Social Innovation in Industry 4.0
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Lecture-21
Costing and Finance

Welcome back to the course on Social Innovation in Industry 4.0. This course is using a practical approach, first introduction to what is Social Innovation is taken in the first week, the use of Social Innovation, why is it important and certain terminologies, such as what is value, what is value creation, creativity, patenting all these things are almost covered in the first 4 weeks. This week I will try to cover Costing and Finances. Because as it is said, you cannot manufacture anything if you cannot measure it. You cannot manufacture the efficiency or the final output of your Social Innovation unless you are able to measure it. So, a technique to measure the Social Innovation impact is directly known as SIA (Social Impact Analysis).

To come to the social impact analysis, we need to understand what is costing. Why do we need to understand costing, what are various types of costing? In general, when we are talking about a product, when you are talking about a service, what other kinds of costing methods do come, and certain methods to include Social Innovation parameters into it, and then to calculate what costs are. These will be discussed this week.

Let us try to start from the Contents which are to be covered in this whole week. An Introduction to what is costing and why do we need really the costing methods when we are talking about Social Innovation, because when we are talking about Social Innovation. We need to have a good cost analysis and why do we need it and when do we need it? It

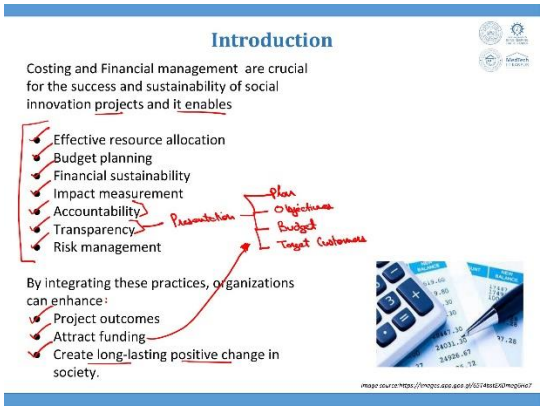
is an important question. For example, one has developed a website to distribute milk in its city, or may be a website to give the information to farmers where to deliver the milk. And, the same website would have information for the consumers where they can take the fresh milk or this website can even connect the farmers that are the people who are there in the horticulture and the final consumers, so that they get the fresh milk immediately.

This website would have an IT team that would be developing the website, have to hire a space, you have to get a domain name, all those expenses. Then, how many customers or how many clients are you targeting to reach, how many people would you hire to make this finally reach the people who are going to use it because the farmers who are there would not be taco savvy. So, they have to understand how to use this website or this android application which also is connected to this website in their mobiles. For this, a team has to be hired. So, in this case, for example, the major cost would be, maybe hiring 2000 people. That is the major cost. Then, the cost to operate the website, the IT people, the people in the marketing, everything would be, the travel of the people who are there in the market, maybe some equipment is to be purchased, some consumables are to be purchased, equipment could be the computers where the website is to be developed, or the consumables could be the fuel, the other consumables, for example, some samples of milk also are to be delivered to certain places. So, all these things, though it is a Social Innovation, an innovation, that helps to put some positive impact in the society but costing is always there. So, to understand what would be the cost of your project depending upon the social positive input it is giving.

So, what cost are you able to bear, are you able to have a trade-off between the regular product and the Social Innovation product that you have, if the product is comparable. So, all these things are to be covered this week. Financial Management Principles of Social Innovation would be just given an introduction to. Then, Cost Analysis in the Social Innovation project, this will be covered. Analyzation and Classification of Cost, what are the general classifications of cost like, we have the direct cost, indirect cost, overhead cost, all these things, we will try to have a small introduction to, and Analyzation, how do we analyze the cost. In general, in production when we are trying to determine the cost, the cost could be based upon a certain production method. For example, it could be batch production method, job production method, or maybe absorption method, the kind of absorption of the consumables which are there, or maybe marginal costing. The small parts we will discuss in this lecture.

