Organization of Engineering Systems and Human Resources Management
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Module - B
Effectiveness and Performance
Lecture - 17
Socio-Technical Systems (Contd.)

The discussion so far has been on the socio-technical system and its impact on the technical aspect of an organization's activity. I would like to move it forward to cover the social aspects, because the socio-technical systems clearly have an equal impact and interface with the social dimension. Talking of social dimension is more easily said than done and it requires a bit of effort to understand it, because the pervasiveness of the social systems covers various aspects of social sciences, which include sociology, anthropology, history, psychology, even political science. Now, it may not be necessary for you to have an appreciation of all these basic disciplines, but in terms of working of organizations it is essential for you to appreciate, that these disciplines do leave an impact on the decision making process.

So, typically the historical experience manifests itself through the heritage variable in any organization, the traditions of an organization, the established technological flaws of the organization, because at any point of decision making there are a set of givens. The whole ethos is captured under longitudinal thinking. Similarly, there are issues of ethnic overtones, gender overtones of culturization and that carries its own weight on decision makings system in organizations and that would be the subject matter of sociology. If you certain components of it, it becomes subject matter of anthropology, not to forget political science, because political science is the study of struggle for the control of decision making process.

All organizations have their struggle for the control of the decision making processes, and there is a whole disciplinary specialization labeled political science, which studies the architecture of this dynamics. The examples can be many, but within the limitations of the time, which we have I would like to focus on certain critical aspects of decision making, which you may find of use to understand the socio-technical systems component, and we can begin our analysis by looking at the psychological dimensions. The impact on psychological dimensions of the technical subsystems is large.

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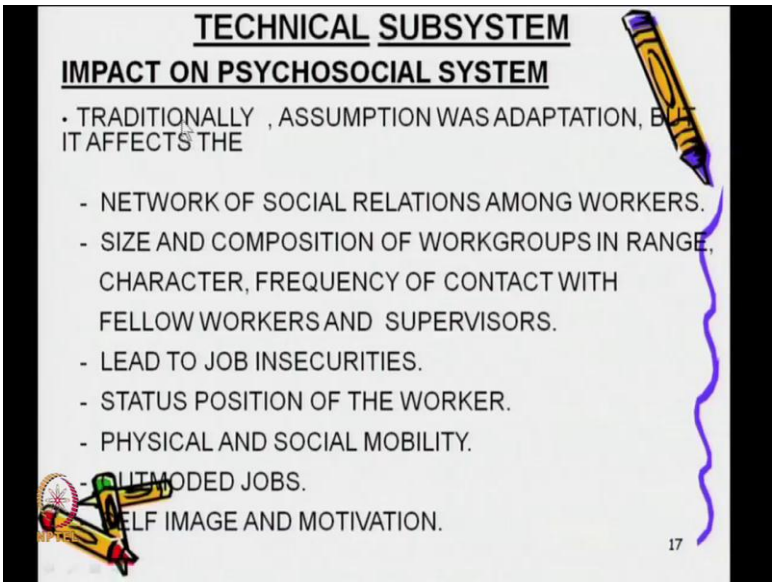

Traditionally, the assumption was adaptation, but it but it affects the network of social relations among the workers, size and composition of the working groups in range character and frequency of contact with fellow workers and supervisors, lead to job insecurities, status position of the workers, physical and social mobility, the outmoded jobs, self image and motivation, and the list goes on.

Fully, a naive person would assume, that these do not affect decision making. Yet, a person who is statistically oriented, who is used to handling inanimate processes, non-live materials can be yet seen in trying to understand what is the network, a social relationship amongst workers. I remember the word worker here is not the blue collared (( )) but anyone who works in an organization. In fact, it has been found, that network of social relationship establishes a definite influence on the decision making patterns and since all decision making roles have a range of possibilities, the tilting is very often in the direction of the pressure of the network, sub-social relationships. In fact, the truth is very often under the pressure of a social relationship. The decision making goes outside the bound.

The size and composition of the work groups in range are also determined by the psychological dimension because there are groups of people who are comfortable working with each other and there are people who simply cannot work with each other and this is the psychological dimension of the technical subsystems, which cannot be ignored if you want to make sense of operating the technical subsystem when the

character, frequency of contact with fellow workers and supervisors is a definite factor in the speed and efficacy of the decision making. Indeed, very often tools of organizational regulations processes can be used to make life uncomfortable for people whom you do not like, which leads to job insecurities and it is not as if all decision making tools, all decision making situations are handled with total degree of impersonality, that would never happen, so the psychological dimension of the socio-technical system.

This is a very important component to keep in mind if you want to understand the impact of the socio-technical systems approach on decision making styles and decision making situations and asses it for a scientific critic and a scientific operation. The status and position of the worker is an important criteria if you keep in mind the fact, that people working in the organization need not necessarily be who have the ownership of the organization because by and large, when it comes to ownership issues, ownership is seen to be wasted in those who have invested their money.

