Designing Work Organization
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Lecture-40
Workplace Technology and Design-2

In the workplace technology and design session, we will talk about the non-core the departmental technology, departmental design, relationship of the departmental technology through structural and management characteristics, workflow interdependence among the departments, impact of the technology on job design and as usual the case study research papers and book recommendations and references will be there. So, in organization no matter how well designed is only as the good as the people who live and work in it. So, the section shifts to the department level of the analysis for the development not within the technical core and the human resources accounting research and development and the marketing departments that are outside of the technical core are there. So, each of these and other non-core departments in an organization has its own production process that consists of a distinct technology. The framework that has had the greatest impact of the understanding of the department technologies was developed by the Charles Perrow and these Perrow's model has been useful for a broad range of technologies which made a ideal for the research into the departmental activities. In this case, these variety is the first dimension and Perrow specified two dimensions of the departmental activities that were relevant to the organization structure and the processes.

The first is the number of the exceptions in the work and this refers to the task variety which is the frequency of unexpected and the novel events that occur in the conversion process. Task variety concerns whether the work activities are performed the same way every time or they differ from time to time as employees transform the organization's inputs into the outputs are there. When the individuals encounter a large number of the unexpected situations with the frequent problems variety is considered a high. When there are the few problems and when day to day the job requirements are the repetitive than the technology contains a little variety.

Here the second dimension which is very important is the analyzability. The second dimension of technology of the analyzability of the work activities when the conversion process is the analyzable and the work can be reduced to the mechanical steps and the participants can follow an objective computational procedure to solve problems. Problem solutions may involve the use of the standard procedure such as the instructions and the manuals or the technical knowledge such as that it is a textbooks or the handbook. On

the other hand, some work is not analyzable when the problems arise it is difficult to identify the correct solution. In the case of the analyzability, there is no store of the techniques or the procedure to tell a person exactly what to do.

The cause of the solution to a problem is not clear. So, employees rely on the accumulated experience, intuition and the judgments are there. The final solution is to problem is often the result of wisdom and experience and not the result of the standard procedures. These non-core departmental technology of the framework, the two dimensions of technology and examples of the departmental activities on Perrow's framework are shown in the following figure. The dimensions of variety and analyzability from the basis for the four major categories of the technology, routine, craft, engineering and the non-routines are there.

So, the categories of technologies are the routine technologies are characterized by the little task variety and the use of the objective computational procedure. The task are the formalized and the standardized examples includes an automobile assembly line and the bank retailer department is there. The craft technologies are characterized by a fairly stable stream of the activities, but the conversion process is not analyzable or well understood. A task requires the extensive training and the experience because the employees they respond to the intangible factors on the basis of the their wisdom, intuition and the experience. Although advance in the machine technologies seems to be have reduced the number of the craft technologies in organizations, craft technologies are still important.

Engineering technologies tend to be complex because there is a substantial variety in the tasks performed. However, the various activities are usually handled on the basis of the established formula, procedures and techniques. Employees normally refer to the well developed body of the knowledge to handle the problems, engineering and accounting tasks usually fall in this particular category. A non-routine technologies have high task variety and the conversion process is not analyzable or well understood. In non-routine technologies, a great deal of the effort is devoted to analyzing the problems and activities, the several equally acceptable options typically can be found.

Experience and technical knowledge are used to solve problems and perform the work. The basic research, strategic planning and other work that involves new projects of the unexpected problems are the non-routine problems. The blossoming biotechnology industry also represents and the non-routine technology. Breakthrough in understanding the metabolism and the physiology at a cellular level depend on highly trained employees who use their experiences and intuition as well as the scientific knowledge is there. Now, when we talk about the non-core departmental technology, here we find that

is the either first we will go through the routine and the in case of that is the variety in the routine is low, then here we find that is the analyzability will be high.

For example, when we talk about the sales, clerical drafting and auditing is there and here the analyzability will be very high. So, in the case compared to the non-routine is there. In the non-routine when we find about that is a strategic planning, social science research and applied research is there. So, analyzability is here it is low and in the case of this the variety is high, then it will be the legal, engineering, takes accounting and general accounting. While when the variety is when low and the analyzability is also low, then we find that is the performing arts, trades, fine goods manufacturing, university teaching, general management that is a craft is there.

So, the technology which will be used in case of this the high variety and the high analyzability will be and that is about the legal, engineering, takes accounting and the general accounting is there. When the variety is high and the analyzability is low, so therefore, the strategic planning and social sciences research that will be the applied research will be applicable. Now, here we find that is the departmental design of once the nature of a departmental technology has been identified, the appropriate design can be determined. The department technology tends to be associated with a cluster of the departmental characteristics such as the skill level of employees, formalization and the methods of communication. The overall design of the departments may be characterized as either organic or the mechanistic is there.

