

7 Analysis of findings

7.1 Introduction

The objective of this chapter is to analyse the data gathered during the empirical phase of this research project. The data presented in Chapter 6 looked at the case study organisation, Kumba Resources; at the level of the organisation, the knowledge management function, the continuous improvement community of practice, and the use of stories and storytelling within that community. This chapter will explore each of these areas in turn, using the findings from the three areas of the non-empirical research comprising this project: the knowledge management context; the use of stories and storytelling for knowledge sharing in a knowledge management strategy; and world-class performance.

This chapter is structured into four main sections, each of which will analyse the theme for that section. The chapter will conclude with a summary of the analysis conducted.

7.2 Analysis of Kumba Resources

7.2.1 Kumba Resources organisation level analysis

A profile of Kumba Resources was presented in section 6.2. At the start of this research project, the company had been listed for less than five years on the Johannesburg Stock Exchange, although it has a heritage dating back to the 1930s. It is a South African-based organisation, although it has operations in the number of other countries, and employs around 10,000 people, which makes it a large organisation in South African terms. It is a profitable organisation, which has enjoyed significant growth in the last several years.

Kumba Resources has a well-defined vision, mission, strategy and objectives founded on a strong set of values, all of which can be found represented in the annual reports

issued by the company, on the company web site, in a variety of internal documents and publications and in statements made in the press by members of the executive. This presents an impression of a coherent management approach to running the business.

The company operates a portfolio of commodity businesses in the area of extracting and processing minerals, including coal, iron ore, base metals and heavy and industrial minerals. This requires a large majority of the total workforce to be employed in operational activities in a number of geographically distributed locations, and entails a wide diversity of language, cultures and operating practices and procedures.

A number of clear statements have been made by Kumba Resources management (including those which form part of the company's strategy) with regard to the organisation's aspirations to achieve world-class performance. To this end the 'Kumba Way' strategy was established in 2002 and now forms a key part of the management approach to delivering on the promise to its stakeholders. This commitment to achieve world-class performance will now be reviewed in the context of the organisation as a whole.

7.2.2 World-class performance in Kumba Resources

7.2.2.1 Best practices in Kumba Resources

Numerous references to the use of best practices at Kumba Resources were found during the empirical study. These included statements made on the company's web site, in the annual reports, in the in-house corporate publication ('Breaking Ground') as well as during the interviews conducted as part of the empirical research.

However, there was no evidence of the use of a classification (such as that identified by O'Dell and Grayson (2004) in section 4.3.1) which defines all levels of best practice: good idea, good practice, local best practice, and industry best practice. This

may lead to some confusion in the company as to the nature of the discussions around those practices.

7.2.2.2 Benchmarking in Kumba Resources

Some statements can be found in Kumba Resources publications referring to examples of the use of benchmarking in measuring performance of Kumba Resources operations. This includes internal and external versions of performance benchmarking in areas such as production and financial performance in order to make good on promises identified in section 6.2.6.2(b). However, there was no clear evidence of a single comprehensive and all-inclusive approach to benchmarking across the whole of the Kumba Resources organisation.

The definition of O’Dell and Grayson (2004:602) (see section 4.4.1), “the process of identifying, understanding, and adapting outstanding practices from others, in order to improve your own performance” may not have been overtly adopted by Kumba Resources but, in practice, is being applied. Gardner and Winder’s (1998) (see section 4.4.1) view that benchmarking can be applied selectively or comprehensively appears to have been adopted by Kumba Resources in that they are benchmarking those activities which helped them to improve their overall performance, as opposed to benchmarking every aspect of their business.

The identified challenges of benchmarking (see section 4.4.2) are not particularly severe in Kumba Resources case, as the industry in which they operate (mineral resource extraction and processing) is well established and offers a number of opportunities to benchmark performance.

7.2.2.3 Standards in Kumba Resources

As was identified in section 6.2.6.2. (c), Kumba Resources has achieved significant results in obtaining certification in line with international standards across a number of its operational locations and has clear plans to expand the range of that

certification, both in terms of the type of certification and the number of locations included (in areas such as environmental management, occupational health and safety).