Then, Budgeting and Resource Allocation in Social Innovation. How the general costing, this is general and how the Social Innovation costing differs from each other, this will be covered. Then, Budget Preparation Methodology, this would come in the second lecture of this week where certain methodologies we will discuss. Parametric methodologies, expert

opinion, all those parts would be covered. Parametric could be regression, linear, multilinear, then power-law, all this would be covered in this course. Financial Sustainability and Impact Measurement would also be covered. Then, it comes a small discussion on Evaluation of Social Impact and Return on Investment, then Financial Sustainability Strategies would be put some light upon, Costing Consideration in SIA (Social Impact Assessment) and Integrating Financial Data in SIA, this is what we covered in week 5 of this course.



Introduction, costing and financial management are crucial for the success and sustainability of Social Innovation projects and it enables, number 1, effective resource allocation. When I am talking about resources, the resource could be anything, resources could be men, material, money. Effective allocation of these, what number of people, what size and the number of pieces of the material, all this part would be covered here.

Then, Budget Planning. Planning of the budget means the total budget that you are targeting. I will talk about target costing, it is separate. Suppose, if you are having a specific budget and your project is of one kind. If you have, suppose, a budget to develop the website which I took as an example maybe 5 lakhs is your budget for the first month only for the development of the website including the purchase of computers, including the purchase of maybe small bikes or so. This budget is there and if you see, this can cover more than once it is.

Then, target costing can help you to expand your budget as well. Expand means that you can inflate your budget as well, you can also deflate it. For example, if your budget was only 5 lakhs and it is a big city which needs a 10 lakhs of amount to be covered, you can have a target costing which can deflate your budget. So these things could be taken care of. Then, financial sustainability, sustainability means whatever finances you have decided upon or you have come up to the final conclusion. These amounts or these finances are there. These are to be sustainable because the product is not something to be covered within

the first few weeks itself. It has to sustain for years. So, to have sustainable sustainability, you need to make sure that what kind of the start up, what kind of innovation, what kind of company you have.

Is it a property, is it a partnership, is it an LLP, is it a private limited or whether it is actually public limited if you are getting some shares from the government itself. So, financial sustainability comes there. Then, impact measurement. Impact measurement, this will be covered in detail in the fourth lecture of this week. We will talk about the social impact analysis that we will try to see. Accountability, who all will be accountable for what you are doing in your product, this will be covered in this week here. Transparency, when something is meticulously planned, though there will be always difference between what is scheduled and what is actual, but this variation should not be that 80 percent of your plans change.

This could be yes 20 percent, 10 percent of your plans would be little different from what is scheduled, that is why we need to have transparency on what we are doing and whenever you have small audits. Audits could be the financial audit, audits could be the audit of your technical excellence or so, audit could be your QMS (Quality Management System) audits. These audits are more clearly replied to when transparency is there. Then, risk management, if there is a risk of failure, though risk-based approach is always there in ISO systems, in Quality Management Systems, in specifically medical devices. Risk management is always there. In all businesses as well the risk management because it is innovation.

Innovation has many things which could be over seen in the beginning or which are completely unseen. So, those things could come up or something catastrophic could also come. So, risk management is more easily or clearly visible when you have a proper cost planning over it. Now, by integrating these practices organizations can enhance, number one, project outcomes. That means if they are able to enhance what project they have target to, outcomes could be enhanced in that.

Then more funding could be attracted because if you have proper accountability and transparency, if you have a proper presentation of your plan, your objectives, your budget which is the focus of this lecture and your target customers, then you have more chances of people who could be willing to do the work to give you funds, so that you are able to enhance your product further. Then, also by integrating all these practices which we have discussed, you can create a long-lasting positive change in society majorly, which is the prime role of Social Innovation.

Next comes financial management in Social Innovation. When I talk about management, management is a skill to allocate the resources in a proper way, to use these resources in a proper way, to operate the systems, and to follow up the systems in a well-planned manner. This is what management is. When I talk about financial management, the finances from where the funds come, how do you use the funds, whom do you allocate the funds to and who are the people accountable for it, what are the final outcomes or in the market you are getting from it, this is all finances included. Financial management is essential for the success of Social Innovation projects. It can help through the following ways.

Number one, financial sustainability and mission enlightenment, this means we ensure financial sustainability while staying true to social mission, stay true to social mission. General costing profitability is something that generally is talked about when we talk about any business, but here the mission is the benefit of the society, that is to be stuck to.

