

## Infrastructure Planning and Management Successful Project Delivery Strategies Part 2

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### Strategic Templates

- Turnkey Contracts
- Mutual Gains (Susskind and Field, 1996)
  - Encourage other side's concerns
  - Encourage joint fact finding
  - Offer contingent commitments
  - Accept responsibility
  - Act in a trustworthy fashion
  - Focus on building long-term relationships



But this is I think in terms of the data collection, I think these are some things that become very important right, encouraging the other side concern and joint fact finding rights, it is very easy to put yourself in the mind-set of I am the data collector, there is the data I just need to sort of find it okay, but it may not be that easy right, so essentially you have got to try of you encourage people to talk about their concerns, perhaps to it is a joint exercise and partnership and this might be ways in which you might be able to get better data, acting in a trustworthy fashion, building long-term relationships, etc.

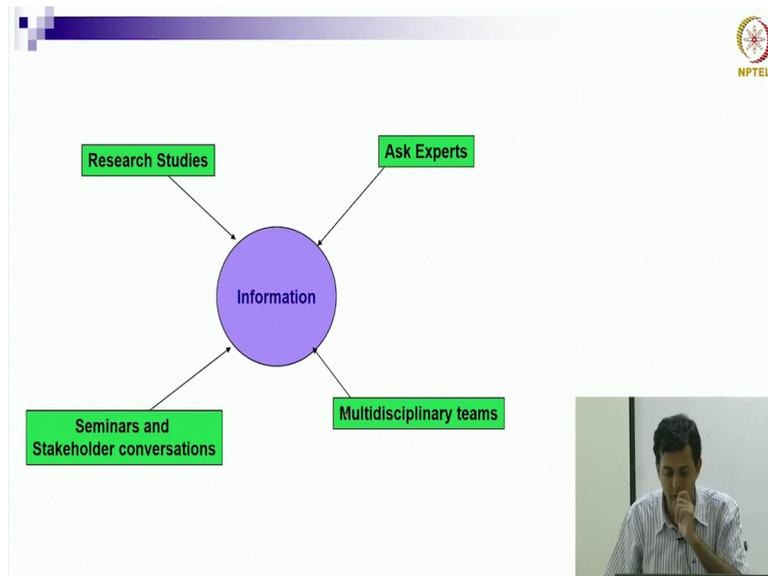
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### Strategic Devices (Tactics) for Risk Mitigation

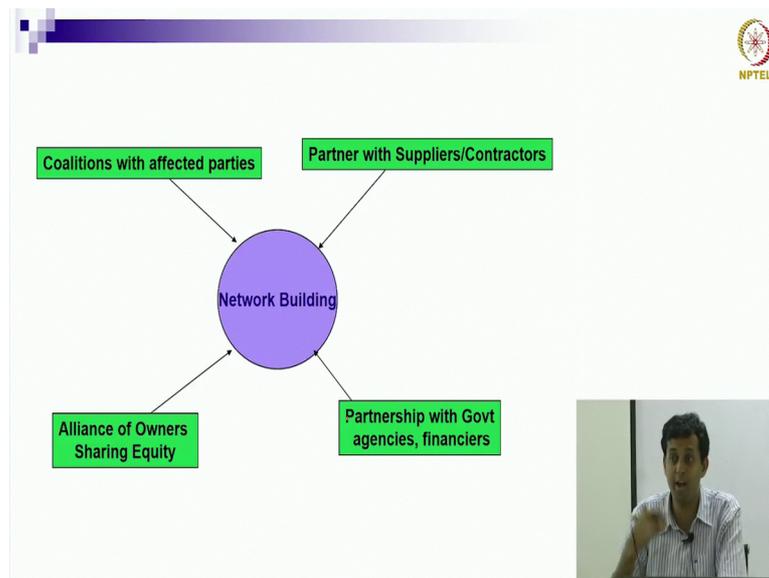
1. Information Gathering Techniques
2. Network Building and Cooptation
3. Structuring Contracts and Incentives
4. Flexible project design
5. Pre-emptive actions





