Starting today, we are actually going to step into the module 4 where we see look, we have seen a lot of failed projects and we have seen why they have failed, what can we do differently? Like what are some strategies that we can sort of use and every class the idea is to pick one idea, talk little bit about it, maybe see if it can be applied in a case situation and see if you can add that into your toolkit of planning and developing infrastructure projects. Okay, so that is the plan, so the plan today will be is actually little bit of the opposite of what we do.

I am 1st going to invite Rahuls group 10 is it, 11 group 10 to make their presentation on the reading, so right, there are essentially a couple of ideas that come out of the readings that they will discussed and then will have a chance to discuss them a little bit, after which we will select, will have one of the a selected group come in and present the Idear Ponga case study, will present the case study I will show you a small video on the project we can watch that and then we can sort of discuss that project. Okay.

So also by way of introduction, we have in class with us today Prof Vince Mangione, Vince is a professor at University of technology at Sydney and works quite a bit in the areas of infrastructure planning, land appraisal, valuation and so on, and he actually had a lot of practical experience working in the industry as well, in the larger infrastructure phase, so since Vince is here, I am going to have him take pick at random group that will present today, so.

(Refer Slide Time: 1:47)

Stakeholder mapping approach

Group-10
CE15B027-J.CHINMAYEE
CE15B062-V.RAHUL
CE15B064-VIVEK VINOD
CE17M018-SUNOJ KUMAR

Good afternoon everyone. I am Chinmayee, I will be presenting stakeholder mapping approach, one of the three approaches that are group will be presenting for the analysis of the relationship between the stakeholders and their interactions.

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Firstly, who are stakeholders, will be concerning a interest in only the construction projects, stakeholders are not only the clients that are directly involved in the project, but they are also the uses of the facility and the community, basically the bystanders of the project, so who are these clients, should they be viewed as a single entity where they will be acting on a same word or same decision or they are group of people different levels and types of powers and the interest in the project.

Viewing the client as a single entity is an approach that was made very long ago and this is not relevant and this is not in use in present age, so the clients are viewed at a group of people with different levels and types of powers and interests, so these clients or the stakeholders have basically these four attributes, they are expectations, stakeholders have a few expectations before taking up a project, they have few interest in particular part of the project or and the whole of the project, they have power to change the decision or make a decision and a predictability of the stakeholder it is where you can be able to predict whether stakeholder will react or will not react to a particular change in decision.

To coming to the project organisations they can be defined as shifting multi-goal coalitions that a clients will not be the same and even if clients are not saying that decisions will not be the same, they may be changing because of these changes there will be conflicts, so how do

we deal with these conflicts is two main methods are sequential addition or buying off opposition, sequential attention is where you solve the problem and making the stakeholder silent, buying off opposition is through side payments to the stakeholders.

Come into the project strategy, how you deal with the project strategy or how you deal with the change in the project strategy, shows the rise and wane in the power of participants, how we deal with the projects strategies shows how powerful you are and why is power needed? To retain the status quo of that particular company or of that particular stakeholder and also to enforce the fundamental changes when you find something is wrong in the project.

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Coming to the stakeholder analysis, it is nothing but interactions between the stakeholders, the primary stakeholders and the secondary the stakeholders, primary stakeholders are those were directly involved in the project, the contract, the developer, the designers and all, secondary stakeholders are not directly involved in the project, they are bystanders, how they interact with each other? How they interact with other organisations and how they respond to changes is what stakeholder analysis looks at.

First part of stakeholder analysis is the interactions, two types of interactions are there in the stakeholder interactions, they are one is cultural arena, where stakeholders discuss and they corporate among, they corporate and take decisions which is nothing but centripetal force that guides the interactions, second thing is the political arena, where only a group of powerful stakeholders enforce that decisions on other stakeholders, which leads to competitions and

conflicts which is nothing but centripetal force, where none of them agree upon a single decision and how are these conflicts.

There are many types of conflicts and major important points of those are long-term vs short-term objectives when decisions and objectives have to change because of particular events happening in the course of the project, cost efficiency vs jobs, quality vs quantity is one important conflict that occurs in almost all construction projects, control vs independence each stakeholders wants to be independent while working that may not happen in all the projects and this conflict is, this can be attributed to almost all the projects not only construction projects.

Coming to the analysis, it depends upon the predictability, power, interest, and the possible impact of the stakeholder's expectations on the projects strategies.

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So one method of analysis of the stakeholders interactions is stakeholder mapping, it can be done in two different ways, one is power predictability metrics and our interest metrics, as you can see in the diagram. The 1st one is the power predictability metrics, there are 4 zones of stakeholders, wherein the 1st zone of stakeholders have low power and high predictability with searches own you will have very few problems while taking up the project and the other extreme is high-power and high predictability, sorry high-power and low predictability, you do not know how they react to the change in the decisions, but they are very powerful, so these are the dangerous zone of the stakeholders it have to be managed.

Coming to the power and interest metrics, the dangerous zone of the stakeholders is in the C Block, wherein they have high-power and low level of interest, they might change the interest when decisions made are not satisfying them, so the main interest of a project manager or who deals with the project is to keep them satisfied and there is a high chances of repositioning of zones C and D, there is a dissatisfaction in those zones, usually when you try to satisfy zone C of stakeholders and the power interest metrics as you see their, it might not be in agreement with the zone D.

So they might get very aggressive while taking this decisions, so there can be a repositioning of the zone C and D, but that does not mean A and B are not important, they also have a very important stake in this decision taking process and all this decisions vary over time and they also depend on the stage of the project, because not all contracts and designers throughout the project, they have certain period and they vary over time.

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Stakeholder management principles is a very important thing that has to be focused in the projects nowadays, the 1st approach to this is the Machiavellian approach, where project manager has to maintain the stakeholders interest against the opposing forces, when there are developers, contractors, designers and local authorities not all of them will be on the same road, so balancing both of them is one of the important duties of a project manager.

