TRANSFORMATION IN THE GLASS INDUSTRY:

THE IMPACT OF NEW TECHNOLOGY ON EMPLOYMENT

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A thesis submitted to Technikon Witwatersrand (University of the Wales), in fulfillment of the requirements for the degree of Master in Business Administration.

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DATE: JULY 2000
I declare that this thesis is my own unaided work. It is submitted for the degree of Master of Business Administration in the Witwatersrand Technikon (University of Wales). It has not been submitted before for any other degree or examination in any other university.

[Signature]

[University of Johannesburg Logo]
To my wife Anesha and children, Cody, Kelly and Alex for their support and patience.
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CHAPTER ONE

1.1 BACKGROUND

The glass industry has transformed significantly in the last five years. The advent of new technology in the improvement of the production process resulted in a significant reduction in labour usage. As a result of this, the workforce that was required to handle this advanced technology had to have the required skills. The unfortunate part was that the majority of the workforce that was currently employed did not have the required skills and educational levels.

The Glass Industry, prior to the nineties, was very labour intensive. Illiteracy amongst employees was rife, and skills levels were very low. This situation did not matter at the time. The main reason for the advancement in technology within the Glass Industry was that the global business arena was changing rapidly, and “yesterdays technology was no longer relevant today”. With South Africa regaining entry into global markets, competition was tough, and it would have been impossible to effectively compete against global international markets with inferior technology. In order for the Glass Industry to survive and maintain sustainable advantages, fast learning and continuous improvement had to be a norm. New standards and radical strategies were demanded. The Glass Industry had to transform from a reactive industry to a proactive industry. Firms had to start working hard at developing ways of managing and developing people, new organisational structures, a new understanding of technology and above all, new kinds of leaders (Manning, 1991).

The Glass Industry in South Africa continually uses international Glass Industries as benchmarks. One of the critical areas that is monitored on a regular basis is the number of people that are employed per glass container.
manufacturing machine. The South African ratio is much higher than that of their international counterparts. One of the reasons behind this state of affairs is that there is an assumption that South African employees in the Glass Industry have lower educational qualifications and lower skills levels, hence more employees are required in South Africa and fewer employees are required internationally to perform similar tasks (Stoltz, 1999).

Many debates have surrounded this topic in the South African Glass Industry in the last five years.

1.2 AIM

The aim of this research is to investigate what problems were experienced by both employers and employees when new technology was injected into the organisation.

New technology can be defined as technology that has never been used in the Glass Industry previously, and is a replacement of old equipment in the production process.

Employment flexibility is defined as using labour atypically, for example multi-skilling, use of contract labour and use of temporary labour.

1.3 RESEARCH OBJECTIVES

1.3.1 To examine current trends used in making employment more flexible.

1.3.2 To analyse management strategies with regard to restructuring.

1.3.3 To analyse the relationship between lean manufacturing and new technology.
1.4 DEFINITION OF CONCEPTS

1.4.1 Transformation

To change something in a way that alters its shape or form so fundamentally that it is turned into another entity. It is usually a deliberate action with the aim of creating something better, better looking, better working, more usable and more valuable.

1.4.2 Glass industry

An industry that manufactures glass containers commercially on a large scale.

1.4.3 TQM

Total Quality Management (TQM) is a large-scale systems change in an organisation. TQM is seen primarily as a change in an organisation's technology - its way of doing work. In the human services, this means the way clients are processed - the service delivery methods applied to them. TQM is in fact also a change in the organisation's culture- its norms, values, and belief systems about how organisations function. It is also a change in an organisation's political system: decision making processes and power basis. For substantive change to occur, changes in these three dimensions must be aligned. TQM as a technological change will not be successful unless cultural and political dimensions are attended to as well (Gummer and McCallion, 1995).
1.4.4 JIT

Just in time (JIT) evolved as a simple method of inventory control, that is linking the supply of parts to demand for them in the factory in such a way as to facilitate rapid switching between different final products. A simple idea perhaps, but JIT contributed greatly to Toyota's competitive success because it helped to massively reduce changeover times between models – one of the more costly exercises in production engineering (Unterweger, 1992).

1.4.5 COSATU

Congress of South African Trade unions.

1.4.6 Forming machine

This is a machine that manufactures glass containers at high speeds and in large volumes.

1.4.7 Melting Manager

A manager in charge of the furnaces that are used to melt raw materials to make molten glass.

1.4.8 Functional flexibility

Refers to the adaptability and mobility of employees to undertake a range of tasks, including multiskilling, and job rotation.

1.4.9 Numerical flexibility

Refers to varying the size and structure of the workforce in response to changes in the level and pattern of demand.
1.4.10 **Temporal flexibility**

Involves various patterns of work hours, shift systems, part time work, homeworking and temporary work.

1.4.11 **Wage flexibility**

Includes a shift towards individualised and team based pay with variability based on performance.

1.4.12 **Lean manufacturing**

Performance improvement by eliminating unnecessary steps, aligning process steps in continuous flow activities, recombining labour into cross-functional teams, continuous improvement methods to develop, produce and distribute products with less human effort, space, tools, time and expense (Horwitz and Franklyn, 1996).

1.4.13 **Flexitime**

Generic term for flexible scheduling formats permitting flexible work hours within limits set by the employer and still requiring a standard number of hours.

1.5. **LIMITATIONS**

This research will be limited to Consol Glass limited only.

1.6. **VALUE OF THE RESEARCH**

This research will provide valuable and important background information on current trends of industry restructuring and management strategies. Such information could be used to re-examine restructuring and strategic intentions
and re-align them if necessary. It will also provide useful information that could be used when injecting technology into an organisation.

1.7. METHODOLOGY

The triangulation research method will be used. The research will be conducted in two companies in the Gauteng area. Individual in depth interviews will be conducted with shop floor employees, supervisors, middle management and senior management. Questionnaires will also be administered to senior management.

1.8. RESEARCH REPORT

This research report comprises of five chapters. Chapter two covers the literature review. It looks at various authors and what are their views regarding the topic that is being researched.

Chapter three discusses the methodology that was used to do the research. It also discussed how the research was done and who were the target people.

Chapter four discusses the findings of the research. It also compares the findings to what literature has to say about the topic.

Chapter five discusses recommendations that have been arrived at from the research findings. A conclusion is also part of this chapter.
CHAPTER TWO

LITERATURE REVIEW

2.1 TECHNOLOGY

2.1.1 Introduction

The introduction of new technology in organisations is often accompanied by a number of assumptions. Some of these assumptions are that new machinery or technology will threaten jobs, skills or the way work is performed. In the early eighties, for example, many employees were concerned at the effect of new information technology on employment. Management, on the other hand, had high expectations with regard to new technology and expected to reap significant productivity gains. In the United States, however, despite massive investment in Information Technology, productivity gains have been elusive and overall productivity has fallen (O’Sullivan, 1994).

This thesis will focus on the impact that new technology has had on employees. It will also propose a process and guidelines for the more effective introduction of new technology. The central theme of this thesis is that technology on its own does not deliver productivity improvements, economic efficiencies, improved working conditions, more efficient labour, or anything else for that matter. Technology only has an effect through people and it is the manner and process in which technology is introduced into organisations that is of vital importance. Technology also has important implications for the way work is organised, skill requirements, the way people are managed and the structure of the organisation (O’Sullivan, 1994).

Simply layering new technology onto existing organisational arrangements will not lead to real benefits. It is for this reason that new technology should be accompanied by a process that takes account of the total impact of the change.
Business performance has always been contingent on new products, process and ways of organising that lead to improved competitive advantages.

The theory, especially for new technology, always looks exciting and promising. New methods or equipment are almost always sold as the panacea to management problems. The reality, however, has proved to be very different. A major study in the USA found that the difficulties of introducing new manufacturing equipment frequently result in productivity losses equal to or exceeding the original cost of the equipment and that disruption can persist for two years or more. For some organisations, especially those in a highly competitive market, this disruption may prove to be fatal. In South Africa it is important to take cognisance of this, given that the country is under pressure to remove the buffers that have protected some of our industries from competition. Some organisations may conclude that being labour-intensive is the route for competitive advantage, but for others, the need to change the technology employed will be an imperative (O'Sullivan, 1994).

The task facing these organisations is to reap the benefits of the technology in as short a time as possible, as failure to respond adequately and to implement new ways of doing things could mean the end of a business. For these organisations where the introduction of new technology is imperative, the question is: What can organisations do to optimise the benefits of technology in as short time as possible? (O'Sullivan, 1994)

In order to develop guidelines, it is always useful to examine the experience of others. The first point is that technology cannot be viewed in isolation from the rest of the business. Morton (1991) developed a model (called the MIT 90s framework) which views organisations as comprising five sets of forces in “dynamic equilibrium” among themselves, even as the organisation is being subjected to pressure from external influences. The task of central Management is to ensure that the organisation – that is, all five forces – moves through time to accomplish its objectives. This framework is illustrated below.
Clearly a change in technology has an effect on other forces in the organisation. The research conducted by MIT indicated that organisations need clarity of purpose and vision, but that the three forces of structure, management processes and individuals/roles are critical in the transformation process. The MIT study found that one root cause for the lack of impact of IT on the improved economic performance of organisations is an organisation's unwillingness to invest heavily and early enough in human resources. New technology often changes the way people work and can be very threatening to all employees – at all levels of the organisation. This can have significant effects on morale and motivation, with consequent negative implications for productivity – and this fall in productivity may even start before any new capital investment have been made (Morton, 1991).

If technology is introduced, careful consideration has to be given to the following:

➢ How to ensure individual and group psychological ownership of the change process.
➢ What new skills will be required; and how these concerns will be addressed.
In addition to the above, changes in technology have numerous implications, including:

- Job design
- Work team structure
- Compensation and appraisal
- Management organisation
- Selection and training

Without integrating the introduction of technology with other organisational processes, it is unlikely that the organisation will benefit. This proposition is supported by hard evidence. Whipp (1994), in his study of management of technological changes, concluded that one of the essential skills of management in any technological change is to match the product, production and people.

Morton (1991) examined the impact of information technology on organisations and compared a number of automobile plans along two axes - a technological axis and a “human resources practices” axis. The plants that invested hundreds of millions in technology, but neglected to adopt suitable human resources practices did not receive the same returns as those plants which made moderate investments in technology, but which employed more sophisticated human resources practices. He emphasises that change can be extremely threatening and that a great deal of investment is required for it to be effectively implemented. For this reason, there has to be investment in new skills, psychological ownership of the change process and a safety net under the employee so that there is no fear of risk taking.

Morton (1991) found that automobile plants that had the best quality and productivity records were those that integrated human resources strategy with technology strategy. The research indicated that policies that develop workforce skill, motivation and flexibility and that promote continuous improvement are seen as critical to the effective use of technology.

All of the above raises the question, what should an organisation actually do to effectively introduce new technology? (O’Sullivan, 1994).
The question is simple but, as is always the case, the development of a comprehensive approach is complex – factors such as collective bargaining arrangements, organisational strategy and organisational culture all have to be considered. The guidelines below are just that, and are not meant to be prescriptive.

They assume that the approach taken by management is one that seeks to involve employees in the process of change and that management approaches this change in a holistic fashion, by considering the total impact of the change on the systems and processes in the organisation – the evidence point to this route as being the most effective (O'Sullivan, 1994).

2.1.2 **A Methodology for technological change**

A lot has been written about planned change in organisations. The difficulty is that one only begins to understand an organisation when one wants to try to change it. This does not mean that one should not try to plan beforehand or to anticipate the effects of the change, but rather that one should be prepared for and iterative, learning process and that the approach used should be robust enough to adopt to unforeseen consequences of the change effort. Methodologies should never be seen as complete in themselves - the process that one uses in applying the methodology is of even more importance.

In other words, how the methodology is applied is of critical importance – the values implicit in the methodology must be reflected. O'Sullivan's (1994) change methodology proposed below consists of five stages – clarification stage, analysis stage, transition planning stage, transition management stage and the evaluation stage. Each of these stages has certain outputs and there are various tools and techniques that can be used in developing these outputs. The goals and content of the stages are: -

2.1.2.1 **Clarification**

The goal is to develop informed commitment with project sponsors. At this stage it is vital that sponsors have a realistic understanding of the implications of the change, as
without this knowledge planning for the change will be inadequate. Work at this stage will consist of assessing the organisations’ capacity to achieve change objectives and determining what strategies need to be followed to realise change objectives.

In the clarification stage one would need to perform activities such as sponsor mobilisation, change readiness assessment, organisational effectiveness assessment, developing a transition strategy and initial communication (O’Sullivan, 1994).

2.1.2.2 Analysis

During this stage a transition council is formed to oversee the stages of the change process. Change teams also need to be formed and these teams will perform tasks such as “enablers and barriers” analysis. Communication activities should also be performed in order to assess change constituencies and communication effectiveness (O’Sullivan, 1994).

2.1.2.3 Transition Planning

The objective of this stage is to create a plan to manage the human aspects of the transition stage towards the desired future state of the organisation. At this stage the key activities are identified that will need to be performed if the desired future state is to be achieved. The analysis of the clarification and analysis stages need to be synthesised (O’Sullivan, 1994).

2.1.2.4 Transition Management

This stage ensures that the processes and plan necessary to manage the human aspects of change are successfully implemented over time. It is during this stage that the strategies and tactics developed in the transition planning stage are implemented and monitored (O’Sullivan, 1994).
2.1.2.5 Evaluation

The purpose of this stage is to determine if the human and technical objectives have been attained on time and on budget. Action is also taken at this stage to sustain the change and to identify any new initiatives and any of the learning's for the organisation. This methodology needs to be supported by a comprehensive range of tools, techniques and skills. According to Sullivan, 1994 it should also be emphasised that the stages do not start and end neatly in real life and often does, however, increase the chances of successful implementation of new technology, as its key features are:

- A comprehensive planning process resulting in a vision of the future and sponsor commitment with realistic understanding of what is required for a successful change;
- A participation of the change process by employees;
- A plan for the change to be managed and monitored; and
- Evaluation of the change, resulting in learning for the organisation.

2.2 ORGANISATIONAL RESTRUCTURING

The ways in which tasks are divided, activities co-ordinated and decisions taken within organisations are the basic building blocks for Management. Organisational structure, to use, the shorthand to describe what is involved is often ignored. In McKinsey's famous "7 S Framework" (Pierce and Robinson, 1997), for example, structure is deemed to be only one of seven factors that make for effective management. It is also seen as part of the "cold triangle", along with strategy and systems, rather than the "warm square" of style, skills, staff, and subordinate goals. Apart from its intrinsic importance, the particular reason for the focus is that major changes are taking place in the structure of organisations.