The physical and the social mobility is a factor. You find people with similar regional background, similar social background creating groups, clicks, factions in an organization and certainly, together they will have the tendency to perpetuate outmoded jobs or declare perfectly relevant jobs outmoded by importing certain kind of machinery, which would run the memory redundant.

Not to forget what is put here right at the conclusion of the listing, self image and motivation, we all have our self images. In fact, the truth is, most of our self images are extremely flattering. If you want an illustration of how flattering our self image is, look at your own behavior each morning when you look at the mirror you keep staring at the mirror repeatedly and running your comb through the hair endlessly till the mirror gets finally tired and says, yes, you are looking grand and you can get out in to the world. It is another matter you may be no were near looking grand, but you have to convince yourself, that you are looking grand. So, self image is the determinant of much of human behavior.

Thereafter comes motivation and that is a psychological dimension. In fact, later on in the elaboration I am going to talk to you for two hours if need be on the need to understand motivation and how it affects actual managerial decision making or actual managerial situations.

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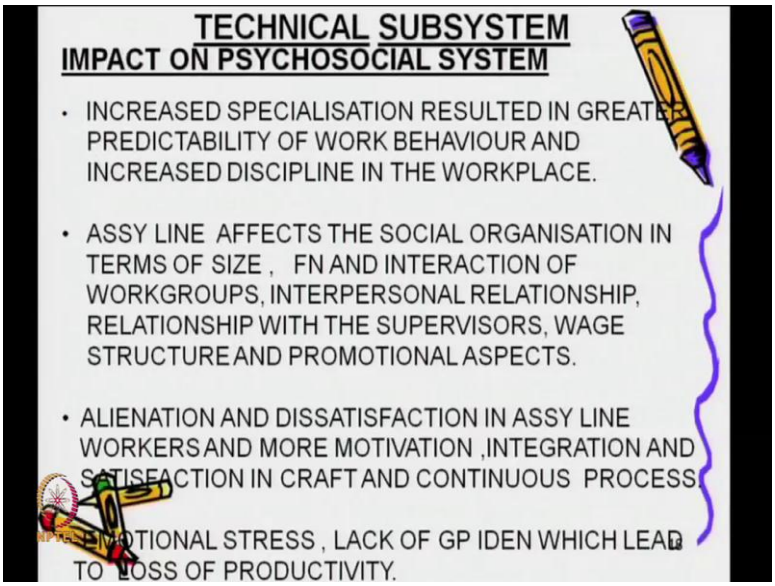

But to carry this discussion of the social dimension of socio-technical systems, I would like to take you away from the self image and motivation concept to the impact it makes on the psychosocial systems. And here you will find psychology and sociology coming together in the understanding of the operational aspect of an organization.

The truth is increased specialization resulted in greater predictability of work behavior and increased discipline in the workplace because the actual tasks being discharged, being carried out in a technical frame creates certain types of a behavior. Those who are interested in linguistics will also realize that certain types of professions speak in a certain manner. The IT specialist speaks in a certain manner, the textile man speaks in another manner and the illustrations can be large, but we do not want to get into all that here. All that we are saying is greater predictability of work behavior leads to increased discipline in the work place because there is tremendous structuring of behavior through the technological processes, which is operated.

Assembly line affects the social organization in terms of size, in terms of the interaction of the work groups, in terms of interpersonal relationships and many others. In fact, it creates a scalar division in the organization. It is rooted in the wage structure and in promotional aspects. The boss on the assembly line were very often, be a supervisor and the supervisor is not always a management person.

Similarly, alienation and dissatisfaction in assembly line workers and more motivation, integration and satisfaction in craft and continuous process workers is well established according to some thinkers. In an assembly line situation, there is tremendous boredom because the tasks are repetitive; it leads to alienation and dissatisfaction. But when it comes to craft and continuous processes, there is some variety in the job and that leads to create a motivation. Therefore, all that is being suggested is the character of the task helps formulate a psychosocial system.

In fact, emotional stress, which is what I am talking here, emotional stress, lack of group identity, often leads to loss of productivity. One of the greatest deterrents of performance is stress. Stress is always a mental phenomenon; stress is always the value you attribute to a situation; stress is always something, which will happen when you have a level of discomfort with what is happening. Also, stress need not be necessarily a personality factor within the emotional ups and downs of a person. It can also be caused by element such as lack of group identity because it is well recognized in social sciences, like preservation of identity is as basic to the operation of social sciences as the conservation of mass is to physical sciences. Be that as it may, for the moment one needs to understand, that the way at technical subsystem is organized will create its own impact on the individual personality.