The project manager also has to make sure that the recent much repositioning of the zones of the stakeholders like zone C to zone D they must not shift, aligning themselves or wise decisions in force in the change, if a project manager aligns himself to a particular group that

does not help the project go in a proper way, wise decision in forcing the change is when he takes decisions of a majority or something like that, alliances between the stakeholders against outside stakeholders when there are stakeholders that are very powerful and they are trying to influence the project with a power, they can be alliances between the stakeholders that are inside the project and they can act against the outside stakeholders.
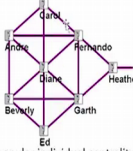
This has to be taken care by the project manager and the internal coalitions vs external coalitions is also the same, they can be active or passive with respect to the power and the interest at that particular point of time and the stage of the project and other approach of the stakeholder management is the Kantian approach, where it has two principles of management, the 1st principle involves management of the project for the benefit of all of its stakeholders and their rights, their right must be ensured and it must be benefit all of its stakeholders, it is like a consciences, principle 2 is where a project manager has to act in both the ways, in the interest of the stakeholders as their agent and the interest of the project to ensure its survival and other approach of the analysis of these stakeholder relations will be continued by my friend Sunoj.
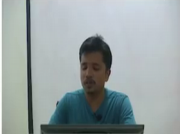
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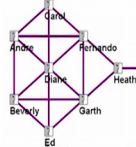
Good afternoon, I am going to discuss about the social network analysis, the social network analysis are morally the relationship between the people or the groups organisation, computers etc, the social data analysis characters divide nodes and links, nodes represent the people or groups, link presents the relation between the nodes, it deployed is both visual and mathematical analysis of human relationship, the locations of nodes and links in very important social network analysis, it represent the various notes in the social network analysis, the network effectively shows the distinction between the three most popular individual centrality measures.

The social network analysis, the property of social network analysis represent by the 3 measures like degree of centrality and betweenness centrality and also closeness of centrality, the degree of centrality measures the importance or influence of the network, for example in

this figure Diane have more connection with other members, nodes, so in this figure, the degree of centrality is more for that iron.

The betweenness centrality measures the number of times node lies in the shortest path between the nodes, it means the, in this figure, Fernando and Gareth, they are the shortest distance between, shortest distance to coming with other numbers in the network.
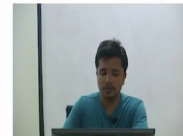
The closeness centrality. It measures the how long it will take to spread information to all the nodes, from the figure we can see that Heather and Fernando and Gareth will take down the less distance to spread information in the network, the networks and centralization, the individual networks satellite is centralization provide insight into the individual location in the network, the very centralize network, it is dominated by or on very central nodes, if the nodes are removed or damage, the network quickly fragments into unconnected sub-networks.

The shorter paths in the networks are more important than the larger path network, the network integration is more important in the social network analysis, those well integrated in the network of paths provide both local and distance information, in this case, boundary spanner means who connect an network with other parts of the network, for example, the Fernando and Gareth and Heather the guides are other part of the network or the clusters, since they have, I have access to the ideas information flowing in the clusters, they are the position into combine different ideas and the knowledge, than the various places, the various places means there is a Carol, Andrew, Beverly are the various places in the social network, they are the various expectation in the network, they play a vital role in the network by the serving as experts. That is what about the social network analysis.

Strategic Management of Stakeholders

Introduction

- Stakeholders- 'those groups without whose support the organization would cease to exist'
- Another definition- individuals who are affected by the organization as well as those who can affect it
- TMTs find the subject of the strategic management of stakeholders problematic, both because it is difficult, but also because it seems manipulative
- Carried out "in relation to the goals of the organization"

The Reasearch

- Three themes that have emerged from the stakeholder literature.
- Specific Stakeholders
- Interactions between stakeholders
- Develop stakeholder management series

So I am going to discuss about the strategy management of stakeholders, this is a research paper written by some people on their views on how to strategically manage the stakeholders because this is very important for any growth of company, so this they began by defining stakeholders in the long terms, those groups who supports the organization, without whose support organization would cease to exist and so on.

They basically give three steps to the top management team to acceptably manage the stakeholders, their first to identify the specific stakeholders because each and every project has different set of important stakeholders, so we need to identify them properly, next we need to identify the interactions between the stakeholders and then develop a strategy management plan for each of the stakeholders.

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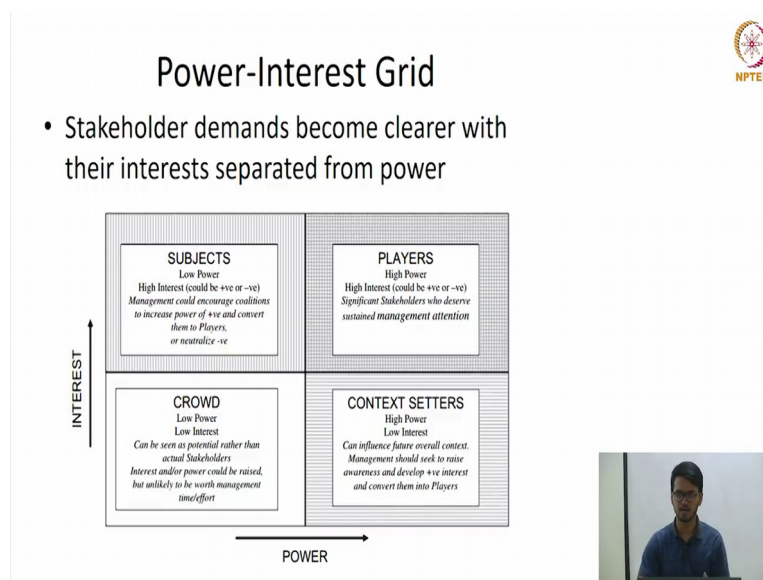
So far, identifying specific stakeholders. They also propose something similar by Chinmayee, it is the interest power grid, so they locate a stakeholders on this grid, they vary the x-axis shows the power and y-axis shows the interest and the right top corner are the players which are very important for a project, they need to be handled effectively and the people with low power and low interest require very less time or effort from the management side.
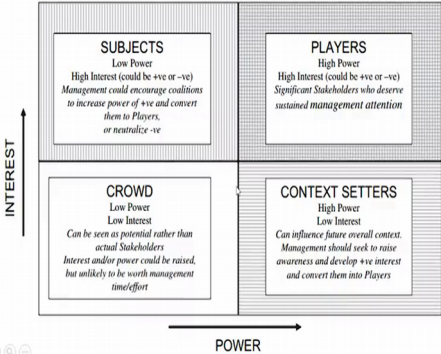
Stakeholder Influence Network

- Contains both formal and informal relationships
- Reveals significant aspects of power
- Very specific to the focal organization and must remain confidential to managers

Power-Interest Grid

- Stakeholder demands become clearer with their interests separated from power

Stakeholder Influence Network

- Contains both formal and informal relationships
- Reveals significant aspects of power
- Very specific to the focal organization and must remain confidential to managers

Stakeholder Management Series

- Understand the bases of stakeholder power and interest in enough detail to be able to develop appropriate actions for specific stakeholders
- Dynamic issue, and involves the need to prioritise between them

Next, the social influence network, so the players when the stakeholders are mapped down the power interest grid, they are also connected through lines showing their connections between the stakeholders, this contains both formal and informal relationships, they are very specific to each organization, so they should be kept confidential, this is an example of a stakeholder network, so the dotted lines indicate that both the those stakeholders have an informal relationship and the solid line indicate that they have formal relationship.