Routine technologies are associated with the mechanism design with the formal rules and the management processes are there. Non-routine technologies are associated with an organic design and the department management is more flexible and free flowing. The specific design characteristics of the formalization, centralization, employee skill level, span of control and communication and coordination vary depending upon the work unit technologies are there. Now, when we talk about the formalization, that is a routine technology is characterized by standardization and division of the labor into small tasks and that are governed by the formal rules and procedures. For the non-routine task, the structure is less formal and less standardized.

When variety is high as in the research department, fewer activities are covered by the formal procedures. Decentralization is the routine technology most decisions are making about the task activity is centralized to the management is there. In engineering technologies, employees with the technical training, they tend to require the moderate and decision authority because the technical knowledge is important to task and accomplishment and the decentralization to the employees is greater of the non-routine settings where the many decisions are made by an employee. So, employee skill levels

works tough in routine technologies typically require the little education or experience or with a congruent with the repeat work activities are there. In work units with the greater variety staff are more skilled and often have the formal training in technical schools or the universities.

The training for the craft activities which are the less analyzable is more likely to be through the job experience, non-routine activities requires both formal educational and experience job experiences there. The span of control, the number of the employees who report to a single managers or supervisors is the characteristics is a normal influenced by the departmental technology. The more complex and non-routine the task, the more problems arise in which the supervisor becomes involved. Communication and coordination or activity and the frequency increase the task variety increases. Frequency problems require more information sharing to solve problems and ensure the proper completion of activities.

The direction of communication is typically horizontally non-routine work and units and vertical in the routine work units are there. The form of the communication varies by the task analyzability. When the tasks are highly analyzable statistical and detailed forms of the communication example memos, then the reports, rules and the procedures are frequent. When task are the less analyzable information typically is conveyed face to face over the telephone or into the group meetings are there. Here the relationship of the departmental technologies to structural and management characteristics are there.

Now, the formalization on the centralization, staff qualifications and the span of control, communication and coordination or these are the dimensions, key dimensions are there. Now, in the mostly organic design, modern formalization is there, when we talk about the formalization, modern centralization is there, work experience is there and the moderate to wide span is there, horizontal verbal communication will be there. When we are talking about the routine jobs are there, so there high formalization, high centralization, little training or experience, then the wide span is there and the vertical written communications will be there. Now, in the case of the organic design is concerned, low formalization, low centralization, training plus experience, moderate to narrow span and the horizontal communications meetings are there, that is a non-routine are there. Engineering mostly mechanistic design, modern formalization, moderate to number centralization, formal training, moderate span written and the verbal communications are there.

So, therefore, this will be the routine and non-routine and the craft and in the engineering style, where the relationship of the departmental technology to the structural and management characteristics are there. When we talk about the workflow

interdependence among the departments, then it extend to which the departments depend on each other for information, resource or materials to accomplish their task. Low interdependence means that the departments can be do their work independently of each other and they have the little need for the integration, consolidation and the exchange of the materials are there. So, high interdependence means the departments must constantly exchange the resources. James Thompson defined three types of the interdependence that is the influence organizational structure, so that is a pooled one.

So, pooled interdependence is the lowest form of the interdependence among the departments. In this form, the work does not flow between units. So, each department is part of the organization and contributes to the common good of the organization but works independently. Thompson produced that the pooled interdependence would exist in form with what he called a mediating technology. A mediating technology provides products or services that mediate or link clients from these external environment and in doing so, they follow the departments its work independently.

Now, workflow interdependence among these are the bank brokerage firms and real estate officers are mediates between the buyers and sellers, but the offices work interdependently within the organization. Thompson argued that manager should use rules and procedures to standardize activities across the departments. Each department should use the same procedures and financial statements for the outcomes of the department can be measured and pooled. Very little day to day conditions with a small required among the units are there. Sequential workflow is when the interdependence of the serial firm which parts the produce in one departmental becoming the inputs to the another department it is called the sequential interdependence.

The first department must perform correctly by the second department to perform correctly. This is a higher level of interdependence than the pooled under interdependence because the departments exchange resource and depend on others to perform well. The sequential interdependence creates a greater and the for the horizontal mechanism such as the integrated or the trade curve factors are there. Sequential interdependence occur in what the Thompson called the long linked technologies. It refers to the combination of a new organization of successive stages of the production in each case of the production uses its inputs, the production of the preceding stage and products inputs for the following stage.