So, if the technical systems can have this kind of an impact on psychological systems, then clearly the demands of management will require identification of remedial measures. The identification of the remedial measures would require documentation of time tested managerial practices, which can eliminate the negative features, which I have been describing to you through the two or three slides, which have been projected in this segment of the presentation. Let me list it for you.

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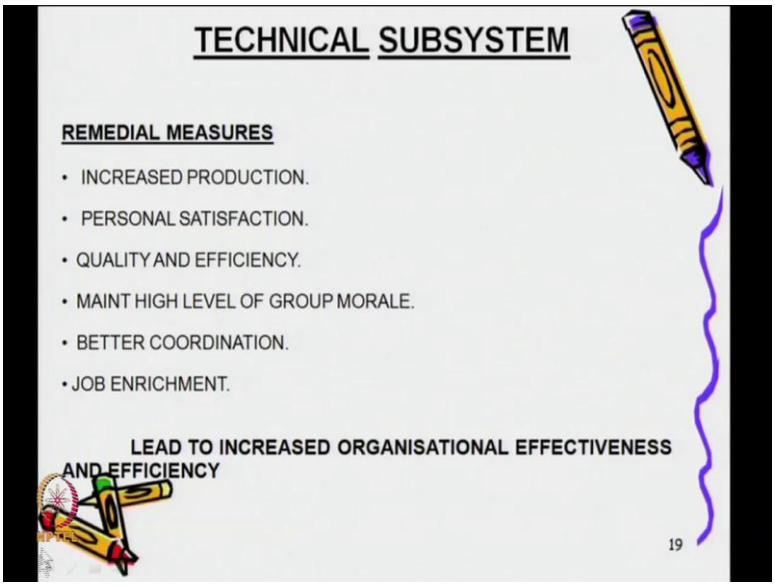

Increased production can be an instrument of higher level of satisfaction and therefore, the level of achievement, motivation could go up. Also, experiences of personal satisfaction, in terms of receiving appreciation, in terms of a job well done in your role, especially where it has to do with a situation where you believe you are underutilized instead of getting frustrated in it. Personal satisfaction will come if there is pure level appreciation for the quality of the task, which you produce, which leads us to the third kind of a remedial measure where technical subsystems could have a positive impact on the social being of the individual when there is quality and efficiency. Much of this is a derivation of personal satisfaction or in operational terms, even in increased production.

The summation will be the maintenance of high levels of group morale. If the morale is high difficult tasks are done efficiently and with speed, but if the moral is not high, then it is difficult to create a positive self image of people. Better coordination always leads to better results, but that has to be enabled not just technically, but in terms of the human factor also and one of the best remedial measures is job enrichment. Your tasks are added to the level of your task, allocation is raised and in operational terms you get to see a situation, which is both, recognition of your talent and a larger contribution to the production process. This leads to increased organizational effectiveness and efficiency.

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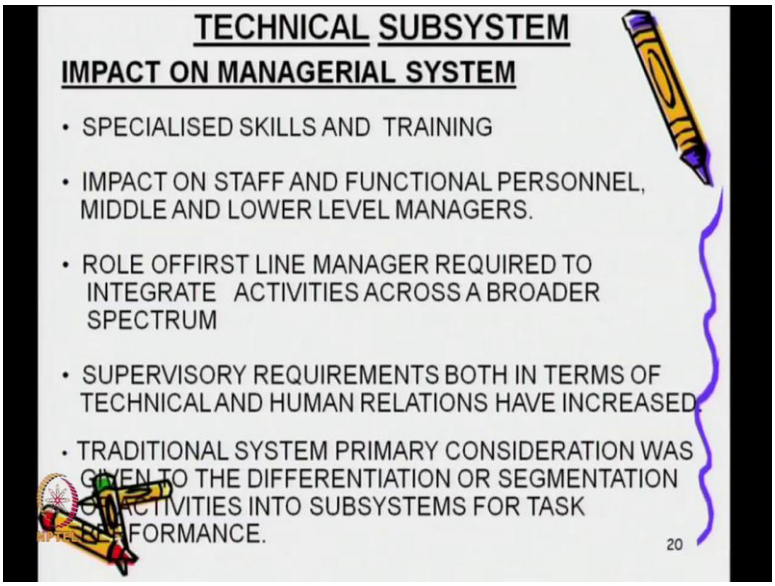

I will sum it up in slides and show it to you as a conclusion of what I have just said. You take a look at it for a few moments. Now, together the psychological and the technical subsystems, the social and technical subsystems will create an impact on the managerial system. Here is a listing of the ways in which it would create an impact on the managerial system. Special skills and training could combine the social system and the technical system to impact managerial system.