Informal relationships is something that is not related to the office like they might go to play golf together or something like that, the formal relationships are something like manager, supervisor relationship and so on, next, so after identifying this relationships we need to manage this stakeholders, so to manage this stakeholders each stakeholder and east to be analyze separately.

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Figure 4. An Example of a Stakeholder Management Web for Scottish Natural Heritage (Focal stakeholder – Scottish Office Accounting Officer; adapted to protect confidentiality)

So they propose something called social management web for this, in which the specific stakeholders which we are analysing is at the centre of the web and on the top of it all those, all the power which he has to influence is written on the top and its interest are written on the bottom and they are linked through lines, the dotted, the light line indicate not much important relationship and solid line indicates that the relationship is very important and its former relationship and the dotted line indicate informal relationships, that is it about the management of stakeholders. Thank you

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Actor Mapping and Social
Network Analysis

Class 14

Power/Interest Matrix
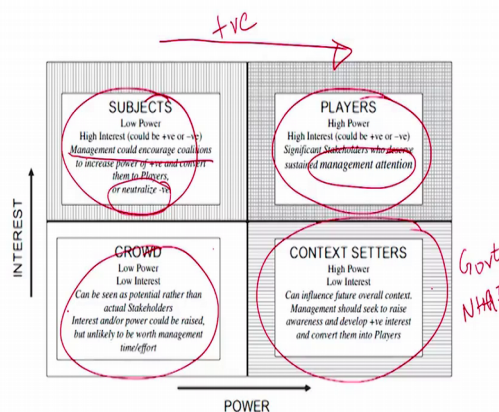
Taking a pretty detailed, comprehensive presentation of various ways to really maps stakeholders because I think what we have seen in many of our cases is we have a number of stakeholders, many of them have ways in which they influence the projects, so we have looked at NGOs, environmental groups, political parties, financiers like the World Bank right, so all of these peoples are affect the project and therefore at the very minimum you need to take them into consideration. I think in times past, you know Chinmayee made the point that there are two kinds of stakeholders, primary and secondary stakeholders.

Sometimes we have called them internal and external stakeholders. I think Johan calls them internal, external stakeholders and the work he is doing, but essentially the internal or primary stakeholders are the obvious ones that you can see on the project the financers, the developer, the sponsor and so on, but then there are all these others secondary stakeholders,

the people are going to use it, the local residents, local or international NGOs and all of these people who also have something to bring to bear on the project and very often in the past people they were really thought that these stakeholders matter right.

So very often uses strike a deal which is based on your economics, you start implementing the project and you have all kinds of protest coming in, you got people moving, government to stop this projects, public interest litigations etc right, so the 1st thing we need to do is actually figure out who are stakeholders are? Rights so that needs to be a way in which we need to start, identifying the stakeholders.

Might seem very easy, but it often is it really done because we really start sit down and start thinking about stakeholders and think of them as internal or external or primary or secondary, sometimes the lists is not completely intuited, so early when you start applying your mind and you actually start, figuring out who your stakeholders are? So I think step 1 in delivering this projects that are is to do an exercise where you at least list or identify stakeholders right, that is the number 1.

And once you identify the stakeholders you got to figure out the way in which you categorised them, you know which stakeholders are more likely to you cause problems to the project, which stakeholders likely to actually help you to take the project forward, which stakeholders are making a lot of noise, but it is not in the right direction, so I think we need to sort of categorise this stakeholders a little bit and then figure out a way in which manage them right and it that way some of these tools come in handy.

So one of the tools is the one both Chinmayee and Rahul showed which is this power interest metrics and as they explained and as is very clear here, you have got two dimensions, you got stakeholders that have a high interest on the project or stakeholders that have a lower interest on the project and you have stakeholders that have high power to influence the project to stakeholders that have low power to influence the project right, so one might argue that may be a small NGO might be highly interested in the project right, they might feel passionately about the fact that you are resettling slum dwellers or whatever.

So they might have high interest, but they may have very low power right because they are small NGOs, they are not well funded, they are internally taken seriously and so on right, similarly and so those are, where we go here, so if you see low power but high interest, you know those guys would fall here, whereas there are other people that developer for interest or

the financier on a project, financiers have high interest on the project. Of course, they are lending money to the project or putting an equity on the projects, so they are very interested in the what is happening on the project.

They also might have a lot of power to influence the project because if they withdraw the project might collapse and therefore governments or developers, etc might be some ways beholden to the financiers in this case and therefore they could be what are called players right, so depending on it you find yourself on the metrics, so step 1 is list down that just a non-relist you go 1 to 20, 1 to 30 whatever 1 to 50 list down people, step 2 is to actually put them on this metrics or the power and predictability metrics which is the other metrics that Chinmayee showed.

See where do they fall right and what do we need to do, so the category here which is low-power, low interest right, so these are people who you know are not really interested in the project, I mean some association project, no doubt, but really also have not much power to influence the project, maybe these are suppliers of you know equipment or material that go into building the project right, so they have some amount of interest in the project, but not a whole lot and they are just vendors right, you do not necessarily have a voice in the project right.

So you do not really need to invest a lot of time understanding what their concerns are etc while the project is concern because their ability to influence and their inclination to influence the project is minimal right, people here on the top the subjects right have a large amount of interest, but very little power which means they probably can make a little bit of noise, but probably do not have either the resources or the networks for the times to anything significant right but and so therefore what we could you do.

So in this paper, encouragement, you can see this probably can, management could encourage conditions to increase the power of the positively aligned players, so when we see interest in projects, so remember that interest could be positive or negative, I might have an interest to make this project go forward, I might have an interest to stop this project right, so interest could go both ways right, if I am a beneficiary, if I am a commuter who could take this Metro rail to work, then I have an interest, that is positively inclined, if I have a property whose value is will going to increase properly, I am sort of a inclined.

But on the other hand, if I may, you know, paying rent and living close to the Metro and I am going to be disturbed by traffic diversions, noise during construction, if my rental is likely to go up as soon as the Metro is finished, then I am likely to have negative interest to the project right, so you have got positive and negative interest and the ideas can be sort of get the people with positive interest together, can be neutralized with the negative interest, can get the people with interest on the project play a larger role right, can we start moving some of the positive objects right to this and to the metrics right, can we get, the more investor in the project right because they can support the project. Okay.

