INTRODUCTION

South Africa has been experiencing dramatic change, particularly since the implementation of the 1996 Constitution and subsequent legislation. Especially local and provincial authorities, as the basis of effective government, have been especially hard hit, continually experiencing change in functional, structural and legislative areas. This change requires deliberate and proactive management actions to transform an authority from its current (experienced as unsatisfactory) state to a required state.

In a changing environment, authorities and their various institutions, should undergo continual strategic repositioning. To transform an authority with a significant personnel component and limited resources within a given policy framework without jeopardising service is an extremely complex process. Transformation is usually associated with resistance, instability and uncertainty and therefore does not simply involve change in services, management hierarchy or methods and processes. People remain the means whereby change must take place. Without adequate support from personnel and the skills of management to act as transformation leaders, shortcomings may be anticipated in the process.

A proven mechanism to implement institutional transformation is project management. This paper will focus on three aspects. Firstly, it will focus on the application of project management as a mechanism to strategically transform an authority, public institution, department or division from its current state to a required state. Secondly, it will concentrate on the application of project management to facilitate community development projects, and thirdly it will focus on the use of information technology to implement project management.

These aspects are also briefly covered in a book with the same title as this paper. The book was to a large extent, the result of the presentation of various training programmes for public officials on all levels of government, members of the community and students of non-formal courses. These programmes are presented to specific clients by the programme group Public Management and Development at Technikon Southern Africa.
THE APPLICATION OF PROJECT MANAGEMENT FOR STRATEGIC CHANGE

During the past two decades strategic management has become common practice in the private sector. However, it is clear that the approaches to strategic management that apply in the private sector cannot simply be applied in the public sector. For the strategic management process to be applied successfully in the public sector, it should be adapted to the particular needs of the public sector. Strategic management can be applied with great success if the differences regarding the provision of services and products are accepted and provision is made for these differences by means of suitable management practices.

Variables which may play a role in the application of strategic management in the public sector include
- the apparent administrative shortcomings in public institutions,
- the inability to establish long-term visions,
- the apparent inability to respond quickly to change,
- the level of resistance to change and
- the way in which the institution responds to environmental issues.

Local and provincial authorities in South Africa are currently undergoing structural changes which require flexibility and strategic vision. The highly mobile internal and external environments, as well as increasing pressure on the more effective use of scarce resources, make thorough planning and management at strategic level very important. We believe that project management can be applied with great success to assist institutions to change strategically. The application of project management for strategic change is what we refer to as the internal perspective or focus of project management application.

Project management: an internal perspective

Project management has an internal perspective - the institution as the client. It is used to bring about change in the divisions of an institution. Members of the project team are permanent officials from the institution.

Project managers must be given the necessary authority to manage the resources required in the institution. Internal politics and the insistence on transparency make the implementation of sensitive projects extremely complex. It is not always easy to gain the participation and involvement of top management, as they may feel project managers are encroaching on their domain.

Before we can discuss the application of project management for strategic change, it would be appropriate to define the main concepts.

Strategic management

Strategic management involves the repositioning of an institution to adapt to environmental forces of change. The word "strategic" indicates a change or transformation of the whole institution regarding the vision, mission and aims. The institution therefore undergoes a complete transformation process.
Management of change

The management of change focuses on the planned change of organisational structures and human resources to adapt to changing circumstances. Aspects such as resistance to change, organisational culture and communication are particularly important.

Change may be necessary because of a change in one of the following:
- Organisational structure
- Management processes and lines of authority
- Utilisation of resources
- Functional activities
- People’s lives (e.g. improvement in standard of living)

Management should monitor circumstances continually and provide answers to questions such as the following:
- Why can our institution not keep up with change?
- Why was our institution caught unawares by recent change?
- Which strategy should we follow to adapt to change?
- We cannot remain here, so where do we go?

Strategic projects

"If your project is so large that if it fails the whole organisation fails, or if it fails directly out of a strategy that your organisation is following, it is known as a Strategic Project." (Obeng, 1994)

Strategic project management includes the following elements in local governments for example:
- Town secretary: Personnel, legal services, planning with city engineer, tenders, contracts, property, traffic, fire brigade services, libraries, museums, etc.
- City treasurer: Finance
- City engineer: Parks and recreation, streets, maintenance, etc.
- Electricity: Street lights, electrification of property, etc.
- Health: Clinics, health inspectors, abattoirs, nursing services, rubbish removal, etc.