The impact on staff and functional personnel, middle and lower level managers would improve if there was specialized skills and training. The role of first line managers required to integrate activities across a broader spectrum would undergo enrichment and therefore, would be extremely useful in understanding socio-technical system. Supervisory requirements, both in terms of technical and human relations, would have increased.

And finally, traditional systems, where primary consideration has been to give differentiation or segmentation to activities in to subsystems for tasks performance would be improved for the better. Be that as it may, it is important for us to recognize, that the focus all along is on improving managerial systems for better results and the socio-technical systems approach is an approach, which moves on two wheels to enable this a little more easily and a little more powerfully.

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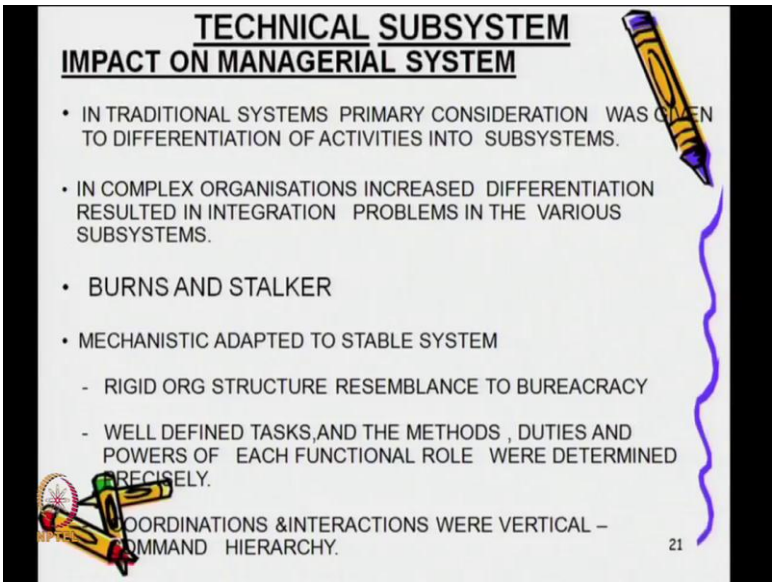

To continue with the impact on the managerial system, in traditional systems primary consideration was given to differentiation on activities of the subsystem, but in complex systems this increased differentiation resulted in integration problems at various subsystems. This is a view, which Burns and Stalker have propagated, but let us try to understand what is being said here.

If you have a traditional system, then there is greater pressure to protect boundaries. If you have a traditional system, then there is a greater need to emphasize differentiation to highlight your own significance. But as the traditional system grows complex, as would be the case in large scale industrial complex systems, differentiation will give way to integration because requirements of coordination and focus and finding a fulcrum for action would be so large, that differentiation will lead to atomization of managerial action and a situation where people may not be necessarily carrying out the tasks in sync and in coordination.

Mechanistic approach works well in a stable system where rigid organization structure starts emerging and they start resembling bureaucracy. Well-defined tasks and the methods, duties and parts of each functional role will be determined precisely. But the relationship of this role with other roles will be a definite variable in the job design. Coordination and interaction with a vertical command hierarchy will be not an autonomous function in a given system, but will have to work in tandem. A situation

where once command at a vertical level would have to be consistent with a command with another vertical level, which is why I have explained to you, that in a traditional system the primary consideration was given to differentiation of activities and subsystems and I have explained to you with referenced stock up.

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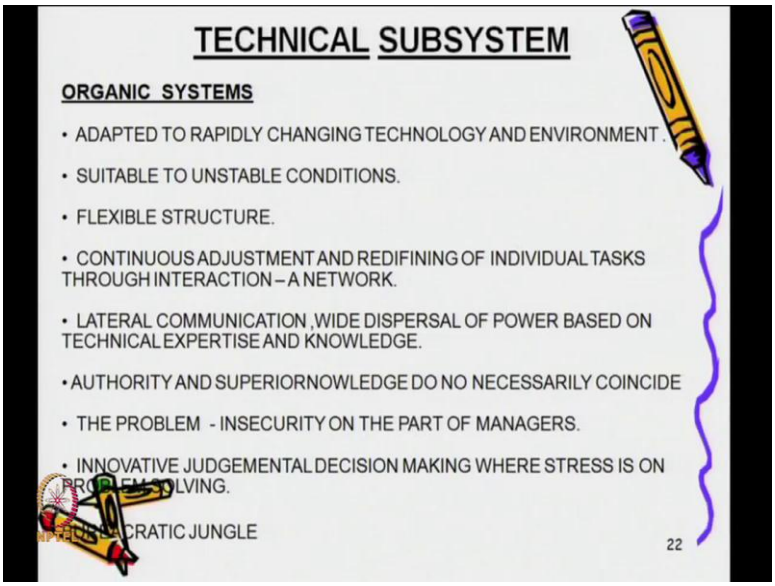

But then I want to take this forward and draw your attention to the opposite of a technical system, a mechanistic system, that is, the organismic system. The organismic system would be adapted to rapidly changing technology and environment. The organismic system would be in very many ways different to what I have just explained to you as the mechanistic system. The basic difference between the mechanismic system and the organismic system, as it is being explained to you here, is that in organismic system decisions in one vertical will be also taken with reference to the systemic consistency with, with, it would have decisions in another vertical.