On the top right, you have the key players in the project right, the sponsors, the financiers, the project developers, high interest, high-power you might have as we seen in some of our cases, International Rivers network right in the case of Bujagali dam somebody with a lot of interest on the project, a lot of power to influence the project as well, because they are able to influence the World Bank, they are able to influence International settlements, so these people deserves sustained management attention right, we really need to understand what they want, figure out the way in which they can, they kept happy so that the project can ahead.

And then there is a group here at the bottom the context setters right, you who have high-power, but low interest right example of context setters who do you think is the organization that could be a context setters? Someones not really interested in the project, but has a high-power to influence the project.

Funding agencies are government agencies, but we already said funding agencies might be players, they have high interest in project, they have put money into it right, government agencies, maybe to some extent right, they can clearly set the policy was a project, but not all government agencies might have the same amount of interest in the project, the way they are located is, if you look at the Metro rail in the highways department right, the highways department actually owns a lot of the land through which the Metro rail passes, they can grant permissions to put your wire except or not, they provide permissions for traffic diversion during constructions.

So they actually have some power right to influence the project, but they may not necessarily be as interested in the Metro because it is not that project, their highways, metros, someone else, so maybe the national highways authority right which acts essentially owns part of Mount Road or you know part of Mount Road in Chennai comes under the national highways authority, probably have a lot of power to influence a development there, but not enough

interest in the project right, so again there are very important you know player, their importance sort of actor because if they exercise their power, it is possible that the project could be negatively affected or the contrary, if they exercise their power positively the project could go ahead right.

So essentially you really want to spend a lot of attention on the top right, you want to spend some amount of attention on the top left and on the bottom right and probably the least amount of attention managing people on the bottom left, but you will understand that only if you list out your stakeholders and actually you mapped them like this right, otherwise just because somebody publish the report in the newspaper yesterday and if you start channelling you know crores of rupees and hours of your organisations time to manage their person and you later on find that essentially it was somebody who wrote an article that nobody really tooks seriously.

Somebody who had little bit interest on the project very little power than a century you will wasted a lot of resources right, so the ideas can we get systematic about managing stakeholders, can we start mapping them up right that sort of strategy number 1.

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We will look at it little bit in the context of Idear Ponga, once we mapped out where they fall. It is also important to understand yes.

Student: (()) (27:48).

Prof: That might be something that is outside your control right national highways authority has a certain set of powers wasted by statutory rules right there is nothing you can do to reduce their power on the project, of course, you can reroute your entire Metro rail and eliminate them as a stakeholder right, but it might be difficult to fiddle with the power in interest right, it is very, it is not as easy to make an interested stakeholders disinterested in the project right or powerful stakeholders less powerful right, possibly can be done, but it is very difficult.

So that is not the idea, the idea is to say we know this person as high-power and high interest, which means we have to listen what they have to say, so International Rivers network is on the project let us listen to what they have to say right that sort of the idea, the 2nd part, which Sunoj Jaitik was presenting right was the whole fact okay, I have identified the stakeholders, I figured out which ones are important and which ones are not. But if we recall the Conoco case yesterday, what did we find about you know what it we find about the NGOs yesterday right in the Conoco case yes, Harsh.

Student: (()) (29:00)

Prof: So, yes, they were highly fragmented, they all had their different goals, you know, some of them were very sort of supportive of the indigenous peoples, some of them said developments and no cost, some of them said oil exploration is going to happen in any way, so we might as well help, so they were fragmented, but they were also linked right, so NRDS, NRCS whoever it was, was actually trying to play the linking role, saying we will be the front right, we will collate everyones opinion, come to a settlement right, so NGOs, so all of these stakeholders are linked in some sense for many of the stakeholders are linked, and that is where sometimes picturing this linkages by putting all this stakeholders and putting lines between them becomes useful right.

So this is a technique called social network analysis, it actually came out of graph theory, which is you know very commonly used in mathematics and computer science and so on, essentially what you are doing is creating what we call a graph right and this graph as nodes and edges right.
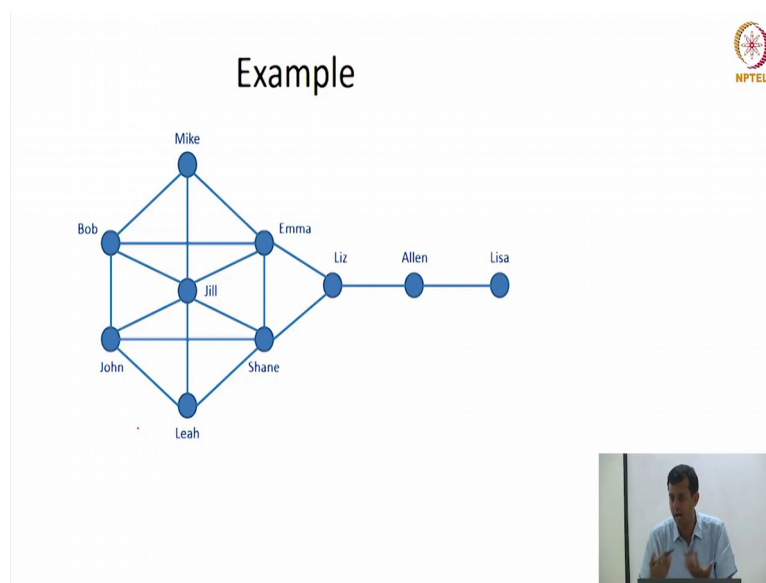
So this is you know exactly the graph that Sunoj put up, but the names are a bit different, this is the canonical very popular social network, it is called the network because if you tilted this 90° probably look a little bit like a kind and this is one way of saying there are bunch of people Bob, Mike, Jill, Shane etc and this is how there are connected right, when we see connection you will have to decide what it means to be connected right, sometimes connection means I speak to you, sometimes connection means I speak to you and you speak to me right, sometimes connection means it transfer information to you, so you will have to have a definition.

The good thing about social network is you can have different kinds of lights right, I think Sunoj was talking about and even Rahul pointed out straight lines and dotted lines right, so sometimes you can see straight lines are when you know we have two-way communications, dotted lines where you have one-way communication, but you just representing network right, so this is how phase 1,2,3,4,5,6,7,8 there are 10 people here right.