Change will have to take place in each department so that the overall transformation of the local government is possible. An example of total strategic transformation was the implementation of the Local Government Transition Act 209 of 1993 and the establishment of the transitional metropolitan councils. No department in any local government has remained unchanged through these aspects.

The management of strategic change can take place at micro-level within a specific department such as parks and recreation. Strategic areas are identified in the department which are changed or modified by a project team. Once these areas have changed, we can speak about a transformed department.
Management of strategic change

The management of change is an integral part of strategic management in a rapidly changing environment. However, the degree of change may depend on how the institution positions itself with regard to the existing and future macro-environment. In times of change, an institution should not try to keep its internal environment stable, but should rather allow the culture, procedures, support systems and resources to adapt. This enables effective transformation and adjustments to take place.

From this theoretical analysis of the integration of strategic management and the management of change, we can formulate the following possible definitions of the management of strategic change:

- The management of strategic change is a deliberate, planned process enabling an institution to adapt to changing circumstances proactively.
- The management process entails a holistic (overall) approach which includes all variables and dimensions of organisational management. The change process entails the evolution of the culture, climate and thought patterns that support change. Organisational change is not merely a process in which the old is replaced by the new. It is also a change of ideas. The transformation process also involves a change of the hearts and minds of all officials affected by the process.
- Change that was initially simple and incremental can become strategic if there is synchronisation with change in other parts of the institution.
- The implementation of a strategy implies change because the institution does not remain the same.
- If a strategy is implemented in an institution, variables such as the existing culture, structures, administrative processes, structures of power and authority, human resources system, technological systems, management styles and resistance to change must be considered. Change in one of these dimensions could imply significant change in others because the dimensions are largely interdependent.
- Key variables in the management of strategic change are the means used in initiating, facilitating, maintaining and directing the change process as well as managing the dimensions arising from the change process itself, e.g. the management of resistance to change. Clarity must be obtained on all the most significant variables for a holistic perspective.

Project management for strategic change

To make strategic change possible through project management, strategic management, change management and project management must be integrated. Because the unique circumstances of the institution and the type of change to be implemented largely dictate the process, we will focus only on the generic elements. Note that these steps are not incremental - they are not necessarily consecutive, but they are interdependent.

Step 1 - Mission
When the mission is formulated as the first step in the management of strategic change, the following types of questions are asked:

- Who are we?
- What do we believe in?
• What are our aspirations?
• For whom and/or what are we doing it and how are we doing it?

Answers to these questions should provide a clear image of the institution's mission. In most cases the mission will have been formulated before project management for strategic change is implemented. However, if the change is very dramatic, the mission should be changed or modified. The mission therefore provides a broad framework of intentions and gives direction to the change process.

If the change affects the whole institution and not only one division or department, the mission is vital. However, if smaller organisational changes are made, changing the mission is not as important.

**Step 2 - Clear definition of the problem (unfreezing)**

In this step the problem to be addressed is defined clearly to obtain an unambiguous impression of its scope and influence on the institution. This problem may be one of the following:

- Obsolete organisational systems
- Rationalisation of services
- Implementation of training programmes
- Change in policy, ordinances and regulations

In this phase purposeful efforts must be made to unfreeze the institution from its current state. To move the institution from a current (and possible unsatisfactory) state to a required state, the forces within the institution that maintain the *status quo* should be reduced or the forces of change should be increased. In practice both strategies are combined. Forces within an institution that maintain the *status quo* are interdependent and forces causing change can create new resistance. If there is new resistance, the chances of maintaining the *status quo* increase.

When unfreezing takes place in an institution, the resistance to change is overcome and the management processes facilitating the change process can be explored actively. From a perspective of strategic management, this process should be linked with the institution's change strategy.

In practice, force field analyses are used to identify and analyse the forces of change in favour of and opposed to change. Information from these analyses can be used to establish which divisions in the institution should be actively manipulated to unfreeze the institution and facilitate the change process. The information serves as an important point of departure when the project team does its planning.