Typically, your managerial style of communication will be in the, in its own segment correlated to the managerial style of the controlled segment of the organization. Your communication patterns will be systematically consistent with your control patterns. It is not as if you are controlling with high degree of rigidity, but you are communicating with a high degree of openness. It would not work if you are controlling with a high degree of rigidity, then communication will also have to be carried out in a controlled manner. Therefore, the organic system or the organismic system, both words are used

interchangeably, adapt to rapidly changing technology and environment. It is suitable to unstable conditions.

In fact, in the present state of affairs all conditions are unstable. There is instability with reference to price. If the price of petrol can escalate three times in a month, that it will not be very long before the frequency would be such, that almost ever so often, within a week you will find your budget being impacted by a simple announcement, which takes place with such frequency, that you do not know where to adjust it in.

That is an unstable condition. There are social unstabilities, there are financial unstabilities, there are regulatory unstabilities and you name it. So, unstable conditions are the only stable factors to content with running an organization. Now, that is a debate, which I do not wish to enter, but there is no debate in realizing, that the element of unstable conditions around an organizations have hugely increased in the last few years.

Therefore, any factory will need flexible structures. The flexible structure should require continuous adjustments and redefining of individual tasks through interaction. Now, this business of continuous adjustment and redefining of individual tasks through interaction would cause a setting up of a network. The key words in the statements are adjustment and redefining of individual tasks, which is the characteristic of an organic system.

Lateral communication, wide dispersal of power based on technical expertise and knowledge will take place. You need to pause here to recognize, that after having studied structure, processes, design and their working in an organization, elements of communication and power could alter the boundaries of structures, could impact the nature of processes. And the operational design of an organization may be very different from the design of work, which is there on paper.

Try to register that statement clearly. The operational design of work of an organization because of lateral communication, dispersal of power and other factors may turn out to be widely different from the design of work, which is there on paper. If that is so then the study of the impact of managerial intervention, the choice of managerial styles and the way a situation is handled will have to become a surrogate of continuous ability of the manager to observe, map, interpret and then decide. Remember, the three steps are observe, map, interpret and then decide.

The authority and supervisory knowledge do not necessarily coincide. This is the very important factor, authority and supervisory knowledge, which is vested in the superior, if they do not overlap, then what would be the result? The result would be people with authority do not have the superior knowledge or vice versa. People with superior knowledge do not have the authority. A perfect case for organizational (( )), therefore there may be insecurity on the part of managers who are in a superior position, but do not have superior knowledge, innovative judgment and decision making, where stress is on problem solving and we would create a bureaucratic jungle.

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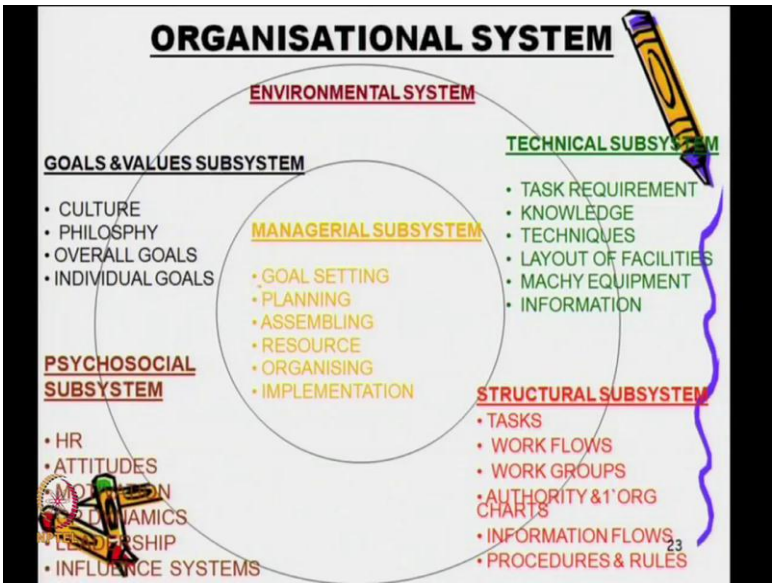

This diagram, like the one before, in this diagram before, in this presentation of socio-technical systems you will recall, there was a similar diagram presented in the preceding presentation. Let me take you back to it. You remember this diagram, goals, values technical system, structural subsystem; we go back to the diagram. Now, which I am showing you, you can see, that there is much repetition, why is this so? It is so because it is to remind you, that organizational systems remain constant and it is the impact of the socio-technical system on the organizational system that is the subject matter of our analysis. So, this is the domain area, which will be taking the impact of socio-technical systems. That is the purpose.