Then, the second point is optimizing the resource allocation that means we maximize the impact of resources on high priority initiatives. Then we measure the social impact social impact is to be measured. We try to quantify and demonstrate the tangible outcomes. Next is risk mitigation and resilience, resilience means how strong is your system to resist the change, how sensitivity in the system plays.

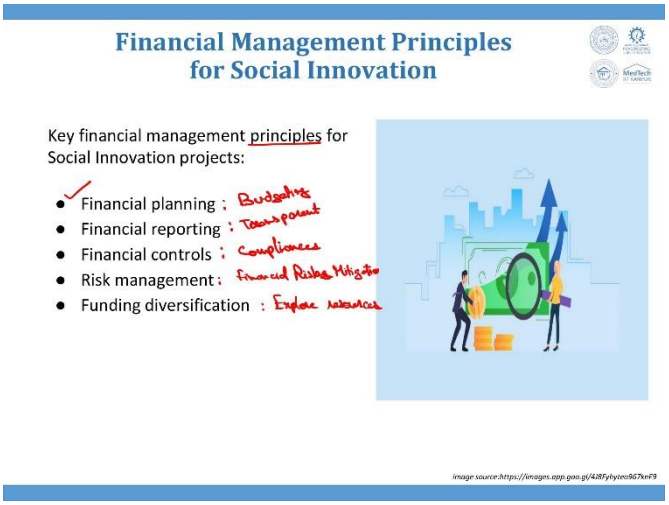
So, how sensitive your system is, this is resilience or risk mitigation which means the system should be able to mitigate financial risks. So, as we have Vector Stability, Stability

Analysis, what we call it SA, is also one of the processes where different models are there. There are models by Wricke, there are models by Jerks and Perkins.

These are the models which help us to understand what is sustainability or stability of the system. Then, attracting funding and investment, which means some credible financial practices are there which make the venture appealing to investors and funders. Now, ensuring accountability and transparency, that means this helps us to build trust that what we are doing is worthy and there is nothing fishy. So, we try to build trust with stakeholders. Because we are involving people, we are involving people's benefit, people should be able to have this feel, people should be able to really understand this, that this is something which is trying to create a social impact.

So, transparency on what you are doing is very important. So, this helps to build trust within them, or across the people, or across all the stakeholders. Then, strategic decision-making. Strategic decision-making means that this empowers leaders to make informed choices. Informed choice is that which are aligned to the social objectives which are there in the social mission here. Then, leveraging financial partnerships which means this opens different doors to collaborative financial partnerships.

Then, promoting innovation and adaptation which means it allows exploration of innovative financial models and adaptation to change. So, this all includes the financial management.



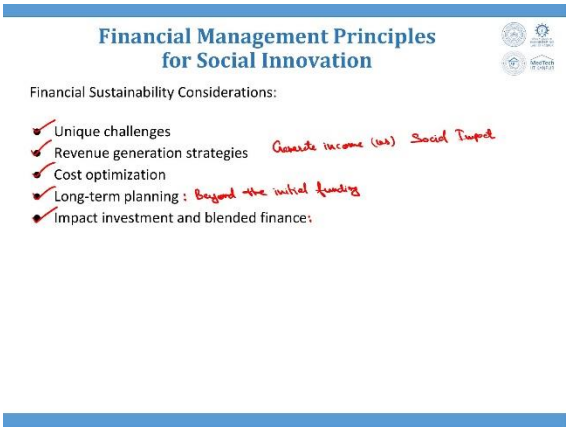
Now, there are certain key financial management principles. Number one is financial planning. When I say planning it is nothing but it is budgeting and resource allocation.

Then, we have financial reporting. So, financial reporting means whatever we just talked about in the previous slide the system has to be reported, documented, it has to be

transparent. Then, financial controls which means we need to safeguard the resources and insurance these compliances are there. That is why I talked about Quality Management Systems. That is why I talked about the audits when you have specific compliances which you have to follow if you have to really adhere with, you will have financial controls that within this system the system is controlled.