**Step 3 - Long-term objectives (define the required state)**

Long-term objectives can be derived directly from the mission. They are actions to be taken to realise the mission. Objectives may include the following:

- To improve organisational systems
- To use resources more cost-effectively
- To create an expert and skilled labour force
- To reposition the institution strategically with regard to changing policy
**Step 4 - Specific objectives (measurable results)**

Specific, quantifiable objectives are derived from the long-term objectives. Long-term objectives (five years and more) are usually not made owing to rapid change, and objectives are rather derived from an aim. These objectives must be measurable. Criteria or standards must be determined for evaluating the results of the objectives. Examples of objectives include the following:

- To implement a new, more relevant computer program before December 1999
- To develop an audit system for each division in the institution by February 2000
- To analyse training needs and develop and implement programmes
- To form project teams to implement strategic change

**Step 5 - Define strategies to achieve objectives (project management)**

This step in the strategic management process is vital, because a suitable strategy for implementing change must be selected. The nature and scope of the change largely dictates the strategy.

In this paper we propose project management as a strategic mechanism for bringing about institutional change. However, top management may decide that the change contemplated is sensitive and may therefore choose not to use project teams. In this course we use a project approach. Projects for strategic actions or activities in each division and/or department in the institution are therefore identified.

In the preparation phase in project management, clarity must be obtained about certain activities or processes in the institution to determine whether there are enough resources and support to launch the change process. In practice the following steps are usually taken at operational level:

- A transformation forum is appointed which consists of all role-players (only needed if the whole institution will be affected by strategic change).
- A strategic change plan with overall aims, procedures and guidelines is formulated.
- Change agents (project managers) are appointed in each department and each division (possibly heads of department) affected by the change.
- Each department and/or division holds a strategic session in which a SWOT analysis is carried out.
- Each department and/or division develops a transformation plan with target dates.
- Project management is used to allocate resources and responsible people to the projects.
- A feedback and control system is developed.
- An evaluation plan is developed.

Aspects that should be investigated include the following:

- Problem analysis (force field analysis - internal and external)
- Identification of the need for a project (prioritisation of needs)
- Choice of a suitable project or projects
- Choice of a project team and appointment of a project manager
- Project formulation and planning
- Reports to the Council or appropriate policy-making body on:
  - the purpose of the project
  - the expected results of the project (advantages)
- a description of the project field (which divisions/departments it will influence)
- the people that will be affected
- activities that will take place
- management and administrative systems
- resources required and how they will be used, with specific reference to the budget, funding period and amounts
- control, accountability and responsibility
- a list of the role of role-players

**Step 6 - Specific activities and resources to achieve each objective**

After a report has been submitted to the policy-making body and the project has been approved, the project team is responsible for allocating activities and resources. The cooperation of divisions or departments in the institution that control and co-ordinate these resources, is essential. Project managers must have the necessary authority and power to obtain these resources.

Some of the activities and resources allocated are the following:
- Office administration
- Co-ordination of activities
- Personnel training
- Networks and committees (especially for reporting)
- Resource distribution
- Use of consultants, if necessary

**Step 7 - Define structures and channels of authority and communication**

The project team must know how it functions within the institution. Organisational provision should be made for channels of authority and communication for project team members.

The simplest way of illustrating structures and channels of authority and communication is by using an organigram, which indirectly gives authority to project managers and indicates communication channels. Public institutions usually have a line structure. The policy-making and decision-making body (the Council in the case of a local government) is at the top of the hierarchy and it has authority over the project. The project team follows, with a manager who is usually a director, co-ordinator or manager.

Project team members are co-opted from relevant divisions, such as personnel, finance and legal services, for the duration of the project on the basis of their expertise. Once the project has been completed, these people perform their usual functions.

**Step 8 - Systems and policy**

Once the overall structure of the institution and the project team’s place in it have been established, internal systems and policy influencing the activities of the project team must be clarified. It is essential to obtain clarity about the following, among other things:
- Personnel procedures
- Financial management
- Progress reports
- Use of and control over resources
- Policy, prescribed rules, regulations and procedures
Project activities can be regulated, amongst others, by the following:
- Financial administration and audits
- Policy, regulations and ordinances
- Procedures for actions, e.g. use of resources
- An operational system of reporting and appropriate communication lines

Provision should be made for each of these aspects.

**Step 9 - Availability of support resources**
In step 6, organisational resources are analysed. In step 9 the availability of resources for the project team is determined. Provision is made for, among other things:
- a budget
  - allocation of funds
  - financial procedures
  - auditsystems
  - financial reporting
  - budget control
- office space for regular meetings
- equipment
- personnel
- time
- training equipment

**Step 10 - Scheduling**
A project is divided into specific activities. Each activity should be assigned to a responsible person and have a target date for completion. A scheduling chart is used to set out each activity of the project on a graph so that everyone can see the progress. A scheduling chart improves the team members' understanding of the scope of the project and is a useful monitoring mechanism for project managers. The planned and actual progress of each phase should be indicated. Because the chart provides a visual image, tendencies and problems can be observed and corrective steps taken in good time.

