

**INFLUENCE OF INFORMATION TECHNOLOGY ON
LABOUR RELATIONS IN
THE UNITED ARAB EMIRATES**

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OPSOMMING

Tema: Die invloed van informasie tegnologie op arbeidsverhoudinge in die Verenigde Arabiese Emirate.

Kern woorde: Informasie tegnologie, indiensneming/arbeids verhoudinge, ondernemingsstruktuur, arbeidspatrone

Informasie tegnologie het 'n fundamentele impak op arbeidsverhoudinge. Eerstens is dit merkbaar dat tegnologie gebruik word as 'n vervanging van arbeid. Hoewel die verbetering in informasie tegnologie komplimenteerend is vir arbeid. Hierdie aspek raak die werknemer en streef hulle om hul status te behou nie alleen vir 'n ander kommoditeit nie van produksie nie maar deel te wees van die onderneming.

Ondernemingsstruktuur verander tot so 'n mate dat werkgewers hul werknemers raadpleeg ten opsigte van die implementering van nuwe informasie tegnologie in die werkplek om 'n goed gestruktureerde struktuur te verseker sowel as 'n gestruktureerde implementerings daarvan.

Die doel van die studie is om die invloed van informasie tegnologie te konseptualiseer vanuit die teorie raamwerk en te bepaal watter en hoe informasie tegnologie geaffekteer word. Verder is die doelgerigtheid en die effektiwiteit van taak uitvoering op 'n geografiese grondslag van werk, wat waarneembaar is onder verskillende tegniese kondisies op die karaktereienskappe van die onderneming, die struktuur en kultuur wat saamwerk, beïnvloeding, kommunikasie asook arbeidsverhoudinge beleid bepaal.

Die studie populasie is geïdentifiseer binne 'n informasie tegnologie omgewing. Die populasie kan gedefinieer word as werknemers in verskillende ondernemings in een informasie tegnologie omgewing in Dubai (Verenigde Arabiese Emirate). 'n Gestratifiseerde random steekproef van 360 uit 'n populasie van 540 werknemers (66,67%) in die informasie tegnologie omgewing was geteiken. 'n Respons van 70% was verkry waarvan 252 (99,6%) respondente se data gebruik is.

Ten opsigte van die analisering van data en die resultate verkry in die studie was dit moontlik deur die navorser om te bepaal dat die implementering van gevorderde informasie tegnologie in onderneming vermeerder het. Dit is as ondernemings die wens het om te opereer in 'n moderne wêreld van besigheid, maar dit is onthul dat min indien enige korrekte kanale of prosedures vir die implementering van doelgerigtheid en effektiwiteit vergesel is. Die navorser stel vas dat die stel van duidelike doele die onderneming kan help om 'n rustige arbeidsverhoudinge omgewing te skep. Dit kan alleen bereik word as partye in die arbeidsverhoudinge verstaan wat hul doel is in die nuwe informasie tegnologie omgewing.

Hoofstukindeling.

Hoofstuk 1 Inleiding

Hoofstuk 2 Teorie van informasie tegnologie

Hoofstuk 3 Invoer van informasie tegnologie op die rolspelers binne arbeidsverhoudinge

Hoofstuk 4 Empiriese bevindinge

Hoofstuk 5 Oorsig, aanbevelings en slotopmerkings

ABSTRACT

Topic: The influence of information technology on labour relations in the United Arab Emirates.

Key terms: Information technology, employment relations, organisational structures, work patterns.

Information technology has fundamentally exercised an impact on the employment relationship. Firstly, and most obviously, technology is often used as a substitute for labour. However, improvements in information technology have also served to complement labour. Thus triggered employees to strive to maintain their status not just as another commodity of production, but a vital cog in the organisation.

Organisational structures changed to such an extent that employers consult their employees about introduction and implementation of new information technologies in the workplace in order to ensure a well organised introduction and structured implementation.

The aim of this research is to conceptualise the influence of information technology from the literature, and to determine how new information technologies affect and are affected by the efficiency and effectiveness of task execution on the geographical distribution of work, and the distinct differences that can be observed under varying technical conditions in the characteristics of organisational structure and culture, which are cooperation, influence, communication and employment policies.

A study population was identified within an information technology environment. The study population can be defined as employees in different organisations of one information technology environment in Dubai (United Arab Emirates). A stratified random sample of 360 of the total population of 540 employees (66.67%) in the information technology environment was targeted. A response rate of 70% was achieved, of which 252 responses (99.6%) could be utilised.

According to analyses of the data and results of the study the researcher was able to conclude that the need for the implementation of advanced information technology in organisations had increased, that is, if organisations wished to operate in the modern world of business, but it

was revealed that little if any corrective channels or procedures accompanied such implementation to ensure effectiveness and efficiency. The researcher established that setting clear goals and objectives for the organisation would help to maintain harmonious relationships. This can be only achieved if the parties to the employment relation understand their stand and role concerning new information technologies.

The research consists of the following chapters:

Chapter 1: Introduction.

Chapter 2: Theories of information technology and labour relations.

Chapter 3: Influence of information technology on the role players within the labour relations.

Chapter 4: Empirical discussion

Chapter 5: Overview, recommendations and concluding remarks.

Recommendations for the future research are made.

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CHAPTER 1

1.1 INTRODUCTION

This study focuses on the influence of information technology on the employment relation, and how it affects the relationship between the employer, the employee and the state.

Organisations spend much of their financial resources on new technologies and on the implementation of new ways of working, such as team work projects and total quality programme. Suppliers of new technologies promise better, less stressful and more efficient ways of working. Employees hope that their work would become more interesting and that they would manage to keep their skills and knowledge up-to-date when adopting new ways of working and using new technologies. However, after having introduced new technology or having implemented another innovation, an organisation is faced with a number of questions. Did the investments pay off? Are the hopes and promises expressed by suppliers fulfilled? Or are new technologies and other innovations a waste of an organisation's financial resources? Do new ways of working lead to deterioration of employees' work situation, as more pessimistic proponents expect? (Rossi, Freeman & Lipsey, 1998:34).

Information Technology has already had significant impacts on organisations, and much more dramatic effects are anticipated in the new millennium. Unfortunately, many of these impacts have simply been allowed to happen, without significant planning, and without compensating for changes in organisational structures and processes. The result has been that the full potential of information technology to improve organisations' efficiency, effectiveness and flexibility has seldom been realised. Greater attention must be paid to the interaction of technology with business methods, work patterns, employees and organisational culture. Organisations must dictate Information Technology's direction of development and use, rather than being passive recipients of supply-driven technology. Organisations and communities should be assisted to understand the impact of information technology instead of falling victim to it, and to act positively to design and manage future developments (Clarke & Cameron, 1989:35).

Researchers and stakeholders within organisations might want to know whether workplace characteristics change when an organisation implements a new technology or a new way of working. For example, it might be of interest to examine whether job control, level of demands and social aspects of the workplace improve or deteriorate. Such workplace characteristics can be measured by using questionnaire methods. In the past, researchers often used measures derived from the job characteristics model (Hackmann & Oldham, 1976) to examine the effects of new technologies and new ways of working (Jarvenpaa, 1997; Wall & Clegg, 1981). However, new technologies might affect more and other aspects of a work situation than originally specified in the job characteristics model (Wall *et al.*, 1990a).

Improvements in technology, and particularly information technology, have fundamentally exercised an impact on the employment relationship. Firstly, and most obviously, technology is often used as a substitute for labour. Production lines have increasingly become automated and expert and other information systems are being used in organisations to replace the middle and lower tiers of management. The simple reason for this is that, as a factor of production, capital often has a cost advantage over labour (Venter, 2003:22).

However, improvements in information technology have also served to complement labour. The work process itself has become increasingly efficient. Secretaries and other administrative functionaries have access to vastly improved computer technologies that assist them in processing and storing data. Employers at all levels use various decision-making systems that help them to scan the environment and make informed decisions (Venter, 2003:22).

Manual employees such as mechanics, plumbers, and electricians are able to complete jobs more quickly with the use of technologically advanced power tools, computer – assisted diagnostic equipment, and the like. Technology also has an impact on the design, location and nature of work itself. A prime example of this is the concept of the virtual office place, and telecommuting, where employees are able to interface with the central office by means of information and telecommunications technology and thus work from home instead of commuting to work. It is thus as a complement to the employment relations, rather than a substitute, that technology has had the greatest impact on the economy (Venter, 2003:22).

However, because of the implications of the new technology for the employment relationship, organisational policies have sought to make the introduction of such technology a matter for consultation. Organisational culture maintains that any changes brought into an organisation should be discussed by the employer in order to share the proposals relating to the restructuring of the workplace, including the introduction of new technology and new work methods. The implication of this is that, even though this is merely a consultative function in which the employer's views will ultimately prevail, the employer is obliged to consider any submissions made with a view to reaching some sort of consensus (Venter, 2003:22-23).

1.2 TECHNOLOGY AND WORK

The spread of technology and scientific developments in the workplace has been accompanied by a variety of changes. In analysing how technological forces influence human activities, Smelser (1976:96) suggests the following:

- The technical arrangements of work determine in large part the amount of physical exertion required from the human organism.
- The technical features of the job influence the degree to which work is paced and human activities are structured.
- The technical arrangements of production influence the level of skills required of workers.
- Technical aspects determine in part the degree of specialisation of the division of labour and the structuring of authority.
- Technological features of work influence the character of social interaction and this influence often extends to off-the-job interaction as well.

The change from human to machine technology has transformed work in the industrial era. It resulted in the imposition of a steady pace or work rhythm for work, bringing with it an increase in the discipline imposed on employees. This was the result of the need for the uninterrupted flow of material and the fact that employees must be organised around the machines' schedule. Because of the imposition of a steady pace and discipline, employees and

work have become increasingly time-oriented and this, in turn, has affected other aspects of nonworking time (Vago, 1999:12).

When the technical aspects of work are highly routinised, monotonous and devoid of much personal interaction, such as on the assembly lines in an organisation, Blauner (1964:15-34) notes that employees become alienated, to the extent that they are powerless at carrying out their work (i.e. they have no control over quantity, quality, direction and pace of work), or to the extent that their work is meaningless (i.e. it has no clear relation to a broader life programme or production programme), or to the extent that they are self-estranged (they do not identify with their work or enjoy it or find it challenging), or to the extent that they are socially isolated from their supervisors and co-workers.

In addition to changes in the labour force, countless social effects can be attributed directly or indirectly to innovations in technology. For example, with the introduction of computers, microwave transmissions, and satellites, organisations have moved from a state of information scarcity to one of information surplus, and now information is produced much faster than it is processed. This creates what is called “data smog” (Shenk, 1997:234) resulting in increased stress or “techno stress” (Weil & Rosen, 1997:79), memory overload, compulsive behaviour, and attention deficit disorder.

The decision to adopt more advanced technology has a significant impact on interaction of role players in the workplace. The point is whether the organisation, when adopting new technology, does so to update its production or because there is pressure to innovate. The core of the proposal throws light on the relationship between information technology and employment relations with respect to innovation that brings drastic changes and routine working procedures (Katsikides, 1998:59).

1.3 IMPACT OF INFORMATION TECHNOLOGY ON EMPLOYMENT

The impact of information technology on employment is not necessarily uniform. It can reduce clerical work to tedious and repetitive jobs and it can create innovative work and create new skills. It can fragment and control work and employees and it can broaden and allow more autonomy. The computer rationalisation of production can be robust and more

democratic, or algorithmic and more authoritarian (Albin & Appelbaum, 1988). Clearly, the direction of change in the organisation of work depends on the strength and articulation of office workers themselves.

Struggles by office workers in information-based organisations reveal that the flexibility of information technology can allow for worker participation in the design of information systems (Clement, 1991; Ormos & Blameble, 1989). Strong trade union demands coupled with a more open government (e.g. in developing countries) can provide channels for participation from all levels of office staff in the planning of technological change. Feminist computer professionals are already combining participatory principles in the design of systems (Greenbaum, 1991:64).

The impact of the introduction of information technology cannot be analysed apart from its immediate context of social relations and the existing organisation of work. The extent of the impact will also vary depending on the type of machines being installed, the period of installation and the existing labour processes which are being automated (Baran & Teegarden, 1987:236). Previous studies have tended to consider the impact of information technology on clerical staff as an undifferentiated group, but different levels of office workers, men and women, should be taken into consideration. And while the new technology skills are being polarised by gender, it is also evident that women are entering computer professions in both the developed and developing countries, leading to class polarisation within the female labour force itself.

It is also important to look at the broader social, economic and political context, as this is reflected in relationships at work. Since society is based on hierarchy, and technology is a medium of power, one needs to understand how power is negotiated. This means that deskilling and intensification of work are not inevitable consequences of technological change, but neither will technology automatically create better opportunities (Greenbaum, 1991:64).

The extensive use of information technology tools also serves to extend the workday and make it more flexible. Some organisations employ a significant number of people who work from their homes and interact electronically with other people in the organisation. Similarly, the use of electronic mail can allow an individual who works best in the early mornings to

conduct work before the regular workday begins in a much more time-effective manner than if interrupted on a constant basis (Martin *et al.*, 1994:12).

Organisations are also demonstrating that the use of information technology improves collaboration among work teams. For example, because insights into common problems come at random times, an electronic bulletin board within a group of design engineers or product planners can be the place to post an idea at any time. Group support systems can help to speed up complex decision making among several individuals (Martin *et al.*, 1994:12-13).

Information technology has provided a basis for the redesign of clerical and professional jobs. The expanded capability for word processing and other automated functions offers an individual a much richer work experience and, in many cases, increased responsibility. Clearly, a knowledge of information technology can have a positive influence on an individual's career, but the person must become actively involved in learning the technology to be able to operate in the information technology environment (Martin *et al.*, 1994:13).

So much information is being produced these days that the term information glut has been coined. In order to utilise information effectively and efficiently, managers at all organisational levels are being forced to learn better ways of managing information resources. No longer can responsibility for these resources be delegated to computer professionals as in the past (Cortada, 2002:298). Managerial skills in the areas of personnel management, planning, resource acquisition and allocation, computer applications and networks are required in order to ensure that the information generated by computers meets organisational goals.

This explains why responsibility for information resources, particularly in the area of systems development operations and control, is shifting to corporate management, especially managers of functional departments that use information generated by computers (Turban, 2001:39).

In many organisations, responsibility for information resource management is also shifting to end-users at operational levels. A number of technological advances have led to this development. For example, advances in telecommunications facilitate distributed data processing and the independence of processing nodes. The establishment of computer

networks, improved user interface, the marketing of database management systems, and the widespread use of microcomputers have contributed to the ability of users to manage information resources. Today, end-users frequently choose equipment, design and develop new systems, and handle their own computer operations (Currie, 1995:103-104). End-users, as well as managers, are faced with the problem of how to

- select and acquire hardware and software;
- provide enough computer power to satisfy demand;
- make technology as accessible and easy to use as possible;
- reduce application backlogs;
- plan, budget, and monitor information systems;
- improve investment payoffs;
- minimise systems maintenance effort;
- ensure the privacy and security of data;
- mitigate “people problems” associated with computerisation, such as resistance to change; and
- speed development of new systems.

The dramatic reduction in the cost of computing power made possible by microelectronics has coincided with the conversion of telecommunications networks from analogue to digital signals – the same “stream of numbers” technique used in computing. The result has been the “convergence” of electronics, computing, and telecommunications and the unleashing of a tidal wave of technological innovation which scientists are now calling the “Information Technology Revolution” (Forester, 1986:20). This revolution is not confined to the world of science and technology: it is bringing about dramatic changes in the way we live and work – and maybe even the way we think.

Information technology in its strictest sense is the new science of collecting, storing, processing and transmitting information. Information is the lifeblood of complex industrial societies and it is growing in importance (Forester, 1986:24).

The effects of information technology, its reproduction and its adaptation in the production process, affect various sectors of society. One main effect is the so called societal

deregulation of industrial relation. At this point various interests act on the sphere of the employer's activities. On the other hand the permanent reorganisation of labour sets as its real goal the circulation and accumulation of capital, and the perpetuation of the existing societal structures (Hanappi & Egger, 1996:454).

1.4 PROBLEM STATEMENT

This proposed study is about the influence of information technology on labour relations.

Information technology removes certain constraints in space and time, so that organisational work can be performed in different phases and during different hours than had been possible before (Lupton, 1986:113).

A basic premise of this document is that the assimilation of information technology and astute management of information resources, mostly concerning employment relations, are keys to survival in the modern business world. Information technology is used to streamline operations and introduce new employment policies to the workplace in order to increase the effectiveness and efficiency of an organisation. Planning, problem solving, report preparation and business meetings fill the schedules of information managers. Few have time to ponder how to transfer information technology to developing nations or how to control transformer data flow. The issues are remote, not related to daily concerns.

Yet these issues will affect organisations for years to come. Every organisation will be affected by the trade policies and regulations, placed on the flow of information across national borders, that are under consideration today in national legislatures and international organisations. State intervention relating to the protection of intellectual property, brain drain, outsourcing and the transfer of technology to the Third World will have an effect on employment relations within organisations in the global village (Rainer, 2001:45-46).

New applications of technology to production in an organisation do not merely affect the methods of production (Rainer, 2001:46). They are inescapably social decisions affecting the routines and satisfactions of men at work on the machine and, creating a need for skill development, in their larger reaches, shaping the very nature of employment economy and

society. These developments are, therefore, placing enormous pressure on the state to present and implement skills development programmes to ensure that the gap created by redundancy is closed.

The problem arising from this topic is how new information technologies affect and are affected by the efficiency and effectiveness of task execution on the geographical distribution of work, and distinct differences that can be observed under varying technical conditions in the characteristics of organisational structure and culture, which are cooperation, influence, communication and employment policies.

The most hidden problems brought up concerning information technologies are:

- Most technologists take their place as experts in a subaltern role with fixed spheres of competence and authority and with a severely delimited orientation toward the effect brought about by information technology on the employment relation.
- Another problem raised is how the experience of employees adapts to the constraints of information technology and its demands.
- In particular, what analytically distinct differences can be observed under varying technical conditions in the organisational culture in terms of cooperation, influence, communication, and employment policies brought about by information technology in the workplace.

1.5 RESEARCH OBJECTIVES

The objectives of this research were divided into a general objective and specific objectives:

1.5.1 General objectives

The general research objective was to determine the influence of information technology on labour relations.

1.5.2 Specific objectives

The specific objectives of the research were to investigate the following:

- Management initiative to implement information technology in the workplace for effective and efficient task execution and maximising job satisfaction, increasing the value of training and to ensure minimal threats towards jobs.
- The employees' experience of information technology practices with regard to personal growth and the variations it brought on job patterns.
- The impact of information technology on organisational processes such as decision making, conflict resolution, and consultation with employee organisation with regard to new employment policies.

1.6 RESEACH METHOD

The research method was divided into two phases namely the literature study and the empirical investigation.

1.6.1 Literature study

The literature study focused on the impact of information technology on employment relations. Sources have been obtained from the following databases:

- CATALOGUES OF LIBRARIES OF THE NORTH-WEST UNIVERSITY
- THE JOINT CATALOGUES FOR DISSERTATIOINS
- EBSCOHOST
- NEXUS
- RSAT
- BUSINESS PERIODICALS INDEX
- ABI/INFORM
- ERIC AND VARIOUS LIBRARY CATALOGUES
- REPERTORIUM OF SOUTH AFRICAN JOURNALS

1.6.2 Empirical study

A basic study was done to determine the influence of information technology on the employment relations and how it affects the relationships of the role players.

1.6.3 Research design

In this section, the focus is on defining and discussing the research design used in the research.

Cook (1965:50) defines a research design as “the arrangement of conditions of collection and analysis of data in a manner that aims to combine relevance to the research purpose with economic procedure”.

The purpose of the research design was to plan and structure the research project in such a manner as to ensure that the eventual validity of the research findings would be maximised (Monton & Marais, 1996:33).

The researcher made use of a **survey research design** (Monton & Marais, 1996:122, 168). Kerlinger (1973:41) describes survey research as follows: “Survey research studies large and small populations (or universes) by selecting and studying samples chosen from the populations to discover the relative incidence, distribution, and interrelations of sociological and psychological variables.”

There are different techniques of conducting survey research, some of which are interviews, telephone surveys and questionnaires. For the purposes of this study a questionnaire was used.

The advantage of survey research is that it gathers a wide scope of information and when gathering information existing educational facilities can be used, which will reduce costs and the information collected will be accurate (within sampling error). Disadvantages are that it does not penetrate the depth of opinions (extensive rather than intensive research), it demands time and money, and it requires a knowledgeable researcher who is familiar with sampling, question and scheduling construction and interviewing. It also requires the researcher to be

able to analyse data. A possible disadvantage is that lifting an individual out of his/her socio-economic context for interviewing purposes may distort results somewhat (Kerlinger, 1973:422-423).

Questionnaires, as a technique of conducting survey research, do have some pitfalls. The way or presentation of the questionnaire affects the quality of responses. Any poor questions could lead to a non-response, which is undesirable. The type of question can also affect the response, namely, closed questions (Yes/No questions), and open questions (own response) that can have an impact on the respondents' answers (Jolliffe, 1986:23-26). Survey research was conducted on diverse population groups (workers skilled in the field of information technology and workers with basic skills or lower skills).

1.6.4 Participants

The research sample (N=250) consisted of diverse study groups with basic skills as well as highly skilled workers in the field of Information Technology. Each sample group was divided into two sample groups, namely a pilot group and a research group. The research was based in United Arab Emirates at Dubai Internet city, in the information technology sector. A stratified random sample of N=250 was selected, representative of various management levels.

In the stratified random sampling (N=250) the sample items were chosen from United Arab Emirates at Dubai Internet city. With this method the sample could be designated so that a predetermined number of items could be chosen from each stratum or section. The predetermined number of items were to be stratified by the skills level of workers in the information technology sector.

1.6.5 Measuring instruments

A questionnaire (developed by the researcher) is used. The questionnaire for the sample was based on information gathered during a group session facilitated by the researcher around two questions, namely "What is the employees' experience of information technology in the

workplace?” and the second one being “What is the impact of information technology on employment relations in the workplace?”

The impact of information technology affects many factors which were tested on employment relations such as employee accessibility to new systems of work, that can be new training methods and new sets of employment policies governing the entire work fraternity. Coordination and cooperation between employers and employees would require flexibility of both parties to adapt to the changes.

