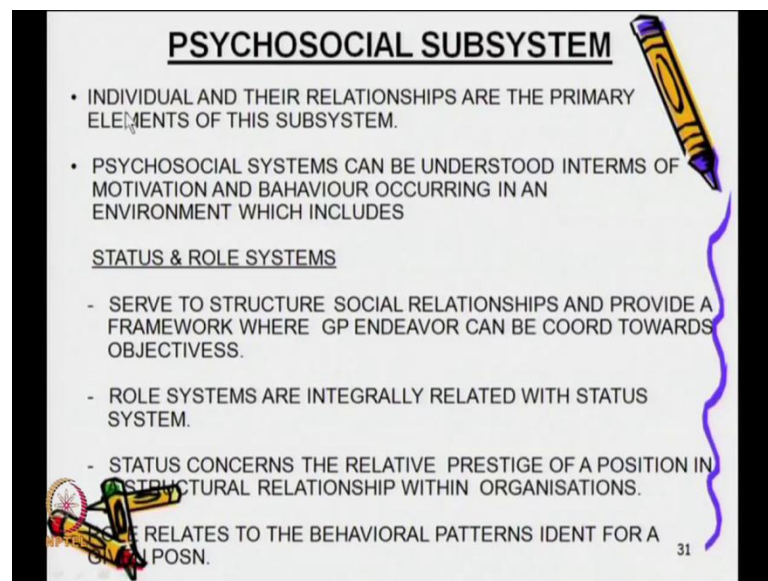**Organization of Engineering Systems and Human Resource Management**
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Module - B
Effectiveness and Performance
Lecture - 18
Socio Technical Systems (Contd.)

We continue with the elaboration of the socio-technical systems and we shall continue looking at the impact, which technical systems make socio-technical systems and together they make the managerial system. And see these effects which they create on the efficiency and effectiveness of the whole process.

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This is to draw your attention to a simple truism. Individual and their relationships are the primary elements of this subsystem. Decision making is very often mortgage to this. The relationship between individual relationships, and relationships between the relationships, because there can be groups and each group may have its own system of relationships. The psychosocial systems can be understood in terms of motivation, behaviour occurrence in an

environment which includes following. Please follow this very carefully, because this would give to you yet another dimension of understanding socio-technical systems.
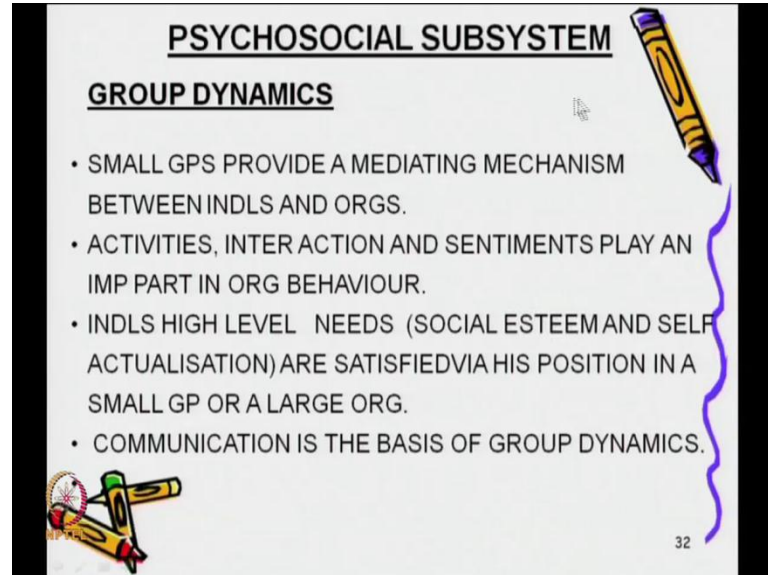
The operational life in India and elsewhere too gives huge emphasis on status and role systems. The reason why I emphasized India before I came to other parts of the world is India is a very status oriented society. Even corporate success has to be converted in the rise of the individual's status of the person in the social segment from which he originates. So, very often his behaviour in the managerial system is determined by his perceived understanding of what would be happening to his status in the social system in which he has originated. This in turn serves to structure social relationships and provide a framework, where group endeavors can coordinate towards objectives. It is important in this context therefore, managerially to leverage status aspirations into designing of role systems.

How do you integrate status considerations in designing of role systems? Clearly at this stage of the discussion, it is not possible to get into too many details, but one thing is obvious. Designations are very often synonymous with status. One of the commonest designations in the world of work today is the word director. There are directors in the corporate world, there are directors which are middle level officials and there are directors which are top of the rank executives have membership of the boards and there are also directors of adhocs teams, especially when it has to do with projects. There are directors in the governmental system and in the governmental system, the rank director comes well below the rank of a joint secretary or an additional secretary, forget the secretary. There are directors in academic institutions. In fact in one case, the institution was headed by a principal and the directors of the system reports to him.