So 10 stakeholders, 10 organizations and this is how they connected to each other right, so Jill talks to Bob, Mike, Emma, Shane Leah and John, Lisa only speaks to Allen or Lisa only communicates to Allen right, this is how the network comes up right.

You can build your own network quite easy, so you could see you know if you Sachin talks to Sandhya, Sandia talks to Sachin and Rahul, Rahul talks to Priya, Priya talks to Sachin and Sandhya right, you could see okay, here Sachin, here Sandhya and here is Rahul and here is Priya okay, so Sachin talks to Sandhya which means Sachin sends information to Sandhya, so I remarked that with an arrow, Sandia talks to Sachin and Rahul so there is a two directional arrow between Sandhya and Rahul, Rahul talks to Priya, notice that boys only talk to girls and girls only talk to boys and Priya talks to Sachin and Sandhya okay.

So I dictate that fact that okay, so Priya talks to, so this is now a social network right and the directionality of the arrow tells me something right, so now it is sort of tells me you know if Priya needs to communicate Rahul right, she does not seems to have a way of come indicating directly with Rahul, Rahul has a phone number she does not have Rahul and so she has to go through Sandhya and say, look how do I get to Rahul pass on the message and so you get to understand a little bit of the dynamics of the network.

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Network

SACHIN   SANDHYA

PRIYA   RAHUL

Ties can be Strong or Weak

- Sachin talks to Sandhya **A LOT**

- Sandhya talks to Sachin and Rahul **A LOT**

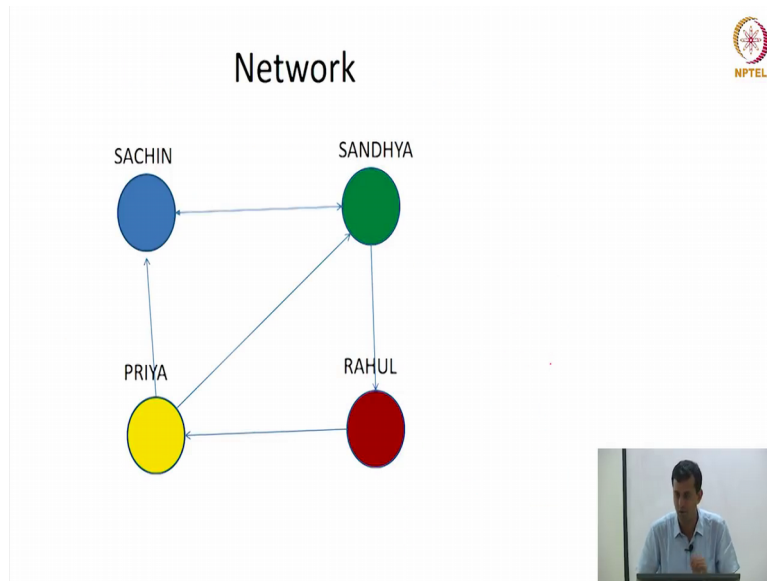- Rahul talks to Priya

- Priya talks to Sachin and Sandhya

Network

SACHIN   SANDHYA

PRIYA   RAHUL
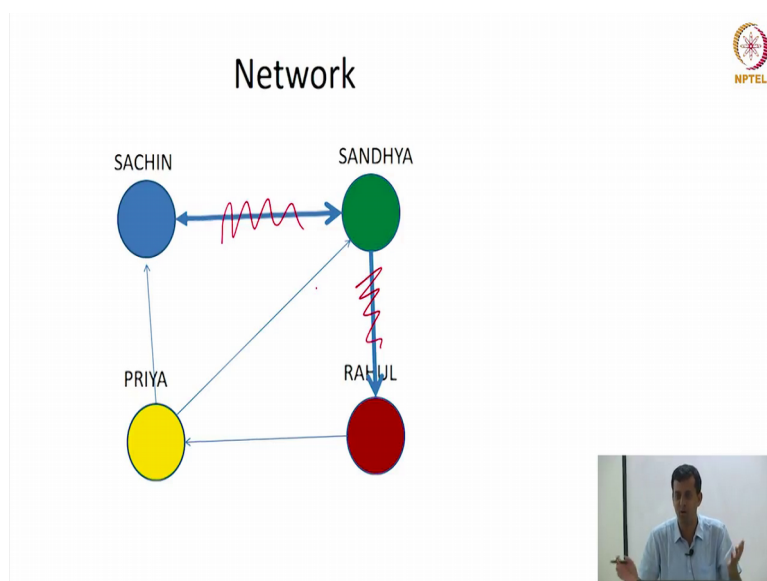
Right, same thing just drawn with colourful notes right and also remember that this ties can also be strong or weak right, so yes, we said Sachin talks to Sandhya but Sachin might be talking to Sandhya a lot right and that might be a strong link right, whereas Rahul talking to Priya might be once in a while and probably just to say no right, so that is essentially a weak link or possibly are non-existed kind of link, so ties can be unidirectional or bidirectional, can carry information, can be strong, can be weak, so I think it is important to start looking at and modelling this kinds of network right.

So now I have put in, sort of shaded these to show that there are strong links and weak links right, so a link now tells me is it unidirectional, bidirectional is a strong, is it weak right, so I can start playing with this, so you can do anything right, you can take you know the network of it does the people in your wing in the hostel and draw social network diagram right, you can even take people in your own group in this class and draw social network diagram right or whatever group it is right.

People on the football team and draw a social network diagram right and so social network diagram can be on who speak to whom but you can look at the football team and you can see who is passing the ball to whom right and you can get sort of a graph of you know what does that look like right and there are certain people who everyone passes to right and the certain people who no one passes to and that gives you a little bit of intelligence on what is happening out there and then you can decide do you like that, do you not, do you want somebody centrally to control the pace of the game or would you like it to be what the Dutch used to call total football right, everyone goes everywhere passing to whoever they can find okay.

Metrics

- Degree Centrality

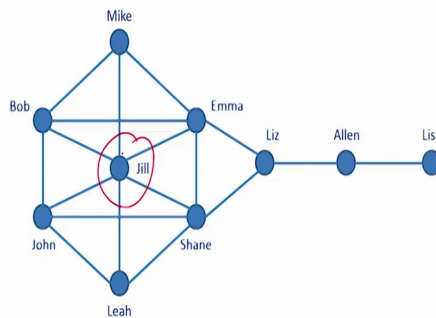- Betweenness

- Closeness

- Eigenvector Centrality

Degree Centrality

- Who has the most connections? Who is most connected?

- Who is the hub? Where does information flow through? **Who is most active?**

- In degree vs Out degree

Who has the highest degree centrality?