Risk management. It means the identification of risk is a major part, then mitigation of financial risks. Here again, I am talking about financial risks only which are connected to the previous point as well. Financial controls or financial risks are quite connected risk management. For example, if controls are not there the maximum salary which a CEO could draw, the distribution of salary across the different positions in the company that you have made. So, these are to be equivalent to what skill they have and what the contribution is. This is only one of the examples. So, these financial controls help us to also mitigate the financial risks.

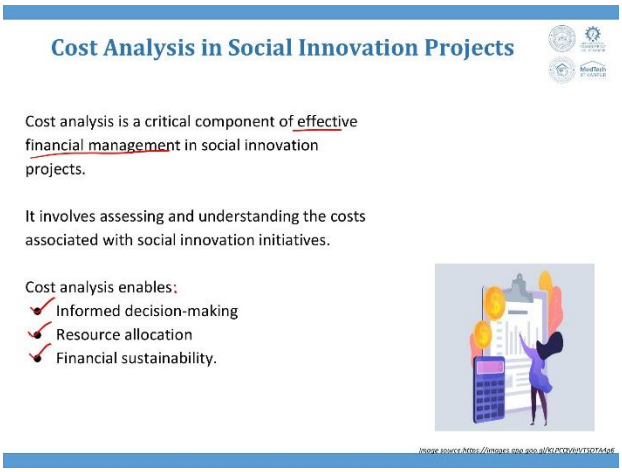
I would also put financial risks mitigation here. Funding diversification, we will learn more about them in the upcoming lectures, but here diversification means exploring various funding resources to support the project.



Now, there are certain sustainability considerations which are there when we are talking about the financial management principles. Number one Social Innovations have unique challenges. This is the point which should be always there in the mind when we are trying to come up with something new because challenges are not just to increase profit, it is not only financial constraints, it is also the sustainability factors.

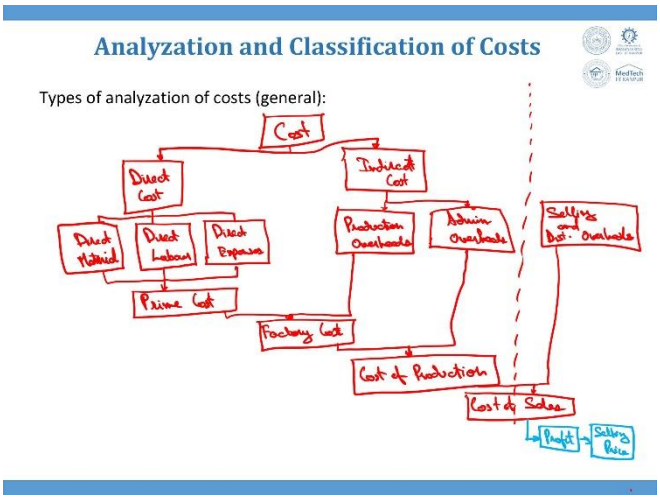
Then, revenue generation strategies could not be the same as those which are there in the general production system because generating income while aligning with the social mission is more important.

So, I will put here generate income versus social impact. There could be a trade-off. In cost optimization that means efficient resource utilization again without compromising the social impact, that is to be there. Long-term planning that is strategies for financial sustainability beyond the initial funding that you have. Then, impact investment and blended finance, that is we leverage the impact investors and blended finance approaches, so that more and more investors do try to come to us to help our businesses.



Cost analysis in Social Innovation projects. Cost analysis is a critical component of effective financial management in Social Innovation projects. It involves assessing and understanding the cost associated with Social Innovation initiatives. It enables informed decision-making, this is all discussed. Resource allocation and financial sustainability. Now what is the cost, what are the types of the cost and what are different costing methods.

This we will try to see in the next slides what are different kinds of cost. The kinds of the cost if I say when we talk about the types of analysis of the cost, let us first try to understand what is the product cost and what are the components of the product cost.



If I talk about the cost of a product, the cost majorly has two components, direct cost and indirect cost. Direct cost is generally something that is known as that you can see in the product directly. For example, the direct cost which is associated with the product is the direct material cost.

