Module 8

Organisational Environment

Introduction

In previous study modules, the focus has been primarily on environments that are internal to organisations. In this module we will discuss various influences of the environments that are external to organisations. Organisational environment discusses the components of an organisation's external environment and various managerial, strategic and behavioural responses to environmental demands. This module will also review contingency theory and discuss its application to organisations today

Upon completion of this module you will be able to:

Outcomes

- *define* organisational environment.
- *explain* the impact of globalisation on organisations and managers.
- *show* how technology affects organisational design.
- *discuss* the importance of ethical behaviour in organisations.

Terminology

Terminology

External Environment:	The external environment refers to 'those events and conditions surrounding the organisation that influence its activities.' There is a wide ranging set of external environmental influences: customers, competitors, suppliers, distributors, as well as technological, economic, demographic, political and legal.
Ethical Behaviour:	Ethical Behaviour speaks to moral principles or beliefs that guide individuals through their interactions with others. It may be defined as morally 'good' and 'right,' as opposed to 'bad' or 'wrong,' in a particular setting.
Moral Rights Model:	The moral rights view is more specific to fundamental rights and privileges shared by all human beings. One might consider whether the decision will protect people's right to freedom, life and safety, due process, and free speech. Managers

must often weigh the outcomes to various groups or individuals when making these decisions.

Justice Model: The justice model would encourage one to make decisions based on what is fair and impartial – equity is distributed across shareholders. Managers must be aware not to discriminate between people, and rely on established objective criteria to make decisions.

Utilitarian Model: This view argues that one would make an ethical decision by considering what would produce the greatest good for the greatest number of stakeholders. The challenge for managers is that often stakeholder groups have distinct and even competing interests

What is organisational environment?

In previous study modules, the focus has been primarily on environments that are internal to organisations. In this module we will discuss various influences of the environments that are external to organisations. The external environment is defined as 'those events and conditions surrounding the organisation that influence its activities.' There is a wide ranging set of external environmental influences: customers, competitors, suppliers, distributors, as well as technological, economic, demographic, political and legal. All of these influences affect the way organisations behave and shape the strategic direction that is adopted. These influences also present numerous and diverse opportunities and threats that must be exploited or mitigated by organisations.

One of the most significant influences on organisations in the last decade has been the emergence of globalisation, and we will discuss this in some detail. In addition, technological advances have prompted organisational re-designs, business process innovations, and significant human resource reallocations. It is an emergent influence that merits attention in this unit. Finally, the accelerated pace of change in the environment has created an environment that forces organisations to examine their diverse stakeholder groups, and establish some systematic ethical guidelines that will ensure appropriate consequences of organisational decisions. For that reason, we will also examine ethical considerations and conduct in organisations today.

The impact of globalisation on organisations and managers

The notion of a closed economy or domestic self-sufficiency is certainly an antiquated one given the rapid emergence of globalisation. World economic, political, legal and technological changes, as well as newly formed international relationships have had a significant effect on managers within organisations. There are a number of economic alliances that merit the attention of global managers today:

1. **European Union (EU)** : The EU (which includes most Western European nations, such as France, Greece, the United Kingdom, Denmark, the Netherlands, Belgium, Ireland, Italy, Luxembourg), has emerged with a political, economic and monetary union among the member countries. Barriers between borders have been lowered, and goods and services now move more freely between countries.

2. **North American Free Trade Agreement (NAFTA)**: This agreement (which came into effect on January 1, 1994) has also reduced tariffs and barriers to trade, and has linked customers and economies between the United States, Canada and Mexico.

3. **Asia-Pacific Economic Cooperation Forum (APEC)**: This agreement emerged with the objective of joint economic development of the Asia-Pacific basin countries.

4. **Caribbean Community (CARICOM)**: This community is pursuing agreements for free trade within Latin American countries.

5. **World Trade Organisation (WTO)**: The WTO is responsible for monitoring the reduction of import duties that will be phased in over the next several years. The founding members of the WTO include Canada, the European Union, and the United States. The WTO has faced a number of challenges from various leaders who are concerned about the economic consequences of freer trade. As well, WTO conferences are often disrupted by protestors, some of whom include labour unions, environmentalists, social activists and farmers.

