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Editorial policy
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Note from the editor

The business of war versus the war of business

"Science is best defined as a careful, disciplined, logical search
for knowledge about any and all aspects of the universe,
obtained by examination of the best available evidence
and always subject to correction and improvement
upon discovery of better evidence.
What's left is magic. And it doesn't work."
James Randi

At the time of writing this editorial, parts of the world are at war – ideology against ideology. Man against man. We are faced with new enemies, new war strategies, new alliances. Even the face of war has changed. Moreover, there is no defining final victory to the war, only a continuation of the battle. Alliances are created and shattered. Boundaries are created and lost. Nothing remains sure or permanent. Superior technology is decisive in combating the war, but more importantly, the outcome is dependant upon the actions of man. This requires non-linear thinking, discontinuous thinking.

At a business level, we face deregulation, globalisation, privatisation, new technology – making industry boundaries as meaningless as the ends the global wars are endeavouring to achieve. It is apt then, that Gary Hamel, in *Leading the Revolution* (Hamel 2000) warns: "Somewhere out there is a bullet with your company's name on it. ... You can't dodge the bullet – you are going to have to shoot first." In such a world of revolution, the answer lies in innovation and non-linear solutions to create wealth. On the business front, the battle is not democracy versus totalitarianism, religion against religion, it is old versus new thinking. Orthodox science, as defined by Randi above, is replaced by innovation and non-linear thinking. It touches on the magic, criticised by the same author.

Following the belief that every business model will sooner or later reach the point of diminishing returns, the *Southern African Business Review* tries to keep the reader up to date with new and changing business practices – adhering to the notion that 'You cannot use an old map to find a new land'. This issue, then, is dedicated to understanding the business war and to developing new, innovative ways of winning the continuous battles this entails.

We are pleased to invite you into the world of renowned author, Professor Margaret Wheatley, as she shares with us her views on the restoration of hope in this dark age. Following on the notions expressed above, she proposes a revolution among the growing ranks of leaders (defining a leader as "anyone who wants to help at this time") emerging from all professions and levels of society. The initiative called *From the Four Directions: People Everywhere Leading the Way,* depends upon diversity and human goodness. Margaret is perhaps most famous for her exciting book *Leadership and the New Science,* in which she introduces chaos theory to explain organisational behaviour, borrowing from features of our orderly universe.

In 'Measuring performance, two models of IT satisfaction' Frank Bannister, Les Worrall, Dan Remenyi and Arthur Money examine two models for measuring and benchmarking the service standards and performance levels of an ICT department or service provider. 'Towards bridging the marketing information gap: an overview' highlights the importance of understanding and implementing marketing decision-making information requirements, by creating synergies between business intelligence and marketing issues. Peter Tyndale develops a taxonomy of the large number of knowledge management software tools, these being either IT or purpose-built tools. Michele Gerber provides some light on the tree model, following on her MBL studies. Michele claims that business process reengineering (BPR) failures can be minimised using an analytical process to understand BPR in terms of clearly identifying input, throughput and output.

Lars Henriksen and Jacob Christensen present a case study deliberating the important question of the end of management as we know it, challenging the textbook notions through the use of Weber's *legitimer Herrschaft* ('legitimate domination'). This issue concludes Dhaya Pillay's series on the South African Essential Services Committee, which we started in July 2001.

At the end of the first year of the much-hyped new millennium, this issue concludes on a futuristic note. Dan Remenyi leads us on a journey into the future with his insights and visions of the future and of utopia in a technology enabled (and disabled?) world. He concludes that beyond the boundaries of a technologically advanced world lies the *real power* that comes from us as humans – and we have to provide the balance between the machine and ourselves. Read with care!

My appreciation and thanks to the contributors and reviewers who brought this issue into being. And especially to Cythia, who acted as international administrator in this.

Enjoy the read.

René Pellissier
Editor

December 2001
Rouen, France

Restoring hope to the future through 'critical education' of leaders

Margaret J. Wheatley*

In the era of globalisation, education everywhere is being subjected to the needs of the economy, whereas over the millennia, education has always been the means to change society and to create new futures. The author considered what she could do to reverse the destructive and dehumanising effects of the 'new economy' and founded the movement known as From the Four Directions: People Everywhere Leading the Way, *which operates through the leadership circles that have been established in local communities in many different countries. Each circle is a site for 'critical education', where people develop new strategies for influencing their world. The belief is that, as leaders meet regularly and talk about their practice, their concerns and their hopes, they will develop enough clarity and courage to stand up to the pressures of globalism and act as leaders who support and nourish the human spirit and all life. The aim is ultimately to link the leadership circles electronically, and create a dialogue that will result in a powerful alternative to globalism, with its narrow focus on economic growth and profit-making.*

This is a dark age, when everything must justify its existence in terms of how it benefits the economy. The economy is no longer seen as the means to create just and good societies; it has become the end in itself. Nowhere is this clearer than in the field of education. We educate students so that they can get jobs; we collect statistics that demonstrate the monetary benefits of education to the individual; we increasingly focus schools and higher education on training, teaching those subjects defined as important by the workplace. As with all other aspects of modern life in the era of globalisation, education has become just one sector of the economy.

But stretching back over millennia, education has always been the means to change society, to create new ideas and practices, and therefore new futures. In the twentieth century, the practice and theory of 'critical education' emerged as a powerful demonstration of how education, used with the poorest, could develop the skills and understanding needed to change their world. Quite recently, as I have been increasingly distressed over how education everywhere is being usurped by the economy, I have returned to the work of Paulo Freire, Cesar Chavez and other Latin American revolutionary thinkers. They have helped me determine what I can do to try and reverse the destructive and dehumanising trajectory created by the 'new economy'. I would like to describe how their inspiration has materialised in the work that I now do.

When I feel brave enough to say it (which I do now), my new work is to create a populist revolution among leaders everywhere. I, with many talented and exceedingly dedicated colleagues around the world, am working to establish leadership circles in local communities everywhere. We believe that as leaders meet regularly and talk about their practice, their concerns and their hopes, they will develop enough clarity and courage to stand up to the pressures of globalism and act as leaders who support and nourish the human spirit and all life.

It is important for me to state at the outset that we have a rather revolutionary definition of 'leader'. We believe that a leader is 'anyone who wants to help at this time'. We meet these people everywhere – of all ages and in all communities and professions. It could be a mother who wants her children's school to change; a local nurse who wants clean water in the many villages she serves; a teenager who refuses to wear the clothing of a corporation that uses sweat shops; a corporate executive who wants to stop unethical practices or the day-to-day disregard of the needs of employees; or a farmer who wants to preserve traditional farming methods.

These new leaders are appearing at an increasing rate in local communities around the world. Each one is motivated by a desire to change some aspect of their world. They are not motivated by self-interest or greed. They want to help others, but they often feel isolated and alone. Few of them realise that their concerns and generosity are shared by an increasing number of people, and it is difficult to act with courage when you feel you are the only one.

Isolation is one barrier to courageous action. Time is a second one. In most countries, time is evaporating. Technology has played a large role in this, speeding up human interactions to the speed of light, even though we cannot, as living beings, work any faster than the speed of life. In highly technological societies, leisure time and private life are fast being eroded by the ever-invading demands of cell phones, e-mail and the assumption that workers should be available '24 x 7'. In societies where technology is not yet so invasive, the very complexity and multiplicity of problems that confront leaders is destroying their time to deal well with any one issue.

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Restoring hope to the future through 'critical education' of leaders

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Under the relentless pressure of time vanishing, we are losing many essential capacities of being human: the time to think and reflect, the time to be in relationships, and the time to develop trust and commitment. In essence, we are forfeiting our unique human qualities in exchange for speed.

There is at least one other great destructive force at work globally, and that is the American management model. Leaders everywhere, no matter what their culture or tradition, are pressured to focus on numeric measures of efficiency and narrow measures of success, namely, growth and profit-making. These practices are not sufficient to create a healthy and robust workplace or planet. American businesses that focus only on these narrow goals fail as well. As these too-narrow measures roll out around the world, they create the conditions for the large-scale destruction of cultures, habitats and the human spirit. Few local leaders can withstand the pressure to be 'modern', however, and so they forfeit their own experience and wisdom about what works best within their own traditions and practices. Pop culture and fast food are not the only elements that are creating a monoculture across the planet; the spread of one management model, a model that is inherently destructive to life, is having the same effect.

Paula Freire said that "reality doesn't change itself". If this is an accurate portrait of today's reality, then we – people everywhere – must be the agents of change. We need to create the conditions where we can think, where we can notice what's going on, and where we develop companions for the work that is required. It is the opportunity to develop these conditions for critical education and action that energises me now.

Our initiative is called *From the Four Directions: People Everywhere Leading the Way*, and this is what we do.

In local communities everywhere, leaders are invited (by a small group of local hosts) to meet regularly to think together, to develop clarity about those of their practices and values that work to affirm and sustain people, and to support one another's courageous acts. Each circle is a site for critical education. People become more knowledgeable about what is going on in their world, and they develop new strategies for how to influence their world. They teach one another, relying on their experience and compassion. Over time, these local circles become good communities of practice – leaders emerge with greater skills to bring about change in their world, wherever they are called to be leaders. Working locally, we act as a global leadership development effort, raising the standards of effective leadership in thousands of communities and changing the global definition of what good leadership means.

For these circles to give birth to new ideas, new courage, and new companions for the journey, we use the simple and ancient practice of good human conversation. We provide support for how to create the conditions for meaningful and deepening conversation. We also insist that these leadership circles include as diverse a mix of people (in terms of age, gender and organisational type) as is possible in that community.

A core value of *From the Four Directions* is that we depend on diversity. We know that people need to be talking to one another again, across all the boundaries and hurts that have been created. We also know that new solutions are only available when new people are in the conversation. Most communities in the world struggle with diversity – whether ethnic, religious, gender or age-based. In every circle, in every country, we strive to gently open the boundaries and extend a welcome to those that were formerly excluded. We want to help re-weave the broken bonds that are a major dilemma of all societies.

Our second core value is that we rely on human goodness. We believe that the solutions needed at this time are not at all technical, but profoundly human. We will find the answers to complex issues, and we will find the courage to push back against the destructive practices of globalism, only if we find one another. At this time, when there is growing evidence for human badness, there is the growing need to rely on the fact that most people, no matter what their culture or physical conditions, have goodness in them. They, we, want to live with other people in more harmonious and humane ways. We develop greater clarity in leaders everywhere about human potential and the positive impulses that motivate people – the search for meaning, the need for good relationships, the opportunity to grow and contribute to others.

The focus of conversation in a *From the Four Directions* circle is leadership – those values and practices that are life-affirming rather than life-destroying. We aspire to support changes in the leadership of local communities everywhere, developing leadership practices at the local level that can restore hope to the future. We also aspire to change the direction of our global future. We want to create a global voice on behalf of those practices and values that nourish and sustain the human spirit and all life. To achieve this, we rely on a change theory taught to us by other living systems.

In nature, change does not happen from a top-down, strategic approach. There is never a boss in a living system. Change happens from within, from many local actions occurring simultaneously. When these local actions learn about other local actions, their own activity is strengthened, but even more is available. As local groups network together, they can suddenly, and always surprisingly, emerge into a global force. This global force is far stronger than the sum of the parts, and it is also different from the local actions that gave birth to it. These global forces are the result of 'emergence', and they are known as 'emergent phenomena'. They always possess great power, and are always a surprise.

Globalism is a perfect example of an 'emergent phenomenon'. No-one planned it; it emerged from many local actions on the part of corporations and nation states – actions available in the absence of laws and policies for a new, international environment. Globalism organised around only a few values – those of growth and profit-making. Suddenly, we find ourselves living in the midst of its powerful pressures, which organise societies and organisations in ways that few people want, and that only a very few are benefiting from.

Once an emergent phenomenon has appeared, it cannot be changed by working backwards, by changing the local parts that gave birth to it. An emergent phenomenon can be changed only by creating a countervailing force of greater strength. This means that the work of change must start again, to organise new local efforts, connect them to one another, and know that their values and practices can emerge as something even stronger.

From the Four Directions seeks to use emergence intentionally. Once many local circles are up and running, we

will network them together, using electronic means. When a leadership circle in Montevideo, Chile learns that they are discussing the same issue as a circle in New Delhi, or when a Zimbabwean circle talks with a Danish circle about their experience with citizen democracy, we know that such connections will have a powerful impact on personal leadership behaviour.

We also believe that as people realise that the problems they face are shared by others in different parts of the globe, they will instantly recognise these as systemic issues. There is no better way for people to become skilled systems thinkers than to realise that their problem is not unique to them, but is affecting many others in diverse parts of the global system. One outcome of *From the Four Directions* is to create thoughtful and practical systems thinkers around the world.

Our biggest intent is to create a global voice for change in the practices and values used in all types of organisations everywhere. To create such an emergent phenomenon, we will consciously connect circles to one another, publicise our efforts, host regional, in-person conferences, and engage in any other means of developing good, meaningful connections.

Using the great goodness of many, and actively developing the critical thinking and relational skills that make us human, we intend to astonish the world with what becomes possible when we nourish and sustain the human spirit.

As of this writing (February 2001), *From the Four Directions* circles have been established in Cameroon, Colombia, Croatia, Denmark, England, Gabon, Hungary, the Netherlands, Norway, Senegal, Slovenia, South Africa, Sweden, Uganda, the USA, the Ukraine and Zimbabwe. Circles will begin shortly in several more African countries, Eastern and Central Europe, Mexico, Canada, the USA and Latin America. We are exploring relationships in India, Asia and Australia to begin circles there by the end of 2001.

For more information on this initiative, or if you would like to join us, please consult our website at www.fromthefourdirections.org, or telephone the Berkana Institute in the USA, at 801-377-2996.

Note

An earlier version of this article was published in *Vimukt Shiksha, a Bulletin of Shikshantar,* The People's Institute for Rethinking Education and Development, Udaipur, Rajasthan, India, in March 2001.

Measuring performance: two models of IT satisfaction

Frank Bannister*, Les Worrall†, Dan Remenyi‡ & Arthur Money §

The issue of evaluating and managing the effective delivery of information and communications technology (ICT) services has been brought into sharper relief in recent years. This has been particularly true of the public sector in the United Kingdom (UK), where the growing emphasis on formalised client–contractor relationships, best value, outsourcing and benchmarking (both between local authorities and between local authorities and private sector organisations) has meant that the definition of service standards and performance criteria has attracted considerable practitioner attention.

This paper examines two models for the measurement of service standards and performance levels in UK local authorities. Based on 296 interviews conducted in six UK local authorities, it first considers a measure of satisfaction based on the adequacy–importance model often used in market research. A second model is then constructed using gap analysis. Both models are shown to provide effective ways of identifying key performance issues from the user perspective and of benchmarking service performance. The two models are compared, and a number of issues raised by this research and the pattern of user responses are discussed. Some lessons for ICT managers, as well as some future research directions, are suggested.

Introduction

This paper proposes a methodology for benchmarking the performance of an information and communications technology (ICT) department or service provider. Although the research has been conducted within UK local government, the methodological framework for the evaluation of the effectiveness of ICT service delivery, incorporating the views of all the main stakeholders, is generally applicable. This subject is important because it is clear that the current approaches to managing ICT and ICT departments have not always produced satisfactory results. Specifically, systems take too long to develop, user departments often voice their dissatisfaction with the quality and timeliness of the support they receive, projects often run over budget, and systems are frequently perceived not to deliver the benefits on which they were originally business-justified (Peters 1988; Parker 1989; Remenyi 1991; Willcocks 1991; Allingham & O'Connor 1992; Attewell 1993; Lester & Willcocks, 1993; Brynjolfsson 1993; Hitt & Brynjolfsson 1994; Remenyi, Money, Sherwood-Smith & Irani 2000). These phenomena are not new; they have been a central challenge to ICT management for the past 30 years and continue to be a problem in many organisations today.

The ICT function of any sizeable organisation is involved in the development, implementation and maintenance of numerous technologies and systems. It supports a wide range of users of differing levels of ability and awareness. In the UK public sector, the power in the user–provider relationship has moved significantly from the provider to users, as initiatives such as market testing, compulsory competitive tendering and best value have been introduced into UK central and local government (see Goss, Miller & Symons (1993) for a description of these terms). The information systems in most organisations aim to meet user needs at all levels within the organisation, from the operational, through the tactical to the strategic. In evaluating the success or effectiveness of an ICT department, it is necessary to evaluate not only the performance of individual systems, but also the performance of the ICT department in supporting the users of those systems. In recent years, and particularly in UK local government, users have become far more concerned about the effective delivery of an ICT service, and, in many instances, this has become enshrined in service level agreements negotiated between ICT users and the service providers. Given this background, it is important to be able to determine the quality of service to users in terms that are meaningful to users.

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From a functional perspective, local authorities in the UK are highly complex organisations (Worrall 1994, 1995). It has been estimated that UK local government spends over £1 billion on information technology each year (SOCITM 1996). This is a substantial sum, yet, apart from regular analysis by the Audit Commission, the authors are unaware of any systematic cross-local authority comparisons of how the users of ICT view the relative importance of the different strands of their organisation's ICT management policies. Nor are the authors aware of any studies that have examined performance criteria for ICT management in local government or how well local authorities perform against these criteria. This study used a combination of a questionnaire and interviews designed to fill this gap in our knowledge. The research was carried out in six local authorities in 1997, and the interviews were completed in September 1997. The questionnaire used was a variant of one that had been designed and tested successfully elsewhere (see Remenyi & Money 1991, 1993).

The structure of the remainder of this paper is as follows:

1. Description of the approach used to collect the data.
2. Analysis of responses to the central question of the importance of different aspects of ICT service delivery. (For simplicity, these aspects of service delivery are termed 'attributes'.)
3. Investigation of users' assessments of their ICT department's performance for each of these attributes and development of some models of the level of satisfaction with that performance.

The paper concludes with a short discussion of the findings, their implications and some suggestions for further research.

Evidence collection

As already noted, the research project made use of a previously validated self-completion questionnaire. This questionnaire was developed in an earlier study (Remenyi & Money 1994). The attributes included with it (see Table 2) were derived from a review of existing literature, from the authors' extensive experience in ICT management and from discussions with users before the implementation of the initial study. Prior to the execution of the study reported here, consultations were held with several IT experts from UK local government and the IT directors from the six participating local authorities. Following these discussions, the attributes derived from Remenyi & Money's 1994 study were modified slightly to reflect the context of UK local government.

To analyse the data, a satisfaction–importance gap analysis, similar to that developed by Parasuraman, Zeithaml, & Berry (1985), was used. Much of the data collected were derived using Likert-type scales. Care must be exercised when applying techniques such as regression, factor and correlation analysis to discrete data of this type. In particular, a technique such a correlation may have a discrete set of possible outcomes. Nonetheless, this form of analysis is frequently encountered in modern management research and is accepted as giving valid results.

Six local authorities were approached through the Society of Information Technology Managers, and all six agreed to participate in the study. For reasons of confidentiality, the local authorities were given the fictitious names of:

- The London Borough of Aston
- Bunton County Council
- Caston County Council
- Dunston Unitary Council
- Eston Unitary Council
- Frinton District Council.

Together, these represent a variety of types and sizes of local authority in the UK. Within each authority, a number of respondents were identified and each was sent a questionnaire. The number of respondents from each local authority is shown in Table 1.

Table 1. Responding local authorities and the number of responses

Local authority	Type of local authority	Responses
Aston	London Borough	52
Bunton	County Council	49
Caston	County Council	82
Dunston	Unitary Authority	31
Eston	Unitary Authority	29
Frinton	District Council	52
Total		**296**

The questionnaire contained seven major sections, and sought the following information:

1. Background information about the respondents, such as their level in the organisation, their years of experience of working in the ICT field, their intensity of use of ICT and 'how comfortable' they felt using ICT.
2. How important respondents believed each of 38 attributes to be, on a six-point scale, in ensuring the effective delivery of their organisation's ICT strategy and ICT service (see Table 2 for a list of these attributes).
3. The respondents' rating of their organisation's performance on the same 38 attributes, using a further six-point scale.
4. How intensively respondents used different information systems.
5. How effective respondents thought those systems were.
6. To what degree and how effectively respondents felt that users had been involved in the process of ICT development; how well existing ICT met users' managerial and operational needs; users' satisfaction with the training that they had received; users' views on how well service-level agreements work, and users' overall opinion of their ICT department.
7. Respondents' views on how they thought the effectiveness of the ICT service in their organisation could be improved. This was done using an open-ended question.

Importance and effectiveness

The first objective of our research was to identify the degree of importance that users ascribed to each of 38 attributes integral to the design, development and delivery of an ICT strategy in their local authority. For this, a six-point scale ranging from 6 = 'critical' to 1 = 'irrelevant' was used. The mean and standard deviation of each score on each of the 38 attributes was calculated and, based on the mean, the attributes were then ranked to show the relative importance that users ascribed to each of the attributes. The results of this analysis are shown in Table 2.

Two things are noteworthy in Table 2:

1. The most highly rated attributes relate not to the technological components of the ICT strategy, but to the 'softer' aspects of the strategy, such as a high degree of technical competence from support staff, ease of access to facilities, and a positive attitude to users by support staff. In fact, the majority of the top-ten rated attributes relate to the quality of the support service provided by the ICT department.
2. The variance (as measured by the standard deviation) is strongly negatively correlated (r = -0.8) with the level of importance – in other words, the lower the mean level of importance, the greater the diversity of viewpoint. While a greater divergence of viewpoint is to be expected where the mean of the response is in mid scale, it is nonetheless a notable correlation, as illustrated in Figure 1.

The second objective of the research was to measure how well users perceived their organisation's ICT department to be performing using the same 38 attributes. Again, this was measured using a six-point scale (ranging from 6= 'excellent' to 1 = 'poor'). The results for the performance scores are shown in Table 3.

Here, too, there is evidence of a negative correlation between perception of performance and diversity of opinion, but it is not as strong as for importance (r = -0.4) (see Figure 2). This relationship is, perhaps, closer to what one might intuitively expect from these types of data.

Importance and performance

The next step was to compare performance with importance. Table 4 shows the means of each of these ranked by the importance score.

Two things are immediately evident from Table 4. The first is that performance scores are always lower than importance scores, which is perhaps not surprising. What is more striking is that performance and importance scores track each other closely. This can be seen quite clearly by graphing the mean score of the two measures by attribute as in Figure 3. The correlation between the mean scores is 0.70.

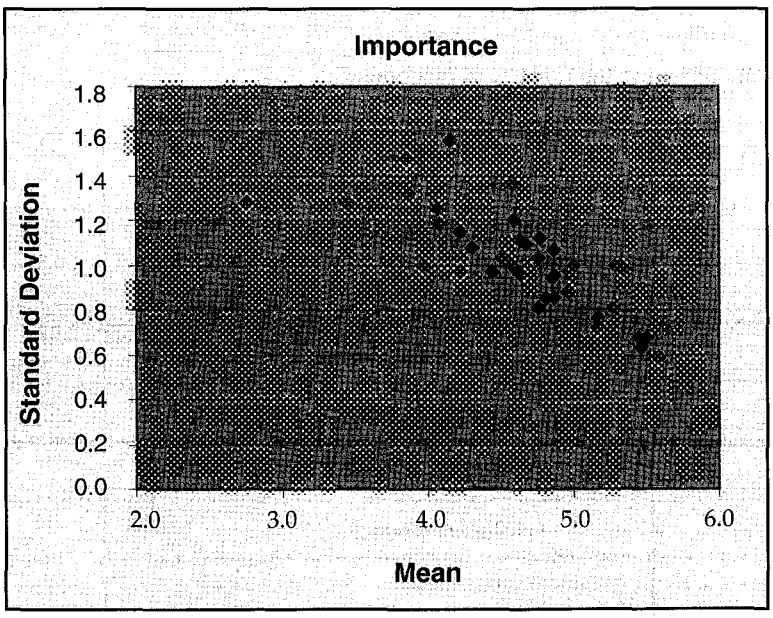

Figure 1. Scatter plot of mean versus standard deviation for importance measure

Table 2: Respondents' assessment of the importance of each attribute

Attribute	Mean	Standard deviation	Median
A high degree of technical competence in systems support staff	5.6	0.6	6
Ease of access for users to computing facilities	5.5	0.7	6
User confidence in systems	5.5	0.6	6
Fast response time from systems support staff to remedy problems	5.4	0.7	6
Provision for disaster recovery	5.3	1.0	6
Positive attitude of information systems/ICT staff to users	5.3	1.0	6
A low percentage of hardware and software downtime	5.3	0.8	5
System's response time	5.2	0.7	5
System's responsiveness to changing user needs	5.2	0.8	5
Extent of user training	5.0	1.0	5
Participation in the planning of the system requirements	5.0	0.9	5
Users' understanding of the system	4.9	1.1	5
Ability of the system to improve personal productivity	4.9	0.9	5
The quality of the reports delivered to the user	4.9	0.9	5
The use of Windows-type software	4.9	0.9	5
Systems analysts that know the user's business	4.8	0.9	5
Flexibility of the system with regard to both data and reports	4.8	1.1	5
Users' willingness to find time to learn the system	4.8	0.8	5
Prompt processing of requests for changes to the existing systems	4.8	1.0	5
How up to date the software is	4.7	1.1	5
Confidentiality of user's own data	4.6	1.0	5
Flexibility to produce professional reports	4.6	1.1	5
Overall cost-effectiveness of information systems	4.6	1.2	5
Monitoring of the Department's performance in delivering services to users	4.6	1.4	5
Alignment of the information systems plan with the corporate plan	4.6	1.0	5
How up to date the hardware is	4.5	1.0	5
Documentation to support training	4.4	1.0	5
The degree of personal control that users have over their systems	4.3	1.1	4
Procedures for avoiding software piracy	4.2	1.0	4
Short lead times for the development of new systems	4.2	1.2	4
The measurement of benefits derived by the user from the system	4.1	1.6	4
Ability of the system to enrich the working experience of the user	4.1	1.2	4
Help with database or data model development	4.1	1.3	4
Standardisation of hardware	4.0	1.0	4
The use of a service-level agreement with the ICT Department	3.9	1.3	4
Increasing the portfolio of applications	3.9	1.5	4
Access to external databases through the system	3.4	1.3	3
Ability to conduct computer conferencing with colleagues	2.8	1.3	3

Table 3. Performance scores ranked by mean

Attribute	Mean	Standard deviation	Median
Flexibility to produce professional reports	4.6	1.1	5
The quality of the reports delivered to the user	4.5	1.0	5
Access to external databases through the system	4.5	1.1	5
Ability of the system to enrich the working experience of the user	4.3	1.2	5
Ability to conduct computer conferencing with colleagues	4.2	1.2	4
The alignment of the information systems plan with the corporate plan	4.2	1.0	4
How up to date the hardware is	4.2	1.0	4
Users' willingness to find time to learn the system	4.1	1.1	4
Users' understanding of the system	4.1	1.1	4
The measurement of benefits derived by the user from the system	4.0	1.1	4
Help with database or data model development	4.0	1.4	4
The use of a service level agreement with the ICT department	4.0	1.1	4
The use of Windows type software	4.0	1.3	4
Increasing the portfolio of applications	3.9	1.3	4
A low percentage of hardware and software downtime	3.8	1.1	4
Monitoring of the Department's performance in delivering services to users	3.8	1.0	4
Overall cost-effectiveness of information systems	3.8	1.1	4
Participation in the planning of the system's requirements	3.7	1.2	4
How up to date the software is	3.7	1.1	4
Standardisation of hardware	3.7	1.3	4
Procedures for avoiding software piracy	3.7	1.3	4
Prompt processing of requests for changes to the existing systems	3.7	1.0	4
Fast response time from systems support staff to remedy problems	3.7	1.2	4
Documentation to support training	3.6	1.3	4
System's response time	3.6	1.3	4
Ability of the system to improve personal productivity	3.6	1.3	4
Provision for disaster recovery	3.6	1.1	4
Short lead times for the development of new systems	3.5	1.1	4
System's analysts who know the user's business	3.5	1.2	4
The degree of personal control users have over their systems	3.4	1.3	4
Confidentiality of user's own data	3.4	1.2	4
Positive attitude of information systems/ICT staff to users	3.3	1.2	3
Systems responsiveness to changing user needs	3.2	1.2	3
User confidence in systems	3.1	1.4	3
Flexibility of the system with regard to both data and reports	3.1	1.2	3
Extent of user training	2.9	1.1	3
Ease of access for users to computing facilities	2.7	1.4	3
A high degree of technical competence in systems support staff	1.9	1.2	1

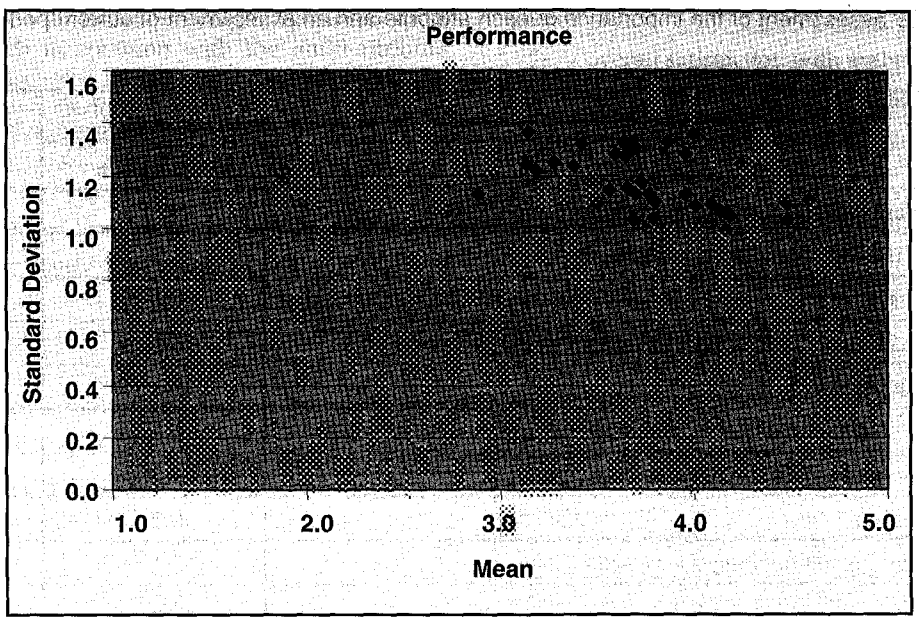

Figure 2. Scatter plot of mean versus standard deviation for performance measure

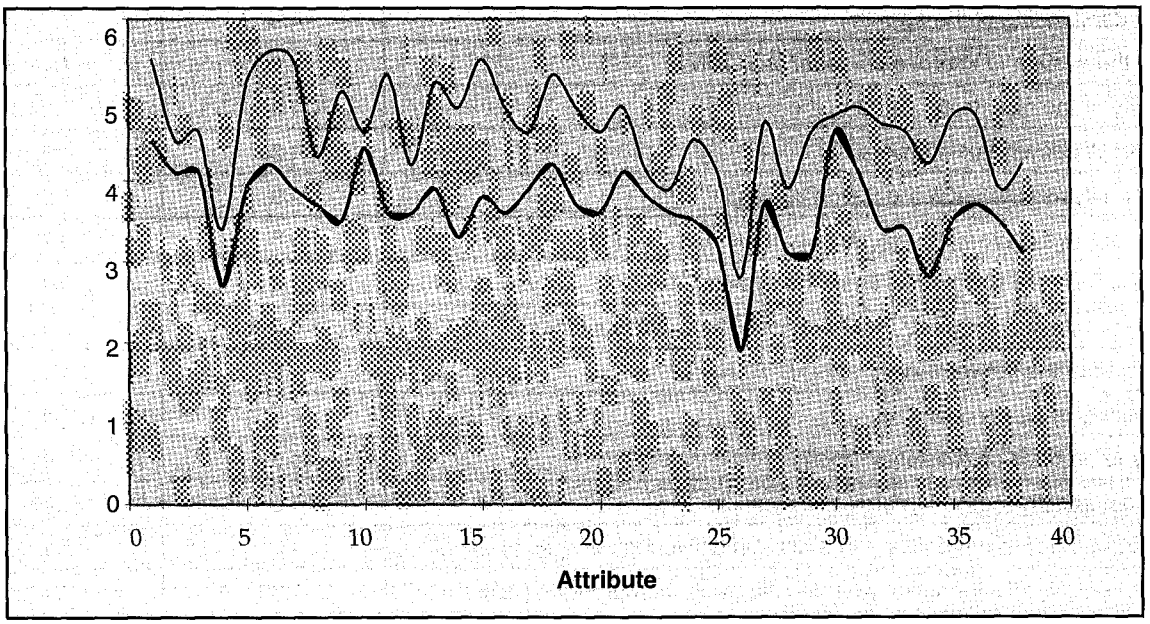

Figure 3. Graph showing the average performance (lower line) and importance (upper line) scores on each of the 38 attributes

Intuitively, there is no obvious reason why these two measures should be so highly correlated. One might reasonably expect performance to be better in some areas than others and that this would be reflected in a divergence of the graphs at a few points at least. Possible explanations for the observed result are that:

- ICT department managers understand the priorities of their users and put more resources into these areas, thus delivering a better performance. If this is true, then it is remarkable that ICT managers are able to allocate resources with such uncanny precision.
- Respondents exhibit a cognitive bias in completing the questionnaire and tend to associate poorer performance with those areas which are of lower importance. This seems to the authors to be the most plausible explanation.
- A third, but less likely, possible explanation is that users perceive services that are more effectively delivered as more important, but this seems improbable.

There is potential for further research in this area. In particular, it would be interesting to see if this phenomenon were replicated with other groups or in other industries. The question of how respondents relate to these types of paired questionnaires is discussed further in the section that follows.

A composite measure of satisfaction

While the absolute performance score provides one measurement of satisfaction, a more useful measurement would incorporate the importance score. Obviously, failure to perform on an attribute with a high importance score is more likely to lead to dissatisfaction than failure to perform on an attribute that is considered unimportant.

Table 4. Respondents' assessment of the importance of each attribute and an assessment of current performance ranked by Importance

Attribute	Importance Mean score	Performance Mean score
A high degree of technical competence in systems support staff	5.6	4.2
Ease of access for users to computing facilities	5.5	4.5
User confidence in systems	5.5	3.9
Fast response time from systems support staff to remedy problems	5.5	3.8
Provision for disaster recovery	5.3	3.6
Positive attitude of information systems/ICT staff to users	5.3	4.2
A low percentage of hardware and software downtime	5.2	3.9
System's response time	5.2	3.9
Systems responsiveness to changing user needs	5.1	3.5
Extent of user training	4.9	3.3
Participation in the planning of the system's requirements	4.9	3.6
Users' understanding of the system	4.9	3.7
Ability of the system to improve personal productivity	4.9	4.1
The quality of the reports delivered to the user	4.9	4.1
The use of Windows-type software	4.8	4.6
Systems analysts who know the user's business	4.8	3.5
Flexibility of the system with regards to both data and reports	4.8	3.7
Users' willingness to find time to learn the system	4.7	3.7
Prompt processing of requests for changes to the existing systems	4.7	3.4
How up to date the software is	4.6	4.1
Confidentiality of user's own data	4.6	4.4
Flexibility to produce professional reports	4.6	3.9
Overall cost-effectiveness of information systems	4.6	3.6
Monitoring of the Department's performance in delivering services to users	4.6	3.1
The alignment of the information systems plan with the corporate plan	4.6	3.4
How up to date the hardware is	4.5	4.1
Documentation to support training	4.5	3.5
The degree of personal control users have over their systems	4.3	3.7
Procedures for avoiding software piracy	4.2	3.6
Short lead times for the development of new systems	4.2	2.8
The measurement of benefits derived by the user from the system	4.2	3.1
Ability of the system to enrich the working experience of the user	4.1	3.8
Help with database or data model development	4.1	3.2
Standardisation of hardware	3.9	3.6
The use of a service level agreement with the ICT Department	3.9	3.1
Increasing the portfolio of applications	3.9	3.5
Access to external databases through the system	3.4	2.7
Ability to conduct computer conferencing with colleagues	2.8	1.9

The question of how to develop a single measurement of satisfaction has much in common with the multi-attribute models of attitude discussed in marketing research literature. In market research, two models are widely used, the adequacy–importance model (Bass & Talarzyk 1973) and the Fishbein model (Fishbein 1972). A good (and quite technical) account of both of these models is given by Bettman, Capon & Lutz (1975). The salient points of each are briefly outlined here.

The adequacy–importance model is defined as follows:

$$A_j = \sum_{i=1}^{n} I_i B_{ij}$$

where

A_j = attitude towards brand j

I_i = importance of weight given to attribute i

B_{ij} = belief as to the extent to which attribute i is offered by brand j

n = number of attributes.