Direct material is, for example, this stylus is manufactured. This stylus is manufactured using plastic, rubber which I directly see from here. There are metal buttons inside. So, this is how it is manufactured direct material cost. Indirect material is while manufacturing this, certain other maybe if it is an injection molding machine, some material is also removed or extracted while removing this from the extrusion machine, that is one material.

Second material is the cooling material, the chemicals, all those are indirect materials. So, when I talk about direct cost, and indirect cost, direct material, indirect material. In the direct cost major components are, if I put it in this way it is direct material. Direct material means the material that is there in your product that you can directly see. Direct labor, direct labor is the salaries of the staff that are there.

And, direct expenses, direct expenses are the expenses which are direct. For example, the equipment expenses, the expenses which are there in the product, that packaging, etcetera, those are there. So, we put it in this way, direct cost and indirect cost. So, in this case when these three costs are there, direct material, direct labor and direct expenses, these are known as the prime cost of a product. These three are known as prime costs.

Now, in indirect, we have production overheads. Production overheads which include the overhead cost, maybe the cost of administration, the cost of marketing, or it could be the cost of manufacturing, or it could be the cost of maybe the electricity rent that we have, all these costs come into production overheads. Along with production overhead, we have administration overheads. So, we have the administration, that means the stationary, the

printing material, the printing ink. In stationery, maybe some pen drives, some hard disks you might have to purchase, pens, pencils everything just comes into the administration overhead. Let me put it in the boxes. We have the production overhead and administration overheads.

When these overheads are added into the prime cost, it becomes our factory cost. So, factory cost is direct material, plus direct labor, plus direct expenses, plus production overheads. So, this means it is the sum of the prime cost and production overheads. This is factory cost. Now, when we add the administrative overheads over it that means here, at this point my production is complete.

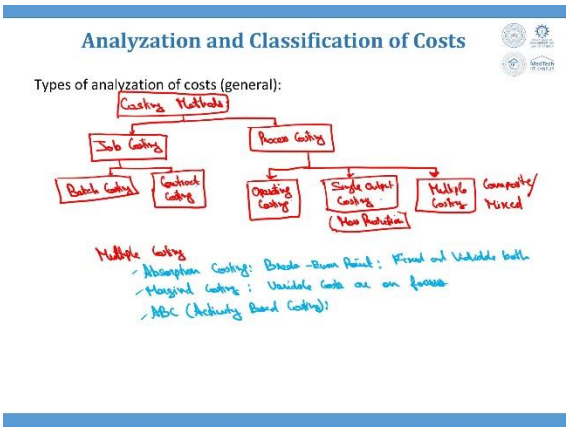
So, it is known as the cost of production which includes the factory cost, plus the administrative overheads. Now, the product also has to go to the market so that means the cost of sales would also come. In that some other indirect costs would be there which are known as selling and distribution overheads. So, when these are included into the cost of production, the cost is known as the cost of sales which includes the cost of production, plus selling and distribution overheads.

Now, the cost of sales, these are all the costs. From here we add profit into it. To have the costing of the product, we need to add profit over it, at what marginal costing what profit do we have, then we get the total selling price. So, this is the general distribution of the cost of a product.

So, these costs have different components. It could be different for different kinds of the products. For some products, if it is a material-based product the direct cost is high, for the services the indirect costs are high, their direct costs are majorly the salaries of the people or the major equipment that you have purchased, the indirect cost reproduction overheads there are not a production overheads, there are service overheads, those are higher, administrative over are higher. In this case maybe development of a service venture. So, these cost components are there when we talk about a product.

I am giving you this terminology because these words direct-indirect cost, overheads, factory overheads, prime cost, cost of production, this will be keep coming in this lecture and we will have to maybe revisit this slide to see what we are trying to talk about when we are talking about costing in Social Innovation. So, to understand costing in innovation,

let us also try to see what are general costing methods, then I will talk about the costing methods in Social Innovation and how are those different for the general costing methods.



General costing methods when I talk about there are certain kinds. For example, the job cost method. I would say the costing method. In costing methods, let me also make a hierarchical table out of this. There are two major methods when we talk about the general costing, number one is job costing, number two is the process costing.