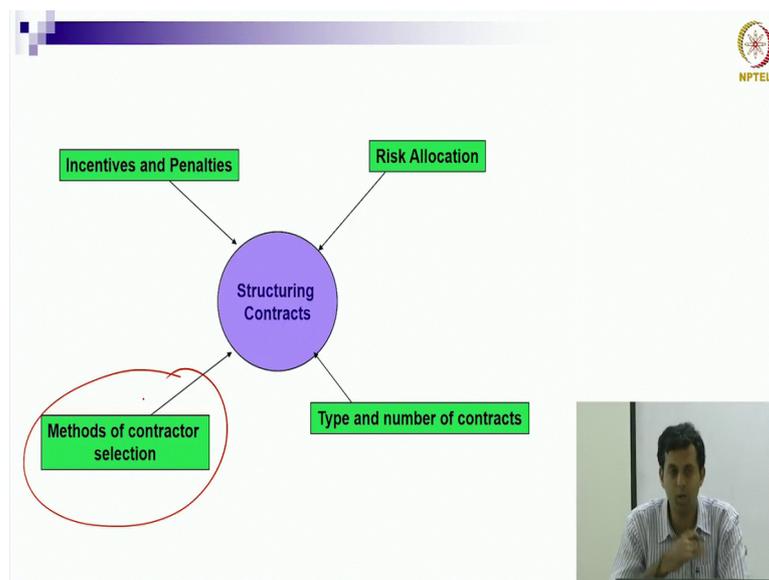
Okay, so a lot of what we studied in this class and a lot of what we talked about in terms of what we need to do in that preconstruction phase, predesigned phase, which is really a lot of what we have talked about in this class, can possibly be lumped into this buckets right, so there are whole series of information gathering techniques that we really need to focus on, we did not really focus too much on this in this class right, we know that it is important right, but we need to sort of look at all kinds of research, studies around their, talk to experts, form multidisciplinary teams that can collect economic data, demographic data, social data, and environmental data, maybe have a lot of these kind of these stakeholder conversation, seminars and I am sure they can add 10 other boxes around this right, but clearly data information collection is something that is sort of need to do, have talked to whole lot about this in this class but I want to sort of emphasise today that it is very important.

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Second thing is how do we will those networks, how do you will those coalitions of stakeholders. Okay, so we sort of built in, built this coalitions with affected parties, suppliers, contractors, government agencies, financiers, promoters of the project, etc and this is where a lot of the stakeholder mapping, social network analysis all of that comes into play right, so after we sort of have this data we really need to start building alliances, essentially projects are viewed as win-win for everybody, projects are going to succeed, people are going to sort of use that, the question is how do you without doping people frame it as a win-win and that involves a lot of negotiation going back to the drawing board, compromising a little bit like the menu honey bay discussions that you guys did, different people with different perspective, the projects to go together, you need to start building that network effectively, so, as in that case, at least 5 have not 6 of 6 stakeholders support you right, so there are bunch of network building techniques, negotiation, fair process etc we have to understand okay.

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Then we start getting into you know, how do we design this projects right okay, so the next two bullets or somewhat similar, what kinds of incentives and penalties to you put in? How do you allocate risks? How do you select contractors? All of this becomes you know important because kind of incentives, they can be very simple incentives and penalties like you know what we have an contracts that we call liquidated damages right, that essentially say for everyday of delay pay me money right and that becomes a very antagonistic kind of contract.

There are other kinds of incentives and penalties structures which group people together right and say if something does not finished then everyone gets penalized, on the other hand of the entire projects gets completed ahead of time, everyone gets recorded right and so those are different kinds of incentives and penalties structures, most of you have taken basic class an contracts right, you have talked about cost-plus contract right, which have certain incentives and penalties structure, where if you have a cost overrun right, where if it is not your fault, but it happens then cost-plus contracts you know, take care of that right.

They allow more money to be paid, fixed-price contracts on the other hand penalize people right, if there are mistakes or if there are changes addition, etc okay, how do you select contractors, do you just blindly go with the lowest bidder right, is again a strategy call that we have to make to see whether these projects are visible or not, so the lowest bidder you know might be good in one sense, if it is public money than being spent, then the fellow who can do cheapest prize represents the best value for public money right.

So if I want to put in toilets in a 1000 villages right, the construction, the constructant right, install this kinds of toilet and the technologies in particularly, you know complex maybe the best thing to do is to talk to people and say can build that alright for me were the cheapest toilet and we and install for the cheapest price right, but at the same time cheap does not necessarily imply quality right, they does not necessarily imply the project will be built in a manner wherever it can be stable right.