Therefore, status and role system serve to structure the social relationships and provide a framework for reference. It is not difficult therefore to see how the interactory relationships between status and role systems can work together. Status concerns the relative prestige of a position in a structural relationship within organization. I will repeat that for you for the sake of better clarity. Status concerns the relative prestige of a position in a structural relationship within an organization much the same way status concerns the relative prestige of an individual, a sub group, the larger group in the larger social ambiance. In fact, the role relates

to behavioral patterns instead of given positions. So, role has to do with behavioral patterns rather than just given positions. In other words, if you conduct yourself in a particular way, you tend to be treated that way. There is a whole set of complex issues, which normally are very little understood when you really handling socio-technical systems.

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The psychological sub systems have their own group dynamics and listed below are four elements of group dynamics. Small groups provide a mediating mechanism between individuals and organizations. A very important to appreciate this because unless appreciate this, you will not be able to grasp the significance of interventions with sort of conflux. Activities, interaction and sentiments play an important part in behavioral organizational. I hope you are noticing the listing of activities, interaction and sentiments. Individual high level needs become a factor. What are the individual high level needs? Social esteem, self actualization. I would like to conclude this discussion with drawing your attention to the power of communication in socio-technical systems, which is based on group dynamic.

Communication has huge influence role. Through communication, group dynamics can be determined and group dynamics becomes somewhat of an impact making factor on the canalization of work through organization structure. Group dynamics can be included virtual or any inter personal transaction which has psychological or behavioral effects. What is a virtual and interpersonal transaction in an organization? It has to do with emotional bonds which put together people. It has to do with relation of give and take which may be rooted in social dynamics outside the work situation.

Thus, it is that in organizations which are campus based, there is one kind of behavior at work and in another organization which is not campus based, but really people assemble for work and disperse after work to their different social units. The managerial behavior has had other roots. In this second case, influence may be exerted in many directions up and down, the hierarchy and laterally in pear groups. In campus based organizations, there will always be a greater consultative process based on a lot of sharing which has got nothing to do with work place. Changes in behavior of a person or a group due to anticipation of the response of others have an effect on relationships among the people. Therefore, to influence behavior, one has to practice a emulation, attempt persuasion and if (( )) where it should require practice coercion.

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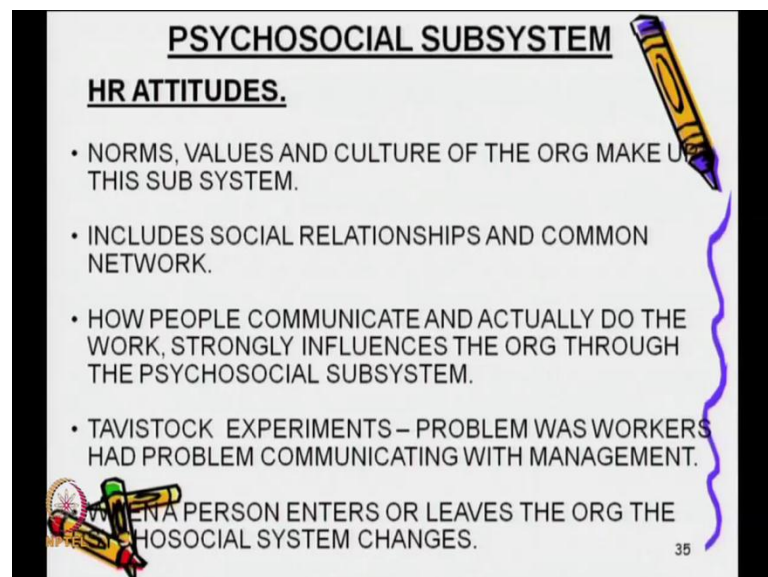This leads us to one of the spin-offs of psychosocial subsystems leadership, but after showing you very quick slides on leadership which I would urge you to read. I am going to skip any discussion on this, because a few sessions later, I am going to come back to study of leadership as a topic in its own right.

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Let us move forward. The psychosocial subsystems. However, it has its human resources attitudes and this would affect the way technology is operated. To give you a very simple example of how psychosocial subsystems affects HR attitudes. Please remember the entire triggering of the first war of independence on this country came between the ruling class and the ruled class because of a simple fall out of a technological characteristic which the social system was a worse to you. You would surely know what triggered of?

The mutiny which converted itself into the first war of independence in 1857, where the story went that the bullet was laced with a fat of either the cow or the pig and you were supposed to pull at them bullet to unsheen with your teeth and your mouth before you could actually use that bullet. That was a technological characteristic. The bullet needed that kind of coverage as that kind of fat, but the social norms did not accept it and look at what happened.