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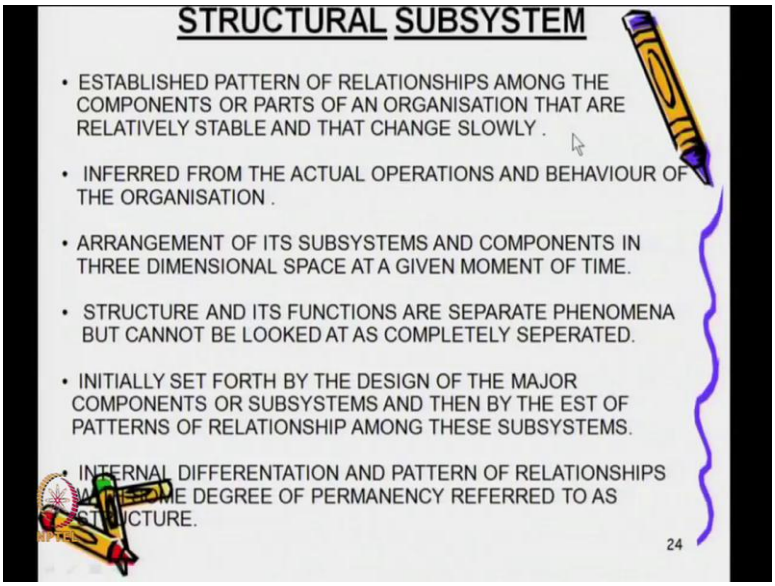

What are the structural subsystems? Structural subsystems, as you see projected before, you are established pattern of relationships amongst the component or parts of an organization, that are relatively stable and that change slowly. They create the structural subsystem. In fact, the structural subsystem is inferred from the actual operations and behavior of the organization. Arrangements of its subsystems and components in three dimension space at a given moment of time determine the direction of the movement of the structural subsystems activities.

Structure and its functions are separate phenomenon, but cannot be looked at as completely separated. Now, if structures and functions are separate phenomenon and yet get integrated, then its impact on the organizational system is going to be large. Initially all this was set forth by the design of the major components or subsystems and then by the set patterns of relationship amongst the subsystems. Internal differentiation and pattern of relationships with some degree of permanency referred to as a structure.

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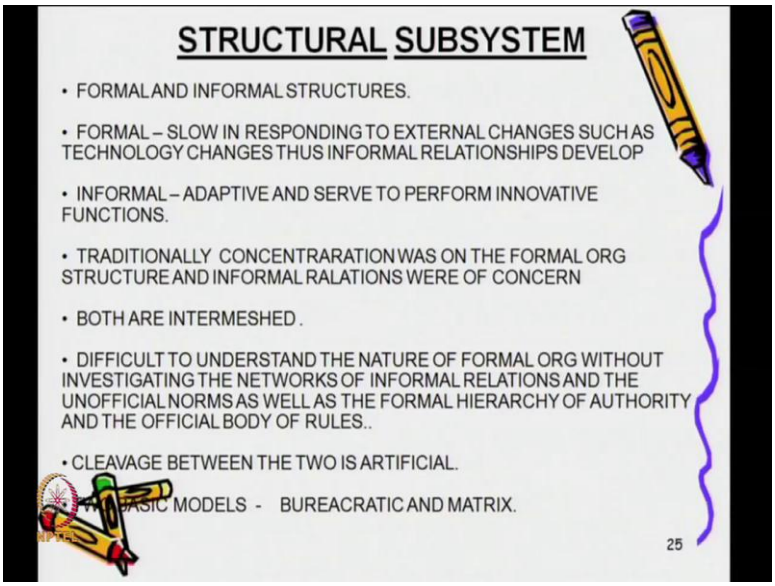

Structural subsystem, therefore, can have formal and informal structures. Formal structures are designated structures. Formal structures are the ones, which exists on paper and therefore, have the annotation of authority and command. But informal systems are the ones, which really design how an organization works and there, again the networking system becomes the determining factor of the direction of decision making.

Very often the structures that are formal may be slow in responding to external changes such as technological changes, and it is the informal relationships, which propel this relationship. The informal relationships propelling changes in technologic factor shows, that there can be a synergistic rhythm between the formal and informal systems. The defining characteristic of the informal structures is that it is adaptive and serves to perform innovative functions. How is it adaptive? It is adjusted to the social dynamics of the players amongst themselves and when that happens, innovation can take place because innovation requires the will to release the energy to move the system in a manner, which is not the traditional patterned manner.