6. **Mercosur**: this free trade agreement came into effect on January 1, 1995, and has as its primary objective, the elimination of tariffs on 80 per cent of goods traded between Argentina, Brazil, Uruguay and Paraguay. It has been proposed that a South American Free Trade Area (SAFTA) negotiate with NAFTA to form an Americas Free Trade Area (AFTA). A number of other free trade areas are in existence in the Americas: The Andean Pact (Bolivia, Ecuador, Colombia, Peru, and Venezuela); The Central American Common Market (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua); the G-3 group (Colombia, Mexico and Venezuela), and The Caribbean Market (several of the Caribbean islands).

7. **Other areas**: There are a number of other free trade associations throughout the world, some of which include: ASEAN Free Trade Area (Brunei, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam); the Economic Community of Central African States (many nations in equatorial Africa), and the Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates).

8. **SAARC**: South Asian Association for Regional Cooperation It becomes obvious, when we consider the growing number of

alliances between nations, that the world is becoming a single interdependent entity. Global managers face a variety of challenges in this 'global village': increased heterogeneity across organisational populations necessitates continuous learning, increased flexibility and successful management of change.

A global manager is described as someone who is able to conduct business across borders. By 2015, trade between nations will exceed trade within nations. In addition, 85 per cent of companies in the American Fortune 500 group indicate that they do not have an adequate number of globally competent managers. There are many opportunities for managers who demonstrate the skills required to function effectively in an international business environment. What characteristics do global managers possess? Before reading further, think about your own perception of characteristics that might contribute to successful 'global management'. Create a list of eight to ten characteristics that global managers might require, and justify your choices (two-three pages). You will probably be able to add to this list; however, the following global attributes are sought after by many organisations:

- Adapts well to different business environments

- Respects different beliefs, values and practices

- Solves problems quickly and effectively in new environments

- Communicates well with people from different cultures

- Speaks more than one language

- Understands different government and political systems

- Conveys respect and enthusiasm when dealing with others

- Possesses high technical expertise for the job.

Think about this list and draw some conclusions about your own managerial attributes. Do you think that you are well suited to be an effective global manager? Do you relish the opportunity to experience new things in foreign cultures? Do you feel comfortable with uncertainty and ambiguity? Are you flexible and willing to adapt to change? Do you think you are able to recognise new market opportunities that are consistent with organisational goals? It is difficult to answer these questions with certainty, but they merit your attention. Managing in a global environment can be challenging and even daunting. There are a number of things you might do in order to better equip yourself, and enhance your global managerial skills. Some of these might include: inquire about existing training programmes in your organisation, seek out a mentor who will facilitate your progress as a global manager, participate in associations or clubs that focus on required skills, and enhance your formal education. Many of these activities will also enable you to improve your network of contacts and influencing factors.

Technology and organisational design

The way work is organised is very much a function of technology within the organisation. Products and services are produced very differently than they were a decade ago, simply because of a new technological presence. The infrastructure of organisations has been redesigned in a way that has radically changed the way people communicate with each other, and the cross-functional nature of work teams has also been enabled with technology. For the purposes of this discussion we will focus on the classifications of technology provided by Charles Perrow, James Thompson and Joan Woodward. These classifications apply to organisations that provide either products or services, or both.

Charles Perrow – Routineness

Charles Perrow argued that various technologies are differentiated primarily by the routineness of the transformation task that is managed by the department or organisation. Perrow examined two components of this task:

1. **Exceptions**: if the organisation is using standardised inputs to produce standardised outputs, it is likely that there are few exceptions. On the other hand the organisation might have a variety of inputs and outputs where many exceptions are the norm. As exceptions increase, technology becomes less routine.

2. **Problems**: some problems necessitate non-programmed decision-making because they are difficult to analyse. Alternatively, programmes can be easy to analyse under some exceptions. Where problems are more complex and difficult to analyse the technology becomes less routine.

Exceptions		
Problems	**Few**	**Many**
Difficult analysis	**Craft technology** Cabinet making Public school	**Nonroutine technology** Research unit Psychiatric hospital
Easy Analysis	**Routine technology** Assembly line Vocational training	**Engineering technology** Heavy machinery Construction health spa

Table 8.1 Perrow's Technology Matrix

Source: Perrow (1967, April, pp. 196, 198)

Outputs from inputs

Perrow used the term technological routineness to describe the extent to which exceptions and problems affect the task of converting inputs into outputs. In **Table 8.1**, the matrix demonstrates that exceptions and problems produce four specific types of technologies:

1. **Craft technologies**: these refer to standard inputs and outputs. Only when a special need or request is present, will an exception be made (for example, you might order a car, and choose a paint that is not among the standard choices available).