We will also talk about the top-down, bottom-up, and parametric costing methods. top-down and bottom, what are those? Those will connect to the job costing and process costing. Job costing is one where the cost is based upon what kind of specific job you have which means it is based upon the variable costing, it involves taking material, labor, overhead, and accumulating them into the production process. And then, creating the items for sale, this is the job costing. Process costing is followed by those ventures where raw material has to pass through certain processes before it is converted to finished goods. So, certain examples here could be manufacturing of the garments, it has to pass to certain processes. For each process, there is a cost associated with it.

For example, if you come to MedTech IIT Kanpur, if you come to an imaginary lab IIT Kanpur, we have the cost for the process. For printing this material, maybe 3D printing this specific kind of a job. The time that the machine would take, and the material that will be consumed would be proportional with the cost of the product. That is process costing. In textile manufacturing, in food processing, it is the time that the machines take to process the material, that is process costing. In job costing, it is directly, that we discussed in the previous slide, the direct material, the direct labor, those are all calculated. That is the kind of job costing here.

So, the process and the job now are a little different. Now further, job costing could be divided into two major components, that is the batch costing and contract costing. Let me just list them down. Then, I will try to explain them with examples. In process costing, we

have the classification based upon what kind of processes we have. It could be operating costing as I took an example about the machines in the imaginary lab IIT Kanpur, then it could be single output costing, or it could be multiple costing. Batch costing is something which is a variation of job costing only, in which similar items are produced, in batches, in large quantities. For example, the production of bicycles for production of readymade garments. I am talking about the textile industry. Textile industry, though is a process costing, but a regular batch of the readymade garments, the sub specific set, becomes a batch.

So, that comes as a batch costing. Now, comes a contract costing. We are given a contract to construct a building, we are given a contract to complete this project within the specific time. The project is given as a contract. Social Innovation has to be developed as a contract. You apply for a grant, the grant is given as a contract within one year of time, within two year of time, you have to complete this for example, BIG (Biotechnology Ignition Grant) is here, where you can apply for up to 50 lakhs of the grant there, what are the costings, they ask for the budget, the equipment, the salary, the travelling alliances, the marketing charges that you have, or the overheads, we call it contingency. All these are put into one budget and the grant is applied for.

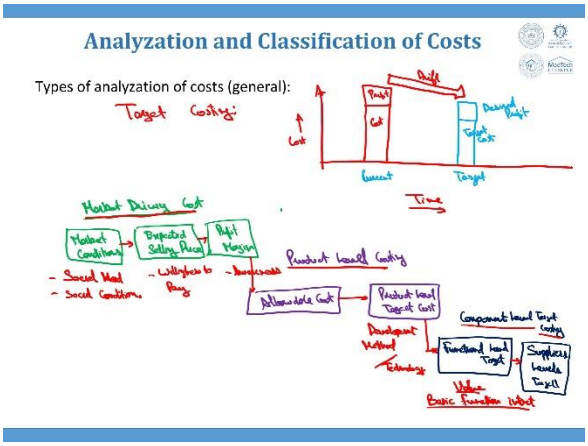
This is a contract cost, you are given a contract, then there are evaluators who try to evaluate for this kind of the contract. These are the places the person needs to visit, this is the team which will have this expertise, these are maybe the charges the team would have, these are the employees that would be required, these are all calculated based upon this. Next comes the process costing. Process costing is based upon the process as I said in this cost completing each stage of work is determined. This method is appropriate for producing entities where a series of continuous and repetitive activities are there. Number one is operating costs, where services, such as transport, power distribution, hotels, then maybe website use,12 these are operating costs. When you operate it, you give money for it.

That is the operating cost. Single output costing is also one of the variations of the process costing where single output is applicable to produce a product specific like one product from one industry only. For example, cement production, steel production, maybe milk production, single output costing. For single output, the thing is repeating. Also, this is generally used for mass production. Not generally, this is always used for mass production.