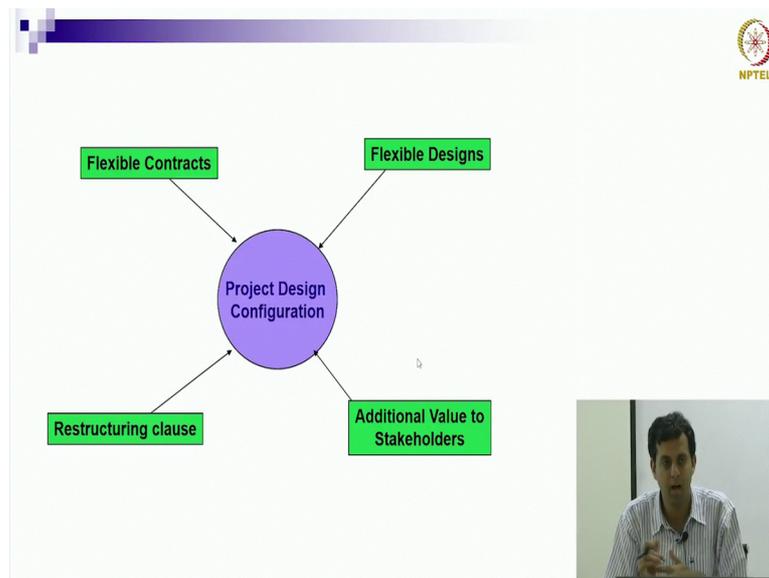
So, in some projects for instances in Chennai Metro rail we had you know examples where contractors who were the cheapest have had trouble finishing, I mean they seem to have under bid on this projects and that is the delay the project considerably because these guys have to be taken out, new people have to be brought in right, so maybe it should not just be financial, maybe it should be a mix of technical and financial.

How do you evaluate the technical side, how do you, you know sort of yes, you know somebody can easily coming, one of the easiest tricks in the book is to say here are the people that I am going to bring on this project and you bring all the all-stars in your company and put them on the project roster right, but when the project actually starts right, those people are working for your company, but they are not day-to-day on the project right, so yes they come, they are available for phone calls whatever it is, but they are not day-to-day right.

So sometimes it is a sort of looking at technical qualification is, tricky, people put in resumes those people, may or may not necessarily show of, so we need to sort of thing about this any order of the government to be able to adopt this, they need to have put this out ahead of time, so it is transparent, somebody talked about transparency right, so the process of bidding and procurable is transparent, so I think we really need to think a lot in terms of how do you structure this contracts, what are the financial incentives that comes back to the government than one of you were making on financial modelling right.

So all of this by the way needs to be done alternatively ahead of time, so you build your networks. Okay and you can start testing our various structures with this networks, certain structures the network may not like, certain structures that the network may prefer right and that sort of a process.

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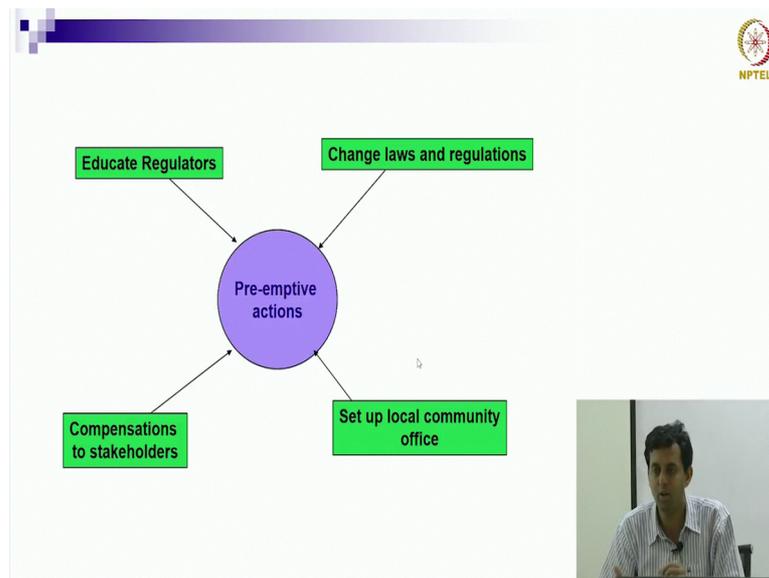


Similarly, where do we put in the flexibility? Right and what do people think about that flexibility? Right, so just before we had come to this class some of us were in a research group meeting right, we were talking about this least present value of revenue kind of contracts, flexible time contracts and the person who was presenting, who is the alumnus, who is taken this class a few years ago, said a lot of practitioners when he went in and present it, you know that he had a flexible contracts he was working on, or whether the duration of the project could be extended or sorted based on the demand.