Therefore, traditionally, concentration was on formal organization structures and informal relationships were looked upon with some question mark. Times changed and both (( )). In the era, that we live in today, malleable structures are much appreciated. Even if they are not totally malleable, certain degree of resilience is a very useful managerial prospector and the socio-technical system helps to establish that. Sometimes it is difficult

to understand the nature of formal organizations without investigating the networks of informal relationships because directions may be given to a decision making, which are not really supported by the formal organization, but to understand it you get an informal relationship.

The interplay of political forces and their positioning very often helps to explain this because political statements even within organizations are made at times not so much with a reference to a reality, but with reference to the expectations of the outcome of a decision. The unofficial norms, as well as, the formal hierarchy of authority and the official body of rules, therefore, work together.

The unofficial norms may prevail because they say, this is an informal organization and we do not codify these patterns. In fact, the argument has been now carried over to a point where it is said, that good organizations are practice driven, they need not necessarily be rule driven as codified. Now, I do not want to take position on that debate, but what you do have to realize is, that nature of organization studies is evolving one and what was fashionable at one stage of analysis need not be fashionable at the another stage of analysis. Therefore, the unofficial norms, as well as, the formal hierarchy of authority and the official body of rules may coexist and there may be a situation where a blind, a blind eye or Nelson's eye may have to turn to an operational elaboration.

Therefore, the perceived cleavage between the two, the formal of the informal in this day and age has become artificial. Two basis models therefore are operating today. The bureaucratic and matrix I have shown to you earlier on while discussing the design of an organization, both bureaucratic and matrix. And just in case you do not remember it let me recall to your attention the three levels of pyramids, which I displayed to show to you. The visual illustration of a paramedical structure and what you should be recognizing is that that is the heart of a bureaucratic system.

Then again if you recall the last diagram, which I showed to you of organization design, it had collegial form of structure in subdivisions, pentangle form structure in subdivisions, a paramedical form of structure in subdivisions of the organization and they were all coordinated through linked pins of one division overlapping with the linked pin of the another division and the end product was mixed matrix, that is how real life operates.

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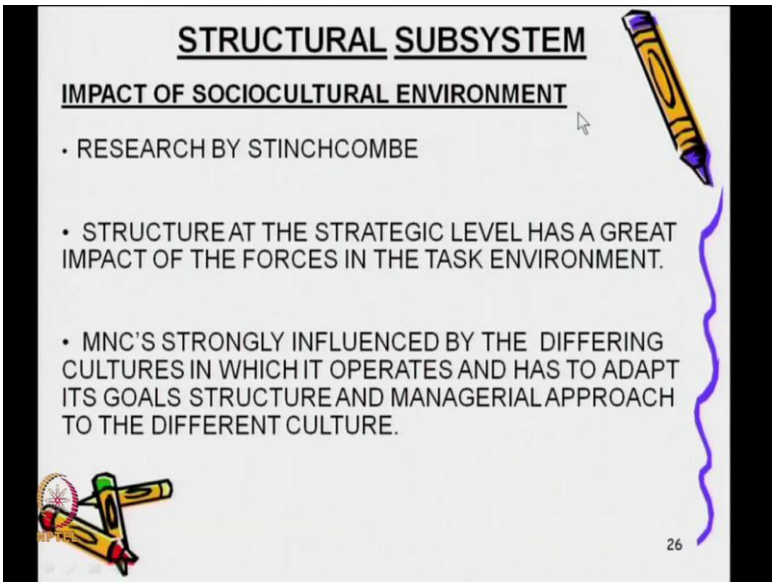

The impact of sociocultural environment has also been studied typically by Stinchcombe who decided structure at the strategic level has a great impact on the forces in the task environment. That was the result of his findings, that structure at the strategic level has great impact on the forces in the task environment. In fact, multinational companies strongly influenced by differing cultures in which it operates and has to adapt its goals and structure and managerial approach to different culture is a good example of how structure at strategic level has a great impact on the forces in the task environment and vice versa. Even multinational companies have to make allowances for what is happening at the local level.