2. **Routine technologies**: these technologies also require standardised inputs and outputs, however, when an exception is made, the adjustments are clearly articulated (for example, you might have a new product line added to an assembly line).

3. **Non-routine technologies**: exceptions are common, and decision-making regarding processes can be complex. An addiction centre might treat alcoholism, but also needs to consider a wider variety of mental disorders.

4. **Engineering technologies**: many exceptions are characteristic of these technologies. However, the solution or application is standardised. For example, you may have a number of clients, all of whom require consulting for fund-raising events. While their needs are distinct, you have an application for each of them based on their own objectives and available resources.

James Thompson – Interdependence

While Perrow focussed on the routineness of technology, James Thompson pursued an understanding of sequential work activities. Specifically, he examined the way work activities are sequenced. Thompson's work examined multiple organisational subunits or activities, with a view to identifying the ways these units or activities were dependent on each other for resources such as raw materials or information. Thompson argued that the degree of interdependence among activities fell into three categories of technology. **Figure 8.1** provides a visual comparison.

1. **Intensive technology:** Intensive technologies are complex environments where interdependence is reciprocal. Under this technology, members of the organisation work interactively and use multiple techniques in order to solve problems. An example that Thompson provides is a hospital, where a combination of efforts and coordination from doctors, nurses, pharmaceuticals, social services, religious services, and others is needed in order to facilitate patients' progress.

2. **Mediating technology:** This is a function of pooled interdependence. Unlike intensive technology, the level of interdependence is not as high, however, each unit or activity relies to some extent on pooled resources generated by other units. An example of mediating technology can be found in

banks, which link creditors and depositors, and are sources of information that facilitate exchanges. A post office provides another example.

3. **Long-linked technology:** This technology implies a sequential interdependence, where each unit is dependent on the unit that preceded it in a sequence. Long-linked technology is also known as mass production or industrial technology, and a common example of this is the car assembly line. An example of a paper processing technology that is sequentially interdependent is an insurance claim, where claims are reported, then verified, then adjusted, then settled.
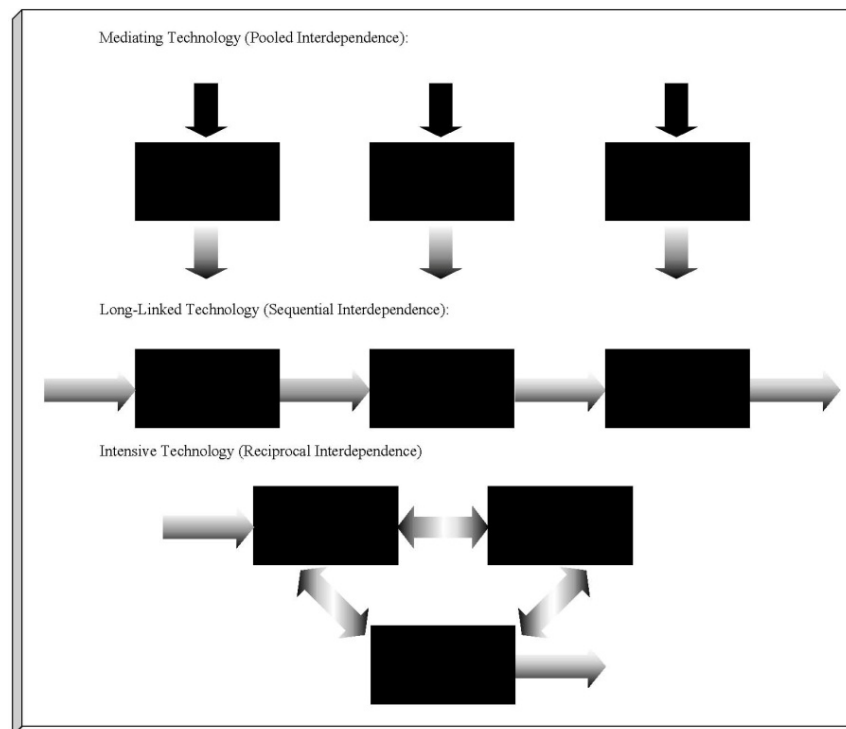

Figure 8.1 Thompson's technology classification

Source: Johns & Saks (2001, p. 505)

The cost of the company is reduced through economies of scale and economies of vertical integration. Examples of savings related to economies of scale are: (1) fewer manufacturing plants each having improved capacity utilisation, and (2) more effective use of corporate resources such as IT. An example of economies of vertical integration is the major move of media companies to acquire organisations that produce content that can be better used in a larger business, i.e., Canwest Global Communications' acquisition of the Canadian daily newspapers of Hollinger Inc. in 2001.