Two critical considerations arise when restructuring the organisation to emphasise and support strategically critical activities. First, managers need to make the strategically critical activities the central building blocks for designing organisation structure.
Those activities should be identified and separated as much as possible into self contained parts of the organisation. Then the remaining structure must be designed so as to ensure timely integration with other parts of the organisation (Pierce and Robinson, 1997).

While this is easily proposed, managers need to recognise that strategically relevant activities may still reside in different parts of the organisation, particularly in functionally organised structures. Support activities like finance, engineering or information processing are usually self contained units, often outside the unit around which core competencies are built. This often results in a emphasis on departments obsessed with performing their own tasks more than emphasising the key results (customer satisfaction, low costs and speed.) the business as a whole seeks (Pierce and Robinson, 1997).

The second consideration is to design the organisational structure so that it helps co-ordinate and integrate these support activities to (Pierce and Robinson, 1997):

- maximise their support of strategy – critical primary activities in the firms value chain and,
- Does so in a way to minimise the costs for support activities and the time spent on internal co-ordination. Managerial efforts to do this in the 1990’s have placed re-engineering, downsizing, and outsourcing as prominent tools for strategists restructuring their organisations.

2.2.1 Primary organisational structures

According to Pierce and Robinson (1997:340-345) matching the structure to the strategy is a fundamental task of company strategists. To understand how this task is handled, the organisation must first review five basic primary structures. Th organisation must also look at the guidelines required for matching structure to strategy.

The five basic primary structures are:

- Functional organisation
- Geographic organisation
2.2.1.1 Functional Organisational Structure

Functional structures predominate in firms with a single or narrow product focus. Such firms require well-defined skills and areas of specialisation to build competitive advantages in providing their products or services. Dividing tasks into functional specialities enables the personnel of these firms to concentrate on only one aspect of the necessary work. This allows use of the latest technical skills and develops a high level of efficiency. Product, customer, or technology considerations determine the identity of the parts in a functional structure. A hotel business might be organised around housekeeping, the front desk, maintenance, restaurant operations, reservations and sales, accounting and personnel. An equipment manufacturer might be organised around production, engineering/quality control, purchasing, marketing, personnel and finance (Pierce and Robinson, 1997).

The strategic challenge presented by the functional structure is effective co-ordination of functional units. The narrow technical expertise achieved through specialisation can lead to limited perspectives and to differences in the priorities of the functional units. Specialists may see the firm’s strategic issues primarily as “marketing” problems or “production” problems. The potential conflict among functional units makes the role of the Chief Executive critical. Integrating devices (such as project teams or planning committees) are frequently used in functionally organised firms to enhance co-ordination and to facilitate understanding across functional areas (Pierce and Robinson, 1997).

2.2.2.2 Geographic Organisational Structure

Firms often grow by expanding the sale of their products or services to new Geographic areas. In these areas, the frequently encounter differences that necessitate different approaches in producing, providing, or selling their products or services. Structuring by geographic areas is usually required to accommodate the differences.
Thus, Holiday Inns is organised by regions of the world because of differences among nations in the laws, customs, and economies affecting the lodging industry (Pierce and Robinson, 1997).

The key strategic advantage of geographical organisational structures is responsiveness to local market conditions.

2.2.2.3 Divisional organisational structure

When a firm diversifies its products/service lines, utilises unrelated market channels, or begins to serve heterogeneous customer groups, a functional structure rapidly becomes inadequate. If a functional structure is retained under these circumstances, production managers may have to oversee the production of numerous and varied products or services, marketing managers may have to create sales programmes for vastly different products or sell through vastly different distribution channel, and top management may be confronted with excessive co-ordination demands. A new organisational structure is often necessary to meet the increased co-ordination and decision making requirements that result from increased diversity and size, and the divisional organisational structure is the form often chosen. A divisional structure allows corporate management to delegate authority for the strategic management of distinct business entities – the divisions. This expedites decision making in response to varied competitive environments and enables corporate management to concentrate on corporate-level strategic decisions. The divisions usually are given profit responsibility, which facilitates accurate assessment of profit and loss (Pierce and Robinson, 1997).

2.2.2.4 Strategic business units

Some firms experience difficulty in evaluating and controlling the operations of their divisions as the diversity, size, and number of these units continue to increase. Under these conditions, a firm may add another layer of management to improve strategy implementation, to promote synergy and to gain greater control over the firm's diverse business interests. This can be accomplished by creating groups that combine various divisions (or parts of some divisions) in terms of common strategic elements. These
groups, commonly called strategic business units (SBU’s) usually are based on independent product-market segments served by the firm (Pierce and Robinson, 1997).

As companies grow, they often adopt a new structure from among alternatives that have been described as a way to help them manage complexity brought on by growth. The SBU structures main value appears to be that it provides a way for the largest companies to regain focus in different parts of their business that were central to earlier success yet which became “lost” or dysfunctional in the complexity and size brought on by companies success (Pierce and Robinson, 1997).

2.2.2.5 Matrix Organisation

In large companies, increased diversity leads to numerous product and project efforts of major strategic significance. The result is a need for an organisational form that provides skills and resources where and when they are most vital. The matrix organisation has been used increasingly to meet this need.

The matrix organisation provides dual channels of authority, performance responsibility, evaluation, and control. Essentially, subordinates are assigned both to a basic functional area and to a project or product manager. The matrix form is intended to make the best use of talented people within a firm by combining the advantages of functional specialisation and product-project specialisation (Pierce and Robinson, 1997).

The matrix structure also increases the number of middle managers who exercise general management responsibilities (through the project manager role) and, thus, broaden their exposure to organisation wide strategic concerns. In this way, the matrix structure overcomes a key deficiency of functional organisations while retaining the advantages of functional specialisation (Pierce and Robinson, 1997).

Although the matrix structure is easy to design, it is difficult to implement. Dual chains of command challenge fundamental organisational orientations. Negotiation shared responsibilities, the use of resources, and priorities can create
misunderstanding or confusion among subordinates. These problems are heightened in an international context with the complications introduced by distance, language, time and culture. To avoid the deficiencies that might arise from a permanent matrix structure, some firms are accomplishing particular strategic tasks, by means of a “temporary” or “flexible” overlay structure (Pierce and Robinson, 1997).

2.3 TECHNOLOGICAL TRANSFORMATION

Technological transformation is the most important feature of an organization’s product, process and system innovations. A continual increase in the development of technology coupled with the invasion of technology into the area of information systems has created new threats for firms and industries, with new opportunities for gaining competitive advantage (Porter and Millar, 1985). That greater attention to technological change is needed by those who formulate strategies is well illustrated by the decline in the relative importance of Western economies over the last quarter century (Abernathy, Clark and Kantrow, 1983). Among many such commentators, Rothwell (1980) suggests that poor Managerial skills in technological development and innovation have contributed to Britain’s declining competitive performance. The extent of the challenge is demonstrated by Tushman and Anderson (1986), who investigated the transformation brought about by technological development in industries as diverse as locomotives, fountain pens, cement and airlines.

Historically the link between technology and the organization has been interpreted as a stable ratio between capital and labour, which changed rarely, and only in quantum leaps.

The study of innovation and of Research and Development has been a specialised field, somewhat remote from business economics (Clarke and Thomas, 1990). Whilst intrinsically useful, these approaches offer limited guidance when the issues of strategic Management are addressed.

Studies of strategic Management emphasise its nature as a continuous process of identifying and resolving the strategic dilemmas that face the organisation. Some of
these dilemmas arise from the nature of the organisation’s environment. Therefore, it is useful to examine how changes in technology affect both new and existing industries. Mature industries can be threatened by technological development that undermines the continued existence of their boundaries. New technologies can also create new boundaries as in the communications and computing industries. Technological development is multifaceted in its ability to destroy or enhance existing productive competences and to affect consumer tastes and requirements (Clarke and Thomas, 1990).

There is a clear need for and enhanced framework to explicate the strategy–technology link; only moderate progress has been made since Kantrow (1980) pointed out that the overwhelming fact of the matter is that the most basic categories and terminology of technological strategy has not yet been satisfactorily determined.

Technological innovation can be considered from at least three perspectives (figure 2.2) on page 20. Whilst these perspectives are related, the nature of the links are relatively unexplored. Most studies have adopted one primary perspective, with a predominance of work in (A) and (B), which are, however largely deterministic in the way the assumed technological change influences the firm. Such a view is limited, since the application of technologies and the development of technological positions are, in the final analysis, managerial choices. This poses the question of how these choices are reached – process perspective (C) (Clarke and Thomas, 1990).

(A) Technological Development as an "Exogenous" Process

(B) The impact of technological development on Firm and Industry structures

(C) The Process by which organisations formulate and implement strategic technological change

Figure 2.2 Technological Transformation
Technology and technological development create pervasive pressures for change. This has always been so, but recent experience indicates more acute problems in coping with their effects on organisational design. However, much research examining technological change has adopted the viewpoint of the “external” analyst rather than that of the practising manager, and has been largely contextual in nature. Much research has also focussed on the aggregated process (e.g. at the industry level) of diffusion rather than at the level of the adopting and implementing firm (Clarke and Thomas, 1990).

2.3.1 Technologically environment and industry structure

Various approaches have examined how technology shapes and industry sector and thereby affects the strategic alternative open to the firms competing in it.

Porter (1983), in an extension of the basic five-forces model of industry structure offered a framework for understanding the technological forces that shape an industry. He discusses how technology influences the five competitive forces (that is, competitive rivalry, threat of entry, threat of substitution, bargaining power of suppliers, bargaining power of customers). For example, entry barriers may be raised by a technology’s impact on economies of scale or switching costs. Alternatively, a novel technology can enable competitors to overcome existing entry barriers. Michilins’ superior radial tyre technology is an example that allowed it to leap frog competition and overcome distribution and advertising scale barriers in the USA, but technology has probably had its strongest influence in the area of potential and actual substitution. The use of calculators in place of slide rules is an obvious example.

Pavitt (1984) argued that industrial groupings have broad sectoral regularities, which may be articulated in “technological trajectories”. In his study based on 2000 “successful” U.K. innovations, firms were classified into three types: supplier dominated, production intensive and science based. Systematic differences were shown to exist across sectors in terms of the source of technology, user requirements (such as price or product performance), and the means by which technological benefits are appropriated by designers or by their customers.
2.3.2 Managerial dilemmas in technological innovation

When technological innovation take place it is important to examine the relationship between technological change and strategy formulation. To what extent is an organisation's technological environment traceable and predictable? What dilemmas do the technological environment produce for and organisation? By what process and/or structural arrangements are such dilemmas perceived, interpreted and resolved within it?

An effective technological strategy both creates and renews an organisation's technological base and appropriates the benefits deriving from that base (Clarke and Thomas, 1990). But how? A number of authors characterise effective technological strategies in terms such as offensive-defensive (Freeman, 1982), technological leadership-followership (Porter, 1983) and first-to-market, second-to-market (Maidique and Patch, 1982). Porter (1983) explored the conditions under which technological leadership is preferable to followership (and vice versa) by focussing on the competitive advantage to be gained via these alternative strategies.

2.3.3 Change and the individual

Technological change has a significant impact on the individual. The individual, in turn, can affect the success, or not, of that technological change. Transition curves have been used, or possibly underused, in assessing this individual/technology change interface. Alternative representations of the transition curve and seek to find which best suits the needs of the change agent will be looked at. Transition curves can be used in assessing and/or identifying self-esteem, motivation, performance, learning and stress.

The role of the individual in the change process, especially when major technological and long-term changes are required, is often the part of the process that is ignored.

At best, the issues involved have been addressed retrospectively by dealing with the problems. The individual needs to be looked at in a more proactive manner. Much
has been written on the process of change implementation and these often consider ways to deal with both organisational and individual resistance — the symptoms of change. However, the individual behaviour should be predictable at various parts of the change process and efforts should be made to identify how each person is responding to that process and how far along the required path they have travelled (Walker, 1998).

2.3.4 The generic transition curve

In many areas of study, perhaps most commonly associated with the process of bereavement, there is the understanding that the individual is in a process of transition, i.e., one thing is ending and another is beginning. This is a point made in much of the change literature. (Scott and Jaffe, 1989; Woodward and Bucholz, 1987) The difficult job for the manager is to identify how each individual is dealing with the change and take the appropriate actions at the appropriate times. One tool, the transition curve, is designed to help in the identification of where the individual is in terms of their personal response. Figure 2.3 on page 24 comes from Scott and Jaffe (1989) and is referred to as the transition grid (Scott and Jaffe, 1989).

This tool now allows us to identify where people are on the grid, by asking questions designed to probe into the psychological state. It also allows us to manage the situation more effectively. During the denial stage the focus is on both the external environment and the past. Behaviour is identified by numbness or apathy and an assumption that the changes will not happen or not affect that individual.

In resistance the emphasis is still on the past but the reactions of individuals become stronger and more active. There are feelings of anger and rejections and many individuals may refuse to take an active part in the change process. The emphasis only switches to the future during the stages of exploration and commitment. How often the resistance stage of the change process is spent persuading the workforce of the bright new future? This grid could have told us that the individual concerns lie firmly in the past with themselves as the main focus of interest. A phrase which sums up the mistakes made at this stage would be: Intellectual understanding does not equal emotional acceptance (Woodward and Bucholz, 1987).
In the exploration stage the individual is now prepared to take on board the new changes but may be finding the adjustment difficult. Some of the reactions may appear similar to those in resistance, as the individual can become frustrated at the lack of accomplishment. Finally the commitment stage is reached and new norms are established.

2.3.5 Modification to the generic transition curve

Attempts have been made to extend the use of the transition curve (Figure 2.4) on page 24 (Wille, Edgar and Hodson, 1991).

Whether this actually helps in managing the individual during change is for each manager to decide. Is managing four phases well better than getting seven phases wrong? However it does introduce an important concept that will be returned to: self-esteem. It also seems to be making an attempt to give the relative lengths of different phases, although again these are only relative and will depend on:

- The nature of change.
- The individual
- The history of change management in the organisation.

2.3.6 The coping cycle

From the extension of the use of the transition curve has come a further development, the coping cycle (Figure 2.5) on page 26, (Carnall, 1995).