The group session was arranged with the management of Dubai Internet city, since the managers were knowledgeable about the workers’ skills and they were also familiar with their abilities.

1.6.6 Data analysis

The data analysis was carried out with the help of the SPSS programme (SPSS, 2004). This programme was used to carry out statistical analysis regarding reliability, validity, construct equivalence and predictive bias of the measuring instruments, descriptive statistics, analysis of variance, correlation coefficients, and canonical analysis and moderated multiple regression analysis.

The procedure consisted of the following steps: Firstly, the target structure was specified. Secondly the hypothesised number of factors were extracted and varimax rotation was used to obtain exploratory factor loadings in the new sample. Thirdly a targeted rotation was performed to examine the extent to which differences between the target and varimax matrix were due solely to the rotation of the axes. Fourthly congruencies were calculated using Tucker’s coefficient of agreement (Tucker’s phi). This coefficient is insensitive to multiplications of the factor loadings, but is sensitive to a constant added to all loadings of a factor. This index does not have a known sampling distribution; hence it is impossible to establish confidence intervals. Values higher than 0.95 were seen as evidence for factorial similarity, whereas values lower than 0.85 were taken to point to non-negligible incongruities (Van de Vijver & Leung, 1997).

An analysis of variance was applied to identify item bias in measuring instruments (Van de Vijver & Leung, 1997). Bias was examined for each item separately. The item score was regarded as the dependent variable; while language groups and score levels were regarded as the independent variables. Cronbach alpha coefficients and inter-item correlation coefficients were used to assess the reliability and validity of the measuring instruments (Clark & Watson, 1995). Descriptive statistics (e.g. means, standard deviations, range, skewness and kurtosis) and inferential statistics were used to analyse the data. Pearson and Spearman correlation coefficients were computed to determine the relationships between variables. Canonical analyses were conducted to determine the relationships between sets of variables. A cut-off point of $p = 0.05$ was set for the statistical significance of the results. Effect sizes were used to decide on the practical significance of the findings. A cut-off point of 0.30 (medium effect) was set for the practical significance of correlation coefficients. To determine the differences between groups t-tests were used. Moderated hierarchical regression analysis was conducted to study the interaction effects between variables.

1.7 DIVISION OF CHAPTERS

The chapters are divided as follows:

Chapter 1: **Introduction**

Chapter 2: **Theories of information technology and labour relations**

Chapter 3: **Influence of information technology on the role players within the labour relation**

Chapter 4: **Empirical study, analysis and interpretation**

Chapter 5: **Conclusions and recommendations**

1.8 CONCLUSION

According to McLough (1999:88) human and machine integration in organisations is important for understanding the effects of information technological changes on employer – employee relations. Important in this integration are the following:

- The beliefs held concerning the information technology
- The nature of organisational goals
- The characteristics of the work
- The modes of organisational assessment used to supervise and evaluate employers and employees

Resistance and conflict of interests may arise when information technology alters the relationships among these organisational features.

When organisations have implemented information technologies for work execution, this may result in investment on communication technologies like e-mail and voice mail. These technologies, by dramatically reducing time and distance barriers to communication, support the formation of new organisational arrangements, such as new work patterns and employment policy and regulation (Cash *et al.*, 1994:263-264).

The following chapter, that is, chapter 2 entails theories on information technology and labour relations. The study attempts to provide information on how to optimise intelligence and skills of employees and associate these with information technology in a way that would revolutionise how they live and work, while discussions in chapter 3 are concerned with the influence of information technology on the role players, i.e. the employers, employees and the state. The chapter includes information about how the role players cope with an information technology revolution, i.e. adaptability to the joint optimisation of the social and technical systems.

THEORIES OF INFORMATION TECHNOLOGY AND LABOUR RELATIONS

2.1 INTRODUCTION

The working environment is affected by many factors within the organisation as well as outside the organisation. Due to the ever-changing world of technology, organisations need to be on the alert to the changes brought about by information technology in the workplace. Information technology raises many challenges to all the role players, that is, the employer, employees and the state.

The problem arising from this topic is how new information technologies affect and are affected by the efficiency and effectiveness of task execution on the geographical distribution of work, and distinct differences that can be observed under varying technical conditions in the characteristics of organisational structure and culture, which are cooperation, influence, communication and employment policies. Culture affects the way people view the world, the way they think and act, and the way they respond to particular situations. Most of the people view culture narrowly, when, in actuality, it is multidimensional and extremely broad in its influence (Skoria *et al.*, 1995:416). Organisational culture has been defined as the ‘shared philosophies, ideologies, values, assumptions, beliefs, expectations, attitudes and norms that knit an organisation together’ (Kilmann *et al.*, 1986:88). The key word in this definition is the word ‘shared’, those values that are shared, widely held and dominant are the values that create a corporate culture (Barta *et al.*, 1997:6).

As we approach the beginning of the twentieth century, the impact of information technology is apparent in many aspects of our daily lives – in organisations and banks, in schools, colleges and universities. New use of information processing and automation are spreading, while people are wondering how best to use them and how they will affect them or their children (Edge, 1988:134).

Many working practices and technologies are typically implemented because they have a significant capacity to shape the nature of work and its effect on individual behaviour. They

include, for example, lean manufacturing, advanced manufacturing technology, total quality management, knowledge management and e-business. Further surveys show that these practices are increasingly prevalent in organisations in advanced industrial societies (Lawler, Mohrman, & Ledford, 1995; Osterman, 1994; Waterson *et al.*, 1999) Then, when modern working practices are implemented, they can sometimes alter work in unintended ways, have deleterious effects on employees and what improvements they hoped for in employee and organisational performance (Clegg *et al.*, 1997; Parker & Wall, 1998; Waterson *et al.*, 1999). Indeed, the design, implementation and management of modern working practices often create problems for employees at all levels in the organisation. It therefore seems essential that we understand the nature of modern working practices, the effects that they have on employees, the extent of their use, and their effect on organisational performance and how they can be more effectively designed, implemented, evaluated and managed. This statement intends to illustrate what one of the specific objectives mentioned in **chapter one** endeavours to determine, *i.e.* the employees' experience of information technology practices.

2.1.1 Theorising Information Technology

The effects of information technology, its reproduction and its adaptation in the production process affect various sectors of society. One main effect is the so-called societal deregulation of employment relation. At this point various interests act within the spheres of the state, employers and employees and their activities. On the other hand the permanent reorganisation of labour sets as its real goal the circulation and accumulation of capital, and the perpetuation of the existing societal structures (Hanappi & Egger, 1996:454).

According to Webster (1995:8) sociologists have, until recently, tended to avoid technology. This began to change significantly in the late 1980s with the growth and development of both (physical) information technology and the (social) debate surrounding it. Information technology in the workplace centres around two main questions:

- Why and how is information technology used at work?
- What are the objectives of those who install expensive information technology systems within organisations?

These two questions appear to be straightforward and simple but unmask highly complex issues.

Technological determinism is the notion that the technological development is autonomous of society; it shapes society, but is not reciprocally influenced. Rather, it exists outside society, but at the same time influences social change. In more extreme varieties of technological determinism, the technology is seen as the most significant determinant of the nature of a society. What is remarkable about the notion of technological determinism is neither its theoretical sophistication nor its explanatory utility. Rather, it is important because it is 'the single most influential theory of the relationship between technology and society' (Mackenzie and Wajcman, 1985:4)

Currie (1995:8) formally defined information technology as *'any computer-based tool that people use to work with information and support the information and information-processing needs of an organization. Information technology includes keyboards, mice, screens, printers, modems, payroll software, word-processing software, and operating system software, just to name a few.'*

The reality, of course, is that technologists do not, in practice, follow some pre-determined course of development. Research and development decisions, for example, are significant determinants of the sort of technologies that are developed. Also, although technologies clearly have impacts, the nature of these is not built into the technology, but varies from one culture to another, depending on a broad range of social, political and economic factors (Mackay, 1992:685).

'Symptomatic technology' is the concept Raymond Williams (1974:13) employs to explain its inverse – that technology is a symptom of social change. According to this model, it is quite clearly society that is in the driving seat of history: given a strong social demand, then a suitable technology will be found. Williams, exploiting the arrival of television, refers to the twin process of 'mobilization' and 'privatization' which have taken place with the outset of individual society: these led to a demand for the development of the television. This is the essence of the social shaping of technology approach, which 'serves as a needed corrective' to technological determinism (Winner, 1985:26). Whilst not denying that technologies have

social effects, the focus, rather, is on the social forces which give rise to the particular technologies.

The researcher believes that the concept of theorising information technology/society relationship quietly illustrates the main effect that information technology has on the broader sphere. With regard to the workplace settings, it really shows that organisations are not operating on islands. They are influenced by interaction to external factors, for example, technological change, and how members of the society react to this interaction will definitely have an impact in organisations as they operate as subsystems to the society.

2.2 DEFINITIONS OF THE 'INFORMATION SOCIETY'

Information society does not have a single definition; it encompasses many factors that have to be considered if one wishes to understand it. It is influenced by the technological innovation which is made easy by the economic status of the state, whereby there will be variations in occupations within an organisation. Flexibility to this varied work patterns will give rise to teleworking, that is, working away from the worksite through the use of computers. The researcher views information society as the end-result of adaptation to new information technologies. The following factors give an in-depth definition of information society:

- ***Technological***

The most common definitions of the 'information society' lay emphasis upon spectacular technological innovation. Their key idea is that breakthroughs in information processing, storage and transmission have led to the application of information technologies in virtually all corners of society. The major concern here is the astonishing reductions in the cost of components, their prodigious increase in power and their consequent application anywhere and everywhere (Office of Technology Assessment, 1990:46). Because it is now economical and feasible to put computers into typewriters, cars, cookers, watches, factory machines, televisions, lads' toys... it follows that we are certain to experience social upheaval of such magnitude that we shall enter a new era.

Somewhat more sophisticated versions of this technological route to the 'information society' pay attention to the convergence and implications of telecommunication and computing. In these instances the argument runs along the following lines: cheap information processing and storage technologies (computers) result in their being extensively distributed; one of the major areas impacted is telecommunications, notably switching centres. Which, in being computerised, in effect merge with the general development of computing and impel still more dramatic improvement of information management and distribution. This unification is especially fortuitous because the widespread dissemination of components means that for optimum use they require connection. In short, the computerisation of telecommunications means that it is increasingly the case that computer can be linked to computer (Winner, 1986:26-27).

This scenario of network computers is often compared to the provision of electricity: The 'information grid' is seen as analogous to the electrical supply. As the electricity grid links every house, office, factory and shop to provide energy, so the information grid offers information wherever it is needed. This is, of course, an evolutionary process, but with the spread of an ISDN (Integrated Services Digital Network) we have foundational elements of an 'information society'.

It is very tempting to dismiss technological approaches to the 'information society'. There has been a surfeit of gee-whiz writing, awed by the pace and magnitude of technological change, that naively tells us that 'the Computer Revolution' will have an overwhelming and comprehensive impact, affecting every human being on earth in every aspect of life (Evans, 1979:13). The genre of futurism, which adopts this tone, is characteristically full of dire 'wake up' warnings, shallow analysis of the substantive realm, and the self-assurance that only the author has understood what most others have yet to comprehend. It presents a poor case for the validity of technological measures (Webster & Robins, 1986:52).

Nevertheless, if writers such as Alvin Toffler and James Martin impel one towards ready rejection of technological criteria, it has to be acknowledged that very many more serious scholars adopt what is at the root a simple approach. In Britain, for example, a much-respected school of thought has devised a neo-Schumpeterian approach to change, combining Schumpeter's argument that major technological innovations 'create destruction' with Kondratieff's theme of 'long waves' of economic developments. These researchers are

content that information technology represents the establishment of a new epoch. This new 'techno-economic' paradigm (Freeman & Perez, 1982) constitutes the 'information Age' which is set to mature early in the next century (Halla Preston, 1988; Freeman, 1987; Freeman *et al.*, 1982:112).

Elsewhere Michael Piore and Charles Sabel (1984) have suggested that it is the new technologies which provide the foundation for a radically different way of working – 'flexible specialization'. Thanks to communication and computer technologies, and the information edge they give to small firms now able to quickly access markets and adroitly respond to them, the prospect is for an end to 'mass production' and its replacement of customised products made by multi-skilled and adoptable crafts people.

- ***Economic***

There is an established sub-division of economics that concerns itself with the 'economics of information'. From within this, and indeed as a founder of this specialism, the late Fritz Machlup (1902-1983) devoted much of his professional life to the goal of assessing the size and growth of the information industries. Machlup's pioneering work, the production and distribution of knowledge in the United States (1962) has been seminal in establishing measures of the 'information society' in economic terms.

Machlup (1983:33) attempted to trace the information industries in statistical terms, the distinguished five broad industry groups (broken into sub-branches) as listed below:

- Education (for example schools, libraries, colleges)
- Media of communication (for example radio and television, advertising)
- Information machines (for example computer equipment, musical instruments)
- Information services (for example law, insurance, medicine)
- Other information activities (for example research and development, non profit activities)

Working with the sort of category, it is possible to ascribe an economic value to each and to trace its contribution to gross national produce (GNP). If the trend is for these to account for an increased proportion of gross national produce, then one may claim to chart the emergence

through time of an 'information economy'. This is just what Machlup (1962) proposed in this early study that calculated that 29 per cent of the United States' gross national produce in 1958 came from the knowledge industries - at that time a remarkable rate of expansion.

As early as the 1990s management guru Peter Drucker was contending that knowledge 'has been the foundation of the modern economy' as we have shifted 'from an economy of goods to.... a knowledge economy' (Drucker, 1969:247, 249). Today it is commonplace to argue that we have evolved into a society where the 'distinguishing characteristics' are that 'knowledge and organization are the prime creators of wealth' (Karunaratne, 1986:52).

• *Occupational*

A popular measure of the emergence of an 'information society' is the one which focuses on occupational change. Put simply, the contention is that we have achieved an 'information society' when the predominance of occupation is found in information work. That is, the 'information society' has arrived when clerks, teachers, lawyers and entertainers outnumber coalminers, steelworkers, doctors and builders (Stonier, 1983:7).

The occupational definition is frequently combined with an economic measure. Marc Porath, for example, calculated that by the 1990s a little under half of the US labour force could be found in the 'information sector', a growth of almost 500 per cent during a century in which agricultural employment plummeted and information occupations expanded massively. On the surface the changing distribution of jobs seems an appropriate measure. After all, it appears obvious that as work, which demands physical strength and manual dexterity such as mining coal and farming the land, declines to be replaced by more and more manipulation of figures and text such as in education and large bureaucracies, we are entering a new type of society. Today 'only a shrinking minority of the labour force toils in factories... and the labour worker is now dominated by information operatives who make their living by virtue of the fact that they possess the information needed to get things done' (Stonier, 1983:7-8).

This trend is seized upon by many reports. For instance, two influential OECD (Organisation for Economic Co-operation and Development) publications (1981, 1986:p204) produced figures from all member countries signalling 'continued growth... in those occupations primarily concerned with the creation and handling of information and with its infrastructure

support' (1986). Elsewhere Marco Porat identifies an 'astonishing growth rate' of the 'information society' which doubled every 18.7 years between 1860 and 1980 (Porat, 1977a:131), propelling the United States of America towards 'the edge of an information economy'.

The shift in the distribution of occupations is at the heart of the most influential theory of the 'information society', namely that of Daniel Bell. Bell sees in the emergence of 'white collar society' (and hence information work) and the decline of industrial labour, changes as profound as the end of class-based political conflict, more communal consciousness, and the development of equality between the sexes (Stonier, 1983:8).

- *Spatial*

This conception of the 'information society', while it draws on sociology and economics, has at its core the geographer's distinctive stress on space. Here the major emphasis is on the information networks that connect locations and the consequences have dramatic effects on the organisation of time and space.

John Goddard (1992:42) identifies four interrelated elements in the transition to an 'information society':

- Information is coming to occupy centre stage as the 'key strategic resource' on which the organisation of the world economy is dependent. The modern world demands co-ordination of globally distributed manufacturing, planning across and between sovereign states and marketing throughout continents. Information is axial to these diverse activities and thus of highlighted importance in the contemporary world. It follows too that 'information management' is of exceptional pertinence and that as a result we witness the rapid expansion of information occupations.
- Computer and communications technologies provide the infrastructure that enables information to be processed and distributed. These technologies allow information to be handled on a historically unprecedented scale, facilitate

instantaneous and 'real time' trading and monitoring of economics, social and political affairs on a global stage.

- There has been an exceptionally rapid growth of the 'trade able information sector' of the economy, by which Professor Goddard means to highlight the explosive growth of services such as new medial (satellite broadcasting, cable, video) and online data bases providing information on a host of subjects ranging from stock market dealings, commodity prices, patent listings and current fluctuations, to scientific and technological journal abstracts.

Completing these developments has been the radical reorganisation of the world's financial system which has resulted in the collapse of traditional boundaries that once separated banking, brokerage, financial services, credit agencies and the like.

- The 'growing information' of the economy is facilitating the integration of national and regional economies. By courtesy of immediate and effective information processing and exchange, economics has become truly global, and with this has come about a reduction in the constraints of space. Companies can now develop global strategies for production, storage and distribution of goods and services; financial interests operate continuously, respond immediately, and traverse the globe. The boundaries erected by geographical location are being pushed further and further back – and with them too the limitations once imposed by time – thanks to the virtuoso ways in which information can be managed and manipulated in the contemporary period.

The application of the information society in this study by the researcher implies that the influence of information technology is not solely affecting organisational settings but the broader society since information-based organisations are the result of a developed society in terms of information technologies. Firstly, defining it in terms of a technological approach, simply implies the technological innovation directly affecting organisations. Technological innovation, for example new information technologies, place enormous pressure on organisations to innovate in order to withstand competition in the business world. Secondly, the economic part simply implies that for an organisation to innovate depends mostly on its

economic ability and standard. Only organisations with good capital can apply advanced information technologies. Thirdly occupation, which simply indicates that new information technology places pressure on organisations to adapt to new work patterns in order to function effectively and efficiently. Advanced information technologies need adaptation on new methods and skills for effectiveness and efficiency. And lastly, the effect of information technology on the spatial aspect which refers to the geographer's distinctive stress on space. As indicated in **chapter one**, the problem arising from this study is how new information technologies affect and are affected by the geographical distribution of work, organisational control of work, the relationship between employees, the state and the organisational structure and culture. Success of an organisation's incorporation of information technology as well as by the broader society, ultimately creates a post-industrial society, which will be discussed below.

2.3 POST-INDUSTRIAL SOCIETY

Information technology in its strictest sense is the new science of collecting, storing, processing and transmitting information. Information is the lifeblood of complex industrial societies and it is growing in importance (Forester, 1986:24). These complexities have triggered organisations to acquire modern skills and employment policies in order to counteract the challenges brought by the new era of industrialised society.

Post-Industrial society emerges from changes in the social structure only. This includes the economy and the occupational structure. The stratification of Post-Industrial society is therefore an account of changes taking place in one sector of society only – and one must not presume, says Bell, that these are the most consequent parts.

Bell (1976:507) offers a typology of different societies, which is dependent on the predominant mode of employment at any one stage. In his view the type of work which is most common becomes a defining feature of a particular society. Agricultural labour, for example, is pretty well ubiquitous, in industrial societies factory work is the norm and in post-industrial societies it is service employment which predominates.

Why these changes should have happened is explained by Bell (1976:507) when he identifies increases in productivity as the key to change. The critical factor in moving from one society to another is that it becomes possible to get 'more for less' from work because of the application of the principle of 'rationalisation' (efficiency). In the pre-industrial epoch everyone had to work the land just to eke out a subsistence existence. However, as it becomes feasible to feed an entire population without every one working on the land (for example through improved agricultural practices), so it becomes possible to release a proportion of the people from farms so that they may do other things while still being assured of an adequate food supply. Accordingly, they drift to the towns and villages to supply growing factories with labour while buying their food from the excess produced in the country.

With the progression of this process, we eventually enter the industrial era where the factory labour begins to predominate. And always the 'more for less' principle tells. Hence industrial society thrives by applying more and more effective techniques in the factories, which in turn leads to sustained increase in productivity. Steam power reduces the need for muscle power while at the same time increasing output; electricity allows assembly lines to run ...and so it continues. The history of industrialisation can be written in this way, mentioning the impressive work of mechanisation and automation that guaranteed spectacular increases in productivity. The indomitable logic is more output from fewer and fewer workers (Bell, 1976:507-508).

As productivity soars, e.g. surpluses of production from the factories, it allows for expenditure to be made on things once regarded as unthinkable luxuries: for example, teachers, hospitals, entertainment, even holidays. In turn, the expenditure of industrial-earned wealth creates employment opportunities in services, as well as occupations aimed at satisfying new needs that have emerged and have become affordable by the courtesy of industrial society's bounty. The more wealth industry manages to create and the fewer workers it needs to do so, thanks to technical innovations (the familiar motto of 'more for less'), the more services that can be afforded and the more that can be released to industry to find employment in services (Bell, 1976:508).

For as long as this process continues – and Bell (1976:508) insists that it is ongoing as we enter post-industrial society – we are assured of, *inter alia*, the following:

- A decline of workers employed in industry, ultimately reduced to a situation where very few people find work in industry (the era of 'robotic factories', 'total automation').
- Accompanying this decline in industrial employment, continuing and sustained increases in industrial output because of unrelenting rationalisation.
- Continued increases of wealth, translated for industry's output, which may be spent on new needs people may feel disposed to originate and fulfil (anything from hospital facilities to masseurs).
- Continuous release of people employment in industrial occupations.
- Creation of a never-ending supply of new job opportunities in services aimed at fulfilling the new needs that more wealth generates.

Bell's identification of post-industrialism (1976:509) draws on familiar empirical social science. It is undeniably the case – as detailed as long ago as 1940 by Colin Clask and qualified later by, amongst others, Victor Fuchs (1968) – that there has been a marked decline of primary sector employment (broadly agricultural and extractive industries) and secondary sector employment (manufacturing) and a counterbalancing expansion of tertiary, or service sector, jobs. For Bell, a 'service society' is a post-industrial one, too.