Most people said that they do not want that flexibility right, for a variety of reasons. Okay, so just because of your flexibility, it does not actually mean people want that flexibility and there is no point putting in flexibility for the sake of putting flexibility right, so you should be putting in flexibility because it adds some value to stakeholders, so again, that sort of negotiated sense in terms of, among the universe of flexibility is what do I putting, how do I restructure, how do I create or additional value to stakeholders.

So this information, data collection, there is building your networks. Okay, but there is also structuring the project right, what is the kind of financial model, what is the contractual incentives, there will the flexibility be put in and all of that has to be sort of taken back to your network right, you need data to inform the project configuration process that has to be taken that to be taken back through your networks to sort of see and identify if you actually have a good project or not. Okay.

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And finally, you know there are a lot of things that you do in regards to the government right in terms of in what ways you should built the capacity of government to be able to understand this new forms of contracting etc, is there a requirement for a change in law and regulation an order for this project to create more value of all of these kinds of things right, how do I compensate the stakeholders, how do I bring in better governance right into the whole government organization, which is, we had Mr Krishna speaks to us, we have seen what Exxon Chan can do, we have sort of look that a new public management.

But how will be governed would these effective right, how will I ensure that I have impulse to, make sure that this project continues to deliver the value over a 20, 30, 40, 50 year time period, so a lot of what we have talked about in the class falls within this three or four buckets right, collect information, build networks, structure the project incentives, contracts, flexible design etc and then setup governance mechanisms right, laws, regulations, community offices, local champions whatever right, all of that start becoming a you know part of, remember we can do all of those things effectively then you are likely to have a project that probably is successful.

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## Agenda

1. Governing against Turbulence
2. Governance model



## What is Governance?

**The capacity of projects to steer through unexpected Turbulence**



Right, so this last part is what we call governance right, which is the capacity of projects to steer through unexpected turbulence and this is important because you have done all of this ahead of time right, but essentially what you are trying to do is give the project, the capacity to steer itself out of turbulence okay because later on if there is some change in demand or some change in technology or some change in whatever the project needs to find a way to overcome that setback right, partly your overcoming that setback because you have collected really good data and you have made that analysis based on it.

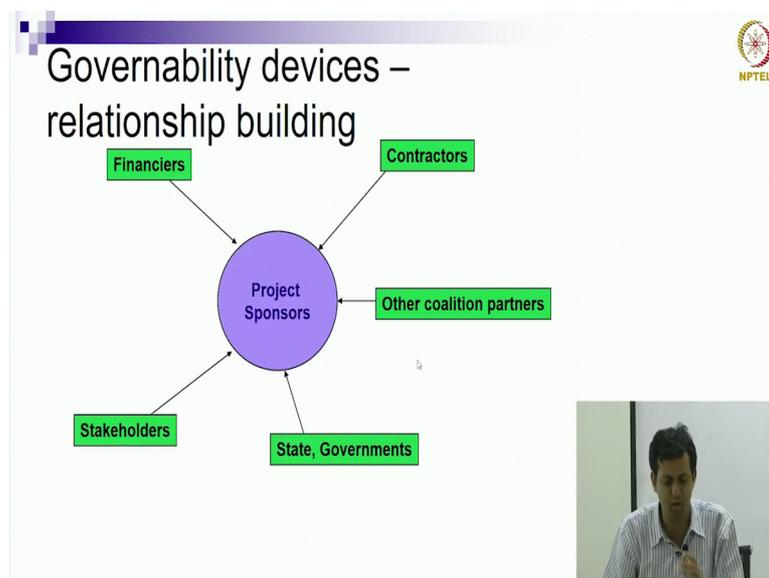
Partly you have got really tight group of stakeholder who all understand that they have to do some give and take to get this project back on track right, hopefully you have flexible design and incentive pays contracts etc that allow project stakeholders to buffer each other and take

the project forward right, so everything you are doing right, he is essentially to try to make sure that the project can steer through the turbulence.