The Fishbein model is as follows:

$$A_j = \sum_{i=1}^{n} a_i b_{ij}$$

where

A_j = attitude towards brand j

a_i = evaluative aspect of attribute i, its goodness or badness

b_{ij} = strength of belief that brand j possesses attribute i

n = number of attributes.

It is clear that both these models can be adapted to the data in this study, for example, in the adequacy–importance model, by substituting local authority for brand and ICT service effectiveness for 'belief as to the extent to which attribute i is offered by brand j'.

There are several problems with this, however. Firstly, and most importantly, both these models assume that the same set of respondents is evaluating each brand. This is not true here where the respondents for each 'brand' are different. Secondly, the number of respondents varies for each local authority, and an adjustment has therefore to be made for this. Furthermore, both models have been controversial in their own right, and there are a number of variants of each. In the form of the adequacy–importance model already discussed, the adequacy and importance of each attribute are first multiplied and then summed over all attributes. The use of multiplication here is a somewhat arbitrary decision (as discussed later). Another variant of the model adds these parameters, yielding a quite different pattern of results (Bettman et al. 1975). The outcome is also affected by the scale chosen, for example, a unipolar scale such as 1 to 5 (as in this research, where a scale of 1 to 6 is used) or a bipolar scale (such as -2 to +2). Typically, the adequacy–importance model assumes a unipolar coding and the Fishbein model a bipolar scale.

Given that the data are unipolar, the adequacy–importance model was applied, modified for the different numbers of respondents as follows:

$$S_j = \sum_{i=1}^{n} \frac{I_i B_{ij}}{R_j}$$

where

S_j = overall satisfaction with authority j

I_i = importance of weight given to attribute i

B_{ij} = performance score for attribute in authority j

n = number of attributes

R_j = number of respondents in authority j.

$i = 1, 38; j = 1, 6.$

Table 5. Performance of local authorities using the adequacy–importance model

Local authority	Satisfaction score	Percentage score
Aston	615	45%
Bunton	661	48%
Caston	699	51%
Dunston	626	46%
Eston	657	48%
Frinton	719	53%

This yielded the overall satisfaction scores in raw form and as a percentage of a possible maximum of 1368 shown in Table 5.

This suggests that Frinton is the best-performing authority and Aston the weakest. The differences are small, however, with a difference of only 8% between best and worst.

A different approach was then considered. The validity of any model also depends on how well it reflects the cognitive process by which respondents code their answers. It had earlier been observed that the multiplication of scores used in the adequacy–importance model is somewhat arbitrary. Indeed, it can be argued that that users are unlikely have a multiplicative effect in mind, as this greatly emphasises the impact of extremes. If this were true, then Table 5 would not accurately reflect relative performance and satisfaction. However, the close correlation observed between importance and satisfaction already noted suggests that there is a cognitive process whereby these factors are somehow related in the respondent's mind. The authors therefore believed that it would be meaningful to investigate the *difference* between these scores and the extent to which the aggregate gap varied between authorities. To do this, a simple gap measure was constructed. A gap score is defined as the attribute's performance score minus its importance score. The gap score for each attribute is shown in Table 6.

A measure of the level of satisfaction (or dissatisfaction) can then be obtained by computing a weighted average gap score as:

$$\frac{\sum_{j=1}^{n} I_j G_j}{\sum_{j=1}^{n} I_j} = \frac{\sum_{j=1}^{n} I_j [I_j - P_j]}{\sum_{j=1}^{n} I_j} = \frac{\sum_{j=1}^{n} [(I_j)^2 - I_j P_j]}{\sum_{j=1}^{n} I_j}$$

where Ij is the importance score, Gj is the gap score and Pj the performance score for attribute j. This is called the raw satisfaction score.

This metric can be used to assess the overall IS satisfaction within each of the six local authorities. The results of this analysis are shown in Table 7.

There is no *prima facie* reason why such a correlation should exist. A number of possible reasons are suggested in the paper, of which user cognitive processes seems to be the most plausible, but there is a need for further research both at the organisational level, to determine whether this pattern is replicated in other contexts, and at the individual psychology level, to investigate whether there is some connection in the way that users think about these issues and exhibit a bias towards ranking more important attributes more highly. The correlation between standard deviation and mean score on the importance scores is also curious, suggesting that there is a high level of agreement about some important items, but considerable diversity of view about others.

The two models, the adequacy–importance model and the gap model (and specifically the 'percentage of achievable satisfaction' variant of this model) provide a good overall measure of the level of user satisfaction with IT service delivery and a fair indication of the relative performance of the ICT unit in each of the six local authorities. The PAS model could be used as a benchmark in any homogeneous group of organisations, not just local authorities or public sectors bodies. Nonetheless, as in all research and metrics of this nature, there are important caveats. For example, in both models measurement is relative. The old canard 'blessed are they that expect nothing, for they shall not be disappointed' should be borne in mind. An organisation that has low expectations may express a high degree of satisfaction with what is, in reality, a poor service. There is also the danger of the Hawthorne-type effect (an account of this remarkable phenomenon can be found at www.accelteam.com/motivation/hawthorne_01.html), where an impression of activity may increase satisfaction levels while not actually adding much by way of value. It would be interesting to revisit these authorities after several years and establish if the results and the rankings have changed.

At another level, our research has revealed considerable variability in how users perceive their organisation's ICT department as a deliverer of services. Analysis has revealed that there were substantial gaps between importance and performance on measures that users considered to be highly important determinants of ICT delivery effectiveness.

The exploration of effectiveness, particularly ICT effectiveness, is a difficult research problem, and it is hoped that this paper has cast some light on this difficult issue. Reducing a complex matrix of issues to a single parameter risks misinterpretation and, indeed, misuse. Nonetheless, our approach has shown that these issues and problems do have a definable structure and that within UK local government, at least, there are considerable inter-authority differences in performance. This methodology could readily be extended to other homogeneous groups and, possibly, with some modification, to heterogeneous groups. Perhaps most importantly, the knowledge base and user orientation of ICT staff were found to be the most important features in explaining users' overall opinion of their ICT department as a deliverer of quality services: an effective ICT strategy can be badly damaged if the people who deliver it do not have good 'people skills'.

Acknowledgements

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Towards bridging the marketing information gap: an overview

Peet Venter,* René Pellissier† & Johan Strydom‡

Information to support decision-making is one of the critical resources available to the organisation. Yet evidence suggests that the use of this resource is not optimal. In the case of marketing decision-makers, there is sufficient evidence to suggest that there is considerable dissatisfaction with the availability of marketing intelligence. While the use of technology itself has many benefits, it would seem that most of the problems relate to behavioural issues, and specifically to understanding and implementing marketing decision-makers' information requirements. The paper suggests several strategies to deal with this problem.

Introduction

When asking executives to identify key resources, there is little doubt that information would feature prominently in most organisations as a key resource. In fact, it could be argued that management is nothing but an information-processing function, using information as a raw material for management decision-making and the development of knowledge. This is the basis of a culture of market orientation, which refers to the organisation's gathering, dissemination and response to market intelligence.[1] Various authors (for example, Nel, Pitt & Van Erkom Schurink 1996; Ruekert 1992; Chan & Chau 1998; Greenley 1995) have found a positive correlation between the market orientation of the organisation and various measures of success, such as return on investment (ROI), sales growth and new product success.

The marketing function plays an important role in making decisions based on external information, and therefore plays an important role in establishing a market orientation culture. Despite the importance of information and information technology (IT) for marketing, there are indications that organisations are not realising the potential of information. The following findings support this statement:

- Jiang, Klein, Motwani & Balloun (1997: 116) found that 47% of a sample of marketing decision-makers in an American survey were dissatisfied with their marketing intelligence systems. Similar results were reported by Venter (2000), who found that 52% of South African marketing decision-makers regard the quality of marketing intelligence in their organisations as 'fair' to 'poor'. This finding was not limited to South Africa, since a broader international sample of managers also surveyed by Venter reported a dissatisfaction level of 45% with market intelligence.
- A study on knowledge management published online in the *Benchmarking Exchange* (1999) reported that 85% of respondents felt that costly mistakes were made at some time in their organisations because the best available knowledge was not available at the right time, in the right format and at the right place.

These findings strongly suggest that there are significant levels of dissatisfaction with the quality of marketing intelligence available to marketing decision-makers. The objectives of this paper are therefore to:

- Identify reasons for the dissatisfaction of marketing decision-makers with marketing intelligence
- Propose recommendations for addressing this problem.

As a starting point for addressing these objectives, it is necessary to examine the business intelligence (BI) process.

Overview of the role of business intelligence in information delivery

Business intelligence in the broadest sense refers to the process of gathering and disseminating information for marketing decision-making from the external environment (Pellissier 2001: 101). This definition suggests that the terms 'business intelligence' and 'marketing intelligence', in the sense of input into the decision-making process, can be used interchangeably, since both refer to the gathering and dissemination of information in support of the decision-making process. Figure 1 illustrates the role of business intelligence in the hierarchy of information delivery systems. This categorisation of information delivery systems is based on a broad study of software conducted by Pellissier & Moorcroft (2000). A definition of each of the categories follows.

Quadrant 1: Office automation

Spencer (1994) describes office automation as "the application of computers and communications technology to improve the productivity of clerical and managerial office workers". It "involves the integration of all information functions in the office, including word processing, electronic mail, graphics, desktop publishing and data processing. The backbone of office automation is a local area network, which serves as pathway between users and computers".

The emphasis of office automation was on personal productivity at the time this definition was written. Organisations now realise that substantial synergies can be

1. Market intelligence refers to external information on the market (customers and competitors), while marketing intelligence refers to all information available for marketing decision-making.

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derived from effective group work. This means that, for the purpose of the information delivery classification matrix, Spencer's definition is expanded to include all software that enhances the efficiency of groups. For further clarification of this quadrant, it should be added that office automation is one of the categories of software that has to do with data capturing, time saving and the achievement of day-to-day efficiencies.

Quadrant 2: Database applications

Turban & Aronson (1998: 80) define a database as "a collection of interrelated data organised to meet the needs and structure of the organisation and can be used by more than one person for more than one application". They add that the database management system (DBMS) is the software program that creates the database, allows for easy single access to the database, and facilitates the adding, updating, deleting, manipulating, storing and retrieving of data. This means that the DBMS permits organisations to centralise data and thereby manage data efficiently.

Quadrant 3: Systems applications (with a focus on ERP)

This quadrant consists of online transaction processing (OLTP) of all aspects of business information provided within one integrated solution, and, more specifically, the enterprise resource planning (ERP) systems. ERP is defined by Deloitte Consulting (1998) as many information systems that work together with the aim of coordinating efforts throughout the organisation in order to share information, automate processes and produce and access information in a real-time environment. This quadrant's focus is therefore on the enhancement of organisational efficiencies.

Quadrant 4: Business intelligence

This quadrant includes software that supports business intelligence in an organisation. The definition of business intelligence is taken from Vedder & Vanecek (1999: 108): "Competitive Intelligence or Business Intelligence can be defined as both a process and a product. In the former sense, Competitive Intelligence involves the legal and ethical means that a company uses to utilise information. On the product side, it provides insights into the activities of the competition. This information can also include the present and projected behaviour of suppliers, customers, technologies, markets, products and services, and the general business environment."

The computer systems that support business intelligence comprise data warehouses, business intelligence tools and strategic decision support systems. The data warehouses serve as a platform for BI tools, which are designed as front ends to the data warehouses and are known as online analytical processing (OLAP) systems and data mining software. Strategic decision support applications such as executive information systems and some of the ERP extension software are also included in the classification of BI systems. This quadrant addresses, in essence, the problem of fragmented data in operational systems, facilitating enhanced decision-making from a complete integrated knowledge base position.

This categorisation suggests that business intelligence is a central function serving all decision-makers within the organisation. To clarify: marketing decision-makers will access and use the information that they require for marketing decisions, while top management will access and use the information applicable to them. In addition, it should be accepted that all delivery platforms could be integrated to present the user with a single point of entry and a consolidated view. Figure 2 illustrates the integrative role of business intelligence and its role in supporting marketing decision-making.

Systems applications (SA) Online transaction processing, Enterprise resource planning systems (e.g. SAP, Baan, JD Edwards) *Internet information focus*	**Business Intelligence (BI)** Information warehousing and mining (e.g. SAS, Hyperion, Cognos, Business Objects) *External information focus*
Database applications (DB) (e.g. Orale, Lotus Notes, Microsoft Access)	**Office automation (OA)** (e.g. e-mail, desktop publishing, word processing, fax, video conferencing)

Source: Pellissier (2000:115)
Figure 1. Information delivery categories

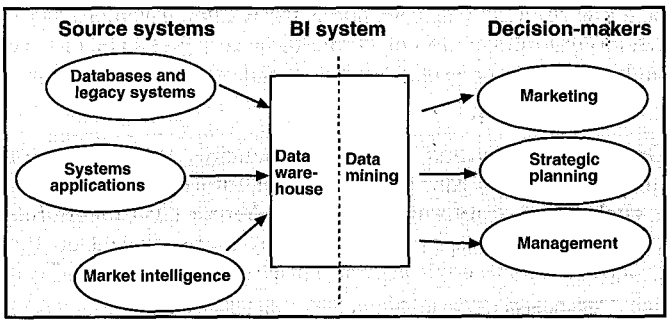


Figure 2. Typical business intelligence flow diagram

The illustration suggests that the business intelligence system obtains information from database applications (which may include legacy databases), systems applications (for example, ERP and point-of-sale systems) and market intelligence (customer and competitor information). This information could be stored in a data warehouse, and is extracted from the warehouse using data-mining tools. This is based on a broad definition of data mining, which presupposes that data mining can range from simple data extraction (for example, using SQL or Business Objects) to sophisticated intelligent data mining techniques (for example, SAS). Marketing and other management functions are typical users of business intelligence.

This section provides a background of the nature of business intelligence and the setting for interpreting the research results to be discussed.

Primary research

The study draws on three primary research surveys:

1. Pellissier & Moorcroft (2000) surveyed 102 South African IT managers using a self-administered questionnaire distributed by e-mail.
2. Venter (2000) conducted an online survey among 106 management decision-makers internationally.
3. Venter (2000) conducted a mail survey among 128 South African marketing decision-makers.

Supporting information was drawn from appropriate sources of secondary information.

Reasons for dissatisfaction with the quality of business intelligence

Various reasons for the dissatisfaction of marketing decision-makers were identified from the three studies mentioned and are discussed.

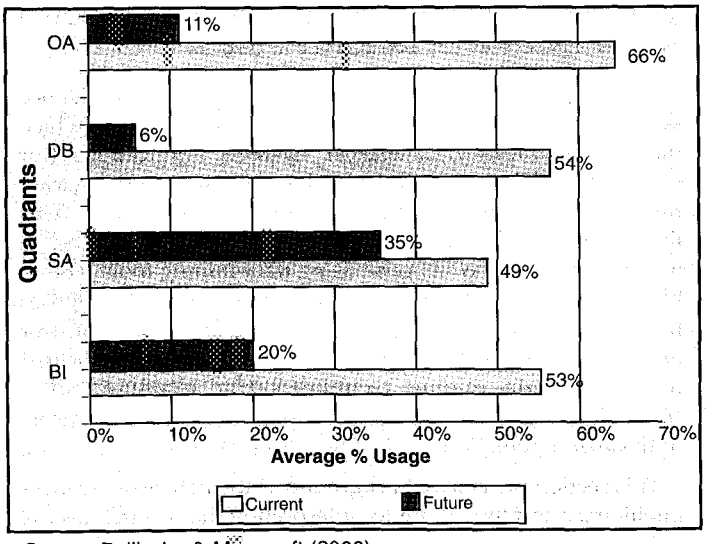
1. implementation of business intelligence systems

While conventional wisdom would suggest that external information is important to management decision-making, IT investment patterns do not seem to support this. In the study conducted by Pellissier & Moorcroft (2000), it was found that only 53% of organisations have invested in business intelligence. Only 20% were planning to invest in it in future. This suggests lower overall investment than in systems applications with an internal focus, as depicted in Figure 3.

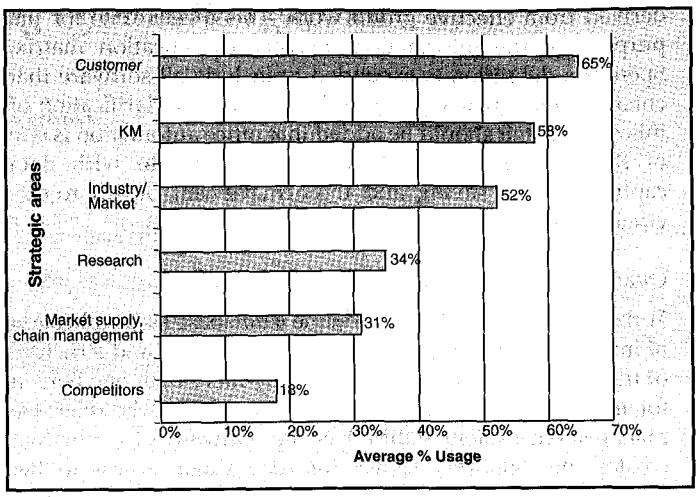
Another possible source of dissatisfaction might occur in the way that business intelligence systems are implemented. For example, Figure 4 suggests that customer data is a high priority for IT managers, but competitor information seems to be a low priority. This contradicts the results of Venter (2000), who found information on competitor strategies to be of very high priority to marketing decision-makers.

2. The content gap

One of the obvious aspects influencing the quality of information is relevance. To this extent, information content is a vital driver of information quality. Venter (2000) identifies various possible types of information content based on the generic 'business environment' structure. Table 1 provides a



Source: Pellissier & Moorcroft (2000)
Figure 3. Adoption of information delivery systems



Source: Pellissier & Moorcroft (2000)
Figure 4. Applications of BI

breakdown of the various categories of content identified. While not exhaustive, it provides an overview of the main categories of information that marketing decision-makers are exposed to regularly. A series of questions on information content was included in the South African survey (Venter 2000).

Respondents were asked to rate each of the content categories as follows:

- How important it is in decision-making (with 1 meaning 'not important at all' and 5 meaning 'critically important')
- How satisfied marketing decision-makers are with its availability (with 1 meaning 'not satisfied at all' and 5 meaning 'extremely satisfied')

This analysis (see Figure 5) yielded some interesting findings:

- The single biggest 'content gap' relates to the requirement for competitive intelligence and analysis – knowledge about competitors' strategies.
- The other large gaps relate to customer feedback, customer demographics and sales forecasts. All of these categories are related to knowledge about customers.

Figure 6 illustrates information content broadly categorised according to the environmental sources of information. This would suggest that the biggest gaps occur in the area of information about the market environment – the same focus area as business intelligence.

Why do the content gaps occur? There are several possible reasons:

- Organisations would naturally tend to focus on information that is easy and relatively inexpensive to gather. This is true of information on the macro-environment (such as economic forecasts) and internal information (such as financial information). Market intelligence (namely, information on competitors and customers) is relatively expensive to gather and requires a significant effort and commitment of resources.
- While organisations invest large amounts of capital in IT and software, business intelligence is not addressed by these systems as a matter of course. This might indicate that organisations focus on the presence of technology as a solution to all information problems, which it clearly is not.

Table 1. Information content categories

Macro-environmental	Industry or market information	Internal organisational information
• Economic indicators • Technology • Social trends • Information on regulation	• Customer demographics • Direct customer feedback • Competitor strategies	• Sales forecasts • Company financial information

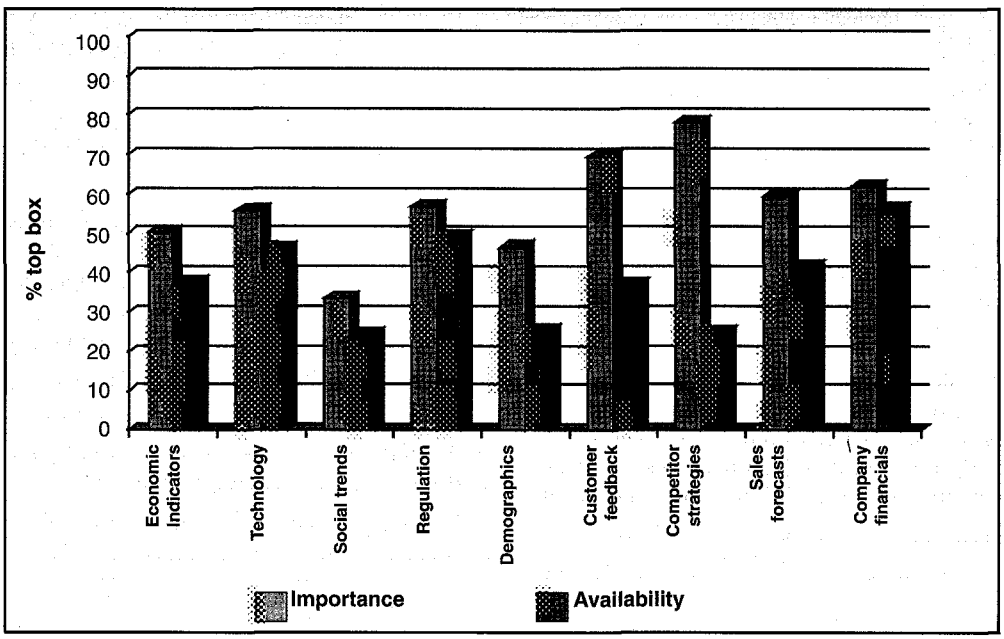


Figure 5. Gaps in availability of information types

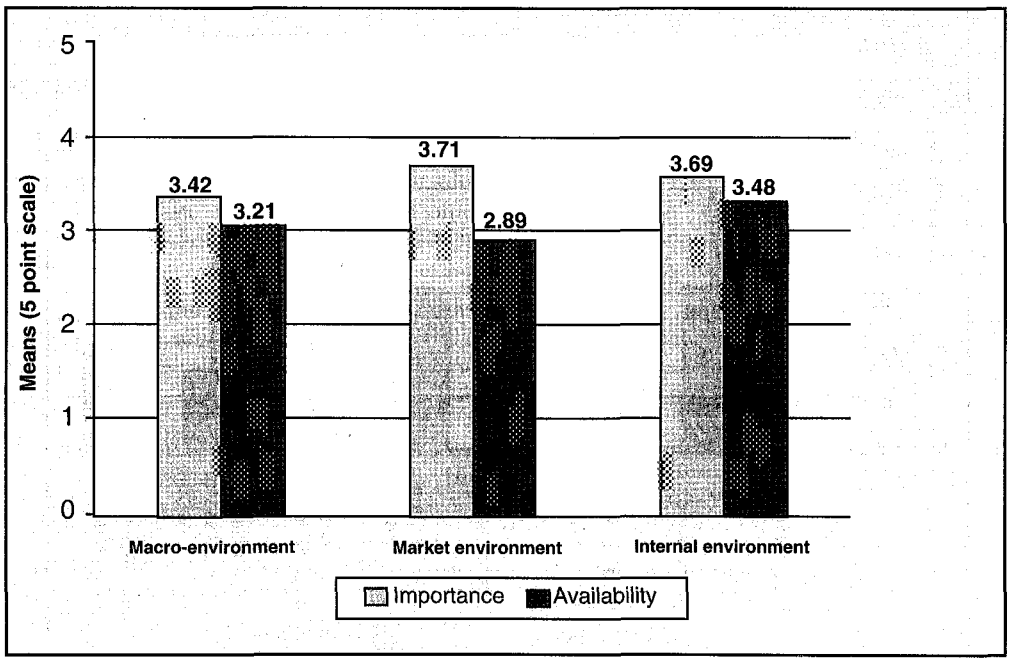


Figure 6. Information gaps per environment

Table 2. Decision support categories

Decision phase	Reports
Intelligence gathering (Step 1)	Status reports Trend reports Exception reports Ad hoc queries
Analysis (Step 2)	Models and analytical tools
Choice (Steps 3–5)	Alternatives 'What if?' Feedback and follow-up

- The often obscure organisational positioning, fragmentation and lack of resources allocated to the organisations responsible for marketing intelligence tend to allow them to focus only on gathering secondary and relatively 'cheap' information.
- Lack of knowledge in the organisation of the support that competitive intelligence and market research could deliver to marketing decision-makers, and how this could be done.

3. The format gap

Another aspect of information quality is addressed in this section, namely the format of the information available to management decision-makers. The different format categories used were identified from Ahituv & Neumann (1990: 41), and are based inherently on the classical decision-making process:

Step 1: Gathering relevant information

Step 2: Analysing information

Step 3: Generating alternatives

Step 4: Evaluating alternatives

Step 5: Selecting the most appropriate alternative.

These were categorised as depicted in Table 2.

Repondents were again asked to rate each of the content categories as follows:

- How important it is in decision-making (with 1 meaning 'not important at all' and 5 meaning 'critically important')
- How satisfied marketing decision-makers are with its availability (with 1 meaning 'not satisfied at all' and 5 meaning 'extremely satisfied').

The following conclusions could be drawn from the results depicted in Figures 3 and 4:

- If Figure 7 is compared with Figure 5, content would seem to be generally more important than the format in which information is presented.
- The largest gaps occur in the areas of analysis and choice (Figure 8). This would suggest that the focus is generally on providing 'raw' information, such as status reports, exception reports and ad hoc queries on request. Very little analysis is done to add value to the information and support the analysis and decision phases.

Again, there are possible reasons for these gaps:

- The shortage of the right information content makes it difficult to gain real depth in analysis.
- The gap between IT and the rest of the organisation was a constant theme of the results (Venter 2000), and would seem to indicate that the lack of analysis and decision support could be a function of this gap.

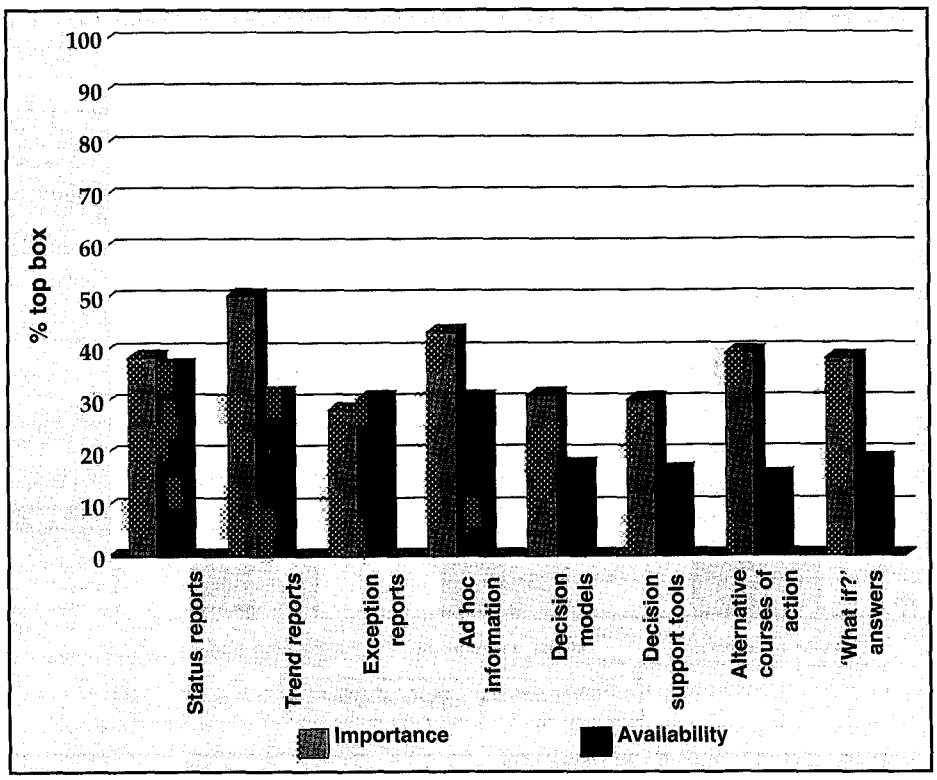


Figure 7. Gaps in importance and availability of information formats

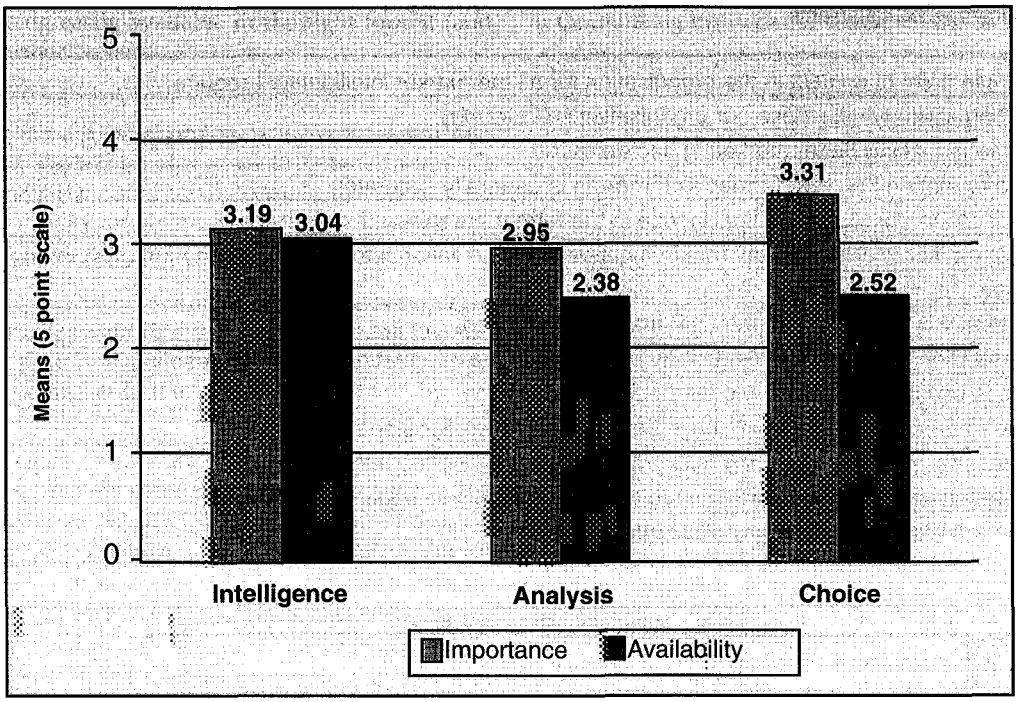


Figure 8. Gaps between importance and availlability of information format categories

Table 3. Use of IT applications

Source	International (%)	South African (%)
Decision support systems	45.3	31.7
Expert systems	11.3	25.8
Internet	92.5	74.0
Intranet	55.7	45.1
Physical library	37.7	44.3
Data warehouse	34.9	40.2
Geographical information systems (GIS)	17.0	34.4

Source: Venter (2000)

- However, management decision-makers are not generally heavy users of technology and seem to focus on office automation and the Internet when it comes to using IT (see Table 3).
- A further reason could be the lack of IT skills among managers. Not all managers are technologically oriented, and lack of skills, or even technology aversion, may further explain the results.

4. The gap between the IT function and decision-makers

The IT function, by its very nature, is a service function. This means that every IT project has a 'user' whose needs have to be addressed. However, as Taylor-Cummings & Feeny (1997) point out, the perceived culture gap between IT specialists and their counterparts (users of IT) has been blamed for the failure of many projects and for systems problems. Despite many efforts to overcome it, the problem has persisted. Therefore, not surprisingly, this problem also surfaced in the surveys by Venter (2000). Figure 9 and Table 4 show the results for both the South African and international samples on 13 statements relating to market intelligence. The results were very similar for both samples (marketing and management decision-makers) and followed the same patterns. As regards the role of IT, the results show:

- Management and marketing decision-makers are generally positive that IT improves the quality of decisions and makes it easy to get access to information.
- There seems to be a feeling that management information requirements are not taken into account when developing marketing information systems and that the IT department does not understand these information requirements.

The following could be possible reasons for the gap between IT and decision-makers:

- The development processes followed by the IT specialists may not be the best development process to facilitate systems development in a management environment.

Table 4. Marketing intelligence statements

1. I have a single point of contact in the organisation for all the market intelligence I require.
2. Our marketing strategy influences our organisation's IT strategy.
3. IT assists me in making better marketing decisions.
4. Marketing information I receive for decision making is generally accurate.
5. It is easy for me to obtain market intelligence in the format I require.
6. As a user of market intelligence, my requirements are always taken into account when marketing information systems are designed.
7. IT makes it easy to get access to the right market intelligence.
8. In our organisation, the IT department really understands the information needs of marketing.
9. Information is usually available to me by the time I need it.
10. I often have to process market intelligence before I can make decisions.
11. I routinely receive market intelligence relevant to my responsibilities without asking for it.
12. Our organisation uses market intelligence to create a competitive edge in the industry.
13. I often feel as if I am swamped by useless information.

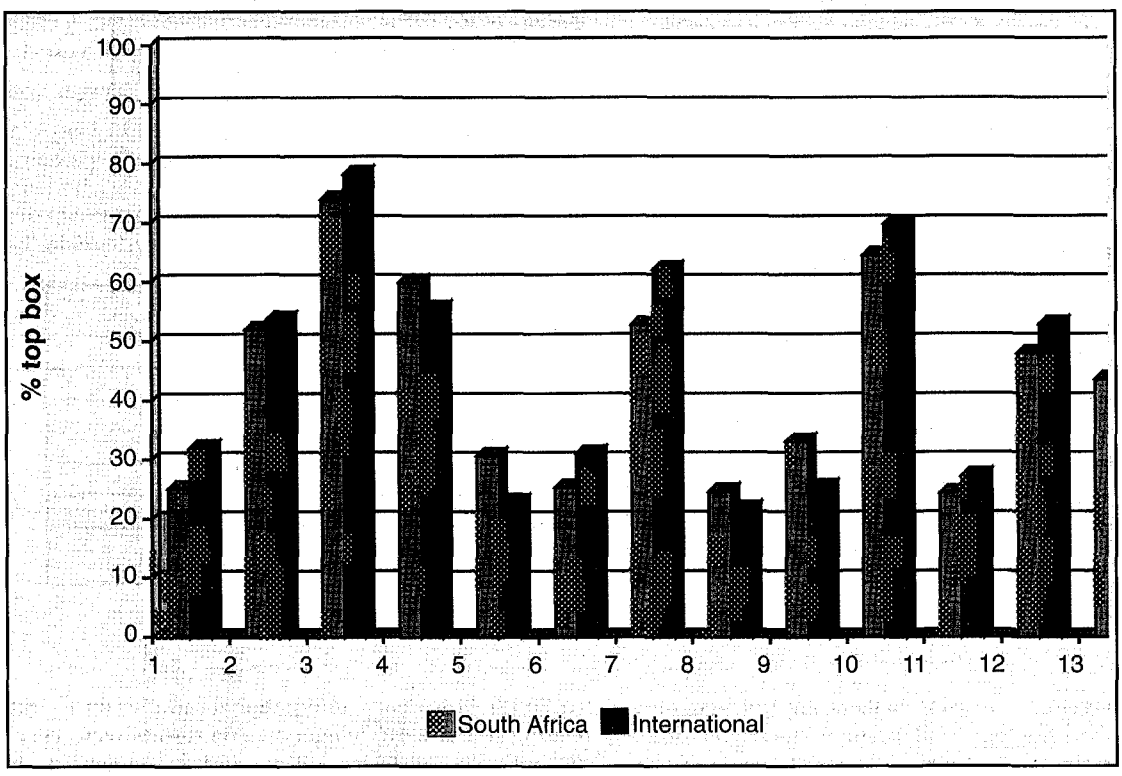


Figure 9. Marketing intelligence statements

- There is a mutual lack of knowledge about one another's business and business processes.
- The mere presence of IT does very little for management decision-making, but makes a significant impact on general productivity. IT is often used to automate existing processes or to improve office production, and not to develop knowledge and insights and to share these. Nonetheless, the information delivery infrastructure exists in many organisations, which seems to indicate that the problem may be cultural and behavioural rather than related to technology.

5. Problems with business intelligence quality

Information quality has always been associated with relevance, accuracy, timeliness and format (Ahituv & Neumann 1990). In other words, having the "right information at the right time in a way it can be used" is a key to satisfactory marketing intelligence quality. Using Figure 5 again as a reference, it seems that management decision-makers are generally satisfied with the accuracy of marketing intelligence. However, there are two key areas determining the perception of information quality that respondents were relatively unhappy with, namely:

1. Information being easily available in the right format (and not needing further processing)
2. Information being available in a timely fashion.

In addition to these quality problems, it would seem that most marketing decision-makers feel that they do not get information proactively, and most certainly that there is no single point of contact for obtaining marketing information.