2.3.1 Critiques of information society

The best-selling status of populists' accounts of the information society stemmed from more than merely the skill and passion of their authors. While critics could complain of the excessive hyperbole employed and undue acceptance of both technological wizardry and free market individualism, it was clear from even the most detached accounts that major information-related change had been occurring in certain advanced societies from at least the 1970s onward (Martin, 1995:4).

By the 1980s, the evidence of such change was all around. People were beginning to use computers at work as well as at home. Most advanced economies had an information sector and a 24-hour global trading on high-speed communications networks, was a fact of life. Along with such developments, society was beginning to face up to the threat of information-related crime and to invasions of personal and corporate privacy (Martin, 1995:4).

David Lyon (1988:196) was one of many writers to question whether or not the sum of the changes inherent in what people refer to as the information society in fact amounted to a shift beyond industrial capitalism. As Lyon pointed out, many of the anticipated benefits of an information society have failed to materialise as far as the majority of people in advanced societies are concerned, for example, a leisured lifestyle in a culture of self-expression, political participation and an emphasis on the quality of life. Tom Forester (1992:3), originally an enthusiastic proponent of the information society concept, reached a similar conclusion. In fact, observed Forester, by the 1990s, people were working longer rather than shorter hours and the paperless office, like the so-called electronic cottage was little more than a myth.

None of this would have come as any great surprise to those commentators who had consistently taken a less sanguine view, perceiving the information society as characterised by the presence of all-powerful multinational corporations, mass unemployment and economic and information inequities. Such critics dismissed the possibility of real social progress in a society that, to them, was tightly constrained by the forces and values of monopoly capitalism (Martin, 1995:4-5). Such changes as did take place were actually that the dominant forces in capitalist society had found new avenues of exploitation and new technological means by which to pursue them, which were therefore changes that could not be welcomed by all.

2.4 THEORIES/APPROACHES WITH REGARD TO INFORMATION TECHNOLOGY

For an organisation to function smoothly within the context of constructive conflict, the application of a socio-technical approach is very important as it is concerned with the interaction of a changing world of information technology and the organisational setting. The approach for this study focused more on the human factor in the organisation, as the researcher intended to determine the impact of information technology on the well-being of employees with regard to employment relations in the workplace.

The researcher believes that the application of a socio-technical approach is of great importance as it is based on flexibility and intellectual growth and it will be useful for determining management's reasons and strategies accompanying the implementation of

information technology for effectiveness and efficiency. By applying this approach one of the specific objectives, as mentioned in **chapter one**, will be addressed. Flexibility entails the tendency of the entire organisation attempting to adopt and adapt to the ever-increasing technologies in such a manner that it will positively encompass intellectual growth and skills development while also encouraging personal development in information technology. The socio-technical approach views technical systems as covering technology and its associated work structure, while the social system covers the grouping of employees into teams, coordination, and control and boundary management. It also covers delegation of responsibility to work teams. A very important aspect of this approach is its function on the formulation of the employment policy and regulations for operational decisions.

2.4.1 Socio-technical design: an approach to information technology

One of the objectives mentioned in chapter one is to determine how employees experience the addition of information technology in their workplace. By applying the socio-technical approach one will better be able to incorporate the human value of employees with the technical aspects of work. Human value simply implies social support, opportunity to relate work to social life and opportunity to learn, while the technical aspect implies necessary skills to function effectively and efficiently in the organisation.

In “Socio-technical Design: An unfulfilled promise or a future opportunity,” Mumford surveys the history and purposes of the socio-technical movement in information systems to reveal its future potential. The principle of socio-technical design, and particularly its value systems, are even more strongly relevant to information technology systems in the coming “wired world” because new organisational forms and economic processes require careful management of the increasingly fluid mutual benefits between employers and employees (Jones, Mumford & Boland, 1999:44).

- ***Transforming the fundamentals***

In “Information systems conceptual foundations,” Davis surveys past and potential formalisms and frameworks used to define discipline. He finds that the concept of information systems as a discipline is aggregated from a set of technologies, methods, ideas, and

processes. The members of this set are not individually persistent, although there are currently more arrivals than departures. The effect is to make the “core” concepts of information systems more difficult to distinguish because of varying assumptions, politics, and the current free-market of ideas (Davis, *et al.*, 1999:22).

Russo (1998:42) argues that electronic commerce is qualitatively changing the mix of skills and knowledge needed in systems development particularly regarding the need for technical skills in telecommunications and multi-media and business skills in collaborative and flexible management.

The basic fundamentals for transformation are very important in terms of a more advanced, collaborative management where all parties within the employment relation are consulted for the benefit of the organisation, as it is stated by the corporate culture. Joint forces in introducing and implementing information technologies will need an adaptable environment where a top management support structure is of vital importance. The support structure can be internal training, external training and also attractive incentives for one to undergo training for information technologies.

- ***Transforming toward new challenges***

In “Toward an integrated theory of information technology-related risk control,” Markus argues that information technology system practices are growing inconsistent with recent management practices because information technology systems have failed to achieve an integrated approach to risk management. An integrated view of information technology-related risk includes systems development failure, security breaches, and competitive threats, and enables intelligent, end-to-end tradeoff decisions in the management of information technology systems (Baskerville *et al.*, 2000:9).

- ***Socio-technical design: An unfulfilled promise or a future opportunity***

The socio-technical design began with the desire of a group of therapists, researchers and consultants to use more widely the techniques they had developed to assist war damaged soldiers regain their psychological health and return to civilian life. This group, most of whom

had been associated with the London Tavistock Clinic before war and some of whom were medically qualified, believed that the therapeutic tools and techniques they had developed could usefully be applied to the organisation of work in industry (Baskerville *et al.*, 2000:33).

- ***Promise and possibilities***

When the socio-technical design was first developed it was seen by its creators as a means for optimising intelligence and skills of employees and associating these with new technologies in a way that would revolutionise how they live and work. The socio-technical school believed in flexibility and intellectual growth: that individuals and groups could reorganise and redevelop to meet new challenges in changing environments and that these processes of change need not to be too demanding and difficult. In the 1970s, many organisations accepted this message and tried to restructure their procedures and change their cultures to meet new kinds of objectives, both human and technical (Baskerville *et al.*, 2000:34).

The socio-technical theory has been continually developed and tested since the Tavistock Institute was founded. Throughout its history, its practitioners have always tried to achieve its two most important objectives: the need to humanise work through the redesign of jobs and the principle of democracy at work. In order to realise these goals, the objective of socio-technical design has always been “the joint optimization of the social and technical systems.” Human needs must not be forgotten when technical systems are introduced. The social and the technical should, whenever possible, be given equal weight. Over the years, this objective has been interpreted in many different ways but it is still an important design principle (Baskerville *et al.*, 2000:34-35).

The technical system was seen as covering technology and its associated work structure. The social system was seen as referring to the grouping of individuals into teams, coordination, and control and boundary management. It also included the delegation of responsibility to the work group and a reliance on its judgment for many operational decisions. A distinction was made between semi-autonomous groups and self-managed groups. The former are given authority for decision making but may lack the means to achieve this; for example, an effective information technology system. The latter have both authority and the necessary knowledge to control their own activities (Mumford, 1996:321).

- *The evolution of Socio-technical concepts*

Albert Cherns, an Associate of the Tavistock Institute, described the socio-technical design principles in an article in Human Relations (Cherns, 1976:783-792). These were:

Principle 1. Compatibility. The process of design must be compatible with its objectives. This means that if the aim is to create democratic work structures, then democratic processes must be used to create these.

Principle 2. Minimal critical specification. No more should be specified than is absolutely essential. But the essential must be specified. This is often interpreted as giving employee groups clear objectives but leaving them to decide how to achieve these.

Principle 3. The socio-technical criterion. Variances, defined as deviations from expected norms and standards, if they cannot be eliminated must be controlled as close to their point of origin as possible. Problems of this kind should be solved by the group that experiences them and not by another group such as supervision.

Principle 4. The multifunctional principle. Work needs a redundancy of functions for adaptability and learning. For groups to be flexible and able to respond to change, they need a variety of skills. This will come to be more than their day-to-day activities require.

Principle 5. Boundary location. Boundaries should facilitate the sharing of knowledge and experience. They should occur where there is a natural discontinuity – time, technology change, etc. in the workplace. Boundaries occur where work activities pass from one group to another and a new set of activities or skills is required. All groups should learn from each other despite the existence of the boundary.

Principle 6. Information must go, in the first instance, to the place where it is needed for action. In bureaucratically run organisations, information about efficiency at lower levels is collected and given to management. It is preferable for it to go first to the work group whose efficiency is being monitored.

Principle 7. Support congruence. Systems of social support must be designed to reinforce the desired social behaviour. If employees are expected to cooperate with each other, management must also show cooperative behaviour.

Principle 8. Design and human values. High quality work requires

- jobs to be reasonably demanding;
- opportunity to learn;
- an area of decision making;
- social support;
- the opportunity to relate work to social life; and
- a job that leads to a desirable future.

Principle 9. Incompletion. The recognition that design is an iterative process. Design never stops. New demands and conditions in the work environment mean that continual rethinking of structures and objectives is required.

William Pasmore, writing in *Human Relations* (1985:18), provides a positive assessment of what the socio-technical approach has achieved over the years. He describes the key insights provided by the early researchers as a recognition that the work systems should be seen as a set of activities contributing to an integrated whole and not as a set of individual jobs. As a result, the work group becomes more important than individual job holders. Control should be devolved downwards with the work system regulated by its members, not by external supervisors. This would increase both efficiency and democracy. At the same time, flexibility and the ability to handle new challenges would be made possible through a work design philosophy based on skill redundancy. Work group members should have more skills than normal production requires. (Today this is called multi-skilling). Work activities should not be restricted to routine tasks. Work group members should have as many discretionary as prescribed tasks to perform. And, most importantly, the individual member of any team must be seen as complementary to any machine, not subordinate to it. This would remove the dictatorship of the moving assembly line. Finally, because an important objective of the socio-technical approach is to increase knowledge, the design of work should lead to an increasing amount of variety for the individual and group so that learning can take place.

The researcher's application of the socio-technical principle for the purposes of this study helps in understanding management's reasons and strategies accompanying the implementation of the information technology for effectiveness and efficiency. The socio-technical principle illustrates the strategies employed by management for the successful introduction and implementation of information technology in the organisation. The principle serves as a guideline whereby that which the organisation intends to achieve should be compatible with its objectives and mostly its depth in terms of skills. Problem solving is tackled from its original root in order to avoid disturbances in operations. For example, the problem of skills lag is critically analysed and strategies for training and development are given full attention. Counteracting the skills lag with training and development creates an environment for adaptation and learning thus developing a variety of skills for employees. This will be achieved if there is a proper support structure based on the organisational culture and respect for human values in the organisation.

2.5 BOURDIEU'S THEORY OF PRACTICE AND CULTURAL REPRODUCTION

Bourdieu is a French sociologist. The objective of Bourdieu's theoretical framework is to uncover the buried organisational structures and mechanisms that are used to ensure the reproduction of social order.

Bourdieu's theoretical framework helps us understand how changes arising from information technology may actually reinforce existing power structures and help perpetuate the social order. For Bourdieu, change is a self-regenerative mechanism required for the maintenance of stratified organisational hierarchies. Static structures can be figured out and conquered over time. However, changing structures keep actors off balance, thus leading them to apply familiar strategies in unfamiliar contexts. It is this re-use of learned dispositions in new settings that makes existing class positions self-sustaining (Morrow, 1994:132).

As the focus of this study is on the influence of information technology on labour relations, the researcher believes that Bourdieu's theory is based on how information technology affects the entire operation of the organisation. The theory points out the impact of the corporate culture, which plays an integral part as everything concerning the organisation is reflected by the compliance to the culture affected by the relationship within the employment

environment. The theory also mentions management support for employee development, that is, in terms of training.

2.5.1 Bourdieu in the domain of information technology

Table 1 gives a high level summary of the most salient elements of Bourdieu's theory applied to the domain of information technology. The table and accompanying text in this section are intended to illustrate how Bourdieu's ideas better inform our understanding of technology empowerment and disempowerment. More importantly, this theory suggests how the application of technologies, even if accompanied by conceived egalitarian motives and a desire to see the technology made available universally, may exclude entire classes of people (Baskerville, 2000:284).

Figure 1: Key theoretical concepts

Key term	Application to information technology
Field	Information technology organization or a given system under investigation
Habitus	Expectations, assumptions, and attitude towards technology; informs practices, for example, how and if one engages technology
Symbolic violence	Use of technology to enforce decisions; decision to limit or deny access to technology or use of technology; technology used for surveillance or control
Cultural capital	Exposure, previous experience and familiarity with information technologies; information technology credentials
Symbolic capital	Use of highly technical language, sharing of technical expertise, removing manual process in favour of technological processes, denying training in new technology
Social capital	Access to relationships with others knowledgeable about technology
Economic capital	Ability to acquire technology and training; choices to allocate resources to the procurement of technology

Adapted from: Baskerville *et al.* (2000:285). Organisational and social perspectives on information technology.

- ***Field***

A field is the social arena under investigation. This could be an entire industry, an organisation dedicated to the development of information systems, or even a virtual community. Autonomy is a particular important measure of the reproductive tendencies of a field. In terms of the information systems development organisation, autonomy may signal a move to an organisation of specialists who are able to progressively develop, transmit and control their own particular culture (Swartz, 1997:45).

- ***Habitus***

The habitus is a product of the internationalisation of the cultural arbitrary. In the information system development organisation, for example, the cultural arbitrary confers privileged status to those with expert technical knowledge. Habitus simply explains the ability of an organisation to adapt to information technologies. Practices and programmes are devised on how to use information technologies and how effectively to apply these to organisational operations (Baskerville *et al.*, 2000:285).

- ***Symbolic violence***

Bourdieu describes the three functions of symbolic violence as knowledge integration, communication and political domination. The information systems' literature on power politics provides examples of these functions. Typically these studies employ a framework that divides organisational control mechanisms into two categories: formal controls and informal controls (Eisenhardt 1985; Henderson & Lee, 1992; Kirsch 1996, 1997; Ouchi, 1979, 1980).

In all cases, the symbolic violence must be "misrecognised" if it is to be successfully imposed on a subculture. That is, the symbolic violence must be seen as a legitimate call for deference to authority, otherwise actors may resist the imposition.

- ***Cultural capital***

Ownership of and familiarity with information technology is a type of cultural capital. It is taken for granted that one would be confident with technology in organisational settings. It is a mark of the well educated and erudite. Unless one is socialised in a culture of information technology acceptance and history, one is rather like the indigenous aboriginal people with minimal exposure to the outside world in the film 'The Gods Must be Crazy' (Feidson, 1986:287).

Similarly, formal language is a type of cultural capital. More so than any other technology, computing has developed its own extensive and unique lexicon. While the ability to speak intelligently about technology in a business setting immediately signals one's position as upper class, it forces those without a command of the language of technology to a position of deference. Bell (1976:112) argues that formal language is the central resource in society. However, formal language by definition is not part of everyday vocabulary but the importance of possessing this type of knowledge has grown enormously in advanced post-industrial societies. Thus knowing about technology is an elite form of knowledge, and prestige and respect are given to the technocrats that possess this form of cultural capital (Feidson, 1986:287).

- ***Symbolic capital***

Symbolic capital is gained when the exercise of power goes unnoticed. It is the use of power in disguised form because it hides underlying interests in order to give them legitimacy. The potency of symbolic capital lies in the fact that it is not perceived as power but as legitimate demands for recognition, deference, obedience, or the service of others (Swartz, 1997:46). By simply conforming to the control mechanism instituted by employers, employees unwittingly provide management with knowledge that may be used to further manipulate the workforce.

- ***Social capital***

Information technology also embodies social capital as it opens doors to new relationships, both physical and virtual. With a desktop computer, employees can "network on the network"

to search for employment opportunities, seek career advice, and retrieve industry reports that will help them to improve their job performance (Romm & Pliskin, 1997:95).

- ***Economic capital***

Economic capital enables one to convert economic resources into information technology resources. Because of its universal applicability and liquidity, economic capital can be defined as the root of all other capitals. In fact, all other forms of capital can be thought of as disguised forms of economic capital (Swartz, 1997:46-47).

2.6 RELEVANCE OF THEORY

Bourdieu's theoretical framework helps to understand how changes arising from information technology may serve to both disrupt social order and still perpetuate existing power structures. While the introduction of information technology may provide opportunities for groups and individuals to gain autonomy, the dominant can ensure their privileged position by enacting mechanisms to monopolise their control over scarce and valuable organisational resources. Information technology extends the power resources from which actors may draw upon in their struggle to maximise social position (Baskerville, 2000:289).

The contribution of this framework to information systems research lies in the ability to explain and measure the reproductive tendencies of technology in diverse settings such as community, organisational society or international studies. This suggests that social order may be an unseen contingency in numerous information systems research areas. For example, changes in jobs classifications and the rise of new occupations may be explained by the "broken trajectory" effect. This occurs when an agent's aspirations soar above its objective chances (Baskerville, 2000:289).

Social class analysis may also be relevant in information systems development studies. Because of their highly specialised skills, developers and analysts are granted authority to interpret and translate business requirements into computer systems. However, these functional requirements are sometimes reinterpreted during systems design and the resulting information does not perform as expected. This theory would suggest that information

systems development is a form of symbolic violence with developers and analysts assuming the role of cultural producers capable of imposing their worldview on the unsuspecting users of their technology products and service (Baskerville, 2000:289).

This theory would suggest that users and developers are predisposed to develop new information systems that reflect the socialisation learned by their habitus. Therefore, calls for participatory design and end user involvement may be questioned because all parties will tend to build systems that reflect their social positions (Baskerville, 2000:290).

2.7 EMPLOYMENT RELATIONS: CONSTRUCTING INTERDEPENDENCIES WITH INFORMATION TECHNOLOGY

Because of the implications of the new technology for the employment relationship, organisational policies have sought to make the introduction of such technology a matter for consultation (Venter, 2003:22-23). Greater attention is paid to the interaction of information technology with organisational methods, work patterns, employees and organisational culture. The two mentioned approaches to information technology place more emphasis on creating a favourable climate for the interaction of information technology with the organisation and also focus on the nature of relationships within the organisational setting. With regard to constructing interdependencies with information technology the researcher views the application of the two approaches as setting a background for the success of interdependence within the employment relation.

Interdependence construction is the gradual formation of mutual relationships between employers and employees in the organisational setting. The main dimensions of this account are the following (Cornfield, 1987:27):

- What is the impact of information technology on employment relations in the workplace?
- In which ways can information technology contribute to or hamper these employment relations and what is the employees' experience of information technology?

Traditionally, the interdependence relationships have been looked at from two perspectives, either as interdependence between people or as interdependence between work tasks. In this regard the area is narrowed to interdependencies at work (Mintzberg, 1979: workflow, process, scale, and social interdependencies). In separating work tasks and people, these perspectives provide only relatively narrow and clear cut views on what could be assumed to be a wide variety of forms and appearances. They also remain insensitive to the complex and situated nature of interdependencies (Weick, 1979:45-46).

The focus is on social practices: the relationships are not considered separately, but the attention is on people engaging in action and interaction. Interdependencies are then seen as constantly constructed and reconstructed social practices (Giddens, 1984:40), that is, repetitive, patterned and reciprocal action-interaction (Weick, 1979:46). Interdependence construction is then creating or reconstructing patterns of action and interaction where employers and employees are mutually dependent on each other.

Interdependence construction may be expected to take different forms when the relationships are mediated or affected. The mediator of interest here is information technology. Information technology is used to denote the kinds of asynchronous groupware where the designers' intent is to provide support for coordination through access to technological capabilities such as shared repositories, discussion forums, and communication facilities (Orlikowski, 1995). The purported "coordinated- inducing facilities" of information technology have been identified as related to their capabilities to support high levels of interaction, many-to-many communication and information sharing, in a group of known users, across hierarchical, divisional, or time – geographic boundaries (Coleman, 1996; Dyson, 1990).

When interdependence relationships are seen as social practices, the focus of interests shifts to the process through which these relationships are formed and reconfigured. The role of technology, in this case "installation of information technology," needs to be considered in parallel, since, as is widely argued (Button & Sharrock, 1997; Haraway, 1991; Joerges, 1988; Latour, 1993; Sproull & Kiesler, 1991), the social process and the technical system cannot be considered separately. The view in this theory is that information technology can be used to support interdependence construction, but rather they may become heavily involved in a variety of ways as they become woven into the employment relationship in the organisation. It is contended that a richer understanding of interdependence construction in relation to

information technology appropriation and use can be achieved by carefully dissecting their intertwined dynamics (Cornfield, 1987:29).

2.8 MAJOR THEORIES ON LABOUR RELATIONS

2.8.1 Definition of labour relations

There is no simple definition of labour relations, because the term has come to include many things in both the public and private sectors, whenever people are employed to do work. Previously focus was largely centred on relations in the manufacturing and mining sectors and what was termed industrial relations. But as more employees have been drawn into the ambit of legislation unionisation has become appropriate (Bendix, 2001:3).

Labour relations can be a simple, interpersonal process involving only two people; or it may occur between groups at a workplace, such as between management and a group of workers. Or a much broader interaction may develop between formalised groups, such as between an association of employers and trade unions which bargain collectively within a specific sector of the economy.

Labour relations is “a broad, interdisciplinary field of study and practice that encompasses all aspects of the employment relationship” (Kochan & Katz, 1988:232).

2.8.2 Dunlop’s systems theory

The general objective of this study is to determine the influence of information technology on labour relations by means of employing Dunlop’s system theory as it applies to the tripartite relationship between the state, employers and employees.

The impact of information technology on employment relations within the organisation required a certain ground for regulating the interaction within the workplace, so the researcher viewed Dunlop’s system theory as appropriate as it comprises the tripartite relationship and

also views the labour relations system as an open system where it can be influenced by external and internal factors like information technologies.