Then, we have multiple costing methods. This is also known as composite costing methods. This includes various techniques of the costings. We call it as composite costing, or we also call it as mixed costing. With multiple other kinds of the costing, these are the major kinds that you have put here, job and process. There could be other kinds of costing. For example, there might be absorption costing, so I will show you the detailed multiple costing here, absorption costing. Absorption costing method is one where the cost is based upon

the variable and fixed cost to the units. Here, break even point is calculated. We are not going into this detail because this is also generally talking about accountancy in general. But here, both the fixed and variable costs are there. Fixed costs are the specific factory that you have taken. The cost of the land, the cost of the investment, the equipment, this is all fixed cost. Variable cost is, each month you have to pay salary, each month you have to pay for consumables, each month you have to pay for maybe if the land is not purchased the rent of the land, that is variable cost and both of them are included in the calculation of the total cost, this is known as absorption costing.

Also, another kind is the marginal costing. Marginal costing is when the fixed cost is taken separately which is to be covered and only variable cost is taken into consideration. Variable costs are on focus. Here, fixed and variable, both are taken into consideration eventually. Then, something that is known as the ABC which is known as Activity Based Costing. This is a very common method nowadays. Other than the regular job and process costing methods, where to carry out an activity assessment, we need to find a cost driver. Based upon the specific activity, the cost is assigned to it and the costing is done accordingly. Similarly, other costing methods could be there in the multiple costing methods. Any of these costing methods whether it is badge, contract, operating, single, output, absorption, marginal, ABC, anything could be used.



Now majorly, I will have to talk about one of the methods that is known as the target costing. Target costing is one when you have a specific target, specific aim, specific amount, specific quantum of the work which is to be targeted too. As I said in the beginning, target costing from the production viewpoint is, if you have the costing quite high and the target that is the market is something that is pulling you into the converging medium, that means the costing is to be reduced.

That means, in the beginning what is there, you have something like this. You have an actual cost and you have profit over it, but the market is asking you to do is, to have a target

cost which is a lesser target cost and you have a desired profit. This is your current, this is your target, this is known as target costing. Let me put a graph here, this is sprite and this is the target cost. This is the target, this is our time this side and this is the cost.

Now, you need to have a drift from here to here. This is known as drift, this is known as target costing. When you have a specific target, it is not just a method of costing it is rather a management technique to have a holistic approach over the overall business model and taking into account several factors.

Several factors could be homogenous, could be switching to different methods, the different levels of the production, or maybe different technology, so as to finally reduce the cost and maybe different purchasing material as well or purchasing vendors could also be changed, so different kinds of methodology is used when we need to reduce the cost. Now, target costing is very important when we talk about the social impact analysis. As I said in the beginning we have to deflate or inflate both. Here, the costing is to be deflated because it was higher in the beginning, so it is a drift to the lower side.

In the target costing majorly if I try to distribute into the small components and why this even required because there is a pull from the market, so there is a market driving cost. Market driving cost in which we have market conditions, we have expected selling price, and we have profit margin. This market driving cost now is to be further divided into the product level, what product are we trying to finally take to the market, are we going to change by keeping the basic functionality same.

The overall view of the product, or not the overall look of the product, overall maybe feel of the product, or we can even divide the product into the component level. For example, a mobile is to be manufactured. This mobile, if it is something having an operating system which is charging, you may be 20 percent of the cost of the mobile is just designing of the software, can this be reduced by 10 percent further. So, this overall look of the product or overall use of the product can be changed. For this, what are the small enablers for providing this kind of the software that is Android software or maybe IOS software in the mobile, so those could be taken into account, that is the component level distribution is there. So, marketing driving costs are there.

So here, we come to the product level costing where the allowable cost and the product level target cost is fixed. And then, we come to the component level costing, component level I would better say target costing, where component level, the functional component or the functional part of the cost, I would say the functional level target and the component level target, that is the suppliers for these functions, suppliers level target, these are all taken into account.

And, we are travelling from left to right, now what the difference between the general target costing and target costing a social impact is that, this drift which I have shown here, in the

first diagram here is downward. It could be an upward drift even if Social Innovation is there, it depends upon converting the kind of innovation you have. See, increasing the cost is very easy but when the target is not reducing the cost, here it is not the marketing conditions, here it becomes the social need or I would better say social conditions. Then, the expected selling price, it is connected to willingness to pay by the consumer. Is the consumer able to understand the website which is developing for the milk distribution that will help to enhance their business or do they wish to just stick to the business which they have been doing from 100 years.