So, that psychosocial subsystem has its norms, values and culture. You cannot debate these rationally. Norms are really the behavior patterns which have emerged after years, decades, million year of tested result oriented experimentation. These norms may be out of sync with the technological environment, but they are a reality. Values and culture or also off-spin of time tested patterns. The relevance of raising it here is that norms, values, cultures create their own subsystems in an organizations.

This includes work relationships and common network. Therefore, the psychosocial subsystem may have a reverse role on operations of technology. So, how people communicate and actually do the work strongly influences the organization through the psychosocial subsystem and that of the significance of the psychosocial subsystem. This sentence is worth reading again how people communicate and actually do the work; strongly influence the organization through the psychosocial subsystems.

Tavistock experiments which we talked about had a strong (( )) problems of workers who had problems in communication with the management not because English was spoken differently or the words that were used were in different meanings, but the values, norms, culture and the psychological and the social subsystems of the workers and management and here, workers again for a change, the blue collared individual and management which

becomes the label for those who control the organization. When a person enters or leaves the organization, the social system often can and does change.
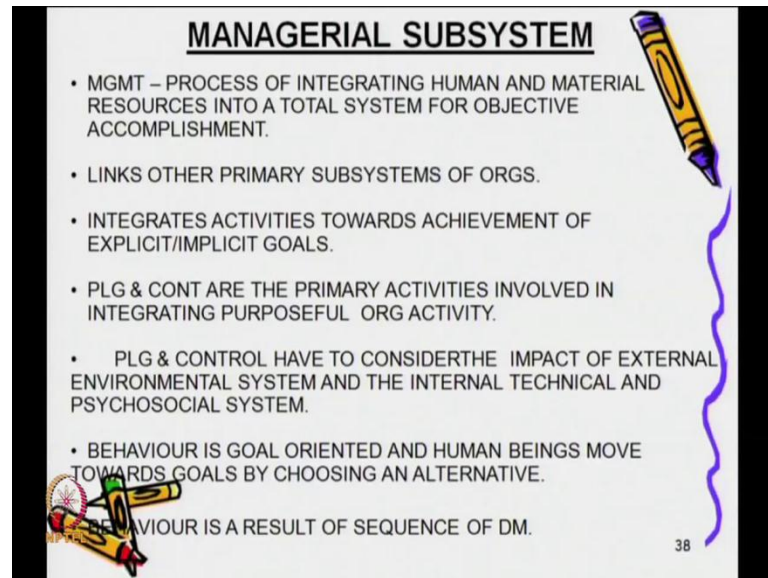
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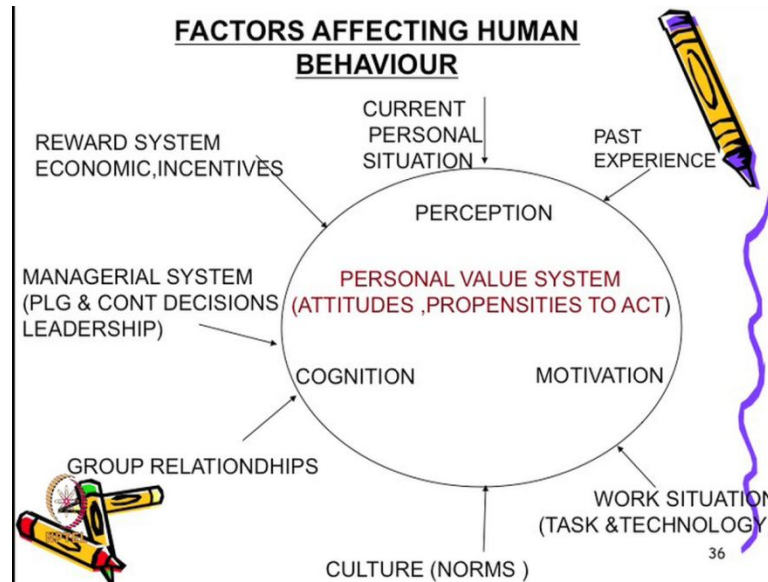
Try to read this diagram on behaviour. You have perception at the core of it, personal value systems, attitudes, propensity to act. Then follows motivation and then follows cognitions. So, within the circle presumably of the domain of the organization, individuals will have that perception, individuals will have their motivations and individuals will have their cognition. Cognition will be determined by group relationships, work situation, task and technology along with culture norms will affect the organization and these two arrows show that. Past experiences will come in and influence perception. Current personal situation will impact perception and interestingly enough, the desire, the reward system and the economic incentives will also impact perception.

So, what would impact cognition? Managerial system, planning and control decisions and leadership. These three will impact cognition. Work situation will impact motivation, past experience will impact perception and current personal situation will impact personal perception as much as reward and economic incentive system. Now, this is converting the psychosocial dimension into concepts which may be intangible concepts, but they are real concepts of the operational world and actually do determine decision making. I remind you

again of the classical model of organizations, but we will not spend too much time on it. By now you must have got use to this diagram.