A scheduled graph is a management tool to indicate all the activities planned to complete the project. Scheduling is sometimes considered to be synonymous with planning. However, in the context of this paper, scheduling is merely a tool for representing planning actions visually.

The following logical steps can be taken to formulate the schedule of the project:
- Identify the activities
- Plan starting and completion dates
- Estimate the duration of each activity
- Adapt the schedule as needed
- Distribute the final schedule to all team members and the institution

**Step 11 - Implement projects (transition phase)**
The implementation of the specific changes represents the transition phase (compare the management of change). In the shift from a former to a required state, employees should be supported by a programme in order to adapt to processes, structures and styles. The
The following receive attention in the implementation phase:

- Organisational arrangements
- Administration and management (especially financial control, decision-making and co-ordination)
- Execution of project activities
- Project monitoring and feedback
- Record-keeping

Gradual change entails adjusting specific dimensions of the institution. By contrast, strategic reorientation is a comprehensive restructuring of the institution. In practice it is an extremely difficult process to manage owing to the complexity and interdependence of variables influencing the change process.

If change is to be implemented in more than one division of the institution, it must be co-ordinated and synchronised so that the institution changes within the most desirable juncture. Management should monitor the process constantly to ensure that the institution's transition process still coincides with the environment (forces of change).

The transition process can be described in terms of strategic synchronisation between three institutional dimensions of change, i.e. culture, technical and political dimension. Cyclical adjustments of each dimension are necessary to ensure that all three are at the same level of change. For example, management may deem it necessary to change the institution's culture before technical or political change is implemented in order to ensure that the institution's value system supports the transition. These dimensions reveal the complexity of the transition process, but other dimensions could be added, e.g. economic, behavioural, human resources and leadership dimensions.

**Step 12 - Monitor and evaluate (refreeze)**

It is vital to establish whether the required change has been brought about by project teams with the given resources. In this phase the project is evaluated against standards and the original plan and the degree of achievement of objectives is also determined. A critical question to be asked is whether the project should continue, change or cease. It is also important to learn lessons for future projects.

In the planning phase of the project team, provision should be made for formulating an evaluation plan. This plan is essential for monitoring and evaluating the process. It also serves as a mechanism that the policy-making body can use to control the project. The evaluation plan indicates the following, among other things:

- Project objectives
- Who will be involved
- Criteria and/or standards
- Sources of information
- Means of gathering information (e.g. questionnaires, interviews, reports and schedules)
• Analysis of information (e.g. by graphs, quantitative modelling, mathematical formulas, qualitative analysis to observe changes in attitude such as opinion polls and questionnaires, and reporting on the final findings)

• Duration and cost of activities

Once the various dimensions of the institution have been changed or modified until the required state has been achieved, the transition phase must be stabilised and then refrozen to prevent a return to the previous or traditional state. We can describe the refreezing phase as the confirmation of new behaviour or actions. The process is a balance between stability and flexibility. The support systems play a very significant role in this process.

The state of equilibrium achieved is merely temporary within a rapidly changing environment, as new adjustments will have to be made. Weeks (1990:182) rightly asks whether it is at all feasible to refreeze an institution, since the environment is unstable and changes rapidly. The interaction between environment and organisational stability in this regard is evident. Change strategies should therefore be reconsidered continually. Stability is essential, but the state that is refrozen should still be flexible and rapidly adaptable.

In practice, particularly in incremental change, only certain dimensions are refrozen while others are in a constant state of change. However, theory shows that the dimensions are interdependent and support one another. Total strategic change therefore cannot take place if not all the dimensions in the institution have been fully adapted. Institutions are constantly being brought into equilibrium with the environment, but never completely.

According to Weeks (1990:183), a phase of stability and refreezing is essential after a transition period. If an institution cannot consolidate, it runs the risk of "unravelling". It is true that an institution must start unfreezing immediately after a refreezing phase, but the fact that the institution is changing strategically means that it has adapted to change proactively. A phase of consolidation and stability is therefore possible because the institution has adapted to change strategically and therefore in good time.