So we are assuming that there will be a turbulence right, we are assuming that things are going to go wrong at some point, the things were not go wrong, but things will not go as per plan going forward and we want to provide the project with the capability to be able to course correct and steer itself as you know, as the project progresses right, it is like taking a voyage you know on a ship or on a plane or whatever right.

Ideally I would like wonderful weather, but I could get hit in a storm right and therefore I need to sort of you know from engineering dynamics prospective. I need to be able to weather this storm, ideally agreed to also maybe have the capability of rerouting myself right, or maybe landing at a different port or whatever it is right in order to, so I need to have the ability to be flexible which means I got to design myself efficiently, I have got to have good weather prediction system, I have got to have good navigation systems on board, so I can reroute, change course, the ability to communicate with other ships, so many things that you might have to do right to really sail from part A to part B under uncertainty, similarly I think we have to think about what we do on projects.

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## Governability mechanisms

- Internal bonding mechanisms
- Coalitions
- Reserves
- Flexibility



## Internal Bonds

- Long term partnerships between sponsor entities
- Complementarities and Synergies among partners
- Leadership



Okay, so financiers, contractors, stakeholders, governments right, so all of these are of course important right, what this slide talks about, I was not to spend too much time on it, but because we hear it just sort of quickly talk about it, is the whole relational aspect of projects right, the only way you can, I think one of the key things that has to be give and take and that is give-and-take only if there is a sort of relational approach right, if it is a completely transactional approach and if you say, you know give me an extra two months to complete this project or can I please increase the project budget by 10 or 15% because steel prices have gone up etc, etc.

From a short-term prospective it seems win-lose right, if I say yes right, then somebody else loses right, if I say yes I can increase the price then I have got to pay that person that much extra which means borrowing from taxpayer money or whatever right, so from short-term

prospective. Okay, it seems as if being flexible is actually costly right, but sometimes the alternative could be even costlier right, which is the project to then cut corners on cost, quality reduce and that endangers you know human lives at some point of the future or because you are allowing delay the operational life of the project becomes smaller, all of this kind of things.

So I think it is very important to start building this kinds of bonds between project players where you know financiers, for instance, are able to say fine right, we were supposed to repay over five years, repay as of 7 years right, you are fine. I thought you finished it in 18 months, why do not you finish in 21 months right, or whatever, so I think relationships become really important in this projects, so again we talked about the Delhi airport case right, we talked about this NFC know that facilitation committee, which the government set up, which essentially was to bring everybody to one particular location, build those bond, so that all of these decisions got taken faster.

Otherwise electricity department will not give you permission to dig somewhere, road departments will not give you a position to dig somewhere right, so you need to build this bonds, when we say yes, you know it is going to disturb your services but and here what we want to do. Okay.

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## Coalitions and Flexibility

- Building social capital
- Legitimate processes
- Technical Flexibility
- Flexible contracts





## Models of Project Control

<u>Governance Model</u>	<u>Contractual Model</u>
<ol style="list-style-type: none"> <li>1. Bottom up, equitable set of project arrangements</li> <li>2. Continuous decision making by all the stakeholders</li> <li>3. Allows for renegotiation and preservation of relations</li> <li>4. Long Term outlook</li> </ol>	<ol style="list-style-type: none"> <li>1. Top down contract enforcement</li> <li>2. Decisions dictated by a central contract</li> <li>3. The sanctity of the contract is insisted upon</li> <li>4. Short Term outlook</li> </ol>



Okay, so we talked about flexibility right, so essentially there are these two models, project control, what is what we call the governance model and put this all out here, the contractual model essentially sort of again goes back to this assumption that let me do a little bit of work upfront, let me figure out risk, let me write a contract and that the contract will sort of just enforce, I just need to sit back, I have done my study, I have done the contract okay.

Decisions are dictated by central contract, sanctity of the contract is insisted upon right, the governance approach right is a bit difference because it sort of says yes we need to spend a lot of time but that final project document that we come up with is it necessarily perfect right because things could still change in the future, yes we have collected data, we have talked to stakeholders, we have confronted their fears etc, but things could still change in the future right and therefore I need to sort of this govern this bottoms-up, it cannot just be a contract governing, I need to sort of feedback from the ground, maybe ten years down the line this as said is completely useless, so I need to able to see that I had of time.