And one-way sort of looking, so when I have four peoples Sachin, Sandhya, Priya and Rahul, it is easy right, I can take a located and very quickly understand what is going on right, but Rahul, this Rahul not that Rahul put up a you know metrics with the Scottish something authority right from that paper, there were what 35, 40 you know actors will be there, so node becomes difficult right, that is lot of links to keep in my mind right, so I want to sort of understand what is network tells me, I want to sort of get some metrics out of the network right and these are some key metrics, the degree centrality is how centralized is this network right, so another words you have maybe I have a picture here yes.

So who is the most? So you can ask question like who is the most central person in this network. Who is connect to the most number of people? Who is the hub? As what we are really asking, who is the hub? Where does information flow through? Who is the most active? Right so who is the most active you think here? Right, so Jills seems to be off the lot, the most central actor in the network, Jills seems to be the hub through which communication flows right, which means if I were to quickly, if I wanted to click quickly influence as many people as I need to in the network right, so there is sort of important piece of information, you know classes cancelled. I want to get the word out, my phones running out of charge, there is exactly one person I can send a message to right.

Then I probably the best served by sending a message to Jill right because she is the most connected and that message can go out as quickly as possible. Okay, of course it could also send it to Lisa and it would slowly propagated its way through the network, but by that time all of you might have already be assembled in class, only to find out and it is cancelled right and so Jill is sort of central really helps spreading information not throughout the network, but were quickly to other parts of the network.

So centrality and you can calculate the overall centrality score for the network right, how centralised is the network or you can calculate centrality scores for each of these nodes right and it is very simple, you know how many people am I talking to versus how many people are talking to me kind of or how many, what are the total number of people talking in the network versus how many people am I talking to, so you can do this, so if you go and read of anything on graph theory or on social network analysis and tons of books and you can go to Wikipedia and all of that and you will find very simple formula that allow you to measure centrality.

But I want to sort of understand centrality of the network, want to understand who was central because this is the stakeholder who if I can positively influence can possibly positively influence a large portion of the network right, this for me could be NRCS, so whoever or maybe even the International Rivers network right, if I can influence these guys positively it really spreads, whereas some other save Bujagali crusade right, might be sort of somebody Perry Farrell, if I influence them, it might take a lot of time, not even be possible for them to influence the network.

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Okay, so that is one that is what we called degree centrality, but there is another concept again, Sunoj mention all of this, but I am just sort of going through them again is betweenness right, so who is a broker? Who influences the network? Right which sort of note

can I penetrate right, so that I actually can sort of penetrate different parts of the network right, so who do you see has the highest betweenness centrality here?

So who could influence simultaneously multiple parts of this network? Right, possibly someone like Liz right, so in fact what you really have here is what we call two subnetworks right, there is almost two subnetworks, you know, sort of join together is what we call clicks right, this is a group, you know these people talk to each other right, essentially Jill and her friends, and once in a while they ask Liz to come out with them, but you know Liz really connecting to Allen and then to Lisa, who nobody else has you know, power to really influence or talk to right.

So Jill would be great to very quickly spread information to at least to part of the network, but Liz, who would actually ensure that is probably more equitable distribution of information around that network right, so she has what we call more betweenness centrality right and that is again, you know, if I want to start spreading a rumour I might actually start with Liz right, rather than with Jill because this could actually spread in multiple directions and it would be very difficult to correct it right, because it is all so far flux, so Liz is in that ways is a broker.
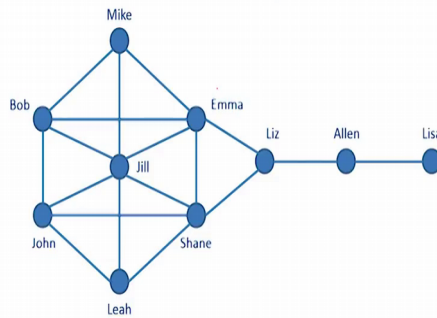
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Who has the highest closeness centrality?

Who has the highest closeness centrality?
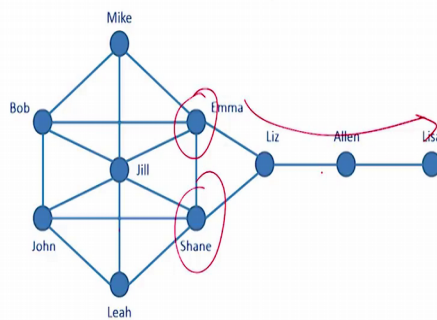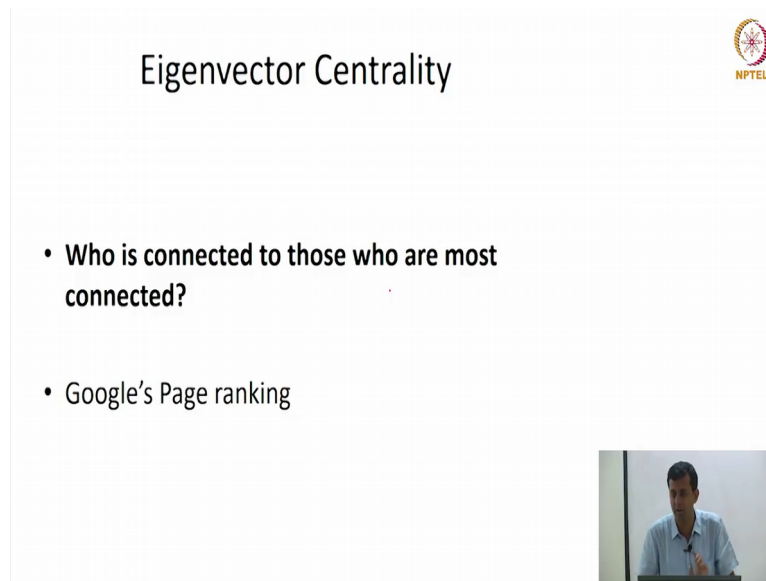
Okay, closeness centrality who can access others most easily? Who has the shortest path to others? Who is the best visibility to what is going on? Who do you think has the highest closeness centrality? Would you think has the best visibility to what is going on? Okay, let us go look at definition again who can access others most easily? Who has the shortest path to others? Right.

So Emma and Shane are in these very interesting positions, they are not as central as Liz, as Jill, there into as connected as Liz to both sides of the network, but if you really look at it if I wanted to send information to anyone. Emma and Shane end up being uniformly you know 2 or 3 steps away, in most cases 2 steps away from most people right, most cases, except for Lisa, who is 3 steps away right, they are essentially 2 steps away from everybody else right,

whereas Liz is 1, 2, 3 steps away from John, she has 3 steps away from Bob, Jill is 1, 2, 3, 4 steps away from Lisa.