THE APPLICATION OF PROJECT MANAGEMENT TO FACILITATE COMMUNITY DEVELOPMENT

Project management can, however, also be applied to facilitate community development projects. Since the implementation of the Constitution of the Republic of South Africa in 1993, the country has undergone drastic changes in virtually all spheres of everyday life. One of these changes was the new political dispensation in the country which was accompanied by constitutional reform.

The political changes and consequential constitutional reform have influenced all levels of government, but also the community. Although most of the political changes are now in place, final structures to change the rigid administrative systems within which government function, have not yet been fully implemented. These rigid systems resulted in the fact that South Africa has a large component of its population who was previously disadvantaged. For this reason, the total community must now be uplifted.
The Reconstruction and Development Programme (RDP) was an election promise of the African National Congress and has been implemented with mixed results. One of the main problems was the fact that the political and administrative systems were not fully geared for the implementation of such a development strategy. Especially on local government level it is clear that the lack of appropriate structures more often than not results in no delivery.

It is, however, important that the structures and systems of an effective and efficient government should be implemented as the RDP Whitepaper (1994:53) states that the establishment of a credible and effective (local) government is considered crucial in the implementation of the RDP in both urban and rural areas.

Although some information exists on the role and function of government as well as the RDP and related strategies, in addressing the past inequalities through the provision of services, there are no specific guidelines on the integration of the process and the implementation of the strategies and its purpose. Implementation of the development strategies, and therefore also projects, is always more troublesome than the initiating and planning thereof, because unforeseen problems that are never envisaged at the planning phase, always occur. The structures that are not in place is an example of this.

However, it is essential that social upliftment takes place in every community in urban and rural areas. Various policy and other documents urges the people of the country, and the responsible authorities, to take decisive action and uplift the people of South Africa. This upliftment, more often than not, results in development projects. For this reason it would also be important to investigate the relation between development and project management.

**Project management: An external perspective**

As its external perspective, project management uses people within a local government as team members to launch development projects within a community. The local government therefore uses project teams to facilitate projects within a community. In this case the community is the client.

External projects are more closed than internal projects and usually have visible results (houses, roads, water, etc.). Because the results are visible, they are easy to monitor. In contrast to internal projects, the functions of all role-players are bound contractually.

**Project management and development**

In recent years there has been an increasing awareness of the need to develop communities. Requests are continually addressed to the public and private sectors to help developing communities to help themselves. As a result of these requests, various development projects have been initiated in various communities. However, often these projects have not progressed much beyond the needs determination stage, and just as often, the completed project has also failed.
By applying a public management technique such as project management, these mistakes of the past can be avoided. Local authorities and their communities face awesome challenges in the new South Africa. The identified socio-economic needs place great pressure on all institutions and individuals involved in community outreach.

Project management allows thorough planning to take place in the development of a particular community, which leads to the successful implementation of projects. By making the community aware of the project management process, possible problems can be avoided in the future. However, certain environmental influences will affect the community itself and the development that must occur within the community. Poverty perhaps has the greatest impact, and as a result, alternative ways of community participation must be found. This is also closely related to communication and its importance in the management of community development projects.

Development has long been promoted in certain countries. This has particularly been the case in developing countries. Industrial countries have always exerted pressure on the developing countries to change. This change was always intended to be to the benefit of the industrial countries, and usually occurred under the guise of so-called "aid" to developing countries.

In our own country the case has been the same. The developed communities extended "aid" to the developing communities, most of the time only to ease their own consciences. In the era in which we find ourselves at present, however, development in and of communities is increasingly emphasised. Nonetheless, there is a great lack of planning for and implementation of this type of development.

The way in which projects are initiated is often vague in most developing communities. We can therefore ask whether projects do indeed exist, yet on the basis of the strategy now being followed by the national government for the Reconstruction and Development Programme it is clear that projects do exist. What is in question, however, is the effectiveness, efficiency and success of these projects.

We therefore ask ourselves whether the existing and new projects are properly managed and, if not, how this can be corrected. Every writer on project management enthuses about this style of management, and points out that it is necessary for the proper management of projects, but few of these writers actually indicate what proper management really means.

From the above the following deduction can be made:
Development projects must be managed properly and successfully. The initiator and developer must take all aspects of the management process, including the phases of project management, into account when undertaking development projects in the community.