I need to sort of enable continuous decision-making by all stakeholders right, so people want to change the scope of the project at some point they should be able to allow for the renegotiation and preservation of relationships, so in another words, the contractual model says do bit of analysis, so to contract and say this is what you need to do, this is the outcome that will get and we will be happy.

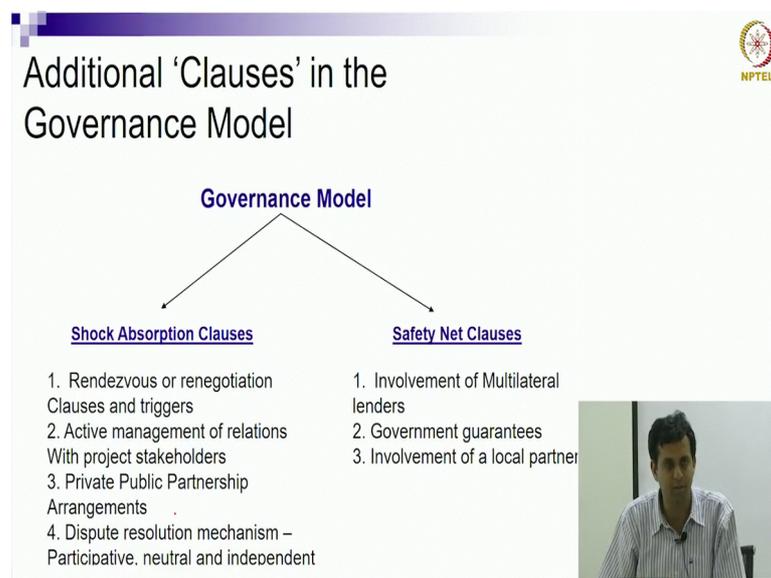
The governance model says let us do a lot of initial study, analysis, etc come up with the initial configuration, but let us be under no delusion that this is the viral configurations right, this will change and let sort of put in a mechanism whereby over a period of time. Changes

can happen, so when we say flexible contracts, the flexibility might arise 20 years later right, I might exercise that option 20 years later right to build my three-storey parking garage to go from three-storey to four-storey or five-storey, that decision might happen much, much later, what I am doing by putting that in upfront by strengthening my foundations is providing the option for that decision to take right.

So I am that the world is going to continuing to be uncertain, and giving the project, as many resources you know as possible to change course over the period of time right, so allows for renegotiation, preservation of relationships rather than saying we have contract right and this is how the project will function, so traditionally a lot of projects are executed under the contractual model right, where we go with a contract and say this is what needs to be done, we are clear what the future should hold right.

Perhaps more project should be encountered, should be undertaken on the governance model, where we say look, let us spend a lot of time upfront right, decision-making, network building, project structuring, come out and execute the project, but ensure that we are continuing to revisits our decisions, continuity makes sure that the project states cannot and relevant and stable and all those kinds of things, so that is more of a long-term outlook right.

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So you have all other kinds of clauses in the governance model, you have all of these shock absorption clauses, safety net clauses all of that you think through with the governance model because you want to give this project as much a chance of succeeding as possible, so you put it in the contract, you put it in the design, you put it in all the work that you do with the

stakeholders early on, you create like we saw in the case of Orlando, resident welfare association, lots of sort of supports that you are essentially giving the project, the theory being the more support you get the project, the more robust it will be against uncertainty.

So you spend a lot of time in pre-design, engineering supports into this right, financial supports, flexibility and design supports, contractual flexibility supports all of these go into the project right, is this making sense.

So essentially where we are with regards to this class is we have looked at sectors, we have looked at economic failure, political failure, social failure, your construction failure etc, we have looked at a number of techniques right, but we are going to put it together is what we sort of try to do at the beginning of this class when you guys told me what you thought needed to be done, point is, we need to sort of really broaden that initial phase of this projects right, this freeze front-end needs to be much longer, in that freeze front-end we need to do this kinds of things.