So we are look at just the shortness of the connections right, the closeness centrality of property that Emma and Shane have right, again that is just something, so there are all this metrics that you can start looking at.

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And who is connected to and those who are? So you are start now getting to metametrics right, she is most connected and she is most connected to him and therefore she is most connected to he who is most connected to and you can actually start you know looking at, but it is very important because now if you can understand this right you understand who to talk to, to influence the network right, so you have a high-power, high interest stakeholder takes a lot of time and effort to manage person.

There are somebody else who may not be has high-power or high interest but maybe much better connected onto the network right, and by influencing that person you actually quickly influence 15 or 16 other stakeholders right and so unless you have this map becomes difficult to sort of understand because you have limited time and resources right to influence stakeholders.
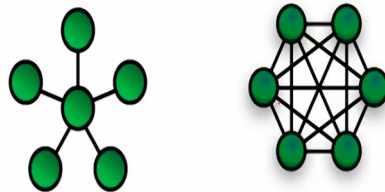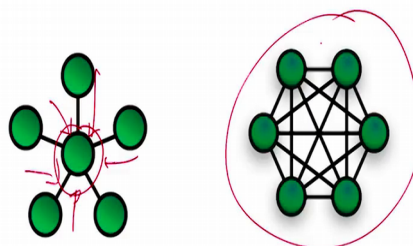
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Questions to ask

- How Centralized is the network?

- How Dense is the network?

- What kinds of clustering do you see? Are there cliques?


Centralized Networks?

Centralized Networks?

Okay, so you can answer this question is how centralize is the network? So these are 2 very extreme canonical networks right, this is sort of the, this I think is what they call the star network is that this, the other is star network, this is highly centralized all information flows into the centre, this is your typical bureaucracy right, everything, nobody else talks anyone else, we only talk the boss right and it has a particular dynamic, highly central network.

This is a highly dense network everyone talks everyone else right, everybody talks everyone else right, so here, it is very clear and this person carries the shots, calls the shots and if I cannot get to that person it. I am in trouble, here I could potentially everyone is equal right, it is a perfect team here, I could influence any of this people and I have an equal chance of being able to influence or contact or deal with anyone else right, so there is centralized.

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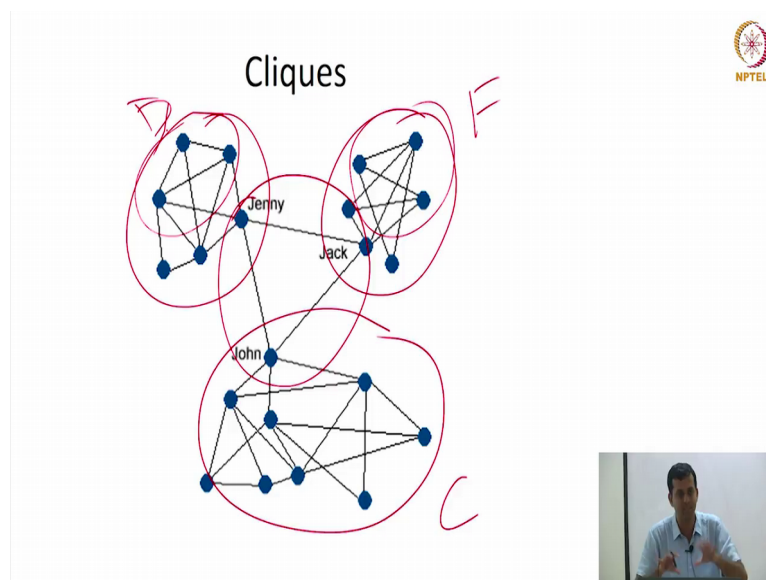
So these are important things to understand, this kind of a network you can obviously see there are 3 clicks here right, there are 3 different sort of subgroups right, very clearly connected to each other, these subgroups you can actually see are not really very well-connected each other right and you can even do metrics sort of figured that out and Jenny, John and Jack form an interesting triangle.

Okay that they actually are now these boundaries panels and these are the gatekeepers through home information flows in and out of these networks right, so in some ways you could have some brilliant scientist with wonderful theoretical ideas right but unless you have good correlation between Jenny, Jack and John none of those ideas might really make it to

other parts of the network right, so just say this is design, this is finance and this is construction right.

These are the gatekeepers we are really sort of help, understand how all of this information flows together right, so again looking at the network helps you understand what other strengths of the network? What are the weakness of the network? Right, what do I have to do to really influence that network? Right and how do I make sure that I get the best ideas, the positive out of the network and I find a way to minimise the troublemakers and negative sentiments and so on.

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Okay, Hey, so will look at this, there is a very important concept, particularly in social sciences, but also in graph theory call structural holes and these are actually you know… In the network where tie is absent, wherein the presence of that tie, you can really solve a lot of issues in that network right, so there is a guy called Ron Burt, who sort of wrote this whole sort of book on structural holes, so there is actually indicates gap absence of ties.

So one of the things you do and you look at a network, you see is that on structural holes here, do I need to bring in, a facilitator, a mediator another agency that can actually pluck the structural hole that can connect these actors together because they certainly need to talk, they are not talking right, a boundary spanners, sometimes somebody who actually feels that structural hole okay.

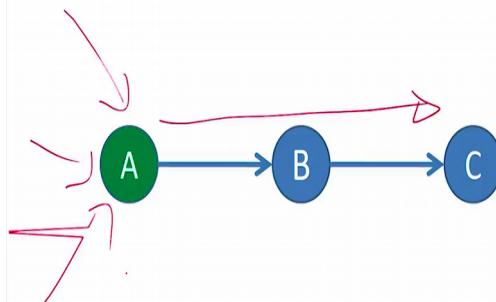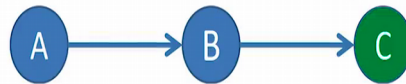(Refer Slide Time: 43:06)

Coordinators
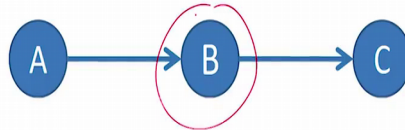
Consultants
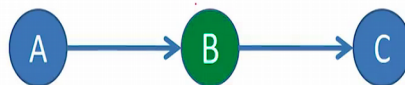
Gatekeepers