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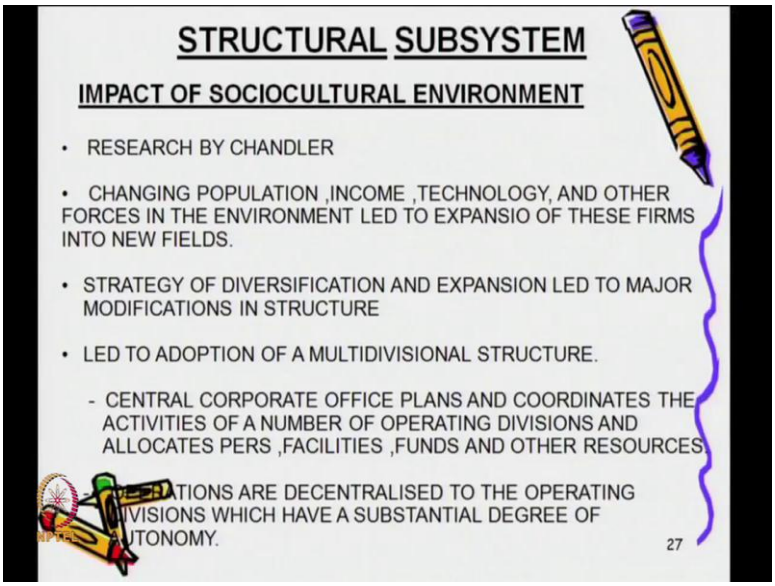

The impact of the sociocultural environment was highlighted by Chandler. He maintained, that changing population, income, technology and other forces, let me repeat for you, changing population, income, technology and other forces in the environmental led to expansion of these firms into new fields. The strategy of diversification and expansion led to major modifications in structure. In other words, strategy and structure are correlated.

A theme, which has been ploughed several times and Chandler is an outstanding name in that field. The field of strategy has a structure and the point, which he is making, is the strategy of diversification and expansion can have a huge impact on the structure. Central cooperate office plans, now not for the whole organization, but for purposes of coordinating the multidivisional structures, the activities of number of operating divisions also have to be coordinated and the corporate office has to allocate personal facilities and funds for other resources. Operations are decentralized to the operating divisions, which have a substantial degree of autonomy. Now, here again is a very important dimension, which leads to be kept in mind. It is not only the structure which varies, it is not only the processes, which need not be identical across the board, but indeed the quality of autonomy, which may exist from one decentralized unit to another decentralized unit, may be at various.

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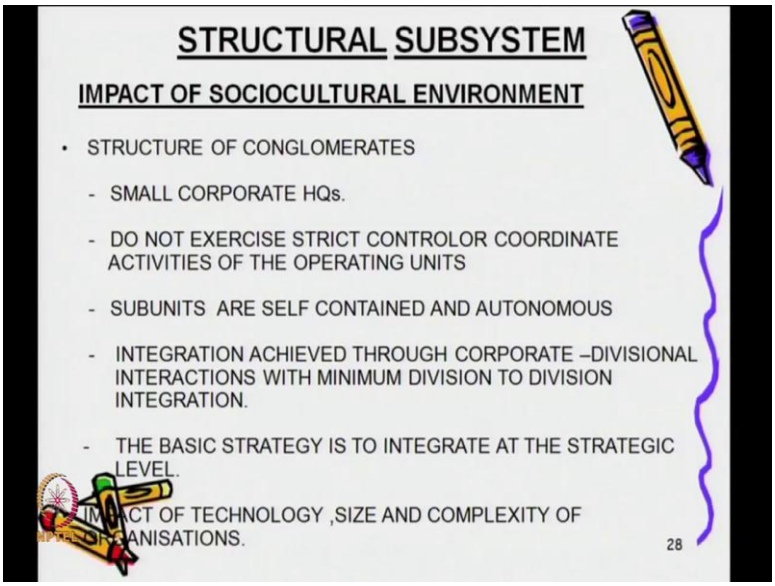

So, ultimately one end ups in a situation where there is a structure of conglomerates. Small corporate headquarters emerge, they do not exercise strict control or coordinate activities of the operating units, and subunits are self contained and autonomous. This is larger point to take home. Integration is achieved through cooperate divisional interactions with minimum division to division integration. Please note this very carefully, integration is achieved through cooperates, divisional interaction with minimum division to division integration. The basic strategy is to integrate at the strategic level. This means you integrate at the top and you led the units operate among themselves.

The impact of technology, size and complexity of the organization are the variables to look at and are the elements to understand. So, back again to the basics and here again one shows the managerial subsystem of goal setting, planning, assessment, resources, organization, implementation. The goal values are subsystems, the psychological subsystems, the technical subsystems and structural subsystem. Why did I bring this diagram back to your attention? The diagram is brought back to your attention to show, that there can be considerable autonomy on all these dimensions at the subunit level and yet, the streaming and flowing of the decision making styles, maybe meeting at the convergent level, to create consistency of command and policy operation.

So, the, so the scalar principle is being carried to its logical process and you are expected to understand, that it is not just the overall internal consistency which matters, but from one level of the organization to another level of the organization, that can be variances of pattern. And those variances of patterns will show itself in acceptable mix of autonomy and unified control depending upon which level needs autonomy and which level needs to be integrated at a policy level. So, the elaboration highlights the social aspects of the socio-technical dimensions of analysis, which we are currently concerned with and has run through various levels of social dynamics to explain how managerial system is impacted.