So you need to really invest in collecting data, we need really invest in structuring this projects creatively, we need to really invest in building this networks of stakeholders, we need to really invest in putting in governance mechanisms, so that the project, you know starts of, with everyone sort of vision the project well, they view as legitimate, it seems to add value, as long as it continues to add values of course, no one is complaining, the moment you stops adding value to certain segments of consumers than all of this resources that you gave to the project starts kicking in right and the project is able to reinvent itself.

So that over 30, 40, 50, a period, it is still adding a value to stable, it is relevant, etc right and that essentially is the challenge of an infrastructure plan or infrastructure manager right, which is able to come up with these kinds of projects right, it requires time, clearly it requires skill, technical skills or social, personal skills, but it also requires an understanding of this kinds of tools and techniques, I can do this a bit easier if I understand stakeholder mapping techniques, if I understand power interest matrices or social network analysis, if I understand how to do Monte Carlo stimulations, if I understand how to negotiate, if I understand how to govern based more on outcome rather than on processes.

If I like Exxon Chan can be inspirational leader all of these things help very much right in creating that ideal project, which hopefully people can then be proud of, and it is very difficult. I think you will find very few projects that have done, some of them end up being

successful, despite not having some of this, they get lucky etc, but many projects fail because you do not go through this systematic process of planning and most of the projects we looked at Enron, Chat Camron etc lot of it. It was because the fact that you really did have enough data, you did not build your coalitions properly, you did not design enough supports to the contract out of the project, you did not have effective governance mechanisms post award, any or all of this conditions and this projects is to back.

Right, so that to me is sort of the nuptial of what this entire course is about, take the freeze front-end, spend as much time as possible, collect data, build your networks, put it creative contracting structures, put in our governance mechanisms and if you can do all of that, then your projects are going to do well and in order to that we have exposed you to few tools right that can help to do it, but this is of our extortion right, you can spent a career in this and still not be the world's expert on all the ways in which you can manage infrastructure purchase okay, great.

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So I am going to stop talking here, brilliant question, so the question is on the IL&FS you know failure if you will, so IL&FS, I am sure you guys. I have all reading about it, but infrastructure easing and financial services company, one of the largest player in Indian infrastructure, you know, as a, it dire financial states at the moment where essentially they are very close to winding up, declaring bankruptcy, the board is being replaced and you board is trying to restructure and it is very difficult, so Harsh has question is, you know why did this even happened could we have seen it, I have time, so

But I think this is where, in part of this clause we started talking about behavior relationships right, psychological issues right when we talk about negotiations a lot of it of psychology right, so similarly here right, when you look at the performance of this organizations a lot of it psychology, when we looked at that Bent Flyvbjerg versus Nuno Gil and why do projects have cost overrun is it because of strategic misinterpretation, etc, so all about psychology and I think therefore there is psychology at play here right.

Objectively we know that this companies are not doing well right, but subjectively we probably believe that IL&FS is a large company that they will be able to get out of it, so for whatever reason right, I think in market, in hindsight everyone says we saw it coming right and I probably will say this the same thing as well, you know with a few subsidiaries that I interacted with right, but collectively nobody really took a strong decision on the IL&FS, you know to actually highlight is earlier, etc.

So I think therefore the psychology around infrastructure is I am very, very important thing to understand, so hopefully what this course is done. It is sort of set infrastructure is not all about finite elements and bending moments and you know shear forces and torsion and an flexure or even you know pert analysis and you know what now, so that the engineering side of it, but it is the social science side of it right, the psychology side of it, the sociology side of it, the political, economic side of it that often really drives this kinds of project right.

So if a project deeps politically necessary, even though financially, it might not be very viable there is still a push towards continuing keep that project alive and active right and therefore I think we really need to understand, so the answer to your question lies in the fact that there is also social science, psychology surrounding this infrastructure projects which unfortunately we do not understand as well as we do in engineering mechanic, the engineering stuff is easy because elements behave in the same way, they follow certain laws and I can therefore if I put a force on a member I figure out stresses and all of that relatively and accurately. I can teach it to you, we can all arrive at the same answer or a computer program can do it for us in seconds right.

Because we have understood exactly how material property works right, we have, we understand elasticity properties this that etc, we understood the material world, we have not understood the human world as much and a lot of what you are talking about with regards to IL&FS, they are not going under because there structures have crashed to the ground, there are going the structures are probably engineering from an engineering perspective doing

really well, but from an financial prospective, from a stakeholder perspectives, from a political perspectives, perhaps not right.