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Let us take a quick look at the way the socio technical systems, therefore through its social system, the psychosocial system and the technical subsystem impacts management processes. We have discussed in the earlier presentations a proposition that management processes are really integrating human and material resources into a total system for objective accomplishment. Remember the discussion on managerial role and behaviour which put together the social and the organizational frame work?

This links with other primary sub systems of organizations, integrates activities towards achievement of explicit and implicit goals. Planning and control are the primary activities involved in integrating purposeful organizational activity. Planning and control have to consider the impact of external environmental systems and the internal technical and psychosocial systems. Behaviour is goal oriented and human beings move towards goals by choosing an alternative. Behaviour is a result of a sequence of decision making.
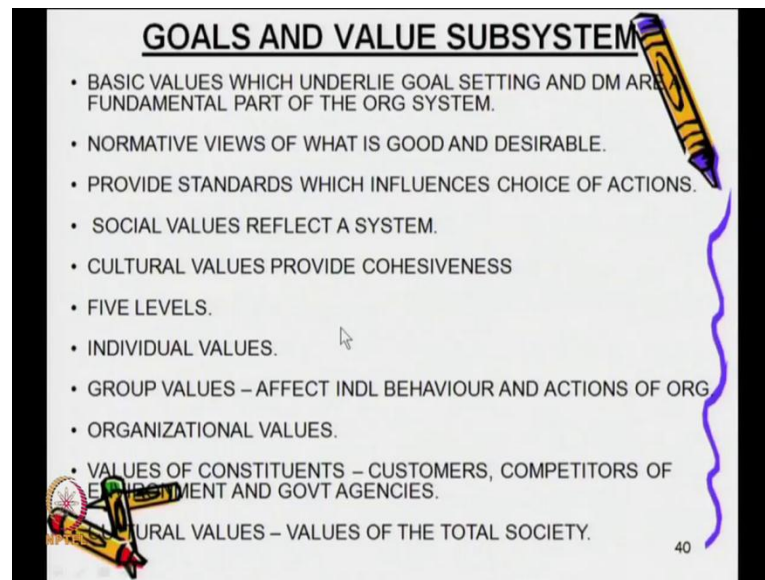
Now, this is an important principle to register. Behaviour is a result of sequence of decision making, a sequence of exercise of choices. Decision making is often the exercise of choices. The choices are determined by the socio technical systems.

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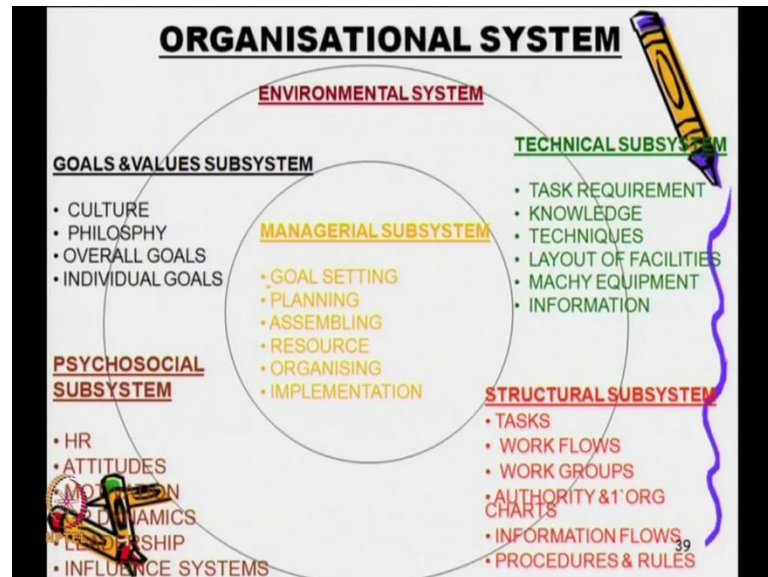
So, back again to the organizational system and again, we need to spend too much time on this, because a constant reminder of the different variables of the five key levels is useful to put the whole discussion in perspective. I walk you just through the levels again. Goals and values subsystem, the technical subsystem, the structural subsystem, the psychosocial subsystem and we have got the managerial subsystem.
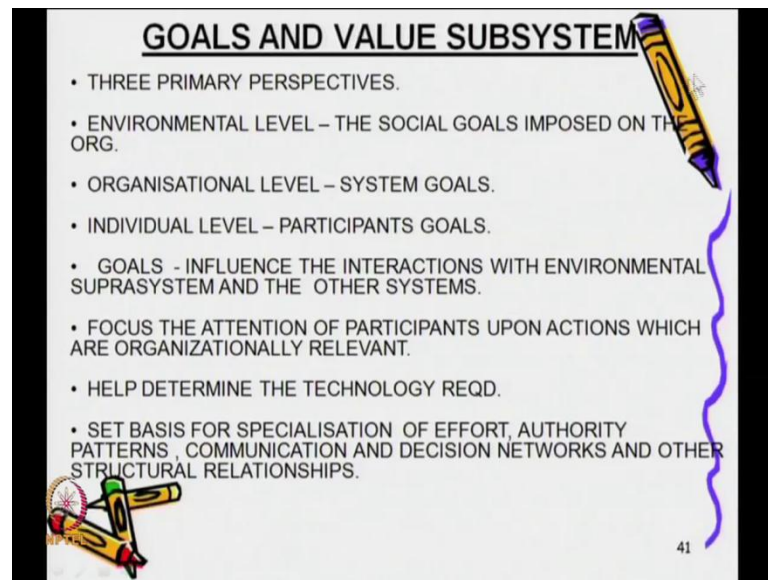
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So, we now get into slightly deeper waters-the goals and value subsystem. The difficulty in dealing with topics like socio technical systems which are super passive that we tend to attribute to a power and influence which is entirely unrealistic. Some people have the notion that socio technical subsystem subsumes everything which happens in an organization. This is simply not true. It is goals and values under which the entire organizational system is subsued. In fact, if you go back to the definition of an organization, it is group of people brought together to fulfill a given set of objectives. If that be so everything in an organization is subsumed under the concept of goals and being subsumed under the concept of goals, innovatively means that the value system becomes important.