Representative

So you have A, B, C if you have a relationship like this then B is essentially nothing, is a coordinator takes information from A, passes it on to C right, essentially in does a coordinator function okay, so B is essentially okay, so A in some ways is a gatekeeper because A is the one who starts the information flow, so if there is another information coming into this network, it has to come to A because information flows from A in, so A is what we call a gatekeeper right.
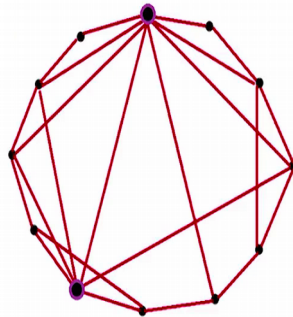
C is essentially is the representative of the information, so someone could call a representative and they, so you can identify looking at your network whose the gatekeeper, who are the representatives? Gatekeepers sometimes are extremely important because they are the ones through which information in right.
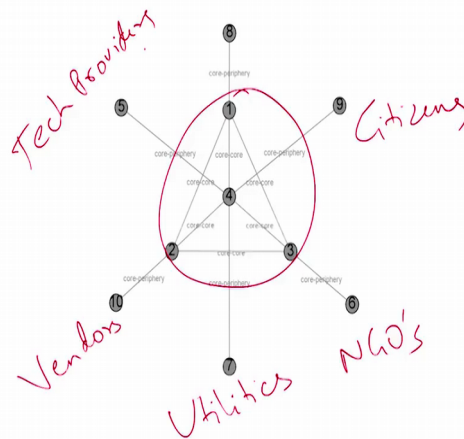
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Liaison
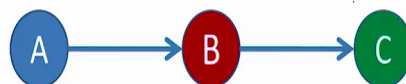
Small Worlds (Hubs)



Core and Periphery Structures

B is sometimes becomes very important liaison kind of person okay, so you know all of this, yes. I do not think, so this is again a very interesting kind of structure, it is similar to that star structure, but it is called the core periphery structure and this is structure that we see very often on infrastructure projects, there is a small core of people right of the centre of the network making a lot of decisions right and there are all of these actors on the periphery, all the actors on the periphery do not know each other right, they are often connected to certain members of the core network right.

So this could be Citizens, this could be NGOs right, this could be utilities, this could be vendors, technology providers, all of them are stakeholders right, but they and they all have interest in the project, but they all have different interest, and they are all connected to

different peoples, citizens might be connected to the government right, technology providers might be connected to the contractors, technology providers and vendors right and so on and so forth okay.

So what I will do is I have got some slides here, but I am going to slip them now, we have a small experiment, we did in some years ago, in a class that some of you to the construction software lab because you will recall that you actually walked with people from other parts of the world as part of the group project, so we actually started mapping the social networks between groves and I will not talk about it, but I will show you the networks.

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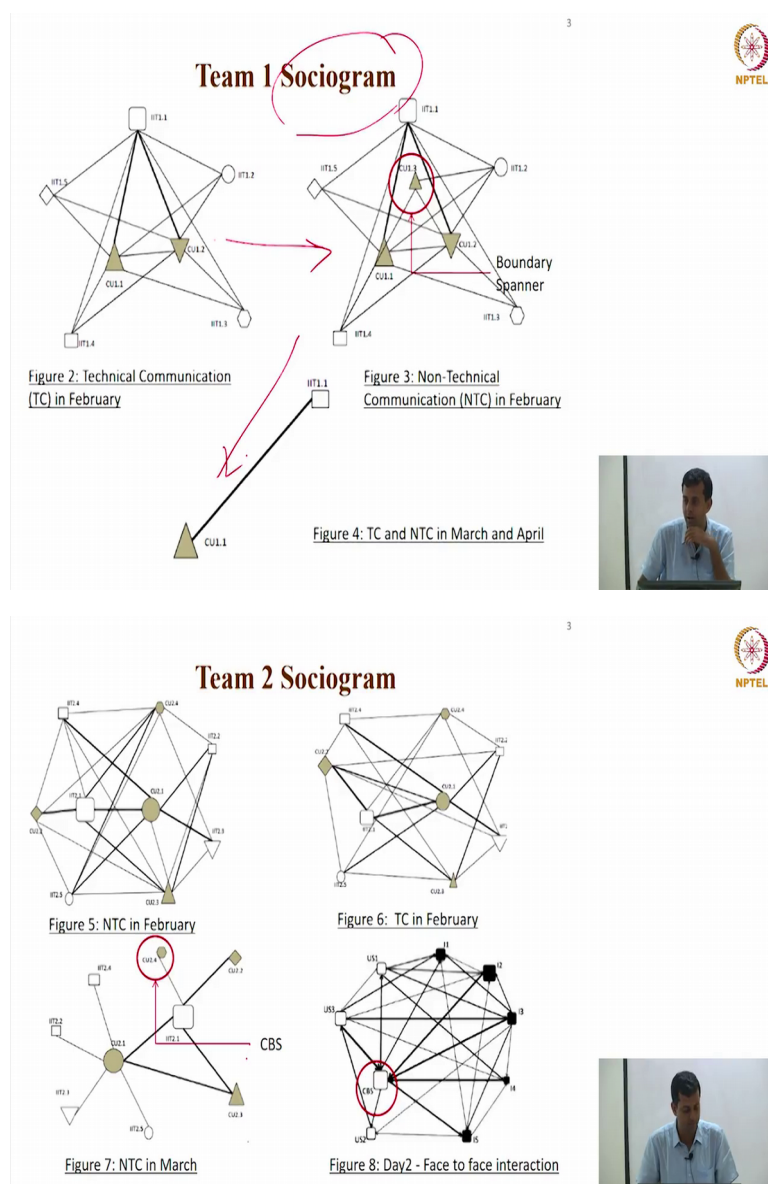
So we did what we call sociograms right, we said okay, you know, there is team1 some people from my 80 at the time it was Columbia University, whose talking to home it and how

does this network evolve over time right, so you can see there is A network here, it becomes far more dense over a period of time and actually that becomes far less dense right, where both teams had one representative and they engage information right and you can look at this kinds of networks right, what happens with this teams and then try to save this networks, can actually predict project performance right and it turns out they can.

Sometimes very dense network tends to do better than another networks and so seeing how a network forms and performs and changes over time is often a very important and useful tool to see how projects might actually takes place, so the whole point is listing out actors, mapping them to figure out who is more important and who is not as important right, figuring out who talks to whom and who can be influenced are all important exercises that you might want to do to, really figure out how to manage stakeholders alright, so we stopped here with this discussion.