The project management steps we are proposing in this paper are the basic elements of all projects. In other words, a need must be identified, the project team must be elected or appointed, the project must be defined properly and then the project must be planned. After the project has been planned, it must be implemented and then evaluated to determine whether the need that was identified was indeed satisfied.
The role of the public manager in managing development projects for the community can be described as follows:

• preparing the project brief,
• managing the relationship with the community,
• recruiting, retaining and motivating project staff,
• managing project staff,
• monitoring project progress,
• initiating remedial action when and if necessary,
• controlling some changes to the project brief and schedules,
• reconciling conflicts within the project, and
• managing the project's external relations.

The application of project management for development is not something completely new. In fact, development projects such as housing projects have been implemented for many years. This paper is merely providing an introduction on the internal and external perspectives of project management application in South Africa. For this reason, the principles stay exactly the same, while the areas of application have been broadened.

But the application of project management for strategic and development projects can be made a lot easier by utilising any one of the vast number of computer packages available on the market. The third focus area of this paper is the use of information technology for project management.

THE USE OF INFORMATION TECHNOLOGY FOR PROJECT MANAGEMENT

The project manager must understand and follow the principles of good project management, and the methods, tools and techniques available, before he or she should attempt to apply computer technology to perform certain tasks in the project cycle. Only after mastering the approach, should managers use a computer system to perform some routine processes, to handle the vast quantities of data involved, or to simplify complex analyses.

The fact, however, is that the technology is available and that it can and should be utilised by the public management and the project manager. Computer technology and project management in many respects goes hand-in-hand. However, note that the use of a computer to facilitate project management functions does not in any way mean that the computer will do the work for you. You still need a thorough knowledge of project management principles and of the project management process as a whole. With this knowledge it will even be possible to visualise your project simply by printing it on a year planner, or by arranging the various activities of the project on a wall chart.

The first question to consider is what project management technology is, and why there is a need for a project management information system. Most organisations have an extensive range of computer-based information systems. One of the most common is a computerised accounts software package, and it might be argued that these could be adapted to provide cost control for most projects. However, functionally oriented systems are not appropriate for the management of projects, because they have many unique requirements, including the following:
• Integration across the organisation: The management of projects involves the integration of several stakeholders from within and outside the project organisation and this requires effective communication.

• The planning and control process: The planning and control process starts during proposal and initiation and the project is developed during the subsequent stages until it is brought together as an implementation plan. This implementation plan may consist of charts, lists and reports. When the process is underway, progress information is gathered and processed to control the project. This feedback cycle continues to the end of the project.

• Fast response times: The feedback cycles are of short duration. Many traditional systems are designed for much longer reporting periods, and so the information gathered is not presented in a time that is of any use for controlling the project.

A project management information system, and therefore also project management technology in general, is used for collecting data in a form suitable for all the stakeholders involved in the project. The technology is used for planning and controlling projects, throughout the project management life cycle, providing timely control information. Technology can also be used for recording historical data for estimating of future similar projects.

Technology for project management should include at least a planning system and a control system. The planning system converts data on the schedule, cost and performance into structured, timely and accurate information. The control system uses that information to support management decisions and direction with respect to the project's organisation and context - in other words, its purpose, the people involved and the procedures to be followed. The planning system manages the plan and control data relating to the scope, organisation, quality, cost and time. The control system enables the manager to use the information generated to direct all elements of the project and the project organisation. The two systems which form part of the technology for project management, can be illustrated as follows:

![Diagram of project management information system](adapted from Turner, 1993:392)

**Impact of technology on the performance of project teams**

Modern advances in information technology clearly have major implications for development projects in general and their management in particular. The potential of technology to store, process and transmit large quantities of data, the speed with which this can be done and the ease with which widely separated locations can be linked...
together make possible a degree of managerial involvement which was unthinkable as recently as the early 1980's (Cusworth & Franks, 1993:176).

There are, however, some dangers inherent in the use of information technology, including its strength in handling data rather than providing information, and in particular its inability to provide information that is easy to understand by all stakeholders in the project. These dangers must be fully appreciated if its full potential is to be realised.

The value of information technology in project management require some consideration and can be broken down into a discussion of hardware (the computers, printers, fax machines and photo-copiérs for example) and software (the programs that were discussed above). In both these areas very rapid changes takes place on a day-to-day basis, which have revolutionised the applicability for managers.

Looking first at the hardware, the main development has been through miniaturisation. In the past any significant quantity of electronic data processing required a mainframe computer which often filled a small room, but nowadays these are required only for really large applications such as administrative systems. By contrast, individual public and project managers can normally have access to all the processing capability they need through personal computers or microcomputers, which are the size of typewriters and can be located at the manager's desk.