There are several possible causes of these perceptions:

- Functional silos are still very much a reality. For example, in an organisation one might find that competitive intelligence processes are dealt with by one department, marketing research by another and the customer database by yet another.
- Business intelligence staff often do not really understand their clients' requirements and are therefore not always in a position to respond as required. This could also be the result of lack of proper processes for the identification of requirements and solutions.
- Managers feel that they have lost control over the firm's information resources. However, systems are being developed piecemeal and haphazardly, reflecting a lack of proper management of organisational IT systems (Jiang et al. 1997: 15–16).
- Market intelligence-based measurements (for example, customer satisfaction measurement) are still regarded as far less important than other key metrics (such as profitability) by most top managers (Meehan 1999: 122). This means that there is a lack of top management commitment to market intelligence gathering and other 'soft' information resources.
- The market intelligence functions are often quite simply understaffed, lack authority and do not have a budget sufficient for doing their jobs properly. This is supported by Meehan (1999: 125), who indicates that the success of market intelligence is dependent on the presence of an organisational structure providing opportunities for customer relationships at all levels of the organisation. In addition, a learning culture is required to facilitate the responsiveness to customer needs and competitive actions. However, as Meehan points out, two common mistakes are made in this regard. Firstly, market intelligence is seen as an end in itself (for example, gathering information because everybody does). It is also often reduced to 'corporate rhetoric' – in other words 'lip service'. Therefore, the structure and culture necessary to facilitating successful market intelligence processes do not exist in many organisations. This is often compounded – as Meehan (1999: 126) points out – by top management's lack of commitment to market intelligence.

Recommendations for overcoming decision-support quality problems

This section provides an overview of some of the recommendations that are apparent from the results of the study and various other sources. While many of the recommendations may seem obvious, the fact is that many organisations have neglected these functions in favour of operational efficiencies or other objectives.

1. Centralising the decision-support function

Centralising the information functions of the organisation is not a new concept, and has manifested itself mainly in the appointment of a chief information officer (CIO) in many large organisations, responsible for all aspects of IT. However, this phenomenon has created its own set of problems and issues (Earl & Feeny 1997). From a decision-support point of view, it would seem that the single biggest problem is the focus on technology rather than information. A far more promising development in this arena is the emergence of the chief knowledge officer (CKO). This role is currently so new that it lacks definition and clarity of its role in the organisation (Earl & Scott 1999).

The potential of the CKO lies in the possibility of combining all of the traditional management information systems (MIS), functions with business intelligence and knowledge management functions into a unit supporting decision-making across the organisation. While the mere appointment of a CKO is not a guaranteed solution to all problems, any suitable solution should address decision-support problems in the following way:

- A focus on knowledge instead of technology would bring a focus on behaviour and culture supporting the use of knowledge.
- It could provide an understanding of the content of knowledge, information and decision-making in addition to 'hard' systems and processes.
- It could assist in creating a single point of contact for business intelligence requirements and help to eliminate functional silos.
- It could provide a central function for determining and managing user requirements and ensuring that processes are put in place to facilitate the flow of quality information – namely, relevant, accurate, timely information in the right format. Use of centralised and intelligent systems could even ensure that information is 'pushed out' to users before they even ask for it.

2. Top management commitment to decision support

Top management commitment has proved to be a key to the successful implementation of many strategic initiatives. In many organisations, top management has taken the lead in being focused on high quality decision support. Unfortunately, in many other organisations, this has not happened. In this light, some of the actions that should be taken to garner top management support are:

- Identify a top management 'sponsor' of decision support to rally support at higher levels in the organisation.
- Communicate decision-support successes to top management – in other words, establish the perception that business intelligence is creating a competitive edge for the organisation.
- Deliver results in the form of useful decision-support information to top management, in the format that they require.

3. Creating an information and knowledge culture

Creating the right culture is an important key to the success of business intelligence. Actions that may assist in establishing a

culture conducive to the creation and sharing of information and knowledge include:

- Top management should advocate the use of information in decision-making and should demonstrate openly how they use information in decision-making.
- Employees should be rewarded for the intelligent use of information and, particularly, for sharing information. In other words, information sharing becomes a critical success factor for every staff member.
- Information-based measures (such as customer satisfaction), rather than just financial measures, should become prime organisational objectives.
- An information audit should be conducted to ascertain the current information position of the organisation and the decision-making processes used. The results of the audit should be used to start the development of a comprehensive information infrastructure and organisation.
- A process for rewarding all managers for the extent to which their activities put them in touch with the market should be established. For example, management should be expected to spend significant time with customers.
- Business intelligence systems should be made adaptable to individual user needs, rather than standard 'one-size-fits-all' systems.
- It is necessary to understand the information quality issues for management in the organisations. In what format do they want information? How often and when do they want information? What is the level of accuracy they require?
- The results also show that managers do not necessarily understand their own decision-making roles. The level of decision-making at executive and middle management levels should be clarified, and the information required to support that identified.
- 'Power users' of information should be identified and used in gaining the support of other users of information.

4. Bridging the user–IT gap

The perceived gap between the delivery of IT systems and user requirements is a persistent and difficult problem to address. Taylor-Cummings & Feeny (1997) suggest the following as means to addressing this gap:

- Intensive shared induction processes and group activity for both information systems (IS) and non-IS staff members to create good user–IT relationships.
- Formal team-building processes in a newly formed project team can contribute towards the project directly, and promote sharing of learning on processes and implementation practices.
- Depending on the project context, multidisciplinary teams with the 'right' blend of members should be established. Close proximity and informal communication are key to the success of these teams.

5. IT strategy

The research by Venter (2000) and Pellissier & Moorcroft (2000) suggests that there is room for the implementation of more advanced business intelligence applications. Pellissier (2001) also suggests that the IT strategy should support and align with the business strategy. This implies an IT-centric organisation, in which IT is the central infrastructure of all processes in the organisation. The subtle implication of this is that the technology becomes less important, and processes, behaviour and decision processes become more important. According to Pellissier (2001), this would suggest a pervasive approach to IT implementation, which implies the following role for IT:

- Facilitating responsiveness to future change
- Anticipating the future needs of the business
- Providing transparent, accessible and proactive IT systems
- Creating an infrastructure with integration at the front-end, but with applications custom-designed to suit the business requirements
- Strategic business orientation and process structure.

Conclusion

There is little doubt that IT is an important part of the future of all organisations. However, it would also seem that IT has under-performed in the area of business intelligence, and specifically in the support offered to marketing decision-making. There are strong indications that these problems may not be limited to the marketing function, but may be applicable to other functional areas (especially those that depend on external information). There are many possible reasons for this, many of which are specific to the organisation itself. However, it would seem clear that most of the problems relate to the behaviour and processes relating to IT and the management of information and knowledge. Organisations have to consciously develop strategies for enhancing the value of IT in supporting management decision-making. This paper presents some possible solutions to that problem. However, the problem is so complex that each organisation would have to realise that it is not a project but rather the adoption of a philosophy and the consistent implementation of that philosophy that will help them realise the true value and potential of their IT investment.

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A taxonomy of knowledge management software: origins and applications

Peter Tyndale*

A large amount of software has been described as knowledge management software. This paper examines, evaluates and organises a wide variety of such knowledge management software. It looks at their origins and their opportunities in the knowledge management arena by examining the literature related to the selection and evaluation of the knowledge management software available on the software market.

The software under investigation is either information technology (IT) software or purpose-built knowledge management software, used in the pursuit of knowledge management, and the context of this investigation to establish whether the 'old software' is being successfully utilised in an apparently 'new' field of knowledge management.

For the purposes of this paper, 'new software' is defined as information technology software, that has been developed for a specific function, that is not a derivative of other software or another product (in other words, there is no predecessor software or product). The converse is true of 'old software'.

In this paper, only mainstream products are examined, as defined by the leading knowledge management analysts and publications, such as the Yankee Group, Gartner, the Delphi Consulting Group, Knowledge Management World *and* Knowledge Management News.

Introduction

This paper restricts the discussion of knowledge management software to either established information technology-based software (borrowed from other disciplines that have entered into the knowledge management arena, such as information technology software with extended functionality), or information technology-based software that has been designed as knowledge management software from its inception.

What is knowledge management software?

Definition of knowledge management software

Knowledge management software can be defined as software that supports the performance of applications, activities or actions such as knowledge generation, knowledge codification or knowledge transfer (Ruggles 1997). Such software also promotes and enables the knowledge process in order to improve decision-making. Not all information technology is computer based, but much emphasis is placed on these electronic tools because of their dynamic capabilities, quick evolution, and organisational impacts (Grantham & Nichols 1993). Areas such as data access, online analytical processing, and the use of the Internet and groupware systems for decision support and knowledge management are becoming the cornerstones of modern management.

Technology

Technology is a powerful enabler of knowledge management objectives. It can be said that the goal of knowledge management software is not to manage knowledge in itself but to facilitate the implementation of the knowledge process. Such software can facilitate the process of generating, structuring and sharing knowledge through the use of information technology. It can also be used to clarify assumptions, speed up communications, elicit tacit knowledge, construct histories of insights and catalogue them (Grantham & Nichols 1993). In some cases, it may be able to automate certain kinds of knowledge work in these areas. In general, however, the role of the tool is purely that of an enabler, with the onus on humans to conduct knowledge activities. The software is designed to ease the burden of work and to allow resources to be applied effectively to tasks for which it is most suited. Despite this, Malhorta (1998) cites examples where no direct correlation was found between information technology investments and knowledge management or business performance. He adds that this failure can be attributed to organisations' ignorance of ways in which knowledge workers communicate and operate through social processes of collaborating, sharing knowledge and building on one another's ideas. A KPMG report on knowledge management also found that, while many organisations have the necessary technological infrastructure in place to support knowledge management, its application has

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not been entirely focused (Parlby 1997). In other words, companies are not exploiting the full potential of the technology they already possess. Furthermore, many knowledge management systems seem to provide elaborate document management rather than actual knowledge management. Knowledge-focused organisations require information systems that maximise knowledge, rather than just manage data (Mellor 1997). This suggests that organisations need the focus of a well-defined business strategy in order to establish the appropriate priorities. With this in mind, it is important to consider a number of critical issues, or design goals, when developing or selecting a set of technologies for knowledge management.

It is important to remember that the knowledge management industry and subsequent knowledge management technologies are still in their infancy. Knowledge management solutions of the future are likely to continue to combine existing technologies with significant enhancements. Technology that seems embryonic today will mature and most likely become obsolete within the next five years.

Knowledge management software

Knowledge management software has to take into account that knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. Knowledge originates and is applied in the minds of individuals, and it often becomes embedded in documents or repositories, as well as in the routines, processes and practices of organisations.

In essence, no knowledge management software stands alone; knowledge management software can only be understood in the context in which it is used and the methodologies that support it. If there is too much focus on the mechanics of knowledge management, we may misrepresent knowledge itself, as there are many different types of knowledge within individuals or organisations, and this richness of knowledge may be lost if we place too great an emphasis on one particular type of knowledge or knowledge culture, as this is likely to 'hollow out' the knowledge of the individual or organisation and leave it competitively vulnerable (since knowledge has a finite shelf life).

Knowledge management software can potentially be used to create 'gatekeepers of knowledge', who allow access only to a privileged few. As early as 1597, Sir Francis Bacon identified the issue that knowledge itself is power in his *Religious Meditations of Heresies*. Thus, knowledge may be jealously guarded, and, if this is the case, it may not be possible to utilise knowledge management software, as this type of culture or environment will not be receptive to knowledge sharing. Indeed, Alavi & Leidner (1999) state that studies on the use of technologies such as Lotus Notes have not shown a change in information sharing and communication patterns. Rather, organisational members who tended to communicate regularly and frequently without Lotus Notes now communicate regularly and frequently with Lotus Notes, whereas members who communicated less regularly and less frequently before the implementation of Notes continue to communicate less regularly and less frequently (Vandenbosch & Ginzberg 1997).

Evaluation of knowledge management software

Although some work has already been undertaken with regard to knowledge management software evaluation and classification (Ruggles 1997; Angus & Patel 1998; Angus, Patel & Harty 1998; Jackson 1999; Wensley 2000), it appears to be in its infancy.

Ruggles (1997) and Jackson (1999) have taken each of the knowledge management activities and sub-divided them further. For instance, Ruggles (1997) claims that knowledge generation requires software that enables the acquisition, synthesis and creation of knowledge. (Anything that pushes individuals to think beyond their current boundaries can be considered such a tool.) Jackson (1999) divides communication into sharing, collaboration and group decisions. Angus et al. (1998) also sub-divide the four knowledge management activities identified by Angus & Patel (1998) and use them to evaluate five knowledge management applications.

Ruggles (1997) claims that knowledge codification is the capture and representation of knowledge, such that it can be accessed and re-used, either by an individual or by an organisation, and transferred. Angus & Patel (1998) and Angus et al. (1998), however, believe that after knowledge has been 'gathered', the process of organising and refinement take place, including such activities as cataloguing, filtering, linking, indexing, contextualising, mining, projecting, compacting and collaborating, and that knowledge transfer involves the movement of knowledge from one location to another and its subsequent absorption.

Ruggles (1997) has simply classified various knowledge management software according to the primary knowledge management activities, without describing the technique used to achieve the results.

Jackson (1999) investigated 59 knowledge management products over a 12-month period. He examined both the software and technology approaches for knowledge management. This resulted in a qualitative investigation of products ranging from small component technologies, such as search engines, to large commercial groupware systems.

This resulted in the following software categorisation:

1. Document management systems
2. Information management systems
3. Searching and indexing systems
4. Expert systems
5. Communications and collaboration systems
6. Intellectual asset systems

Angus & Patel (1998) and Angus et al. (1998) take this a step further by evaluating five knowledge management applications using the categories and respective actions. Each programme is investigated to identify which of the actions it is capable of performing, under each category.

Wensley (2000) simply discounts any software that is not web based, believing that knowledge management software will only be utilised in an intranet or Internet environment. This may be true in the future, but this may actually preclude approximately 95% of current businesses in the United kingdom (UK), namely, the small or medium enterprises (SMEs) that do not necessarily use the Internet or have networked personal computers to form an intranet, but still require knowledge management facilities.

Attributes of knowledge management software

From the review of the literature available, a classification of knowledge management software categories can be created, as

illustrated in Table 1. From this table, it will be possible to identify which software successfully satisfies which attributes.

Table 1 summarises the different categories of knowledge management. Each category has grouped the actions required for knowledge management, and then broken these down into functional areas, which have to be satisfied by the available software if knowledge management is to be successfully handled electronically.

From this compartmentalisation of knowledge management, it will now be possible associate the 'actions' with the technologies available.

Classification of knowledge management software

For the purposes of this paper, 'new software' is defined as information technology software, that has been developed for a specific function and that is not a derivative of other software or another product (in other words, there is no predecessor software or product). The converse is true of 'old software'. The age of the software can be established by viewing the product history, functionality or even the date stamps and names of the executable binary files from the software manufacturer.

On the basis of existing literature (Ruggles 1997; Angus & Patel 1998; Angus et al. (1998); Jackson 1999; Wensley 2000), a number of technologies are commonly associated with the term 'knowledge management', some of which are newer than others. Each technology type has software associated with it; most of the technologies are either web based, thick or thin client based, or a combination of all three.

The following categories of technology types or organisational processes are most frequently utilised in the context of knowledge management, as defined by the leading knowledge management analysts and publications, such as the Yankee Group, Gartner, the Delphi Consulting Group, *Knowledge Management World* and *Knowledge Management News.*

Intranets

An intranet is a company-wide information distribution system that uses Internet software and technology. It could be a simple HTML file linked on a LAN, a full-blown system with dedicated server hardware, or anything in between.

Intranets are typically used to give employees access to company documents, distribute software, enable group scheduling, provide an easy front-end to company databases, and

Table 1. Knowledge management categories

Ruggles (1997)	**Angus & Patel (1998); Angus et al. (1998)**	**Jackson (1999)**	**Wensley (2000)**	**Tyndale (2000)** Knowledge development life cycle model
Generation • Acquisition • Synthesis • Creation • Fusion • Adaptation	**Gathering** • Pull • Searching • Data entry	**Gathering** • Pull • Searching • Data entry / Optical character recognition (OCR)	**Generation** • Communication • Culture • Barriers	**Creation** • Capture • Generation • Gathering • Absorption • Assimilation
Codification • Auditing • Categorisation	**Organising** • Cataloguing • Filtering • Linking • Indexing	**Storage** • Filtering • Linking • Indexing	**Codification** • Conceptual analysis • Rules	**Organisation** • Interpretation • Filtering • Codification • Categorisation • Amalgamation
Transfer • Face-to-face • Collaboration • Dissemination	**Refining** • Contextualising • Mining • Projecting • Compacting • Collaborating	**Communication** • Sharing • Collaboration • Group discussion	**Refinement** • Rule deduction • Filtering • Classification	**Distribution** • Publishing • Face-to-face • Dissemination • Transmission
	Disseminating • Flow • Push • Sharing • Notify	**Synthesiss** • Analysis • Creation • Contextualisation	**Transmission** • Assimilation • Face-to-face	**Application** • Process • Change • Revise • Amendment • Review
		Dissemination • Push • Publishing • Notification		

allow individuals and departments to publish information they need to communicate to the rest of the company.

Typical intranet content includes the corporate directory, calendar of events, policies and procedural manuals and the company newsletter. The most important information will be industry specific, such as supplier information and databases of products.

An intranet is a way of thinking about and organising the way people work with others. It is a method of leveraging the people, and the software they all use, to create something new and better than merely the sum of the parts within that group.

Web portals

Portals can be seen from several perspectives. 'Portal' means 'large door' or 'gateway', indicating that the portal itself is not the final destination but a way of reaching many other places. A web portal is a website, usually with little content, providing links to many other sites that can either be accessed directly by clicking on a designated part of a browser screen, or can be found by following an organised sequence of related categories.

Portals can provide links to all the enterprise-relevant sites (internal content providers) and certain external, relevant information can be found through extended search facilities or by following an enterprise-defined taxonomy, which is usually created by subject matter experts or competency communities, and organised by professional librarians. The extension of the search is limited by usability and technology considerations.

Content management

Content management generally includes not only internal and/or external websites, but also databases, file servers and document management systems. Because of the increasing load of information, web portals or content management provide some personalisation facilities that are usually set manually by the users. These basically define a set of information categories to which the users want easy access, as well as news or changes in web pages they want to be alerted about.

Document management systems

According to Hibbard (1997), a document management system utilises the following activities:

1. Stores files in a central library
2. Controls access to files, both for security purposes and collaboration needs
3. Keeps an audit of activity and changes in the managed documents
4. Searches documents on either content or index terms.

Until recently, document management systems were designed around expensive, highly functional client software reserved for critical, high-return applications, but with the advent of the Internet, document management can be deployed more easily and more affordably.

Now, in addition to traditional client/server systems, document management can include browser-based clients, for users who might need only basic functions. Companies are rapidly buying into document management in all its forms, from the wide deployment of general business applications to the narrower installation of critical ones (Hibbard 1997). These systems are primarily used in the collection, storage and distribution of the artefacts of knowledge contained in an organisation. Many of these systems emulated the paper and library systems. Advanced features of document management systems provide for version control, authentication and translation.

Information retrieval engines

Information retrieval engines are used for indexing, searching and recalling data, particularly text or other unstructured forms – "finding documents, or the information contained in them, in a library or other collection, selectively recalling recorded information. Methods of retrieval vary from a simple index or catalogue to the documents, to a computer-based system. Classification, indexing and machine searching are all systems of information retrieval"(Prytherch 1990).

Relational and object databases

A database is a store of information. The data is stored in tables and categorised by fields. Each group of information is a record. Relational databases are designed to build links or relationships between two or more different tables of information. The relational model is one of the most successful and widely used, but for complex corporate applications, there may be more suitable approaches. An object database management system (ODBMS) offers simpler solutions to applications that involve objects and the relationships among them. Now, with native database support for new types of data, such as spatial, audio and video, and improvements that enable organisations to get new ODBMS applications up and running more quickly, ODBMSs are becoming even more valuable to the enterprise.

Electronic publishing systems

Electronic publishing is the distribution of information and entertainment in digital format, usually including software that allows users to interact with text and images. Most forms of information can be published electronically, but users normally require a personal computer and sometimes a connection to a network or the Internet to access the information. The advent of graphical user interfaces (GUIs) in the late 1980s made electronically published information much more marketable than it had been previously. This, along with the more widespread availability of CD-ROM drives and intense interest in the potential of the Internet, has turned electronic publishing into a mass-market industry after years of being limited to specialist information.

Groupware and workflow systems

Groupware is technology designed to facilitate the work of groups. This technology may be used to communicate, cooperate, coordinate, solve problems, compete or negotiate. While traditional technologies like the telephone qualify as groupware, the term is ordinarily used to refer to a specific class of technologies relying on modern computer networks, such as e-mail, newsgroups, videophones or chat.

The general definition of workflow, according to the Workflow Management Coalition (WfMC) is "the computerised facilitation or automation of a business process, in

whole or part." Workflow technology allows an organisation to automate its business processes to better manage those processes, and therefore better manage their outcomes, be they products or services. Workflow technology will deliver work items (things to do) to appropriate users, and help the users by invoking appropriate applications and utilities (how to accomplish the task). Further, it will allow management and employees to track the progress of the work item through the process and generate statistics on how well the different steps of the process are doing.

Push technologies

The technology of push–pull is deceptively simple; such technology facilitates relevant information to be sent to the clients automatically without the clients' having to make an effort to retrieve information. Push technology, eliminating the need for browsing by pushing Internet content to the desktop, was introduced when PointCast Inc. transformed the screen saver of a personal computer into a news feed. Since then, scores of vendors have attempted to establish niches in the potentially lucrative push market.

Agents

Intelligent software agents are programs that act on behalf of their human users in order to perform laborious information gathering tasks, such as locating and accessing information from various online information sources, resolving inconsistencies in the retrieved information, filtering away irrelevant or unwanted information, integrating information from heterogeneous information sources and adapting, over time, to their human users' information needs and the shape of the information delivery or presentation.

An agent is an autonomous, (preferably) intelligent, collaborative, adaptive computational entity. 'Intelligence' in this context is the ability to infer and execute needed actions, and to seek and incorporate relevant information, given certain goals.

Help-desk applications

Helpdesk applications allow organisations to effectively manage internal and external client support; they provide a single, shared database for logging helpdesk issues, notifying support personnel and tracking problem resolution. This is typically achieved using call tracking, problem resolution, knowledge base, call history, action log, progress notes, asset management, custom fields, job templates, drill-down management reports, e-mail support, auto-e-mail notification and escalation.

Customer relationship management

Customer relationship management (CRM) is a strategy for delivering superior customer service in order to effectively acquire, develop and retain a company's most important assets – its customers. In particular, it entails acquiring an understanding of the kinds of things that are important to each and every individual customer and developing programs that consistently satisfy those needs during every customer interaction. It is important to note that 'customers' are no longer just traditional end-users or consumers, but could potentially be partners, resellers or any group that requires information or services from an organisation.

CRM technology has traditionally been used in the 'call centre' or customer service type environment. CRM provides for seamless integration of front office and back office, thereby creating a 'closed-loop' problem resolution scenario, in which everything is automated, from taking the call, to providing the service, to fixing the problem or answering the query. CRM also allows cross-selling or up-selling opportunities to be maximised, made possible by leveraging all information about any given customer. It can provide a method of collaboration throughout the organisation, ensuring that customer needs are thoroughly met through a consistency of access, providing customers with the option of reaching an organisation by means of a variety of self-service vehicles (such as e-mail and the Internet), and obtaining immediate results – 24 hours a day, 7 days a week.

Data warehousing

A data warehouse is a central store of data common to the organisation. It is a central repository of information drawn from the disparate and physically distributed operational source systems of an enterprise, as well as external data. Business managers and specialists use it as a data source for decision-support applications. Creating an enterprise data warehouse is an investment. Enterprise data warehouses are usually not designed for direct business-user access, but rather as a source for dependent data marts. Implementing an enterprise data warehouse requires greater attention to high-level business requirements as well as to the metadata.

Data mining

Data mining can be defined as the process of selecting, exploring and modelling large amounts of data to uncover previously unknown patterns. In the insurance industry, data mining can help firms gain business advantage. For example, by applying data mining techniques, companies can fully exploit data about customers' buying patterns and behavior and gain a greater understanding of customer motivations to help reduce fraud, anticipate resource demand, increase acquisition and curb customer attrition.

Business process reengineering

Business process reengineering (BPR) is, according to Davenport & Short (1990), "the analysis and design of workflows and processes within and between organizations". Teng, Grover, Jeong & Kettinger (1995) define BPR as "the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures". Gladstone (2000) believes that knowledge management is primarily the management of the processes that generate knowledge rather than the management of knowledge itself, and that business knowledge can be embedded into the processes by redesigning them.

Knowledge creation applications

Knowledge creation applications include brainstorming applications, concept mapping, mind mapping and decision-support applications.

From the this list of technology types and the discussion of the knowledge management models of Ruggles (1997), Angus & Patel (1998), Angus et al. (1998), Jackson (1999), Wensley (2000) and particularly the knowledge development life cycle of Tyndale (2000), a mapping of technology type to knowledge management philosophical action may be created.

Table 2. Technology types, knowledge phase and software type

	Creation		Organisation		Distribution		Application	
Technology	**New software**	**Old software**	**New software**	**Old software**	**New software**	**Old software**	**New software**	**Old software**
Intranets	✓ (1/5)		✓ (5/5)		✓ (3/5)		✓ (1/5)	
Push technologies			✓ (2/2)		(2/2)			
Agents	✓ (4/4)		✓ (4/4)		✓ (4/4)		✓ (2/4)	
Web portals	✓ (4/4)		✓ (4/4)		✓ (4/4)		✓ (4/4)	
Content management	✓ (2/4)	✓ (2/4)	✓ (4/7)		✓ (3/6)	✓ (3/6)		✓ (3/5)
Document management systems		✓ (10/14)		✓ (11/17)		✓ (9/14)		✓ (6/9)
Groupware	✓ (8/11)		✓ (9/12)		✓ (9/12)		✓ (6/9)	
Workflow		✓ (48/75)		✓ (48/75)		✓ (48/75)		✓ (48/75)
BPR		✓ (26/34)		✓ (26/34)		✓ (26/34)		✓ (26/34)
Information retrieval engines	✓ (9/12)			✓ (4/7)		✓ (3/5)		✓ (3/4)
Relational and object databases		✓ (4/5)		✓ (4/5)		✓ (4/5)		✓ (4/5)
Electronic publishing systems	✓ (2/4)		✓ (4/4)		✓ (4/4)		✓ (1/1)	
Help-desk applications			✓ (1/1)		✓ (1/1)			
CRM	✓ (4/4)		✓ (5/5)		✓ (6/6)		✓ (4/4)	
Data warehousing		✓ (4/4)		✓ (3/3)		✓ (4/4)		✓ (1/1)
Data mining			✓ (2/2)		✓ (2/2)		✓ (1/1)	
Knowledge creation applications	✓ (5/5)		✓ (5/5)		✓ (4/4)		✓ (3/3)	

This mapping will include an indication of whether the technology type may be described as new software or old software.

By analysing the software and comparing its properties with the following functionality (knowledge creation, knowledge storage, knowledge distribution and knowledge application), a profile may be established linking the technology type old or new with the knowledge management software and the knowledge management functionality, hence the comparison that will be achieved will identify which knowledge management software is in fact 'old software with a new badge'.

Using the categorisations from Table 4 in the Appendix (namely, knowledge creation, knowledge organisation, knowledge distribution and knowledge application), it is possible to create a consolidated table identifying where the majority of the technology software is available within these categorises and whether they are either new software or old software technology.

Figures in brackets represent the number of applications that fell into the category. (For example, 1/5 means that one out of five applications were new software technology.)

Table 2 groups the technologies commonly associated with the term knowledge management, according to their product characteristics, and as the result of the analysis of the product descriptions and product positioning in Table 4 (Compilation of software classified as 'old' or 'new'), it is possible to generalise the technology background of the knowledge management software.

Items 1 to 5 are regarded as 'new technologies' (even though item 5 uses products from item 6, which is an old technology). Items 6 to 11 are regarded as 'old technologies (even though the groupware item appears to comprise predominantly new technology). The authoring element of electronic publishing can now be seen as part of content management; CRM and helpdesk technology are allied technologies, as are data mining and data warehousing. Knowledge creation software is the tacit acquisition software, unlike the explicit acquisition software such as document scanning, optical character recognition (OCR), barcode reading, file and data transfers.

Hence, from Table 2 it can be seen that a number of new softwares have been developed to accommodate the unique elements of knowledge management and the arrival of technologies such as the Internet (which started out as the Advanced Research Projects Agency Network – ARPANET in 1969) into mainstream business (often as e-business). The Internet is the backbone or network hub of e-business at global or organisation level, along with the World Wide Web, which is the interface or portal with the widest available coverage, allowing knowledge distribution at global or organisation level.

Table 3. New software or old software?

	New software	Old software
Intranets	✓	
Push technologies	✓	
Agents	✓	
Web portals	✓	
Content management	✓	
Document management systems		✓
Groupware	✓	
Workflow		✓
BPR		✓
Information retrieval engines	✓	
Relational and object databases		✓
Electronic publishing systems	✓	
Help-desk applications	✓	
CRM	✓	
Data warehouse		✓
Data mining		✓
Knowledge creation applications	✓	

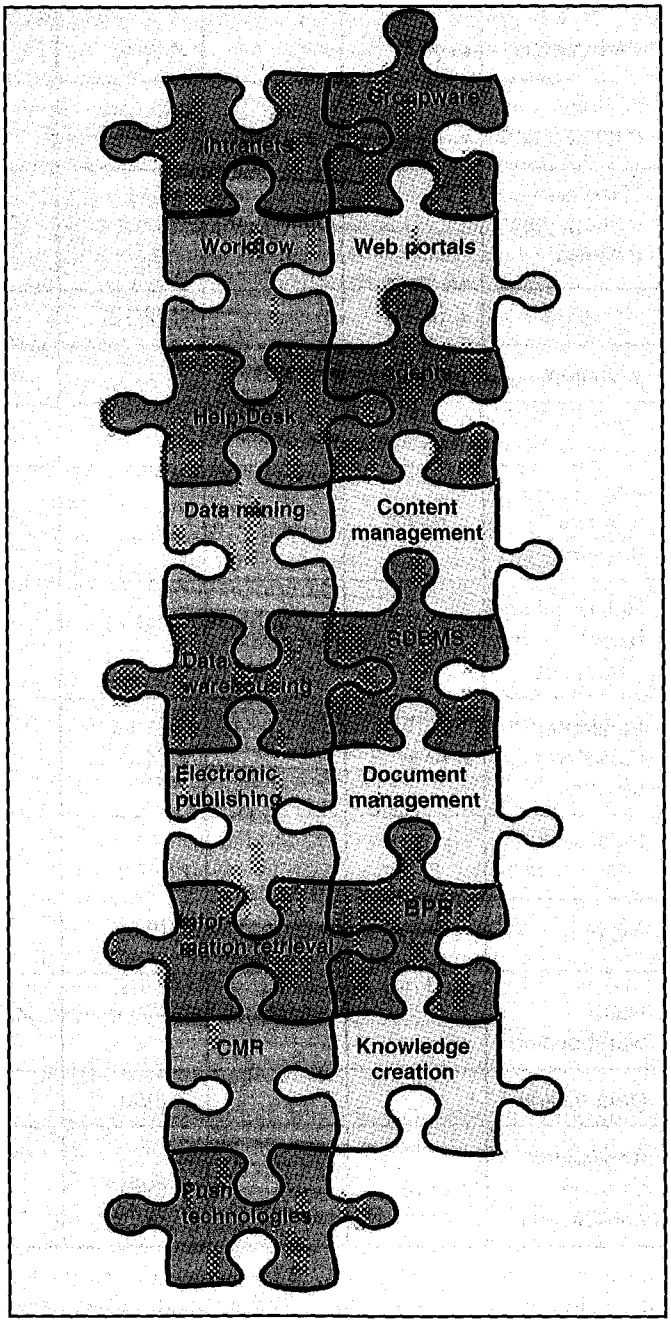

Figure 1. Knowledge management jigsaw

Conclusion

It can be seen from Table 2 that the majority of certain knowledge management software technologies can be categorised as either new software or old software.

The question remains whether software from an IT vendor has been reinvented as a knowledge management product or whether it is more important that old software is being successfully utilised in the apparently 'new' field of knowledge management.

The author believe that the answer to these questions may be derived from a modified version of Table 2. It is now possible to identify the most common software technologies for any category, and whether the software in question is either new or old software.

This becomes the basis for Table 3, which highlights that knowledge management utilises technologies were previously regarded as specialist technologies in their own right. It was therefore not obvious that these applications needed to be combined with other applications to achieve their greatest potential, in other words, the whole is greater than the sum of the parts. Knowledge management is the umbrella that pulls the various software together, as they are all closely related to knowledge management.

Examples of this are technologies such as electronic document management (EDM), which have been in existence since 1985.

However, EDM is now being positioned as the content management component for the intranet and Internet space and is being used as a back-end technology to support the web portal technology.

Information retrieval engines are now being incorporated in applications such as web portals and EDM systems.

This convergence of the technology types under the knowledge management umbrella allows the old technology software a new lease of life in the e-business space, no longer working as stand-alone solutions but being implemented as part of enterprise solutions in a jigsaw-like fashion (see Figure 1).

New technologies are arriving all the time, and with each new technology, there is the potential for a new set of tools to be developed for that technology.

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Appendix

For the purposes of this paper, new software is defined as information technology software that has been developed for a specific function and is not a derivative of another application or product.

Some IT vendors have reinvented themselves (badge engineering) as knowledge management product specialists and are organised by technology family shown in Table 4. In this table, N stands for new software and O for old software. Of the 200 products identified, 87 were new software products and 113 were old software products.

The appendix table groups the technologies according to their product strength in the fields of knowledge creation, knowledge organisation, knowledge distribution and knowledge application.