Joan Woodward – Batch Technology

Woodward's work focused primarily on the relationship between technology and organisational structure. She distinguished among three kinds of technology based on relative contributions made by people or machines. Woodward's work is based on a study in South Essex, England, where she was examining technology, structure, and organisational effectiveness. It was Woodward's assumption that mechanistic structures would be most effective under all circumstances. However, the results indicated that there is no predictable or consistent relationship between organisational structure and effectiveness. In fact, some successful firms produced their goods using an organic structure, where decision making is more decentralised, in a structurally flatter organisation. This type of organisation might entail more team or group-managed projects as well.

Woodward classified technology of many firms in her sample in three specific production groups:

1. **Unit or small batch technology**: entails custom-tailored units using unsophisticated machinery and equipment. Quantities are small and production is carried out by small groups of skilled participants. Examples of small batch technology include custom tailored suits, custom built cars, or highly specialised metals and chemicals. Small batch technology necessitates a customised and situation-dependent effort and analysis. As such, organic structures that lend themselves to decentralised decision-making models are most appropriate in unit production.

2. **Mass production technology**: makes use of automated machines that perform the same activities over and over again. Tasks tend to be repetitive and there are typically stringent controls in place that manage the production process. Products are produced in large quantities and are highly standardised. Woodward determined that the most appropriate structure for this type of production was a mechanistic structure, where hierarchical levels are common, and there is a clear separation between lower-paid workers who have very detailed instructions, and higher-level management, where strategic decisions are made.

3. **Continuous process technology**: is highly mechanised and inputs are transformed as on ongoing process. This is done using automated machines that typically are centrally controlled with computers. Examples include automated oil refineries and chemical plants. Employees monitor the processes continuously and are responsible for reacting quickly when a breakdown occurs. As such, a flexible organisational structure is required.

Woodward made a substantial contribution by demonstrating that there is indeed a relationship between organisational structure and technology, and her argument that structure must be tailored to fit the technology employed by the organisation has received further support from numerous other studies.

Advanced information technology in organisations today

For the purposes of this discussion, we will define **information technology** (IT) as:

> *A combination of machines, artefacts, procedures and systems that are used to generate, aggregate, store, analyse, and disseminate information that is translated into knowledge.*

When mainframe computers were introduced, they did displace many routine, highly-specified and repetitive jobs. Yet the character or 'personality' of the organisation was typically unaltered.

As time went on and a second wave of IT implementation took place, we began to see subtle changes in organisational design. Technology did replace some process controls and coordination mechanisms. Firms in some cases began to outsource operations that were traditionally managed by internal staff. An example of this is employee payroll.

People have historically made predictions about the influence of information technology within an organisation. Some would argue that job loss and deskilling would be a result; others suggested that productivity, quality and efficiencies would improve exponentially. But the impact of IT is not as deterministic as that. In fact, what we can safely assume is that, in most organisations, IT increases the number of choices organisations can make about how to design and manage work.

Manufacturing technology was significantly advanced with the introduction of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM); together known as a CAD/CAM system. These programs allowed for technological integration that enabled members of the organisation across several levels to make informed decisions, increase coordination and become empowered to make non-programmed decisions.

Advanced manufacturing technology has led to more organic, flatter structures that facilitate flexibility. These findings support Woodward's proposition about the correlation between technologies and organisational structure.

With respect to job design, advanced manufacturing technologies often require more sophisticated skills and diverse responsibilities; in fact, self-managed teams are often responsible for operating and servicing the system.

Like manufacturing technology, advanced office technology has also had a significant impact on the nature of work within organisations, as well as managerial decision-making. Technology has enabled employees to work from home; managers can supervise and coordinate work across geographically dispersed employees, meetings can be conducted via videoconferencing.

There have been a number of positive effects of advanced office technology in the workplace: organisations have enjoyed significant labour savings by making use of many computer programs that allow employees to work faster: word processing, spreadsheet analysis, email, video conferencing and others. In addition, technology has enabled people to improve decision making, with increased and faster access to information, coordination and responsiveness.