The coping cycle has one significant advantage over the transition curves. It attempts to plot both self-esteem and performance, which have a causal relationship but performance has a built in time lag. How many managers must have implemented major change and, as morale improves, the performance continues to remain below that anticipated?
Figure 2.3: The generic transition curve.

Figure 2.4: The extended transition curve.
This model suggests that this is natural and that persistence should ensure that the change comes right in the end – assuming all the planning and preparation were carried out initially.

Managers may get themselves bogged down in a vicious circle of failing attempts to change the culture. Each time a new concept is introduced the starting point is lower, both in terms of self-esteem and performance. The denial and defence (resistance) stages are likely to be more intense as the “seen it all before” mentality starts to take hold.

An examination of the literature on learning curves would soon confirm this view, although again the literature on the learning curve and the individual is not easily accessed. The learning organisation and methods of learning are popular in current management literature. However, the literature, once it has been found, shows the obvious similarities between the learning curve and the performance curve during the adaptation stage (Figure 2.6) on page 26, (Robinson, 1989).

This may help the organisation understand what their employees are going through (it may also help the organisation understand their own problems coping with the changes needed). Previously experienced employees with experience of the organisation are now back at the bottom of the learning curve. Too much may be expected of them too soon. They are likely to feel a lowering of self-esteem and an increase in stress if the organisation manages this stage inappropriately.

Managers can also use some of the principles of the learning curve to help plot their employees on the coping cycle. Do employees have different rates of learning? Have they hit the learning plateau?

### 2.3.7 Self-esteem, performance and stress

An investigation was done on how to improve self-esteem, as this is a major trigger for improved performance. As part of this analysis he introduces another type of transition curve (Figure 2.7) on page 28, (Carnall, 1995).
Figure 2.5: The coping cycle.

Figure 2.6: The learning curve.
Again this could represent what is going on at the start of the coping cycle, at least for the self-esteem curve. The problem in management terms is that all employees copes and responds to stress in different ways.

However, this would give and indication that in the early stages of change management should think about managing the stress associated with that change.

Motivation (often a result of High self-esteem) is also seen to have a curvilinear relationship with performance (Figure 2.8) on page 28, (Stewart, 1983).

This suggests there is an optimum relationship between motivation and performance – with too much motivation (perhaps related to over-stimulation) performance starts to decrease. Sometimes the organisation may be guilty of over-promising too much hype or too much change and the performance is adversely affected by those very techniques used to increase it.

It is also suggested that the optimum point occurs earlier for complex tasks and later for simple ones, suggesting that intrinsic motivation has a part to play. Relating this to managing individuals on the coping cycle may suggest that, despite basic instincts, the organisation should work harder on motivating those who do not want to change and let those who do want to change take care of themselves. The point here is that the organisation works harder on some but must ensure that they do not ignore the others. The organisation should also be prepared to deal with those they see as being difficult rather than focusing on those who already agree with them.
Figure 2.7: The stress curve.

Figure 2.8: The motivation curve.
2.3.8 Pain and change

Another version of a transition curve is that produced by Woodward and Bucholz, 1987) (Figure 2.9) on page 30. This adds to the picture of the individual in two ways:

- It identifies two stages of "pain" in the change process. The first is common to all individuals in the change process. Major organisational change is going to be a shock to most people and managers often respond by trying to lessen the initial impact. The "pain-time" curve would suggest that managers are wasting time. It may be that it makes employees feel better to do this — to give a lollipop with the injection, but it may actually be harmful and could prolong the denial stage identified in the coping cycle.

- The model also suggests that managers must encourage the individual to take some responsibility for prolonging the pain. The organisation needs to change their mentality.

2.3.9 Change and the marketing curve

A final use of the transition curve is in a similar representation to the marketing curve. This is known as the "commitment curve" (Figure 2.10) on page 30, (Ward, 1995).

There is one major variation from the marketing curve — the existence of people actively against what you are trying to do.

This theory adopts the concept that a critical mass is needed to change those who are passively against into passively in favour of the change. This obviously helps the waiverers decide, but is only one part of the process and should be used in conjunction with the issues mentioned previously. However, this version does have merit. It could allow managers to talk about transitions in a language, with which many people in the organisation may already be familiar, rather than the perceived psychological "mumbo-jumbo" of traditional transition curve analysis (Woodward and Bucholz, 1987).
Figure 2.9: The two stages of aftershock.

Figure 2.10: The commitment curve.
2.3.10 Summary

This literature survey has looked at a number of different approaches to the use of transition curves in the management of individual reactions to change. It has not attempted to look in any detail as to how they can be applied, but has simply looked at the differences of each approach. As response to change is an individual one, so the preference for the tools that the change manager uses is also an individual decision. Once the tool has been chosen or a personal modification developed then the change manager needs to do more research into the signs, symptoms and possible cures at each stage of the transition.

It is worth summarising some of the issues that are common to managing the individual as an individual in the process of change: (Woodward and Bucholz, 1987)

- Organisations tend to jump straight to beginnings, i.e., they look to the future, individuals initially look to the past.

- The worried people are said to have a bad attitude.

- Everyone is not at the same place at the same time on the transition curve, yet the organisation moves on monolithically.

- History is usually seen as the Golden Age, even if before you talked it down.

- Some people will still be fighting the change long after others have moved on. This can hold back the whole organisation.

With these points in mind the change manager can start to develop effective plans that deal with organisational, team and individual needs in the change process.
2.4 FLEXIBLE FORMS OF EMPLOYMENT

Flexible forms of employment refers to the use of atypical types of employment practices as opposed to typical types of employment.

A research was conducted by Horwitz and Franklin, (1996). They investigated the extent to which workplace flexibility was implemented in manufacturing organisations in South Africa. Their findings are summarised below.

2.4.1 Emphasis on numerical flexibility

Flexibility in South African organisations occurs most commonly in the numerical category, specifically through reduction in workforce size. This is indicative of recent economic conditions in South Africa. Other elements of numerical flexibility practised are the use of temporary agencies, contractors and consultants. Homeworkers and job sharing are not commonly used. Despite the claims of positive consequences for both employers and employees, job-sharing is rare, possibly due to lack of managerial interest and indifference from trade unions (Horwitz and Franklyn, 1996).

2.4.2 Temporal flexibility

The next most common type of flexibility is the temporal category, specifically in the use of shifts, part time and temporary staff. The high use of overtime in South Africa is still prevalent. On average, 30% of the workforce works regular paid overtime. In manufacturing companies using overtime an average of 36% of the workforce do regular paid overtime, with an average of 18,16 hours per worker weekly. When averaging this across manufacturing organisations – i.e. including those not paying regular overtime – this figure reduces to 4,8 hours per week. Like the use of shift work, the impact on people’s quality of life is apparently significant (Horwitz and Franklyn, 1996).
2.4.3 Functional flexibility

The use of functional flexibility is evident in methods to save labour costs, such as training new technologies and work re-organisation. But functional flexibility does not often replace numerical flexibility. These are exceptions in motor and retailing sectors. Given the high levels of unemployment in South Africa work sharing and a reduction in working time are important in policy debates about job creation. While it is expected that other flexible work practices, especially functional flexibility, are important, they require higher levels of skills, numeracy and literacy. This may limit their widespread use in South Africa in the medium term (Delsen, 1995).

There is a spread of methods used to reduce labour costs. It is not surprising that larger companies emphasise reducing labour costs. Local industry has focussed more on cost cutting through downsizing the labour force (numerical flexibility) than using other flexible work practices, work re-organisation (functional flexibility) and skills development. A consequence is declining formal sector employment, although in some sectors such employment may increase with positive economic growth (Delsen, 1995).

2.4.4 Outsourcing

Most organisations have increased the use of contractors and consultants. This is expected to continue, following global trends. Use of sub-contractors in South Africa has shown a steady expansion of around 20% since the mid 1970's. Reasons include avoidance of non-wage benefits, greater flexibility by passing costs of fluctuating demands onto the contractor, greater flexibility in hiring and firing, organisational restructuring, wage in high-risk areas, lean manufacturing and "scab" labour (Horwitz and Franklyn, 1996).

Forty one percent outsourced work previously done by core employees in the last five years. Up to 20% of the workforce consists of non-standard or peripheral workers. This is higher in retailing, hospitality and agricultural sectors. Peripheral, non-core workers are a much larger proportion of the workforce in modern economies of Europe and North America, but the trend towards a segmented labour market in South
Africa is increasing. Use of fixed term and occasional workers is expected to grow steadily. But 16% of employers, particularly in manufacturing, have in-sourced functions previously outsourced, due to efficiency, delivery, quality and labour problems in sub-contracting firms. Job security is a clear union concern. Progressive agreements formalise the concept of “permanent temporaries” who may have more career opportunities, training, similar conditions of employment to full time workers and a long-term relationship with employers. The Pick ‘n Pay agreement with SACCWU is an example. In companies such as Truworths, some part time staff are studying for industry specific qualifications. Training agreements emphasising industry portability of skills are vital for industry competitiveness and labour stability (Horwitz and Franklyn, 1996).

2.4.5 Union participation

The introduction of flexible work practices is not strongly associated with the presence (or absence) of unions. Although unionised companies generally make higher use of flexible work practices, they show little difference in their pattern of usage. While relative usage of flexible work practices is similar between unionised and non-unionised companies, unions may influence the success of implementation. An area in which significant union involvement occurs is temporal flexibility. In this case, 42% of companies with union presence indicated union involvement. Next highest was functional (23%), followed by wage (16%) and numerical (14%) flexibility. Until recently, South African trade unions have been preoccupied with the political struggle. Hence, trade union responses to work flexibility initiatives may be opposition, pragmatic scepticism or an attempt to shape the agenda strategically. There is some anecdotal evidence to suggest that the latter approach has influenced the introduction to flexible work practices. Most unionised employers consult or negotiate or jointly decide on workplace flexibility (Horwitz and Franklyn, 1996).

An issue of importance to unions is how their power base will be affected by changing practices. Most development economies have shown declining union density coincidental with increase workplace flexibility. Although changing now, unionisation increased in South Africa over the last two decades. For flexible work practices to be successfully applied in South Africa, therefore, trade unions should be
involved. The Labour Relations Act provisions on workplace forums will reinforce this. In addition modern human resources practices are more likely in larger organisations and may include a more inclusive and flexible approach to unions (Horwitz and Franklyn, 1996).

### 2.4.6 Organisation size

With increasing size above 100 employees, companies involve unions at a more meaningful level. Trade unions are often more powerful in larger organisations, where they are able to limit unilateral employer decisions. There is a relationship between organisation size and use of flexible work practices. Larger organisations may be more attuned to international developments and best practices. There may be pressures from employees within larger organisations for the implementation of certain flexible work practices. Employers may seek to simplify and "re-engineer" rigid and restrictive practices. Larger organisations may have greater numbers of skilled and knowledge workers with potential and with a need for flexibility. Smaller organisations, on the other hand, are likely to have informal practices with intrinsic flexibilities. (Delsen, 1995).

### 2.4.7 Economic imperatives

Given the country’s rapid re-introduction to the global economy and foreign competition, use of flexible work practices is important for international competitiveness of local industries. These practices may have a small impact on reducing unemployment (in the context of organisational downsizing, removal of trade barriers, protectionism and structural adjustment policies) by increasing secondary/atypical employment. The introduction and regulation of flexible work practices is likely to be a central issue for employers, trade unions and government. But the real task facing South Africa is to improve productivity and create jobs (Delsen, 1995).

Productivity improvement may have both cost cutting and skills or competency development components. An over reliance on down sizing through staff reduction is disturbing. South Africa needs to consider a widespread and comprehensive skills
and development programme funded by employees and unions, with government incentives. This offers employees the best chance of life long employment (Horwitz and Franklyn, 1996).

Negotiated economic flexibility at enterprise level is necessary, but “constructive flexibility” should concentrate on value adding and output expansion activities rather than on competition through cost reduction. Strong pressures to downsize or “re-engineer” organisations in ways that produce short term cost savings may in the long run destroy the trust and commitment needed to sustain work re-organisation innovations and flexibilities. Employers and the unions cannot ignore flexible forms of employment, but they need to minimise their adverse impact and develop constructive practices to benefit both the worker and the enterprise. Labour market reforms should be approached with humility. Over-regulation may result in rigidity and low growth, under-regulation in labour exploitation (Horwitz and Franklyn, 1996).

2.5 ‘LEAN PRODUCTION’ OR ‘MANAGEMENT BY STRESS’.

The Japanese version of teamwork is the one most heavily promoted by management. To understand how teams work in the Japanese context it is necessary to understand the whole form of work organisation.

There are several names for this, including ‘Lean Production’ and Toyota Production System. Critics also refer to this form of work organisations as ‘Management by Stress’, even ‘Management by Blame’ and ‘Management by Fear’ (Lloyd, 1994:6).

Far from introducing industrial democracy, Japanese work organisation and its impact on workers is controversial. Perhaps the best pointer in this controversy comes from the words of the designer of lean production, Taiichi Ohno, who described the principles at its heart: “If I found a job being done efficiently, I’d say try doing it with half the number of men, and after a time, when they had done that, I’d say OK, half the number again” (Lloyd, 1994:7)
Ohno was among the post-war period’s most creative production engineers. He described his ‘philosophy’ in these colourful words: “There is an old Japanese saying ‘the last fart of the ferret’. When a ferret is cornered and about to die, it will let out a terrible smell to repel its attacker. Now that’s realness, and it’s the same with human beings. When they’re under so much pressure that they feel it’s a matter of life or death, they will come up with all kinds of ingenuity” (Lloyd, 1994:7).

With this kind of confession the attempts by some consultants and academic researchers to describe lean production factories as fundamentally better places to work appear somewhat unconvincing. Rather the term ‘management by stress’, coined by other researchers more critical of lean production, could be more apt (Lloyd, 1994).

What was special about teamwork in this environment was that it contained methods that obliged workers to place their ideas about possible production improvements at the service of their employers. This is one reason so many analysts of these production methods (who do not have to work under them) portray as benevolent, even as examples of industrial democracy (Lloyd, 1994).

2.5.1 The Principles of Lean Production

Why should workers contribute to rationalising production, especially if it means harder work for them? A full answer to this question is quite complex because lean production involves interrelated principles covering management strategy, work organisation and production process design.

It is no accident that lean production emerged in a context where unions were excluded from public policy making and had no external support form central unions in their dealings with management. This may explain Japanese unions’ legendary ‘cooperativeness’ (Berggren, 1992).