Appendix table. Compilation of software classified as 'new' or 'old'

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
Intranets	B1Cogito Inc.	N	Intranetics	N	2Bridge	N	Adhesive	N
			2Bridge	N	Adhesive Software	N	Software	
			Adhesive Software	N	Banyan	N		
			Banyan	N				
			B1Cogito Inc.	N				
Push technologies			BackWeb	N	BackWeb	N		
			WebSprite	N	WebSprite	N		
Agents	Infoscout	N	Infoscout	N	Infoscout	N	Autonomy	N
	Autonomy	N	Autonomy	N	Autonomy	N	Cartia Inc	N
	GrapeVine	N	GrapeVine	N	GrapeVine	N		
	InfoMagnet	N	InfoMagnet	N	InfoMagnet	N		
Web portals	BroadVision	N	BroadVision	N	BroadVision	N	BroadVision	N
	Plumtree	N	Plumtree	N	Plumtree	N	Plumtree	N
	Vignette	N	Vignette	N	Vignette	N	Vignette	N
	Interwoven	N	Interwoven	N	Interwoven	N	Interwoven	N
Content management	Documentum	O	WebOS	N	WebOS	N	WebOS	N
	FileNET	O	Documentum	N	Documentum	N	Documentum	N
	Eastman Software	N	FileNET	O	FileNET	O	FileNET	O
	Opentext	N	Eastman Software	O	Eastman Software	O	Eastman Software	O
	Trim	O	KnowItAll	N	EntreVision	N	Openext	N
			EntreVision	N	Openext	N	Trim	O
			Opentext	N	Trim	O		
			Trim	O				
Document management systems	Documentum	O	Documentum	O	Documentum	O	Documentum	O
	Hummingbird	O	Hummingbird	O	Hummingbird	O	Hummingbird	O
	FileNET	O	FileNET	O	FileNET	O	FileNET	O
	Eastman Software	O	Eastman Software	O	Eastman Software	O	Eastman Software	O
	Plexus	O	Plexus	O	Plexus	O	Plexus	O
	Mosaix	O	Mosaix	O	Mosaix	O	Mosaix	O
	Interleaf	O	Interleaf	O	Interleaf	O	Interleaf	O
	Optika	O	Optika	O	Optika	O	Tower	O
	Opentext	N	Opentext	N	Opentext	N	Trim	O
	Tower	O	Tower	O	Tower	O		
	DocuShare	O	OptixWeb	N	OptixWeb	N		
	InConcert	O	ByteQuest	N	ByteQuest	N		
	Cogito Inc.	N	Chrystal Software	O	Cimage	O		
	Trim	O	Cimage	O				
			InConcert	O				
			Cogito Inc.	N				
			Trim	O				

Appendix table continued

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
	Cipher Systems	N	WebTeam	N	WebTeam	N	DataBeam	N
	DataBeam	N	DataBeam	N	DataBeam	N	IBM-Lotus	
	Cipher Systems	N	InfoPlace, Inc.	N	InfoPlace, Inc.	N	Notes	O
	IBM-Lotus Notes	O	Changepoint Inc	N	Changepoint Inc	N	Microsoft	O
Groupware	Microsoft	O	IBM-Lotus Notes	O	IBM-Lotus Notes	O	eRoom	N
	eRoom	N	Microsoft	O	Microsoft	O	HotOffice	O
	HotOffice	O	eRoom	N	eRoom	N	involv.net	N
	involv.net	N	HotOffice	O	HotOffice	O	Netopia	N
	Netopia	N	involv.net	N	involv.net	N	Netscape	N
	Netscape	N	Netopia	N	Netopia	N	3-2-1 Intranet	N
	3-2-1 Intranet	N	Netscape	N	Netscape	N		
			3-2-1 Intranet	N	3-2-1 Intranet	N		
	Action Technologies Inc.	O	Action Technologies Inc.	O	Action Technologies Inc.	O	Action Technologies Inc.	O
	Antley Business Systems Inc.	O	Antley Business Systems Inc.	O	Antley Business Systems Inc.	O	Antley Business Systems Inc.	O
	Aliroo	N	Aliroo	N	Aliroo	N	Aliroo	N
	AT&T	N	AT&T	N	AT&T	N	AT&T	N
	Blueridge Technologies	O	Blueridge Technologies	O	Blueridge Technologies	O	Blueridge Technologies	O
	CASEwise Systems	O	CASEwise Systems	O	CASEwise Systems	O	CASEwise Systems	O
	Centre-file Ltd	O	Centre-file Ltd	O	Centre-file Ltd	O	Centre-file Ltd	O
	Cimage Corporation	O	Cimage Corporation	O	Cimage Corporation	O	Cimage Corporation	O
	Computron Technologies	O	Computron Technologies	O	Computron Technologies	O	Computron Technologies	O
	CSE Systems	O	CSE Systems	O	CSE Systems	O	CSE Systems	O
Workflow	COSA Solutions	O	COSA Solutions	O	COSA Solutions	O	COSA Solutions	O
	DST	O	DST	O	DST	O	DST	O
	Dun & Bradstreet	O	Dun & Bradstreet	O	Dun & Bradstreet	O	Dun & Bradstreet	O
	Eastman Software	O	Eastman Software	O	Eastman Software	O	Eastman Software	O
	Edify Corporation	O	Edify Corporation	O	Edify Corporation	O	Edify Corporation	O
	Elf Technologies	N	Elf Technologies	N	Elf Technologies	N	Elf Technologies	N
	Excalibur	O	Excalibur	O	Excalibur	O	Excalibur	O
	F3 Software Corp.	N	F3 Software Corp.	N	F3 Software Corp.	N	F3 Software Corp.	N
	FileNet Corporation	O	FileNet Corporation	O	FileNet Corporation	O	FileNet Corporation	O
	Fischer	N	Fischer	N	Fischer	N	Fischer	N
	Fleet & Partners	N	Fleet & Partners	N	Fleet & Partners	N	Fleet & Partners	N
	Fujitsu	O	Fujitsu	O	Fujitsu	O	Fujitsu	O
	GFI Ltd.	N	GFI Ltd.	N	GFI Ltd.	N	GFI Ltd.	N
	Handysoft Corp.	N	Handysoft Corp.	N	Handysoft Corp.	N	Handysoft Corp	N
	Hatton Blue	N	Hatton Blue	N	Hatton Blue	N	Hatton Blue	N
	Hewlett Packard	O	Hewlett Packard	O	Hewlett Packard	O	Hewlett Packard	O
	High Performance Systems	O	High Performance Systems	O	High Performance Systems	O	High Performance Systems	O
	I Levy & Associates Inc.	N	Levy & Associates Inc.	N	Levy & Associates Inc.	N	Levy & Associates Inc.	N
	IBM Corporation	N	IBM Corporation	N	IBM Corporation	N	IBM Corporation	N
	ICL	O	ICL	O	ICL	O	ICL	O
	IdentiTech Inc.	O	IdentiTech Inc.	O	IdentiTech Inc.	O	IdentiTech Inc.	O
	Image Business Systems	N	Image Business Systems	N	Image Business Systems	N	Image Business Systems	N

Appendix table continued

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
	Image Fast Software Systems Inc	N	Image Fast Software Systems Inc	N	Image Fast Software Systems Inc	N	Image Fast Software Systems Inc	N
	JetForm Corporation	N	JetForm Corporation	N	JetForm Corporation	N	JetForm Corporation	N
	JTS Limited	N	TS Limited	N	TS Limited	N	TS Limited	N
	Keyfile Corporation	O	Keyfile Corporation	O	Keyfile Corporation	O	Keyfile Corporation	O
	Knowledge Based Systems Inc.	O	Knowledge Based Systems Inc.	O	Knowledge Based Systems Inc.	O	Knowledge Based Systems Inc.	O
	LanCept	N	LanCept	N	LanCept	N	LanCept	N
	LaserData	O	LaserData	O	LaserData	O	LaserData	O
	Logical Software Solutions	O	Logical Software Solutions	O	Logical Software Solutions	O	Logical Software Solutions	O
	Lotus Development Corporation	O	Lotus Development Corporation	O	Lotus Development Corporation	O	Lotus Development Corporation	O
	Meta Software Corporation	O	Meta Software Corporation	O	Meta Software Corporation	O	Meta Software Corporation	O
	Metafile Information Systems	O	Metafile Information Systems	O	Metafile Information Systems	O	Metafile Information Systems	O
Workflow	Metaphase Technology Inc.	O	Metaphase Technology Inc.	O	Metaphase Technolog, Inc.	O	Metaphase Technology, Inc.	O
	Micrografx Inc.	O	Micrografx Inc.	O	Micrografx Inc.	O	Micrografx Inc.	O
	Microsoft Corporation	O	Microsoft Corporation	O	Microsoft Corporation	O	Microsoft Corporation	O
	Mondas Information Technology	O	Mondas Information Technology	O	Mondas Information Technology	O	Mondas Information Technology	O
	Portfolio Technologies Inc.	O	Portfolio Technologies Inc.	O	Portfolio Technologies Inc.	O	Portfolio Technologies Inc.	O
	Premenos Corporation	O	Premenos Corporation	O	Premenos Corporation	O	Premenos Corporation	O
	Proforma Corporation	N	Proforma Corporation	N	Proforma Corporation	N	Proforma Corporation	N
	Promatis	N	Promatis	N	Promatis	N	Promatis	N
	Reach Software Corporation	N	Reach Software Corporation	N	Reach Software Corporation	N	Reach Software Corporation	N
	Recognition International Inc.	O	Recognition International Inc.	O	Recognition International Inc.	O	Recognition International Inc.	O
	Remedy Corporation	O	Remedy Corporation	O	Remedy Corporation	O	Remedy Corporation	O
	RKB Limited/Prism Performance Systems	N	RKB Limited/Prism Performance Systems	N	RKB Limited/Prism Performance Systems	N	RKB Limited/Prism Performance Systems	N
	The Salamander Organization Ltd	N	The Salamander Organization Ltd	N	The Salamander Organization Ltd	N	The Salamander Organization Ltd	N
	Scopus Technology Inc.	N	Scopus Technology Inc.	N	Scopus Technology Inc.	N	Scopus Technology Inc.	N
	Siemens-Nixdorf	O	Siemens-Nixdorf	O	Siemens-Nixdorf	O	Siemens-Nixdorf	O
	Staffware Ltd	O	Staffware Ltd	O	Staffware Ltd	O	Staffware Ltd	O
	Star Information Technology	O	Star Information Technology	O	Star Information Technology	O	Star Information Technology	O
	Sterling Software Inc.	N	Sterling Software Inc.	N	Sterling Software Inc.	N	Sterling Software Inc.	N
	Taligent	N	Taligent	N	Taligent	N	Taligent	N
	TeamWARE	N	TeamWARE	N	TeamWARE	N	TeamWARE	N
	Technology Deployment International Inc. (TDI)	O	Technology Deployment International Inc. (TDI)	O	Technology Deployment International Inc. (TDI)	O	Technology Deployment International Inc. (TDI)	O

Appendix table continued

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
Workflow	Technology Economics Inc	N	Technology Economics Inc	N	Technology Economics Inc	N	Technology Economics Inc	N
	Texas Instruments Inc., AIM Division	N	Texas Instruments Inc., AIM Division	N	Texas Instruments Inc ,AIM Division	N	Texas Instruments Inc., AIM Division	N
	The Vantive Corporation	O	The Vantive Corporation	O	The Vantive Corporation	O	The Vantive Corporation	O
	The Workflow Automation Corporation	O	The Workflow Automation Corporation	O	The Workflow Automation Corporation	O	The Workflow Automation Corporation	O
	Timephaser Corporation	O	Timephaser Corporation	O	Timephaser Corporation	O	Timephaser Corporation	O
	Unisys	O	Unisys	O	Unisys	O	Unisys	O
	W4	O	W4	O	W4	O	W4	O
	WorkFlow Incorporated	N	WorkFlow Incorporated	N	WorkFlow Incorporated	N	WorkFlow Incorporated	N
	Workflow Inc.	N	Workflow Inc.	N	Workflow Inc.	N	Workflow Inc.	N
	Workgroup Technology	N	Workgroup Technology	N	Workgroup Technology	N	Workgroup Technology	N
	Xsoft	O	Xsoft	O	Xsoft	O	Xsoft	O
Information retrieval engines	Aeneid	N	Aeneid	N	Ardilog	N	Brightware	N
	Ardilog	N	Brightware	N	Dataware	O	Dataware	O
	Dataware	O	Dataware	O	BASIS	O	Excalibur	O
	Excalibur	O	Excalibur	O	DICE – Contahal	N	Verity	O
	Infoseek	N	BASIS	O	InTEXT Systems	O		
	InTEXT Systems	O	InTEXT Systems	O				
	Yahoo	N	DICE - Contahal	O				
	DICE - Contahal	N						
	Excite	N						
	AltaVista	N						
	Verity	N						
	Sageware Inc.	N						
Relational and object databases	DB2 – IBM	O	DB2 – IBM	O	DB2 – IBM	O	DB2 – IBM	O
	Informix	O	Informix	O	Informix	O	Informix	O
	Sybase	O	Sybase	O	Sybase	O	Sybase	O
	Oracle	O	Oracle	O	Oracle	O	Oracle	O
	SQL	N	SQL	N	SQL	N	SQL	N
Electronic publishing systems	Arbortext	N	Arbortext	N	Arbortext	N	Document Sciences Corp.	N
	askSam	N	askSam	N	askSam	N		
			Claris	N	Document Sciences Corp.	N		
			Hyperwave	N				

Appendix table continued

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
	Apache	O	Apache	O	Apache	O	Apache	O
	Apparent Technologies Ltd	O	Apparent Technologies Ltd	O	Apparent Technologies Ltd	O	Apparent Technologies Ltd	O
	Bonapart	O	Bonapart	O	Bonapart	O	Bonapart	O
	Business Design Facility	O	Business Design Facility	O	Business Design Facility	O	Business Design Facility	O
	Business Improvement Facility	O	Business Improvement Facility	O	Business Improvement Facility	O	Business Improvement Facility	O
	Caddie	O	Caddie	O	Caddie	O	Caddie	O
	Changepoint	O	Changepoint	O	Changepoint	O	Changepoint	O
	COMPROSE Inc.	O	COMPROSE Inc.	O	COMPROSE Inc.	O	COMPROSE Inc.	O
	ice tools	O	ice tools	O	ice tools	O	ice tools	O
	IDS Scheer AG	O	IDS Scheer AG	O	IDS Scheer AG	O	IDS Scheer AG	O
	IntelliCorp Inc.	O	IntelliCorp Inc.	O	IntelliCorp Inc.	O	IntelliCorp Inc.	O
	Interfacing Technologies Corporation	O	Interfacing Technologies Corporation	O	Interfacing Technologies Corporation	O	Interfacing Technologies Corporation	O
BPR	Ithink	N	Ithink	N	Ithink	N	Ithink	N
	Vensim	N	Vensim	N	Vensim	N	Vensim	N
	Meta Software Corp	O	Meta Software Corp	O	Meta Software Corp	O	Meta Software Corp	O
	METIS	N	METIS	N	METIS	N	METIS	N
	QPR Software Inc	N	QPR Software Inc	N	QPR Software Inc	N	QPR Software Inc	N
	SILVERRUN Technologies Inc.	O	SILVERRUN Technologies Inc.	O	SILVERRUN Technologies Inc.	O	SILVERRUN Technologies Inc.	O
	DPA	O	DPA	O	DPA	O	DPA	O
	oCTAVe Process Manager	N	oCTAVe Process Manager	N	oCTAVe Process Manager	N	oCTAVe Process Manager	N
	Logic Works' BPwin	O	Logic Works' BPwin	O	Logic Works' BPwin	O	Logic Works' BPwin	O
	Gensym's ReThink	N	Gensym's ReThink	N	Gensym's ReThink	N	Gensym's ReThink	N
	Clear Process	O	Clear Process	O	Clear Process	O	Clear Process	O
	Optima!	O	Optima!	O	Optima!	O	Optima!	O
	Extend+BPR	O	Extend+BPR	O	Extend+BPR	O	Extend+BPR	O
	Cosmo	O	Cosmo	O	Cosmo	O	Cosmo	O
	Workflow Analyser	O	Workflow Analyser	O	Workflow Analyser	O	Workflow Analyser	O
	FirstSTEP	O	FirstSTEP	O	FirstSTEP	O	FirstSTEP	O
	Process Charter	O	Process Charter	O	Process Charter	O	Process Charter	O
	Business Resource Software	O	Business Resource Software	O	Business Resource Software	O	Business Resource Software	O
	DTIC	O	DTIC	O	DTIC	O	DTIC	O
	CROSSFLOW	N	CROSSFLOW	N	CROSSFLOW	N	CROSSFLOW	N
	ETC	N	ETC	N	ETC	N	ETC	N
	The Workflow Factory	O	The Workflow Factory	O	The Workflow Factory	O	The Workflow Factory	O

Appendix table continued

	Creation		Organisation		Distribution		Application	
	Software	**NO**	**Software**	**NO**	**Software**	**NO**	**Software**	**NO**
Help-desk applications			Dimensional Insight Inc.	N	Dimensional Insight Inc.	N		
CRM	Siebel	N	Siebel	N	Siebel	N	Siebel	N
	Clarify	N	Clarify	N	Clarify	N	Clarify	N
	Vantive	N	Vantive	N	Vantive	N	Vantive	N
	ePoint	N	ePoint	N	ePoint	N	ePoint	N
			Edify	N	Diffusion Inc	N		
					Edify	N		
Data warehousing	Redbrick	N	Redbrick	N	Redbrick	N	Sagent	N
	SAS	N	SAS	N	SAS	N		
	Cipher		Sagent	N	Omnidex	N		
	Systems	N			Sagent	N		
	Omnidex	N						
Data mining			Abuzz	N	Abuzz	N	Information	
			Information		Information		Discovery Inc.	N
			Discovery Inc.	N	Discovery Inc.	N		
Knowledge creation applications	Hyperknowledge	N	Hyperknowledge	N	Hyperknowledge	N	Hyperknowledge	N
	Cogito Inc.	N	Cogito Inc	N	Dataware	N	Dataware	N
	Dataware	N	Dataware	N	Intraspect		Ygnite	N
	Intraspect		Intraspect		Technologies	N		
	Technologies	N	Technologies	N	Ygnite	N		
	Ygnite	N	Ygnite	N				

The tree model: creating successful synergy for business process reengineering

Michelle Gerber*

Models and theories of business process reengineering (BPR) abound, yet, purportedly, 70% of the attempts to do so fail. In order to grow and be profitable, an organisation needs get the basics right the first time and ensure that it remains proactive in its dealings with its environs. Most BPR theories encompass an internal or external focus. However, only by taking a holistic view of the organisation can the implementation of BPR be successful in making headway towards creating synergy.

All of these theories, models and analyses can make BPR seem somewhat daunting to the management and staff of organisations. This paper introduces the tree model to BPR – a simple model that aids the analyst in understanding the BPR process. The analyst(s) should be seen as internal management and staff – consultants should be facilitators only. Long-term growth and profitability for the firm can then be built on the foundations of the BPR project's successful implementation.

Introduction: Aspects of business process reengineering

According to Sethi & King (1998: 3), the working definition of business process reengineering (BPR) is "a redesign and reorganisation of business activities that results from questioning the *status quo*. It seeks to fulfil specific objectives and can lead to breakthrough improvement. It is often associated with significant cultural and technological changes".

Manganelli (in Smith 1994: 17) defines reengineering as "the rapid and radical redesign of strategic, value-added business processes – and the systems, policies and organisational structures that support them – to optimise the work flows and productivity in an organisation". Furthermore, he adds that reengineering has to be done by the corporation's members and that outside consultants should only be utilised as facilitators. Reengineering methodology must focus on two strategic guidelines: empowering people and enabling technology. This is done in five stages: preparation, identification, vision, solution and transformation.

Holland & Kumar (1995: 79), in *Getting Past the Obstacles to Successful Re-engineering*, discuss combining an external focus on satisfying customer needs and an internal focus on the development of unique resources that should drive reengineering efforts. These efforts need to be fully supported by top management. Companies have to discover what customers value. Customer expectations are based on three contact points between the customer and the organisation: (1) interaction with the company in the ordering process; (2) the use of the actual product or service; and (3) the delivery and post-delivery process. Based on their expectations, customers judge each of these points of contact on whether they are: (1) correct and appropriate; (2) timely, and (3) economical. Customer satisfaction with the three points of contact defines for the company what the customers value and which processes might need to be reengineered. A firm's investment in resources should not only provide value to the customer but should enable the firm to maintain a profitable edge over its competitors. To sustain a competitive advantage, the company's reengineering efforts should be invested in resources that cannot easily be developed, replicated, substituted or bought by competitors (adapted from Holland & Kumar 1995: 79–82).

Anjard (1996: 9) maintains that reengineering is re-determining how the job should be done and that the key to reengineering is to concentrate on the macro level. At this level, the full support of top management is needed because the changes are far-reaching and dynamic for the organisation. Through the radical and rapid redesign of critical core processes and the systems, policies and organisational structures that support them, reengineering achieves breakthrough results. This should take a maximum of one year. Reengineering focuses on the processes of delivering goods and services to customers. It is not based on functional specialities associated with the way work is currently being organised. The initial reengineering efforts are directed to critical core processes that actually add value to what the customer is offered. Value-added can be defined as "something the customer cares about and is willing to pay for". For reengineering to succeed, it must encompass the technical, human and organisational dimensions of the organisation in its project plan.

According to Valiris & Glykas (1999: 65), the concern that BPR methodologies try to alleviate is any identified difference between business activities and organisational strategy; and current and desired productivity of organisational resources. In order to achieve this, a BPR methodology should provide a consistent set of techniques and guidelines that will enable the business process redesigner to reorganise business activities and processes in an organisation. Valiris & Glykas classify BPR methodologies into two main categories, depending on the perspective they take in BPR: (1) the management accounting and (2) information system development categories. A third category has recently emerged, which incorporates organisational theory (Figure 1).

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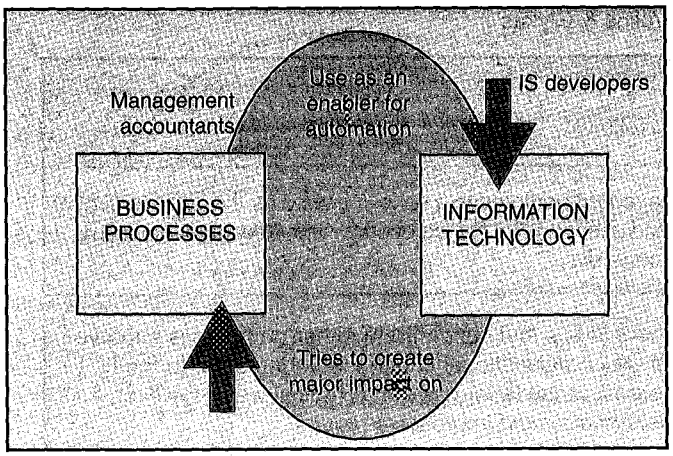
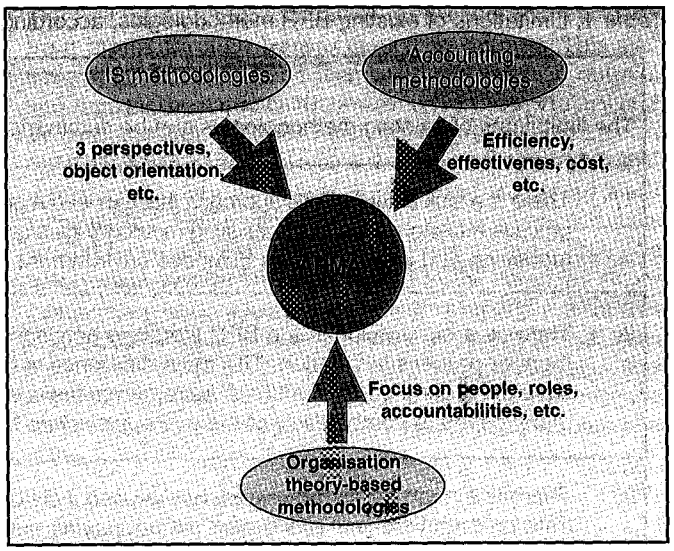


Source: Valiris & Glykas (1999)
Figure 1. The different approaches to BPR



Source: Valiris & Glykas (1999)
Figure 2. The agent relationship morphism analysis (ARMA) methodology

Furthermore, they add that in finding a redesign process that satisfies most of the existing BPR methodologies, the result would be:

1. The vision and objectives of the organisation are established.
2. This is followed by the identification of and focus on the core business processes that support the vision and objectives.
3. The business environment is modelled and analysed.
4. A streamlining process is undertaken.
5. Lastly, a continuous control process is implemented and improvement of previous steps is undertaken.

Business redesign can be achieved in two modes:

1. Incremental – improvement and simplification. This is usually done slowly by eliminating non value-added activities and applying best practices by means of benchmarking. Staff are usually less resistant.
2. Radical – the current, existing organisational frameworks are challenged. This is usually done quickly and requires dramatic changes to the established processes. More often than not, new technologies are introduced in this way. Staff often exhibit resistance.

In the context of the article by Valiris & Glykas (1999), reengineering is synonymous with radical change, while process improvement is synonymous with incremental change. Both reengineering and process improvement are regarded as being included in the definition of redesign.

The limitations of existing methodologies are summarised in Table 1.

Valiris & Glykas propose their own methodology, named the agent relationship morphism analysis (ARMA) methodology, which takes a holistic view of the organisation (Figure 2). It does so by combining accounting BPR principles (such as efficiency, effectiveness and cost) with organisational theoretic concepts (such as roles and accountabilities) and some powerful modelling techniques from information systems development that have been upgraded to become systematic business modelling tools.

Revenaugh (1994: 16–27) focuses on the assessment of strategic relevance and corporate culture as being particularly important in the implementation of major business changes of all types. His focus is the result of the findings of Hammer & Champy (1993), who are quoted in numerous BPR articles, that as many as 70% of BPR projects do not deliver the intended results.

In 'BPR implementation process: An analysis of key success and failure factors', Al-Mashari & Zairi (1999: 87–112) discuss the following dimensions: (1) change management; (2) management competency and support; (3) organisational structure; (4) project planning and management; and (5) information technology infrastructure. These are elucidated in the article and found to be the most important to be navigated if BPR is to be achieved successfully, in the shortest time, with the least problems.

Most theories of BPR encompass an internal and external focus. Externally, the focus is always on providing a product or service that is valued by the customer. Competing in the market with a sustainable competitive advantage is also imperative. Internally, theories tend to focus on different components of the business. These theories address a number of aspects, including: top management support; the empowerment and motivation of employees; the enabling of technology; the management of change and corporate culture; communication and planning (of the BPR process); and the rapid and dramatic change of the way things are done (processes). These can be grouped under three sections: (1) technology; (2) human resources; and (3) organisational elements. The involvement of these aspects is regarded as ensuring the success of the BPR process.

The tree model (Figure 3) of BPR is a simple model that aids the analyst in understanding the process to be followed when managing a BPR project – from formulation (planning), implementation (organising and leading) through to control. The analyst(s) should be seen as internal management and staff – consultants should be facilitators only. For BPR to be successful, all levels of human resources in an organisation should be involved (bottom-up and top-down). Open and honest communication, employee buy-in and motivation should aid in the organisational and cultural changes to be implemented. Overcoming resistance to change is always difficult, especially when rapid and radical change is introduced.

Table 1. Limitations of existing BPR methodologies, according to Valiris & Glykas

The limitations of existing methodologies can be summarised as follows:
1. There is a lack of systematic approach that can lead a process redesigner through a series of steps for the achievement of process redesign. Most of the existing methodologies are based either on real life experience, with little attention to the modelling and analysis of the business environment, or vice versa.
2. There is a big division in the BPR literature between methodologies that concentrate either on process improvement or process innovation. The main difference is on the way organisational change is understood. In the first case, change is performed in an incremental fashion, whereas, in the latter case, in a radical way. However, in many cases, a combination of the two approaches has yielded the most impressive results.
3. There is a need for an integrated, holistic and individualistic view of the organisation. Most methodologies concentrate on organisational processes without paying any attention to the roles and responsibilities of the employees that carry out the activities that comprise these processes.
4. Most methodologies are orientated towards specialists, rather than being orientated for use by organisational managers and people that want to carry out BPR in their organisation.
5. Most methodologies use a more black and white approach. For example, in some methodologies, cost is the central issue, whereas in others, generic management and the use of IT is the main objective.
6. Most methodologies fail to recognise the importance of a diagnostic stage at the beginning of the redesign process. During this stage, the BPR scope, mode and objectives are determined.
7. There is inadequate support for storage of and access to gathered information during and after the redesign process, especially for non-participants in the redesign exercise.
8. Business modelling is performed using either inadequate descriptive notations from management accounting or through poor use of graphical notations that were created for software development and do not take into account organisational issues.
9. Most of business analysis performed is based on subjective rather than objective analytical methods.
10. There is a lack of integrated tool sets that allow modelling and analysis of the business environment. Most of the existing tools for modelling come from the area of software development and usually concentrate on conceptual business modelling. At present, there is a lack of business analysis tools that are integrated with the business modelling ones.
11. There is no formal underpinning to ensure consistency across models. When graphical notations are used in business modelling and business redesign, there is no means of verifying the logical consistency of the resulting models. This creates a feeling of insecurity among business process redesigners that their work might be undermined by the company's cynics.
12. BPR is a new discipline that is in need of case studies that provide justification of the benefits it can provide to the organisation. BPR should be applied in different organisational contexts and cultures, and in organisations of different sizes. Most of the existing methodologies are applied in western countries, where the business environment is more suitable to the BPR philosophy.

Source: Valiris & Glykas (1999)

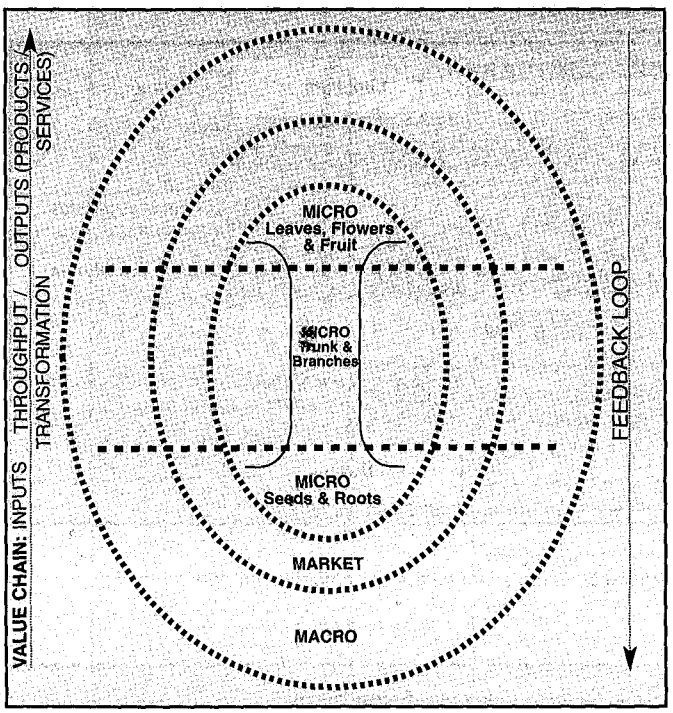


Figure 3. Tree model of BPR

The model is simple to understand and to use. It utilises a few basic management tools that do not require intense understanding of technology or computer models. Various other tools and models are mentioned that can be utilised in addition. The company needs to analyse internal and external factors and understand core processes in its value chain in order to know what customers value. It has to ensure that this process is carefully planned and implemented and controlled holistically. Only then is it likely to succeed in its BPR process. The tree model explanation focuses on the planning stage in order to get the foundations right first time. This does not mean that implementation and control are less important – they are equally so. In fact, control forms part of the feedback loop – new inputs into the value chain process. This feedback ensures that the company will constantly strive to improve itself (according to the *Kaizen* approach introduced by the Japanese) after the BPR has been implemented. Although the BPR process should only take a year, information generated should be kept for use in annual reviews so that the company grows stronger and better each year.

To succeed, companies should differentiate and specialise; focus (outsource non-core activities); think globally (benchmark against global competitors) and have a perpetual spirit of innovation. They should also have a sensitive radar system (environmental scanning and strategy re-evaluation); retain talent (value human resources; train, grow and develop; fast track); and show social and environmental responsibility. All these elements are addressed in business analysis and in BPR. This is especially pertinent to South African firms that need to become globally competitive by taking a holistic approach to managing their companies and utilising BPR if, and when, required. In most instances, this is required.

The tree model of BPR

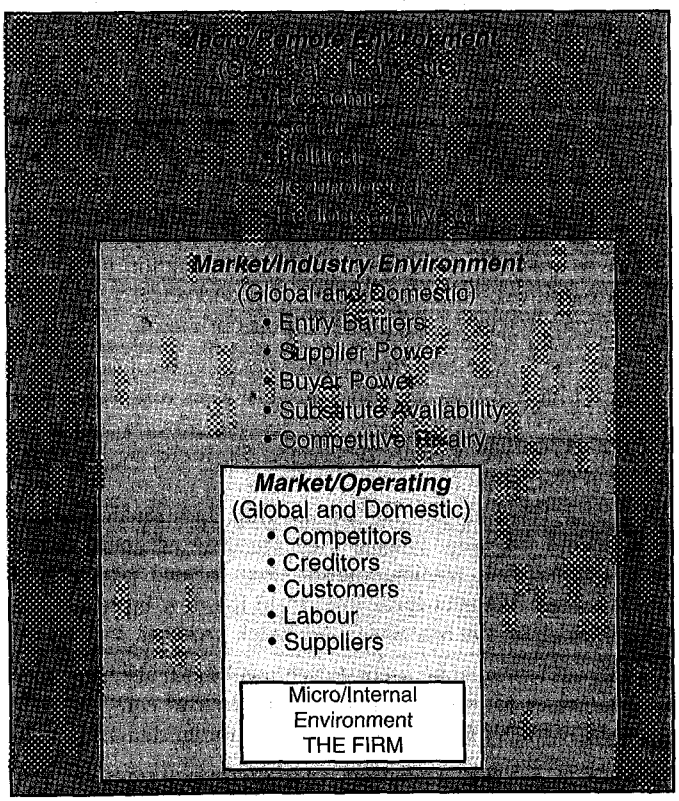
This model is proposed as a simple process to use and a framework within which to work when analysing or reengineering a business. The following can be noted from Figure 3:

- The tree model process is based on a value-chain system: from inputs through transformation to outputs. This systems approach includes a feedback loop between outputs and inputs. The value-chain system comprises primary and support activities. These must be identified correctly in order to ensure that the process (from inputs through transformation to outputs, followed by a feedback loop) is all value added. This means that all non value-added activities should be eliminated or outsourced where applicable. The value-chain system is closely linked to the company's core competency and mission focus. The company's resources and capabilities culminate in a core competency that must be used to establish a competitive advantage. However, this must be sustainable and result in profits and growth for the firm, or the firm will risk decline, loss of market share and failure.
- The tree model incorporates the tree as a component that is split into three levels: (1) seed and roots; (2) trunk and branches; and (3) leaves, flowers and fruit:
  1. Seed and roots – these can be viewed as the planning (formulation) phase in a company and in BPR; as well as the input stage of the value chain. The seed is the company idea/concept and the roots the long-term strategies, as well as the generation of the core competency that must form the sustainable competitive advantage for the firm. The core competency is based on resources and capabilities. The firm must use this core competency as a basis to compete in the market and satisfy customer needs.
  2. Trunk and branches – these can be viewed as the implementation (organising and leading) phase in a company and in BPR, and also equate to the transformation stage in the value chain. The trunk and branches equate to the structure and systems, policies and procedures, and other organisational aspects (including location, centralisation, division of labour, automation, and so forth). The strength of the trunk and branches sets the stage for the bearing of the leaves, flowers and fruit. The long-term business objectives must be translated into medium- and short-term objectives that utilise inputs and transform them into outputs. The medium- and short-term objectives are achievable only if the transformation process is streamlined, value added, efficient and effective (from a human, technical and systems point of view).
  3. Leaves, flowers and fruit – these can be viewed as the control phase in the company and in BPR, as well as the outputs of the value chain. The leaves, flowers and fruit equate to the product or service produced by the firm. The quality and quantity of the leaves, flowers and fruit are a function of the inputs and the transformation process (in other words, they are only as good as the planning and implementation that formed part of the process). These outputs then form the new inputs in the value chain (by means of a feedback process).

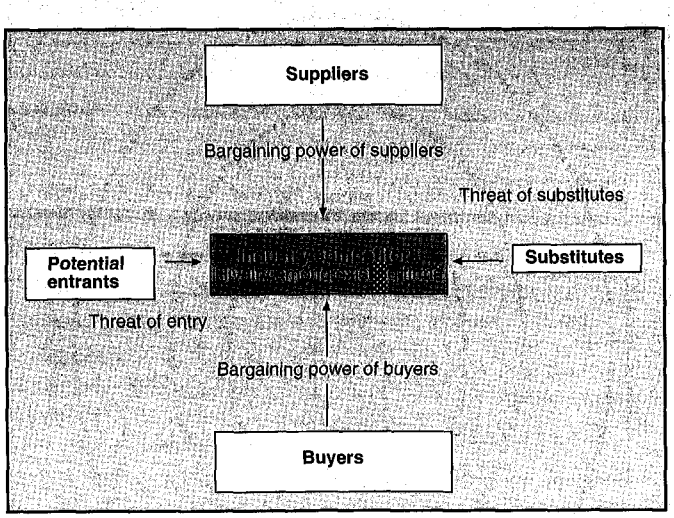
  Different tools can be used at each level to identify key success factors to ensure that the company can compete successfully in its industry and satisfy customer demands.
- There is a micro (internal), market (operating/task and industry) and macro (remote) environment to each level/stage. These environments radiate outwards from the tree model, the tree being the centre or source. Figure 4 illus-

trates the firm in relation to its environment. The industry environment in Figure 4 is the basis of the forces in Porter's five forces of competition model (Figure 5). The analysis can be taken from the broad macro environment, narrowing in through to the market environment (industry and operating), and finally focusing on the firm itself (its micro/internal environment). Thus a funnel (from broad to narrow) is created in order to move from the factors that have a direct impact on the firm (and on which it has little or no impact) to factors that the firm should have complete control over (its micro/internal environment). Figure 3 can therefore be viewed with Figure 4 and Figure 5 when doing an analysis of strengths, weaknesses, opportunities and threats (SWOT analysis), so that a complete picture is created concerning the firm in relation to its environment.