7.2.2.4 Quality in Kumba Resources

There is an active focus on quality issues at Kumba Resources. The Safety Health Environment and Quality (SHEQ) function is well established in the company, and forms part of the corporate commitment to operational excellence, particularly in the area of safety and environmental management. This commitment extends to the publication of a quarterly internal newsletter focusing on the issues covered by the SHEQ teams across the company.

There is also evidence that in a number of other areas, the company has achieved performance levels worthy of recognition as highlighted in section 6.2.6.2.(d) (including receiving a number of awards); further indications of the commitment to quality at the company.

7.2.2.5 Capability Maturity Models in Kumba Resources

Although there were no explicit statements to be found in the documentation obtained from the company or on the Kumba Resources website as to the application of the capability maturity model approach, on further investigation it became clear that the approach used inside the company known as ‘the staircase’ is in fact based on the principles underlying the capability maturity model. The use of this staircase will be discussed further in section 7.4.

Kumba Resources can, therefore, be seen to comply, to some extent, with the elements of world-class performance as defined in Chapter 4, but there is clearly an opportunity to increase the level of consistency across the organisation in each of the five elements of the model, whilst at the same time increasing the level of maturity in each of those areas. Examples of this approach in various areas would be:

- Best practices: the implementation of a company-wide approach to identify, evaluate and implement best practices, whether sourced internally or externally
- Benchmarking: to identify where the use of benchmarking will add to improved performance, with or without the use of best practice. Benchmarking can also be applied using both internal and/or external benchmarking comparisons.
- Standards: to proactively identify which standards apply to Kumba Resources business and whether or not the achievement of those standards meets the corporate objectives; then to develop and implement a plan for the achievement of the standards selected
- Quality: to apply the principles of quality management across the organisation in such a way that quality is not only seen to be activity associated with operations/production functions but also applying to all aspects of the business.
- Capability maturity models: to identify where the maturity model concept can be successfully applied and how to do so.

7.2.3 Role of knowledge management in the Kumba Resources business strategy

The role of knowledge management in Kumba Resources was discussed in section 6.3. Clear evidence was found of a commitment dating back to 2002 to have knowledge management as an element of and supporting the overall Kumba Resources business strategy. Knowledge management activities were described in terms of existing strategic and tactical decision-making, as well as assisting in the sharing of best practices and other elements of world-class performance. This is consistent with a number of authors who have identified the importance of the relationship between business strategy and knowledge management strategy (see section 2.4.1). Another indication of the commitment to knowledge management is the formal structure that has been established, including the appointment of a full-time knowledge management manager during 2003, as well as the establishment of a knowledge management department.

7.2.4 Importance of knowledge sharing in Kumba Resources

In line with the commitment to knowledge management as one of the elements of the conduct of the strategy and the implementation of practices that would enable world-class performance, evidence was found of the commitment to the sharing of knowledge across the organisation (see section 6.2.3). This included not only statements made in Kumba Resources publications, but also through the use of a number of practices used in the organisation. These include, for example, the use of a comprehensive corporate library, the building of a knowledge map for the organisation as well as the establishment, and the funding of a significant number of communities of practice (the evidence of this can be found in section 6.3.3 in terms of the initiatives undertaken by the Kumba Resources knowledge management team).

The importance of knowledge sharing has been widely recognised in the literature and a number of processes (identified in Table 2.5) to assist in the sharing of knowledge have been clearly identified. In addition, specific objectives for the sharing of knowledge have been identified by a number of authors, as was discussed in section 2.3.2. Kumba Resources has clearly established a number of the initiatives just mentioned, in order to support this knowledge sharing.