At the bottom however, the key concepts are kaizen and stress. Kaizen means continuous improvement, and implies that the production system is in a state of steady
evolution. Workers contribute ideas to constantly rationalise the production process, which never settles into a finished pattern (Berggren, 1992).

Kaizen is driven by stress. This stress is achieved by removing ‘waste’, ‘excesses’ of labour (like spare time) or inventory stock, in which lurk inefficiencies and possibilities for improvement. Thus the whole production system is deliberately made more fragile, and then run very hard (‘stressed’) until it breaks down. This encourages workers to make minor changes to the production process to relieve the pressure of work intensification. The point of breakdown indicates where the production process can be redesigned and productivity improvements won (Berggren, 1992).

The obsession with ‘waste’ varies from plant to plant. In its purest form, in plants like Opel Eisenach in Germany, potential areas of ‘waste’ include management, energy costs, recyclable materials and excessive meetings. In South Africa it appears that the only ‘waste’ is at the factory floor – more particularly, workers (Lloyd, 1994).

2.5.2 Kaizen and standardised work

The idea of continuous improvements might suggest freedom to experiment and to vary work. Rather, work in Japanese factories is highly standardised, with short cycle times. Any proposed variation from standard operating procedures (SOPs) must gain management support.

Opportunities for kaizen occur most frequently when a new product or production process is ‘bedding down’. Eventually work is ‘kaizened out’, and becomes highly standardised and repetitive. This has lead some commentators to call kaizen, high-tech Taylorism (Berggren, 1992).

One of the more popular ideas among researchers about lean production is the supposed ability of workers to control and redesign their work. It is seen as a step towards industrial democracy through teams. Nothing could be further from reality.
The ‘teams’ which design the jobs usually consist of engineers, supervisors and management-chosen team leaders. This group sets out to standardise all practices in a given work area or ‘cell’ in order to produce a balanced line. Once standardised and recorded (as a SOP) the actual work team is ‘trained’ in these standardised routines and the line speed gradually increased – more commonly inventory or labour is reduced – until it is ‘stressed’ to the point of breakdown (Lloyd, 1994).

2.5.3 JIT and the ‘zero-buffer’ principle

One of the key mechanisms for applying stress is the ‘Just-In-Time’ system (JIT) or the ‘zero-buffer’ principle. Under this regime, components must arrive for assembly just in time. In other words, they must arrive at the precise moment they are required, and in the precise quantities they are to be used (Unterweger, 1992).

That is, suppliers would build and supply components in the required quantity when needed, rather than build a batch, which would be stored until needed. Orders would be relayed up the line on cards, or kanbans, rather than be orchestrated by computer from one central point. In some cases these cards are replaced with bar code reading technology, similar to that used in supermarkets to read product prices, which speeds up the ordering and communication with suppliers (Unterweger, 1992).

JIT evolved as a simple method of inventory control, that is linking the supply of parts to demand for them in the factory in such a way as to facilitate rapid switching between different final products. A simple idea perhaps, but JIT contributed greatly to Toyota’s competitive success because it helped to massively reduce changeover times between models – one of the more costly exercises in production engineering (Unterweger, 1992).

The other great advance JIT achieved was that it linked the factory to its customers much more closely – customer order ‘pulled’ through the car being built on the line. This ‘demand-pull’ system replaced the old mass production arrangement where cars were ‘pushed’ through the plant, possibly to lie idle while they waited for buyers.
Overall then, there are three advantages for management in the JIT system.

Firstly, unused inventory stock in the form of ‘buffers’ costs money. Removing them obviously lowers costs.

Secondly, when the production process is so ‘tightly coupled’ – with each stage tightly linked to the next with minimal buffers – the whole production process is ‘levelled’. In other words, the speed of production is the same for all processes, and ‘waste’ in the form of idle time is eliminated. Thus the process can be paced, making it difficult or impossible for workers to work hard for a while to build up a buffer between them and the line, and then take a break for a while.

Thirdly, since all the stages are tightly linked to each other, stressing the system to cause breakdowns indicates where the system can be improved (Unterweger, 1992).

Thus JIT is dependent on production levelling, or maintaining a constant flow of work. This eliminates opportunities for personal breaks. The system however is also highly vulnerable to disruption, since component supplies are rapidly exhausted. It is this feature of lean production that has helped it to colonise manufacturing industry, since car makers insist their component suppliers operate a JIT system, who in turn require it of their suppliers (Unterweger, 1992).

2.5.4) Exposing unused resources or ‘visual management’

Lean production aims to reveal the areas where productivity improvements can be won; where ‘waste’ can be eliminated. The production process is therefore designed to be highly visible so that potential waste – like surplus inventory or labour power – is immediately apparent to management (Lloyd, 1994).

Waste elimination often becomes an obsession. Such management often defines ‘waste’ as anything which does not add value to the product. Non value-adding activity is divided into categories: those that can be removed immediately, such as contracting out catering and security; and those that require changes to the production
process or labour organisation, such as removing maintenance workers or line management (Lloyd, 1994).

Surplus inventory is obvious for all to see on the shop floor. Since the very design of the production process seeks to prevent the accumulation of inventory buffers, managers allocate as little floor space as possible to that purpose. The Toyota Production System manual even suggests that workers should stand upright, hands by their sides and perfectly till once their tasks have been finished to reveal superfluous labour power which could be redeployed (Lloyd, 1994).

There are some technological aids to this pursuit of waste, the best example of which is the Andon Board. This is an illuminated control board, made up of a series of lights controlled by a worker, which is prominently displayed. The Andon Board indicates the degree of difficulty the worker is having maintaining the pace of production, or whether the worker has discovered any defects (Lloyd, 1994).

Typically the board has three coloured lights. Green indicates things are going okay. Orange means that some difficulty is emerging, which attracts the attention of the supervisor who may help out. Red stops the line and, needless to say, attracts attention from all quarters (Lloyd, 1994).

Management can therefore survey the whole line. Possibilities for reducing labour and intensifying work are thus readily apparent. A predominance of green lights indicates surplus labour, and some workers may be reallocated to other jobs to maintain stress. Management aims for orange lights mainly to be on, since this indicates people are working at maximum pace (Lloyd, 1994).

There are other indicators, which display the production and error rates of teams and individual workers, ostensibly under the guise of quality control. These also serve a surveillance and control function.
2.5.5) **JIT and outside suppliers**

Contrary to historical practice, lean production does not encourage competition between suppliers of the same component. It rather encourages integration of the supplier into the quality and logistical chain of the assembly plant. Reliability becomes as critical as price to a plant run on JIT principles (Womack et al, 1990).

The relationship between supplier and plant becomes more long term and complex. Often assembly plants will run extensive ongoing training plans for suppliers. Communications systems are developed to ensure the supplier meets the sometimes hourly delivery schedules that JIT requires. Because delivery will ideally be direct to the line, team workers often have to relate directly with transport contractors and suppliers. This obviously implies increased skills and responsibilities within the team (Womack et al, 1990).

Component and service suppliers are encouraged to locate closer to the final assembly plant to avoid delays through transport difficulties. Vacant land and buildings within the assembly plant are often turned over to suppliers as an inducement to relocate.

Transport companies are also integrated into the JIT process, sometimes becoming a first step in the quality assurance process by examining the items for specification before accepting the load (Womack et al, 1990).

JIT becomes optimally effective when all elements in the logistical chain are integrated into one system. One German plant manager describes them as 'system suppliers' not contractors. The increasing tendency of the industry to use sub-assemblies, such as built up dashboard units, emphasises the need for integrated work organisation throughout the logistical chain – not just within the final plant (Womack et al, 1990).

2.5.6) **Total Quality Management**

TQM is a large-scale systems change in an organisation. TQM is seen primarily as a change in an organisation's technology - its way of doing work. In the human
services, this means the way clients are processed - the service delivery methods applied to them. TQM is in fact also a change in the organisation's culture- its norms, values, and belief systems about how organisations function. It is also a change in an organisation's political system: decision making processes and power basis. For substantive change to occur, changes in these three dimensions must be aligned. TQM as a technological change will not be successful unless cultural and political dimensions are attended to as well (Gummer and McCallion, 1995).

In past Japanese practice workers' error and work rates were prominently displayed, and the offending worker, or work team, was publicly humiliated for letting the team down.

An obvious limitation to this technique in South Africa is the high levels of illiteracy and innumeracy among production workers. This would mean that the collection, processing and display of such data would remain a line management function. This defeats the purpose of the technique, particularly as the only one likely to be able to read it would be the same line management (Lloyd, 1994).

2.5.7) Assessment and reward: The Satei system

The assessment and reward system (Satei) is in many ways the glue that holds the whole thing together. In Japan individual evaluation and performance-based pay allocated at management's discretion fulfils this function. In overseas transplants, satei plays less of a role. There the major lever of management over labour is the high levels of unemployment in the regions into which the transplants are put, like Northern England, rural areas of the United States and, more recently, parts of Eastern Europe (Berggren, 1992).

In Japan the most important wage-setting mechanisms are controlled by management, which has a lot of discretion in the design of the assessment and reward system. Most of the systems reward not only seniority (as in the fabled nenko wages system) but has significant merit-based components. Merit is assessed not only in terms of productive performance (getting the job done, in terms of quality and quantity), but
also contribute to kaizen in the form of suggestions to improve the production process (Berggren, 1992).

Also, the assessment of merit takes into account such subjective factors as ‘attitude’ to one’s superiors, and ‘commitment’ to the company.

The frequency of attendance at company functions; whether one has actually taken recreational leave owing or sick leave entitlements; and most importantly, one’s willingness to work unpaid overtime for the good of the company, are important indicators of such ‘commitment’. Furthermore, satei focuses on teams and individuals, so that workers don’t get the same increase. There is a uniform firm-level wage increase, of which teams and individuals get a portion (Berggren, 1992).

Teams get a bonus or a penalty according to how they perform on various indicators of quality and quantity. Individual members of the team get a proposition of that according to how they perform. The proportions (at least in one plant studied) varied from 115 to 85 percent, and therefore compound in subsequent years. This clearly has a major impact on collective bargaining for industry-wide or plant-wide wages (Berggren, 1992).

How is decided who gets what proportion? The key figure here is the team leader, an agent of management – who in Japan is quite often the trade union representative. This indicates the blurring of trade union representation and team leadership, which is part of lean production. The criterion used is basically how useful the worker has been to the achievement of company goals. Petty tyranny and the individual worker’s compliance may also play a role (Berggren, 1992).

2.5.8) Technology

An interesting aspect of lean production is its approach to new technology. Japanese plants are not, as is often assumed, at the leading edge of high technology – though they are not far behind. These plants tend to automate the higher skilled areas such as maintenance or the indirect labour of cleaning and materials handling while the direct production areas are subject to the kaizen process. As the latter tends to turn people
into human robots operating to standardised ‘programs’, the effect is broadly the same (Lloyd, 1994).

Technology is also introduced to improve the monitoring of the production process in order to increase management information and flexibility. Condition monitoring and maintenance programming are common areas for technological change primarily to replace high skilled and therefore expensive, maintenance and planning labour (Lloyd, 1994).

An executive of Nissan UK described the approach: “Technologically there are not too many secrets in the auto industry. It comes down to two things. The commitment of the people and control over the process. The standard norm is the principle – the best way of doing the job is the starting point.

The development of standardised routines for production teams as part of the kaizen process also facilitates the development of production labour saving technologies. By finding the ideal method of carrying out a manual process one is laying the basis for a future robotics programme to replace the human component. As these standardised routines rarely require substantial quantities of conventional technical skills there is little emphasis in the recruitment process on workers who possess these. This makes career development for the team member a difficult process as they generally lack the underlying technical knowledge necessary to move to maintenance or to programming of the robotics technology that has replaced their multi-tasked team function (Lloyd, 1994).

Clearly the issues of consultation and information disclosure around technological change become critical if workers are to have any chance of ensuring new technology does not further degrade their role in the production process. For management, a better trained workforce who has rights in decisions over technological innovation has the benefit of more effective exploitation of their knowledge of the production process and therefore more potential for continual innovation. Isn’t this the rhetoric of kaizen? (Womack et al, 1990)
3.1 METHODOLOGY

3.1.1 Introduction

Questionnaires were drawn up for both Managers and Employees. The reason for this was to determine if both the employee and the employer shared the same views. The methodology that was adopted, far from being a mere technical question, is an integral part of the understanding of the basic concepts of this research. These provide a de-contextualized, static and fragmented understanding of individuality, isolating worker attitudes as reactive capacities from a broader understanding of the dynamic nature of the production process, everyday interactions, and overt and covert determinants of consciousness. For these reasons structured interviews to unstructured interviews were preferred.

This research was conducted at the Consol Glass container manufacturing plants during the May and June 2000. The organisation has four plants, one in Germiston, one in Midrand, one in Pretoria, and one in Cape Town. The head office is also based in Germiston. The other Glass container manufacturer chose not to participate in the research.

3.1.2 Employee questionnaire

The research methods includes structured interviews with 20 employees who are directly involved in the production of glass containers. Workers in unskilled positions are not included. Four of the interviewees are shop stewards, three of them being senior shop stewards. Being employed in the glass industry for some seventeen years it was possible to visit the plants in different times during the period of the research, having access to all its main sections and with the possibility of talking to the employees on the lines. Each interview took approximately thirty minutes. The employees also completed a survey on training and development. The reason for the survey was to see
if there was any correlation between the answers that were given during the interviews and the survey on training and development.

The age of ten of the workers are between 35 and 49, six workers are between 25 and 30 and four between 30 and 35. Eleven workers have been in the glass industry for between 10 and 20 years, 7 for between 5 and 10 years and 2 for less than five years. By choosing to conduct structured interviews as an alternative to detailed semi-structured interviews, the aim was not to summarize workers' attitudes towards the implementation of technology in the glass industry. Instead it aimed at showing how the quality and nature of restructuring and the implementation of technology were represented in worker experiences and how these provided meanings and sense to restructuring and implementation of technology itself.

A survey was conducted amongst the employees. The intention of the survey was to see if all employees received the same attention with regard to training and development. The survey allowed employees to rate the Organisation as a whole, then to rate the department within which they work, then rate their Supervisor, and finally rate the HR/Training department. The other reason for the survey was to clarify the content of some of the survey results.

The employees were also given a questionnaire to complete. The questionnaire for the employees was based on the technological aspect of the research. The intention of the questionnaire was to investigate if the employees understood the reasons for the organisation embarking on a technological advancement. It also investigated what impact the advancement of technology had on them as employees, and what are their perceptions of the injection of new technology.