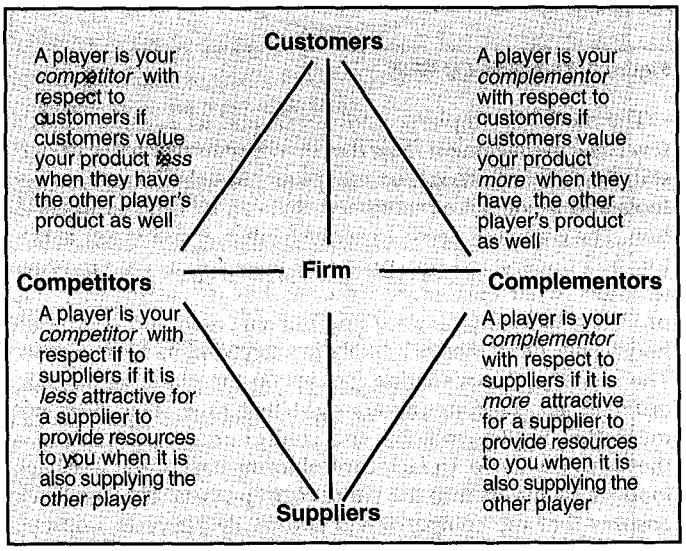
- The tree equates to the micro environment, which can be seen as the firm itself, and its internal environment. The company should have complete control of this internal (micro) environment.
- The market environment immediately surrounds the company and can be seen directly as the area in which the tree grows (comprising an environment made up of factors such as other trees, plants immediately surrounding the tree, soil, air and water). The variables involved for a company in this core business environment (industry) would be its competitors, customers and suppliers (which include creditors and labour – see Figure 4). These can also be viewed in terms of industry forces and their relative strengths (see Figure 4 – industry environment section; and Porter's model in Figure 5). Complementors can also be mentioned here (see the value net depicted in Figure 6).



Source: Adapted from Pearce & Robinson (1994)
Figure 4. The firm in relation to its environment

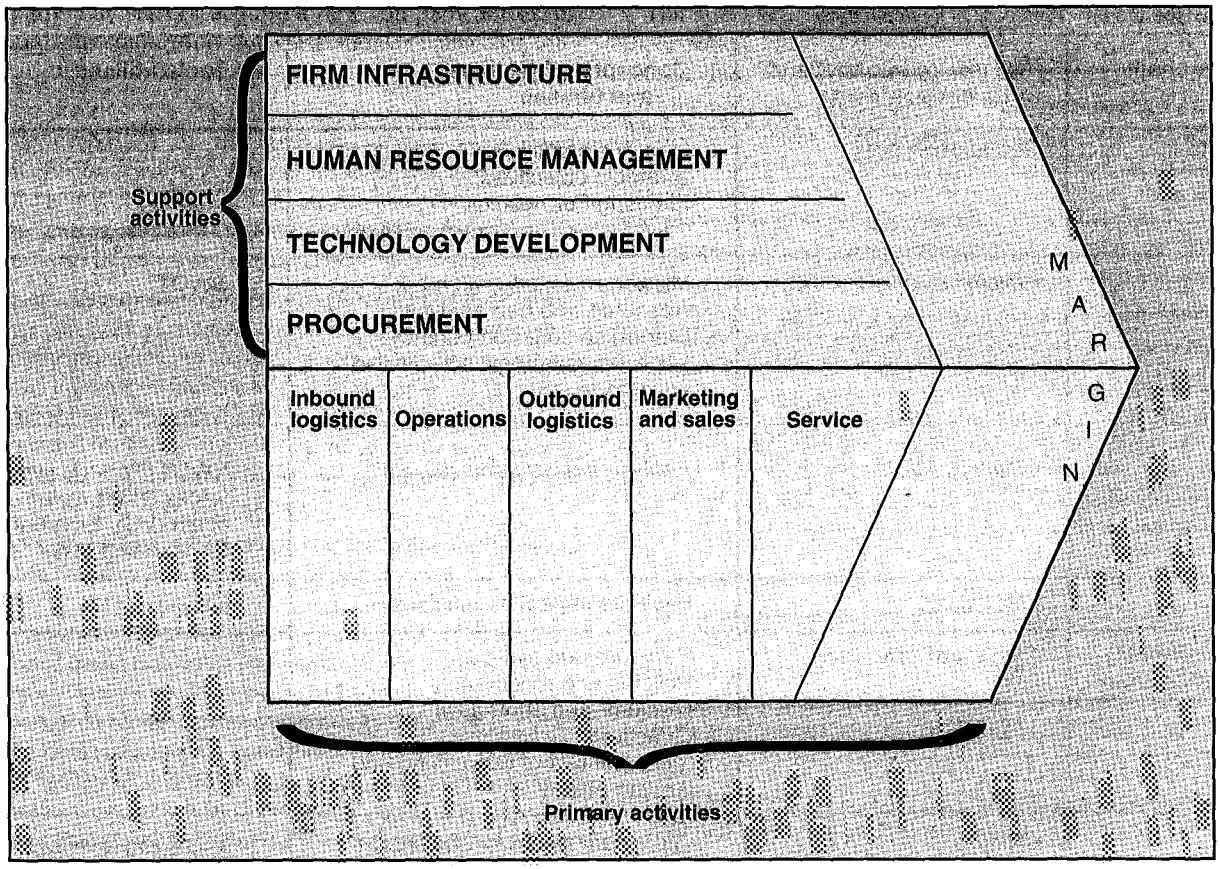


Source: Grant (1998)
Figure 5. Porter's five forces of competition model



Source: Grant (1998)
Figure 6. The value net

Suppliers to the tree are the quality, quantity and suitability of the air, soil and precipitation directly around it. A competitor can be seen as other trees and plants that want to utilise the suppliers' inputs (such as air, soil and precipitation), the space the tree grows in (market share), as well as the outputs due to the customer (leaves, flowers and fruit). These are direct competitors. Customers for the tree vary from those using leaves (for example, insects, such as worms – not the chosen market niche for the firm), flowers (for example, insects like bees – part of the market, but not the chosen niche) and fruit (birds, animals and humans – all part of the niche market, with various demographic profiles aimed at). Insects, birds and humans that utilise these outputs negatively cause harm to the tree if they destroy its ability to photosynthesise (by destroying the leaves used in producing energy) and to bear flowers and fruit. These can be seen as the negative users of products and can be equated to indirect competitors.



Source: Pearce & Robinson (1994)
Figure 7. Porter's value chain (adapted)

The company has a relative measure of control in this environment, and vice versa. Factors that affect control are the strengths and weaknesses of the variables mentioned (for example, a tree may develop bitter leaves to keep them from being eaten by insects; it may grow thorns to protect its leaves, flowers and fruit; it may grow bigger and stronger and bear more leaves, flowers and fruits, so that either animals cannot reach them or so that the effect of consumption (competition) is not so devastating. In turn, the market factors adapt accordingly and the struggle continues. These have a direct effect on the profits earned by the firm itself and its competitors in the industry. Looking at a typical value chain (Figure 7), that has been adapted from Porter's value chain, in conjunction with Porter's model of the five forces of competition (Figure 5), the following can be noted:

- The value of the product or service to customers
- The intensity of competition
- The relative bargaining power at different levels in the production (of goods and/or services) chain all affect profits.

- The space around the market environment over which the company (tree) has no control is the macro environment, the variables of which include:
  - The geographical location of the tree (planted in a plantation or orchard or grown randomly)
  - Weather conditions/phenomena in the area (intensity of sunlight; type of precipitation – rain, hail; cyclone activity; flood risks; earthquakes; or wind)
  - Overall soil conditions in the region (desert, fertile valley, rocky, eroded)
  - Human intervention (for example, cutting a tree down for commercial purposes or because of building or road requirements)
  - Too great an intensity of insects (for example, swarms of locusts), birds, animals, and so forth.

These variables would refer to the domestic (national) and global/international economy, technology, political (government), social, and ecological/physical (natural) environments. The company has no control over these variables, although the variables can have a tremendous influence on the firm itself. By analysing the market variables, the company can usually determine to an extent the most influential macro variables to analyse and constantly scan.

It should be noted that wherever the production of products is mentioned, the production or delivery of services is automatically implied, if not specified. The basic tenets of the tree model are summarised in Table 2. The following discussion will focus on explaining these in more detail.

The process in detail

Inputs: Seeds and roots

This can be seen as the planning (formulation) phase – building the foundations for future growth and profitability (success). A tree starts out in one of two ways: (1) either as a seed that takes root (before a company is started, the idea of it has to be there); or (2) it is grafted from an existing tree (an exist-

Table 2. Tree model – summary of key concepts

Value chain	The tree (company) and its environments	Concepts, objectives and phases	Tools utilised
Inputs	**Seeds and roots**	Idea; Vision/mission; Strategic objectives; Planning/Formulation	
	• Micro	Mission revisited/written up; Resource and gap analysis; Determine core competency to become strategic competitive advantage	SWOT
	• Market	Analyse industry and players	SWOT, Porter's five forces (P5F), value chain (VC), Environmental scanning (ES)
	• Macro	Evaluate impact of variables	ES
Throughput/ *Transformation*	**Trunk and branches**	Structure and systems; Policies and procedures; Medium- and short-term objectives; Implementation/ Organising and leading phase	
	• Micro	Implement medium- and short-term objectives; Analyse core processes; BPR team plus functional responsibility and accountability; Establish time frames; Reduce resistance to change (of organisation and culture)	VC, TQM, *ishikawa* diagram; Team building
	• Market	Take best competitor strengths; Analyse and utilise as benchmarks	P5F, Benchmarking, ES
	• Macro	Evaluate impact of variables	ES
Outputs	**Leaves, flowers and fruit**	Product/service; Control phase	
	• Micro	Analyse sales, Customer surveys; Staff assessments	VC, Sales analysis, Market share
	• Market	Analyse competitor sales, Market share and media tools used; Get feedback from customers	Market share (e.g. BCG), Customer surveys and other media research tools, ES
	• Macro	Evaluate impact of variables	ES
Feedback Loop	**New seed**		
	• Micro	Update information and utilise for constant improvement – *Kaizen*	Income statement, Staff assessments, Results
	• Market	Analyse new strategies and financial results of competitors	Customer survey results, ES
	• Macro	Evaluate impact of variables	ES

ing company may start or acquire a new company, for example, through diversification, forward and/or backward integration, acquisitions or mergers).

The seed is either purposefully sown (for example, in plantations or orchards) or the grafted sapling is planted. Alternatively, the seed may happen to land where it does by chance as a result of humans littering (throwing the pip or core away after eating the fruit), animals eating the fruit and discarding the pip (seed), weather conditions or insects.

The *raison d'être* or mission (vision) statement of the company is either carefully planned to guide the company's future or the company stumbles into existence either by chance or haphazardly as a result of market or macro variables. It is important to note initially that no matter how good the idea for starting a company (in terms of potential for growth and success, measured by its profitability), these will be negatively affected if the required basics are not followed.

The roots of the tree can only grow if the soil conditions are suitable for the specific species of tree, for example, the soil suitable for a thorn tree (dry, dusty, rocky) differs radically from that suitable for a tree growing in a tropical rain forest (lots of water daily, rich soil). This equates to a company being suited to its business landscape (the industry in which it operates or plans to operate – corporate strategy). If a tree is grown in unsuitable or sub-optimal conditions, it may still grow and bear fruit (seed), but it is unlikely to reach its full growth (size) and potential (to bear leaves, flowers and fruit). If a company chooses to compete in an industry that it is not suited to due to internal constraints (such as structure, strategy and resources), it is unlikely to be very profitable even if it does manage to succeed.

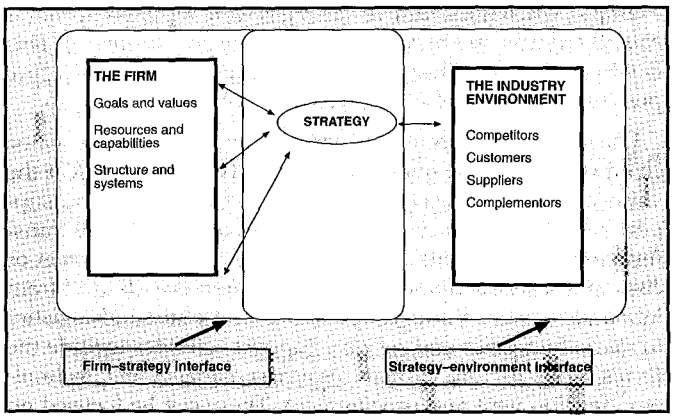
Micro

The seed equates to the mission/vision statement and should communicate to all the stakeholders the overall direction the firm wishes to take. The mission must be devised/revisited first and must include the specification of: (1) the basic product or service; (2) the primary market; and (3) the principal technology for production or delivery. Whether explicitly stated or implicitly implied, the mission of the firm is to secure survival through growth and profitability. Lastly, the company philosophy and public image should be addressed. It should also provide an articulation of the linkage between the company's vision and values and its planned strategy. A strategic fit is important. A proper mission or vision statement can guide the company's goals to fruition via long-range plans for growth and profitability/success. (The long-range plans are broken into medium-term plans, and finally into annual plans that assist in monthly goal determination). It must be noted that the size of the seed (company idea/size at its formation) is not a determinant of the tree's potential (for example, the tiny mustard seed grows into a huge tree) or profitability (a big tree may not produce fruit or even foliage if conditions are unfavourable). However, the decision on where to sow the seed (carefully planted or scattered by chance occurrence) can influence potential growth and profitability – if a seed germinates in a wall and starts to grow, it shows excellent strength of will and intention, but, due to the conditions in which it chose to grow, its scope is limited by environmental factors (market and possibly macro). This equates to a company's not putting thought, effort and planning into its vision/mission.

The successful germination of the seed and the growth of the seedling, into a sapling and finally into a tree, are all reliant on the roots' ability to anchor the growing tree. This means that the company can only be successful if it carefully plans its long-term strategy so as to reach its goals. The strategic business plans need to be simple, consistent and show a profound understanding of the competitive environment. These strategic plans can only be implemented with adequate resources (in terms of quality and quantity), which have to be objectively appraised. A resources analysis or audit must be conducted in conjunction with determining the market opportunities to be utilised and the threats to be neutralised. This is done by means of a SWOT analysis:

- The SWOT analysis assists in determining what real and potential opportunities and threats are in the environment (market and macro) that can assist or inhibit the company's potential for growth, profitability and success. These lead to a choice of industry. Industry attractiveness will determine the corporate strategy of the firm. The corporate strategy can be defined as the scope of the firm in terms of the industry (industries) and market(s) in which it competes (domain selection). Corporate strategy decisions include the allocation of resources between the different businesses of the firm, investment in acquisitions, divestments, new ventures, diversification and vertical integration.
- The SWOT analysis also aids in assessing the company's possible or actual strengths and weaknesses. An audit of all company resources is also required, including:
  - Tangible resources – financial, physical
  - Intangible resources – technology (for example, proprietar technology – patents, copyrights, trade secrets), culture and reputation (for example, brand name)
  - Human resources – communication and interactive abilities, specialised skills and knowledge (education, aptitude, training, problem solving), motivation (self and others), teamwork (coaching and development, building consensus) and achieving objectives (risk taking/initiative, responsibility, accountability, results orientation).

These resources determine the company's capabilities and impact on its strategies and competitive advantage. These must be weighed up against the industry (market) key success factors so that improvements and changes can be made accordingly.



Source: Adapted from Grant (1998)

Figure 8. Shifting from an industry focus to a resource focus

It is necessary to determine the company's goals and values, its resources and capabilities, as well as its structure and systems (see Figure 8 – Shifting from an industry focus to a resource focus).

A strategic fit is necessary, which creates synergy to be utilised in competing in the industry. Industry and company life cycle should also be taken into consideration. The company's goals should be simple, consistent and long term. These goals must be carefully written up by top management after a careful analysis of the external (market and macro) environment in order to maximise the firm's resources utilisation.

The company's resources have to be carefully analysed in order to understand where the company's competitive advantage lies. The company's competitive advantage determines its business strategy – namely, how it competes in its chosen industry (navigates the domain). An intense understanding of the competitive environment is necessary to fully utilise the company's competitive advantage in the market.

Market

The market factors determine the source of the company's resources (inputs). The market comprises suppliers, competitors, customers (consumers and buyers), and complementors (see Figures 5 and 6). The five forces of competition can be seen as: (1) (existing) industry competitors; (2) potential (new) entrants; (3) suppliers; (4) buyers (customers and consumers); and (5) substitutes. The SWOT analysis mentioned under the micro environment above can be utilised in identifying the opportunities and threats that the market poses in terms of these five forces or in terms of the factors discussed below. Using the SWOT as a tool, the company can identify its strengths and weaknesses in relation to the industry opportunities and threats. It must analyse its resources and capabilities carefully to identify a potential sustainable competitive advantage that will be in line with key success factors for its industry. The sustainable competitive advantage determines the strategy chosen to compete in the industry. Any resource gaps have to be filled in order to compete successfully. If the firm underestimates its competitors or mistakes industry key success factors for whatever reason, it is likely to fail. Continuous environmental scanning is necessary, as can be seen from Porter's model of the five forces of competitive advantage. There are always competitive threats in the industry, and the company must be prepared to deal with these, especially as these factors can change the industry entirely (for example, when horse-drawn carriages were replaced by motor cars, there was an entire shift in the transport industry). This is why scenario analysis (worst, probable, or best-case future possibilities) is a useful management tool as well.

Looking at this from the perspective of the firm's value chain (Figure 7), the quality and quantity of inputs affect the value chain in two ways, because there are primary and support activities. Primary activities are involved with the transformation of the inputs and the interface with the consumer or customer. These activities should add value at each level from inbound logistics through operations and outbound logistics to marketing, sales and service. Support activities include the firm's infrastructure, human resources management, technology development and procurement. These can be focused on when outsourcing is considered for non-value adding activities. Support activities stretch across the entire value chain and will briefly be discussed here and not again.

Support activities arise in one of four categories and can be identified or disaggregated by isolating technologically or strategically distinct activities. Often overlooked as sources of competitive advantage, these four categories can typically be distinguished as follows (adapted from Pearce & Robinson, 1994: 184–187):

1. Procurement – this includes all activities involved in obtaining purchased inputs – such as raw materials, purchased services and machinery
2. Technology development – activities involved in designing the product as well as in creating and improving the ways in which the various activities in the value chain are performed
3. Human resources management – any activities necessary to ensure the recruiting, training and development of staff
4. Firm infrastructure – such activities as general management, accounting, legal, finance and strategic planning and all others that are decoupled from specific primary or support activities, but are essential to the operation of the entire value chain.

Suppliers

The supply of resources is dependent on availability. The economic principles of supply and demand determine the cost of these resources. There are suppliers of resources that form inputs into the company's value chain in terms of its primary activities. These resources can be raw materials for a manufacturing concern and the utilisation of human and other resources for a service concern. In terms of value chain management, it is imperative that a company work in partnership with its supply chain and build a solid relationship with suppliers in order to create a synergistic relationship. This synergy can reduce costs by:

- Improving quality (in terms of reduced numbers of defects and returns)
- Reliability (delivering on time, with the correct orders every time)
- The long-term relationship (working together to improve value-chain management and long-term profitability for both parties)
- Reducing lead times (by having stock available and minimising back orders).

Resources (both human and financial) are also required for support activities. The quality and quantity of human resources required by the company are determined by market availability. In some industries, demand is higher than in other industries for certain required skills. Factors affecting the quality and quantity of skills include education, training, aptitude and vocational interest of the human resources market.

Competitors

This is a more complex aspect of the market, as competitors are not restricted to the industry in which the company has chosen to compete (industry domain/business landscape). Competitors can come from unexpected sources when a new entrant introduces a completely revolutionary technology that changes the competitive landscape. Competitors also appear in the form of substitutes. These competitors are not always easy to identify (for example, acupuncture therapy as an alternative to prescription drugs in combating pain; Amazon.com as a virtual Internet bookshop as opposed to the traditional

physical bookshop). This is why a competitor analysis is crucial to assist in strategy determination, to determine key success factors for the industry and to ensure that the competitive advantage chosen by the firm is a potentially sustainable one.

Competitors affect the company's inputs in that they can:

- Try to poach valuable staff (human capital resources)
- Forge alliances with suppliers and cut off the company's supply chain or reduce the number of suppliers it can utilise
- Force the price of inputs up through behaviour such as mentioned above.

Customers (consumers and buyers)

Customers can influence the firm's inputs by:

- Consumerism – which could force the company to change the standard (quantity or quality) of inputs used for health, environmental or ethical reasons
- Product demand – which ensures the company utilises the inputs necessary to cater for specific demands (which may have increased or decreased dramatically)
- Demographics – changes in these factors over time change patterns of demand, which affect inputs required by the firm.

Complementors

A competitor is regarded as a complementor if customers value a company's product more when they have the competitor's product as well than they would have if they had had only the one product. Thus, a synergy is created between the company and its competitor (now known as a complementor). Complementors can affect the company's inputs in that the demand they create changes the inputs required (from suppliers) to produce the product or service (see Figure 6 for the value net).

Macro

The company has no influence on this environment. At best, it can try to create situations where it carries influence in this environment. However, this is very rare, and usually only applicable to huge conglomerates. Therefore, this environment is not dealt with in detail in the analysis of the BPR process. It should be noted that this environment, like the market environment, should be constantly scanned.

Factors affecting the organisation are noted under the six macro variables. Some of these factors affect the entire value chain of the organisation, while others are specific to the inputs, transformation, outputs and feedback loop respectively. Additionally, all factors comprise a global/international and domestic/national component. The focus here will be on the domestic aspect. To eliminate repetitiveness, common factors will be mentioned hereunder and only pertinent specific factors and examples thereafter:

1. National and global/international economy: tax rates; inflation; value of currency in relation to other currencies (devalued currency like the rand makes South African companies more competitive internationally); economic wellbeing of major currencies and economies (for example, if the United States of America suffers recession it affects whole world); status of trade relations (in terms of GATT – the General Agreement on Tariffs and Trade – agreements and trade blocs, for instance); infrastructure (which affects transportation and delivery times of goods) in the country, which is related to the economy and government (or political factors); status of the economy (First or Third World or a combination, which refers to developed or developing economies – for example, Germany is a First World economy, Mozambique is a Third World economy and South Africa is a combination of the two types).
2. Technology: includes the available infrastructure in terms of telephone lines, computer cable connections over land and under sea for Internet availability, as well as satellite communication, and research and development resources (in other words, the quality and quantity of technical and scientific utilisation). Creative technological adaptations that may influence the development of new products or services or the improvement of existing ones are also incorporated. Additionally, the improvement or redesign of manufacturing and marketing techniques may be developed.
3. Political (government) factors including the influence of this variable on:
   - Industrial relations (in other words, the tripartite relationship between government, employers [companies] and employees [individuals]), which affects labour laws
   - Laws governing business (which either aid or restrict operations)
   - Influence over type of economy (for example, free market or controlled) in the country
   - Trade relations with other countries
   - Openness of information (government transparency, free and fair elections, freedom of speech to allow media and people the right to express themselves as they feel fit)
   - Movement of goods and people (barriers to entering or leaving due to import/export and immigration/emigration laws).
4. Social factors: size of upper, middle and lower class; ease of mobility between classes (in India the movement is restricted entirely); lifestyles; beliefs, attitudes and values; other demographic factors, such as size of population in terms of young, middle age and old groups (which affects working class availability and the suitability of certain products and services); geographic dispersion; urbanisation; literacy, education and training of population (which affects skills and earning potential); culture of, and subcultures in population; effect of disease, crime, education, empowerment and other factors on the workforce, families and consumerism.
5. Ecological/physical (natural) environment: this includes all land, sea, air and other water resources.

   (i) Land resources:
   - Impact in terms of space (how much land is available in the country – for example, Japan has very little, while the United States of America has vast resources)
   - In terms of quality (suitability for primary [agriculture, mining], secondary [manufacturing] and tertiary [services] activities)
   - Preservation – ecotourism, for example, wildlife in South Africa, rare flora and fauna species, caves, historic significance (such as bushman paintings and fossils)
   - Cost of utilisation (for example, there may be considerable mineral resources, but the cost of extracting them may be too exorbitant).

(ii) Sea resources – fishing (commercial), mining (oil, gas), aesthetic appeal (ecotourism in terms of coral reefs, rare species (such as coelacanths)

(iii) Air resources – purity of air (such as pollution hazards); safety of weather (geographic location in terms of cyclones (for example, Hawaii has cyclones, South Africa does not)

(iv) Other water resources – purity of water (in terms of pollution hazards and disease, for example), quantity available in the form of dams, rivers, streams, and aesthetic appeal (for ecotourism in terms of, for example, waterfalls at the Victoria Falls).

Transformation/throughput: Trunk and branches

This can be viewed as the implementation (organising and leading) phase for a company and for BPR. The firm's long-range goals must be effectively implemented (in terms of doing the right things) and supported by top management to guide the firm to goal attainment. The company must utilise its structure, strategy, policies and procedures, culture and other processes to implement the medium-term and short-term objectives of the firm. The BPR project will not be successful if top management does not support it, and they can only support it if they understand it. The BPR process must be simple and clear so that everyone in the organisation understands the scope and implications of the project.

If the foundation of the tree (seed and root system) is good, this has a strong positive effect on the ability of the trunk and branches to grow. However, the trunk and branches of the tree are affected by factors mentioned previously, such as neighbouring flora, fauna, insects, birds, weather conditions, and so forth.

If the company's base is good (in terms of its mission/vision and objectives), it has a good chance of growing to its full potential and being successful (profitable). However, it is affected by internal (micro) factors, direct external (market) factors and factors even further afield (macro). The strength of a firm's competitive position relative to that of its industry will determine its growth and profitability. The industry environment impacts on the competitive strategy chosen by the firm. The firm establishes its goals and values, determines its resources and capabilities and develops structures and systems in order to maximise growth and profitability. The company's competitive advantage, which influences its business strategy, should dictate the core processes that must be focused on in the BPR process. The value chain and the processes it incorporates must transform the inputs into a value-added product or service that puts the company ahead of its competitors.

Key industry success factors are determined by analysing what customers want and what the firm can do to survive competition in the long run. However, just to stay in the game is not enough. In order to grow and remain profitable, the firm must know what drives competitors, what the main dimensions of competition are, how intense that competition is and how the firm can obtain and maintain a competitive position (see Figures 5 and 6).

Looking at BPR from the point of view of the tree model, the trunk and branches are part of the transformation process when viewed in conjunction with the value chain (Figure 7). The strength of the trunk and branches determines the tree's scope to grow leaves, flowers and fruit. It must be able to bear the weight of these. The number of leaves a tree has – its foliage – impacts on its ability to photosynthesise food (using sunshine) to provide more growth for the tree. This growth impacts on the number of flowers that can blossom and in turn mature into fruit and, ultimately, more seed, for the tree to expand its gene pool, so to speak. All of this rests on the strength of the tree's trunk and branches. Factors that influence the quality of the foliage/leaves, flowers and fruit include soil conditions, precipitation, insects, birds, animals, weather conditions, and so forth.

This can be likened to a company's ability to take its mission and strategic (long-term) objectives, convert them into medium- and short-term goals, and achieve these by utilising all the internal (micro) elements of the firm. As mentioned above, use is made of the structure and systems, policies and procedures and other organisational elements to implement (organise and lead) the workable objectives. The firm's elements need to be utilised as efficiently and effectively as possible (streamlined) in order to realise cost and time to market advantages, among others.

Micro

The BPR teams should be formed and responsibility and accountability for these teams, as well as for functional departments, must be established. The BPR project goals need to be clearly outlined and the one-year plan broken up over twelve months to motivate staff towards goals attainment. This also assists in the implementation and control process to ensure everything is on track and to coordinate simultaneous (or parallel) implementation where necessary. In some instances, sequential implementation will mean that one department's (or team's) output will be another's input, so achievement of milestones will be critical. Management by objectives (MBOs) can be utilised as a tool to motivate employees to achieve measurable goals that are determined between the employee and his or her supervisor. Where necessary, training programmes must be undertaken after manpower audits and job analyses are conducted to ensure that staff understand what their jobs entail and what is expected of them in terms of performance. Only then will employees properly understand efficiency and effectiveness in relation to their work. This will aid their buy-in and the overall changes implemented by management. MBO or other quality and/or productivity programmes put in place by employers will also be complemented.

It is important that the company culture be analysed and understood when attempting to implement the BPR process. Each company, like a nation, has a culture. Subcultures also occur in the company. However, the prevailing, dominant culture is the one to be harnessed, modified or changed in the BPR process, depending on the desired results. Moreover, all the employees in the company will need to be assisted in adapting to any change in culture that must be made in conjunction with the changing organisation. As a norm, people resist change. Change agents can be identified to assist in changing the structure, technology, physical setting (work layout) and employees (attitudes and behaviours) to fit the BPR requirements. Change agents will need to overcome individual and organisational resistance. Transparency, communication, motivation, seeing the bigger picture, teamwork, rewards and feedback are all positive contributors towards reducing resistance.

With reference to Figure 7 (Porter's value chain), in terms of transformation:

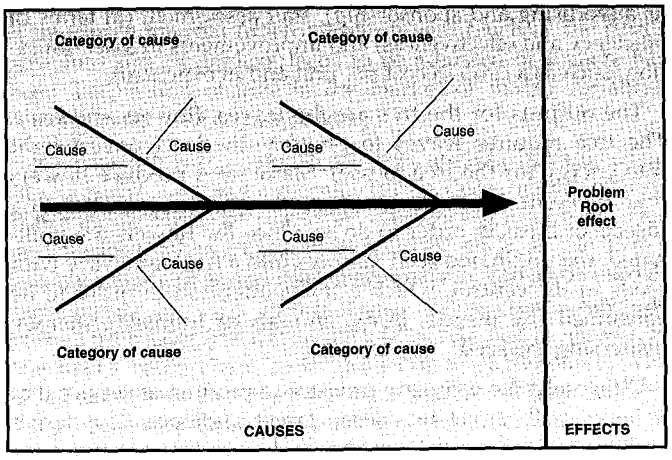
- The firm takes the inbound logistics activities (receiving, storing, and dissemination of production inputs, which include the handling of materials, warehousing, inventory control, scheduling and supplier returns).
- It uses these in operational activities that are associated with transforming the inputs into the final product form, whether it is a product or service. These activities include packaging, machining, printing, testing, equipment maintenance and facility operations.

BPR efforts will be focused on the value chain from the input stage, through transformation to outputs. Critical, or core, processes have to be identified in the addition of value along the chain. Depending on the type of company, certain functional areas can be outsourced in order to concentrate on core processes. The virtual corporation is an example of a company that does not physically exist as it brings together all the necessary elements, if and when it requires them. Therefore, everything can be outsourced, so to speak. When analysing a company, cognisance should be taken of the type of company under scrutiny. This includes analysing factors such as: the functional focus of the firm (micro factor), the life cycle of the firm (micro factor) in relation to the life cycle of the industry (market factor) and possible opportunities and threats that could arise because of discrepancies betwee the two. Certain functional areas are concentrated on to a greater extent, depending on the part of the life cycle curve on which the company lies. This impacts on the various functional strategies, for example, the marketing, financial, and research and development strategies. In BPR, this must be borne in mind, as a start-up company differs radically from a mature one. BPR must reengineer the company and its processes to suit its life cycle and prepare it for its next (future) life cycle move, taking the industry life cycle into consideration.

In a manufacturing environment, there is usually considerable room for improvement in the value chain between inbound and transformational activities. Inventory is often used as a buffer to bypass problems such as poor scheduling, long setups, quality, delivery, breakdowns, dirt and absenteeism. Tools such as total quality management (TQM), quality circles, and just-in-time (JIT) manufacturing can be used to improve such operational problems. The *ishikawa* (cause and effect) diagram (Figure 9) illustrates a useful tool when trying to work out the cause of a particular problem. It assists in analysing various categories of causes that are subdivided into branches, under which specific causes are listed. These are all analysed and, eventually, the one cause, that, when solved, would create the biggest positive impact on the effect, is chosen as a focus point for process improvement. This may sound simple, but much careful thought and analysis must go into the compiling of the cause–effect diagram in order for it to be successful.

Market

As mentioned above, the company can look at industry norms and compare itself to those companies (competitors) that are most like it. This can assist the firm in its outsourcing quest. It can also note what the market leaders in technology, market share, profitability and size are doing respectively to gather information as to benchmarking best practices. These best practices can range, for example, from technology such as better manufacturing and marketing), to product or service



Source: Melnyk & Denzler (1996)
Figure 9. Cause and effect (*ishikawa*) diagram

improvements (bells and whistles), to training methods and control procedures.

In a country like South Africa, where the potential for service improvement is possible in almost every organisation, benchmarking against international standards would be a good start to rendering the country's companies more efficient and effective. Benchmarking against best practices can transform a company, and even an industry (once a reengineered company has won market share as a result of improvements, which include the utilisation of benchmarking against best practice locally and internationally).

The company should continually scan its environments (throughout the value chain process).

Macro

Labour laws can influence the maximum number of hours in a work week and the minimum wages earned. Companies are then forced to hire additional labour for an extra shift in manufacturing environments because it is more efficient to run a plant 24 hours a day. This puts an added burden on the company in terms of more employees that will join a union (which is the norm), additional administration, and higher costs ultimately, as the recruitment process and training are costly. Minimum wages also affect the firm, in that salary costs go up but productivity tends not to increase concomitantly. In South Africa, where labour laws generally favour employees, companies are finding it difficult to compete internationally in terms of productivity and the cost of labour (when tendering for contracts). Productivity is low and labour costs are high per unit of productive work hour. The only saving grace for a country like South Africa is that the falling of the rand against hard currencies, such as the United States dollar or British pound, means that South African products and services are inexpensive to international customers. Therefore, the transformation process in South Africa is expensive relative to companies abroad, but the outputs are cheaper.

Outputs: Leaves, flowers and fruit

This can be viewed as the control phase of the organisation and the BPR process respectively. The outputs for the firm include the quantity and quality of its product and/or service, the income generated from the sale of the product or service, and the market share obtained. Other outputs include the customer product awareness generated by the media utilised (such

as advertising and sponsorship), staff assessment (in terms of efficiency and effectiveness) and improvements in asset utilisation (such as a drop in cost per unit and in expenses).

The outputs for the tree are the leaves, flowers and fruit. The tree requires leaves to photosynthesise (convert light into energy for the tree to use). Many trees produce flowers that blossom in order to assist in pollination, attracting insects or birds in order to do so. Once the flowers are pollinated, the pollinated seed matures into a fruit (an ovary with seeds in the centre), which attracts attention in order to be consumed (by insects, birds, animals or humans), thereby dispersing the seed.

Ultimately, the company produces a product or service that it hopes will attract its chosen target audience. This target audience (niche market) purchases the product or service for money. After expenses and so forth, the firm is left with a net profit or loss. This firm is successful only if it makes a profit. However, a profit is not indicative of the efficiency and effectiveness of the firm. The efficiency and effectiveness are calculated by using various financial ratios.

Micro

The success of the BPR project can be measured in terms of goal attainment. Monthly meetings are held to provide feedback upwards (from employees to management) and downwards (management to employees). It is prudent to have the BPR project team represent the employees, especially when the company is large. However, it is imperative that departmental managers meet with their staff and communicate progress to them. At the end of the year, the BPR process should be completed and the final results, which are directly measurable in terms of improved efficiency and effectiveness, should be known.

All successes and failures must be reported on and information gathered from the BPR process should be kept available for future benchmarks and comparisons. Constant improvement (*Kaizen*) should be aimed at, so that this becomes second nature to employees and management. Innovation and lateral thinking should be fostered so that employees are empowered to be proactive and enthusiastic about the value they add in the process of producing the product or service.

Staff assessments should be held at least once a year. This may not seem often enough, but most companies do not have any process for the formal assessment of staff in place, and, if they do, it is usually primarily for the purpose of establishing the annual increase to be awarded. Perceptual bias, the halo effect and prejudice often mar this process. Staff assessments should be a positive, open and fruitful discussion between a manager and staff member so that, where a staff member is not performing adequately, training is provided to assist in performance improvement.

Sales analyses must be scrutinised against market share figures. These can be compared against competitor figures available. Production must be accurately planned to be in line with sales predictions. The income statement should be used to work out staff cost to turnover and total cost, so that, for example, productivity ratios for the company can be compared against competitor figures on a month-to-month basis.

Market

Sales analyses and market share figures can be compared against the available competitor figures. Where industry norms have been established in terms of certain ratios, these can guide the firm in benchmarking itself accordingly. Market share can be analysed by drawing up a Boston consulting matrix (market share in relation to the life cycle of the market). It is a useful tool to be used as a basic analysis of the company's market share in relation to that of its competitors, either by product or product range (if there are too many products to analyse separately). This is drawn up in relation to the product life cycle applicable to the product or product range under review.

Analysis can be made of media utilised and how successfully they are creating awareness of the company's product(s) and/or service(s). A common approach is the use of surveys; the latest type being disguised as phone-in competitions. A cellphone number is given for a televised competition hotline where the customer can stand a chance to win a prize after answering a few survey questions, a qualifying question and then leaving personal details. This aids the company sponsoring the prize in that they:

1. Monitor viewer response to the competition advert and compile a 'guesstimate' of the total number of viewers reached
2. Obtain product usage information
3. Obtain demographic information
4. Obtain personal details that can be loaded into a database to be used to contact the customer (the user or potential user of the product).