The power of the microcomputer is being increased even as you are reading this book through the advances in networking, which links together numbers of microcomputers so that they can communicate with one another and share data. The Internet is one of the best examples of such sharing of information and communication between different microcomputers across the world.

Microcomputers, such as the notebook computer, can also easily be moved to the location where it is needed because so many of them are fully portable. In addition to this, they have few moving parts and are fairly easy to maintain, so that they are likely to be increasingly available to project managers, even at remote project sites.

The electronic revolution has perhaps been even more dramatic with respect to software, than it has been through miniaturisation of hardware. Whereas it was once necessary to have some knowledge of computer programming to use electronic data processing, nowadays the project manager can buy a range of programs which will perform most of the information processing which he or she requires. Examples of the available project management software were discussed earlier in this chapter. The cost of these software packages are also not very high and in the exceptional cases where specific organisation-related software is required, it can be written to order by software companies.

The standard software programs which are of most value to project managers can be divided into the following major categories:

- spreadsheets, such as Lotus 1-2-3,
- databases, such as dBASE,
- word-processors, such as MS Word or Word Perfect,
- graphic programs, such as Corel Draw or Harvard Graphics,
• project management programs, such as MS Project or Project Scheduler, and
• other packages, which are also called integrated packages.

The performance of project teams can be vastly improved by for example the use of spreadsheets. Spreadsheets provide an invaluable tool for the many aspects of financial planning and management, but also for a variety of technical aspects. They can be used, for example, to prepare cost estimates which can be constantly and instantly be updated as new information comes in. Spreadsheets can also be used for a variety of numerical modelling applications, where the effects or outcomes of different managerial decisions can be investigated.

Databases provide a useful tool for record-keeping and for those aspects of project management which utilise large quantities of data, such as store-keeping, stock and inventory control. The immediate availability of the data from the database when required by the project team, would mean that costs are cut and time is saved. The quality of the information normally is also very high.

Word-processors provide a major facility for project teams in their role as communicators. Indeed, it normally is a word-processing program that is the first to be installed on a project manager's computer. The compatibility between systems and different word-processing programs proved to be a problem up to a couple of years ago. With the new technology, this is not the case any more.

The value of the Internet and electronic mail should also not be underestimated. The access to a large variety of information via the Internet make the task of the project manager and team so much easier. It is far quicker and cost a lot less to do a search on the Internet for applicable and appropriate information, than to spend days and weeks to try and collect it yourself. The fact that basically any information and documentation can nowadays be transferred between computers by using electronic mail is another major advantage for the project manager.

Electronic mail, or e-mail as it is generally known, provides a quick and inexpensive service which should be utilised by the project team. Messages and information can be mailed to the members of the project team if they are situated in different remote locations. This would allow them to access the information, like database information, and immediately start working on it on their personal computer, wherever they are.

It is therefore clear that the use of information technology can and does benefit project teams and organisations alike. The performance of project teams should consequently improve as a result of using the correct hardware and software. Two important components of project management, namely time and cost, will be significantly saved by applying project management technology.
CONCLUSION

The advantages of using information technology in managing projects, whether they be for socio-economic upliftment and development of a community, or for strategic change within an organisation, cannot be denied. The technological age we are living in will become even more technological. It is therefore imperative that the project organisation, manager and team will also be affected at some stage.

Technology for project management includes a wide variety of software packages. One should, however, not forget the appropriate hardware which is in fact the basis of the technology. Without the necessary hardware, the most impressive software package will mean nothing to the project manager.

The impact of technology on the project manager and team is a given fact these days. The moment technology is used in managing a project, the stakeholders will be able to spend more time on aspects of the project other than the often monotonous administration thereof. Project management technology can make the life of a manager a lot easier, if it is used correctly. It is important that the organisation or individual(s) involved take all the requirements and needs of the project(s) into account when deciding to acquire specific technology, whether it be hardware or software.

The management of multiple or complex projects is a topic on its own, and in this chapter we only touched on the very broad aspects thereof. The fact is that the project or programme manager can apply project management technology with great success when dealing with a project portfolio.

The future of project management is very bright. When considering the great impact project management had and is still having on the public sector in South Africa, one cannot help but to wonder what the next century holds with regard to project management for strategic change and upliftment!