With regard to the employees, shop stewards were targeted as well as employees who were directly affected by the transformation process. The reason for targeting the shop stewards is that they are normally the "communication channel" for the majority of the workforce. Therefore they would be in a more informed position to answer the questionnaires and do the surveys.
Interviews were conducted in some cases where possible, and in other instances questionnaires and surveys were handed to employees and were returned a day or two later.

3.1.3 Managers Questionnaire

Managers were questioned mainly on restructuring and technology. The intention of questioning the managers on restructuring was to see if there was any improvement in the organisation with respect to restructuring. It was also used to investigate how was the restructuring done and what were some of the advantages of doing it in a particular fashion.

With respect to technology, the intention of this questionnaire was to investigate if proper planning was done, and if the organisation was prepared at the time when technology was introduced into the organisation. The questionnaire also investigated what impact the injection of technology had the organisation as well.

A wide spread of Managers were targeted, from Line Manager level, to Director level. Six Managers were interviewed. Seven managers chose not to participate in the interviews. The intention here was to ascertain if all managers within the different levels shared the same strategic views about the topics mentioned above. The questions were of a structured nature.

Interviews were conducted in some cases where possible, and in other instances questionnaires were handed to managers and were returned a day or two later.

3.1.4 Organisational Structure at Consol Glass

A peromnes grading system exists at Consol Glass. This grading system classifies employees into different categories. The grades range from grade one to grade eighteen, with grade one being the Managing Director and grade eighteen being the lowest level employee within the organisation, e.g. A Sweeper. Broadly speaking, grades one to four is regarded as senior management. Grades five to seven is regarded as middle management. Grades eight to eleven is regarded as highly skilled employees. Grades
twelve to thirteen is regarded as semi-skilled employees, and grades fourteen to eighteen is regarded as un-skilled employees.
CHAPTER FOUR

DISCUSSION OF THE RESEARCH

4.1 MANAGER’S QUESTIONNAIRE

4.1.1 What Changed after the Restructuring exercise

The forms of restructuring of a workplace adopted by the glass industry are not necessarily consistent with the predicaments of the “technological road”. Indeed, consistently with impressions gained from interviews with management, employees testimonies indicated patterns of worker responses which do not in all cases fit the ideological claims found in Manager’s statements. An authoritarian use of flexible technological innovation under rigid forms of work organisation is from one side, recognising the importance of human input in quality enhancement.

Managers were asked if the restructuring improved co-ordination between departments. Because managers that were interviewed were from different levels, they viewed this question from different perspectives. The good that has come out from interviewing managers on different levels as well as from different spheres, was that a broader insight was obtained to this question. One Manager’s response was as follows:

“Yes, due to the reduction in numbers at senior level, especially when the Voluntary Early Retirement (VER) programme was finalised, lower levels of management (grade 6+) improved co-ordination as fewer levels had to be navigated through to make a management decision.”

“For example, manager Forming Services was required to get involved directly with factories without having to work through the T&M direction. We also improved the culture within the organisation with the disappearance of “it can’t be done” attitudes.”
Another senior Manager’s response was as follows: -

"With the change 2 years ago the focus was on making the factory a small business unit which was totally accountable for actions and outputs.”

“The direct responsibilities + accountabilities were supported by a structure which was simple and ensured quick decision-making. The General Manager reported direct to the MD removing several layers of Head Office Management which added minimal value and slowed the decision process down. The Head Office focus was on being a support function to the factories as opposed to previously whereby Head Office made decisions and the plant simply carried them out. This effectively meant that layers of Head Office could be removed.”

This manager further stated that the results of the above were as follows: -

The decision making was at the point where it would be more effective, the Factory.
Roles and responsibilities were focused on accountability in the factory. Decision making process was quicker.

Initially a higher level of hierarchy was removed in the support function.

The support function from Head Office were evaluated against what value did they add to the bottom line? / did they justify their existence.

The above answers were obtained from two senior managers. In chapter 2.2.1.1 the concept of a functional organisational structure is discussed. It seems that this organisation redefined their areas of expertise focusing each business unit in a specific direction and with a narrow product focus. This enabled the organisation to sharpen their skills in an area of specialisation so that a competitive advantage could be built in providing their products.

The answers below were obtained from junior managers for the same questioned mentioned above: -
“In some instances it did due to the reduction of level of supervision. The Operator in Forming and the line controller in Inspection and Packaging were able to communicate better with each other, more direct communication and this facilitated the resolving of problems. In other instances, the restructuring led to some bottlenecks due to less people who were available to perform certain duties, especially on day shift and in the higher positions were people were involved in more meetings and therefore could not attend to operational problems as soon as required.”

“Only to a small extent. Departments are too much as isolated islands. There should have been more cross training done.”

It is clear from the above that different kinds of effects were experienced at different levels. In all levels it seems that the restructuring did indeed improve co-ordination between departments. It is interesting to note that in the lower levels some form of problem was experienced. One of the major problems that was experienced at senior level was that decision making was prolonged as a result of the steep levels of hierarchy that existed. It is also clear that managers who did not add value had to be removed from the communication channel as their presence was causing frustration amongst those who wanted to act promptly and get things done quickly. The comment made by one manager, "The General Manager reported direct to the MD removing several layers of Head Office Management which added minimal value and slowed the decision process down",

The fact that one manager indicates that employees had to attend more meetings and as a result they could not attend to operational problems on time is an indication that the co-ordination was not as successful in the lower levels. The response from one manager who stated, "In other instances, the restructuring led to some bottlenecks due to less people who were available to perform certain duties, especially on day shift and in the higher positions were people were involved in more meetings and therefore could not attend to operational problems as soon as required" is evident for the comment made above.

Another Manager believes that there is a training deficiency in these lower levels. It seems that although there was communication done to the lower levels with regard to
restructuring, employees either did not understand what was been said, or there was indeed a training deficiency. It seems the more senior levels were targeted for restructuring.

4.1.2 Difficulties experienced in Restructuring

When the managers were asked if they found it difficult to implement the new structures, and what sort of difficulties were experienced, if any.

Five of the six managers interviewed responded by saying that the implementation process was difficult. Below are excerpts of the answers received from two managers:-

Manager One:
"Yes, in that management (line) have not embraced change willingly as good example is the Wadeville line Controller, a concept (structure that was proposed to Operations Management then). (Manager's name) and I visited Venezuela and we could not get management to implement it. Is it because of the non-inventive syndrome, or had we not sold it correctly?"

"I also think that it was due to the management style that prevailed at that time, of not allowing enough time to implement change and it to work through the system."

Manager Two responded as follows:-
"The new structure, way of doing business, was brought about by an outside ‘change agent’ the new MD. It was difficult because:-

"In order for the change or survival of the company to be possible it had to challenge the way business was previously done."

"Removal of old way meant the removal of the 'older generation'".

"The focus of dividing the business from the coalface, the plants, as opposed to from the Head Office meant that certain people / areas felt vulnerable."
The model that is shown in chapter 2.1.1 figure 2.1 is pertinent here. It is clear that individuals and their roles as well as Management processes should be considered at great length before embarking on a restructuring exercise. There will always be resistance to change. However it needs to be as minimal as possible.

One Manager's response to the question was:-
"It was not difficult to implement since everyone affected by the change was consulted and fully briefed before implementation".

The question must be asked: "Why did this plant not find it difficult to implement the change?"

Looking at the response that was received from this manager, it is clear that communication was the key here. The fact that this plant communicated with all its employees before the implementation is the reason why it did not experience difficulties.

4.1.3 Understanding the Structure and allowing for advancement

With regard to employees understanding the structure, and if the structure allowed for the advancement of employees:-

One manager responded as follows:-

"The new structure was driven from the top. The communication of this structure not formally discussed. The resulted in a certain amount of confusion and senior person feeling threatened."

"The new structure placed the emphasis on accountability in the Plants. Sub standards, performance were not accepted or justified with excuses."

"The support from the Head Office function were focused on being more effective and efficient in supplying glass to customers. The 'political games' were reduced."
Another Manager's response was as follows:-

"I am sure that they would have had the structure change of key performance areas (KPA's) etc. explained to them. However in many cases, employees don't willingly accept the change and they try to resist the change and have to be faced to either fit in or go. However with a reduction of numbers in excess of 50% - employees quickly give the impression that they understand what is required of them."

"Advancement opportunities will be limited in a shrinking organisation, especially in the area of employment equity. Fewer levels means that fewer opportunities exist, we should however concentrate on wide spans of control and provide lateral / horizontal advancement to employees. I don't think that many people are being promoted vs previous years but we are not tracking their figures."

It is clear that different communication channels were used, hence the different answers. Once again it is evident that insufficient communication was done to the employees as is mentioned above. The fact that the manager states that the structure was 'driven' from the top is an indication the results were going to be achieved irrespective of whether people bought into the process. Also mentioned above "employees don't willingly change and they try to resist the change and have to be faced to either fit in or go". This is also clear that the organisation were intent on achieving the results even if it meant "getting rid" of people. The comment made by the manager, "However with a reduction of numbers in excess of 50% - employees quickly give the impression that they understand what is required of them" is also evident that employees had to give the impression that they understood the changes that were taking place, irrespective of whether they understood the changes that were taking place or not.

With regard to the advancement of employees it is clear that the structure does not really allow for the advancement of employees. Obviously in a shrinking organisation advancement becomes difficult. Advancement upwards may be a problem, but advancement by being exposed to broader aspects is definitely happening. This kind
of advancement is good for an organisation as it allows the employees to become multi-skilled. In chapter 2.2 some of the critical considerations that need to be taken into account when restructuring are discussed.

4.2.1 Investment in HR versus investment in Technology

Managers were asked if the Organisation's investment in technology was proportionate to the investment in human resources.

All managers indicated that the organisation did not spend enough money on Human Resources development when compared to the amount of money spent on technology. Below are some responses received:-

One manager stated:-
"No it was not. The lack of ability and training normally only becomes apparent when the anticipated benefits do not materialize".

Another manager's response was:-
"Our investment in HR was not proportionate to the investment in Technology by virtue of the fact that the installation on new Forming machine, and finished products machine was being installed and then only was trainees being trained. Very little money was set aside for technical training when the Bellville Factory refurbishment took place".

"The need for the training and development of technical personnel has however been realised and the target of 1 forming trainee (future artisan) per forming machine has been embedded. Numerous graduate engineers are being trained (but not enough). Glass Industry Millwrights and young forming technologists, Melting Managers and Quality Specialists are in training, 8 community trainees are also being developed and also few apprentice trainees".

The fact that this organisation did not spend sufficient money on training and development is an indication that there was too much emphasis on embarking on a
technological drive, and not doing a proper needs analysis of the human resource capacity.

“No. The human resource requirement was not analysed against future technology”.
“Not in totality. Still have illiterate people working on latest technology. People in first line management are not even computer literate”.
“No. We were aware that we will need a higher level of skill, but we are only now starting to react to the need. The recruitment process is underway, but some of the equipment has already arrived and the opportunity for training of our staff by the people who installed the equipment is lost.”

The lessons that will be learnt will be expensive lessons. It is obvious that the equipment is not being used to full capacity. The reason for saying this is because on manager in his response stated that the forming operators if fully trained could improve production efficiencies by one or two percent, which could result in an improved profit of five million rand. The cost of not training employees on time could be exorbitant. In chapter 2.1.1 Morton clearly states that careful consideration must be given to what new skills will be required and how this concern will be addressed. He further states that changes in technology will have numerous implications for selection and training.

It is also clear that the organisation is not equipped in terms of skills to meet the challenges of new technology. At the same time this organisation is trying very hard to get there. As one manager puts it, “The company is operating in a third world environment with first world technology. The installation of technology is far easier than upgrading the human operating and maintenance skills to make this possible.”

Illiteracy levels is obviously a problem within the organisation. The organisation will have to examine the extent of the illiteracy problem. Thereafter they will have to decide if an Adult basic education initiative will become part of the broader organisational strategy.
4.2.2 What changed once technology was implemented

A few questions were asked what had changed since the implementation of new technology:-

One manager responded as follows:-

"Yes, people have been trained, have learnt more i.e. comsoc, cold end equipment: have improved production competencies".

"Most probably as they expect greater quality, light weighting, more stringent decorating requirements."

"Yes"

"See above
• forming artisans
• Glass Industry Millwrights
• Management competence and so on."

With the injection of technology the organisation’s customers have become more demanding with respect to the quality of the products. What used to be acceptable previously is not acceptable any more. Producing glass ware with less weight is what this organisation is now pursuing. This is also a cost saving drive for the organisation. One facility had to re-look at their product ranges as well as the way they do product development.

4.3. ANALYSIS OF SURVEY CONDUCTED WITH EMPLOYEES

The survey that was done amongst the employees will now be analysed under the following headings:-

1. Analysis of the organisation in terms of its ability to encourage and foster learning in all employees
2. Analysis of the department's ability to encourage and foster learning in all employees.
3. The supervisor's capacity to encourage and foster learning in the workplace.
4. The Training/Human Resources function's ability to encourage and support learning in all employees.
E in the tables stands for Employee.

4.3.1 Analysis on the rating of the organisation in terms of its ability to encourage and foster learning in all employees

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Table 4.3.1 Rating of the Organisation

The majority of employees rated the organisation as a whole in terms of its ability to encourage and foster learning in all employees fairly high. Seven employees rated the organisation with less than fifty percent, whilst thirteen employees rated the organisation with more than fifty percent. Here again those employees who rated the organisation with less than fifty percent are "lower level" employees compared to the other thirteen. It is obvious that these "lower level" employees were not trained as there was no need to train them or that they were overlooked for opportunities within the organisation. Referring back to the data stated in chapter three, it is interesting to note that the employees who rated the organisation with less than fifty percent, are between the ages of thirty five and forty nine. These employees as a result of their age could be resisting change and hence no wanting to go on training. It could also be that there is a need to look at the individual in a more proactive manner to counter the resistance to change as is mentioned in chapter 2.3.3 and chapter 2.3.4.

What was also very striking result in this portion of the survey, was the fact that ninety five percent of the employees indicated that the Organisation does not make good use of teamwork for decision making and problem solving. The employees further indicated that Managers seem to have all the answers and that good ideas cannot come from employees. On the contrary it was found that most employees felt that the organisation believes in empowering people, and not just telling them what to do.
4.3.2 Analysis of the departments ability to encourage and foster learning in all employees.