The Dixon (2000) model (as discussed in section 2.3.5) can be applied to Kumba Resources: evidence was found of serial sharing (within the same team, such as the CICOP at a particular location), near sharing (between members of the CICOP at different geographical locations), far sharing (tacit knowledge shared by members of the CICOP on special projects, such as the introduction of stories and storytelling as knowledge sharing practices) and strategic sharing (where more complex forms of knowledge, such as how to successfully complete technical projects, are shared across business units and through time).

Some evidence was found during the semi-structured and unstructured interviews of the concerns expressed by O'Dell and Grayson (2004) in section 2.3.5, in terms of obstacles to knowledge sharing (including organisational structures; lack of a culture

of knowledge sharing; challenges of physical distance; relying extensively on explicit knowledge (for example in documents and databases) as well as issues surrounding knowledge sharing rewards), but this is to be expected in an organisation which has nearly 10,000 people spread around a large geographical area, accommodating many different types of business units and regional diversity (such as language and culture).

In terms of the SECI model (see section 2.3.4), each of the main elements of knowledge sharing can be found at Kumba Resources: socialisation (where the company is actively encouraging the individual sharing of knowledge through the growth of a culture that supports knowledge sharing); externalisation (through the use of a number of tools, including the provision of a document management system and other forms of explicit knowledge capture); combination (using a number of explicit sets of knowledge available from both internal and external sources) and internalisation (to a variety of initiatives to train, educate and communicate with employees, including the use of stories and storytelling, supported by a variety of media). The SECI model (see section 2.3.4) recognises three levels of the individual, team and organisation and it is clear from the evidence in the case study that Kumba Resources is attempting to ensure knowledge sharing at those three levels.

7.3 Analysis of Kumba Resources knowledge management function

7.3.1 Objectives and activities

There has been extensive discussion in the literature as to the nature of knowledge management and how to leverage knowledge management in an organisation, including the types of objectives to be set, particularly in the area of activities in a knowledge management function to support knowledge processes such as knowledge sharing (see Table 7.1 on page 7-18). These views include the structure, objectives, role, measures, tools and practices, processes and practices that can be used to support a knowledge management strategy in the organisation.

A profile of the Kumba Resources knowledge management function has already been presented in section 6.3. It is clear from that (as well as the profile of Kumba Resources as a whole in section 6.2) that knowledge is valued as a resource at Kumba Resources. Although no single source or model could be identified as the basis on which the Kumba Resources knowledge strategy has been established, the implementation of knowledge management at Kumba Resources appears to carry many of the characteristics associated with world-class performance in terms of knowledge management (as will be analysed in section 7.3.2).

The Kumba Resources knowledge management function certainly complies with the views of Prusak (in Cohen, 1998) in terms of the three most common objectives found in the 100 knowledge projects which Prusak evaluated:

- To make knowledge visible and show the role of knowledge in the organisation: this has been achieved, for example, through the Kumba Resources orange pages and knowledge map and various other initiatives and through coverage in the Kumba Resources internal publications
- To develop a knowledge-intensive culture by encouraging and aggregating behaviours such as knowledge sharing: evidence of this comes from the diverse initiatives of the knowledge management team members, including the establishment of many communities of practice for knowledge sharing
- To build a knowledge infrastructure: evidence of this comes from the use of technology to further the management of knowledge at Kumba Resources (such as the orange pages, corporate library, document management system and other initiatives).

Hiebeler (1996) has identified (as discussed in section 2.3.3) a set of success factors for knowledge management, which can be applied to the Kumba Resources knowledge management function:

- Taking a long-term view of the benefits of a knowledge strategy: this has clearly been happening judging by the evidence of the corporate commitment

since 2002 and the scope of the current knowledge management organisation with its objectives stretching into the future