So, reciprocal the highest level of the interdependence in the reciprocal interdependence is there and this exists when the outcome of the operation A is input to the operation B and the output of the operation B is the input back again to the operation A. So, here we find out that is the outputs of the department influence those departments

to reciprocate fashion. So, reciprocal interdependence tends to occur in the organization with what the Thompson called the intensive technologies which provide a variety of the products or the service to the combination to a client. Reciprocal interdependence requests that departments work together intermittently and be tightly coordinated. A study of these top management team confirms that the effective performance of teams characterized by the high interdependence dependence on the good communication and the close coordination.

People from the several departments might need to be involved in face to face coordination, teamwork and the decision making is there. Now, here we will talk about the Thompson's classification of the interdependence and management implications are there. So, form of the interdependence are the diesel pool link bank is there, client sequential and the reciprocal is there what we are talking in the above slides. So, the demands on the horizontal communication decision making will be low communication, medium communication and the high communication will be there. The type of the coordination required is standardized service procedures, divisional results are there, plan schedule, self-advocacy is there, then the mutual adjustment relational coordination and teamwork is there.

So, priority for the location units close together and that the low, medium and the high priorities that will be decided for the pooled bank the sequential and the reciprocal hospitals are concerned. Coordinating these interdependence in business that is the Thompson theorize that the correct way to get the departments within an organization working together effectively to structure respective work of task by intensity of interdependence and then the manage each of those interdependencies with the different coordinated methods. For example, a poor interdependence requires the standardization in the rules and operates the procedures while the coordination method for the other two interdependence are the slightly more flexible. A sequential interdependence is managed through the mildly adoptive planning and scheduling while reciprocity interdependent departments are the managed through the constant information sharing and the mutual adjustments are there. This impact of the technology and the job design will be that is the ultimate impact of the technology that can be partially understood through the concern of the job design and the socio-technical systems are concerned.

So, job design includes the assessment of these goals and tasks to the accomplished by the employees. Managers may consciously change the job design to improve the productivity or the worker motivation. However, managers may also unconsciously influence the job design through the information of new technologies which can change how the jobs are done and their nature of jobs are there. Managers should understand how these introduction of the new technologies may affect the employees jobs are there.

In addition to actually replacing the human workers technology may have the several different effects on the human jobs.

Research has indicated that the mass production technologies tend to produce the job simplification which means that the variety of any difficulty of tasks performed by a single person are reduced the consequence of the being boring repetitive jobs that generally provide by the little satisfaction. So, sometimes the managers introduce the job rotations which means the moving employees from the job to job to give them a greater work variety of the task. More advanced technologies on the other hand tends to cause the job enrichment meaning that the job providers greater responsibility recognition and opportunities for the growth and development is there. Decision manufacturing and the other advanced technologies may also contribute to the job requirement which is in turn the expansion of the number of the different tasks performed by an employees. So, fewer employees are needed with the new technologies are there.

So, what will be the impact? The impact will be socio technical systems. The socio technical systems approach recognizes the interaction of the technical and human needs in an effective job design combining the needs of the people with the organization need for the technical efficiency. The socio portion of the approach refers to the people and groups that work in an organization and the how the work organizations are correlated. The technical portion refers to the materials tools managers and the processes used to transform the organization inputs into the outputs are concerned. The following figure therefore, listed the three primary composition of the socio technical systems.

The social system includes the human resources as such as individual and team behavior, organizational culture system and the practices and degree of the communication openness that can influence the performance of the work is there. The technical system refers to the type of this production and the technology, the level of the interdependence, the compatibility with the task and the force is there. The goal of the socio technical system approaches is to design the organization of the joint organization which means that an organization functions best when the social and the technical systems are designed to fit the need of the one another. The socio technical systems approach attempts to find a balance between the what workers want to and what the technical requirements of the organizations production systems are there. Here we find out the socio technical systems model and that is a social system and the technical system is there.

So, here it is the individual and the team behavior is there organization team culture will be there and this management practices leadership style that will lead towards a degree of communication individual of all the designing of the job optimization. For example, what is a person, how his communication skills are there, what are the managerial

practices he knows and degree of these individual needs and desire to grow and this will give the technical systems input also. Type of the production strategy he has been used, level of the independent the pooled required as the reciprocal, the physical and start working. The complexity of the production process, variety in an eligibility, nature of raw materials and the time pressures are there. These impact of the technology of the job design of the socio technical system principles and that states that the people should be viewed as resources and provided with the appropriate skills, meaningful work and the suitable rewards becomes the even the more important in today's world of the growing technological complexity.

