4 and similarly, the working capital figures shown here will be relevant for the year 5.

Because the any figure of the working capital which is shown at the end of the previous year will be treated to be the same amount in the beginning of that next year. So, the closing balance of the previous year in this way, we can say in the language of accounting we can say, the closing balance of the previous year will be known as the opening balance of the next year.

So, it means, if we show it means the working capital requirement as a percentage 20 percent of the sales. If we show the requirement of the second year, in the second year only it means we are requiring that at the end of the year. So, we do not require that at the end of the year, we require at the beginning of the year. So, we have to estimate at the end of the previous year, so that it is available at the beginning of the next year.

So, the closing balance of the capital will be the opening balance of the working capital required in the year in question. So, be careful about that, that all these cash flows which we show here, they are presumed to be means be available with the firm at the end of the year, not as the beginning of the year.

So, similarly, when we are going to estimate the working capital which is the 20 percent of the sales, we are showing at the end of the first year it means it is relevant for the second year because it will be available, same amount will be available in the beginning of the second year. So, now, we have seen in the 0 period we have seen that only cash outflows are there and no cash inflows are going to be there in the 0 period.

Now, we talk about the revenues, third important requirement here is the revenues or maybe the sales. So, if you look at the information given here to us is the revenues are already given to us for the 5 years. So, we are say given here the revenue that is for the first year, the revenue is going to be 100, second year 150, third year 200 million, fourth year 150 and then the next year the last year that is going to be again 100 million rupees.

So, we are going to put all the revenues here. So, what is going to be the revenue in the first year? The first year revenue is going to be 100 million rupees, this is the first source of inflow and in the first year we are going to have inflows. Now, let us complete it for the first year only, and then we will move to the second year.

So, in this case, point number 4 here, so it means you can understand that whatever the working capital requirement here we are showing is that working capital requirement is say

available only means we are showing in the 0 period. So, at the end of the 0 period, the working capital available will be 20 millions. So, that will be used in the first year.

And you can understand here it is automatically 20 percent of the sales of the first year, it is the 20 percent of the revenue of the first year. So, it means I am showing it not against year 1, I am showing it against year 0 because it is the end of the year 0 and that will be anything which is at the end of the year 0 will be certainly available in the beginning of the year 1.

So we will be showing 1 year before, not on the same year because otherwise it will be available at the end of the year. And we do not need that working capital at the end of the year but in the beginning of the year. So, this is a one important thing we are going to be careful about. So, let us put it together all the revenues because we will be able to adjust everything.

So, the revenue for the year 1 will be how much? 100 million rupees, year 2 will be how much? 150, year 3 will be how much? 200, year 4 will be how much? 150 and last year it is going to be again 100 million rupees, last year is going to be again 100 million rupees revenue. And accordingly we are going to estimate for the sales. Now, here we have shown here the 20 percent of the revenue of the first year, but we have shown it at the end of the 0 period or in the current period.

Now, we are going to show what is the revenue in the second year? The sales in the second year, 150 million rupees and as 20 percent of that will be how much? That is going to be 30 million rupees, so we are going to show it 1 year before means at the end of the first year will be available in the beginning of the second year. Here how much we require is that is 20 percent.

So, the working capital is going to be how much? 40, in this case the working capital is going to be again 30 and in this case also the working capital is going to be how much? 20, it is the 20 percent again of the revenue of the year 5. And in the last year, the working capital will not be required rather it will be say liquidated means the firm will be liquidated, the project will be liquidated. So, working capital will be retrieved back it will be available, it will be realized back.

So, no investment is required means that investment of the 20 million rupees which we are showing has been made at the end of the year 4 will be available for the year 5 and since the project is going to be terminated in the year 5. So, it means no further working capital is

required in the year 5, otherwise it will be relevant for the year 6 and project does not have the life of the year 6. So, this is the total information about the capital equipment, level of net working capital and the revenues.