The basic values which under goal setting and decision making are fundamental part of the organizational system and let me repeat that for you for the sake of a clear understanding. Basic values which underline goal setting and decision making are fundamental parts of the organizational system. Normative views of what is good and desirable are one of the driving forces of organization system. They provide standards which influence choice of actions. Social values reflect a system and these social values when pressurized into decision making, acquire managerial values. It is here that the study of culture becomes important and cultural values provide cohesiveness, provide a basis of interaction amongst people who do not know each other.

Typically, how do you treat a profession if somebody is a priest? How do you narrate to him if somebody is senior executive? How do you narrate yourself and your actions to him if somebody is senior to you in age? How do you relate to him and typically in India, why do you touch somebody's feet? Why do you do in certain cases shake hands? Why do you in other occasions touch somebody's head as a blessing? These are cultural values which interestingly transcend caste, religion, regions and are available at a sub-continental level. In no part of India is a blessing given by touching of the shoulder or the nose. Blessing is always given by touching of the head and if you think it isn't that normal thing to do, I am sorry that not the most normal thing to do.

In another cultural paradigm, touching of the head tells about to insulting somebody, typically in Thailand and with all the given communalities of the culture which prevails in Thailand and the culture which prevails in India, symbolic gestures of touching of the head have two different connotations all together. Thus, it is that normative views of what is good and desirable is determined by a value system that in term provides standards which influence choices of actions and you just heard me refer to social values and cultural values. These cannot vary many levels. They can run at group level, they can run at individual level, they can run at the organization level, they can run at the constituent level and what is more? They can run at a level which has value for the total society in terms of its cultural dimensions.

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Goals and value subsystems therefore has three primary perspectives. The primary perspectives are environmental, organizational and individual. At the environmental level, the social goals imposed on the organization because they come from the organization. For example, you go to Saudi Arabia and at each prayer time when the alert is sounded, work is supposed to stop and it does stop. I am not going to get into integrity of what would happen in the process oriented manufacturing unit, what would be happening into an assembly line. You can clearly take it that there are ways of responding to it, but at an environmental level, the social goals imposed up on the organization. Social goals of celebration, social goals of regret, social goals of recall of a hero, they all impose upon the organization. At an organization level also, goals and values operate.

Remember, I said there are three primary perspectives. First is environmental level and second one is the organizational level. The organizational level, the system goals effect the functioning of an organization and the third and no prizes for guessing. The third besides environmental level, organizational level is individual level. Goals influence the interactions between an environment and a supra system and the other system. They focus the attention of the participants.