So, one study of the paper manufacturers found that the organization that put too much faith in the machines and technology and pay little attention to the appropriate management of the people do not activate analyzing the productivity and flexibility is there. So, today's most successful campaigns strive for to find out the right mix of the machines, digital systems and people and the most effective way to coordinate them is there. So, although the many principles of these socio technical systems theory are still valid, current scholars and researchers are also arguing for in the expansion of the approach to the capture the dynamic nature of the today's organizations and this chaotic environment and the shift from the routine is a non-routine joint brought that is the about the advances in the technology is there. So, how far and how fast is the automation of the task proceeding is there. So, how technology affects the job design the recently changed, initially computers had largely automated the task that could be well defined and the studied by the humans either the traditionally the computer programs that is speedy and guided by the humans traditional and here this recently how a computer scientist and that meets the significant stages in the machine learning to which consideration develops.

They evaluate and their own algorithm with little or no human interventions are there. So, these impact no opportunities the automation of the cognitive task and these is moreover the such algorithm may improve mobility, dexterity vision and the recognition of the robotics increasing the automation of the physical task is there. For example, automobile manufacturing or adopting the computer vision and the robotics in the assembly processes. Meanwhile, the financial services firms are they adopting the machine learning and the next recognition technique in this risk assessment and the service operations. Individually, the humans may be substituted by the machines into the particular task then here the future job should be designed to ensure complementary between the machine prediction outputs and worker task and an excellent example is the evaluation of the radiological scans are there.

So, it allows for that that is examination of far more scans then that could be evaluated by the humans and that increase the likelihood and directing a medical problem. These

also fields of a radiologist time to interpret the automation in praise identified by the algorithm and work individuality with patients to develop the customized treatment plan task data safely out of the reach of the automation is there. This is the case study my hospitals which you can refer and find out that is the how the admitted to treatment to the point he is discharged and then the time of the discharge how the person has been documented on his the all these different field of the required items and these directly for a part of the hospital staff such as the medicine supplies and the other hospital equipment suppliers are there. So, this is a gap in the communication between the any of these departments may lead to each in the patient's proper quality treatment. So, my hospitals are known to have a smooth functioning treatment process radiology.

So, here we will find that is the hospital has its centers which is spread across the various cities in the country and head is used to their efficient relational coordination systems that the patients can be treated success is in any of the hospital central authority any glitch is there. In this kind of study you will also find that is the how the extremely crucial in cases where the doctors from the different fields of specialization they are coming together and when there is a inter segmental function is there and that is the here the patient's quality of treatment is no compromise. However, the senior doctors are encouraged to maintain a two way earning process rather than the just as the process is there. So, proper coordination between the interns, nurses, senior doctors and the head of the departments under which a patient is admitted is the most crucial for ensuring the effective and the efficient treatment of the patient. Since working together forms a vital part of the setting training on these employees to work as a team management importance are there.

So, the hospital seeks to recruit the employees who possesses a collaborative attitude and can easily get and work well with the others rather than the focus on their individual goals for the becoming the successful is there. The hospital work with the philosophy that when there is a patient or the entire team succeeds together or they all fall together by using these practices that support the teamwork, shared goals, mutual respect and shared responsibility and accountability. So, Mayo facilitates the relational coordination that interdependent departments are largely distributed. So, here we find this is a research paper, new organizations and new workplace and the purpose of this paper is to outline key changes occurring within the office of occupier business that will have a medium to long term impact upon the nature and design of the office to workplace and the implications for the corporate real estate manager is there. So, this paper will be also talking about the quantitative and qualitative demands of the space there is a number of the practical implications arising from these funding no notice to the need for the invention to consider the appropriation of the current standards for the best building design and the fit out of the contemporary offices are there.

Now, this research papers outcome will be definitely will be particularly very useful for the corporate real estate manager and whilst much has been written about the agile working, the less has covered the practical implication of the building design and the corporate real estate management is there. This is the book the participatory IT design and authors are the Keld bodker, Finn Krnsing and Jesper Simonsen for the designing for business and the workplace realities it will help you to getting the detail into how these IT design and participation will help for the success of the organization. And this book recommends about the industrial design provides for the compliance and organizations broadcasting corporation is there. So, therefore, here you will find in depth analysis and innovation is required and in the part 3 explains the methods, the 16 techniques and related representation tools that is offering first in overview and then specific description of each on the these separate sections are there. And these are the references, you can refer these references for your further detailed studies which will be guiding you that is the how this technology that is making a change in designing the issue of these organization. Thank you. Thank you.