Dunlop (1958:7) attempted to provide an integrated theory of industrial relations and focused his attention on the system of rules which governs the workplace and work community. His major work provided a theoretical framework which defines the industrial relations as a subsystem of wider society. The wider society is seen to provide certain external influences and constraints but not to dominate industrial relations completely. Dunlop (1958:7) defined an industrial relations system as follows:

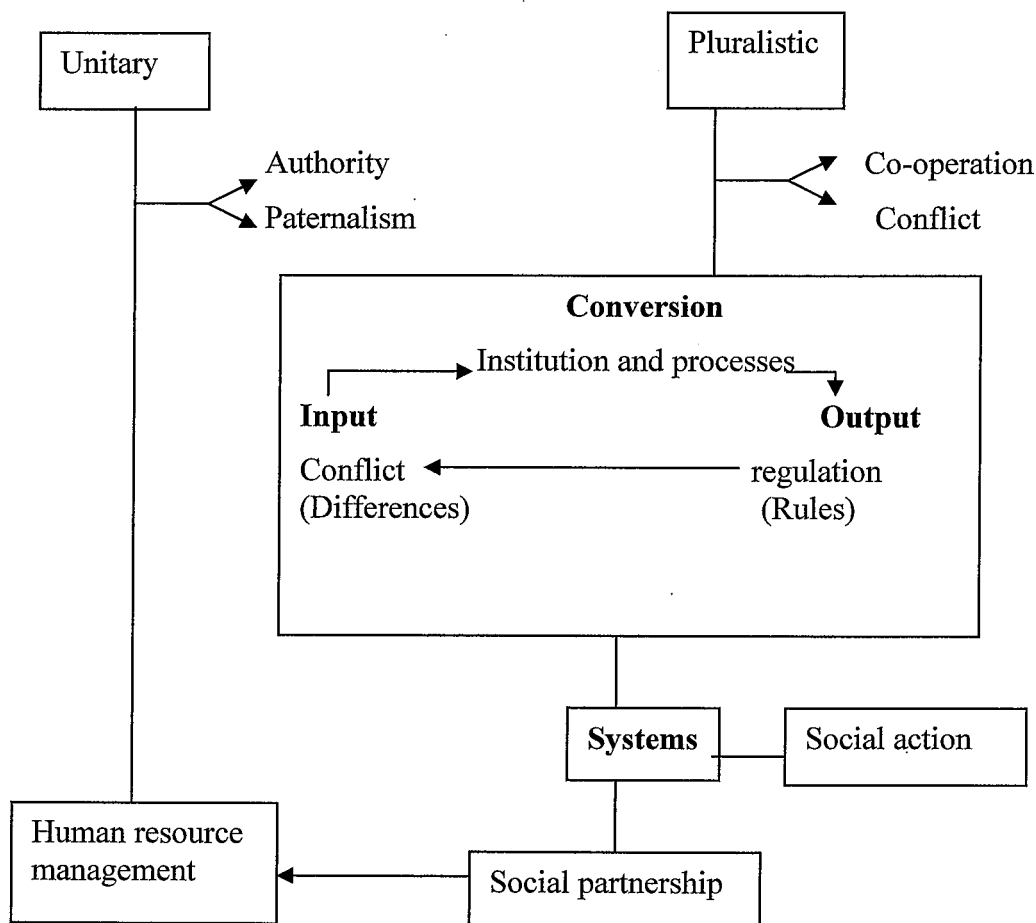
It is comprised of certain actors (managers, workers and specialized governmental agencies), certain contexts (technological characteristics, the market and the distribution of power in the society), an ideology which binds the industrial relations system together, and a body of rules created to govern the actors at the workplace and work community.

According to Dunlop (1958:7), the actors establish the rules for the workplace and work community. These rules are essentially aimed at governing the relations and interactions between the actors, and therefore include the establishment of justice in the work environment. Dunlop emphasised that the environment surrounding the workplace influences the actors, and as such the industrial relations systems of any country exist alongside other systems such as the political and economic systems, and the technological system.

- **Actors:** the actors are the managers, workers and government agencies who take part in the rule-making process.
- **An environmental context:** technological and economic factors together with the locus of power distribution in the larger society from the environment which impinges upon the actors.
- **A common ideology:** while each actor may have his/her own ideology, an industrial relations system requires that these ideologies be sufficiently compatible and consistent so as to permit a common set of ideas which recognises an acceptable role for each actor.
- **A set of rules to regulate labour relations:** rule-making, and the application of such rules via agreed procedures, is regarded as the central aim of the industrial relations system.

While these definitions do point to the need for regulation of the modern labour relationship and to the fact that this is often done on a collective basis, they do not sufficiently stress that we are, in essence, dealing with a relationship, on both an individual and a group basis, and that the nature of the rules and regulations, even the manner in which they are made, will largely depend on the manner of the relationship itself. If the labour relationship, whether formal or informal, individual or collective, undergoes radical change, new and different industrial relations processes, rules and institutions will evolve. Equally, significant changes within society or within the institutions and laws which govern the labour relationship will impact on labour relations, causing the parties to adopt new roles and to interact in new and different ways. There is, thus, a great deal of reciprocity between the labour relationship and the institutions and laws which govern it. Any definition of 'industrial relations' or 'labour relations' should take cognizance of this fact (Bendix, 2000:3).

Figure 2: Approaches to labour relations



Source: adapted from Davies, A. (1986:4). Industrial relations and new technology.

2.8.3 The unitarist theory on labour relations

The introduction of information technology in the organisation raises more challenges to both the employees and employers which will propel them to comply with the organisation's shared values and norms by joining forces to address the shortcomings brought to the system by information technology. Due to the fact that the unitarist approach encourages joint optimisation, the researcher viewed the approach appropriate for counteracting these shortcomings.

The unitarist maintains that the organisation is a cohesive, unified unit comprising a common set of values and goals subscribed to by all members. Authoritative management styles are accepted as legitimate and the managerial prerogative is therefore rarely challenged. Conflict is perceived as being irrational and is most often of fractious nature (that is, a direct clash between opposing ideologies) (Salamon, 1998:7). Managers generally attribute conflict to a clash of personalities or a general failure on the part of employees to understand the decisions taken by management as a whole or to a breakdown in managerial communication.

Organisations are also demonstrating that the use of information technology improves collaboration among work teams. For example, because insights into common problems come at random times, an electronic bulletin board within a group of design engineers or product planners can be the place to post an idea at any time. Group support systems can help speed up complex decision making among several individuals (Martin *et al.*, 1994:12-13).

The underlying assumption of this perspective is that the people working in an organisation are in basic harmony, and that conflict is undesirable and exceptional. Conflict between employer and employee is explained as a product of factors such as poor communication by management, a lack of understanding on the part of employees of management's decisions, and the actions of agitators. This perspective denies any notion of inherent, structural conflict due to the nature of the employment relation (Nel, 2002:3).

Labour unions are therefore regarded as unnecessary and dysfunctional. Many managers who share this perspective see labour unions as a leftover of the 19th century, when unions played an important role in addressing the malpractice of the time. In the enlightened management of the 21st century, management takes full account of the interest of employees in decision

making. The view is thus taken that there is no need for an outside body (such as a trade union) to intrude on the employment relationship (Nel, 2002:3).

2.8.4 The pluralistic approach

This approach is characteristically appropriate for the modern information-based organisation as it allows for the sharing of power and authority, where communication is a two-way mode of transmission and consultation is one of the priorities for conflict resolution made possible by information technology tools. The researcher views this approach relevant to these modern organisations in which employment relation is a major challenge.

The pluralistic approach is almost the flip-side of the unitarist perspective. It presupposes that organisations are multifaceted, complex groupings of individuals who align themselves with other members of the organisation sharing similar views, values and objectives. Power and authority is typically not centred in one individual but is rather spread among a variety of stakeholders. Trade unions are accordingly accepted as a legitimate forum for coordinating various interests and expressing them accordingly. Because of this interface between a variety of interest groups and a greater dissemination of power, there is a greater propensity for conflict that is now accepted as rational and inevitable (Salamon, 1998:7).

Software can be designed to constrain the user or give the user great discretion. This creates a paradox: networked information technologies give individuals greater control over their information processing needs than ever before, yet there is also greater potential for others to exert control over individuals through privacy-reducing on-line performance monitoring and database technologies (Cash *et al.*, 1994:34).

Conflict is primarily the result of the tension that arises between the parties to the employment relationship as a consequence of the differing roles they play. However, any conflict that does arise is manageable through a system of negotiated trade-offs and settlements. The pluralistic argues that there is, in the employment relationship, a constant shifting of balance of power that ultimately needs to be maintained through compromise and collaboration (Salamon, 1998:7).

The pluralistic view is clearly one that is more widely accepted than the unitarist perspective and appears to be better supported by current organisational and societal patterns (Salamon, 1998:7).

- ***The application of pluralism internationally***

Historically, pluralism evolved in the United Kingdom and the United States, and collective bargaining has remained the major pillar of collective dispute resolution in these countries. However, declining union membership as a result of the demise of large, labour-intensive industries; the changing nature of work, and global competition, has impacted on the traditional collective bargaining process in many ways.

Pluralism is increasingly questioned. Collective bargaining based on an acceptance of ongoing adversity is perceived as being too disruptive, and the accompanying industrial action too costly for any country that wishes to compete on global markets, and especially with the newly-industrialised countries of South East Asia. Employers in these countries still follow a unitarist policy where the boss role is regarded as paramount and trade unionism is restricted. The effectiveness of any country's labour relations systems in providing a climate conducive to the promotion of a productive workforce is now itself a critical factor in the competition for global markets and investments (Poole, 1986:22).

2.8.5 The labour relations system

The approach that the labour relations system is composed of three groups, namely the workers and their organisations, managers and their organisations, and the governmental agencies that are concerned with the workplace and the work community, focuses on the tripartite nature of labour relations (Finnemore & Van der Merwe, 1996:18).

“These groups interact within a specified environment comprised of three interrelated contexts: the technology, the market or budgetary constraints and the power relations in the larger community and the driven status of the actors” (Dunlop, 1958:8).

An ideology (commonly shared ideas or beliefs regarding the interaction and roles of the actors) is created to help bind the system together (Dunlop, 1958:9).

According to Schutte and Pieterse (1989:45), the changes in the macro-environment lead to pressure on the various parties to ensure good relations in the workplace. This is one of the most primary objectives of labour relations (Kochan, 1980:689).

2.9 CONCLUSION

Ever since Karl Marx identified technology as a major element in his theory of relations between workers and owners, industrial relations scholars have generally acknowledged technological change as a major environmental variable affecting collective bargaining. It is a dynamic reality demanding work rule changes and adaptations.

There has been an incredible evolution in the relationship and changes between human beings and computing machinery. Machines are acquiring human status, not through robotics, but rather through reification. Computers have become inscribed socially with autonomy and human values, and organisations have become hybrid collectives of humans and non-humans (Baskerville, 2000:11). Consequently we need new norms for defining the relationships and exchanges between human beings and computers. New policies and regulations are needed that permit designers to appreciate how technology shapes the culture of virtually collocated people, deal with flexibility that is absolutely necessary in both information technology and organisations, and allow role players to interpret information technology in relation to the social interdependence of organisational members (Stage, 2000:29).

Information technology has not only broken through technical barriers, but through social ones as well. Organisations must raise awareness of the social issues to the same new plane as that reached by information technology. For example, we can see how web designs imply changing an incredible web of social relationships. We can also see how rational-technical information systems designs have endured even more unreasonably than rational-technical information systems management and that the need for interpretive approaches for systems development is paramount (Baskerville, 2000:11).

The next chapter is based on the influence of information technology on the role players, which are employees, employers and the state. The previously mentioned theories will be applied to determine how effectively and efficiently they can be applied for the benefit of the organisation and, most importantly, how role players avail themselves in the employment relation.

INFLUENCE OF INFORMATION TECHNOLOGY ON THE ROLE PLAYERS WITHIN THE LABOUR RELATIONS

3.1 INTRODUCTION

As it has been mentioned in chapter one, the objectives of the study were determining management's reasons and strategies in connection with the information technology for effectiveness and efficiency, employees' experience of information technology, and the impact of information technology in the workplace and this can be achieved by restructuring of organisation in order to counteract and accommodate the changes brought about by information technology, raising major challenges to the employer, employee and the state. The employer, as the sponsor of information technology, has a major role in integrating the existing or available human resource into an information-based organisation, whereas employees as important role players in the employment relationship need to be skilfully equipped to keep up with the ever changing technological change. State, as the mother of the relationship, has to regulate the entire employment relationship by passing employment and information technology policies.

Information technology change is one of the most powerful forces transforming the employment relations system. In fact, the synergistic relationships between information technology and employment relations are so complex that they are not well or completely understood. It is known that the impact of technology, while not independent of social forces, already has been profound: it has transformed occupations, creating new skills and destroying others; altered the power relationships between workers and managers; and changed the way workers learn and work (Abrams, 1987:11). Information technology also has made it possible to decentralise some economic activities out of large metropolitan areas and into small towns, rural areas and other countries.

It is important to note that information technology makes it possible for international organisations to operate on a global basis. Indeed, some international organisations, especially those based in developed countries, are losing their national identities, detaching the welfare of organisation from that of particular worker and communities (Abrams, 1987:11).

External influence, facilitated by information technology, has transformed the labour relations system. A major objective of the traditional employment relations was to take labour out of competitions. External interaction by organisations makes it impossible for unions to restrict labour market competition through employment regulation and collective bargaining alone. External impact and dynamic change also require much greater attention to productivity, flexibility and organisational competitiveness. These economic imperatives require that traditional adversarial labour–management relations be complemented by more cooperative arrangements whereby managers pay more attention to worker security, welfare and development and workers and their leaders are more concerned with the economic viability of firms. In order to survive and grow in a modernised information world, labour movements must develop policies and procedures to deal with International Organisation and global competition (Cornfield, 1987:22).

3.2 INFLUENCE OF INFORMATION TECHNOLOGY WITHIN THE WORKPLACE

Researchers and stakeholders within organisations might want to know whether workplace characteristics change when an organisation implements a new technology or a new way of working. For example, it might be of interest to examine whether job control, level of demands and social aspects of the workplace improve or deteriorate (Wall *et al.*, 1990a).

The introduction of information technology has a major impact on the employment relations. When organisations plan on implementing information technologies, there are some vital aspects that the researcher thinks need more attention in order to ensure a well organised introduction and a well structured implementation. The focus is on the following aspects:

- ***Volume of employment***

One must express concern about the impact of new technologies, and information technology is no exception, because such innovations will place certain jobs in jeopardy. The worst case is the image of the computer composition technologies that rendered obsolete skills of and renowned for an entire profession of typewriters. While typesetters represent one extra, the most significant technologies have led to economic growth and job creation at the other end

of the spectrum. Communications and transportations – the railroad, the automobile, the telephones and the computers expanded the economy and led to economic growth beyond the dreams of their investors (Osterman, 1986:20).

The typical case is considerably more shaded than either of these extremes. Most new technologies so in faith ease the substitution of capital for labour and hence, for a given level and quantity of output, reduce employment. By the same token, however, the very efficiency induced by the technology lead to lower prices per unit. This in turn can expand overall demand for the product and increase employment (Osterman, 1986:21).

Several research efforts carried out by the management in the 1990s Research Programme have demonstrated the complexity of this topic. In one study they examined the impact of the spread of mainframe computers on the employment of clerks and managers (Osterman, 1986:21-22). For this project they had data on employment, wages and output in about forty industries. By combining these data with information on the number and size of mainframe computers, they estimated employment (labour demand) equations. Each 10% increase in computer power was associated with 1.8% decrease in the employment of clerks and 1.2% decrease in the employment of managers. Hence, there is a clear employment loss (Phillips, 2000:42).

The answer to the overall impact really depends on how well the labour market – and this means both the external market and the internal training and transfer policies of firms– succeeds in moving people from old to new jobs (socio–technical principle of multiskilling from the socio–technical approach in **chapter two**) (Phillips, 2000:42-43).

- ***Organisational versatility***

One of the first issues at the organisational level is that some organisations may experience employment decline while others are growing. The impact of this on the labour force depends crucially on the effectiveness of labour market institutions in matching workers with jobs. If the people who lose their jobs can find new ones, then all will be well. If there are substantial difficulties, then this will have consequences with regard to issues ranging from work rules to international trade (Lupton, 1986:13).

The second issue refers to the internal rules, employment policies, of the organisations themselves. Within the organisation some occupations will gain employment while others will lose employment. How this is experienced, and its consequences, will depend on the organisation's employment policies with respect to retraining and employment continuity. The main question is whether the new jobs are made available to those who have lost their previous ones. Again, the answer to this question will have substantial consequences for how the impact of information technology on employment is played out (Lupton, 1986:14).

3.3 COPING STRATEGIES OF THE ORGANISATION

Coping is required, especially in situations of fairly drastic change, which defies familiar ways of behaving or thinking. That, in turn, requires the production of new behaviour "and very likely gives rise to uncomfortable effects like anxiety, despair, guilt, shame, or grief, the relief which forms part of the needed adaptation. Coping refers to adaptation under relatively difficult conditions" (White, 1974:48-49). This is particularly true to displaced employees who have to learn new skills to cope with a restructured organisation and to develop a new set of social relationships (Bun & Chiang, 1994:197-198).

3.4 CHANGING WORK

The changing patterns in work execution need more time for adaptation, so it is important that relevant strategies are implemented to ensure flexibility.

Rapidly evolving information technologies are altering employee life in three ways: by creating new work, new work arrangements and new human resource issues (Cash *et al.*, 1994:208).

3.4.1 New work

New information technology capabilities are leading to enhanced products (such as microprocessor-controlled automobiles and appliances), new products (such as cellular phones), and new industries (such as personal computing software). Literally thousands of

small software, hardware, and information technology service companies that do business today did not exist a decade ago, and still more are to come, all forming part of promising new technology developments. The Massachusetts software council, for example, predicted in 1993 that 33,000 new Massachusetts jobs would be created in the sector over the next coming years. Applicants with updated technical skills and adaptable knowledge will find many employment opportunities; furthermore, jobs are being redefined in traditional industries, as both Drucker and Zuboff (1988:226) discuss:

- ***Division of labour***

- Differentiation: extending horizontal and vertical specialisation of jobs; for example, job breadth in terms of the number of different activities to be performed, and job depth in terms of the extent to which the conception, execution and administration of activities are combined.
- Departmentalisation: the grouping of activities according to the goods and services the organisation markets, to whom it supplies, or the functions, skills and knowledge the organisation uses to practise them.

- ***Division of decision rights***

- Vertical authority: the vertical dimension spans the different levels of an organisation, leading to the problem of determining an appropriate degree of centralised or decentralised authority;
- Horizontal authority: the horizontal dimension concerns activities at the same level of an organisation. For example, should the marketing or engineering department have the right to decide on new product specifications? Ideally, decision rights are given to those with great access to relevant information.

- ***Coordination mechanism***

Because labour and decision rights are divided among the various members of the organisation, differentiation must be balanced with integration. Integration can be achieved through coordination mechanisms that include such formal means as direct supervision, the

use of formal rules and procedures, standardised work processes and outputs, standardisation of skills, and also through *ad hoc* or informal mechanisms such as task forces. The choice of coordination mechanisms depends in part on the degree to which issues are routine versus exceptional (Cash *et al.*, 1994:26-27):

- Routine coordination includes such matters as integration across stations in an assembly line or monthly processing of pay checks. Standard operating procedures and direct supervision typically accomplish this coordination.
- Exceptional coordination includes the resolution of infrequent or unusual matters or allocation of limited resources. Plans and budgets, negotiation, committees and task forces are often used for this form of coordination.

3.4.2 New work arrangements

Information technology leads to changes in relationships with the organisation and its members, in how they are being supervised and evaluated. The most dramatic changes in the worker's relationship with the organisation is the massive downsizing occurring in many firms, and the increasing reliance on a "disposable" or contingent labour pool, consisting of workers hired on a short-term renewable contract basis. Information technology has driven these phenomena in three ways. Firstly, much clerical work has been replaced with automated systems. Secondly, increased access to timely information about operations makes a broader managerial span of control possible (more workers report to each manager) and thirdly, the information technology enhances the ability to capture an organisation's history and codify its members' expertise enabling a more efficient transfer of knowledge and skills, which in turn makes more flexible employment arrangements possible (Belous, 1989:32).

Work is being carried out in new ways. There is more team work, and teams are supported by networked technologies such as electronic mail, group decisions support systems and authoring system video conferencing and other capabilities. Geography is a far lower constraint thanks to these technologies. "Telecommuting" –working at home or in suburban satellite locations while electronically connected to the organisation – has become a frequently chosen option that helps to lower fuel and corporate overhead costs and give workers greater flexibility in where and when they work (Cash *et al.*, 1994:33). Both new

working arrangements and new technologies give rise to new forms of supervision and performance evaluation.

3.4.3 New human resource issues

As mentioned in **chapter one**, the change from human to machine technology has transformed work in the industrial era. It resulted in the imposition of a steady pace or work rhythm for work, bringing with it an increase in the discipline imposed on employees (Vago, 1999:12).

The new contractual relationships create new personnel issues. A big one is job security and its flip side, employee loyalty to the firm. It is too soon to tell whether the flexibility of a contingent labour pool offers sufficient benefits to offset the threats to employee morale, and unions are likely to use this issue to try to regain the clout they suffered in the 1980s. Traditional notions of the “career ladder” may also have to change, as Drucker (1988:220) discusses.

A second issue concerns employee autonomy. Software can be designed to constrain the user or give the user great discretion. This creates a paradox: networked information technologies give individuals greater control over their information processing needs than ever before, yet there is also greater potential for others to exert control over individuals through privacy-reducing on-line performance monitoring and database technologies (Cash *et al.*, 1994:34).

3.5 CHARACTERISTICS OF INFORMATION TECHNOLOGY

In order to understand these impacts mentioned above, people need to examine how new technology differs from past innovations. There are three technical characteristics of the technology that have significant implications for understanding its impact in the organisation of work (Cameron & Clarke, 1991:31):

- Tighter integration across functions and tighter independencies of activities.
- More rapid speed and real time response.
- More costly consequences of errors and breakdowns.

Computers and information technology knit closer previously semi-independent aspects of the production systems. This is true for both blue- and white-collar work (Clarke & Cameron, 1991:31).

Paul Aldler (1986:12) provides a persuasive example of this phenomenon from banking. Vastly oversimplifying Aldler's description, one can speak of a transition between two states. Prior to the introduction of computers, the processing of customer requests and accounts by the 'front office' resulted in a paper flow to the 'back office' which was entered into account records. Each of these clusters of activities involved numerous steps. There were various checks for errors because of the paper flow and an error made by a teller could be noticed by a bank office processor. Under new regime, information technology integrated the two functions to the point where tellers could introduce data directly to the bank's account database. This led to great efficiency but also to considerable risk. The point here is that a series of separate functions were tightly linked together because of the introduction of computers.