Like distributing the milk to one part and just having a specific amount or specific margin from the specific buyer that they have, so do they wish to change or not, so what is the willingness to pay. This is connected to the profit margin and this is connected to the awareness that you create. The kind of Social Innovation as it is discussed by Professor Ram Kumar, is it a market pull or is it a makers push. If it is a market pull, the customers would definitely be willing to pay more. If they are pulling it, their requirement is there. In critical conditions, the requirement for the vaccines was very high.

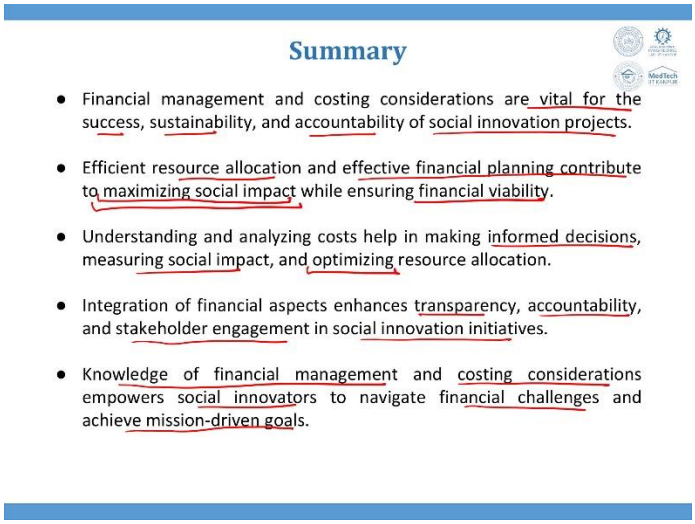
It was a Social Innovation as well, how to distribute the vaccines, how to produce the vaccines, how to transport vaccines from one place to another. This was a market pull, where governments were only paying, so certain examples could be taken.

Then, makers push, makers trying to develop a website, maybe develop a different innovation which they are trying to push to the people, Mitti Cool is one of the examples where the developer wanted to push it to the market. Now, what is the awareness of the people, what is the willingness of them to pay? Then, comes the allowable cost, product level target costing.

Do we completely change the production method, do we change the overall development method, development I would say method or technology. Is that completely changed here, or how do we even try to work upon the specific components, are we trying to finally hit the basic function of the cost or not? Basic function is something that is connected to value engineering I would say.

Are we giving the same value or maybe enhanced value to the customer that is the basic function should be intact. Basic function is selling the milk at the maximum possible price, that should be intact. Only an enhanced knowledge given to them could help them to

increase their production, or maybe able to reach the clients, or the final users of the milk directly.



So, Summarize, we have discussed in this lecture that financial management and costing considerations are vital for success, sustainability, and accountability of Social Innovation projects. Efficient resource allocation and effective financial planning contribute to maximizing social impact while ensuring financial viability. Understanding and analyzing cost help in making informed decisions, measuring social impact, and optimizing resource allocation.

Then, integration of financial aspects enhances transparency, accountability, and stakeholder engagement in Social Innovation initiatives. In this lecture also we have put some light on knowledge of financial management and costing considerations which empowers social innovators to navigate financial challenges and to achieve mission-driven goals, where the mission is social mission.

We will try to discuss about The Parameters of The Cost or the Components of the Cost for Social Innovations. For example, equipment, for example infrastructure, for example communication. All of them have some inputs for the cost. This we will discuss in the second lecture. In the third lecture we will try to talk about the Methodologies for Cost Estimation for Social Innovation only.

In the fourth lecture we will try to have some information on Social Impact Analysis, with which we will complete this week. So, with this I will try to take a break this week and we will try to discuss more upon the Costing and Financial Management and Budgeting for Social Innovations. And, in Industry 4.0 how technological innovations are helping us to develop more Social Innovations.

When we are trying to talk about the costing for them, the technological cost assessments are very important, this also will be discussed in the coming lectures. Thank you.