Value chain partnerships (for example, suppliers and distributors) can be assessed and monitored in terms of the value they add to the company, and whether there is any reduction in problems previously encountered. The distribution network can be assessed in terms of various components. These include efficiency (what it costs to use them); effectiveness (whether they are doing the job properly, for example, packing shelves on behalf of the company when delivering); and value added (whether, overall, outsourcing distribution costs the company less or more, because it affects the costs passed on to the customer).

The company must monitor all outsourced functions, as those entities can cause considerable damage to the firm if not managed properly – for example, if an advertising firm makes an advertisement that is negatively perceived by consumers (whether in the target market or not), it can have a detrimental effect on the firm's reputation.

Macro

Should the product or service cause environmental pollution or ill health, the government may force the company to change its business operations – for example, tobacco advertising and new smoking laws in South Africa are making a huge impact on the tobacco industry. Legal action (criminal or civil) may cripple the firm financially or close it down permanently (through liquidation). Spiralling petrol costs cause an increase in the cost of distribution. These costs affect the value chain because:

- Inputs cost more as suppliers' costs go up.
- Outputs (goods and services) cost the consumer more because of the increase in suppliers' costs as well the increase in the price of distributing products and services.

Feedback loop: Seed from fruit

Not all trees yield fruit. Those that do, however, produce fruit of varying quality and quantity. Various factors influence the yield – for example, if the tree is grown in an orchard, the quality and quantity can be controlled to a degree as the process is managed. The seed is sown and seedlings grown under optimal conditions. Saplings are spaced to give adequate space to grow once transplanted to the orchard. Soil conditions and watering are controlled to ensure optimal growth and successful development in terms of bearing fruit. Pesticides are usually sprayed on fruit to protect them against insects, birds and animals, and the fruit is picked at the best seasonal time to ensure maximum earning potential for the farmer. Not all trees bear fruit as a means of spreading their seed: some only flower and disperse seeds. Fruit can fall to the ground, rot and the seed can grow into a new plant or fruit can be eaten and the seed sown in the excrement of the eater. Seeds can also be dispersed and pollination can occur through the agency of insects, birds, animals, weather conditions (for example, wind) or humans. In some instances, the tree has a specific manner in which it has its flowers pollinated and seeds dispersed. In other instances, the dispersal is by chance.

In any event, the new seed, under the right conditions, becomes the new generation of trees. If the tree does not flower and produce fruit or seed, the tree will be unable to perpetuate itself. Once the tree dies (whether of natural causes or is cut down or destroyed), there is no evidence of its having existed unless a part of it is used in the making of furniture or if the rotten tree fertilises new trees or plants.

The company's outputs become the new inputs with which it can work to grow bigger and stronger and be more successful. The outputs are either goods or services for which the company is paid money. This money is used in various ways to ensure that the company is able to grow and be successful. If the company does not produce goods or services that are valued by the market, the company will either have to sell the goods or services at a lower price (make less profit) or at a loss. This will have a negative impact on the long-term profitability of the firm, and it will eventually lose market share and die or be taken over by industry rivals if an analysis by competitors or outsiders reveals that the company has potential but is badly managed.

Micro

The feedback loop is an important consideration, because the loop is equal to the net profits earned by the firm. Profits range on a continuum from high through to low, depending on the type of industry the company is engaged in. A company needs to take care that its position and strategy do not cause it to wither and die in the long run. This is why the SWOT analysis and other tools are so important. The basics have to be right to ensure that planning, organising, leading and controlling all create synergy. The company needs to follow through the process to the end to ensure that the outputs add value when fed back to become the inputs for new value creation.

Internal (micro) reviews that have been done monthly and in greater detail annually ensure that the company stays on track. If deviations are evident, they can be analysed to check if the firm's internal (micro) environment (such as the firm's structure and strategies) needs to be adjusted or if there has been a profound change in the market or macro variables, which would need to be addressed.

Staff assessments, customer surveys, analysis of value chain (for example, suppliers, manufacturing department and distributors) in terms of improved efficiency and effectiveness and various other information sources, such as the firm's income statement and market share analysis, can all be used as new inputs into the informational value chain. Revenue earned from sales (the net value) will be retained to reinvest in the firm's value chain or be paid out to shareholders. The share value is an important feedback in terms of how the market perceives the company (if it has shareholders).

Market

Constant environmental scanning is necessary to keep track of industry (market) and macro developments. Sometimes the entire competitive landscape changes instead of just moving – banking via the Internet or by cellphone are the latest trends for the banking industry, which is entirely changing the competitive landscape for this industry. In time, banks will require smaller and smaller premises, until they become almost virtual offices.

Information gathered from the marketing media utilised (for example, customer surveys and the monitoring of television viewing habits) can be utilised to ensure that the firm improves on its products and service. Information gathered can also be utilised in the research and development of new products and services or the improvement of existing ones. Environmental scanning can provide clues as to what is happening in the industry, and the firm can utilise this information to adapt its strategies if necessary. This is crucial in industries where the environment is dynamic and the norm is constant change. Today, industry environments are becoming more dynamic and only a few can still be regarded as static.

As mentioned in the discussion of the micro environment, share price is indicative of the market value placed on the firm, which can differ radically from the actual value of the firm. Where the market undervalues the firm, takeover bids are a possible threat. The company can also compare its price/earnings ratio to that of other firms in the industry as further information to be fed back into its strategy reviews (such as financial information), which incorporate the new planning (formulation) process.

Macro

Constant environmental scanning, as already mentioned, ensures that the company is aware of changes in its environment (both market and macro). Although it cannot really affect the macro changes, only react to them, by keeping abreast of developments that affect it, the firm can at least be proactive in adapting if and when necessary.

If the product or service pioneers a new technology that can benefit the country and, perhaps, the global economy, the company is likely to receive state funding, big corporate sponsorship (intra or inter industry) or alliance offers. This can be utilised to expand the growth and development potential of that firm. If the product or service is of national importance (such as the production of arms and ammunition) or if it is a product or service that is rare in the global arena (such as cer-

tain drugs), the government might take control of the company to ensure that production is controlled and monitored. Alternatively, political instability (civil war or the overthrow of the government) could cause a change in laws that give the government more or total control over the company. If the product causes illness in people or animals or has terrible consequences for the population (such as birth defects caused by DDT pesticides), a shift in the age spread will be evident, and people may need to be relocated to new geographic areas. Moreover, any legal or civil case that causes financial ruin of the company will mean that no resources are fed back into the value chain.

Success factors

The success factors of the tree model can be seen as follows:

- It is a simple process to understand and follow.
- It was not designed with specialists in mind, but was designed for management and employees in organisations to plan, implement and control (top-down and bottom up).
- It therefore involves both management and staff to obtain buy-in and acceptance from everyone.
- It fosters openness, communication, motivation and teamwork.
- It aids in combating resistance to change.
- It is a systematic process (implemented over one year, broken up over 12 months to motivate goal attainment).
- It combines innovation and process improvement.
- It is a holistic approach (combining all functional departments because it takes the value chain approach, in other words, dealing with the core processes, rather than the functions in isolation).
- It fosters an objective approach through dealing with core processes by means of teamwork.
- It combines organisation processes with people (employees).
- It emphasises the planning stage as being the foundation from which everything should flow. However, this is not seen as the only function. Implementation (organising and leading) and control are also emphasised.
- Therefore, constant improvement is nurtured and BPR is not seen as a once-off solution, but as a new culture and a new organisational approach by all.
- The information gathered is important for future reference.
- The use of basic tools is encouraged (to keep the process simple and company specific).

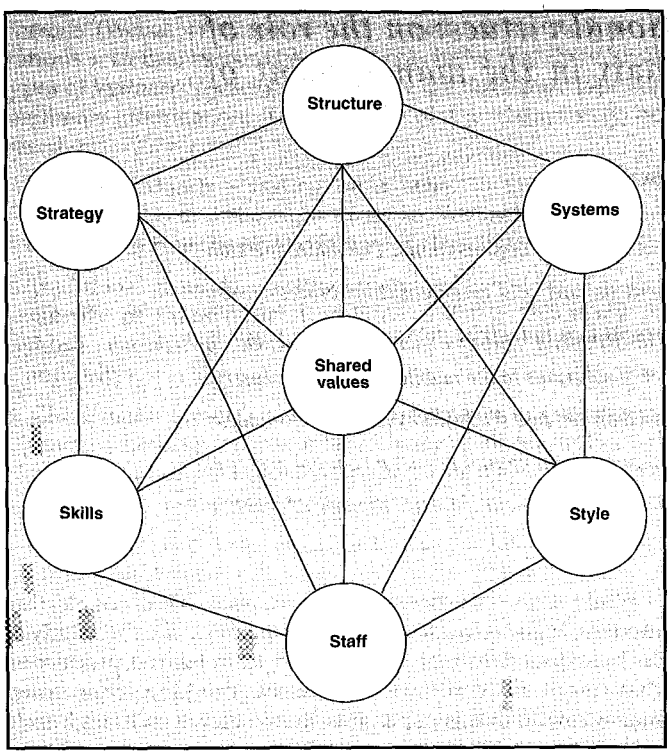
The steps

1. The mission is revisited (or compiled, if necessary) – this must guide the process and form the foundation of corporate strategy.
2. A SWOT analysis is undertaken to assess the strengths and weaknesses of the company, and the external opportunities and threats.
3. Porter's five forces model is used to analyse the strength of industry forces (in conjunction with step 2).
4. Value chain analysis is used to analyse the operating environment (in conjunction with step 3).
5. Core competency is compared with customer requirements, as well as with the core competencies of competitors (see steps 2–4).
6. A core competency is chosen as a basis for the company's strategic competitive advantage. This is used to determine long-term business strategies.
7. Medium- and short-term objectives are determined for the company, and its divisions and departments.
8. The BPR strategy and teams are determined (and these liaise and communicate).
9. Time frames are devised (over one year, with achievable monthly goals – MBOs).
10. Leaders and followers are designated (which determine responsibility and accountability, both for BPR teams and functionally).
11. The core processes used in producing value-added products or services are devised.
12. The cause–effect diagram is used if necessary to establish problem areas in the value chain.
13. Obstacles to change are noted, for the purpose of reducing resistance (through motivation and by fostering teamwork and communication).
14. Communication is fostered in moving towards one goal (using empowerment and motivation as well as open communication, bottom up and top down, to ensure that cultural and organisational changes are accepted and successful).
15. Synergy is created through a new vision. Review meetings are held at the end of each month. Every employee must obtain feedback via staff assessments and have the opportunity to offer comments. This can be limited to exception reporting during the BPR process initially (once job analyses and MBOs are established), but must be done at least annually thereafter. Successes must be charted and failures analysed. The company must analyse sales, market share and profitability figures in comparison to the pre-BPR period, as well as against current competitor figures. Management and employees should work together towards a new organisation – towards *Kaizen* (constant improvement).

Conclusion

Hammer & Champy (1993) define BPR as follows: "Re-engineering involves the fundamental rethink and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality service and speed." Models and theories abound in the BPR process, and yet, purportedly, 70% of the attempts to do so fail. In order to grow and be profitable, an organisation needs to get the basics right the first time and ensure that it remains proactive in its dealings with its environs.

Today, productivity, quality, customer service and speed have become competitive imperatives – firms have to be good at all of these, not to compete, but to survive. From a strategic point of view, it is thus no longer sufficient to consider how to achieve a competitive advantage, but also to what extent such an advantage can be sustained (Ferreira 2000: 5).



Source: Pearce & Robinson (1994)
Figure 10. McKinsey's 7-S framework

Prasad (1999: 178) defines a process as a set of 7Ts (talents, tasks, teams, techniques, technology, time and tools) arranged in a particular manner so as to transform a set of inputs into a specified set of outputs (goods or services). This process (7Ts) combined with McKinsey's 7-S framework (Pearce & Robinson 1994) (see Figure 10) encapsulates that which should constantly be monitored and adjusted if and when necessary: – Strategy, structure, systems, style, staff, skill, and shared values – to keep the company ahead of its competitors while adding value to the customer.

The creation of synergy should be aimed at from a holistic perspective. Perhaps the tree model of BPR will prove to be a useful process in ensuring this proactively.

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High-tech industry and traditional virtues: on the role of legal and traditional Herrschaft *in the management of industrial production*

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This paper investigates the concept of management in industrial organisations. The main question addressed is whether textbook images of management as part of a rationalisation process really reflect what is happening in the management of present-day industrial production. The paper is based on a small case study of a Danish manufacturer of solutions to the mobile telephone industry, focusing on the project management of DanFirm. Based on the case study and Weber's (1968) ideas on legitimer Herrschaft, *the paper concludes that management cannot be just a rational exercise. Tradition must be revitalised and included in theories of management if we are to more adequately understand management and management practice.*

Introduction

The study of industrial organisation has always been a very blurred and equivocal matter. Since its inception, the concept of management has been pivotal to any narrative on industrial organisation. Almost all studies of industrial organisation have been conducted from the perspective of the manager in charge of the industrial operation. It is assumed that managers could and should plan, monitor and control the operation, and they have been expected to do so by executing some kind of authority over the individuals and groups in their charge. In turn, those individuals were expected to be mere 'unwilling participants' in the industrial game. However, the modernist myth of continuous development from traditional societies towards modern societies, characterised by a rationalisation process, must be questioned. The image, role and work of the industrial manger are not what normative management science prescribes. The image of a manager as a person who is planning, controlling and monitoring the production process – and therefore a part of the rationalisation process that the modernist myth describes – could hardly be said to match the work of present-day industrial managers.

In this paper, the concept of management is explored by questioning the idea of management as part of a modernisation process. Such critique is not exactly new. Mayo, for example, recognised the dangers of basing management solely on rational planning (O'Connor 1998). In the 1970s and early 1980s, the advocates of 'workerism' stated much the same (Braverman 1974; Lysgaard 1972). The romanticist view has occasionally also asserted that values, feelings and emotions should also form part of the manager's everyday life, in order to increase output as it is understood (Peters & Waterman 1985). Studies of flexible specialisation taught that there was more to management than mere rational planning. The literature on flexible specialisation has argued this on several occasions (Sabel 1984; Piore & Sabel 1990; Hull Kristensen 1996, 1999; Henriksen 1999). From such studies, it could be said that the conventional image of industrial management and organisation is leading us astray, as it has never succeeded in capturing the reality of industrial production.

While these studies have been accused of neglecting modern, high-tech, science-based companies, the case study of an industrial firm that has engaged in industrial production that requires a different type of thinking concerning management. In this paper, it is shown that even in high-tech, science-based industrial operations, virtues and traditions play a major role. DanFirm (not its real name), the subject of the case study, is a medium-sized Danish manufacturing company, servicing some of the largest companies in the electronics industry. In order to be able to deliver its products (specialised mechanical components used in mobile phones and the like), DanFirm has organised its production, and its product development in particular, in a very unconventional and flexible manner, which challenges the business school approach to management. Yet, DanFirm is able to design, develop and produce products faster than most of its competitors. This is achieved through an integrated process of simultaneous development of products, processes and organisations. This could appear to be a trivial reengineering exercise, but it is not. On the contrary, it seems that the company's success is conducted through a worldview that combines old craftsman-like traditions with a large element of self-monitoring work groups, as well as an attitude towards technology that always seeks the most advanced of high-tech solutions – a way of organising that leaves no room for the usual normative management textbook exercises.

In our case illustration of the role of management in present day industrial production, reference is made to the classic thoughts of Max Weber, and his ideas of *legitimer Herrschaft*.[1] Weber defines *Herrschaft* as "the probability that a command with a specific content will be obeyed by a given group of

1. The original meaning of *Herrschaft* is difficult to translate into English. Usually the word is translated as 'domination', 'command' or 'control'. However, the authors prefer to use the German term *Herrschaft* as no equivalent English word captures the essence of the concept. *Herrschaft* is not only a concept related to power, but also a concept that points to mutual agreement and dependency. The word *Herrschaft* is therefore used throughout this paper.

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persons"(Weber 1968, vol. I: 53). Based on his studies of various societies, Weber (1968: 215) concludes that three ideal types of *legitimer Herrschaft* exist. There are three pure types of legitimate domination. The validity of the claims may be based on:

1. Rational grounds – resting on a belief in the legality of enacted rules and the right of those elevated to authority under such rules to issue commands (legal authority)
2. Traditional grounds – resting on an established belief in the sanctity of immemorial traditions and the legitimacy of those exercising authority under them (traditional authority)
3. Charismatic grounds – resting on devotion to exceptional sanctity, heroism or exemplary character of an individual person, and of the normative patterns or order revealed or ordained by him (charismatic authority).

However, it is not the object of this paper just to show the grounds on which *Herrschaft* is based. Instead, Weber's thoughts are used as an inspiration to move the focus from the manager as a person to management as praxis. Weber focuses very much on 'the manager' as a position in an organisation exercising an appointed authority. However, the case study shows that this perspective does not provide all the answers. Instead of explaining why people obey their managers, it is much more interesting to investigate management itself. This approach facilitates an understanding of when, and why, management can dispense with the use of rational management tools. In this way, it can be determined whether or not management can be explained merely as a modernist enterprise relying on legal *Herrschaft*. In order to answer this question, the authors have chosen not to structure the paper according to the usual headings of theory, method, case study, discussion and conclusion. A different approach is used, in which the reality of the case study is given more weight. In this way, reality is presented not through the tainted glasses of theory, but through the tainted glasses of the protagonists within the company. The research strategy chosen by the authors is less concerned with presenting evidence than with the questions raised by the case study. The rest of the paper is thus structured in three parts.

In the first section, a case study of the company DanFirm is presented, and there is emphasis on the concepts of legal and traditional *Herrschaft*.[2] These concepts are not explored in depth at this stage, however, but are explained in the next section as we move through the story of DanFirm.

In the second part of this paper, the authors use the thoughts of Weber and the case illustration in their discussion of Harvey's (1990) ideas of flexible accumulation. The aim is to explain the seemingly contradictory mode of management and organisation that is encountered and outlined in the case study.

Finally, some consequences of this analysis for the future study of industrial management and industrial organisation in the modern age are discussed.

Case study – DanFirm

DanFirm is a manufacturer of solutions for manufacturers of mobile telephones. (Solutions is the term used for all products manufactured by DanFirm.) It specialises in developing, producing and marketing these solutions. The story of DanFirm dates back to its inception in 1885. From the start, it was involved in the production of telephones. During the 1970s and 1980s, DanFirm was bought and sold several times. It was most often sold to large foreign firms with only faint ideas of the role and strategy of DanFirm. In 1991, however, a successful management buy-out was carried out. Today, the investor group that was behind the management buy-out owns DanFirm. Choosing the investor group as financial basis was the preferred way of ensuring that no individual would have majority shareholding and that DanFirm would remain in Danish hands.

In 1997, DanFirm made substantial investments in new automated production lines, specifically to accommodate solutions for the mobile phone sector. With the latest production technology and a rapidly growing market for mobile telephones, DanFirm is expecting high future growth. DanFirm currently employs about 270 permanent staff, which represents a growth in staff numbers of more than 50% since 1999, and the volume produced during the last year has increased by 100%. As a consequence, DanFirm is now the world's largest provider of solutions to its niche within the mobile phone industry.

DanFirm's business is to manufacture and sell solutions, as well as associated consultation, mainly with respect to mobile phones. The solutions come in different designs, which accommodate various types of customer needs, and are essential components of any mobile phone. The solutions are thus designed according to application and customisation. These solutions are marketed as components of consistently high quality and high performance according to specification, at a premium price. New product development and the fact that DanFirm is able to sell a total solution (both of which are aspects of the associated consultation) generally allow DanFirm to be positioned in the premium priced segment of its market. DanFirm is regarded as being ahead of competitors with regard to the on-going development of even smaller sized solutions, as well as technical solutions to improve performance. Product development has concentrated on variants with an improved quality, reduced overall price and smaller size.

This last aspect, in particular, is what initially aroused the curiosity of the authors about DanFirm. How has it been possible for this medium-sized Danish manufacturer to develop solutions at a speed that makes it possible to remain ahead of its competitors? How is this development, and the development of matching manufacturing processes, managed? What is the role of managers and employees in this process? The answer given by the manager of the project department, Bo Woetman, seemed at first somewhat disappointing, but this issue is addressed again later in the paper. Since February 2000, Bo has been managing the project department, which consists of about a dozen engineers and technicians. Their job is to develop new products, with matching production equipment. The product development projects can be divided into four different categories:

- Existing products on existing machinery
- Existing products on new machinery

2. The authors are well aware that charismatic *Herrschaft* is also an essential part of management. To describe charismatic *Herrschaft*, however, would require methods like participant observation in order to get much closer to the people working in DanFirm, which has not yet been possible.

- New products on existing machinery
- New products on new machinery.

It was the fourth type of project – new solutions on new machinery – that Bo was addressing when he talked to the authors of this paper about the firm's projects. Before the start of any project, one of the large manufacturers of mobile phones dispatches a request for quotation (RFQ). This request tends to be partly negotiated and most often based on previous projects and solutions, as well as the manufacturer's knowledge of DanFirm's capabilities. The RFQ is a product specification, which actually takes the form of a black box. All it describes are the features, the performance of the product and the outer physical measurements. This information serves as interface to the rest of the telephone. The manufacturer is not concerned with the inside of the product. DanFirm looks through the product specification, considers whether an existing specification could be changed or improved, and the target price is then negotiated.

When the manufacturer and DanFirm have agreed on the price and performance of the product, the actual project begins at Danfirm. The authors initially found this disappointing, because it seemed that the representatives from DanFirm did not understand their interest in the company's project management processes. It seemed very interesting that, in a single rapid process, they were able to develop solutions, as well as the production equipment to produce them, and to negotiate deliveries of components. The authors thought that there was some kind of secret to this seemingly 'magical' type of project management. Bo Woetman and the purchasing manager, Henning Jensen, did not seem to be impressed with the questions the authors put to them and responded: "It's nothing, really, what we do – it's just project management" (Woetman) and "Planning and experience is what it takes" (Jensen).

However, when pressed, they described the various phases of a typical project, making the 'magic' somewhat more tangible to the authors.

Project planning and management – the formal part

A project is initialised via a project committee (the management at DanFirm). A project comprises up to five phases, or milestones, depending on the complexity of the product. Phases M0–M2 deal with market possibilities, business development and technical considerations. Following the M2 milestone, the project is directed by a meeting with the project department. Prior to the M2 meeting, an itemised demand specification on the project has to be made. It is the responsibility of the project committee to do this, but, in reality, the project department does all the work. The specification is quite detailed and entails a product specification, which is usually similar to the one from the manufacturer. Every time – it does not happen very often – something needs to be changed in the demand specification, the projects go back to a new M2 meeting for the approval of the changes. This could entail changes regarding anything from time schedules to material costs. After the M2 meeting, a project manager takes over. From then on, the project manager is the project owner, and carries full responsibility for the project. The project manager develops the demand specifications further with detailed schedules, budgets and so forth. The project is then in the hands of the project manager, whose word is law, provided that the project remains within the limits of the demand specification.

In larger projects, two further milestone meetings are held before the project is closed and handed over to production at the M5 meeting. This way of formally organising a project perfectly matches Weber's description of *Herrschaft* based on legal authority:

> The following may thus be said to be the fundamental categories of rational legal authority: (1) A continuous rule-bound conduct of official business. (2) A specified sphere of competence (jurisdiction). This involves: (a) A sphere of obligation to perform functions which have been marked off as part of a systemic division of labour. (b) The provision of the incumbent with the necessary powers. (c) That the necessary means of compulsion are clearly defined and their use is subject to definite conditions (Weber 1968).

It is especially the second of Weber's categories that resembles the formal part of DanFirm's project management process. The RFQ and the M2 meeting form the sphere of competence (jurisdiction) of the project manager, who is given the necessary power to operate the project. However, within the sphere of the project, work is no longer organised by means of 'continuous rule-bound behaviour'. The development of machinery, products and purchasing runs simultaneously. The product developer makes a hand-drawn sketch of the idea, with only the rough measures and no tolerances. Regarding machinery, the main functions of a machine are usually the same or can be determined quite easily. Therefore, the usual suppliers of machinery can also get started very early on in the process and can develop the production line continuously, as the project progresses. The purchasing manager contacts the suppliers, who give a price estimate based on their previous experience of the quality and tolerances that DanFirm usually requires. A product tends to consist of approximately ten different parts. The purchasing manager then divides these into basic parts, the prices of which are known and fixed. Suppliers are then found for the rest of the parts, and price negotiation takes place between the suppliers and the project manager. It is important not simply to focus on the price of the single component but to bear the overall target price of the entire product in mind. The purchasing manager therefore develops a list of parts as quickly as possible. This is used to obtain an overview of all the 'ifs and buts' of the components. These are added together in order to see how far from the target the total cost of the materials is. In most cases, the total costs are far too high, and this initiates a process of debate and dialogue, with calculations adjusted towards the components that need further development and price negotiation. In this dialogue, the 'bottom line' is never forgotten, and certain things, like quality, are non-negotiable. As purchasing manager Jensen puts it: "Quality? Quality is not an issue. There is only one quality, and that is the one we ask for. Period."

In this way, product development, project management and purchasing are in continuous dialogue, with the demand specification and the manager of the project department acting as the overall referees. One could say that *Herrshaft* based on traditional authority fills the sphere that legal authority started out by creating. The dialogue and the tacit knowledge (tradition) of 'how things are done around here' lay the

foundation for the success of the project. If suppliers of machinery did not know the 'ways' of DanFirm they would never be able to deliver on time, and the way the purchasing manager has slowly developed a system for getting an overview of the purchasing situation is based on experience, rather than formal rational rules. This indicates that it is important not to base management on purely rational grounds, but to leave room for tradition in order for the process not to stop or to have an unsuccessful outcome because of conflicting goals and stiff hierarchies. In the project group, everybody is on the same level, working towards a common goal. If a project were to be led by legal *Herrschaft*, embodied in a managerial position all the way through, it would probably be terminated along the way or not reach a successful conclusion. Still, it is important to note that tradition only rules within the sphere appointed by legal authority.

Another variant of this is found in a product development project that is called the vibrator case for the purposes of this paper. (A vibrator is the name of the component within a mobile phone that makes the phone vibrate rather than ring when someone calls.) In this case, the process differed slightly from the formal process, since it was the project committee that said: "This we must be able to produce!" The product developer then went to work, but took too much time. He just would not let the product go and kept on improving it. When the project department eventually took over the project, however, everything had to be made right away. The manufacturer already had suppliers of vibrators, but DanFirm's product was different. It was produced on fully automatic equipment and consisted of fewer parts than the traditional vibrator. Because the manufacturer already had suppliers delivering vibrators, however, they were not willing to promise DanFirm anything. "Show us your product and let us know when you can produce 300 000 of them, and then we can talk," they said. This product development project entailed quite a large risk.

DanFirm remained confident, however, because they knew that their product would be better than that of their competitors. "One of the characteristics of DanFirm is that we are always late," Jensen says. "We are never the first ones on the market with a new product. We are followers. Then after some time we suddenly become the trend [setter] and define the standard of how a product should look and function." This came as a surprise to the authors, but nevertheless makes sense. The ability to be innovative is not necessarily a question of new products. The ability to 'catch up' also requires innovative competencies, as exemplified by the vibrator case.

The same thing happened with some of the other solutions observed. The problem is that, because DanFirm is always a follower, the standards have always already been set, and DanFirm then has to comply with these. DanFirm then becomes the trend-setter when it slowly enters the market with superior product. The vibrator case also illustrates the importance of tradition. The project was not conducted in the same manner as for ordinary products, which made it difficult to fill out the sphere that the legal authority appointed. The product developer did not have any tradition (or legal authority, for that matter) as a guide to what was expected throughout the process, and the project was late from the beginning.

Work modes – the informal part

Bo Woetman might have been right when he said that there was nothing special about DanFirm's process – right in the sense that DanFirm's formal arrangements around the projects do not differ much different from what one would find in other similar companies. The main interest of the authors was the everyday activities of employees and management – how people communicate, handle conflicts and so on, but mainly, how they get the job done. Woetman, manager of the project department, keeps an eye on the various project managers and makes them stick to their time schedules and budgets. At the same time, however, he has confidence in them to do their job well. Jensen comments: "We don't make unnecessary noise out of a problem. Instead, we talk about things. The Motorola project is a perfect example. All activities are started simultaneously, and all of a sudden the 'terminal' costs 0.50 DKK, which is much too expensive. But we do not start an internal war because of this, blaming each other for the problem. Instead we talk to one another. Then slowly we reach an acceptable level, which of course is not good enough, but we keep working on it together. We have a common goal. In other places they might say: 'Those engineers in product development are crazy, they do not know what they are doing. ... But this is not our way'."

This way of communicating has developed slowly within DanFirm. Again, the dialogue is what separates ordinary legal authority from that of DanFirm. What is right and what is not is not decided by the normal (rational) hierarchies. Instead, the tradition that has gradually developed enables such decisions. The role of the manager of the project department thus resembles Weber's description of a person enacting *Herrschaft* based on traditional authority:

> The person exercising authority is not a 'superior', but a personal master, his administrative staff does not consist mainly of officials but of personal retainers, and the ruled are not 'members' of an association but are either his traditional 'comrades' or his 'subjects'. Personal loyalty, not the official's impersonal duty, determines the relations of the administrative staff to the master (Weber 1968).

It is important to note that the strong tradition of DanFirm makes it possible to manage without a manager. It is tradition itself that informs people what to do, and not a manager exercising *Herrschaft* the way Weber describes it. The concept of 'comrade' is further illustrated by Jensen: "A good argument always counts." At DanFirm, people know how to listen, and it does not matter if the chain of command is not always maintained. In the days before the management buy-out, this was not always the case. As Jensen says: "If you came to somebody with a good argument why something needed to be changed, the response was very often: 'Have you talked to so and so, or so and so, about this.' Responsibilities were always transferred to someone else. This is not how it works anymore. Of course not everyone is able, or allowed, to make the same kinds of decisions, but if somebody comes to me with a question that I cannot answer, I can always point the person to someone who can."

This again highlights some of the shortcomings of pure legal *Herrschaft*, and the advantages of and flexibility inherent in managing by means of tradition. Another example of bypassing chains of command and complying with tradition is that of quality control in production. In order to avoid

unnecessary bureaucratic procedures, the individual operator working at the production line is responsible for the quality of the products. Operators that find components that are not of the right quality are expected to take the components directly to the purchasing manager, who is asked to correct the mistake immediately and do a better job in the future. No paperwork is involved and no manager is contacted; instead the error is corrected immediately. The advantage of this procedure is, of course, speed and the ability to correct errors instead of filling in forms. This is an example of tradition being stronger than legal authority. The operators bypass the legal authority of the hierarchy and instead follow the tradition that that they have been brought up with or socialised into. This is also the reason why the operator's complaints are acknowledged by the purchasing manager, who was also socialised in DanFirm. Weber describes this situation as follows:

> Authority will be called traditional if legitimacy is claimed for and believed in by the virtue of the sanctity of age-old rules and powers. The masters are designated according to traditional rules and are obeyed because of their traditional status (*Eigenwürde*). This type of organized rule is in the simplest case based on personal loyalty which results from a common upbringing (Weber 1968: 227).

In the example of the operator and the purchasing manager, there was no master whatsoever, only tradition itself, which was then obeyed. Personal loyalty was present, however; not towards a master (a manager) but towards the organisation, in terms of a common upbringing or process of socialisation. This again is an example of tradition managing without the use of managers.

This account makes it sound as if DanFirm is characterised by harmony, very egalitarian relationships and the absence of conflict, but this is not necessarily the case. Instead, it is the ability to confront conflicts head on that characterises life in DanFirm. This is not a question of harmony, but of consequence, which is illustrated by the case of the woman who was fired because of lack of trust. All employees have to fill in forms showing the hours that they are present at the workplace. They do this themselves, and they are trusted to fill in the forms correctly and honestly. One woman regularly arrived five minutes late, but she omitted to account for the five minutes on the form she filled in. She was fired after only a few weeks, not because she came five minutes late, but because she had proved unworthy of the trust she had been given. It was argued she had been disloyal to her co-workers and had endangered a system of time keeping, with which everyone was satisfied, based on tradition rather than formal rules. She therefore had to leave.

Some intermediate remarks

As already alluded to, DanFirm is no 'holiday camp'. Conflicts do exist, but they are confronted. This is not achieved through a formal system of management, but through a seemingly strange mix of employer involvement, self-management and paternalism. Bo Woetman notes: "One of the forces of DanFirm is that everybody believes in DanFirm. Even if everything looks hopeless, the demand specification brings people together in a common goal." The project manager acts as 'father' of the project – in charge of everything and responsible for everything. "An important aspect is also that responsibilities and liabilities go hand in hand," Woetman says. However, the manager is not alone, and always has the option of referring to the demand specification, which acts as a point of reference for the project and for the project manager.

What is described in this paper is a system by means of which DanFirm is able to manage projects in a way that allows the company to act quickly and decisively. There are no unnecessary administrative procedures, and the focus is on getting the job done. The benefits of this system are quite obvious: it is possible to develop solutions in a fast and cost-effective way. "Life is not as square as textbooks prescribe," according to Woetman. "Our product development is neither technology-driven nor market-driven. It is a mix. When we meet with the manufacturer, the last point on the agenda is a discussion of 'product roadmaps', where the future possibilities in the market are discussed."

The disadvantages are perhaps not as obvious, but with the rapid growth in the number of employees, problems lie ahead. How will it be possible to socialise a large number of new employees in existent DanFirm traditions? DanFirm currently employs almost 270 people and is doubling in size every nine months. This kind of growth causes a dilemma. As DanFirm grows, it becomes increasingly difficult to maintain the fluid borders between departments. There is the danger that the organisation may turn into a bureaucracy, with hierarchical levels of managers. Bo Woetman mentions his own position as an example of this. Another example is that of the newly established position of human resources manager. The project part of the organisation could perhaps continue to function as a small company, but the production department is definitely moving towards a bureaucracy, which makes communication more difficult.

A new mode of production? A traditional mode of management?

In the introduction, it was stated that the present shape of management in industrial production could be understood as a tension between rational planning and other modes of management. The case of DanFirm shows that the standard conception of the task of management as planning, monitoring and controlling does not fit. Management is not merely a rational exercise. Instead, management was said to entail paternalism, egalitarianism, self-management, tradition and virtue. Production methods, organisational forms and ways of managing industrial production do not seem to resemble very closely what management textbooks prescribe. To some extent, this is also reflected in studies of industrial production.

The development of the writings of management guru Tom Peters quite clearly demonstrates developments in the ways that industry is described. *In Search of Excellence* (Peter & Waterman 1984) challenges the image of cool, calculated, rational, modern decision-making. The everyday life of business is lived by passionate people, and the most passionate will do best, according to Peters. That was a major break with the conventional wisdom of the time. The idea that the large Fordist firms were the ideal type of industrial organisation, which other firms should try to emulate, was abandoned for good. Instead, Peters (1992) offers an image, not just of industry, but of business in general, where size does not matter. The critical factors for any business organisation are the abilities to learn, to act according to customer needs and to do so faster than anyone else. This includes new ways

of organising, eliminating red tape and bureaucratic procedures, and setting people free to manage themselves, so that scarce resources are not wasted on the unnecessary supervision of staff. Information technology is used to increase the speed at which the organisation operates. All this is used by the successful organisation to achieve what Peters calls "necessary disorganisation for the nanosecond nineties". The buzzwords of this management revolution sum up the new image that Peters offered: future successful business organisations would be decentralised in favour of fast decision-making, they would empower and educate their staff, thus enabling them to handle decentralisation, to take decisions for themselves and to work without supervision. They would be characterised as skilled, fast, quality-minded and innovative.