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Table 4.3.2 Rating of the Department

Six employees scored the department with less than fifty percent, whilst fourteen employees scored the department with more than fifty percent. Two of these employees scored their departments at one hundred percent. The reason why there is such a high score here is because the departmental Managers realised that with the injection of new technology the employees were not competent enough and had to be brought up to speed quickly, or else they would have not reaped the benefits of the new technology. The reason for stating this is derived from the responses that were received from the managers. In the questionnaire to the managers, the following question was asked:

"Do you think that your Organisation's investment in Human Resources was proportionate to the invest in technology?"

All five Managers that responded to this question stated the investment in human resources was not proportionate to the investment in technology. One of the Senior Manager's response was as follows:

"Our investment in HR was not proportionate to the investment in Technology by virtue of the that the installation on new Forming machine, and finished products machine was being installed and then only was trainees being trained. Very little money was set aside for technical training when the Belville Factory refurbishment took place."

"The need for the training and development of technical personnel has however been realised and the target of 1 forming trainee (future artisans) per forming machine has been embedded. Numerous graduate engineers are being trained (but not enough). Glass Industry Millwrights, young forming technologists, Melting Managers and
Quality Specialists are in training, 8 community trainees are also being developed and also few apprentice trainees."

It is evident that the organisation did not contribute sufficiently to the development of human resources to ensure that they were equipped to meet the challenges of the new technology, hence my reasoning above. In chapter 2.3 Rothwell (1980) suggests that poor managerial skills in technological development and innovation have contributed to Britain’s declining competitive performance. It is therefore important to understand the implications of poor managerial skills when technological development can give an organisation a leading edge.

4.3.3. The supervisor's capacity to encourage and foster learning in the workplace

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Table 4.3.3 Rating of the Supervisor

Only three employees rated their supervisors with less than fifty percent, whilst seventeen employees rated their supervisors with more than fifty percent. It interesting to note that eleven of the seventeen employees rated their supervisors with more than seventy percent. One element that stands out significantly is that the employees rated their supervisors very low on the issue having agreed personal plans and taking appropriate action. It is obviously clear that although the supervisor takes cognisance of the fact that there is a need for the development of his/her subordinates to meet the challenges that has come with the transformation, it is not done in a structured manner.

There seems to be commonality amongst most employees with regard to the type of management style the supervisor has. They believe that the supervisor has an open and accessible management style. They also felt that the supervisor encourages questions about and challenges to assumptions. This obviously indicates that the supervisor adopts a participative approach. A participative approach will encourage
creative thinking and at the same time foster a learning culture amongst the employees.

4.3.4 Analysis of the training/human resources function’s ability to encourage and support learning in all employees

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</table>

Table 4.3.4 Rating of the HR Department

Seven employees rated the Human Resources department below fifty percent, whilst thirteen employees rated the HR department above fifty percent. Off the thirteen employees, only four of them rated the HR department greater than seventy five percent. From the results of the survey there is an indication that the employees are somewhat satisfied with the HR departments ability to encourage and support learning in all employees. The results also show that there is a need for the HR department to play a more meaningful role in encouraging and supporting learning in all employees. Although the supervisor is responsible for ensuring that his training departments training needs are met, the HR department is the custodian of training and development, and should be giving direction to the line functions.

4.4 ANALYSIS OF THE EMPLOYEES QUESTIONNAIRE

4.4.1 Knowing why the Organisation was advancing in Technology

Employees were asked if they understood why the organisation was advancing in technology. All twenty employees stated that they knew the reasons for the organisation advancing in technology.

It is obviously clear that all twenty employees who were interviewed were fully aware that the company was going to advance in technology. The majority of the employees felt that the reason for embarking on this technology drive was to be able to compete globally. One employee indicated that the company embarked on this technology
drive to maximise profits and have fewer people employed. This comment is viewed in a negative sense. It is true in both respects, however, the organisation was fighting for survival. If it did not embark on this technology drive, the organisation would have probably been forced out of competition and the employees that once had jobs would have been out of jobs.

4.4.2 Fears about the implementation of Technology

Fifty percent of employees feared the implementation of the new technology. All of them felt that the injection of new technology would have led to job losses. In chapter 2.3.8 the topic of “Pain and Change” is discussed. The model suggests that the individual must be encouraged to take some responsibility for prolonging the pain. Their mentality needs to be changed. It is true that the injection of technology would have led to job losses. This situation would be imminent, or else an organisation would not spend millions of rands on technology if there were no benefits in it for them, as one manager stated,' One billion rand was set aside for capital projects'. However, sufficient sensitising of employees would have been appropriate to minimise this fear. It is also noted that those employees who indicated that they did not fear the injection of new technology were those employees who were employed in highly skilled positions.

4.4.3 Training to meet Technological requirements

Fifty percent of the employees indicated that they did not receive training to meet the demands of the new technology. This is obviously in line with the response that was received from the managers with regard to the proportion of investment in technology versus the investment in human resources in chapter 4.2.1. This could have been very frustrating for the employee and demotivating as well. In chapter 2.5.1 the principles of lean production is discussed. The question is asked, “Why should workers contribute to rationalising production, especially if it means harder work for them? If all employees were adequately trained in their respective fields of expertise, then rationalising of production may not have been an issue. Seventy- percent of the employees felt that their workload increased. Technically speaking the implementation of technology should see a decrease in workload and not an increase.
If there was an increase, more people would have been required, hence there would not be any retrenchments. In chapter 2.5.8 it is mentioned that if an employee lacks the underlying technical knowledge necessary to move to maintenance or to programming of the robotics technology that has replaced their multi-tasked team function career development then becomes a difficult process.

4.4.4 Adjustment on remuneration

With regard to their remuneration, only twenty five percent of the employees indicated that their rate of pay was adjusted. Seventy five percent indicated that their rate of pay was not adjusted. There seems to be a view amongst most employees that their rate of pay should have been adjusted commensurate with the increase in the workload. However, the injection of technology should have resulted in a decrease in the workload, because manual labour would have been replaced with automation. In chapter 2.3.3 the concept of change and the individual is discussed. As mentioned in chapter 2.3.3, the role of the individual in the change process, especially when major technological and long-term changes are required, is often the part of the process that is ignored. Meetings should be held probably on a larger scale covering a wider range of employees. The aspect of wage increases could have been discussed there. This would have prevented any expectations that may have arisen amongst the employees. In chapter 2.5.7 the Assessment and Reward system is discussed. A merit system not only in terms of productive performance, but also to the kaizen approach in the form of suggestions to improve the production process should be considered. This will shift the emphasis from asking for more money for the same work being done to being rewarded for making a valuable contribution towards improving the production process.

4.4.5 Improvement on Quality

With regard to quality, eighty five percent of employees felt that the quality of the products have improved. The greater awareness amongst employees about the importance of quality has led to an improvement in quality. The employees obviously played a significant role in the improvement of the quality of the products. It is
gratifying to note that the injection of technology did lead to an improvement in quality.
5.1 CONCLUSION

The topic for this thesis was:-

Transformation in the Glass Industry: The impact of new Technology on employment.

With so much transformation intent around, what is it that causes it not to work or whose fault is it when it fails?

The following topics will be discussed, which come out from the results in chapter four.

- insufficient consensus or participation;
- inadequate understanding of the South African situation;
- not creating a powerful enough change group charged with making transformation happen;
- lack of management commitment;
- not addressing fears;
- not understanding that transformation causes pain;
- poor communication and marketing.
- Addressing skills shortage
- Insufficient consensus or participation

The transformation process needs to engage all stakeholders in the company. Union exclusion, as an example, is a sure recipe for disaster. Some type of representative transformation structure would need to be set up involving all stakeholders in the process form start to finish.

Often this is still not enough, as people left out of the structure move off onto paths or agendas of their own. Continuous checks are required to assess whether the representative structure remains representative.
Reporting into this structure would be the transformation or facilitation team whose responsibility it is to facilitate the process.

- Inadequate understanding

Transformation ideas and principles originated in Europe and then spread to the USA and Asia. As the world becomes a smaller place with more free trade, the need to become efficient and competitive is linked to and organisation's life or death. Survival has required transformation to become efficient, productive and competitive.

Parallel to that, national democracy has also established a need to make the workplace more participative and democratic.

Now that South Africa has entered the world market, it is being exposed to a whole variety of imported products and services. Transformation processes and ideas are included which are healthy when the 'world-class' objective is considered. The downside would be pushing into place transformation processes that do not fit in with the complex South African culture and environment. It is essential, therefore, to ensure that transformation processes are either South African-originated or South African-customised in real terms. There should be no assumptions made.

- Powerful change group

Transformation does not happen on its own, nor does it happen if left to line functions. Because line functions are either too busy with the 'nuts-and-bolts running of the business or are in crisis mode, a separate structure has to be created to make transformation happen.

Because transformation suggestions and recommendations are passed back to the line functions for implementation, the change group needs to be both representative (involving all stakeholder levels) and credible (having the necessary authority).
During the transformation process there should be a period where the change group is taken out of its line functions so that it can dedicate itself full-time to making transformation happen (processed and installed).

- **Lack of management commitment**

The process of transformation requires as a prerequisite strong management commitment, involvement and participation. Without it the process is neither taken seriously, nor is it given the high-level energy required to make it succeed.

Management commitment becomes meaningful when:

- the managing director is made responsible for reviewing transformation progress (quantifiable measurements are required);
- a high-level manager(s) is removed from his line position and is allocated full-time to the transformation team;
- the management team continually needs to show its support of the process, both formally and informally;
- the management team needs to interact strongly and frequently with the transformation team;
- benefits of the process to all stakeholders in the organisation need to be defined and communicated by management;
- management involves itself in the communication and marketing of the process and results;
- managers are evaluated in terms of change goals.

- **Not addressing fears**

When people in an organisation are exposed to a transformation process, they are shifted out of their zones of stability and behave in a number of different ways.

One common type of behaviour is based on fear of the unknown and job security. These fears need to be addressed by communicating as much about the process as possible and by committing the organisation to the goal of employment security.
Employment security differs to job security in that it assumes the redefinition of people’s roles and responsibilities, multiskilling and possible job reassignment.

- **Transformation causes pain**

‘No pain, no gain’ is a well-used phrase which has relevance to the transformation process.

At all levels in an organisation people are stretched, pulled from their comfort zones and required to put energy into a process where they are not quite sure of the end result. While all this energy is being invested, there will be a period where the change will be perceived negatively and result will show that things are, in fact, getting worse.

The solution to this phase of the transformation process lies in being aware that it happens and ensuring that it is managed in such a way that its duration is kept to a minimum.

- **Poor communication and marketing**

The transformation process must be communicated and marketed throughout the organisation in a planned way. Some form of action group should be tasked with this role to ensure high visibility of the process in a continuous manner.

Transformation is very much part of everyday life in South Africa. Organisations are being forced, either by legislation or market forces, to embark on this journey. Because South African managers have been assessed internationally as high on task and low on people skills, objectivity and creativity (from a human perspective) are the inputs to a successful transformation process. In the past few years, companies have become much better at managing external consultants and, providing they have the experience and South African understanding, they are the best option for facilitating a
managed, creative, objective, speedy transformation process in a people-orientated way.

- Addressing skills shortages

Transformation cannot be successful if there is deficiency in skills. There must be some form of assessment done on employees to identify what the current skill levels are, and what the required skill levels will be. Thereafter a strategy must be put in place to address this gap. In order to do this sufficient funds must be available. The organisation needs to allocate funds adequately to ensure that the skills of the employees will meet the demands of new technology to full capacity.
BIBLIOGRAPHY


Please rate your organisation as a whole in terms of its ability to encourage and foster learning in all employees:

<table>
<thead>
<tr>
<th>Description</th>
<th>Generally true</th>
<th>True to some extent</th>
<th>Not true</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management is committed to fostering learning in all employees.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>There is strong management support for self-development in all employees.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>There are many opportunities for gaining access to education, training, open learning.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>This organisation has made good provision for individual access to learning opportunities.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>This organisation encourages questioning of and challenges to assumptions.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>This organisation believes in empowering people, not just telling them what to do.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>This organisation makes good use of teamwork for decision-making and problem-solving.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Management here does not believe it has all the answers and recognises that good ideas can come from others.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Score: ____________ + ____________ = ____________

Please rate your overall satisfaction with the organisation as a whole in its Encouragement of continuous learning and development in all employees.

Excellent  Satisfactory  Marginal  Poor
Now consider your department/function's ability to encourage and foster learning in all employees.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Generally True</th>
<th>True to Some Extent</th>
<th>Not True</th>
</tr>
</thead>
<tbody>
<tr>
<td>The managers in my department are committed to fostering learning and development in all employees.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>In my department there is strong management support for self-development in all employees.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I feel I have many opportunities for gaining access to education, training, open learning.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>In my department, there is a strong emphasis on always finding ways to do things better.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I feel I personally have good access to learning opportunities.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I feel I am free to ask questions and challenge assumptions.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I feel I have the scope to take important decisions and solve problems for myself which affect my work group.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>We make good use of teams for decision-making and problem-solving.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>My manager does not believe he/she knows all the answers.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Consider your overall satisfaction with the department/function as a whole in its Encouragement of continuous learning and development in all employees.

- Excellent
- Satisfactory
- Marginal
- Poor

Total Score: [ ] + [ ] = [ ]
Consider your *Supervisor's* capacity to encourage and foster learning in the workplace.

<table>
<thead>
<tr>
<th>My Supervisor:</th>
<th>Generally true</th>
<th>True to some Extent</th>
<th>Not true</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Has an open and accessible management style.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Encourages questions about and challenges to assumptions.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Uses coaching and mentoring as a means of development.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Uses teams well to achieve decision-making and problem-solving.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Encourages the group to adopt different view points.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Allows time for reflection on how to do things better and learn from experience.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Has agreed Personal Development plans and takes appropriate action.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Listens to and takes heed of our views and opinions.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Believes in the value of developing all his/her subordinates.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Score: 


Consider your satisfaction with your Supervisors in their encouragement of continuous Learning and development in all employees.

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Satisfactory</th>
<th>Marginal</th>
<th>Poor</th>
</tr>
</thead>
</table>

Now consider the *training/HR function's* ability to encourage and support learning in all employees.