Participant means those who are in the organization. Focus the attention of the participants upon actions which are organizationally relevant. They help to determine the technology required and set the basis for specialization of effort, authority patterns, communication and the decision networks and other structural relationships. Let me repeat that for you. They set the basis for specialization of effort. Yes, effort can be specialized. Authority patterns, communication and decision networks and the other structural relationships. Therefore, the large point being it your consideration, socio technical system approach not only affects the working of entire organization, giving it a frame work of analysis and interpretation, but much more, it impacts the specific functions. These functions can be of authority patterns communications and more.
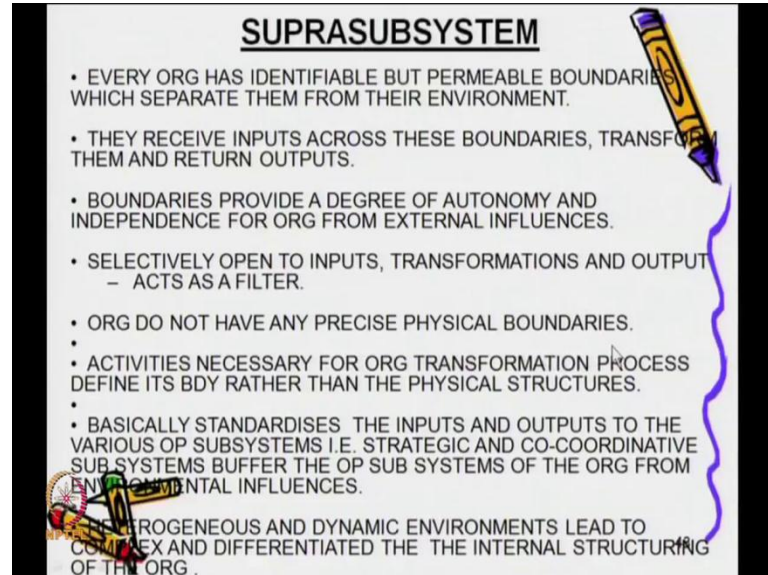
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A quick run through this slide will help you to catch up some of the elements which determine the goal and value sub systems from the socio technical dimensions point of view. They influence the goals. Of course, they do. We have discussed that but what is more influence, they have there one of their variable personality of top executive, the history of the organization, the community environment, norms and values with which the organization deals with, the cultural safety. So, basically speaking, systems goal which is elaborated here deals with self perpetuation. Remember one of the laws which says a body seems will continue to be in a state of motion or in a stable state unless etcetera, etcetera, etcetera. Now,

staying in a state of motion or in a static state is a system characteristic. So, this is called self-perpetuation. Stability of operations, high rate of return, growth and satisfaction of participants, technical leadership, innovation, these become the systems goals which are held forth and which help take the organization forward.

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SUPRASUBSYSTEM

- EVERY ORG HAS IDENTIFIABLE BUT PERMEABLE BOUNDARIES WHICH SEPARATE THEM FROM THEIR ENVIRONMENT.

- THEY RECEIVE INPUTS ACROSS THESE BOUNDARIES, TRANSFORM THEM AND RETURN OUTPUTS.

- BOUNDARIES PROVIDE A DEGREE OF AUTONOMY AND INDEPENDENCE FOR ORG FROM EXTERNAL INFLUENCES.

- SELECTIVELY OPEN TO INPUTS, TRANSFORMATIONS AND OUTPUT
  – ACTS AS A FILTER.

- ORG DO NOT HAVE ANY PRECISE PHYSICAL BOUNDARIES.
-
- ACTIVITIES NECESSARY FOR ORG TRANSFORMATION PROCESS DEFINE ITS BDY RATHER THAN THE PHYSICAL STRUCTURES.
-
- BASICALLY STANDARDISES THE INPUTS AND OUTPUTS TO THE VARIOUS OP SUBSYSTEMS I.E. STRATEGIC AND CO-COORDINATIVE SUB SYSTEMS BUFFER THE OP SUB SYSTEMS OF THE ORG FROM ENVIRONMENTAL INFLUENCES.

- HETROGENEOUS AND DYNAMIC ENVIRONMENTS LEAD TO COMPLEX AND DIFFERENTIATED THE THE INTERNAL STRUCTURING OF THE ORG .

Then, there are the supra subsystems, that is the subsystems which transcend systems. Every organization has identifiable but permeable boundaries which separate them from their environment. They receive inputs across these boundaries and transform them into return outputs. Boundaries provide a degree of autonomy and independence for organization from external influences. Selectively it can be open to inputs transformation and outputs as a filter. We are describing the supra subsystem.
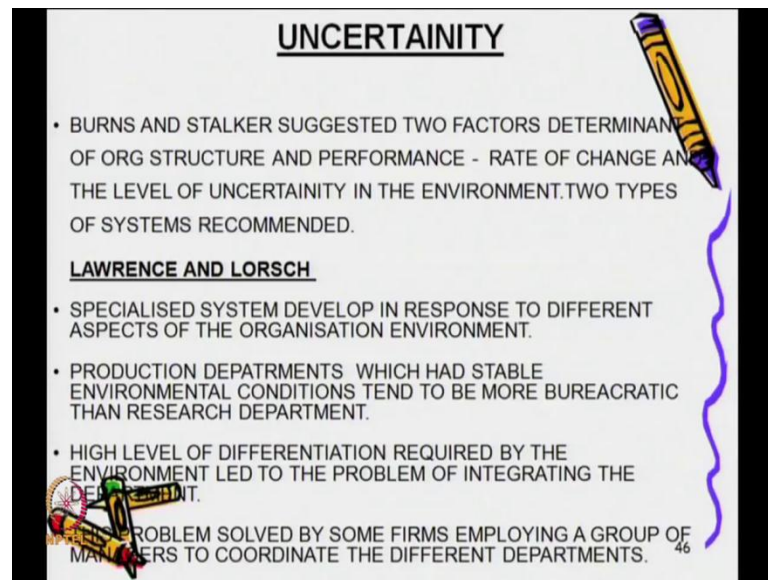
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We shall move on to an analysis of the next sub head, which is autonomous workgroups which we were talking about earlier on in terms of integration and autonomy at different levels of organization. The socio technical systems theory argues with some force basically as fallout of the Tavistock researchers that productivity and satisfaction can be pretty high in autonomous work groups.