3.6 INFORMATION TECHNOLOGY IN ORGANISATION

Having introduced new technology or having implemented another innovation, an organisation is faced with a number of questions. Did the investments pay off? Are the hopes and promises expressed by suppliers fulfilled? Or are new technologies and other innovations a waste of an organisation's financial resources? Do new ways of working lead to the deterioration of employees' work situation, as more pessimistic proponents expect? (Rossi, Freeman & Lipsey, 1998:34)

Information technology influences the organisation in such a way that the entire functioning of the organisation becomes effective and efficient. The researcher believes that after focusing on aspects which need attention for introduction and implementation, it is quite important that focus shifts to the role of information technology.

3.6.1 Role of information technology in a new organisation

Information technology, as both an industry and organisation resource, is still in its infancy. In the 1950s, businesses embarked on the first widespread use of computers, primarily as tools for recording and processing accounting transactions. Thus information technology has only really been part of business for about forty years. Nonetheless, information technology is one of the most important resources in today's business environment, and successful businesses are investing heavily in information technology (Best, 1996:22).

Best (1996:30) identified four uses of information technology in organisations and industries:

- ***Supporting information-processing tasks***

First and foremost, industries are using information technology to support basic information-processing tasks. These tasks range from computing and payroll checks, to creating presentations, to setting up Web sites from which customers can order goods.

Considering information-processing tasks, one can easily categorise various information technology tools according to their purpose. To help remember the categories of information technology tools, 5 C's of information-processing tasks are created:

- Capturing information – at its point of origin with input devices.
- Conveying information – in its most useful form without output devices.
- Creating information – to obtain new information with the CPU and internal memory (RAM).
- Cradling information – for use at a later time with storage devices.
- Communicating information – to other people or other locations with telecommunication technologies.

With regard to information technology's impact on labour relations, information-processing tasks should be at their very best, because this is where work-related information is obtained and processed. Preferably one can say that for the smooth or favourable climate in the industry, the 5 C's need to be thoroughly implemented. Every bit of information that the

organisation captures, will be highly evaluated with accordance to the state's rules and regulations of the labour market.

- ***Supporting decision- making tasks***

When organisations use information technology to process information such as payrolls or sales orders, it is referred to as online transaction processing. Online transaction processing involves gathering input information, processing information, and updating existing information to reflect the gathered and processed information. Organisations also use information technology to support decision-making tasks, by what is called online analytical processing. Online analytical processing is the manipulation of information to support decision-making.

- ***Supporting shared information through decentralised computing***

Decentralised computing is an environment in which an organisation splits computer power and locates it in functional business areas as well as on the desktops of knowledge workers. This is possible because of the proliferation of less expensive, more powerful, and smaller systems including desktop computers, laptop computers, and minicomputers. Shared information is an environment in which an organisation's information is organised in one central location, allowing anyone to access and use it as he/she needs to.

- ***Support innovation***

Information technology tools not only support information-processing, decision making and shared information through decentralised computing, but also enable innovation. Consider FedEx, the first freight company to offer package delivery software that its customers can use to electronically request package pickup and check the status of packages during delivery.

3.7 IMPACT OF INFORMATION TECHNOLOGY ON THE LABOUR RELATIONS

In **chapter one** Venter (2003:22) is referred to as having stated that improvements in technology, and particularly information technology, have fundamentally impacted on the employment relationship. Firstly, and most obviously, technology is often used as a substitute for labour. Production lines have increasingly become automated and expert and other information systems are being used in organisations to replace the middle and lower tiers of management. The simple reason for this is that, as a factor of production, capital often has a cost advantage over labour.

The effect of information technology on the labour relations is basically the implications it brought to the employment relations. The researcher viewed issues like internal rules and employment policies of the organisation as the most affected scenarios in the organisation. All issues mentioned above need to be revisited to ensure the smooth functioning of the organisational system.

3.7.1 Deregulation and labour relations

Technological change and organisational deregulation have promoted the development of cooperative labour relations arrangements in information technology industries. With the entry of non-union competitors and the adoption of labour-saving technology in the industry, union membership and market share have been jeopardised, compelling labour and management to resolve their divergent interests and address their mutual concerns (Cornfield, 1987:30-31).

In order to analyse this shift in labour-management relations in the information technology industry, focus is on the relationship between changes in technology, industrial organisation and labour relations in a socio-economic framework. From this prospective, technological innovations are developed, supported and modified by social groups with divergent interests. Technological change, along with the political organisation of an industry, facilitates changes in the balance of power between employees and management, leading them to institutionalise new labour relation arrangements. The chapter addresses the interdependency of regulatory policies, technological changes and their impact on industrial organisation and labour relations (Cornfield, 1987:31).

3.7.2 Employment relations and information technology

The concept of employment relations assumes somewhat competing interests between employers and employees. Employment relations, in their application to organisational settings, have three dimensions: direction over investment and resource allocation, supervision of labour power and command of the production process (Hill, 1981:113). Of interest here is the third dimension. Command or control over the production process requires knowledge, resources, and skills: that is, knowledge of the process, its boundaries, and its constituent tasks and skills and physical resources (or access to them) to carry out these tasks. For both employers and employees this control is desirable. From management's point of view, command over the production process allows it to organise work in order to maximise productivity, and thus also possible profits (Braverman, 1974:111). For employees, on the other hand, control reduces alienation on the job by enabling their work to be empowered, meaningful, socially integrative and creative (Blauner, 1974:11-12).

“These groups interact within an employment relation comprised of three interrelated contexts: the technology, the market or budgetary constraints and the power relations in the larger community and the driven status of the actors” (Dunlop, 1958:8).

An ideology (commonly shared ideas or beliefs regarding the interaction and roles of the actors) is created to help bind the system together (Dunlop, 1958:9).

According to Schutte and Pieterse (1989:45), the changes in the macro-environment lead to pressure on the various parties to ensure good relations in the workplace. This is one of the most primary objectives of labour relations (Kochan, 1980:689).

According to Braverman (1974:144), mechanisation has contributed to increased managerial control in business enterprise throughout the twentieth century, especially in the skilled crafts (Braverman, 1974:144). In the early stages of industrialisation, craft workers controlled production with essentially the same skills and knowledge used in pre-industrial settings. Since labour possessed the information and expertise, management assumed the responsibility for financing, sales, and co-ordination, while remaining somewhat distanced from production. Through the nineteenth century, this separation from the labour process became increasingly unsatisfactory to employers. In the first place, control over production costs and scheduling

became more important as organisations grew larger and more complex. More fundamentally, management's imperative of cost minimisation with productivity maximisation was not an imperative for employees. Accordingly, to ensure that their interests were organisational priorities, managers moved to assume greater control over production, typically by increasing the division of labour, pre-planning tasks, and by mechanising operations. Yet mechanisation occurs for other compelling reasons, such as improving quality and volume, reducing unavoidable errors, and making possible the production of new goods. Nevertheless, the links between technology and control are important. Managerial control is easier when the instruments of production are inanimate. Also, technical innovation can eliminate the skills from which craft workers derived their autonomy and control.

This having been said, it should be noted that it is not clear that more advanced technologies inevitably reduce worker control. For example, Blauner suggests that worker control is greater in automated, continuous process production than in mass production assembly lines. Furthermore, the particular form that technology takes in any situation is partly derived from the choices made by managers and workers (Wood, 1983:16-17). While employees and their employers may try to ensure that technological choices serve their interests, social and economic forces in the workplace dictate the relative influence of each. As Winner (1983:124-127) points out, "different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness". Therefore, the form of technological change depends in part on the bargaining power of labour and management.

While there are innumerable models of bargaining power (Kochan, 1980:39), most include some notion of the source of control over the production process. The capacity of employees to control production depends on both the indispensability of labour in the production process and, therefore, on the capacity of workers to disrupt operations by withdrawing their labour. Technology can influence the bargaining power of employees by enhancing or eroding their indispensability in production. Thus, while the legacy of labour relations in an industry may affect the course of technological change, so, in turn, may technological change alter the balance of power between labour and management.

3.7.3 The policy impact of information technology

There can be little doubt that information technology is now critical to policy making. Such relevance is increasing, as technological developments of the 1990s offer new opportunities for policy innovations, especially in authority-wielding agencies. Now flexibilities and increased responsiveness of administrative systems introduce new possibilities for policy making. Some of these innovations rely on the integration of existing computer systems, the matching of data across organisational boundaries and a move towards a client focus rather than an organisational focus for information systems development. Through the use of information technology, in the form of electronic interactions between citizens and government, legislators have high hopes of the transformation of government's modal resources. However, as such interactions start to increase, the transformation can often be seen to be 'skin deep'; interactions flounder as they come up against the information systems that currently exist within government. Co-ordination between computer systems is often assumed to result from computerisations; but the study has shown that there is nothing automatic about the process. Inter-agency projects remain as difficult to initiate and maintain as they had been in the 1970s. Lack of social co-ordination, especially vertically between policy makers and technical decision makers, creates further problems for technical co-ordination (Swann, 1985:119).

Another reason why information technology is likely to be of importance to organisations in the future is the challenge it provides for political oversight and for internal regulation, which presents a new administrative dilemma for government. The successive failures of Computerized Information System regulatory efforts illustrate how difficult the regulatory challenges introduced by information technology are to overcome. The laissez-faire approach of the British government illustrates the disadvantages of the other course of action: departments and agencies develop computer projects in isolation, with problems unlikely to reach the public agenda and a handing over to control to a few major computer companies (in one-to-one relationships with government departments) with sparse residual governmental checks on their accounts (Roth, 1988:10).

One of the major challenges to oversight in both countries comes from the widespread outsourcing of information technology that both governments have undertaken. In the Computerized Information System both legislators and public officials take a more cynical

view of computer companies, a view developed through years of contracting. Such a view means that far greater regulatory resources are directed towards controlling the activities of both computer companies and government agencies. But this regulatory response brings problems of its own, the most notable being a tendency for regulatory strangulation of activities, stifling innovation and discouraging the more relational contracting preferred by private sector companies. Such problems demonstrate that some of the control problems introduced through information technology are real dilemmas with no simple cure. In Britain public administrators are more trusting, more naïve and seem likely to hand over a greater proportion of control to the new players in government; yet the same tendency of government agencies to run contracts to tight profit margins seems equally likely to discourage innovation (Fassen, 1995:8).

The traditional problems raised by politicians' lack of concern for administration are heightened by computerisation for two reasons. Firstly, the perceived difficulty of technology has introduced a new layer of organisational complexity for policy makers seeking comprehension of administrative capacity. Politicians may not be interested in bureaucracy, but most would purport to understand how it operates; the same is not true of information systems. Secondly, the evidence revealed illustrates how the number of organisational clearances that legislators are required to understand increases as new organisations undertake these operations. Many information systems in government now represent a maze of contracts and computer companies, as the largest companies with their constantly shifting competencies search for new roles (Swann, 1985:122).

3.7.4 Organisation and human resource implications

The technical characteristics of tighter integration across functions, more rapid response time and increased fragility of the system or costliness of errors, carry with them implications for the organisation of work within firms (Cameron & Clarke, 1991:29).

Even casual reflections on the technical aspects of the technology identified above raises questions about Tayloristic strategy. In addition to the more general case for a high-skill labour force giving knowledge to the machine, the characteristics of information technology and additional resources call for advanced skills. In an environment in which activities are tightly linked and in which the costs of errors are high, it does not pay to risk a labour force

that does not understand the system or respond effectively to problems (Cameron & Clarke, 1991:29-30).

This intention for increased skill levels does imply, however, that the nature of skills will shift. The emphasis will move away from manual skills toward working with data and understanding the operation of the entire system. Indeed, this aspect of information technology is at the heart of Zuboffs's (1988) distinction between automate and informate. She argues that information technology will distance workers from the physical 'feel' of production and will require, instead, that they learn the meaning of the data generated by computer driven processes and discover how to fit the data together into a coherent understanding of the processes. A very similar argument was advanced by Hirschhorn (1984:22).

In order for firms to take advantages of the possibilities of the technology, they must be willing to teach employees enough for them to gain this overall insight and must then permit the labour force to act on it. This requires both a new version of skill from the labour force's perspective and a considerably more trusting and teaching-oriented management than that which has traditionally characterised American firms (Hirschhorn, 1984:22-23).

An important element of new skills required by information technologies, will be responsibility. That is, in most instances the system may perform well on its own, but the importance of spotting and understanding malfunctions increases sharply (Hirschhorn, 1984:22-23).

Information technology will reshape work well beyond its impact on specific jobs. The way jobs look together will change and with these changes will come new forces of work organisation and career patterns. Several examples illustrate this point. On the production floor, considerable evidence suggests that work teams, in which job boundaries are quickly diffused, are more productive than more traditional arrangements (Katz, Kockans & Keepe, 1987).

3.7.5 The effect of information technology on the organisation

There is no question that information technology is having a considerable impact on working patterns of both individuals and organisations, and that indirectly it can bring about changes in organisational structure. There is the direct influence of technology on how employees execute individual tasks; an obvious example in information work is the use of online databases in place of manual searching of printed indices. Word processors have become so common that in some organisations executives are now expected to type their own memos and letters using their desktop personal computer. This is an innovation that not all welcome as they may have lost the services of a secretary or two and the image of having many secretaries is more of a status symbol than anything else and the loss is seen almost as a form of demotion or failure within the organisation (Bawden & Blakeman, 1990:228).

Information technology can lead to changes in organisation structure. In some cases the organisation functioning undergoes a complete metamorphosis as a result of changes in procedures, systems, re-allocation of responsibilities, and even culminating in a complete change of corporate personality.

There is agreement, however, concerning the exact nature of the changes and the manner in which they happen or are implemented. Burton (1988:19) has summarised very neatly the conflicting conclusions reached by different authors:

- Information technology centralise/decentralise authority within the organisation.
- Information technology allows operational staff greater access to 'management information', or it will strengthen management control over the flow of information.
- Information technology will magnify/reduce the role of middle management as summarisers and filters of information move up and down the hierarchical pyramid.
- Information technology will increase/limit opportunities for employee participation and involvement.
- Information technology will change/freeze existing organisational structures.
- Information technology will limit/increase job satisfaction.
- Information technology consumes capital/puts capital to work.

3.8 INFORMATION TECHNOLOGY AND ORGANISATIONAL DESIGN

Lau *et al.* (2001:267-280) believe that one of the most electrifying changes in organisational design has been brought about by the impact of information technology. They are adamant that information technology has far-reaching effects on complexity, formalisation, decentralisation, span of control, outsourcing and lateral communication. But technology is not only limited to electronic processes. At the organisational level, technology is the term used to describe the combination of human resources, raw materials and equipment that employees use to convert raw materials into finished goods and services. Each job or function in an organisation is part of an organisation's technology, just as its information systems and computers are.

The socio-technical approach supports the organisational design since it endeavours to achieve its two most important objectives: the need to humanise work through the redesign of jobs and the need for democracy at work. In order to realise these goals, the intention of the socio-technical design has always been "the joint optimization of the social and technical systems." Human needs must not be forgotten when technical systems are introduced. The social and the technical should, whenever possible, be given equal weight. Over the years, this objective has been interpreted in many different ways but it is still an important design principle (Baskerville *et al.*, 2000:34-35).

3.8.1 The importance of organisational culture

Organisational culture maintains that an employer should discuss any changes brought into the organisation. Such discussions should refer to the proposals relating to the restructuring of the workplace, including the introduction of new technology and new work methods. The implication of this is that, even though this is merely a consultative function in which the employer's views will ultimately prevail, the employer is obliged to consider any submissions made with a view to reaching some sort of consensus (Venter, 2003:22-23).

The way an organisation selects the type of technology to produce goods and services determine the way it has chosen to achieve its goals. An organisation must design its structure and culture to allow the efficient operation of its technology.

The functions of organisational culture can be summarised as follows (Weisner & Millet, 2000:125):

- It creates a corporate identity that distinguishes one organisation from others, with regard to application and successful implementation of information technology facilities, gives a competitive advantage in the market.
- As a result, it gives members of the organisation an identity. Management support in terms of training and developing employees to match the demands of new technologies in the organisation, results in employees identifying themselves better with the organisation.
- Organisational culture guides employees in terms of acceptable behaviours and attitudes, especially when they have to make decisions and solve problems. A good foundation on technology utility is assisting in providing direction on how employees execute their tasks within the organisation.
- It creates social system stability with associated emotional security. Successful training helps employees to overcome the emotional demands of technologies in the workplace. Training familiarises workers with the full operations and also reduces alienation.

In addition to being integrated with human factors, various studies have observed that these technologies must be integrated with job and organisational factors. For example, the Manufacturing Studies Board (1986) concluded that realising the full benefit of advanced manufacturing technologies requires inter-related changes in resource practices, planning, plant culture, plant organisation, and job and work design and labour-management relations. These findings were also echoed by European studies on the fusion of flexible manufacturing systems and new information technologies (Brodner, 1987, 1991). These studies concluded that organisational factors are a key element in economic success of modern production systems and should be valued and appreciated at the level equal to new technology.

3.9 THE EMPLOYMENT RELATIONS: IMPACT ON THE STATE, EMPLOYERS AND EMPLOYEES

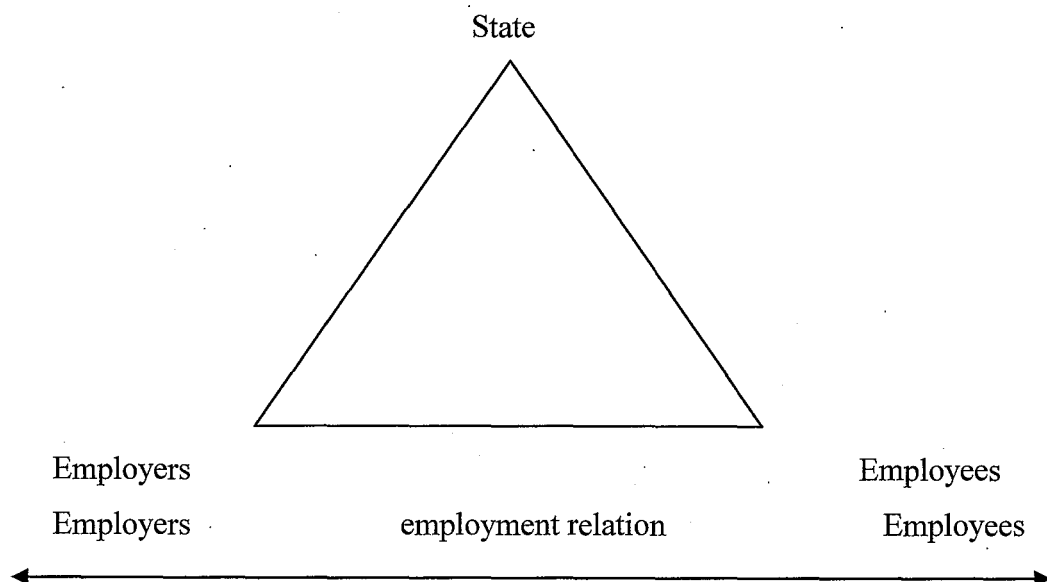
The approach that the labour relations system comprises three groups, namely the workers and their organisations, managers and their organisations, and the governmental agencies that are concerned with the workplace and the work community, focuses on the tripartite nature of labour relations (Finnemore & Van der Merwe, 1996:18).

Historically, any employment relations system used to consist of three role players, namely the state, employers and employees. A tripartite nature of any employment relations system is recognised.

3.9.1 The relationship itself

A major source of conflict in the labour relationship stems from an inherent divergence of roles. The employer fulfils the role as decision maker and planner who directs the employees in the fulfilment of their duties, and plans and controls the general operation of the organisation. The employee, in turn, fills a subservient role in carrying out the employer's orders. And lastly, the state has a vital role to play in the relationship in terms of being the regulator, mediator of the overall relationship (Bendix, 2000:10).

Figure 3: The tripartite relationship



Adapted from: Venter, R. (2003). Labour Relations

3.9.2 The State

The general research objective of this study is to determine the influence of information technology on labour relations where the government is one of the major role players in this relation.

The successes of introducing information technology have led government departments and agencies to become more ambitious. They are now taking a hard look at their roles in the years to come and are willing to talk about re-engineering their processes through enterprise of wide information systems. The government departments explicitly want their information technology plans to be intrinsic to the planning process so as to improve the efficiency and effectiveness of its service delivery systems (Margetts, 2003:110).

The second stance of the information technology plan for the state focused on the use of information technology in enhancing the quality of government services, creating a responsive and transparent administration thus facilitating empowerment of people and satisfying their right to information. In order to achieve the overall objectives, the following policy initiatives would be taken (Margetts, 2003:110-111):

- Each governmental department shall prepare a five-year plan. This plan should address the extent of computerisation of its core activities, need for hardware and software resources, manpower requirement and training of employees.
- In the times to come, speed and accuracy of communication would be a strategic factor in determining the success and effectiveness of any organisation.
- Computer proficiency of a specified level would be stipulated as essential qualification for all appointments in organisations. In case of new entrants to organisations, a computer training certificate shall be made a mandatory component of the induction level training. In case of serving employees, confirmation of services shall be done only after having passed the basic computer test.
- The government shall establish information technology training centres with the existing government employees in each department in mind. These training centres shall be an integral part of the departmentally-based information technology centres.

- Government and departmental personnel shall be sent on regular high-end computer training courses so as to be always in touch with the emerging and cutting edge technology.

The wave of information systems rolling across all aspects of government administrations has brought change in its wake. This part looks at governmental responses to the change, by examining consequences of using information technologies to carry out governmental tasks. First, it examines the pressure that information technology places on governmental agencies to innovate. The pressure to innovate bears cost: the cost of carrying out previously impossible tasks, or existent tasks to a greater capacity. The second section examines trends in government expenditure on information technology (Margetts, 1999:3-4).