<table>
<thead>
<tr>
<th>The training/HR function:</th>
<th>Generally true</th>
<th>True to some extent</th>
<th>Not true</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Understands the real learning and training needs of my work group.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Provides the training/development we really need.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Provides access to open learning (e.g. packages we can do at home or away from the workplace.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Helps us become better or more confident learners</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Uses methods to analyse training and development needs</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Provides flexible and adaptive responses to our learning needs</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Makes good use of modern methods (e.g. computer-based training, interactive video, etc.)</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Provides a range of development options, not just courses.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Encourages feedback and constructive criticism.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• Works in a consultative, supportive manner.</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total Score:**

Consider your overall satisfaction with the training/HR function as a whole in its Encouragement of continuous learning and development in all employees.

- Excellent
- Satisfactory
- Marginal
- Poor
DEREK STOLTZ

1. **Restructuring**

   a. Did the restructuring improve co-ordination between departments.

      Yes, due to the reduction in numbers at senior level, especially when the VER programme was finalised, lower levels of management (grade 6+) improved coordination as lower levels had to be navigated through to make a management decision.

      For example, manager Forming Services was required to get involved directly with factories without having to work through the T&M direction. We also improved the culture within the organisation with the disappearance of “it can’t be done” attitudes.

   b. What was done differently after the restructuring exercise?

      Management employees were required to do more, their jobs became wider and most probably more specific and less strategic. Employees who remained have had to do more work and are busier. However occupants most probably have stopped doing some tasks that have not added value.

      Fewer meetings, less management decision groups – maybe to few.

3. Were hierarchical levels removed or added to the structure.

   - Yes – he corporate to glass structure reduced – GMD ----Glass MD ---Technical & Manufacturing director's Regional General Manager - General Manager.

   - Yes – GMD -GFD –Accounts Manager GFM – Factory FM.

   - Also within factories as well, a philosophy of wide spans of control, more qualified people to fill jobs, more meaningful jobs – However some factories still tend to create longer and have not fully embraced to concept – old school management.

4. Difficulty to implement new structure.

   Yes, in that management (line) have not embraced change willingly as good example is the Wadeville line Controller, a concept (structure that was proposed to Operations Management then Jos and I visited Venezuela about and we could not get management to implement, is it because of the non invented syndrome, or had we not sold it correctly.
I also think that it was due to the management style that prevailed at that time, of not allowing enough time to implement change and it to work through the system-

5. Did subordinates understand new structure?

I am sure that they would have had the structure change of KPA’s etc. explained to them. However in many cases, employees don’t willingly accept the change and they to resist the change and have to be faced to either fit in or go. However with a reduction of numbers in excess of 50% - employees quickly give the impression that they understand what is required of them.

6. The restructuring of Consol, has improved efficiency, i.e. tons per employees, labour cost as an % total cost, manufacturing cost per ton and so on. I can e-mail you copies of these slide if you with to include that in your Thesis.

7. Advancement opportunities will be limited in a shrinking organisation, especially in the are of employment equity. Fewer levels means that fewer opportunities exist, we should however concentrate on wide spans of control and provide lateral / horizontal advancement to employees. I don’t think that many people are being promoted vs previous years but we are not tracking there figures.

The appointments of graduates Engineers also requires in wider range that these trainees get involved in wide range of products.

Another example s that being required to handle a broader scope.

DEREK STOLTZ
TECHNOLOGY

1. Our investment in HR was not proportionate to the investment in Technology by virtue of the that the installation on new Forming machine, and finished products machine was being installed and then only was trainees being trained. Very little money was set aside for technical training when the Bellville Factory refurbishment took place.

The need for the training and development of technical personnel has however been realised and the target of 1 forming trainee (future artisan ) per forming machine has been embedded. Numerous graduate engineers are being trained (but not enough). Glass Industry Millwrights and young forming technologists, Melting Managers and Quality Specialists are in training, 8 community trainees are also being developed and also few apprentice trainees.
2. No, not done early enough, as stated above, remember the installation of the Wadeville Furnace and only realising very late that trainees / forming operators were required.

3. Yes. I do believe so, and is still having a negative effect on performance, better-trained Forming operators could expect another 1 on 2% in pbp and improve predictability by R5,0 m.

4. Not evenly equipped at the moment, but working very hard to get there. A great concern is to look at Forming personnel to take over from forming personnel who will shortly reach retirement age. However the appointment of future forming Engineer is being tackled I addressed this matter.

5(a). Yes, I think so, an acceptance not Consol glass is prepared to invest in worldclass equipment, project facelift and other improvements must improve moral and motivation or No! great equipment requires by people and causes forced retrenchment and would have a negative effect on morale------------- however gradually, I believe that the reduction of people has caused motivation and morale to decrease as employees are granually more insecure and this will effect morals.

5(b). All levels – have not been affected Management levels were the least effected (initially) but now they are being with the reduction of levels and the expectation of senior management that management must perform a F "go away"

6. When new technology was introduced into your organisation, was any consideration given to the following?

8. Individual and group psychological ownership.
   * We tried with the 20 keep process in two plants, but this was not successful because management were not capable of driving it through and were also being confused by Head Office management with flavours of the mouth being joke fed from Head Office.
   
   • The world class manufacturing skills not were required and were being taught via 20 keys, and covey – habits of higher effective people was not carried through from top to bottom.
   
   • The strategy was changed when the new management group took over of “COST REDUCTION” “IMPROVED PERFORMANCE” “IMPROVED QUALITY” “IMPROVED SERVICES” at all cost.
   
   • I believe that this focus has been correct and has added significant to the bottom lines.
7. New skills – World Class manufacturing techniques – METERICS and it is being forced down by the top - the monthly factory management reviews have been implemented as a strategy to get executive focus forced through management teams by asking questions and requiring action in the very short term, - non action by teams, a resistance to change, after counselling could even lead to termination.

7. EMPLOYEE CONCERNS

A few management feedback sessions but really enough, which led to a lot of insecurity amongst employees. My view is that we could not do both we needed to get the job done, even if painfully and now must settle down and help the survivors and this will be our next area of tours through performance counselling, development needs analysis so on.

7. We have a training skills plan that does address the elimination of skills deficiency by not clearly enough.

7. Yes, people have been trained, have learnt more i.e. comsoc, cold end equipment : have improved production

8. Most probably as the expert greater quality, light weighing, more decorating equipment.

9. Yes
See above
- forming artisans
- Glass Industry Millwrights
- Management competence and so on.

BRIAN RODGER

RESTRUCTURING

With the result change 2 years ago the focus was on making the factory a small business unit which was totally accountable for actions and outputs.

The direct responsibilities + accountabilities were supported by a structure which was simple and ensured quick decision-making. The General Manager reported direct to the MD removing several layers of Head Office Management, which added minimal value and stowed the decision process down.

The Head Office focus was on being a support function to the factories as opposed to previously whereby Head Office made decisions and the plant simply carried them out.
This effectively meant that layers of Head Office could be removed.

**RESULT**

* The decision making was at the point where it would be more effective, the Factory.

* Roles and responsibilities were focused on accountability in the factory.

* Decision making process was quicker.

* Initially a higher level of hierarchy was removed in the support function.

* The support function from Head Office were evaluated against what value did they add to the bottom line? / did they justify their existence.

4. The new structure, way of doing business, was brought about by an outside “change agent” the new MD. It was difficult because.

   - in order for the change or survival of the company to be possible it had to challenge the way business was previously done.
   - removal of old way meant the removal of the “older generation”
   - the focus of dividing the business from the rock face, the plants, as opposed to from the Head Office meant that certain people / areas felt vulnerable.

5. The new structure was driven from the top. The communication of this structure not formally discussed. The resulted in a certain amount of confusion and senior person feeling threatened.

6. The new structure placed the emphasis on accountability in the Plants. Sub standards, performance were not accepted or justified with excuses.

   The support from the Head Office function were focused on being more effective and efficient in supplying glass to customers. The “political games” were reduced.

7. The new structure was required in order for the organisation to survive. This would require the company to be more effective and efficient. This required, and still requires, both human and equipment/ machinery resources. The advancement of employees in a dynamic organisation is not based on years of experience but rather what is the effect of their input.

   The question mentions (i) development and (ii) advancement. Possibly has two different meanings in the contents of my reply.
8. With the removal of structures initially, middle management was exposed. Accountability and effectiveness was the focus whereby the actions of middle whereby the actions of middle management were viewed directly and not hidden by legacy.

TECHNOLOGY

1. No

2. No. Human Resource requirement was not analysed against future technology.

3. Yes. The benefit of technology through enchanted performance has not fully been utilised.

   Improved efficiency has been achieved to some degree as well as operating cost reduction through automation.

4. No. The company is operating in a Third world environment with first World Technology. The installation of technology is far easier than upgrading the human operating and maintenance skills to make this possible.

   Consider the basic literacy levels within South Africa.

5(a) Morale and motivation has improved. The new technology offers new challenges and the results achieved are at a higher level than previously experienced.

   (b) It is not totally consistent throughout the organisation. Supervisory levels benefit more through improved results and better understanding of the process. The lower levels have new tasks which new technology will make easier but with time will become

   (i) Nil

   (ii) Improved analytical skills

   Basic skills i.e. reading + writing

   Computer skills

   Physiological skills to deal with employees who feel threatened

   Training of employees

   (iii) The employees concern were not considered. The available workforce was initially, due to isolation, ignorant to how technology had advanced.

   When the technology was installed there was the direct threat and challenge;

   modern sophisticated technology
against

years of experience

result

- no support to ensure the new technology would be a success.
- scepticism on future intention of management i.e. – job loss

iv) there was no gap analysis provided of technology : available Human Resources.

The belief within the organisation was that new technology recommended by our technical partner would solve the poor performance of the organisation

R1 billion was allocated for capital projects. The training portion is not quoted but would possibly quote to less than 2%.

KOBUS SWART

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (FOR MANAGER)

1. RESTRUCTURING

1) Did the restructuring improve co-ordination between departments? Give examples.

1.1 Only to a small extended. Departments to much as isolated little islands. There should have been more cross training already done.

1.2 A strong emphasis on cost. Good sound decisions on market demands in rationalising of facilities. also a lot more higher stress levels on people.

1.3 At factory level a lot more than what happened.

1.4 No as it did not effected from middle management down.

1.5 It did not really effect them so it did not bother them.
1.6 In getting the goals communicated down quicken. More efficient communication no fear and job losses.

1.7 No there is no official proposals for advancement. No possible career paths/roots.

1.8 To give people exposure you must take them through a process. Allow to make mistakes but not continuously. They are not given responsibilities and measure accordingly very preventative culture.

2) What changed/was done differently after the restructuring exercise?

3) Were hierarchical levels removed or added to the structure?

4) Was it difficult to implement a new structure? If yes, what sort of difficulties were experienced?

5) Did subordinates understand the “new structure”? (I.e. reporting structures, roles, etc.)

6) Has the new structure resulted in improved efficiencies? Explain.

7) Does the new structure allow for the development or advancements of employees?

8) Does the new structure allow for middle managers to gain more exposure?

TECHNOLOGY

1) Do you think that your Organisation’s investment in Human Resources was proportionate to the investment in Technology?

1.1 No little invested in training people aspects

2) Was the investment in Human Resources (if any) done early enough? (I.e. before implementation of technology.)

2.1 Not in totality with only from a certain level. Still illegible people working on latest technology. People in first line management not even computer literate.

In your opinion, did the non-investment or late investment in Human Resources have an impact on the economic performance of your organisation? Explain. (NB. This
question must only be answered if one of the questions about investment were answered negatively.)

3) Is your organisation currently adequately equipped in term of skills to meet the challenges of new technology?

3.1 Yes, high maintenance cost of old equipment that contributed to high production losses. Only now dusty implementing plan new maintenance.

4) a) Has the injection of new technology had an impact on morale and motivation amongst employees? Was the impact at all levels of the organisation, or particular levels?

4.1 To meet new technologies high level of learning need to exist as skills is ability and to be able to develop skills, rapid changing work learning environment? needs to be created what about the level of education

5) a) Has picked up the morale?

b) At all levels

5) When new technology was introduced into your organisation, was any consideration given to the following:

- Ensuring individual and group psychological ownership of the change process (explain).
  a) Yes, the people was involved from the beginning

- What new skills would be required (explain).
  b) Problem solving
     Decision-making
     Teaching
     Leadership

- Employee concerns (explain).
  c) Yes, training and coaching was done in advance, identified.

- A plan to ensure that there was no skill deficiencies to meet the technological challenges.
7) Has the injection of technology enhanced productive competences?
   7.1 Yes, less people doing the same, more work

8) Has the injection of technology affected consumer tastes and requirements?
   8.1 Yes, there expectations level was raised?

9) Has the injection of technology resulted in you having to adjust/change your strategies? Explain.
   9.1 No. Even with the old technology we were working proactively towards as if when the new technology will be implemented.

PHILLIP MEYER

Restructuring:

1) Restructuring done within a department
2) After change, responsibilities and authorities had to be redefined into who could/should initiate changes on machine settings etc. The enhanced role of the Machine Specialist had to be "guesstimated" and implemented. Evolution still taking place
3) Level removed from the shift system. Grade 8 level on dayshift expanded, but not added.
4) Difficult implementation. Perception that the dayshift appointees are "better" than the shift supervisor difficult to change. (Different roles, different needs)
5) Structure is easy to understand. As it is still in its infancy, all details have not been resolved as yet.
6) Too early to establish improvement or not. Will need at least a 3 month period to compare sensibly
7) One of the intentions with the new structure was the development of personnel. The dayshift machine specialists gain further exposure to trials, designs and job improvement techniques. The shifts personnel are now more "exposed" with less skill on the floor. Learner SPT’s are in training to increase the skills level without increasing the headcount. Once the dayshift specialists are more confident in their roles, shift supervisors will rotate thru a shortened route to gain more technical and supervisory knowledge.
8) Not designed for that. Exposure will only come from involvement in the process.

Technology:
1) In retrospect, no.
2) Yes. We learned from some mistakes made by eg. Bellville with the implementation of the MCS.
3) Yes. Full utilisation of the available technology is not possible when there are unskilled people using it. They inevitably start using it in a wrongful manner, which compounds the problem as it is more difficult to “unlearn” and learn the correct way than learning the correct way from the start.
4) No. Especially in the electronic fields, we are very poorly placed.
5) The rapid development and spread of PC based systems have impacted differently on the workforce. The more “outgoing” persons (not scared to admit not knowing or asking) have adapted well, but the other group does not ask, does not adapt to these systems. To what measurable extent this is showing itself is difficult to estimate. All levels of the organisation is affected.
6) Not to the extent that we should have. Psychological ownership:- no. New skills:- only placed a schooling level on operating types to ensure communication and on-the-job training potential.