Therefore, the play is on the concept of autonomy, the limits of autonomy and the contents in the limits of autonomy determine what kind of work organization or work effectiveness can be expected. Workers work as a team to complete an entire task (( )) workers performing a particular chore along an assembly line. Two approaches help. Team building and matrix organizations and both these have been explained earlier on.
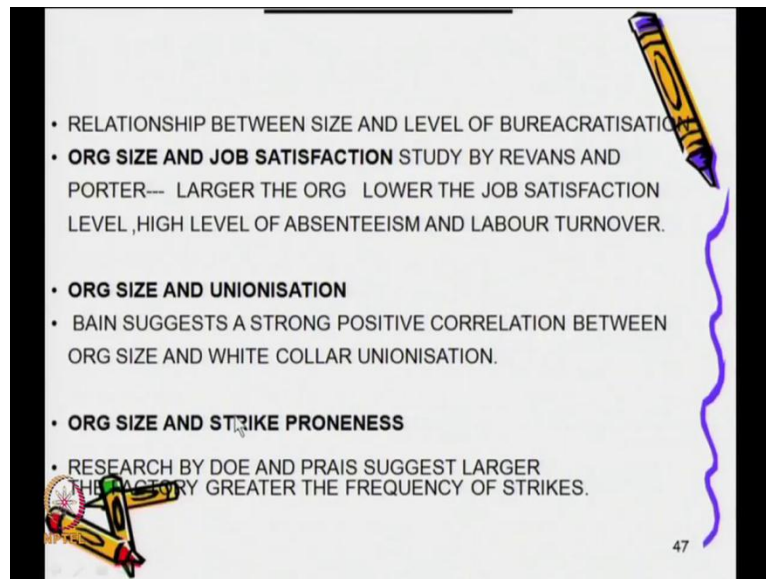
So, we do not want to spend more time on autonomous work groups, but we want to talk of what many authorities have referred to and which we have agreed is an inductive factor of the functioning of organization that is the concept of uncertainty and I need some comments on the nature of uncertainty which exists in today's world, but the important thing to realize is that uncertainty is not a new bond phenomena, but uncertainty has been around long enough for very many serious researchers to have been done on it. Two names which come to mind and one of them we have already heard of Burns and Stalker and another one is Lawrence and Lorsch.

Burns and Stalker suggested two factors in determining of organizational structure and performance. Rate of change which has to do with uncertainty and level of uncertainty within the rate of change, but going beyond it, levels of uncertainty in the environment. Therefore, levels of uncertainty in the rate of change and the levels of uncertainty in the environment, two types of systems were recommending. Lawrence and Lorsch however specialized systems development as a factor of response to different aspects of an organization environment.

You know the words there whole specialization was in developing and an identifying specialized systems which develop in response to different aspects of the organization

environment. For example, production department which has made stable environment conditions tends to be more bureaucratic than research department. So, there contribution is and then specialization is having identity specialized systems which developed in response to different aspects and they concluded illustratively that production departments which had a stable environmental conditions will tend to be more bureaucratic than say research departments.
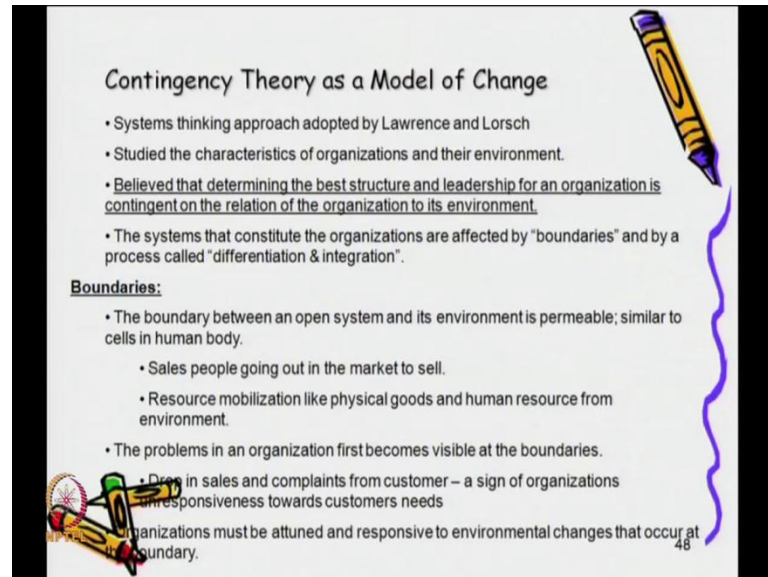
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- RELATIONSHIP BETWEEN SIZE AND LEVEL OF BUREACRATISATION
- **ORG SIZE AND JOB SATISFACTION** STUDY BY REVANS AND PORTER--- LARGER THE ORG LOWER THE JOB SATISFACTION LEVEL ,HIGH LEVEL OF ABSENTEEISM AND LABOUR TURNOVER.