Now, we take the next part is now we talk about the cost part. So, cost of raw material, we write here as the raw material cost, raw material cost. So, what is the raw material costs here? It is given to us and if you look at the raw material cost, it is already given in the form of the percentage, it is given to us as 30 percent of the sales.

So, how much it is nothing to be here. So, 30 percent of sales is going to be how much? 30 percent, 30 million, in this case 30 percent is how much it is going to be? 30 percent it is of the so same amount we are going to take here is a 45 million rupees, here it is going to be 60 million rupees, here it is going to be 45 million rupees, and here it is going to be 30 million rupees. So, this is the cost of raw material.

Next head of the cost is what? Labor cost, labor cost, so, how much is going to the labor cost or the cost of the labor is going to be how much? It is given to us is that it will be 20 percent of the sales. So, if you talk about it, 20 percent of sales is how much? Nothing here, 20 percent of sales is again how much? 20, here it is 30, here it is say 20 percent of sales is going to be how much? It is again 40. So, it is 20, 30, 40 and is going to be 30 again, and it is going to be again 20, so 30 and 20 again.

And after that, we are given here is the, next information is about the overhead allocation, fixed annual operating and the maintenance cost, fixed annual operating and the fixed annual operating and the maintenance cost which is fixed for all the 5 years. So, you can call it here as the operating and maintenance cost. How much it is going to be it is going to be? It is going to be 5 millions fixed, all the 5 years it is not going to change, 5 millions fixed. So, you can put a 0 here.

So, it is the 5 million rupees is the operation, operating and the maintenance cost which is given to us, it is the fixed cost to be taken as you can call it as 5 million rupees. One important thing, now the next important thing here is the loss of contribution, loss of contribution, it is given to us in the information about this project.

Loss of contribution means there is a going to be cannibalization effect and what is a loss of contribution? It is clearly written, given in the information in the case that because of the introduction of this K-cin new product, the sales of the existing products will be negatively

hit and there will be expected loss of the revenue to the tune of 15 million rupees. So, that is considered as the opportunity cost and that will be new drug will be causing a contribution loss of the 15 million rupees every year from the sales of the existing products.

So, we have to say a treat it as a cost similarly as a cost, so that from the total revenue which is coming or being generated by this product, you have to subtract this that is called as a contribution and that is how much? 15 million, so this is the loss of contribution 15 million rupees. This is the 15 million rupees. So, this is treated as same as the cost, you call it as the negative revenue effect.

And it is going to cost certainly is going to cost as a negative revenue effect because the revenue of the existing products is going to go down by the this amount 15 million rupees. So, it means say it has to be taken or treated like a cost. Now, after this we have to take into account some other important components like depreciation, bad debt losses, and then we have to arrive at the profit after tax and then we have to look at the some other kind of the components here, the say termination part and then we have to go for the say recovery, we will start recovery.

So, we will add for the other expenses means after this loss of contribution, we have the depreciation as a non-cash expense and then we have the say bad debt losses are given to us, because that is also expected that in 1 year that in the last year out of the total working capital that is 20 percent of sales, which is invested in the business as a 20 percent of the revenue, 5 millions of that will not be recoverable. So, we have to factor for that. And similarly, the other factors we have to take into account, so the net cash flow will be worked out.

So, in this class I have worked out till the say up to the important components that we have taken into account the cash outflow which will be occurring in the current period, on account of the two heads, one head is that is the capital equipment and second is about the net working capital. Then we estimated the revenue and then we estimated some components of the cost, like the material cost, labor cost, operating and maintenance cost and the loss of contribution.

Other components of the cost like your say depreciation, similarly the loss of the say working capital because of the bad debts and some other important relevant aspects, I will be taking care of. So, we will continue with this problem in the next class also and hopefully in the next class we will be able to complete it and work out the net cash flows. So, till then I stop here

and remaining part of the problem I will solve and I will discuss with you in the next class.

Thank you very much.