Is this image of business as flux, change, speed, fashion, decentralisation, education and empowerment also suitable for describing the present status of an industrial enterprise such as DanFirm? This paper will attempt to answer this question. Firstly, Peters is right. Things have changed, or at least the image of industrial production has changed. To equal the business success of large manufacturing companies not only takes a lot of courage these days, but also requires a large amount of ignorance. There have been enough third Italies, German *mittelstands* and, it might be added, Danish manufacturers like DanFirm to demonstrate that there are other ways of doing things. So, assuming that Peters is right, the world of business and industrial production needs another vocabulary. Secondly, despite the numerous interesting case stories, it is hard to see what to do with what Peters points out to us. He does not offer much by way of explanation as to why this management revolution is to take place now. Broad hints about information technology alone causing all the fuss seem insufficient. This lack of theoretical elaboration is perhaps also the main reason why Peters is not regarded seriously in certain academic circles. Weber's ideas have already been presented as a means of understanding what management is about, and revolution might not be the right term to describe this reality. Nevertheless, Weber's theories serve to fill some of the gaps in Peters' conceptions. Reengineering, decentralisation and eliminating bureaucracy do not go far enough by way of explanation. The case of DanFirm shows that tradition is one way of getting the job done effectively by avoiding bureaucracy and centralisation. Peters misses this point completely and gives the impression that decentralisation, new ways of organising and so on will suffice, which might be true. However, establishing a tradition that will help people judge right from wrong is also needed for this to work, and this is cannot be achieved overnight. The answer to the question already posed – whether Peters' image of business can also be used to describe the present status of an industrial enterprise like DanFirm – is therefore that it can. Peters does not have the answers as to why this image is correct, however; what he lacks is the identification of tradition.

Peters is not the only one to have discovered that the image of industrial management has changed. Harvey (1990) concludes that comprehensive changes in political economy and in labour market structures "are paralleled by equally important shifts in industrial organisation". So, even if Harvey's main interest is somewhat different from that of Peters, he cannot fail to see that the changed conditions he describes in *The Condition of Post Modernity* (1990) are characterised by speed, change, knowledge, new technologies and new organisational forms. Some quotations from Harvey serve to illustrate his views:

> Organised subcontracting, for example, opens up opportunities for small business formation, and in some instances permits older systems of domestic, artisanal, familial (patriarchal), and paternalistic ("Godfather", "guv'nor" or even Mafia-like) labour systems to revive and flourish as centrepieces rather than appendages of the production systems (Harvey 1990: 152).

and

> Such flexible production systems have permitted, and in some degree depend upon, an acceleration in the pace of product innovation together with the exploration of highly specialised and small-scale market niches (p. 156).

and

> Access to scientific knowledge and technical know-how has always been important in the competitive struggle, but here, too, we can see a renewal of interest and emphasis, because in a world of quick changing tastes and needs and flexible production systems (as opposed to the relatively stable world of standardised Fordism), access to the latest product, the latest scientific discovery implies the possibility of seizing an important competitive advantage (p. 159).

The picture that Harvey shows us is, indeed, a varied one – science-based, artisanal and flexible – and does not present a pretty sight for old-school Marxists; none the less, it is the same type of production system that Peters has seen and describes so enthusiastically. Perhaps it is also a description that fits DanFirm. Even if the management guru and the Marxist geographer agree perfectly on the present state of capitalism, only the latter offers some sort of explanation about how this new look is modelled. Harvey's analysis is from a Marxist perspective, from whence he observes the conditions for accumulation and regulation and finds, not surprisingly, that they have changed because of the internal contradictions of capitalism. Capitalism requires the constant development of organisation and technology, and, during the past decades, this has led to the type of capitalism Harvey refers to as "flexible accumulation", as opposed to Fordism. Harvey analyses these changes, very convincingly, in terms of a changed relation to space and time. According to Harvey, capitalism has always sought to overcome space and time, both of which are obstacles to accumulation. For a perfect condition of capitalism, time would be only a "twinkle in the eye" in order to please the cyclical character of capital accumulation. Space can be annihilated by time and can therefore also be eliminated as an obstacle. By using modern technology, the constraints that time and space impose on the accumulation process can, in many cases, be dealt with. Thus, the flexible accumulation process no longer needs the large-scale firm and Keynesian macro-economic policy in order to flourish.

For Harvey, this new form of accumulation has several implications, the most important of which is that it has led to a new type of relativism and post-modernism, within architecture, art and all other forms of culture. Harvey is even able to link the emergence of post-modernism to the breakdown of the Bretton Woods fixed currency agreement in 1972.

Concluding remarks – the role of management and industrial production

In the introduction, the question was posed whether management, as we know it from the management school

textbooks, can guide industrial operations. Management as planning, monitoring and controlling, performed by a privileged class of specially trained personnel, was not what we saw at DanFirm, and it might even be possible to argue that this was never the case anywhere. Instead, we witnessed a different type of management, with traditional virtues playing a vital part, together with important elements of self-management, group work and responsibility for consequences. We could therefore say that the textbook image of industrial management as a rational exercise does not fit.

Peters saw this – and described it enthusiastically. This was, according to Peters, the industrial organisation of the future, even though he did not describe it in terms of traditional *Herrschaft*. Harvey saw the same thing and described it less enthusiastically. To Harvey, the phenomena he witnessed must have represented a decline of management practice into a sort of domination belonging to a pre-modern age. The main outstanding question is whether it is possible to maintain an image of industrial management as a rational exercise. In other words, is it still possible to regard industrial management as part of a modernisation process in which traditional *Herrschaft* is gradually replacing legal *Herrschaft*, in accordance with the conventional image. The response of the authors is that the rationalisation process never succeeded, despite great efforts. Traditional *Herrschaft* has always been a vital and necessary part of industrial management. There was therefore nothing new in what we saw at DanFirm. Moreover, if this new form of industrial management (which is not necessarily new) is characterised by being science-based, artisanal, and flexible, and if it is able to outperform more rational (legal) forms of management, this gives rise to a further very interesting question. If the rationalisation of industrial management means (costly) bureaucratisation, and if the elements of tradition mean efficiency, this poses a challenge to the conventional image of industrial management and organisation.

It also poses a challenge to the initial questions that were posed. It might appear that the type of management that rational models have to offer is too costly, too inefficient and, to some extent, even unnecessary. Therefore, other types that are more efficient replace them. As regards decisions, it seems that the existence of tradition eliminates some of the need for decision-making, in that tradition tacitly informs managers (if there are any) and their employees what to do in many of the situations they face. Decisions are thus not needed; instead, the guidelines are provided by tradition. Perhaps tradition could even entirely eliminate the role of management. Weber's focus is very much directed towards the manager as an individual, but what if managers do not exist, and decisions are made and actions taken within the guidelines of tradition itself, without its managerial representation? Are managers as important as Weber believes, or could tradition itself handle everything without the need of 'appointing' a manager? In DanFirm this was partly true, but managerial representation was indispensable. The manager was the bridge that made it possible for legal and traditional *Herrschaft* to work together. Thus, the manager still plays an important part in industrial management in distinguishing between different kinds of authority. The role of the manager is therefore two-fold and has to manifest aspects of both rational and traditional authority.

Bearing this in mind aids in understanding why changing organisations and reengineering projects are so difficult to handle. As can be imagined, such exercises entail quite considerable risk if one takes into account only legal *Herrschaft* and rational authority. The results are often painful experiences, and confusion may persist for a long period of time. This situation might be avoided by integrating tradition from the beginning. It could give rise to the question of what could be changed and what would need to remain stable as regards tradition. On the basis of the DanFirm experience, it could be argued that, in order to be able to change, some degree of stability is needed, which could be described as tradition.

To answer questions like this, Weber's categorisation and description of the three ideal types of *Herrschaft* is useful, providing new and often overlooked ways of understanding the role of management in these and other situations. While we seem to be quite familiar with the concept of management, the (re)introduction of *Herrschaft* makes it possible to see new aspects of the relationship between managers and employees. Schanz (1999) describes the concept of virtue connected to social obligations if viewed from a pre-modern perspective. Community (*Gemainschaft*) would always come first. This is the opposite of the modern interpretation, where the individual, and individual rights, would be important (Schanz 1999). If we use this distinction when interpreting the concepts of management and *Herrschaft*, we see that management cannot be simply a rational exercise. Whether one is a manager or not, one has to act upon certain social obligations. This is usually not associated with 'management' but it is an essential part of *Herrschaft*.

However, from Weber's point of view, being a manager means that you know better, and you know everything. Your subordinates do not question you, and they will come to you when in doubt. This is not the situation today. Today, knowledge is not bound to an organisational position as Weber presupposes, which is another reason why management is much more interesting and complicated than described by Weber's ideal types. Nevertheless, the use of *Herrschaft* is able to provide insight into new aspects of management, which could prove to be a field for future investigation. We can thus turn to Harvey's description of flexible accumulation. As we have already seen, Harvey's description of this type of industrial production fits the description of DanFirm very well – science-based, artisanal and flexible. The case of DanFirm also suggests that some of Harvey's conclusions may have been too hasty. This is not necessarily a new type of industrial management, neither is it necessarily a regression to older, pre-modern types of management. It is probable that traditional *Herrschaft* has always been a vital, if little acknowledged, part of industrial management and organisation.

It would also be difficult to link this type of management solely to the emergence of post-modernity. If tradition and traditional authority are seen as pre-modern elements in modern management, and if they have always been present, then it can hardly be the result of a post-modern movement. It is not, as Harvey maintains, that flexible accumulation is a result of the new relativity that Harvey terms post-modernism. This would then presuppose that we had passed through a period in which legal *Herrschaft* dominated the everyday lives of people employed in industry, and we have no reason to believe that it ever has. Instead, we could say that if we were to organise industrial production using only the

means of legal *Herrschaft*, this would require a system of bureaucracy that would prove so costly that it would make industrial production practically impossible.

From this, we learn that future research should be directed towards investigating the extent to which these modes of management exist and the extent to which they are manifest in present-day industrial production. We could also ask what is required in order to organise industrial production with a large element of traditional authority, as in the case of DanFirm. The missing bureaucratic procedures ensure the speed and quality of both development and production processes, but they also make it necessary to ensure a high degree of training and education. If traditions, rather than legal procedures, are responsible for the high quality, it needs to be established how such traditions are socialised, or are taught to the members of the organisation, and how they are passed on to new members.

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The South African Essential Services Committee Part II: Functions of the committee

Dhaya Pillay*

In the second and final part in the series on essential services, the functions of the Essential Services Committee (ESC) are discussed.[1] The purpose of the ESC is to investigate and decide which services are essential and to resolve disputes in this regard. The focus of the article is on assisting practitioners with the procedures followed by the committee.

Investigations and designations at the instance of the committee

The procedure for investigations of the Essential Services Committee (ESC) is prescribed (RSA 1996a: regulation 7, read with RSA 1995: section 71).[2] The committee publishes notices of investigations and hearings in the *Government Gazette*, as well as in a newspaper circulating in the area in which the service is provided.[3] Anyone that wishes to make written or oral submissions to the committee must state the nature of their interest in the investigation. The term 'interested party' would usually be interpreted to mean persons having a direct or material interest in the matter under investigation. Given the nature of the investigations, however, the term has been interpreted broadly, to be as inclusive as possible. This not only allows the committee to be informed by a wider array of public opinion, but also adds legitimacy to its decisions.

The committee may hear anyone that has a relevant and reliable submission to make, irrespective of whether the procedural formalities have been complied with, but an obstructive person may be barred from the proceedings. The submissions of those parties that are directly involved in providing the service, namely, the employer and employees, are particularly important, as they would usually be knowledgeable about the details of the service. They would often be in the best position to answer the question as to the consequences if the service, or a part of it, were interrupted.

Information that is not confidential is usually available to parties making representations to the committee. The rationale for maximum disclosure is obviously to encourage constructive participation. Prior knowledge of the evidence also results in the hearings being conducted more efficiently and expeditiously. As a small body made up of people that may not have technical knowledge of each service, the committee depends on the representatives to make informed, accurate and comprehensive submissions. Bearing in mind that the proceedings are investigative rather than adversarial, and that they are in the public interest, the committee is better able to make informed decisions if all the relevant material is adduced and properly tested. To this end, the proceedings are conducted with a minimum of legal formalities. Technical objections are not encouraged, unless the issue impacts substantively on decision-making. Moreover, the committee may condone non-compliance with any provisions of the regulations (RSA 1996a: regulation 5).

Some of the organisations (such as welfare bodies and nursing homes) that responded to the notice of the hearings were not aware of the legal formalities of the investigations and inadvertently omitted to indicate their desire to make oral representations. The committee nevertheless heard them. As it transpired, many of the representatives were far more articulate and persuasive when they made oral submissions than in their written representations. Having the actual providers of the service at hand when the hearings were underway was very helpful for the committee, as it was able to test the submissions in the presence of all concerned.

If objections exist to hearing any person, the committee is able to exercise its discretion after considering the grounds for the objection. In doing so, it should not lose sight of the purpose for the investigation, which is to inform itself as fully as possible about the service in order to make a designation.

A roll is prepared of all the parties that make written representations or that wish to make oral representations and is sent to them in advance. In this way, they are alerted not only to the order in which they will present their cases, but also about who the other interested parties are. This may alert them to the need to inspect and obtain copies of the other representations. It could also lead to a dialogue among the interested parties, resulting in differences being identified, discussed and possibly even reconciled before the committee commences the hearings.

At the hearing, those who are enrolled are called upon to address the committee or to lead their witnesses first. The proceedings incline towards being inquisitorial (Baxter 1996: 249–250). Once all the enrolled parties have presented their respective cases, the committee may allow them an opportunity to clarify any matter that arose during the hearing by making further submissions or by questioning the other

1. 'Part I: The definition of essential services' appeared in *the Southern African Business Review*, July 2001, 5(2): 57–60.

2. An amendment to the Labour Relations Act (LRA) in 1998 (RSA 1998: section 6(a); section 115(2)(c) A) (ii)) permitted the Commission for Conciliation, Mediation and Arbitration (CCMA) to make rules to regulate the practice and procedure of the committee, but no rules have been made thus far.

3. For notice of all the investigations conducted by the committee, see *Government Gazette*, no. R2094 (20 December 1996) and no. 66 (9 January 1998); *Sunday Times* (4 May 1997); *Mail and Guardian* (16 May 1997).

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parties. The committee may endeavour to synthesise the submissions and evidence and to test the extent to which the parties agree or disagree with one another. Differences among the parties may be reconciled through further discussion. However, it would not be in the public interest if concessions were to be made merely for the sake of reaching agreement. Alternatively, if the parties disagree fundamentally on the facts, the committee may adjourn the proceedings and call an expert to testify (as happened in the investigation into the payment of social pensions and health services), or it may request the Commission for Conciliation, Mediation and Arbitration (CCMA) to prepare a factual report (RSA 1996a: rule 7(10)).

After considering the representations, both written and oral, and any report compiled for it by the CCMA, the committee decides whether or not to designate the whole or part of the service under investigation as essential. It then publishes a notice in the *Government Gazette* of any service, or part of a service, that it designates as essential.

The designation is effective from the date of publication or any other date as may be stipulated in the designation. Those services that the committee decides not to designate as essential are not published in the *Government Gazette*. The effective date of such decisions is the date on which they are made.

Although the committee may vary or cancel a designation at any stage by re-investigating the service (RSA 1995: section 71(9)), it has not had need to do so to date. If the nature or provision of the service changes, or if new evidence comes to light, a fresh investigation may be warranted. Until such time, the designations remain in force (Baxter 1996: 371).

The committee is compelled by considerations of fairness (Baxter 1996: 569) and the provisions of the Constitution (RSA 1996b: section 33(2); Baxter 1996: 253)[4] to provide reasons for its decisions. In so doing, it seeks to improve the quality of its decisions and enhance their acceptability (Baxter 1996: 740–741, 227–228). All the designations and the reasons are contained in the committee's reports which are published in summary on its website. Publication of its reasons has also served an educative purpose in that the public is able to test and correct prospective applications against the reasons supplied in previous designations (Baxter 1996: 228). The strict application of the definition has also discouraged many referrals to the committee (and the number of telephonic enquiries about the requirements for having services determined as essential have not been matched by the number of applications or referrals to the committee).

Pursuant to the investigations into the services that the Minister deemed to be essential,[5] the committee designated more than 60 services or parts of services as essential and more than 25 as non-essential.[6] As a result, a significant part of the committee's work has been completed. The committee has been reluctant to initiate any further investigations.

Public response to the initial investigations was limited. Contrary to expectations, for some services there were no representations from even the trade unions involved. At that time, essential services may not have been an immediate priority. Perhaps the committee was new and not well known. However, it may be that employers and trade unions prefer to resolve disputes over issues such as wages substantively, rather than being distracted by applying to the committee to determine whether the service is essential. The public in general is not particularly concerned about essential services until they are actually interrupted. Besides, as communities are often without many essential services, it may make little difference to them whether their deprivation is because the services are unavailable, unaffordable, or the result of industrial action.

Investigations at the instance of a bargaining council

The committee is obliged to conduct an investigation if requested to do so by a bargaining council. A procedure similar to an investigation conducted at the committee's own initiative is prescribed. (A bargaining council must complete and submit Form LRA 4.7 of the ESC Regulations (RSA 1996a) to the committee (RSA 1995: sections 70(3) & 71; RSA 1996a: regulation 7).

No request from a bargaining council has ever been made to the committee. The bargaining councils that are most affected by essential services are in the public and local authority sectors. As the initial investigations by the committee covered most of the public services, it is unlikely that the bargaining councils in these sectors would initiate an investigation.

However, a bargaining council may request the committee to investigate whether a part of a service is essential, even in cases in which the whole of the service has already been designated as essential. The bargaining parties may also refer disputes to the committee to determine whether part of a service is essential, whether it is essential all the time or whether the content, quantity and quality of the service could be scaled down. If pursued, this approach could contribute towards refining the designations and facilitating the conclusion of minimum service agreements, which have been slow in coming.

Factual report

A statutory function of the CCMA is to prepare a factual report at the request of the committee concerning any service or part thereof that is investigated (RSA 1996a: regulation 7(4)). The legislation does not prescribe the circumstances in which such a request may be made. It could therefore be made when the providers of the service, either as employers or employees, fail to make representations to the committee. If the point of view of only one party is available, a factual report may be necessary to obtain an objective perspective of the service.

The preparation of the report also serves as a facility that the committee may use whenever it is inconvenient, costly, or inappropriate for the committee itself to gather information about a service; for example, when it entails engaging with certain interested parties in the absence of others, or when the independence and impartiality of the committee may be

4. Neither the LRA (RSA 1995) nor the ESC Regulations (RSA 1996a) specify that reasons should be provided for the designations. This may be an inadvertent omission, as ESC Regulations 8(5) and 11(8) provide for reasons when decisions in terms of those provisions are made.

5. By amending the LRA, part G of schedule 7 per *Government Gazette*, no. 17516, vol. 377 (1 November 1996); *Government Gazette*, no. 17973, vol. 383 (9 May 1997).

6. For a full list of the services, see *Government Gazette*, no. 18043, vol. 384, 6 June 1997; *Government Gazette*, no. 18761, 27 March 1998. See also www.ccma.org.za for the committee's reasons and those services which it decided were not essential.

compromised. Although the committee has both investigative and adjudicative roles, there is merit in distancing the gathering of evidence from the evaluation and adjudication of that evidence. The guiding beacon should be the ability of the committee to be impartial at all times. If there is any risk that the impartiality of the committee may be compromised, it should restrict its information-gathering activities. As an employee or a person contracted to the CCMA, nothing less than independence and impartiality would be expected of the person preparing the report, on which the committee would rely in making its designations.

The only report that the committee has requested was one relating to the investigation of national key-point installations, compiled by the Information Services Department of the CCMA. The South African National Defence Force had made submissions to the committee to designate key-point installations as essential, but it was not evident from the submissions what these installations were[7] and what the impact would be if the services relating to such installations were interrupted. Furthermore, it appeared that, in the interests of national safety and security, some parts of the information might be confidential.

Disputes in terms of section 73(1)(a) and (b) of the Labour Relations Act

The procedure for resolving disputes is prescribed in the Labour Relations Act (LRA) (RSA 1995: section 73), the ESC Regulations (RSA 1996a: regulations 10 &11) and the LRA Regulations (RSA 1996c: form LRA 4.2). Section 73 of the LRA may be invoked once a dispute arises between an employer and its employees or their trade union. This presupposes that there should be some engagement between the parties before it can be said that a dispute exists. If there has been no engagement, or if the other party has not signalled its disagreement, it would be premature to approach the committee for a determination.

Applications or referrals are defective if they have not been served on the other party to the dispute. The referring party must cite the other party and its details in the referral form. If there is no trade union, the employer will have to give notice to every employee who is party to the dispute, as the right to strike attaches to employees. If the employees have identified representatives from their own number to represent them in the dispute, service on such representative would suffice. Although service is prescribed (RSA 1996a: regulation 9), the committee may also give directions about service (RSA 1996a: regulation 10(5)).

If a referral of an essential services dispute is urgent, the grounds for urgency must be set out. Usually, the other parties to an essential services dispute are required to make written representation to the committee within 21 days of receiving the referral or application. If the matter is urgent, however, the committee may require the parties to submit their written representations within a shorter period. The committee may make interim determinations in matters that are urgent.

The committee may, of its own accord, in writing, call for further specific information from the parties, who may be required to produce such information either at a hearing or before a hearing is convened. Such requests have sometimes caused a party to reconsider the merits of its case. The definition of essential services embodies the terms of reference of the committee, which are clear, precise and limited. Once this is explained to the parties, it usually becomes apparent whether the particular application falls within the ambit of the powers of the committee. If it is not obvious, a hearing is convened for a formal ventilation of the issues as soon as it is practicable.

The committee is not obliged to hear evidence, and may resolve the dispute simply on the basis of the written representations it receives. The committee may also call for oral evidence in the course of a hearing, and if it deems it necessary to hear such evidence, it must notify the parties timeously of the issues on which oral evidence needs to be led. This will usually occur if there is a dispute of fact or if it is not self-evident whether the service is essential or not.

The committee conducts the hearings with a minimum of legal formality (RSA 1996a: regulation 11(7)). If the parties have skilled and experienced representation, the committee plays a less interventionist role. Bearing in mind its ultimate obligation to determine the outcome of the dispute, the committee may facilitate discussion among the parties to elicit agreement on as many issues as possible. If the parties consent to a determination, the committee may deliver a written determination by consent, provided it is also in the public interest. In the absence of such consent, the committee must consider the evidence and submissions and deliver its decision, together with a brief summary of its reasons, to each of the parties (RSA 1996a: regulation 11(7)).

A discussion follows of the disputes heard by the committee in the four years since its establishment.

The first dispute to be referred to the committee was in the matter of Newhaven Chronic Sick Home *vs* NEHAWU (National Education, Health and Allied Workers' Union) (case no. ESC081). A member of the committee presided at the hearing, which was convened in East London as a matter of urgency. The general assistants, who were members of NEHAWU, were threatening to strike over wages. The hearing, held at the Newhaven Chronic Sick Home, was interrupted by an *in loco* inspection to determine the level of care that patients required. It became obvious that a part of the service was essential for the care of patients that were either very frail or bedridden. For a cash-strapped organisation such as the Home, the option of outsourcing and hiring replacement labour was limited. The discussion then focused on what the minimum service should be. The parties requested an opportunity to endeavour to settle the matter and, if they failed to do so, to make representations at a hearing on an investigation into health services. The case was therefore postponed.

The very first determination was made on 16 May 1997 in the matter of the Transport and General Workers Union *vs* the South African Bus Employers' Association (case no. ESC093). The union brought an urgent application for a determination as to whether passenger transport services were essential. In granting a strike interdict against the union, the Labour Court had directed the parties to the Essential Services Committee to resolve any disputes over whether the service was essential.

7. Section 2 of the National Key Points Act (RSA 1980) empowers the Minister of Defence to declare a place or area a national key point. A list of key point installations is published periodically.

The dispute was heard when such services had been deemed by the Minister of Labour to be essential. The committee found that the employees' right to strike had been suspended by the Minister, pending an investigation by the committee, or until 10 September 1997, when the deeming provisions expired, whichever occurred first (RSA 1996c: item 25, part G of regulation 1734). It also concluded that the decision of the Minister to deem a service as essential could only be substituted by a decision of the committee made after an investigation in terms of section 71(8) of the LRA and not after the determination of a dispute in terms of section 73(3), as the former provision allowed the public to participate and the latter was confined to the parties to the dispute. Under the circumstances, the employer's insistence on arbitration was not a violation of an existing right to strike. The application was refused. About three months later, the committee, after investigating passenger transport services in terms of section 71 of the LRA, concluded that such services were not essential.

In Dr Pat Gorvalla, St Patrick's Investments (Pty) Ltd trading as Pats Transport *vs* Transport and General Workers Union (case no. ESC100), the employer applied to have its transport service (which it was contracted by the government to provide to out-patients of Groote Schuur Hospital), determined as an essential service. The application, which was heard in Cape Town by a member of the committee, was refused, a decision that was subsequently ratified by the committee (RSA 1996a: regulation 4(11)–(13)). The committee found that the transport had not been modified or specially equipped for the patients and that alternative transport would be readily available during any industrial action.

In Medlab CC *vs* NEHAWU (case no. ESC106), the employer, a private enterprise providing comprehensive clinical pathology services in Pretoria, applied to have such services determined as essential. Prior to the hearing, both the employer and the trade union were informed that the committee would require oral evidence, including a detailed description of the services, which parts of the service would, if interrupted, result in an endangerment of the life, personal safety and health of the whole or part of the population, whether there were any other providers of the same or similar services, whether the employer was publicly funded, what training was required for the staff, and how long it would take to qualify for the various categories of employment in order to provide the service, and why the services should be designated as essential.

At the hearing on 24 August 1998, neither party tendered any oral evidence. The committee persisted in requesting a detailed written application with sufficient supporting evidence to allow the committee to take an informed decision. The matter was postponed.

The hearing resumed on 14 April 1999. Again, neither party chose to lead any oral evidence. Both reported that they had not met at all since the previous sitting to attempt to reconcile their differences, despite having made a commitment to the committee to do so. The employer's view was that a minimum service agreement would not suffice and that the only available option was to have its entire service declared essential by the committee. The trade union disagreed with this approach and insisted that the parties try to conclude a minimum service agreement, but further attempts to conclude such an agreement were unsuccessful. In determining the matter, the committee considered the following: the service involved the collection of blood specimens from private hospitals and doctors in private practice. The specimens were brought to the main laboratory for analysis. The results were then conveyed to the clients within a day of receipt of the blood samples.

The employer's obligation to provide the service was entirely commercial and the public exercised free choice in using the service. If the company either failed or refused, temporarily or permanently, to render the service, the public would, at most, be inconvenienced, and the employer would run the risk of losing custom. Neither inconvenience to the public nor potential loss of custom could serve as the basis for declaring a service as essential.

Two other enterprises in Pretoria were providing similar services to those of the applicant. The employer submitted, without leading any evidence, that its competitors were providing an inadequate service as they lacked the capacity to carry the large volumes that the applicant was able to. If there had been any validity in the submission, the committee would have considered conducting an investigation. This would have been more appropriate than determining the matter as a dispute because it would have given all interested parties, including other pathologists, an opportunity to be heard. However, any such investigation would have to have been in the public interest and not merely in the interests of an individual enterprise.

The employer also feared the impact of sympathy strikes by the employees in the same industry in the area, but no data about such strikes in the past were presented. If circumstances changed – for example, if the employer were to become the exclusive provider of pathology services or if such services were indeed interrupted by sympathy strikes in a way that posed a risk to the life and health of the population of Pretoria – application, substantiated by evidence, could then be made to the committee as a matter of urgency. Consequently, on 14 May 1999, the committee turned down the application to have the pathology services rendered by the applicant declared essential.

Determination of maintenance services

A maintenance service is a service which, if interrupted, would result in material physical destruction to any working area, plant or machinery (RSA 1995: section 75(1)). The question of whether services that provide for the protection, preservation and care of animals are essential or maintenance services has arisen on several occasions. Certain local authorities manage and control zoos, aquariums, aviaries and gardens. The Mpumalanga Parks Board applied to have the service provided by game rangers on a game farm declared as a maintenance service (case no. ESC099). The motivation was that the park had to be secured at all times to ensure the safety of the animals and the people visiting or living in the area surrounding the park. The working area also needed to be protected around the clock against fire hazards. What promised to be an interesting application, combining essential and maintenance services, came to naught as the employer failed to cite and serve the application on the employees.

Only an employer may apply to the committee in writing for a determination that a whole or part of its business or service be declared a maintenance service (RSA 1996c: form LRA 4.3: RSA 1995 section 75(2); RSA 1996a: regulations 10 & 11).

Unlike section 73, there need not be a dispute about maintenance services before the matter can be referred to the committee. The procedure followed for determining maintenance services is in other respects the same as for essential services disputes. However, employers and trade unions are encouraged to deal with the provision of maintenance services in collective agreements.

The employment of replacement labour is prohibited once a service, or part thereof, is designated a maintenance service (RSA 1995: section 76(1)(a)). This may partly explain why the committee has determined only two maintenance service applications.

In H.L. Hall & Sons Group Services Ltd *vs* South African Agricultural Plantation and Allied Workers Union (case no. ESC011), the committee determined, with effect from 13 March 1997, that during the fire season, fire fighting teams comprising a specified number of workers, supervisors and drivers are maintenance services for certain defined forestry areas. The focus was the preservation of the work area, namely the forest. If the focus had been the population in or around the forest, an essential service referral would have to have been made, which would have required the declaration of a dispute with the union before the matter could be determined. A maintenance service application provides an easier route for a remedy with a similar outcome.

In Apollo Brick (Pty) Ltd *vs* National Construction Building and Allied Workers Union (case no. ESC101), the employer sought to have the emergency repairs carried out on brick manufacturing machines declared as maintenance services. The committee found that although the employer and the employees would suffer severe economic losses if the machinery was not maintained regularly, the employer had not established that an interruption, as a result of industrial action, would lead to material physical destruction to any working area, plant or machinery.

The committee pointed out that before industrial action was embarked upon, the employer would have at least forty-eight hours' notice, which was more than adequate to shut the machines down safely. As the emergency repair service did not meet the criteria for a maintenance service, the application was refused.

However, the trade union had apparently indicated its support for the application. The committee recommended that the parties consider concluding a collective agreement relating to the repair services if it was their common intention to prevent those responsible for such services from participating in industrial action. It was not incumbent on the committee, the powers of which are strictly circumscribed by legislation, to designate the service as a maintenance service unless this had been supported by the evidence, despite the consensus between the parties.

Minimum service agreement

A minimum service agreement (RSA 1995: section 72; RSA 1996a, regulation 8; RSA 1996a, form LRA 4.8) is a collective agreement in terms of which the employer and trade union parties identify and agree on providing a minimum quantity and quality of an essential service during industrial action, sufficient to avoid endangering life, personal safety and health.

The first requirement is for a service to be designated as an essential service before a minimum service agreement can be ratified. The agreed minimum service then becomes the essential service. Those falling outside the minimum service may strike on behalf of those that render the minimum service. The rule that there may be no industrial action by providers of an essential service is thereby observed. Compulsory arbitration falls away once a minimum service has been agreed.

The International Labour Organization's (ILO) Committee on Freedom of Association accepts the provision of minimum safety services necessary in order to comply with statutory requirements or to meet requirements for the safety of machinery and equipment and the prevention of accidents. It would also allow minimum operational services in services that are not strictly essential but are "public services of fundamental importance", or where the extent and duration of the strike might result in an "acute national crisis" (ILO [S.a.]a: 554–556). For instance, while adopting the view that the services provided by the National Ports Enterprise in Peru did not constitute essential services in the strict sense, the ILO Committee concluded that they were an important public service in which a minimum service could be requested in the event of strikes (ILO [S.a]b). However, in a complaint against the Government of Germany by the German Confederation of Trade Unions and the German Postal Workers' Union, the ILO Committee pointed out that "it would appear legitimate that a minimum service be maintained in the event of a strike, the extent and duration of which might be such as to result in an acute national crisis endangering the normal living conditions of the population. Such a minimum service should be confined to operations that are strictly necessary to avoid endangering the life, personal safety or health of the whole or part of the population."

It also recognised that a stoppage in services such as the postal service "could disrupt the normal life of the community, but that it was difficult to concede that such stoppages were by definition likely to bring about an acute national crisis" (case no. 1692).[8] The test remains that the minimum service must be strictly necessary to avoid endangering life, personal safety and health of the population.

The ILO Committee has been disinclined to give its opinion on whether the minimum services in specific cases were excessive. It would recommend, however, that there be joint consultation to enable a careful exchange of views on precisely what is absolutely essential so that the strike is not rendered ineffective because of its limited impact (Hodges-Aeberhard & Odero de Dios: 554).

As an administrative authority, the committee is equally responsibility for applying the definition of essential services strictly and protecting the public interest. The committee examines whether the minimum service is adequate. The committee may compare what the actual staff attendance is on a normal day with what is offered. In Britain, it transpired that the minimum service offered sometimes exceeded the normal staffing because of the high level of absenteeism generally (Bob Abberley, National Officer, UNISON, pers. comm.). If the

8. See also Complaint against the government of Canada, presented by the Canadian Labour Congress and the Postal, Telegraph and Telephone International, report no. 268, case no. 1451.

service offered is excessive, the committee may nevertheless ratify the agreement if it is satisfied that the trade union offered the service voluntarily and with full knowledge of its rights. It may also refuse to ratify an agreement if the minimum service offered is inadequate. The committee has no powers other than those of persuasion to compel the parties to either negotiate a minimum service agreement or provide an adequate service. The ratification function of the committee is thus largely supervisory.

Whenever the committee is approached to determine or designate a service as essential, it encourages the parties to voluntarily engage each other about concluding a minimum service agreement before the committee makes its decision known. The committee is bound to determine the matter strictly in terms of the definition of essential services. While the committee may not take into account considerations of convenience or economic harm in deciding whether a service is essential, the parties may wish to accommodate such concerns in a collective agreement.

Once the committee has disclosed its decision about a service, the incentive to offer a minimum service dissipates. If the service is designated as essential, the employer 'wins' and may become complacent and uncompromising about yielding any part of the service as non essential. If the service is not designated as essential, the trade union 'wins' and would be most reluctant to relinquish its right to strike in any part of the service for the convenience of the public or to prevent economic harm to the employer.

A minimum service agreement may be ratified by the committee only if the service is designated as essential. If the parties agree on a minimum service for a service that has not been designated as essential, such an agreement enjoys the status of an ordinary collective agreement if it meets the formalities prescribed in the definition of 'collective agreement'. It would thus be a private agreement, binding and enforceable as such, without being ratified by the committee.

Rand Water was the first enterprise in South Africa to conclude a minimum service agreement. Such an agreement is binding only between Rand Water and its employees. Other suppliers of water are not bound by the agreement. The second and only other minimum service agreement is between Eskom and the trade unions to which its employees belong.

More than two years have passed since the committee designated certain public services as essential. Despite the elapse of time, not one public service has submitted a minimum service agreement for ratification. The question for consideration is whether the substantially voluntarist approach to minimum services should persist or whether there is a need for compulsion by legislation. The arguments that favour the voluntarist approach include:

- If a minimum service agreement is not a priority for the bargaining partners, then any compulsion to conclude one will be ineffective.
- A minimum service agreement may not be the most desirable option, as both the conclusion and monitoring of such an agreement could be complex. A high level of organisation, discipline, administration and sophistication would be required for the level of complexity typical of most public services.
- Arbitration rather than industrial action may be the mutually preferred method of dispute resolution. There would therefore be no need for a minimum service agreement.
- The absence of a minimum service agreement could be an incentive to resolve the substantive issue in dispute expeditiously and through negotiation or mediation. This could be reinforced if arbitration was not the preferred method of dispute resolution.
- The absence of a minimum service agreement may also encourage such industrial action that might occur to be for short periods only, as such action would be unprocedural. This situation might be more tolerable than protracted procedural strikes.
- Informal arrangements made immediately before industrial action may be easier to conclude, as the parties would be in a position to address the conditions at hand, rather than a hypothetical situation that may or may not exist in the future.
- Non-compliance with the strike laws and the designations may be an aberration rather than the norm. The enforcement procedures, such as interdicts and the prospect of dismissal, are effective.
- Concluding minimum service agreements is costly, time-consuming and bothersome. Those who have the resources and the will to pursue this course of action should be free to do so.

The arguments that favour legislative compulsion to conclude minimum service agreements include:

- Legislation could give better direction to employers and trade unions about the conclusion of minimum service agreements. For instance, time limits could be prescribed for the commencement of negotiations for a minimum service agreement after a service has been designated as essential. Furthermore, legislation could specify the percentage of a service that should be maintained and leave it to the bargaining partners to determine how the percentage is to be made up. The Canadian Labour Code prescribes the minimum service to be 90% in long-term care centres, psychiatric hospitals and hospitals specialising in fields such as neurology and cardiology; 80% in other health care centres; 60% in community service centres; and 55% in child protection and social services (Canada 1996: section 111.10). If a similar approach were followed in South Africa, the function of the committee would be to ensure that the minimum service offered complies with the prescribed percentages. The Conseil des Services Essentiels of Quebec had to consider an agreement in which doctors offered the prescribed 90% minimum service by ensuring that in cycles of ten days, all the doctors would work for nine days. The Conseil rejected the agreement as it meant that on one day in the cycle, there would be no doctors on duty at all (Madame Madeleine Lemieux, past president of the Conseil, pers. comm.).
- As any limitation of the right to strike has to be reasonable and justifiable in an open and democratic society, it is arguable that the refusal to negotiate a minimum service agreement is an unreasonable and unjustifiable limitation of the right to strike (RSA 1996b: sections 23 & 36). By compelling the conclusion of minimum service agreements, employers would have to recognise that the right to strike is

constitutionally entrenched and enable strikes by making reasonable efforts to conclude minimum service agreements. The legislation would then serve to safeguard employers from such constitutional challenges.