Enhance productive capabilities. Competencies flow from the correct utilisation of the technology.
MANAGEMENT QUESTIONNAIRE.

1. RESTRUCTURING:

1.1) In some instances it did due to the reduction of level of supervision. The Operator (Forming) and the Line Controller (I & P) were able to communicate better with each other, more direct communication and this facilitated the resolving of problems. In other instances the restructuring lead to some bottlenecks due to less people who were available to perform certain duties, especially on dayshift and in the higher positions were people were involved in more meetings and therefore couldn’t tend to operational problems as soon as required.

1.2) Reporting lines were changed, less levels of supervision, some multi-tasking and multi-skilling were done in the I & P department, the QA Department and certain peripheral functions in the Mechanical shop were delegated up to Artisans.

1.3) Structures were removed in the QA dept. but added in the I & P dept.

1.4) Yes, the initial difficulty arose due to the fact that some employees didn’t see the need to change and hence was not convinced about it. The second and perhaps biggest obstacle, was probably the fact that the union (CEPPWAWU) was concerned that some of the positions were to be downgraded after the restructuring process and that caused them to stall the process.

1.5) To a large extent they did.

1.6) Difficult to say. The production efficiencies went up, however we are now running into major customer complaints and our resort levels are higher than before.

1.7) Yes, it provides more employees the opportunity to get exposure in higher positions than before.

1.8) Yes.

2. TECHNOLOGY:

2.1) No.

2.2) No, we were aware that we will need a higher level of skill, but we are only now starting to react to the need. The recruitment process is underway, but some of the equipment has already arrived and the opportunity for training of staff by the people who installed the equipment is lost.

2.3) It will have an impact on the Company since it will take time before the new staff is able to utilise the new equipment to its full capacity and capability.

2.4) No, we are terribly exposed in terms of our Cold End skills as well as management skills.

2.5) a.) Yes, especially in view of the fact that 6 months ago there was serious consideration to closing the factory. The capital investment is a clear signal that there is confidence in the company to meet the demands of customers as well as investors.

b.) At all levels.

2.6) * Yes, the process was explained in detail to management as well as employees.

* Electronics. Cold End as well as management skill. We believe that some of our managers are technically very competent, however, they are not very competent as managers of people.

* Employees were in most concerned that the introduction of new technology will affect their jobs, less jobs, reduction in grades. The concern pertaining to the reduction of jobs was valid, the introduction of technology almost always reduces the need for manual labour. In other cases jobs were upgraded to the higher level of skill required in performing the job.

* Informal.

2.7) To soon to answer, however the expectancy is that it will have this impact with the right level of skills.

2.8) The injection of technology directly relates to the needs of customers.

2.9) Yes. We had to re-look at our product ranges as well as the way we will do product development. We also had to look at skills and the way in which we will attract the right skills and how we will upgrade our current skills to meet the new requirements.
MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY (with reference to CSG)

BY STEVEN KALICHRARAN

1. RESTRUCTURING

1) The restructuring that took place at CSG was prompted by technological influences as well as by organizational needs. Certain sections were made to report into technical functions - e.g., Cold end section reporting to Engineering Manager because of technological advances which could not be absorbed by the previous functional reporting structure. Co-ordination improved because of the reduction in the number of Heads of Departments.

2) With respect to the example quoted the CE section functioned better because of easier access to inputs and assistance of a technical nature.

3) Hierarchical levels were removed

4) It was not difficult to implement since everyone affected by the change was consulted and fully briefed before implementation.

5) In view of comments under point 4 the subordinates understood the change in structure.

6) Job change time has improved although it is still not satisfactory but that is because the technological advances outstripped the capability of the people involved.

7) Yes it does, but it is essential that the ability of the individuals involved be properly assessed and then appropriate training be made available.

8) The structure does allow it but lack of ability and training prohibits managers from gaining more exposure elsewhere.

2. TECHNOLOGY

1) No it was not. The lack of ability and training normally only becomes apparent when the anticipated benefits do not materialize.

2) No, as already mentioned it was not done early enough.

3) Yes, it does have a negative impact on the performance because the full benefit of the capital expenditure is not realized and the people reductions are not possible to implement.

4) No, we are not adequately equipped in terms of skills hence the frantic search for skills outside the organization.

5a) Yes, it has had a negative impact because the people involved invariably are put under pressure to improve their performance and they are not capable of it.

5b) On all levels because lack of performance affects all levels, eventually.

6) Very little or at least insufficient consideration was given to all these factors because of pressure to reduce costs and the reduction of labour is normally seen to be the most effective method.

7) It generally has but not to the extent envisaged.

8) Yes, because of the actual and perceived improvements in the quality of the finished products produced.
9) It certainly has in terms of the caliber of people that should be employed and it has also allowed the company to enter markets that were previously too risky. So, there are positives associated with technological advances but normally not at the anticipated levels, mainly due to the people issues referred to.
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?
QUESTIONS (EMPLOYEES)
TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? **YES. TO BECOME WORLD CLASS.**

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? **YES. PROJECT MEETINGS.**

3) Did you have any fears about the implementation of new technology? If yes, what were they? **NO.**

4) After the implementation of the new technology, did your workload increase or decrease? **INCREASED.**

5) Were you given enough training to perform your functions? **YES.**

6) Was your rate of pay and grade adjusted? **NO.**

7) Do you think you are adequately remunerated for the work you currently do? **NO.**

8) Are you coping with the new technology? **YES.**

9) If you are not coping, what do you think is the solution to this problem? **N/A.**

10) Do you think the quality of your products has improved with the implementation of new technology? **YES.**
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?

1) Yes, we need to improve quality and bring our company to higher standards.

2) Yes, we were all involved in meeting ext. to hear our opinion.

3) Yes, you are always a bit afraid of the unknown.

4) It increased in the beginning regarding training of personal. But currently, it has decreased a bit.

5) Yes!

6) Not sufficiently!

7) No!

8) Yes/No

9) It is very difficult to get hold of people overseas for info.

10) Very Much. The quality is of a very high standard.
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?
2) Did the company inform you about the changes that were going to take place? If yes, how was this done?
3) Did you have any fears about the implementation of new technology? If yes, what were they?
4) After the implementation of the new technology, did your workload increase or decrease?
5) Were you given enough training to perform your functions?
6) Was your rate of pay and grade adjusted?
7) Do you think you are adequately remunerated for the work you currently do?
8) Are you coping with the new technology?
9) If you are not coping, what do you think is the solution to this problem?
10) Do you think the quality of your products has improved with the implementation of new technology?

1) Yes
2) Yes
3) No
4) Increase
5) Yes
6) No
7) No
8) Yes
9) More training/retraining
10) Yes
Questions 1. Employee Technology

Yes.

Yes, through meetings.

Yes, retraining and increase in work to those who will be remaining behind.

Yes, increased.

Yes.

Yes.

Yes.

Yes.

No training.

Yes.
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? Yes

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? Yes

3) Did you have any fears about the implementation of new technology? If yes, what were they? No

4) After the implementation of the new technology, did your workload increase or decrease? Increased

5) Were you given enough training to perform your functions? No

6) Was your rate of pay and grade adjusted? No

7) Do you think you are adequately remunerated for the work you currently do? Yes

8) Are you coping with the new technology? Yes

9) If you are not coping, what do you think is the solution to this problem? N/A

10) Do you think the quality of your products has improved with the implementation of new technology? Yes
QUESTIONS (EMPLOYEES)
TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?
2) Did the company inform you about the changes that were going to take place? If yes, how was this done?
3) Did you have any fears about the implementation of new technology? If yes, what were they?
4) After the implementation of the new technology, did your workload increase or decrease?
5) Were you given enough training to perform your functions?
6) Was your rate of pay and grade adjusted?
7) Do you think you are adequately remunerated for the work you currently do?
8) Are you coping with the new technology?
9) If you are not coping, what do you think is the solution to this problem?
10) Do you think the quality of your products has improved with the implementation of new technology?

1) Yes
2) Yes. Through workshop meetings
3) Yes. Job loss was my fear
4) Decrease
5) Not enough
6) No
7) No
8) Slowly I'm coping
9) More time for training can speed up 'coping process'
10) Yes
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?
2) Did the company inform you about the changes that were going to take place? If yes, how was this done?
3) Did you have any fears about the implementation of new technology? If yes, what were they?
4) After the implementation of the new technology, did your workload increase or decrease?
5) Were you given enough training to perform your functions?
6) Was your rate of pay and grade adjusted?
7) Do you think you are adequately remunerated for the work you currently do?
8) Are you coping with the new technology?
9) If you are not coping, what do you think is the solution to this problem?
10) Do you think the quality of your products has improved with the implementation of new technology?

1. To maximise profits which the few number of employees
2. Yes: Through union/Management meetings
3. Yes: Job reduction not contributing to job creation
4. Increased dramatically.
5. No.
6. No.
7. No.
8. Training
9. Training and re-training.
10. Yes.
STEVEN KALICHARAN

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? Yes, to better the product line and increase productivity.

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? Yes, formal meetings.

3) Did you have any fears about the implementation of new technology? If yes, what were they? Yes, loss of jobs, increased workload.

4) After the implementation of the new technology, did your workload increase or decrease? Yes, increased.

5) Were you given enough training to perform your functions? No.

6) Was your rate of pay and grade adjusted? No.

7) Do you think you are adequately remunerated for the work you currently do? No.

8) Are you coping with the new technology? Yes.

9) If you are not coping, what do you think is the solution to this problem? More training.

10) Do you think the quality of your products has improved with the implementation of new technology? Yes.
STEFAN KALICHARAN

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?

1. Yes.
2. Yes - in a group session.
4. Increased.
5. Yes - through many years experience.
6. No.
7. No.
8. Yes.
9. Partial - the mechanics needs more training in order to set the machines correctly to work that in battle with a fault free jet.
10. Partly
Dear [Boss],

(1) = To compete with other company's of glass.

(2) = Union officers were asked if we were informed about the changes.

(3) = The fear was that many people will lose their jobs.

(4) = The work load increase.

(5) = No training was given to perform the fight.

(6) = Rate of pay was not adjusted.

(7) = Yes, I am adequately remunerated with the job.

(8) = So we are not coping because of lack of training.

(9) = The solution is people must be given enough time to train and to study the technology.

(10) = The quality of product has not improved with the implementation because we have more customer complaints than before.
8.6

Technology

Do you... to compete globally and become more competitive on the open market?

- Yes - Verbally & by E-mail.
- No
- Decrease to an extent.

- Yes
- No

- Yes
- Yes
- N/A

Somewhat yes.
STEVEN KALICHARAN

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? **YES**

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? **NO**

3) Did you have any fears about the implementation of new technology? If yes, what were they? **NO**

4) After the implementation of the new technology, did your workload increase or decrease? **INCREASE**

5) Were you given enough training to perform your functions? **NO**

6) Was your rate of pay and grade adjusted? **NO**

7) Do you think you are adequately remunerated for the work you currently do? **YES**

8) Are you coping with the new technology? **YES**

9) If you are not coping, what do you think is the solution to this problem? **N/A**

10) Do you think the quality of your products has improved with the implementation of new technology? **YES**
STEVEN KALICHARAN

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? **YES**

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? **NO**

3) Did you have any fears about the implementation of new technology? If yes, what were they? **NO**

4) After the implementation of the new technology, did your workload increase or decrease? **INCREASE THEN DECREASE AFTER A YEAR.**

5) Were you given enough training to perform your functions? **NO**

6) Was your rate of pay and grade adjusted? **NO**

7) Do you think you are adequately remunerated for the work you currently do? **NO**

8) Are you coping with the new technology? **YES**

9) If you are not coping, what do you think is the solution to this problem? —

10) Do you think the quality of your products has improved with the implementation of new technology? **NO - PRODUCTIVITY INCREASED.**
QUESTIONS (EMPLOYEES)
TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?

1) To be up to standard to the rest of the world
2) Yes;
3) Yes; Retrenchment
4) It decreased
5) In the workshops and on the machines
6) Yes
7) Yes
8) Yes
9)
10) Yes
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? **Yes - To be more efficient & competitive in the Glass industry**

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? **Yes - Change management course (Recently)**

3) Did you have any fears about the implementation of new technology? If yes, what were they? **No.**

4) After the implementation of the new technology, did your workload increase or decrease? **Decrease.**

5) Were you given enough training to perform your functions? **No - had to teach myself.**

6) Was your rate of pay and grade adjusted? **No.**

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology? **Yes.**

9) If you are not coping, what do you think is the solution to this problem? **Proper training on new equipment.**

10) Do you think the quality of your products has improved with the implementation of new technology? **Yes.**
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology? **YES**

2) Did the company inform you about the changes that were going to take place? If yes, how was this done? **THROUGH MEETINGS & NOTICE BOARDS**

3) Did you have any fears about the implementation of new technology? If yes, what were they? **YES. LOSS OF JOBS**

4) After the implementation of the new technology, did your workload increase or decrease? **INCREASED (THERE ARE NOW FEWER PEOPLE ON THE PRODUCTION FLOOR)**

5) Were you given enough training to perform your functions? **(YES)**

6) Was your rate of pay and grade adjusted? **YES**

7) Do you think you are adequately remunerated for the work you currently do? **(YES)**

8) Are you coping with the new technology? **YES**

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology? **YES**
STEVEN KALICHARAN

MBA THESIS: THE IMPACT OF TECHNOLOGY ON THE GLASS INDUSTRY

QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?

1) Yes. This will be off benefit to all in the long run.

2) Yes. I think the changes were done in a good way.

3) No.

4) It increased

5) Yes

6) Yes
QUESTIONS (EMPLOYEES)

TECHNOLOGY

1) In your opinion did you understand why the company was advancing in technology?

2) Did the company inform you about the changes that were going to take place? If yes, how was this done?

3) Did you have any fears about the implementation of new technology? If yes, what were they?

4) After the implementation of the new technology, did your workload increase or decrease?

5) Were you given enough training to perform your functions?

6) Was your rate of pay and grade adjusted?

7) Do you think you are adequately remunerated for the work you currently do?

8) Are you coping with the new technology?

9) If you are not coping, what do you think is the solution to this problem?

10) Do you think the quality of your products has improved with the implementation of new technology?

1. Yes.
2. No
3. Yes. Technology is taken people's work...
4. Decrease
5. No.
6. Yes
7. Yes.
8. Yes.
9. Everything is computer.
10. Yes.
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