With respect to organisational structure, office technology has often resulted in eliminating middle management layers, making organisations flatter. Like manufacturing technology, office technology has in many cases enabled employees at lower levels to make decisions that were historically made by middle management, because the programs available are able to provide the analysis that was typically the responsibility of middle managers. While many organisations have had great success with the introduction and management of office technology, others have not. Often the assumption is made that employees will simply adapt and exploit the advantages of technology, without consideration of the training involved, as well as the emotional stress of change. The effects of organisational change are discussed in Module 11.

Ethical behaviour in organisations

Many of the environmental variables that influence organisational behaviour have also brought attention to the importance of established ethical standards within organisations. Customers are well-informed, sophisticated, and often demanding. This includes demands and expectations about ethical responsibilities that organisations must consider. Ethical standards have become a critical factor in 'adding value to the customer' for many organisations, and the customer (thanks to technology, primarily) is in a position to circulate dissatisfaction with unethical organisational conduct very quickly; and this information will potentially reach a very wide audience!

Organisations have also come to believe that their primary objective – to maximise shareholder wealth – is dependent on behaviour that its stakeholders believe to be appropriate. Child labour, workers' rights, environmental issues, bribes, have all become issues surrounding social accountability.

For our purposes we will define ethical behaviour as morally 'good' and 'right,' as opposed to 'bad' or 'wrong,' in a particular setting. This definition speaks to moral principles or beliefs that guide individuals through their interactions with others. Often members within organisations face ethical dilemmas when they must manage the needs and expectations of multiple, diverse stakeholder groups. The challenge for many people is often deciding which behaviour is most ethical and most appropriate for any given situation.

This section introduces three models that have been used to help us determine whether decisions are ethical or unethical:

Utilitarian model

This view argues that one would make an ethical decision by considering what would produce the greatest good for the greatest number of stakeholders. The challenge for managers is that often stakeholder groups have distinct and even competing interests.

Moral rights model

The moral rights view is more specific to fundamental rights and privileges shared by all human beings. One might consider whether the decision will protect people's right to freedom, life and safety, due process and free speech. Managers must often weigh the outcomes to various groups or individuals when making these decisions. For example, if you are responsible for meeting an economic objective of a 10 per cent return on revenues, yet you must also consider making expenditures to ensure environmental protection (that would not enable you to meet those economic objectives), how might you decide?

Justice model

The justice model would encourage one to make decisions based on what is fair and impartial – equity is distributed across shareholders. For example, employees who share similar skills, experience and education should receive the same pay. Managers must be aware not to discriminate between people and rely on established objective criteria to make decisions.

Ethics in practice

Many organisations have established a code of ethics which articulate standards and rules for managers so that appropriate decisions can be made; decisions that consider stakeholders needs and expectations. Often, the promotion and management of ethical behaviour in organisations is dependent on support for such behaviour. The role of an ethical supervisor, or ombudsman, can be established so that ethical standards can be overseen. This person is also available to discuss ethical dilemmas faced by employees in the company and provide guidance with respect to a course of action.

There are a number of considerations and questions that one can entertain when dealing with ethical dilemmas:

- Recognise and clarify the dilemma.

- Identify the stakeholders that might be affected by the decision.

- Gather all the relevant facts.

- Identify costs and benefits of various decision alternatives to stakeholders.

- List all of your options.

- Test each option by asking: Is it legal? Is it beneficial?

- Make your decision.

- Double check your decision by asking: 'How will I feel if my family finds out? How will I feel if this is printed in the newspaper?'

- Then take action.

Module summary

Summary

One of the most significant influences on organisations in the last decade has been the emergence of globalisation. In this module, you have learned that with the advance of technology, organisations have been prompted to re-design themselves, business processes have become more innovative, and significant human resources have been re-allocated in order to achieve a competitive advantage in the globalised environment. Work is organised as a function of technology within the organisation. Products and services are produced very differently than they were a decade ago, simply because of new technologies. You learned three classifications of technology provided by Charles Perrow, James Thompson, and Joan Woodward in this module. These classifications apply to organisations that provide either products, services, or both.