- Notice to the public of a strike and the minimum service offered can be prescribed. In Italy, the form and content of such notices is prescribed. The companies or administrations must give consumers ten days' notice of the strike. Five days before the strike, notice specifying when the strike will commence and terminate, and what services will be offered and when, must be broadcast on public radio and television. In this way, consumers are protected and are in a position to make arrangements to use alternative services (Italy 1990: article 2(5)).
- Legislation could compel organs of state to account to, say, Parliament or a minister periodically so that progress in concluding minimum service agreements can be monitored.
- By being able to exercise the right to strike, as opposed to being compelled to arbitrate, the quality of bargaining and, ultimately, its outcome could be enriched. Better terms and conditions of employment may ensue.
- Compulsory arbitration as an effective means of dispute resolution is controversial (ILO [S.a.]c).

The preference is to retain the *status quo*, which is voluntary. The critical success factor common to the committee's counterparts in Italy and Quebec has been their powers of persuasion and emphasis on consensual outcomes (Treu 1998; Bernier 1994; Lemieux 1992, [S.a.]). The weakness, particularly in Italy, has been at the level of enforcement and sanctions (Italy 1990: article 4; Essential Services Committee [S.a.]). If the social partners do not consider minimum and essential services a priority, it would be counter-productive for the committee to insist that they do.

How it all fits together

The way in which the various procedures mesh with one another is best illustrated in the case study of Eskom. The committee investigated the generation, supply and distribution of electricity in terms of LRA section (RSA 1995) and designated it as essential. Eskom management and the trade unions were encouraged to negotiate a minimum service agreement. In September 1997, a minimum service agreement was submitted to the committee for ratification in terms of LRA section 72. The National Union of Metal Workers of South Africa (NUMSA) and the National Union of Mineworkers (NUM), which together had a sizeable membership at Eskom, refused to abide by the agreement, as they realised that there had been a mistake in the definition of 'general workers'. A clause in the minimum service agreement treated the services of certain general workers as essential. Compliance with this clause would have denied the right to strike lawfully to a substantial proportion of NUMSA and NUM members. After further discussions, the parties agreed to amend the clause to accommodate the concerns of the two unions.

Another trade union, the Eskom Employees' Association (EEA), refused to sign the renegotiated agreement. This trade union was made up predominantly of artisans. In the event of a strike by the general workers, the artisans would have been under considerable pressure to maintain the services on their own. Inter-trade union politics might also have played its part in their decision not to sign the agreement, since a trade union that is allowed to strike may be perceived as more powerful than one that is not allowed to do so.

Although the agreement would have been binding between Eskom management and those unions that had signed it, as they represented the majority, it was unsatisfactory and incomplete without the signature of all the representative trade unions. Furthermore, to be effective, the implementation of a minimum service agreement requires maximum cooperation of all the parties. In this case, members of NUMSA and NUM could strike safely only if members of EEA covered for them.

On examining the renegotiated agreement, the committee found certain inconsistencies and used the opportunity to invite Eskom and all the trade unions involved to a meeting to clarify the matter. The meeting led to further discussions among the parties until, eventually, the parties agreed to disagree on whether a certain part of the service was essential. NUMSA then referred that part of the service for determination as a dispute in terms of LRA section 73(1)(a). Although the dispute was between NUMSA and Eskom management, the committee requested that notice be given to the other unions as well, as they would have had an interest in the outcome of the section 73(1)(a) dispute.

A hearing in terms of section 73(1)(a) was convened. As evidence about the service unfolded, the parties interrupted the proceedings to resume their own negotiations. They reported back to the committee that, with the exception of one issue, NUMSA was willing to concede that the part of the service in dispute was essential. The issue that remained a concern for NUMSA was whether certain employees would be regarded as being employed in particular parts of the service that may have been designated as an essential service. The committee pointed out that if a dispute arose as to whether a particular employee was employed in an essential service, then either party could refer such a dispute to the committee in terms of section 73(1)(b). With that option available to them, all the obstacles to signing the agreement were resolved and the minimum service agreement (the second such agreement in South Africa) was signed.

The various provisions of the legislation on essential services interconnect in a way that effectively captures international best practice for a transforming industrial economy. The legislation combines the 'list' method (the investigations by the committee in terms of LRA section 71 and the inclusion of police and parliamentary services in the definition of 'essential services'), collective bargaining (to agree essential minimum and maintenance services agreements in terms of sections 72 and 75 respectively) and the ad hoc approach (to resolve specific disputes in terms of section 73).

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As the first 50 years draw to an end ... Get out your crystal ball

Dan Remenyi*

Advances in information technology and telecommunications will, in the next five to ten years, continue to impact all aspects of society. This will lead to a more efficient and, perhaps, effective way of life, but a price over and above any financial consideration will have to be paid for these developments.

The year 2002 will be a special one for those of us involved with the 'e' world, as it marks the 50th anniversary of the use of computers in business. In 1952, computers, which until then had really only been used in the military arena, were introduced to office environments in both the United Kingdom (UK) and the United States (USA). In the UK that year, computers were implemented by the Lyons food and catering business, while in the USA computers were set to work in the Bureau of the Census for the American government. It is quite amazing that these early machines achieved anything at all, as they were remarkably primitive, apart from being extraordinarily unreliable and enormously expensive.

Despite these factors, both these applications were a great success, and in the UK the Lyons organisation set up a computer sales business, which it called Lyons Electronic Office or LEO. The company supplied this technology to others and prospered for many years. In the USA computers spread rapidly beyond central government, eventually making that country the leader in the use and manufacture of all things to do with information technology.

The spread of computers in business is a well-known fact of economic history. Today, computers support just about every human activity in the western world and, by and large, have contributed to much of what many regard as progress in the past half century.

Now as we reach the year 2002, half a century into the computer age, we have started to ask how computers will develop during the next 50 years and what will they do for our society. In a number of major cities, conferences have been convened, at which international gurus have attempted to provide plausible suggestions of what might transpire over this period of time. A competition has been set up to award a prize for the best 50-year forecast. It is hard to imagine what the criteria for winning this could be, as the sponsors will not want the contestants to have to wait for 50 years to see what actually happens.

Is this interest in the next 50 years a waste of time? Perhaps it is just too challenging, since it is enormously difficult to provide a credible answer to the question of what computers will achieve in this period. An old quip sometimes made by stand-up comic entertainers goes that, "Prediction is always difficult; especially prediction about the future". There is also an interesting admonition against prediction in Dante Alighieri's *Inferno*. Dante suggests that the eighth (and second worst) level of hell – Dante's hell has only nine levels – is reserved for futurists and fortune tellers (Jacoff 1993). Moreover, the computer industry is littered with mistaken predictions, futurists and fortune tellers. Thomas Watson (Sr), the founding father of IBM, said, "There is a world market for five computers!" Ken Olsen, founder of Digital Computer Corporation, said, rather to his regret one supposes, "Who would ever want a computer in their home?" Also let us remind ourselves of Bill Gates's contribution to these faux pas, "Who could ever need more than 640K of memory?"

By the way, most of us would agree that 50 years is too long a period about which to make any sensible comment or to think rationally when thinking ahead. Given the current rate of change in political, sociological and financial structures, not to mention new currencies and international wars, the medium to longer-term future is perhaps even more 'unseeable' and inaccessible that it was before. I will therefore limit myself to making a few comments on what may transpire over the next five to ten years and run the risk that our crystal ball may, one day, seem to have been as silly as Thomas Watson Sr, Ken Olsen or Bill Gates – that is, if anybody remembers this article.

From a technological point of view, there is every prospect that computers and telecommunications technologies, the bedrock of what we have grown to know as information technology, will continue to improve by leaps and bounds. Computers will relentlessly continue to become more and more powerful. Moore's Law is alive and well and living in Silicon Valley. Even greater advances in computing and memory power may be derived from the suggested amalgamation of biotechnology and electronics. Telecommunications will continue to become faster and faster. This will be achieved while the price of the equipment and facilities will continue to fall. This does not necessarily mean that computers will become cheaper, but rather that the price will probably stay at about the same level, with much more power being provided for the same amount of money. As inflation will continue, even at modest levels, the real cost of computers will drop, and more and more people will own one or more machine. Eventually there will be at least one computer in every home in the land. (This does not include the fact that there are already many computers in many homes, because of their presence in kitchen appliances and, of course, in children's toys). On the telecommunications front, we will see computing speed rise and prices fall dramatically. It has been said that in the next decade, there will be a single price for a telephone connection to anywhere in the world, and that this price will fall to a few pence an hour. Video-on-demand will probably become a reality, as will domestic video conferencing, probably even from wristwatch-type devices, as envisaged in the Dick Tracey stories. How many of us will actually want mobile teleconferencing is another matter. We will also put computers

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and telecommunications ability into may other contraptions, ranging from fridges to automobiles. Perhaps we will also put this type of tracking technology into our domestic pets and even children's clothes. One day, someone will probably propose that we put a microprocessor and a telecommunications device in a toothbrush, which will report to the dentist and schedule and appointment. When we are not brushing our teeth, the toothbrush could possibly double as a telephone. We will use computers, video and telecommunications to enhance private and public security, and will effectively chase crime off the streets. There is little doubt that in the ten-year timeframe, computers and telecommunications in the form of a whole range of smart machines, many of which may not even have been thought of yet, will be ubiquitous, and that we will become a fully wired society.

We will integrate the electronics in our homes, so that ovens and kettles will be switched on and baths will be run as we approach our houses at the end of the day. Our fridges will have placed orders for us with our grocers or supermarkets, and the groceries will be delivered 'just-in-time' as we arrive at our homes. We will use the technology in an attempt to eradicate as many domestic chores as we can. Hopefully, not many of us will buy such fully wired homes, as they will eliminate much of what actually constitutes human life. However, they will be on the market for those who want them and have sufficient spare cash to buy them.

Generally, software will become more user friendly and intuitive, which will allow computers to undertake many more tasks for us. As regards advanced software, we will make progress on the artificial intelligent front (Kehal & Khurshid 2001). We will produce intelligent programs, which will help us in many different situations, from medicine to banking, and travel selection to cooking. The computer will indeed help us make smarter decisions. It is worth noting that sometimes 'smart' decisions are made at the expense of wise decisions. It is thought that in the next five to ten years we will make some progress towards a robotic or silicon brain. But, in all probability, the quintessential nature of human intelligence will elude us for somewhat longer than ten years, and, until we understand natural intelligence, it is not likely that we will be able to fully master real artificial intelligence. Arthur C. Clarke's vision of HAL, as portrayed in the film 2001, was clearly quite wrong, as computer intelligence of that type probably lies more than 50 years into the future.

On the business or commercial front, we will see many more innovative applications, but they will not be of the same type that we have seen in the past few years. The mania for crackpot e-businesses, with astronomical stock market valuations, has now been exposed for what it was. In this post-hype period, we now have a much more mature view of and attitude towards information technology and business. We understand that we may have a new economy, but that we still have the old economic laws, which insist that we all have to earn a living by providing a service for which someone will pay. We will see increasing numbers of well-established businesses add electronic operations of one sort or another to their basic business model. Those that have already done so will continue to invest in this type of business. These will not be dot.com-type operations, however, but mainstream businesses and business activities, which will be using information technology and telecommunications to enhance their basic business model. The firms that adopt the right approach to e-business will make a great deal of money. There is also little doubt that mobile or m-business will begin to play an important role, but we may have overestimated how important this business model will prove to be. At present, m-business has not shown noteworthy performance, but over five to ten years, it may well become an important aspect of business. The jury is clearly still out on this issue.

In the next five to ten years, business and business decision-making will be increasingly automated by means of advances in knowledge management systems (Depres & Chauvel 2001). Furthermore, computers will increasingly interface with the public. As a purchaser, it will become ever more difficult to find anyone to talk to. We will increasingly buy on the web or through a telephone or some sort of infernal machine. It will become hard to find a bank with people, rather than ATM-type devices in it. Furthermore, we will buy just about every type of ticket from a machine. This could be regarded as the 'siliconisation' of the relationship between the seller and the buyer. For many people, siliconisation is simply a synonym for depersonalisation with accompanying reductions in service. As organisations seem to believe that siliconisation is also synonymous with lower costs, and thus higher profits, the end of this trend is not in sight. This will probably mean more redundancies, with their accompanying impact on society. Inside companies, computer systems will play a great role in management decision-making, with machines automatically re-ordering inventory, planning production and rescheduling vehicles, for instance. Systems will tell us when to go on leave and perhaps even choose menus for our canteens. In general, this will lead to continuing increases in centralisation for greater control of decision-making, much like that forecast by Leavitt & Whistler (1958) at the outset of the business computer age.

As regards e-government and the public service sector, the next five years will see considerable progress as the initiatives that have begun in the past few years gain growing momentum. There will be seamless transference of information from one government agency to another, with the objective of servicing the needs of the citizen. E-government will significantly increase the efficiency and the effectiveness with which our taxes are spent (Jackson & Curthoys 2001). The social and health services, as well as education provision, will be improved as computers and telecommunications make these services more accessible. E-learning will become a reality, which will affect the entire range of potential learners from kindergarten to pensioners. The health services will see computers used far more extensively, and this will be matched by the public using Internet health information services with or without the enthusiastic support of their medical practitioners and specialists. The application of e-government technology will help improve the services provided by the police, and customs and immigration services. The outcome will be a society that is distinctly more efficiently run. Of course, there may well have to be a certain amount of restructuring as a result of this technology. For example, it is difficult to see how the Post Office, which is based on a Victorian business model, will be able to survive in its current form for much longer. We will also see the notion of e-democracy (Mach & Sabol 2001) taken forward, at least to some extent, and this will probably allow us to vote in elections from the comfort of our homes.

Some people would say that the down side of this technology is that governments would know much more about us.

They would have comprehensive files on us, immediately accessibly from anywhere in the country. Under such circumstances, it is perhaps inevitable that we will increasingly become numbers in the government machine. There will be fewer and fewer exceptions to the rule; hardly anyone will be able to make a case that they should be treated as an exception. Our lives will become more efficient and, who knows, perhaps more effective from the state's point of view, but also less colourful and more bland. It is not likely that we will find ourselves in an Orwellian world – unless we choose to nominate ourselves for television programmes like *Big Brother* –, but rather living a monochrome type of life in which all the systems that affect us will have been thought through so as to be most efficient. Some people are already concerned about the danger that something special will be lost in the inevitable programming necessary for e-government. In a much more efficient and ordered society, will we perhaps have to work harder at being individuals, and at bringing colour into our lives?

In summary, over the next five to ten years, computers and telecommunications technology will continue to relentlessly insinuate themselves into even more aspects of our lives. We will definitely become more and more efficient and maybe effective, in some senses, in the way we live. As smart machines become pervasive, many aspects of our lives will operate more smoothly. Business will increasingly siliconise relationships and thus be more efficient and probably more profitable. Government will be more accessible and thus effective. In some senses, we will live in a safer world. For some people, this will represent a Utopia of sorts!

But will we be happy and will we feel free? Does this all make sense? Who knows?

Perhaps all these advances in the use of information technology and telecommunications will mean that we may have to become vigilant if we are not to create a highly depersonalised world in which our lives become increasingly siliconised and we become hugely uncaring and, moreover, complete bores. We will also have to be very careful that we do not allow the digital divide to get completely out of hand (Morino 2001). It is certainly true that in recent years the rich have got richer and the poor have got poorer, and technology clearly has had some role in this. It is all very well to design our world around the young, the knowledgeable and the well-to-do. But what about those who are too old to learn about using a computer, or who are illiterate, or who just will never have the income to afford such a machine. It is well to remember that something like half of the world's population has never used a telephone! It is also clear that the more our society polarises, the more dangerous it will become and the more unpleasant it will be to live in.

Information technology and computers will thus force us to examine a number of philosophical issues. We will need to think hard about our basic values and what sort of society we really want or need to create. Do we actually want to deal with machines rather than people? Do we get a better feeling from buying from a machine or drawing cash from an ATM or obtaining information from the Web than we do from having real live people help us across a counter? Also, although machines are generally more reliable than people, when they break down, they can have a greater and more catastrophic effect than the breakdown of a poor people-based service. Remember the last time your credit card was swallowed by an ATM in a town far from home, leaving you on a Saturday night without cash and without your credit card. Perhaps we will need to cultivate a culture that realises that there is more to life than simple efficiency.

We may need to concentrate on balancing power between information technology and telecommunications, on the one hand, and other aspects of our society, on the other. We will also need to balance power between the impersonal siliconised services offered by the machines and what we ourselves are prepared to accept. We will need to make sure that everyone is aware that the advancing use of these computing machines and the systems we have created are intended for our benefit. The idea is that technology is our slave, not the other way round, and this is sometimes forgotten. We will need to remind ourselves that we are not there to serve the technology. Not every technological application we can think of needs to be implemented. We can pick and choose. The value of computers and telecommunications and the real social costs that accompany them really need to be kept in perspective. This is no easy task, but if we fail to do so, we will be storing up considerable difficulties for future generations.

The next five to ten years are likely to offer a considerable challenge – let alone the next 50.

However, this is certainly very deep crystal ball territory, with all the dangers suggested by Dante, and thus beyond the scope of this short paper.

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Doctoral Colloquium in Business and Management Studies

28 April 2002 – University of Reading, United Kingdom
16 July 2002 – University Dauphine-Paris, France
23 September 2002 – Trinity College Dublin, Ireland

Chairman: Dr Dan Remenyi, Visiting Professor, Trinity College, Dublin

The Doctoral Colloquium in Business and Management Studies is intended for researchers working on doctorates in the area of business and management studies. By attending the colloquium, doctoral candidates can improve their understanding of the research issues and the methodologies available to them and thus improve their doctoral work. In addition, the colloquium provides insights to those intending to submit papers for possible publication in academically refereed journals.

The day commences with presentations from experienced academics that will address these two subject areas. These will be followed by short presentations from the doctoral colloquium participants. These presentations are optional. At the end of the afternoon, there will be a panel discussion.

Research topics that would be relevant for presentation by doctoral candidates at this colloquium include, but are not limited to, general management, business policy, business and management strategy, information systems management, marketing and sales management, human resources issues, e-government and other public service sector issues, health services management and informatics, e-learning, knowledge management, leadership studies, operations management and workgroups.

A number of experienced academics from the panel will be present at each colloquium, selected from Professor Arthur Money (Henley Management College), Professor Roy Williams (Reading University), Ann Brown (City University Business School), Dr Frank Bannister, (Trinity College, Dublin), Dr Carole Brooke (Reader, University of Lincoln), Professor Egon Berghout (Groningen University, Netherlands).

Numbers of participants are strictly limited. The first doctoral colloquium was run in September 2001 and was oversubscribed. In order to provide an opportunity for more doctoral candidates to benefit from this programme, the colloquium is being offered on three separate occasions in 2002, at different European locations.

Programme outline

09:15	Registration
09:30	Chairman's welcome and introduction to the nature of doctoral research and guidelines for successful completion
10:00	Presentations of current research from Doctoral Colloquium members
11:00	Refreshments
11:15	Continuation of presentations
12:30	Lunch
13:45	How to get published in academically refereed journals
14:00	Continuation of presentations
15:30	Refreshments
15:45	Panel discussion
16:45	Closure

The actual time at which the colloquium will finish will depend on the time of completion of all the presentations of the colloquium members.

This doctoral colloquium welcomes both those registered for a doctorate and other members of faculty who are interested in improving their exposure to the field of academic research. When registering, doctoral candidates must state their university or business school, faculty and department. Doctoral candidates should also state the title of their proposed dissertation and should supply the name of their supervisor or promoter or the chairperson of their doctoral advisory committee. Doctoral students are also required to provide their registration number if registered.

To register, either email the Conference Registrar, Charl Walters, at conferences@mcil.co.uk, or apply online at www.mcil.co.uk. The conference office can assist with accommodation requirements, and you should indicate your requirements when applying.

The cost of attending the colloquium, which includes refreshments and lunch, but does not include accommodation, is:	
Full-time students	£85 + VAT = **£99.88**
Part-time students	£95 + VAT = **£111.63**
Faculty	£125 + VAT = **£146.88**

Payment instructions will be sent on application, and payment can be by sterling cheque, sterling bank draft or credit card.

The Doctoral Colloquium in Business and Management Studies is being run to coincide with the following conferences:

- European Conference on Research Methology for Business and Management Studies

  29–30 April 2002, Reading University, Reading, UK
- 9th European Conference on Information Technology Evaluation

  15–16 July, Université Paris-Dauphine, France
- 3rd European Conference on Knowledge Management

  24–25 September, Trinity College, Dublin, Ireland

European Conference on Research Methodology for Business and Management Studies

ECRM 2002

Reading University, Reading, United Kingdom

29–30 April 2002

Conference Chair: Professor Arthur Money, Henley Management College, United Kingdom

Programme Co-Chairs: Professor Roy Williams Reading University UK, and Dr Dan Remenyi, Trinity College, Dublin, Ireland

Mini-Track Chair: Dr Carole Brooke, University of Lincoln, United Kingdom

The European Conference on Research Methodology for Business and Management Studies (ECRM 2002) is an opportunity for academics to share the latest thinking on research strategies, tactics and paradigms. The conference will present theoretical and practical papers concerning research models, as well as case studies that demonstrate how these research strategies, tactics and paradigms are applied in practice. Topics include theoretical and empirical research, action research, the use of qualitative and quantitative research methods, as well as developing research proposals, getting academic papers accepted by journals, research design, research protocols, and research ethics.

The conference is being held in Blackhorse House, which is on the Whiteknights Campus of Reading University. The campus is approximately two kilometres from Reading town centre, which is very well served with train and bus connections to London and the major UK airports.

A list of papers to be presented will be posted on the web when the committee has reviewed the submissions and made its selection.

Please note that there is a Doctoral Colloquium in Business and Management Research running on Sunday, 28 April. Any doctoral student who might be interested in attending can obtain further information at www.mcil.co.uk or contact the conference office at conferences@mcil.co.uk.

Registration and payment details

Registration is from 09:30 on Monday, 29 April 2002. Fees include entrance to the conference and a copy of the conference proceedings. Lunch and refreshments are included, as well as end-of-day drinks and conference dinner on the 29th.The conference will close by 17:00 on 30 April.

Fees are payable in advance in pounds sterling and are as follows:

Without accommodation
Earlybird – must be paid before 28 February 2002
Academics, £325 +VAT at 17.5% = **£381.88**
Registered students, £199 +VAT at 17.5% = **£233.83**
Professionals and consultants, £499 +VAT at 17.5% = **£586.33**

For registrations after 28 February 2002
Academics, £375 +VAT at 17.5% = **£440.63**
Registered students, £250 +VAT at 17.5% = **£293.75**
Professionals and consultants, £550 +VAT at 17.5% = **£646.25**

With accommodation (en suite single room on a bed and breakfast basis for the nights of 28 and 29 April 2002)
Earlybird – must be paid before 28 February 2002
Academics, £425 +VAT at 17.5% = **£499.38**
Registered students, £299 +VAT at 17.5% = **£351.33**
Professionals and consultants, £599 +VAT at 17.5% = **£703.83**

For registrations after 28 February 2002
Academics, £475 +VAT at 17.5% = **£558.13**
Registered students, £350 +VAT at 17.5% = **£411.25**
Professionals and consultants, £650 +VAT at 17.5% = **£763.75**

To reserve a place, e-mail the Conference Registrar, Charl Walters, at conferences@mcil.co.uk . You can also register online at www.mcil.co.uk. When registering, please be sure to include your full postal address and state which registration package you require. An invoice with payment instructions will then be sent to you. (Payment can be by sterling cheque, sterling bank draft, or by Visa or Mastercard.)

Students need to provide the name of their institution and their student registration number.

As there are only limited accommodation packages available, you are advised to book these early to avoid disappointment. Details of other accommodation, travel options and information about Reading can be found on the website at www.mcil.co.uk.

Cancellations

Please refer to the website for cancellation terms and conditions. These can also be obtained on request by contacting Charl Walters at conferences@mcil.co.uk. Please pass these details on to any colleagues that may be interested.

Conference executive

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Conference committee

The conference programme committee consists of key people in the research methods community, both from the UK and overseas. The following people have confirmed their participation:

John Affleck-Graves (Notre Dame University, USA); David Avison (ESSEC Business School, France); Gabriela Avram (AISTEDA University, Romania); Atta Badii (University College Northampton, UK); Lennart Bångens (Chalmers University of Technology, Sweden); Diane Benjamin (NHS Information Authority, UK), Frank Bannister (Trinity College Dublin, Ireland); Egon Berghout (Gronigen University, Netherlands); Carole Brooke (Lincoln University, UK); Ann Brown (City University Business School, UK); Sven Carlsson (Jönköping University International Business School, Sweden); Baggy Cox (Imperial College, UK); Marguerite Cronk (Harding University, USA); Stephen Drew (University of East Anglia, UK); Mark Easterby-Smith (Lancaster University, UK); Jean-Noel Ezingeard (Henley Management College, UK), Barbara Farbey (University College London, UK); Andras Gabor (Budapest University of Economic Sciences and Public Administration, Hungary); Valerie Graeser (Templeton College Oxford, UK); Ray Hackney (Manchester Metropolitan University, UK); Joe Hair Jr (Louisiana State University, USA); Richard Heeks (Manchester University, UK), Jaak Jurison (Fordham University, USA); Cyril Kirwan (Cyril Kirwan & Associates, Ireland);

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9th European Conference on Information Technology Evaluation

ECITE 2002

Université Paris-Dauphine, France

15–16 July 2002

Conference Co-Chairs: Dr Claudine Toffolon, Université du Littoral, France and Dr Frank Bannister, Trinity College, Dublin

Programme Chairs: Ms Ann Brown, City University Business School, London and Dr Dan Remenyi, TrinityCollege, Dublin

Mini-Track Chair: Dr Carole Brooke, University of Lincoln, UK

CALL FOR PAPERS

ECITE is now an established platform for academics and practitioners from Europe and elsewhere who are involved in the study, management, development and implementation of IT/IS to come together and exchange ideas. The advisory group for the conference invites submissions of papers on both the theory and practice of all aspects of IT/IS evaluation. The conference in July 2002 is seeking quantitative, qualitative and experience-based papers from industry and academe. Topics may include, but are not limited to, the evaluation of e-commerce and e-business, intranets and knowledge management, as well as papers on general evaluation methodologies for both the appraisal and post implementation of projects. Other areas of interest include decision-making processes for new investments; the management of IT benefits, costs and risks; research methods for IT/IS evaluation; human and organisational aspects of IT/IS; the evaluation of IT project management; the management of IS development and IT departments; and the impact of IS on work and organisations. In addition, the conference welcomes papers either on the subject of Critical Research methods as they may be applied to IS evaluation or research papers using a Critical Research approach. These papers will be presented as a mini-track.

In 2002, the conference is being held in Paris at the University Paris-Dauphine, in cooperation with the Centre de Recherche en Informatique Appliquée (CERIA) de l'Université Paris-Dauphine.

Submission details

Abstract details:	No more than 500 words, to be received no later than 28 February 2002
File type:	Word for Windows
Submission:	By e-mail attachment to: dan.remeney@tcd.ie
Full paper:	Only required on acceptance of abstract, and not to be more than 5000 words. Submission date will be no later than 14 May 2002.

All abstracts received by the submission deadline will be considered for presentation at the conference. Papers accepted will be published in the conference proceedings, provided that authors present their work at the conference. ***Selected papers will also be considered for publication in the*** **Electronic Journal of Information Systems Evaluation.**

Important dates

Abstract submission deadline:	28 February 2002
Notification of acceptance:	12 March 2002
Final copy of full paper due:	14 May 2002

Conference executive

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Conference committee

The conference programme committee consists of key people in the information systems community, both from the UK and abroad. The following people have confirmed their participation:

Atta Badii (Northampton University, UK), Joan Ballantine (University of Warwick, UK), Frank Bannister, Joint Conference Chair (Trinity College, Dublin), Diane Benjamin (NHS UK), Egon Berghout (Groningen University, Netherlands), Carole Brooke (University of Lincolnshire & Humberside, UK), Ann Brown, Joint Programme Chair (City Business School, UK), Sven Carlsson (Jönköping University, Sweden), Mike Cash (Butterworth Heinemann, UK), Aileen Cater-Steel (University of Southern Queensland, Australia), Yolande Chan (Queen's University, Ontario), Baggy Cox (Imperial College, London), Reet Cronk (Harding University, USA), Enrique Dans (Instituto de Empresa, Spain), Neil Doherty (Loughborough University, UK), Barbara Farbey (University College, London), Catherine Griffiths (Imperial College, London), Gus Liston (Irish Management Institute, Dublin), Roger Lundegard (Applied Value Corporation, Sweden), Arthur Money (Henley Management College, UK), Jonathan A. Morell, (Center for Electronic Commerce, Ann Arbor, USA), Chris Morse (Xansa), René Pellissier (SBL-UNISA, South Africa), David Pennington (Sainsburys plc, UK), Dan Remenyi, Joint Programme Chair, (Trinity College, Dublin), Vesa Savolainen (University of Jyvaskyla, Finland), Mike Sherwood-Smith (University College, Dublin), Elisabeth Somogyi (Team Consulting, UK), Reima Suomi (Turku School of Economics and Business Administration, Finland), Claudine Toffolon, Joint Conference Chair (Littoral University, France), Han van der Zee (Tilburg University, Netherlands), Roy Williams (University of Reading, UK), Leslie Willcocks (Templeton College, Oxford), Les Worrall, (Wolverhampton University, UK).

This call for papers can be found on the conference section of www.mcil.co.uk.

3rd European Conference on Knowledge Management

ECKM 2002

Trinity College, Dublin, Ireland
24–25 September 2002

Conference Co-Chairs: Professor Sven Carlsson, Jönköping International Business School, Sweden
Programme Chair: Professor Roy Williams, Reading University, United Kingdom

CALL FOR PAPERS

ECKM 2002 provides a valuable opportunity for academics and practitioners from Europe and elsewhere who are involved in the study, management, development and implementation of IT/IS to come together and exchange ideas. The advisory group for the conference invites submissions of papers on both the theory and practice of all aspects of knowledge management (KM). The conference in September 2002 is seeking quantitative, qualitative and experience-based papers from industry and academe. Topics may include, but are not limited to: frameworks for conceptualising KM; parameters of the field of study, knowledge creation and sharing mechanisms; knowledge asset valuation models; impact on organisational learning; impact on business strategy; architectures for KM systems; integration of knowledge from different groups in an organisation; knowledge sharing between different groups in an organisation; how to initiate KM; resourcing KM; KM case studies; the evaluation of KM; KM and the Web; and e-business.

Submission details

Abstract details:	No more than 500 words, to be received no later than 31 May 2002
File type:	Word for Windows
Submission:	By e-mail attachment to conferences@mcil.co.uk
Full paper:	Only required on acceptance of abstract, and not to be more than 5000 words. Submission date for accepted papers will be no later than 31 July 2002

All abstracts received by the submission deadline will be considered for presentation at the conference. Papers accepted will be published in the conference proceedings, provided that authors present their work at the conference. In addition, a selected number of ECKM 2002 accepted papers will be expanded and revised for possible inclusion in *Knowledge and Information Systems: An International Journal* by Springer-Verlag.

Important dates

Abstract submission deadline: 31 May 2002
Notification of acceptance: 15 June 2001
Final copy of full paper due: 31 July 2002

Conference executive

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Conference committee

The conference programme committee consists of key people in the Knowledge Management and IS community: Gabriela Avram (AISTEDA University), Atta Badii (University College Northampton), Joan Ballantine (Warwick University), Frank Bannister (Trinity College, Dublin), Freddie Beaver (University of Memphis), Diane Benjamin (National Health Service), Egon Berghout (Delft University of Technology), Ann Brown (City University Business School), Mike Cash (Butterworth Heinemann), Reet Cronk (Harding University), Jean-Noël Ezingeard (Henley Management College), Nenad Filipovic (Bled School of Management), Andras Gabor (Budapest University of Economic Sciences and Public Administration), Kevin Grant (Bell College of Technology), Milenko Gudic (Bled School of Management), David Gurteen (Gurteen Associates), Meliha Handzic (University of New South Wales), Gus Liston (Irish Management Institute), Roger Lundegard (Applied Value Corporation), Bill Martin (Royal Melbourne Institute of Technology), Arthur Money (Henley Management College), Chris Morse (FI Group), René Pellissier (SBL-UNISA), David Pennington (Sainsburys plc), Danica Purg, Conference Co-Chair (IEDC - Bled School of Management), Dan Remenyi (Trinity College, Dublin), Mike Sherwood-Smith (University College, Dublin), Edward Truch - Programme Chair, (Henley Management College), Andrey Volkov (Moscow State University of Management), Roy Williams, Conference Co-Chair, (Reading University), Les Worrall, (Wolverhampton University).

This call for papers and an invitation to attend can be found at the conference section of www.mcil.co.uk.

2nd European Conference on e-Government

ECEG 2002

St Catherine's College Oxford, United Kingdom

1–2 October 2002

Conference Chair: Les Worrall, University of Wolverhampton Business School, United Kingdom

Programme Chairs: Dr Frank Bannister and Dr Dan Remenyi, Trinity, College Dublin, Ireland

CALL FOR PAPERS

The European Conference on e-Government (ECEG) is an opportunity for academics, practitioners and consultants from Europe and elsewhere who are involved in the study, management, development and implementation of web enabled and ITC initiatives in the government sector to come together and exchange ideas. The advisory group for the conference invites submissions of papers on both the theory and practice of all aspects of web-enabling technology in the public sector. The conference in October 2002 is seeking qualitative, experienced- based and quantitative papers as well as case studies and reports of work in progress from academics and government departments. Topics may include, but are not limited to, e-government portals, e-government transaction sites, webocracy, security and confidentiality, integrated systems, citizen-centric information systems, web-enabled knowledge management and other ITC-enabled systems in the public service sector.

Submission details

Abstract details:	No more than 500 words, to be received by 31 May 2002.
File type:	Word for Windows
Submission:	By e-mail attachment to dan.remenyi@tcd.ie
Full paper:	Only required on acceptance of abstract and not to be more than 5000 words. Submission date will be no later than 31 July 2002

All abstracts received by the submission deadline will be considered for presentation at the conference. Papers accepted will be published in the conference proceedings, provided that authors present their work at the conference.

Important dates

Abstract submission deadline:	31 May 2002
Notification of acceptance:	15 June 2002
Final copy of full paper due:	31 July 2002

Conference executive

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Conference committee

The conference programme committee consists of key people in the information systems community around the world. The following people have confirmed their participation:

Atta Badii (Northampton University College), Joan Ballantine (Queens University), Frank Bannister (Trinity College, Dublin), Chris Bellamy (Nottingham Trent University), Egon Berghout (Technical University, Delft), Jan Burn (Edith Cowan University), Derek Bond (University of Ulster), Ann Brown (City University Business School), Daewon Choi (UNECE Geneva), Sean Connolly (Revenue Commissioners of Ireland), Anne Davies (Queens University, Belfast), Wim van de Donk (Tilburg University), Paul Frissen (Tilburg University), Tracy Gardiner (Centre for Defence Analysis, DERA), Kevin Grant (Bell College), Chris Guest (Flintshire County Council), Bill Hutchinson (Edith Cowan University), Patrick Gannon (OASIS USA), Mike Jackson (University of Wolverhampton), Steve Jones (Conway County Borough Council), Denise Leahy (Trinity College, Dublin), Alan Mullally (Trinity College, Dublin), Arthur Money (Henley Management College), Chris Morse (OSI), René Pellissier (School of Business Leadership), David Price (Henley Management College), Dan Remenyi (Trinity College, Dublin), Michael Sherwood-Smith (UCD), Ignace Snellen (Erasmus University, Rotterdam), David Taylor (CERTUS), Henry Watermeyer (University of the Witwatersrand), Roy Williams (University of Reading), Les Worrall (University of Wolverhampton).

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