So the social science of infrastructure is sort of the great sort of undiscovered area that we are all working on and people like Mahesh and John there are essentially doing their Ph.Ds in areas that relate to this, not so much on the technical side of the infrastructure, but on the social side of or psychological side of infrastructure, so those are again, so those of you interested in Masters in this area, potentially, Ph.Ds or even sort of working in this area. I think that sort of way, if you need if you became a expert right would be a fantastic career move.

So you have got to work your way up from the bottom in some case, so yes, first it is the question of joining the right company, it is a question of getting you know, getting some experience on projects and you will find that, see what we have talked about in this class also is not directly recommendable rights, so there is no point going to accompany and say to stakeholder analysis, they know they have to do stakeholder analysis right, the question is to for you to sort of know that is important, you have got some background here, but maybe you actually go out and work with stakeholders, you become a bit of an expert at how to sort of built coalition etc.

Then you offers those services to that company on a project by which you probably reach the level of seniority right, so even if it is a consulting company offering services to someone else, so I think this is just a starting point and I will, my view is that if you, hopefully you saw this during the menu honey bay negotiations right, I do not know how many of you really were thinking of partners and the parties and interest, and all of those technical things, while we were doing in the negotiations? Right, how many of you thinking of all of that? Versus just negotiating in platypus, like a platypus right.

Probably most of you just negotiated the way you would negotiate right, so it is not as if you guys have already imbibed all of this right, it turns out that you sort of have to practice, even the financial modelling that we did which is a relatively straightforward right, I had a very simple example right, of a two manufacturing facilities, actually start looking at modelling it on real projects it is not that simple, so I think the answer to your question is you need to go through a phase where you strengthen your domain knowledge on this topics would right.

The object is of this course you want to say here are problems, here are challenges, here are things that you can do right, so you can write our strategic plan you cannot implement at the moment right, but once you actually start working on some of these, you will get to a point where you will be able to implement at which point you will also have a reputation in companies will also call you in and a sort of see if you can actually solve this problem for them by introducing flexibility, by introducing better stakeholder management techniques that is all.

Good, very good question right that is an excellent question I go back and forth on that. I am not really sure that there is a great answer, I think, I do not think it is really useful to talk, with some people say okay, get some experience your master classes will be a bit more relevant right, others say look, but your sharper now sometimes the experience that you get in, we have seen that in the past, you go bad experience, but you know, sometimes you go work for a company, but it is not necessarily a great experience right, they put you in subdivision that is not necessarily very exciting.

So I to me and always comes down to what is the opportunity in front of you right, so if you want to get in to a wonderful university right now right, take it right, if you got to a really interesting job right now they can right, so just do something that I would say is sort of you fail would really help you to develop without necessarily thinking about should I do studies first work later, work first studies later just to what appeals to you at that point at a time right, in some ways that is what happen to me of course the situation 20 years ago was very different we did not have the job seen you guys have right.

Hardly any company used, we have that kind of placement sees and of that, so most of us were looking at applying, a broad a few of us wrote the CAT exam and those kinds of things but the things was always clear, you know I got admitted, I got admission into Stanford, we said look, now let us go that and figure things out. Okay, rather than try to overthink, oh should actually defer this admission, work for 2 years, then go etc right, it is here, it is now just go okay.

So at that would be my general career advice to all of you right, you get a particularly interesting job during placement, your field, you know, you might develop go right, you get into a good university, do not worry about experience, you can always get that later no, you just have to priorities your options in front of you, do not overthink all of this things, how many of you guys making long-term plans, by 20 to I should this, by 25 I should do this, by

28 I should do this, by 30 I should do this, you guys think we all did right, useful thought exercises, completely useless right.

And 30 none of us were anywhere close to what we thought we do that right, so opportunities arises, so the same with infrastructure right in the sense yes, for instance, it is give you a example based on this if the NITI AYOG comes in and offers one of you a job right for a couple of years right, it is a contract position for a couple of years, there do not be you very much right, my views still taking right, it is fantastic opportunity okay, rather than sort of saying oh I have got this other thing in hand and it pays me much more etc, so just always try to priorities the ones on the cable and just go with what you think is the most excitement.