Ethics are the moral values, beliefs, and rules that establish the right or appropriate ways in which one person or group should interact and deal with another person or group. Many of the environmental variables that influence organisational behaviour have also brought attention to the importance of establishing ethical standards within organisations. The three most used models to determine whether decisions are ethical or unethical are utilitarian, moral rights and justice model. Many organisations have established a code of ethics which articulate standards and rules to guide managers and ensure appropriate decisions are made.

Case study 8.1

Please read the case study given below and answer the questions that follow.

Case study

Changing the Technology at Signicast Corp

Signicast Corp., an investment castings* manufacturer based in Milwaukee, had a major problem. In 1992, the company was landlocked in its Milwaukee facility. There was obviously no more room for expansion. "If we wanted to continue to grow, and we very much wanted to – we'd have to buy some land and build," said Robert Schuemann, vice-president of sales and administration. "Why don't we build what we've always wanted? As long as we can start from a blank sheet of paper, we can design the best facility in the world."

So management decided to build a new USD12 million automated plant. They began talking to customers to learn how Signicast could improve its investment-castings service, which makes precise metal parts direct to customers' blueprints, such as a kickstand for a Harley Davidson motorcycle or a part for a John Deere tractor.

Customers' principal concerns were long lead times, unreliable delivery dates and cost. Accordingly, the new plant would be designed to attack these concerns. The strategy for cutting lead time was to cut throughput-time (the time it takes to make a product from beginning to end). That, in turn, required converting production from batch processing (creating batches of product at intervals) to automated continuous-flow processing. "In a traditional shop, people spend most of their time trying to figure out what to do next," says Terry Lutz, Signicast's president. "With a control system and a continuous flow manufacturing, we are able to get the product to flow to the people. Everybody knows what to do, because that's what comes next." If an order starts on time, the process ensures it will ship on time, thus providing more reliable delivery dates.

A core group of five executives started planning the new facility to be built in Hartford, not far from the existing Milwaukee facility. Every Signicast employee had an opportunity to contribute to the new facility. An early decision was made to build the new plant as a small module, designated Hartford 1 that would handle a closely related product mix for which Signicast would develop business. If successful, Signicast would then build a second facility, Hartford 2, and develop a product mix for that module. Each product would be a stand-alone operation. While the new technology would contribute to the objectives of speed, low costs and flexibility, would other changes be necessary? Manufacturing through-put times were to be only three to five days versus approximately 25 days at Milwaukee. Signicast would achieve low costs only if production was right the first time, every time. Thus, the executive team resolved that no space would be allocated to rework. Signicast employees at Milwaukee, working within batch processing technology, performed only one highly specialised job consistent with a mechanistic

organisational structure. However, management realised that Hartford personnel would have to do more, and have more responsibility than their counterparts at Milwaukee.

*'Investment casting' is the modern industrial equivalent of the 'lost wax' casting technique.

Case Study Questions

1. What else would have to change as a result of new automated and continuous flow technology and the objectives of low costs, speed, and flexibility? You decide.

2. How will the change in technology at Signicast affect organisational structure? Refer to Perrow, Thompson &Woodward to answer this question.

3. What changes do you think Signicast made in order to tailor the organisation's structure to the new technology?

To find out what Signicast did, refer to the notes following the Reference section.

Source: Nagler (1988, January, pp. 101-106); Johns & Saks (2001, pp. 508, 514)

Self-assessment

Read the ethical dilemmas below. Think carefully about what you would do in each of these circumstances, and explain your reasons.

Assessment

You are driving to a nearby country from your job as a manager of a foreign subsidiary. In your car are a number of rather expensive gifts for family and friends in the country you are visiting. When you cross the border, the customs official tells you the duty will be equivalent to USD200. Then he smiles, however, returns your passport and suggests quietly that you put a smaller sum, say USD20 in the passport and hand it back to him.

What do you do?

One of your top managers in a Middle Eastern country has been kidnapped by a terrorist group that has demanded a ransom of USD2 million, plus food assistance for refugees in a specified camp. If the ransom is not paid, they threaten to kill him.

What do you do?

Your company has been trying to get foreign contracts in a developing country for several months. Yesterday, the brother-in-law of the Finance Minister offered to work as a consultant to help you secure contracts. He charges one and one-half times more than anyone else in a similar situation.

What would you do?

You have been hired by an investment firm funded by US dollars. Your job is to fund companies in several former communist countries. If you do not meet your quota for each of three months, you will lose your job, or at least have your salary severely cut back. One of the countries is still run by communists, though they have changed the name of their political party. They want you to fund three companies that would still be tightly controlled by the state. You know they would hire their relatives to run those companies. Yet, if you don't fund them, no other opportunities will exist for you in this country.