- ***Innovation in information technology in government***

The spread of computers throughout government departments places great pressure on government bureaucracies to innovate, fuelled by the enthusiasm of politicians for the benefits of the “information age.” Governmental organisations have never been seen as natural innovators. Indeed, economic analysts of bureaucracy have argued that bureaucrats have little incentive to innovate (or to remove barriers to technical progress) because they cannot appropriate profits personally from cost-saving, labour-reducing innovations (Peacock, 1979:112-113). Such arguments have been used to explain perceived differences in productivity and labour-intensiveness between business and government (Margetts, 1999:4).

The increasing use of information technology by government brings new pressure to innovate. New policy windows open. And as government agencies innovate, counter-innovations, that developed outside government, provoke further innovations from government in terms of formulation of policies and legislation to regulate information technology in government and organisations. Another pressure to innovate is the growth in counter-initiatives developed outside government in response to government innovations in the use of authority. For example, the use of information technology in the public domain to commit new types of crime puts further pressure on governmental agencies wielding authority to innovate (Guardian, 9 April 1997).

Due to the high level of technical and information technologies on the global village United Arab Emirates ranks in the top league among countries that have successfully introduced e-government. Globally, the index has ranked United Arab Emirates as the first in the Arab World and twenty-first worldwide, giving it 2.17 points. The position is ahead of Japan (2.12), Ireland (2.16), Austria (2.14), and Russia (1.89) and following closely behind Italy (2.21) and Luxembourg (2.20). The top five countries in the list include United States of America (3.11), Australia (2.60) and New Zealand (2.59). Given the fact that United Arab Emirates is one of the most 'Internet-connected' countries in the Arab world (claiming the most Internet hosts), with over a million Internet users, and Dubai is home to the world's first Internet City, it is not surprising that both individual governments and the Federal Government have turned to e-government strategies to increase efficiency (United Arab Emirates Yearbook, 2003:115).

The federal initiative in this field was approved by the Federal E-government Steering Committee in November 2002. The project to be undertaken consists of a series of phases, that is, planning and prioritisation, tendering and contracting, and finally implementation. It will also entail a review of all procedures and services offered by federal ministries, preparation of necessary recommendations on the current status of the information technology sector in the Federal Government and specification of best global practices. The new project will include provision of e-services from government to the government; government to citizens; and government to the private sector (United Arab Emirates Yearbook, 2003:115-116).

Dubai has already initiated major initiatives in the field of e-government. In October 2002 Dubai e-Government launched a revamped portal www.dubai.ae that gives users online access to a wide range of government services, including a facility for payments to different government departments, together with renewal of visas, labour department documents, ownership deeds and health cards (United Arab Emirates Yearbook, 2003:116).

- ***E-Government Vision***

The United Arab Emirates Federal Government e-Government vision is embodied in the following statement:

“Enabling integrated policy formulation facilitating a knowledge-based world class government”

This vision defines:

- **What the United Arab Emirates Federal Government will become - a world-class e-Government.** A world-class government provides its communities with the best access to knowledge and services in the most efficient, effective and economic way. That access is facilitated by e-Government technologies and channels.
- **What the United Arab Emirates community will become - a knowledge-based society.** Creating a knowledge-based society is seen as the foundation for e-government to see its citizens, businesses, schools, public administration and service industries all become knowledge-based. Networks and information technology are to become part of the daily work and lives of the people. In the digital economy, the creation and strategic use of knowledge - how well it is managed, shared, transmitted and stored - is growing in importance. Government must lever enterprise-wide information technology initiatives to manage records, information and knowledge resources in ways that have never before been possible. Of equal importance is that knowledge must be viewed as a resource to be nurtured and shared in support of broad corporate goals. While knowledge creation, transfer and sharing are principally behavioural, information technology can be the key enabler in this process. To succeed in the future, government ministries and departments must collaborate to develop the necessary systems, strategies and cultures for knowledge management.
- **The goals of the United Arab Emirates Federal Government e-government strategy-integrated policy formulation through cross-departmental cooperation.** The Government is committed to identifying additional opportunities for cross-Ministry/Department online initiatives, through different Ministries:
 - Identifying specific areas with potential for joint initiatives with other Ministries/Departments.
 - Developing a number of trials of cross-Ministry/Department initiatives.

- Consulting other Ministries/Departments when new services are to be launched.
- Facilitating research and information sharing on the technological approaches appropriate to implementing.

Ministries must cooperate in the development of policies that cut across traditional portfolio boundaries. This involves addressing the issues of ownership of shared business systems and adoption of appropriate standards. It is important that there be further collaboration on information technology procurement both by leveraging the Government's collective buying power and by increasingly re-using valuable intellectual property across the United Arab Emirates Public Service. Re-use of assets will be enhanced by greater commonality of architecture and open standards (ANON.2005).

- ***Counting the cost of information technology***

The new pressures for innovation that technological development brings to government are expensive. Expenditure on computing resources in government rose steadily during the 1980s. By the 1990s information technology formed a significant proportion of most departments' operating budget (Margetts, 1999:36-37).

Such developments do not come cheaply. Government has steadily increased its budget for information technology, both in absolute cost and in percentage of overall expenditure. Differences across departments seem likely to continue, reinforced by the increasing variation in the extent to which technology is used for core tasks. In some departments information technology has assumed a role in the core task of the department. Finally, governmental attempts to use information technology as a government wide tool have been minimal. The pressure to innovate calls for action as to the integrative power of information technology heralded by enthusiastic modernists (Edge, 1995:14).

3.9.3 Employers

Information technology is changing the nature of work at all organisational levels, from the factory floor to the board room. The focus is on the impact of computers on management: that is, how information systems are changing the way in which decisions are made, work and the span of a manager's control are altered and top-level management is challenged to use information technology as competitive weapon (Hussain, 1992:295).

The policies and practices which management adopts necessarily grow out of a certain way of thinking about technology and employment relations. For example, whether management tries to help foremen counteract some of the pressure and impersonality associated with the assembly line will depend on its interpretation of the cause of these problems and its judgment as to whether they are undesirable and need to be counteracted. When management itself is thoroughly involved with a particular technology, and committed to its basic concepts, it is difficult to see what the human implications of that technology may be. There is a natural temptation for employers to carry over into their thinking about human motivation the assumptions that seem to underline the assembly line technology (Hussain, 1992:249).

- *Changes in decision making*

With the emergence of business computing in the 1950s, many observers predicted that computers would be managers of the future. Managers continue to be indispensable, particularly at higher managerial levels. What has changed is the decision-making process because of the ability of computers to process and deliver information to managers on which decision making is based (Hussain, 1992:254).

To illustrate, most managers today receive computerised reports on the status of work for which they are responsible, for example, reports on production quotas, orders, inventory levels, sales targets, accounts payable, and so on. The type of report, the amount of detail, the time horizontal of the data, the degree of data aggregation and the source of data input are tailored to the manager's position in the organisational hierarchy. Without a doubt, computers provide today's managers with more information, more timely information and better quality information on which to base decision making than in the past (Hussain, 1992:256).

- ***Altered span of control of job content***

Besides changing the decision-making process, computers have altered the management span of control by changing the number and level of employees a manager supervises. They have also transformed the content of a manager's work. To illustrate, the drilling machines were formerly operated by employees following blue-prints and the shop floor was managed by a supervisor. Today, instruction tapes may be fed into numerically controlled machines that do the drilling without worker intervention. The semi-skilled or skilled workers who formerly operated drilling machines have been replaced by professional designers who prepare the instruction tape and the floor supervisor has been replaced by a worker who monitors production on a machine console (Cornfield, 1987:123).

- ***Information as a competitive weapon***

Most important of all, information technology presents employers with a challenge. They must learn to harness the speed and processing power of computers to achieve organisational goals and objectives. With computers changing the fundamental nature of industry, altering the structure of markets and transforming daily operations from product design to marketing and sales, opportunities exist to exploit information technology to enhance corporate strength in the marketplace (Holman *et al.*, 2003:234).

An important role of employers is to develop strategies to take advantage of information technology and to mitigate threats to the organisation because of use of this technology by rivals. Traditional organisational structures are not able to respond to growing pressures for more and better information, nor are they able to manage new information technologies effectively. A reorganisation of the industry, the responsibility of top management, may be necessary for the effective implementation and overseeing of information technology (Bawden & Blakeman, 1990:133).

Several responsibilities of managers need to be considered to ensure the important role management plays in the organisation. (Martin *et al.*, 1994:658) discuss them as follows:

- ***Dealing with information systems politics***

Politics is a critical element in the management of information technology. “Politics of information,” may lead to serious difficulties to arise when the movement toward the new information-based organisation encounters the realities of organisational politics.

The impact of politics is not merely an organisational concern; rather, politics may determine success or failure when employers attempt to use information technology to obtain resources required for a new system and when managing data. Negotiations within the organisation about the access, guidelines and usage of information technology are inclusive in the political agenda in the employment relationship.

- ***Building power and influence***

There are many ways for an employer to build up power and influence. Firstly, the employer can develop a constituency – a group of loyal supporters who will add their own power and influence. Constituencies are based upon mutual benefit, and building and maintaining a constituency requires one to be helpful and generous to supporters and to always remember and repay favours. An effective long-term way to become powerful and influential is to learn to negotiate win-win solutions to conflicts.

- ***Dealing with the politics of systems development***

Employers as sponsors of new information technology systems need to consider the political implications of their system from the very beginning. It is far better to avoid political problems than to become involved in trying to overcome resistance. The astute employer avoids unnecessary political battles, even those he knows he can win. Politics is a long-term game, and the long-term winners are those who have the most effective network of mutually beneficial relationships – it is best to avoid alienating those whose support you and whom you may need sometime in the future. Thus, it is wise to consider how the new system will be perceived by each person or group that it will affect. That includes the employees because they may have immense power to make the system fail. Employers often make the mistake of

assuming that they are the experts and that the systems belong to them alone, and acquire systems that fail because of resistance by their employees.

3.9.4 Employees

Traditionally the employee party refers to the workers and their representative bodies, namely, trade unions. The International Confederation of Free Trade Unions describes a trade union as a continuing permanent organisation created by workers to protect themselves at their place of work, to improve the conditions of their lives, and to provide a means of expression for the workers' views on matters of society (Nel, 2002:112).

Deregulations and technological change have jeopardised not only information technology market share, but job security and the quality of working life as well. These changes, in turn, have led to the institutionalisation of new labour relations in the organisation (Cornfield, 1987:318).

- ***Job Security***

The most prevalent staffing reductions have arisen from the automation of information-handling skills. Such reductions have become fairly common among semi-skilled and craft workers in telecommunications equipment manufacturing, local telephone operating companies and in Bell's Long Lines division. It has been estimated that staffing requirements in switching offices decline by 50% when 'analog-stored programme' devices replace 'step-by-step' methods and that further labour savings of 40% are achieved when digital switching technologies are introduced (The 1979 Conference: A Final Report, p. 18)

Substantial layoffs have occurred among local and long distance operations, whose functions have been progressively automated by computerised directory information and direct overseas dialling.

Traditional craft workers such as switching technicians, repair personnel and line staff have been affected by computerised switching, testing and replacement of telephone lines by satellites, radio links and fibre-optics (The 1979 Conference: A Final Report, p. 20). As a

result of more intensive utilisation of electronic components, the need for workers involved in the traditional craft activities of trouble shooting, maintenance, repair and installation has declined at many information technology industries (George Kohl "Changing Competitive and Technology Environments in Telecommunications", 1982: pp 67 – 68)

- ***Quality of working life***

Computerisation has lowered worker morale and job satisfaction in three significant ways (C.W.A. Local President, 24 Feb 1983). Firstly, computerisation has led to closer monitoring and supervision of workers, for example, the volume of operator calls is automatically monitored at short intervals which increases operator accountability to the supervisor. A detailed computer-generated printout of each operator's daily call-handling activities enhanced centralised long-term supervision (Ibid). Secondly, the use of video display terminals isolates workers and reduces on-the-job social interaction. Stored computer programmes route the incoming operator or directory assistance requests continuously to the video display terminal and assign work breaks automatically according to business needs (Kohl, 1987:66). Thirdly, project fragmentation has increased boredom (Cornfield, 1987:320).

- ***Dehumanisation***

A frequent criticism of traditional data processing systems is their negative effect on people's individuality. Such systems are criticised as being impersonal; they dehumanise and depersonalise activities that have been computerised. Many people feel a loss of identity; they feel like "just another number" because computers reduce or eliminate the human element that had been present in the non-computerised systems (Turban *et al.*, 2001:298).

- ***Psychological impacts***

Home computers threaten to have an even more isolating influence than was created by television. If people are encouraged to work and shop from their living rooms, then some unfortunate psychological effects – such as depression and loneliness – could develop. Another example is distance learning. Children can be schooled at home through information

technology, but the lack of social contact could be damaging to their development (Turban *et al.*, 2001:298).

3.10 EMPLOYEE STRATEGIES TO COPE WITH INFORMATION TECHNOLOGY

Information technology in the organisation requires effective acclimatisation by employees as they are the most affected because every restructuring process may mean, in terms of technical change, new employment policies and new methods of task execution that mostly require total employee coordination. The researcher believes that the application of coping strategies to accommodate information technology changes are very important to an organisation for functioning effectively and efficiently.

3.10.1 Education and training

Education and training is an area of information technology which is frequently neglected or left to chance. While many organisations are prepared to invest heavily in the technology itself, few have a structured approach in training the users of that technology so that it can be used in the most efficient and effective way. Not only are the people who will be using information technology ill prepared, but also those whose responsibility it is to decide on the role of information technology in corporate strategy, lack appropriate skills (Coopers & Lybrand, 1988:232).

It is often the case that an initial 'introduction' course in how a system fits into the working of the office or department, and basic instruction which amounts to 'press this key and it will do this' is all that an information worker needs.

3.10.2 Participation in decision making

Involving employees in the very beginning phase of introducing information technology in the organisation could help in avoiding many unnecessary implications as employees would be well informed about restructuring which will physically affect their day-to-day work. The

researcher suggests that employees be involved in decision making about their work in order to ensure them that they have an important role in the functioning of the organisation.

Employee participation in organisational matters enhances organisational performance. With regard to this matter Cook (1994:595) mentions the following: “employees generally have more complete knowledge and information about their work, tasks and processes and are thus in a better position than employers to plan and schedule work, to organize work tasks and to identify and resolve obstacles to achieve optimal performance”.

Cooke (1994:57) further identifies the following benefits:

- Employees would gain a greater intrinsic fulfilment that would lead to work satisfaction, which is a motivation for employees to strive for the goals.
- The availability of information would increase mutual trust between the parties and develop among employees the “notion of belonging” so that they will commit themselves to the organisation’s goals.
- Employees would be more flexible and more responsive to changes in the human resource policy, and thus less resistant.
- Employees would use their power more constructively.

Lawler (1986:37-38) identifies higher motivation, satisfaction, better decision quality and less resistance to change as advantages of participation in decision-making, and includes the following:

- Less resistance to new work methods and procedures.
- Improved cooperation resulting from increased satisfaction and involvement.
- Increased flexibility resulting from cross training and teamwork.
- Higher motivation and better methods to increase product and service quality.
- More self-management and broader skills reduce the staff support level.
- Better communication and improved union management relationship reducing the number of grievances.
- Better input and decision-making processing to improve the quality of decisions.
- Problem solving as well as technical skills to be developed.

3.11 CONCLUSION

There can be little doubt that information technology is now critical to policy-making. Such relevance is increasing, as technological development of the 1990s offer new opportunities for policy innovation, especially in authority-wielding agencies. New flexibilities and increased responsiveness of administrative systems introduce new possibilities for policy-making. Some of these innovations rely on the integration of existing computer systems, the matching of data across organisational boundaries and a move towards a client focus rather than an organisational focus for information systems development. Through the use of information technology, legislators have high hopes of transformation of government's nodal resources. However, as such interactions start to increase, the transformation can often be seen to be 'skin deep'; interaction flounders as they come up against the information systems that currently exist within government. Co-ordination between computer systems is often assumed to result from computerisation, but researchers have shown that there is nothing automatic about the process. Inter-agency projects remain as difficult to initiate and maintain as they had been in the 1970s. Lack of social co-ordination, especially vertically between policy-makers and technical decision-makers, creates further problems for technical co-ordination (Margetts, 1999).

Another reason why information technology is likely to be of importance to public administrative procedures in the future is the challenge it provides for political oversight and for internal regulation, which presents a new administrative dilemma for government. The successive failures of the state's regulatory efforts illustrate how difficult the regulatory challenges introduced by information technology are to overcome (Margetts, 1999).

One of the major challenges to oversight in technologically developed countries comes from the widespread outsourcing of information technology that governments have undertaken.

The traditional problems raised by politicians' lack of concern for administration are heightened by computerisation for two reasons. Firstly, the perceived difficulty of technology has introduced a new layer of organisational complexity for policy-makers seeking comprehension of administrative capacity. Politicians may not be interested in bureaucracy, but most would purport to understand how it operates; the same is not true of information systems. Secondly, the evidence revealed illustrates how the number of organisational

clearances that legislators are required to understand increases as new organisations undertake these operations. Information technology puts forward major challenges in terms of restructuring the entire employment relationship, where employers and employees have to devise new policies which are compliant with the major state policies concerning information technology (Cornfield, 1987:332).

Information technologies have other impacts on corporate structures. They reinforce the trend toward flatter, less hierarchical structures. They allow people in the middle of an organisation – the point at which its key competencies are most likely to lie – to communicate directly and easily with each other, even when they work in different departments or in different countries and time zones (Cairncross, 2002:227). The next chapter is about the findings of the empirical study.

THE EMPIRICAL STUDY

4.1 INTRODUCTION

The purpose of the study was to determine the influence of information technology on labour relations. The employment literature and its relation to information technology were discussed, explained and expanded on in **chapters one and two**. The general objective, which was to determine the influence of information technology on labour relations, and the specific objectives, which were to determine management's reasons and strategies while implementing information technology for effectiveness and efficiency, the employees' experience of information technology practices and the impact of information technology on the labour relations in the workplace were also discussed. From the literature discussion it seems that the impacts on the role players have a major effect. An increasing number of organisations are turning to the introduction and application of information technology for effectiveness and efficiency. The mentioned effect to the employment relationship, the types of changes to the entire organisation and the employment relationship must have an impact on the role players, that is, the state, the employer and the employee and the relationship with the organisation. To affirm the meaningfulness of the study and measure the influence on employment relationships, an empirical investigation was done to determine the validity. In this discussion the underlying literature (reasons and strategies) are made valid and are reaffirmed. Furthermore the influence of information technology on the experience of employees is highlighted and discussed, and the influence of information technology on labour relations is discussed as well.

4.2 RESEARCH DESIGN

The literature was followed up, expanded on and supported by an empirical investigation. This was done by means of a questionnaire. For this purpose access was obtained to the personnel in an information technology environment in the Dubai Internet City (United Arab Emirates) as a desirable study population. The questionnaire on the influence of information technology was suitable for and presented to diverse study sample groups, that is, employees

with basic skills as well as highly skilled employees in the field of information technology. The questionnaire was developed to focus on the following sections: Firstly, the **reasons and strategies about information technology** for effective and efficient task execution. Secondly, the **workers' experience of information technology** in the workplace. Thirdly, the **influence of information technology on labour relations**.

The sampling method used for the empirical study was a stratified random sample, by identifying employees with basic skills and employees with high skills in the field of information technology to complete the questionnaire (Sprinthall, 2003). According to Steyn, Smit, and Du Toit and Strasheim (1994) if the method for gathering information is the use of a questionnaire, the following aspects are essential:

- To get the desired information from the population as accurately as possible.
- To achieve the maximum co-operation from the respondents in the target population.
- To facilitate the data collection and data analysis.

4.3 STUDY POPULATION

To reach the study objectives, as identified in **Chapter 1**, a study population that included personnel, was identified within an information technology environment. The study population can be defined as employees in different organisations of one information technology environment in Dubai (United Arab Emirates). A stratified random sample of 360 of the total population of 540 employees (66.67%) in the information technology environment was targeted. A response rate of 70% was achieved, of which 252 responses (99.6%) could be utilised.

Descriptive information of the sample is given in Table 1.

Table 1

Characteristics of the participants

Item	Category	Frequency (percentage)	
Education	Grade 12	29	(11.5%)
	Diploma	71	(28.2%)
	Bachelor degree	113	(44.8%)
	Honours	9	(3.6%)
	Masters	29	(11.5%)
Staff category	Professional	78	(31.0%)
	Semi – professional	73	(29.0%)
	Skilled	89	(35.3%)
	Semi – skilled	11	(4.4%)
Gender	Female	86	(34.1%)
	Male	166	(65.9%)
Job grading	Level A (technician)	75	(29.8%)
	Level B (artisans)	74	(29.4%)
	Level C (engineers)	83	(32.9%)
Working hours	Full time	248	(98.4%)
	Part time	4	(1.6%)
Age	(18 – 25)	50	(19.8%)
	(25 – 30)	72	(28.6%)
	(30 – 35)	54	(21.4%)
	(35 – 45)	54	(21.4%)
	(45 and older)	21	(8.3%)

4.4 MEASURING BATTERY

The measuring instrument used in the empirical study was specifically constructed for this study, with peer review of the compiled items. The theoretical part, as discussed in previous chapters was used as guideline for the measuring instrument. The measuring instrument consisted of the following parts:

4.4.1 Reasons and strategies about information technology questionnaire (RSEE) (Author)

This questionnaire tested the organisation's reasons and strategies surrounding information technology for the effective and efficient task execution in the organisation. The items were divided into three subscales, namely *job satisfaction*, *threats* and *training* in connection with the influence of information technology for effective and efficient task execution.

- ***Job satisfaction (10 items)***

Items in this subscale assessed the impact of information technology on the morale of employees and how the introduction of information technology affected the well-being of employees in the organisation. For example, *employees perceive computers good for their job description and they understand how to use information technology tools*.

- ***Threats (5 items)***

This subscale assessed the perception employees have concerning information technology application in their work and the resistance to adapt to employment policies, structures and job patterns. For example, *employees view information technology equipment as a replacement for the human factor in the workplace and it also limits employee abilities*.

- ***Training (5 items)***

This subscale assessed the importance of training as an employee development strategy in the field of information technology to ensure adaptation to the new era of information

technologies. For example, *employees were well trained to use information technology and also that they had acquired the relevant training method.*

4.4.2 Workers' experience of information technology in the workplace (EWIT)

This questionnaire focused on workers' experience of information technology in the workplace. The items were divided into two subscales; *work patterns* and *personal growth* in the information technology field in the workplace.