- **ORG SIZE AND UNIONISATION**
- BAIN SUGGESTS A STRONG POSITIVE CORRELATION BETWEEN ORG SIZE AND WHITE COLLAR UNIONISATION.

- **ORG SIZE AND STRIKE PRONENESS**
- RESEARCH BY DOE AND PRAIS SUGGEST LARGER THE FACTORY GREATER THE FREQUENCY OF STRIKES.

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Typically, relationship between size and level of bureaucratization will also stand as has been already explained. Relationship between organization size and job satisfaction is a factor to keep in mind. Interestingly, there is a relationship according to some people on organization size and unionization and the organization size and strike proneness.

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We shall not spend too much time on that. To wrap up discussion, therefore there is a contingency theory as a model of change, we have spent some time discussing this when we were looking at the systems theory. Therefore, I will leave this here for a moment, but will not spend too much time explaining it because this is basically by way of conclusion and a recap.
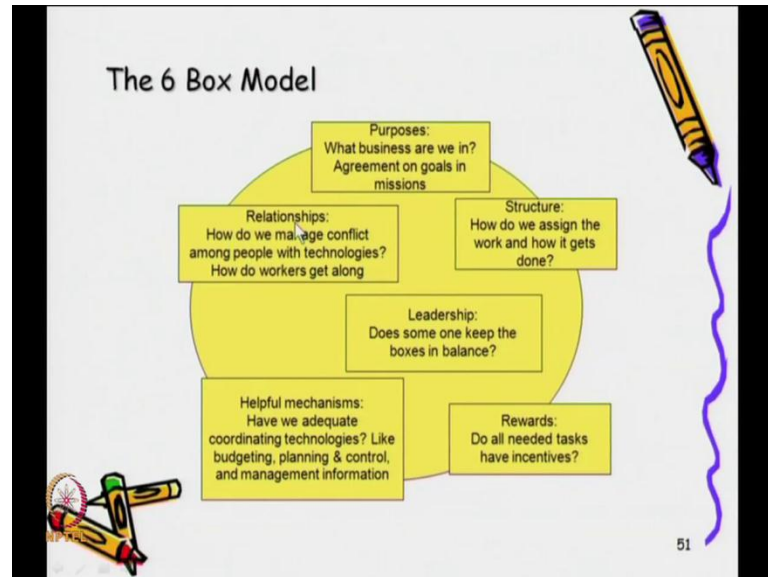
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We have also discussed the formal and informal systems.

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So, finally I draw your attention to what I call the 6 box model. The purpose, the relationships, the structure, the leadership and helpful mechanisms and the rewards. I will read you through it, so that you can understand the concluding portion of the presentation through the 6 box model on socio technical systems. Purpose: What business are we in? We are in the business of looking at management theory and practice of engineering business through the trend perspective of organizations and human resources.

Therefore, if you know what business we are in, we would have agreement on goals and machine. What is the relationship which we are in which means asking the question, how we manage conflict among people with technologies. In other words, we also look at how does workers get along. Thus, third box is of structures how do we assigned the work and how does it get done. That is the question which structure answers. Leadership, does someone keep the boxes in balance? That is leadership answers to an individual's role in an organization.

Remember, we ask the purpose and we asked what business we are in? We asked questions on relationship and we asked how do we manage conflicts amongst people and technologies

and we asked how do workers get along. We asked a question on structures which let us to ask how do we assign a work and how to we get it done, how it gets done and we were at the stage where we are looking at leadership which basically is explained in terms of asking, does someone can keep the boxes in balance. Finally, two conclusions helpful mechanism in running organizations have been adequate coordinating technologies like budgeting, planning and control and management information because helpful mechanisms in socio technical systems will cover both the soft technologies and hard technologies and then we get to the rewards to do all need tasks have incentives. So, that is the question you ask on rewards.

In simple terms therefore, the socio technical systems perspective as elaborated helps to put together a very large number of variables with reference to the working of organizations, the working of technology, the working of people, the components of technology, the components of people and in the ultimate analysis, assist the cognitive system of people who organize the organization to look at. Thus, the whole exercise, the whole operation, the whole entity in a way which keeps them insides or what to do to keep it effective, what to do to keep renewing it and what to do to keep making it grow and that is the ultimate outcome of socio technical systems perspectives.