What would you do?

You are the manager of a foreign company in a country where bribery is common. You have been told an important shipment has arrived but it will take up to six months to clear the paperwork. However, you were informed casually that a "tip" of USD200 would cut the time to three days.

What would you do?

Source: Francesco & Gold (1998, pp. 594-596)

Assessment

1. In what ways do you believe a global environment poses new or different challenges in your workplace? How might this shape your behaviour or learning interests?

2. Choose an organisation and interview a manager; ask that manager to list the most significant influences of the environment on his/her work, and make some predictions as to the future direction or patterns of decision making for that person.

3. As a manager who has experienced structural change, describe the specific structural and control/system alterations that have help the organisation respond to a changing environment.

4. Provide some examples of unit technology, mass technology and process technology. Which technology do you believe fits best with a mechanistic organisational structure? Why?

5. Provide an explanation for the emergence of more organic structures in organisations today.

6. In what ways does technology influence job design? How might you reconcile the research findings of Perrow, Thompson and Woodward?

7. Do you believe that managers should place a priority on a specific group of stakeholders when making ethical decisions? Why?

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Changing the Technology at Signicast Corp.: Commentary

Signicast Corp's shift to an automated continuous-flow processing technology is a good example of how a shift in technology can affect organisational structure. According to Perrow, routine technologies should function best under mechanistic structures, while non-routine technologies call for more organic structures. With the new continuous-flow technology, there are likely to be more exceptions and difficult problems compared with the batch-processing technology. Thus, decision-making power should be located 'where the action is,' and this is most likely to occur in an organic structure. According to Thompson, the continuous-flow technology would result in greater technological interdependence and would require intensive coordination. This would call for greater mutual adjustment and an organic structure for the free and ready flow of information among units.

Woodward's views would also predict a more organic structure. His research showed that successful firms with unit and process technologies relied on organic structure, while successful firms that engaged in mass production relied on mechanistic structures. Because process production is almost totally automated, the workers are usually skilled technicians who monitor and maintain the system, and they tend to also work in teams. As well, informal relationships with supervisors replace close control. Thus, all three theories predict an organic structure in which workers make decisions, coordinate their efforts, and work in teams. Now let us take a look at how the new technology actually changed the structure at Signicast.

The basic requirements for new hires at Milwaukee are a high school diploma and a good work ethic. No specific experience is sought because Signicast provides all necessary training. For the 135 new employees at Hartford, however, the same basic requirements were sought plus a team orientation, good trainability, good communication skills, and a willingness to do varied jobs over a 12-hour shift. These skills were not required because of changes in job design and working arrangements. For example, it was decided that employees at Hartford would not stay in the same job for more than four to six hours as was the case at Milwaukee. Instead, employees would be cross-trained to do a variety of jobs thus enabling them to move elsewhere in the plant to work and perform two or more jobs in a shift. This would make jobs more interesting, teach employees new skills and reduce injuries.

Thus, Hartford was structured so that people would move to the work rather than having the work moved to the people. Employees have the title of technician and operate equipment, inspection devices, and other aspects of the plant, while machines do the heavy physical work. Signicast also created teams for the Hartford plant. Instructors from a local technical college were brought in to give 10-week team-building courses for two hours a week. The course covered habits, problem-solving, team-building, diversity and other issues affecting how workers relate to their co-workers and work, and how they can solve problems as a team. A team consists of everyone on a given 12-hour shift. There are two

day-teams (6 a.m. to 6 p.m.) and two night-teams (6 p.m. to 6 a.m.) and each team has its own supervisor. These teams have a large degree of input and impact on operations. Many policies and procedures are put to a vote as to what team members want. Because the supervisor runs the entire plant, he or she has neither the time nor the inclination to do any straw boss-type supervision. Accordingly, empowered workers have to be both motivated and trained to do their jobs not only well but independently.

In the end, Signicast was able to build a new kind of workforce along with a new kind of facility because management realised that in addition to technology, changes also had to be made in work arrangements, structure, and job design. The reduced supervision combined with the use of empowered work teams and cross-trained, multi-skilled employees created a more organic structure that was more suitable to the new automated technology.

Source: Nagler (1988, January, pp. 101-106); Johns & Saks (2001, pp. 508, 514)