- ***Work patterns (9 items)***

This subscale assessed the experience of changes to work patterns that were brought about by information technology and whether information technology had improved work execution, or made work more demanding and more of a routine. For example, *information technology makes work more demanding and more of a routine.*

- ***Personal growth (11 items)***

This subscale assessed the advantages of information technology to employees and the entire organisation. The emphasis in this subscale was mainly based on employee self-actualisation and how this experience can be advantageous to his/her career development as well as to the organisation. For example, *information technology helps employees to realise their full potential and it also provides a ground for self-expression.*

4.4.3 Influence of information technology on labour relations (ITLR)

This questionnaire focused on the influence of information technology on labour relations. This scale assessed the major objective of the study, that is, the influence of information technology on labour relations. The focus was on how new information technology affected the workplace settings, working conditions, employer-employee relationships, employment policies, disciplinary measures and new employment contracts (wages, benefits, compensation). This scale consisted of 20 items.

4.4.4 Personal opinions about information technology (POIT)

This questionnaire had an ordinal scale with various choices that could be made by the respondents.

This scale assessed employees' views on the introduction of information technology, forecast and future challenges and how these challenges could be addressed by the support structures provided by an organisation to ensure smooth functioning of the organisation. Motivations could be presented in terms of management support, rewards, compensation to undergo training and participation in decision making. The counteraction would be reflected in the impact on employment policies and regulations. The focus was on how these new information technologies could and would influence the organisational setting, employment relations, and whether these policies and regulations would be compatible with the state's policies and regulations in connection with information technology and its implementation.

4.5 STATISTICAL ANALYSIS

The statistical analysis was done by means of the SPSS-program (SPSS, 2004). Principal factor extraction with varimax rotation was carried out on items which had no confirmed factor structure. Principal component extraction was carried out prior to principal factor extraction to estimate the number of factors, presence of outliers and factorability of the correlation matrices. The eigenvalues and screen plot were studied to determine the number of factors underlying a specific measuring instrument. Cronbach's Alpha-Coefficient (α) and inter-item correlation was used to determine the internal consistency of the measuring instrument (Clarke & Watson, 1995).

The mentioned Alpha-Coefficient highlights important information regarding the proportion of fault-variation within the boundaries of a specific scale. According to Clarke and Watson (1995:53) the average inter-item correlation-coefficient (r_{Avg}) (which is a determinant of internal consistency) is a usable index to support information which was provided by the Alpha-Coefficient. The unit- dimension of a scale cannot be determined by focusing on the average inter-item correlation only and it is therefore necessary to investigate the range and the distribution of the correlations.

Descriptive statistics (that is, averages, standard deviations, skewness and kurtosis) were used to analyse the data. The impact of information technology on personnel in the information technology environment was determined by means of t-tests (two variables). The t-test is an excellent testing mechanism to indicate different correlations between groups. This mechanism's formula and application will be discussed later on where applicable.

Although the standard deviation does not result in significant research outcomes in isolation, it is still necessary where correlation studies are done to use the same questionnaire for different populations. The standard deviation is also used with t-tests. The skewness (Sk) highlights where the majority of the responses lie as an extreme on the scale. The closer the skewness result is to 0.00, the closer the majority of the responses were to the centre of the scale. For the total sub-sample the majority of the responses for this study resulted in ($Sk=0.157$) on the scale. This means that the graph on the scale would lean to the left.

The factor analysis indicated that most of the measuring items according to the guideline of $0.15 < r < 0.50$ (Clark and Watson, 1995) were acceptable. If the same questionnaire were to be used for future research it is suggested that the items which did not meet the criteria be merged with other items strongly correlated to them or be rephrased in the questionnaire so as to measure more precisely. Acceptable levels of internal consistency can be seen from the response, which underlines the factor. Although some of the items strongly correlate and therefore did not meet the requirements, there still are enough acceptable items to state consistency and validation of the factor.

The Cronbach Alpha-Coefficient (α) can be seen as a measuring instrument of internal consistency and validity of the factor (Nunnally & Bernstein, 1994) *i.e.* if all the measuring instruments can be clustered successfully under the factor identified. Nunnally & Bernstein (1994) also point out that the Cronbach Alpha-Coefficient's loading must be higher than 0.50 ($\alpha > 0.50$) to render the response on the scale correlated. The factor analysis of this study indicated that all the measuring instruments complied with the criteria.

The larger the values of the standard deviation, the more the scores of the respondents are spread out around the mean. The smaller the value of the standard deviation, the fewer the scores that are spread out around the mean. The responses in this study indicated that they

could be measured as homogeneous; their scores were clustered very close to the mean. The standard deviation of the distribution of means provides a measure sampling error variability (Sprinthall, 2003). One expects sample means to deviate from the population mean, but precisely to which extent depends on the standard deviation.

This particular standard deviation is thus called the standard error of the mean (SEM), since it expresses the extent of variability being displayed between the various sample means and the true population mean.

4.6 RESULTS

The first section of the questionnaire, that is, **section A** entails biographic information of respondents. **Section B** (RSEE); indicates the reasons and strategies about information technology for effective and efficient task execution with three factors (F1-job satisfaction, F2-threats, F3-training). **Section C** (EWIT) focuses on the workers' experience of information technology in the workplace with two factors (F1-work patterns, F2- personal growth), **section D** (ITLR) concerns the influence of information technology on labour relations with one factor (F1-employment relations), and the last **section E** (POIT) entails personal opinions about information technology with three factors (F1-expectations, F2-motivations, F3-policy and regulation). These factor loadings are illustrated in **Tables 2 to 6** below:

Table 2

Factor loadings, Communalities (h^2), Percentage Variance and Covariance for Principal Factors Extraction and Varimax Rotation on Reason and Strategies for Effective and Efficient task execution items (Section B)

RSEE

Item	F1	F2	F3	h^2
Job description	0.61	0.00	0.00	0.41
Personal development	0.57	0.00	0.00	0.46
Ability limit	0.00	0.79	0.00	0.68
Job insecurity	0.00	0.71	0.00	0.57
Replacement	0.00	0.75	0.00	0.57
Training	0.00	0.00	0.72	0.58
Relevant training	0.00	0.00	0.72	0.58
Policies	0.00	0.00	0.64	0.43
Adaptation	0.00	0.65	0.00	0.52
Competitive advantage	0.59	0.00	0.00	0.44
Adaptation to change	0.65	0.00	0.00	0.48
Effectiveness	0.84	0.00	0.00	0.75
Efficiency	0.79	0.00	0.00	0.66
Corporate identity	0.74	0.00	0.00	0.55
Organisational image	0.71	0.00	0.00	0.51

Extraction method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

A rotation converged in 4 iterations

F1 – job satisfaction

F2 – threats

F3 – training

Table 3

Factor loadings, Communalities (h^2), Percentage Variance and Covariance for Principal Factors Extraction and Varimax on Experience of Workers on Information Technology items (Section C)

EWIT

Item	F1	F2	h^2
Competition	0.00	0.70	0.55
Independence	0.00	0.66	0.44
Self actualisation	0.64	0.00	0.43
Feedback	0.67	0.00	0.45
Efficiency	0.76	0.00	0.59
Effectiveness	0.71	0.00	0.52
Decision making	0.66	0.00	0.43
Problem resolution	0.73	0.00	0.55
Locus of control	0.75	0.00	0.56

Extraction method: Principal component analysis.

Rotation method: Varimax with Kaiser Normalization.

A rotation converged in 3 iterations.

F1 – work patterns

F2 – personal growth

Table 4

Factor Loadings, Communalities (h^2), Percentage Variance and Covariance for Principal Factors Extraction and Varimax Rotation on Influence of Information Technology on Labour Relations Items (Section D)

ITLR

Item	F1	h^2
Improved employment policy	0.67	0.45
Job demands	0.68	0.46
Communication	0.66	0.44
New work methods	0.63	0.40
Job specialisation	0.65	0.42

Extraction method: principal analysis.

1 component extracted.

Component matrix (a) *F1 – employment relations*

Table 5

Factor Loadings, Communalities (h^2), Percentage Variance and Covariance for Principal Factor Extraction and Varimax Rotation on Personal Opinions about Information Technology Items (Section E)

POIT

Item	F1	F2	F3	h^2
Personal view	0.00	0.00	0.82	0.72
Expectations	0.00	0.67	0.00	0.52
Management support	0.00	0.52	0.00	0.42
Policy compliance	0.83	0.00	0.00	0.73

Extraction method: Principal Component Analysis.

Rotation method: Variance with Kaiser Normalization.

A rotation converged in 4 iterations.

For factor analysis the results of **reasons and strategies for effective and efficient task execution (RSEE)**, the **experience of workers as to information technology in the workplace (EWIT)**, the **influence of information technology on labour relations (ITLR)**, and the **personal opinions about information technology (POIT)** of the questionnaire were analysed. A factor analysis is used to determine the patterns of change in values of various variants (Bless & Kathuria, 1993). All of the measuring items had a loading above 0.5, for the reasons and strategies for effective and efficient task execution, three factors, *F1-job satisfaction(clear work roles or job description)*, *F2-threats (job insecurity and replacement)*; the experience of workers on information technology in the workplace have two factors, *F1-work patterns (routine and demanding work)* and *F2-personal growth (increase responsibility and self actualisation)*; the influence of information technology on labour relations, with *F1-employment relation (improved working conditions and new employment policies)*, were therefore successfully clustered. If it had been the case that some of the measuring items loaded below 0.5, they would have been ignored and not clustered under the factor.

Table 6
Descriptive Statistics, Alpha Coefficients and Inter-Item Correlations of the RSEE, EWIT and ITLR

Item	Mean	Skewness	Kurtosis	α
RSEE				
F1: Job satisfaction (n=239)	31.5	0.16	0.31	0.87
F2: Threats (n=247)	16.5	0.15	0.31	0.63
F3: Training (n=243)	14.1	0.16	0.31	0.67
EWIT				
F1:work patterns (n=245)	26.7	0.16	0.31	0.68
F2:personal growth (n=250)	12.1	0.15	0.31	0.54
ITLR				
F1:employment relation (n=254)	22	0.16	0.31	0.72

In **Table 6** descriptive statistics include those techniques used for describing large amounts of data in convenient and symbolic form. Table 6 provides a summary of the descriptive statistics of all the factors: **the reasons and strategies for effective and efficient task execution** (RSEE) which consists of three factors, F1-job satisfaction, F2-threats and F3-training. The respondents experienced job satisfaction as loaded factor under RSEE, as (31.5%), while respondents experienced threats as (16.5%), and with training as (14.1%). Closer investigation of **Table 6** shows there are three factors under which measuring items in RSEE could be successfully clustered. The validity test confirmed the factor loading as sufficient on job satisfaction ($\alpha=0.865$), on threats ($\alpha=0.625$), and on training ($\alpha=0.668$).

The **experience of workers on information technology** (EWIT) which consists of two factors, F1-work patterns and F2-personal growth. The respondents experienced change in work patterns as loaded under EWIT, as (26.7%), while respondents experienced personal growth as (12.1%). Closer investigation of **Table 6** shows that there are two factors under which measuring items in EWIT could be successfully clustered. The validity test confirmed the factor loading as sufficient on work patterns ($\alpha=0.861$), and personal growth ($\alpha=0.542$).

The **influence of information technology on labour relations** (ITLR) consists of one factor, employment relation. The respondents experienced changes on employment relations in the organisations as loaded under ITLR, as (22%) and the validity test confirmed the factor loading as sufficient on employment relations ($\alpha=0.715$).

The last section of the empirical study concerns the **personal opinions on information technology**. In this section each item will be discussed individually since underlying factors cannot be used on single items.

Table 7**Descriptive Statistics and Inter-Item Correlations of the personal opinions on information technology (POIT)**

Descriptive Statistics								
	N	Mean		Std.	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
POIT1	252	2.40	.056	.885	-.889	.153	-1.133	.306
POIT2	251	1.84	.048	.763	.278	.154	-1.235	.306
POIT3	250	1.60	.045	.716	.753	.154	-.711	.307
POIT4	252	1.16	.027	.436	2.831	.153	7.563	.306
POIT5	251	1.99	.016	.253	-.403	.154	12.942	.306
POIT6	248	1.61	.048	.755	.777	.155	-.834	.308
POIT7	252	1.96	.060	.952	.080	.153	-1.902	.306
POIT8	252	1.88	.058	.913	.246	.153	-1.762	.306
Valid N (listwise)	246							

Table 7 represents the descriptive statistics of the final questionnaire; personal opinions about information technology (POIT). This questionnaire is associated with general items that are non-related, therefore data reduction, in the form of factor analysis was not done. Further discussions of these statistics follow in the descriptive group statistics.

4.7 DESCRIPTIVE GROUP STATISTICS

The empirical study has highlighted the factors for each section of the questionnaire. Section B (**reasons and strategies for effective and efficient task execution**) revealed job satisfaction, threats and training as underlying factors. Section C (**experience of workers on information technology**) revealed work patterns and personal growth as the underlying factors. Section D (**influence of information technology on labour relations**) revealed employment relation as the underlying factor.

4.7.1 Reasons and strategies for effective and efficient task execution (RSEE)

- ***Job satisfaction***

As mentioned previously one of the factors underlying the measuring instruments in this section of the questionnaire was job satisfaction. The sum of averages of the response from employees was ($M=0.31480$). Stated in percentage this means that 31% of the respondents experienced job satisfaction negatively.

- ***Threats***

Mentioned as one of the factors underlying the measuring instruments in this section of the questionnaire, was threats. The sum of the averages of the response from employees was ($M=0.16480$). Stated in percentage this means that 16.5% of the respondents felt less threatened by information technology at their work.

- ***Training***

Training was the last factor underlying the measuring instruments in this part. The sum of the averages of the response from employees was ($M=0.14098$). Stated in percentage this means that 14.1% of the respondents experienced training as meaningless.

4.7.2 The experience of workers on information technology in the workplace (EWIT)

- ***Work patterns***

Work patterns were revealed as one of the underlying factors on this part. The sum of the averages of the response from employees was ($M=0.26711$). Stated in percentage this means that 27% of the respondents experienced variations in work patterns negatively.

- ***Personal growth***

Personal growth was previously mentioned as the second underlying factor on this part. The sum of the averages of the response from employees was ($M=0.12061$). Stated in percentage this means that 12% of the respondents experienced no influence of information technology on personal growth.

4.7.3 The influence of information technology on labour relations (ITLR)

- ***Employment relations***

As mentioned previously the factor underlying the measuring instruments in this part of the questionnaire was employment relations. The sum of the averages of the response from employees was ($M=0.21996$). Stated in percentage this means that 22% of the respondents experienced information technology as less influential on labour relations.

4.8 DISCUSSION AND CONCLUSION

In this part of the study, attention was given to the literature regarding the influence of information technology on labour relations. It provided the reader with the background for understanding the impact of information technology in the workplace and the effect on the broader society. From the study it seems clear that information technology has changed the nature of employment relations, organisational setting and organisational culture. The study attempted to shed light on the interaction between information technology and labour relations on the organisational level.

It provided the reader with insight regarding reasons and strategies of information technology for effective and efficient task execution; workers' experience of information technology and the influence of information technology on labour relations. In addition to this it facilitated the importance of optimising the social and technical aspects of man to work. The role of the state, employers and employees was also discussed. Models were provided to assist future organisations with optimisation of intelligence and skills of employees and associating these

with the new information technologies in a way that would revolutionise how they live and work.

Empirically, the research design was focused on discussions of the research method, the sample and the analysis techniques. The significant findings of the empirical investigation were highlighted and analysed. The findings supported and represented the specific and the general objectives. In this discussion the factors and the different items were simplified by means of descriptive statistics. References to literature were made where necessary. The use of tables in the empirical study simplified the statistical results and helped to better explain and analyse some of the data gathered from the questionnaire. The core of the empirical findings as well as the applicable comments will be summarised in the following discussion.

Section B identified three factors (job satisfaction, threats and training) as the underlying factors in the **reasons and strategies for effective and efficient task execution** questionnaire. The response from the total sample indicated that employees (31.5%) experienced job satisfaction negatively because of the complexities brought by information technology in the work settings. Employees viewed the introduction of information technology as benefiting the organisation without giving much effort on orientating employees for the changes on their jobs. This can be attributed to the ineffective implementation of processes like employee participation and consultation within the organisation. Involving employees in decision making for organisational operations entice employees to have that feeling of belonging and this will result in a satisfied workforce. Attractive rewards and user-friendly information accompanying technology equipment also contribute to a satisfied workforce. A response from the total sample (16.5%) indicated that employees were less threatened by the incorporation of new information technologies in the organisation. This is supported by the fact that the organisation valued employee participation as the major role for effectiveness and efficiency in organisational operations. Being consulted over the introduction of new information technologies decreases the fear of change and prepares employees to deal with change effectively to the benefit of the entire organisation. A response from the total sample (14.1%) indicated that employees viewed training as simply being one of the reasons or strategies for the effective and efficient task execution, since it added no value to their work and there was little motivation for them to undergo information technology training.

Section C of the empirical study, according to the questionnaire, identified two factors (work patterns and personal growth) as the underlying factors in the **workers' experience of information technology**. The response from the total sample indicated that 26.7% of employees viewed variations on job patterns negatively due to an ineffective orientation process on information technology. This can be attributed to employees' dissatisfaction over their job. Involving employees in decision making about the organisational operations will assist in making them aware of changes pertaining to where and how they work. A response from the total sample (12.1%) indicated that employees did not see the introduction of information technology as a means of personal growth or development within the organisation. This can be attributed to the negative perception employees have of training in their workplace, and they mostly preferred external training; this is possibly because of a lack of motivation and compensation to undergo training. Employees view their organisation as an unfavourable environment for career development.

Section D of the empirical study's questionnaire identified employment relations as the underlying factor in the **influence of information technology on labour relations**. The response from the total sample indicated that 22% of employees regarded information technologies to be less influential on labour relations, but viewed information technology as being the complicating factor in the employment relation at organisational level. Complex issues such as that the organisation needed to revisit its policies and regulations concerning incorporation of new information technologies would call for discussion. Policies that could be expected to be affected pointed to employment security, supervision, interaction within the workplace, mode of communication, employee privacy, division of decision of rights. This finding was supported by the fact that the impact was felt mainly at organisational level and not in the broader spheres of the labour relations. Employees were concerned about what happened around them on a daily basis, because they believed that what happened externally would be for the organisation to take care of on behalf of them. Knowledge about the concept of labour relations should be expanded (the less knowledge, the less understanding), especially with regard to the duties and responsibilities in this relation.

The partial response from employees might be ascribed to the traditional perception that what employers do in the organisation purport employee obligation to submit to or accept changes, since employees fill a subservient role in carrying out the employers' orders.

This can be attributed to ignorance or employees' misunderstanding of their organisational rights such as employment benefits, employment rights, right of self expression, collective bargaining and compensation and reward systems for undertaking information technology training.

In **section E** each item was analysed individually, since the underlying factors could not be used for single items. The first item of the questionnaire attempted to analyse employees' views regarding **information technology in the organisation**, and 56% of the total sample believed that information technology added value to the organisation. The second item attempted to obtain employees' forecast on the changing world of technology, and 48% of the total sample predicted a promising future with information technology. The third item was concerned with consultative processes in an organisation. The response from the total sample indicated that 45% viewed the process as being important. The fourth item analysed management support on implementation of new information technologies. The response from the total sample indicated that 27% valued the support from management. The fifth item attempted to determine employees' possible participation in internal and external training, and 16% of the total sample regarded training as being ineffective. The sixth item analysed the motivational programmes within the organisation and 48% of the total sample agreed that the programmes were effective. The seventh item was intended to analyse compatibility of the organisation's information technology policy, with the state policy and regulations on information technology. The response of the total sample indicated that 60% believed that the organisation's information technology policy was compatible with the state policy and regulations. The last item had to do with the employees' rights concerning information technology and 58% indicated to be well informed about their rights.

The next chapter entails the overall findings of the study, the recommendations and concluding remarks.

OVERVIEW, RECOMMENDATIONS AND CONCLUDING REMARKS

5.1 INTRODUCTION

The study was conducted to explore the impact of information technology on labour relations. Interests surrounding this specific topic arose from the need of a clear understanding of the immense impact of information technology on organisational settings and the negative impact that could have been avoided if the parties involved in the employment relationship had dealt with technological change in an appropriate manner. The need arose to identify the extent to which the strategies with regard to employment relations and as applied by the parties involved (state, employer and employee) in order to deal with the demands that information technology brought into the working place, affected such relations. It was suggested that the parties to the employment relationship establish a base of understanding each other's roles in the relationship in order to resolve the implications brought about by information technology in the workplace. Improvements in technology, and particularly information technology, have fundamentally impacted on the employment relationship. Firstly, and most obviously, technology is often used as a substitute for labour. Production lines have increasingly become automated and expert, and other information systems are being used in organisations to replace the middle and lower tiers of management. The simple reason for this is that, as a factor of production, capital often has a cost advantage over labour (Venter, 2003:22).

The problem statement, aims of the study and research questions were formulated in **Chapter one**. The background, as contained in the first chapter, was presented in explanation of certain complications resulting from the introduction of information technology into an organisation, especially if appropriate procedures had not been followed. Appropriate procedures should be followed with regard to interaction of information technology with organisational methods, work patterns, employees and organisational culture. In the **problem statement** it was explained that information technology removed certain constraints in space and time, so that organisational work could be performed in different phases and during different hours in a way that had not been possible before.

The basic premise of this document is that the assimilation of information technology and astute management of information resources, mostly concerning employment relations, are keys to survival in the modern business world. Information technology is used to streamline operations and introduce new employment policies to the workplace in order to increase the effectiveness and efficiency of the organisation.

New applications of information technology to production in an organisation do not merely affect the methods of production. They inescapably initiate social decisions affecting the routines and satisfaction of men at work on the machine and, creating a need for skill development, in their larger reaches, shaping the very nature of employment economy and society. The process includes the placing of enormous pressure on the state to pay immediate attention to the necessary skills development programmes in order to ensure that the gap created by redundancy can be filled. **The problem arising from this topic is how new information technologies affect and are affected by the efficiency and effectiveness of task execution on the geographical distribution of work, and distinct differences that can be observed under varying technical conditions in the characteristics of organisational structure and culture, which are cooperation, influence, communication and employment policies.**

This study thus explored the ability of employers, employees and the state to function effectively and efficiently within the organisational context and the mechanisms as provided by the employment relations policy and regulations.

A multi-perspective approach was used to explore the problems and the aims of this study. In **Chapter two**, some of the most well-known theories were utilised to assist in analysing the mechanism and processes for information technology in the organisation. **Technological determinism** was used to explain that the influence of information technology affected the broader society, that is, technological development as being autonomous of society and shaping society, but not being reciprocally influenced. Rather, it existed outside society, but at the same time influenced social change. In more extreme varieties of technological determinism, technology could be seen as the most significant determinant of the nature of a society. What is remarkable about the notion of technological determinism is neither its theoretical sophistication nor its explanatory utility. Rather, it is important because it is “the

single most influential theory of the relationship between technology and society” (Mackenzie & Wajcman, 1985:4)

The reality, of course, is that technologists do not, in practice, follow some predetermined course of development. Research and development decisions, for example, are significant determinants of the sort of technologies that are developed. Also, although technologies clearly do exercise an impact, the nature of this is not built into the technology, but varies from one culture to another, depending on a broad range of social, political and economic factors.

‘**Symptomatic technology**’ is the concept Raymond Williams (1974:13) employs to explain its inverse – that technology is a symptom of social change. According to this model it is quite clear that society is in the driving seat of history: given a strong social demand, a suitable technology will be found. Williams, exploiting the arrival of television, refers to the twin process of ‘mobilisation’ and ‘privatisation’ which took place with the outset of individual society and which led to a demand for the development of television. This is the essence of the social shaping of technological approach, which ‘serves as a needed corrective’ to technological determinism (Mackenzie & Wajcman, 1985:4). While not denying that technologies have social effects, the focus, rather, is on the social forces which give rise to the particular technologies.

The **Socio-technical approach** was used, as discussed in **chapter two**, since it is principally based on flexibility and intellectual growth, both of which are considered important for the purposes of this study. Flexibility entails the tendency of the entire organisation attempting to fit or match the ever-increasing technological change, whereby intellectual growth encompasses skills development and also encourages personal development in information technology. The socio-technical approach views the technical system as including technology and its associated work structures. The social system refers to the grouping of employees into teams, coordination, and control and boundary management. It also includes delegation of responsibility to work teams and the very important function of formulating the employment policies and regulations for operational decision (Baskerville *et al.*, 2000:34).

It was first developed by its creators as a means for optimising intelligence and skills of employees and associating these with new technologies in a way that would revolutionise

how they lived and worked. The socio-technical school believed in flexibility and intellectual growth: that individuals and groups could reorganise and redevelop to meet new challenges in changing environments and that it would not be necessary for these processes of change to be too demanding or difficult. In the 1970s, many organisations accepted this message and tried to restructure their procedures and change their cultures to meet new kinds of objectives, both human and technical (Baskerville *et al.*, 2000:34).

Throughout its history, its practitioners have always tried to achieve its two most important objectives: the need to humanise work through the redesign of jobs, and democracy at work. In order to realise these goals, the objective of a socio-technical approach has always been “the joint optimization of the social and technical systems.” Human needs must not be forgotten when technical systems are introduced. The social and the technical should, whenever possible, be given equal weight. Over the years, this objective has been interpreted in many different ways but it is still an important approach (Baskerville *et al.*, 2000:34-35).

William Pasmore, writing in *Human Relations* (1985:18), provides a positive assessment of what the socio-technical approach has achieved over the years. He describes the key insights provided by the early researchers as a recognition that the work systems should be seen as a set of activities contributing to an integrated whole and not as a set of individual jobs. As a result, the work group becomes more important than individual job holders. Control should be devolved downwards with the work system regulated by its members, not by external supervisors. This would increase both efficiency and democracy. At the same time, flexibility and the ability to handle new challenges would be made possible through a work design philosophy based on skill redundancy. Work group members should have more skills than required by normal production. (Today this is called multi-skilling).

Bourdieu’s theory of practice and cultural reproduction was discussed in **chapter two**. The theory includes the disclosure of buried organisational structures and mechanisms that are used to ensure the reproduction of social order.

Bourdieu’s theoretical framework helps us understand how changes arising from information technology may actually reinforce existing power structures and help perpetuate the social order. For Bourdieu, change is a self-regenerative mechanism required for the maintenance of stratified organisational hierarchies. Static structures can be figured out and

conquered over time. However, changing structures keep actors off balance, thus leading them to apply familiar strategies in unfamiliar contexts. It is this reuse of learned dispositions in new settings that makes existing class positions self-sustaining (Morrow, 1994:132).

As the focus of this research is on the influence of information technology on labour relations, the researcher believes that Bourdieu's theory is based on how information technology affects the entire operation of the organisation. The theory points out the impact of the corporate culture, which plays an integral part as everything concerning the organisation is reflected by the compliance to the culture affected by the relationship within the employment setting. The theory furthermore refers to management support for employee development, that is, in terms of training.

Theories on labour relations were discussed in **chapter two**, where the most appropriate ones were identified. **Dunlop's system theory** comprises a tripartite relationship, while viewing the labour relations systems as an open system that can be influenced by external and internal factors, as would be the case with information technologies. Dunlop (1958:7) attempted to provide an integrated theory of industrial relations and focused his attention on the systems of rules which govern the workplace and the work community.

The **unitary approach** maintains that the organisation is a cohesive, unified unit comprising a common set of values and goals subscribed to by all members. The underlying assumption of this perspective is that the people working in an organisation are in basic harmony, and that conflict is undesirable and exceptional. This approach denies any notion of inherent, structured conflict due to the nature of the employment relation.

The **pluralistic approach** is characteristically appropriate for the modern organisation as it allows power and authority sharing, where communication is a two-way mode of transmission and consultation is one of the priorities for conflict resolution. It presupposes that organisations are multifaceted, complex groupings of individuals who align themselves with other members of the organisation sharing similar views, values and objectives.

The employment relation consists of three role players, namely the state, employers and employees. A tripartite nature of any employment relations system is recognised. The impact of information technology on the role players was discussed in **chapter three**. Information

technology has transformed labour relations systems in such a way that role players within the employment relations have been immensely affected, and this, in turn, calls for certain reactions. The changes have placed pressure on the employer to fulfil his/her role as decision maker and planner who directs the employees in the fulfilment of their duties, and who plans and controls the general operation of the organisation. The employee, in turn, fills a subservient role in carrying out the employer's orders. And lastly, the state has a vital role to play in the relationship in terms of being the regulator, mediator of the overall relationship (Bendix, 2000:10). Influences on organisations, employers and employees as well as how these role players react to the demands of new information technologies were discussed. Distinctive functions of the role players were also discussed in detail in **chapter three**.

With the organisation adapting to the changing world of technology, the study provided a better understanding of application of the approaches of information technology and labour relations for effectiveness and efficiency. The intention with using these approaches was to present a general theory of employment relation and information technology. A framework, such as the previously mentioned approaches, allowed for the conceptualisation of the major impact the role players have on the employment relations, as well as the influence of information technology on the role players. These approaches provided a mechanism to understand and interpret the actions of employers and employees inside the workplace. Various processes and mechanisms for dealing with the shortcomings accompanying the incorporation of information technology in the organisation, were identified in **chapter three**.

It was necessary to elaborate on the phenomenon of organisational culture and employee participation because understanding the influence of information technology on employment relations is of vital importance to be able to see how the organisational structure was designed to cater for management of information systems and dealing with its shortcomings within the organisations.

To make the literature study meaningful, a discussion of each section of the questionnaire was devoted to empirical investigation to verify certain aspects of the research. The method of data gathering was the use of a questionnaire, which was completed by employees in an information technology environment in United Arab Emirates. A response of 70% of the target population was achieved. Principal component extraction was carried out prior to

principal factor extraction. This was done to estimate the number of factors, presence of outliers and factorability of the correlation matrices.

Factor analysis revealed patterns of change in the values of the measuring instruments. The measuring instruments were clustered by means of loading size to facilitate interpretation. From this, the different sections of the questionnaire revealed the following: **Section A** entailed **biographic information of the participants**; **Section B** of the questionnaire entailed **the reasons and strategies of information technology for effective and efficient task execution**. Three underlying factors were revealed, namely job satisfaction, threats and training. **Section C** focused on **workers' experience of information technology in the workplace**. Two underlying factors were revealed, namely job patterns and personal growth. **Section D** alerted the awareness to **the influence of information technology on labour relations** and revealed employment relation as the underlying factor. **Section E** elucidated **personal opinions about information technology**. This model corresponded with the model taken from Linde, Schalk and Linde (2005)

THE CORES OF THE EMPIRICAL FINDINGS

The cores of the empirical findings as well as the applicable comments are summarised in the following discussion: a fair response from *the reasons and strategies for effective and efficient task execution questionnaire* (specific objective) in the total sample (31.5%) indicates that the employees experienced job satisfaction negatively. This means that employees have negative views about the changes brought about by information technology in their work. This can be attributed to ineffective consultation processes and a lack of employee participation. Participation may result in increased job satisfaction and consequently improved motivation and enhanced service and product delivery. With regard to consultation workers are increasingly allowed to influence decisions affecting their jobs. One of the major objectives of introducing participative structures in an organisation is to ensure constructive and harmonious labour relations. The response from the employees in the total sample (16.5%) indicates that employees are less threatened by the introduction of new information technologies in the organisation. This can be attributed to the organisation's ability to manage change in the workplace. Organisations have accepted the fact that change is going to happen and recur frequently. Employers have created, and will have to continue doing so, an effective change management system which attempts to align the organisation with the rapidly

changing world of technology. A weaker response from the employees in the total sample (14.1%) indicates that employees viewed training as just another strategy or reason for incorporating new information technology. Another reason might be that employees misinterpret the meaning of training or ignore the calling for training due to poor management support and reward systems.

From the *experience of workers of information technology questionnaire* (specific objective), a stronger response from the total sample (26.7%) indicates that new information technologies in the workplace have an impact on how tasks are being executed. New information technologies improve decision making, communication and problem solving techniques in organisations. Information technology is leading to changes in relationships of the organisations and their members, in how they supervise and evaluate. Firstly, much clerical work has been replaced with automated systems. Secondly, increased accesses to timely information about operations enable a broader management span of control. Work is being carried out in new ways. There is more to team work, and teams are supported by networked technologies such as electronic mail and group-decision support systems.

Telecommuting, that is, working at home or in suburban satellite locations while electronically connected to the organisation, is a frequently chosen option that helps lower fuel and corporate overhead costs and give workers greater flexibility as to where and when they work.

A negative response from the total sample (12.1%) indicates that employees did not see the introduction of new information technologies as a catalyst for personal growth. This can be attributed to their limited perception of training, which is a problem that can be rectified, since training at an organisational level leads to more productive workers and greater personal satisfaction, job enrichment and a feeling among employees that the organisation is interested in their advancement.

With regard to the *influence of information technology on labour relations questionnaire* (specific objective) employment relations was identified as the underlying factor. The response from the total sample indicated that employees (22%) viewed information technology to be less influential on labour relations, but perceived information technology as the complicating factor in the employment relation at an organisational level. Information

technology inevitably leads to changes in organisational structures. In some cases the organisation's functioning undergoes a complete metamorphosis as a result of changes in procedures, systems, re-allocation of responsibilities, and could even culminate in a complete change of corporate personality.

Complexities may be instigated by conflicting ideas on information technology with regard to centralisation/decentralisation of authority within the organisation, increase/reduction of the middle management role, increase/reduction of employee opportunities, changing/freezing existing organisational structures, and limiting/increasing job satisfaction.

The partial response from employees might be the traditional perception that what employers do in the organisation purport employee obligation to submit or accept changes, since employees fill a subservient role in carrying out the employers' orders.

This can be attributed to ignorance or employees misunderstanding their organisational rights such as employment benefits, employment rights, right of self-expression, collective bargaining and compensation and reward systems to undergo information technology training.

In the *personal opinions about information technology questionnaire* each item was analysed individually, since the underlying factors could not be used for single items. The first item of the questionnaire attempted to analyse employees' views regarding information technology in the organisation, and 56% of the total sample believed that information technology added value to the organisation. It knit closer previously semi-independent aspects of the production process.

The second item attempted to obtain employee forecast on the changing world of technology, and 48% of the total sample predicted a promising future with information technology. An organisation able to adapt to the changes reflects an improved change management. The third item was presented with the intention of gathering information on consultative processes in an organisation. The response from the total sample indicated that 45% of the employees viewed the process as being important since it would facilitate effectiveness and efficiency in the organisation. The fourth item endeavoured to analyse management support after implementation of new information technologies. The response from the total sample indicated that 27% valued management's support. The fifth item attempted to estimate

employees' views on internal and external training, and 16% of the total sample regarded training to be ineffective. The sixth item analysed the motivational programmes within the organisation, and 48% of the total sample agreed that the programmes were effective. The seventh item attempted to evaluate compatibility of the organisation's information technology policy with the state policy and regulations on information technology. The response from the total sample indicated that 60% believed that organisation's information technology policy was compatible with the state policy and regulations. The last item analysed the employees' rights concerning information technology, and 58% indicated to be well-informed about their rights.

5.2 SUMMARY

It is quite clear that the influence of information technology on labour relations raised more employment relations issues than the creators could foresee. Once employers had decided on introducing new information technologies, the structure of the organisations underwent a complete metamorphosis. Aspects subjected to change could include decision-making powers, communication channels, employee participation, new employment policies, strategies for implementation and evaluation, technological change awareness campaigns within an organisation and compatibility with the state legislation on information technology.

According to analyses of the data and results of the study the researcher was able to conclude that the need for the implementation of advanced information technology in organisations had increased, that is, if organisations wished to operate in the modern world of business, but it was revealed that little if any corrective channels or procedures accompanied such implementation to ensure effectiveness and efficiency. The researcher established that setting clear goals and objectives for the organisation would help to maintain harmonious relationships. This can only be achieved if the parties to the employment relationship understand their stand and role considering new information technologies. What the researcher basically established from the study was that the root of successful incorporation of information technology in the workplace relied mainly on the effective processes of employee participation and consultation, the main reason for this being that employees would participate in decision making concerning their jobs.

5.3 RECOMMENDATIONS FOR FUTURE STUDIES

From this study the researcher identified the following possibilities for future research:

- Conducting a study, focusing on employee reaction to change, not employee acceptance of change within the organisation.
 - Conducting a study, focusing on the importance of effective consultation and employee participation.
 - With regard to employee experience, future research could focus on assessing the impact of information technology on employees and how it affects the relationship between them and employers.
 - With regard to employment relations, future research could focus on the adaptation of information technology policies within the workplace.
 - Also interesting for future research would be the organisation facilitating effective processes for human and machine integration in the organisation.
 - Further recommendations for future research would be to assess employees' readiness for technological change while at the same time investigating coping strategies applied by the organisation, so as to determine whether the change management system of the organisation is effective.

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APPENDIX

Please find attached a questionnaire regarding a study at an information technology industry. This research forms part a Master Degree at the North-West University, in South Africa.

The purpose of this study is to determine the influence of information technology on the labour relations within the workplace.

Your participation in this project is extremely important, and therefore I ask your kind-hearted co-operation in the completion of this questionnaire. The completion of this questionnaire will not take much of your time, because marking appropriate blocks with a cross can complete a great deal of the questionnaire.

This questionnaire is anonymous, so please do not mention your name, your company number or anything personal. So you must be free and confident to answer the questionnaire with honesty.

PLEASE NOTE QUESTIONNAIRE PRINTED ON THE REVERSE OF EACH PAGE. YOU MUST COMPLETE BOTH SIDES OF EACH PAGE. PLEASE ENSURE THAT YOU COMPLETED ALL QUESTIONS.

MATAR ALNEYADI

The influence of information technology on labour relations within the workplace.

NB

- ❖ Please complete all questions
- ❖ Please tick the appropriate box
- ❖ All information will be treated as confidential and will remain strictly anonymous.

Section A

Biographic information

Question 1. Gender

Female		1
Male		2

Question 2. How old are you?

18 – 25		1
25 – 30		2
30 – 35		3
35 – 45		4
45 and older		5

Question 3. Indicate your level of work (job grading)

Level A (technicians)		1
Level B (artisans)		2
Level C (engineers)		3

Question 4. Indicate your highest level of qualification/education

High school		1
Diploma		2
Bachelor degree		3
Honours degree		4
Masters degree		5
Doctor		6

Question 5. Mark your staff category

Professional		1
Semi-professional		2
Skilled		3
Semi-skilled		4
Unskilled		5

Question 6. How many years have you worked for this organisation?

1 – 2		1
3 – 5		2
6 – 10		3
10 – 20		4
20 and more		5

Question 7. How many years have you worked on current position?

1 – 2		1
3 – 5		2
6 – 10		3
10 – 20		4
20 and more		5

Question 8. Are your working hours:

Full time		1
Part time		2

Question 9. Which of the following are you familiar with?

Modems		1
Internet		2
E-mail		3
Facsimile		4
Programming		5

Section B

Question 10. This part is indicating the reasons and strategies about the information technology for effective and efficient task execution

Consider the following statements thoroughly, and indicate your opinion by marking on the five – point scale how strongly you agree or disagree with each statement. Indicate your choice by using a cross. Use one cross per statement.

1- Strongly agree 2 – Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

Statement		1	2	3	4	5
10.1	Computers are good for my job description					
10.2	I accept changes in my job					
10.3	Information technology helps in personal development					
10.4	Information technology limits my abilities in the organisation					
10.5	Information technology equipment takes away our jobs					
10.6	Information technology is one way of replacing man with machine					
10.7	I have to be highly skilled to cope with information technology					
10.8	I understand how to use information technology tools					
10.9	Information technology is only good for the organisation					
10.10	I am aware of the shortcomings of information technology					
10.11	I am well trained to use information technology					
10.12	I am sure that I acquired the relevant training					

10.13	I received a policy about information technology in my organisation					
10.14	I need more time to adapt to information technology					
10.15	My organisation needs information technology for competitive advantage					
10.16	My organisation needs information technology to adapt to the changing growth of technology					
10.17	Information technology increases effectiveness					
10.18	Information technology increases efficiency					
10.19	Information technology helps to maintain corporate identity					
10.20	Information technology portrays an image of the organisation					

Section C

Question 11. This part focuses on the experience of workers on information technology in the workplace

Consider the following statements thoroughly, and indicate your opinion by indicating on the five – point scale how strongly you agree or disagree with each statement. Indicate your choice by using a cross. Just one cross per statement.

1 – Strongly agree 2 – Agree 3 – Neutral 4 – Disagree 5 – Strongly disagree

	statement	1	2	3	4	5
11.1	Information technology makes my work more routine					
11.2	Information technology makes my work more demanding					
11.3	Information technology creates unfavourable atmosphere of competition among colleagues/departments					
11.4	Information technology makes my work more independent					
11.5	Information technology makes me more responsible					
11.6	Organisational training is relevant to my work demands					
11.7	I prefer external training in information technology					
11.8	I prefer internal training in information technology					
11.9	Information technology provides a need for more skills					
11.10	Information technology helps me to realise my full potential					
11.11	Information technology provides a ground for self-expression					

11.12	Information technology helps me to be informed about my work					
11.13	Information technology provides an effective way of receiving feedback					
11.14	With information technology training I am eligible to a good salary					
11.15	My job is secure with the introduction of information technology					
11.16	Information technology increases efficiency					
11.17	Information technology increases effectiveness					
11.18	Information technology improves decision-making processes					
11.19	Information technology speeds up problem-solving processes					
11.20	Information technology increases locus of control					

Section D

Question 12. This part is intended to evaluate the influence of information technology on labour relations

Please indicate your opinion by marking your chosen statement by using a cross. One cross per statement.

1 – extremely positive 2 – positive 3 – neutral 4 – negative 5 – extremely negative

statement		1	2	3	4	5
12.1	Information technology erodes the traditional way of task execution					
12.2	With information technology my working conditions will be better					
12.3	Information technology intensifies worker – employer relationships					
12.4	Introduction of information technology raises a need for wage negotiations					
12.5	Introduction of information technology to work needs improved employment policy					
12.6	Information technology facilities improve my employment rights					
12.7	Information technology raises new issues of employee participation					
12.8	Information technology policies entail my rights of expression and association					
12.9	I was given a copy of disciplinary measures concerning transgression of information technology policy					
12.10	Information technology enables access to organisational information					

12.11	I am aware of the demands of the information technology concerning my job					
12.12	Information technology increases the rate of communication					
12.13	I can evaluate my performance through information technology equipment					
12.14	I am aware of the technological changes concerning my job					
12.15	Information technology makes me more independent					
12.16	Information technology creates new ways of work execution and new employment policies					
12.17	I am aware of new job arrangements due to information technology, e.g. job specialisation					
12.18	I need a new employment contract with benefits of using information technology					
12.19	Information technology gives me a greater flexibility, in where and when I work					
12.20	I need compensation to undergo information technology training					

Section E

Question 13**The personal opinions about information technology**

This section needs your personal opinion. It should be answered by everyone, irrespective of job level. There are some suggested answers given, you only choose one and make a cross next to it.

13.1 What is your view about the introduction of information technology in your organisation?

It is reasonable		1
It is not important		2
It improves organisation and employee		3

13.2 What is the future like with regard to the rapid changing nature of technology, any long – term strategies to overcome the challenge?

Bright		1
Promising		2
Demanding		3

13.3 Have you ever been consulted about the transformation within the organisation?

Yes		1
No		2
Not important		3

13.4 How supportive is the management in ensuring the successful implementation of new information technology?

Supportive		1
Not supportive		2
Not important		3

13.5 What is your intake about the internal and external training and development?

Time wasting		1
Helpful		2
Not important		3

13.6 Are there any motivational programmes for one to undergo training and development?

Sufficient		1
Insufficient		2
Not helpful at all		3

13.7 Is the organisation's policy regarding information technology compatible with the state regulations governing information technologies?

Yes		1
No		2
I don't know		3

13.8 Do you know your rights concerning utilising information technologies, and also the disciplinary measures for transgressing the regulations?

Yes		1
No		2
Not informed		3

Thanks for your cooperation, time and participation