- Integrating knowledge management into the culture: this is being reinforced by the knowledge management team as well as by active support from executive and line management
- Making and communicating a commitment to knowledge sharing: ample evidence of this has already been presented in terms of the Kumba Resources corporate commitment to knowledge management since 2002, through statements made and actions taken
- Developing a framework for capturing knowledge: this is still under development (through a number of the initiatives from the knowledge management team, such as the corporate orange pages the knowledge map and document management system)
- Making information systems accessible and easy to use: this has been a focus of the knowledge management team (through the provision of various tools such as the community of practice toolkit and the customer-oriented approach of the information and library service)
- Creating, capturing, and transferring knowledge internally: Kumba Resources knowledge management has achieved this in a number of ways, in particular through the establishment of communities of practice
- Allocating time and resources for knowledge sharing: an example of this is the knowledge conferences that have been convened as well as the active participation by the knowledge management team in supporting the communities of practice
- Finding financial and non-financial ways to measure the benefits of knowledge management: this is an area where little evidence was found that significant progress has so far been made at Kumba Resources.

Elements of the Kumba Resources knowledge management function approach will now be evaluated against the proposed world-class framework performance measures.

7.3.2 World-class performance in Kumba Resources knowledge management function

7.3.2.1 Best practices in Kumba Resources knowledge management function

Many of the most widespread knowledge management practices identified in the literature and presented in Table 2.7 can be found at Kumba Resources. Several of these have already been mentioned in this chapter (the Kumba Resources knowledge map, the Kumba Resources orange (yellow) pages, communities of practice and a document management system) as well as other tools such as knowledge audits and the provision of physical and virtual library services.

What is not so well-defined is a broader understanding of the overall approach of Earl (2001), as outlined in section 2.3.4, or a specific model (such as the learn before/during/after model as advocated by Collison and Parcell (2001) in the case of BP (see section 2.3.4)) or a set of clearly defined knowledge management processes drawn from other sources (such as one or more of the specific processes and sub-processes mentioned in Table 2.5). Although many of the knowledge management function's activities can be closely identified with the SECI model (see section 2.3.4), including supporting knowledge sharing at the level of the individual, the group and the overall organisation, the explicit use of such a model was not identified during the research.

The wide range of activities undertaken by the Kumba Resources knowledge management team are based on extensive external research in the local (South African) and international knowledge management communities (in particular with Buckman Laboratories) for guidance on the adoption of best practices.

7.3.2.2 Benchmarking in Kumba Resources knowledge management function

Kumba Resources knowledge management function has undertaken to benchmark its knowledge management activities since the outset (Sandrock, 2004). This has taken

place through a variety of initiatives, including comparisons with other local organisations implementing knowledge management, and through visits to other companies in an effort to benchmark Kumba Resources knowledge management activities and achievements (see section 6.2.6.2.(b)).

These activities conform well to the definition of benchmarking from Gardener and Winder (1998) (which was presented in section 4.4.1), although the benchmarking activities are largely qualitative rather than quantitative in nature. Some of the different types of benchmarking identified by de Jager (1999) (see section 4.4.1) have been used at Kumba Resources (co-operative and collaborative benchmarking), although Kumba Resources faces the same challenges as identified by Kouzmin *et al.*(1999) (see section 4.4.1). These challenges are: the difficulty of obtaining data about competitor organisations (because there are so few users of knowledge management at the standard Kumba Resources has reached in South Africa); identifying the type of benchmarking measures to be used (in the field of knowledge management this is particularly problematic due to the cultural nature of many of the aspects of knowledge management); the completeness of benchmarking data (very little documented evidence exists in South Africa against which to benchmark), and having benchmarks durable over time (due to the relatively recent establishment of the Kumba Resources knowledge management function it has, thus far, been difficult to build up an historical perspective of performance).

7.3.2.3 Standards in Kumba Resources knowledge management function

As has been identified (in section 4.5.3) the area of standards for knowledge management is relatively immature (in effect, no standards have been established other than the interim standards available from Australia (SAI, 2003)), and there is little evidence that even those have been widely adopted outside of Australia. It is understandable, therefore, that for the knowledge management activities at Kumba Resources, using internationally recognised standards as a measure of world-class performance is not feasible.

7.3.2.4 Quality in Kumba Resources knowledge management function

As was identified earlier in this chapter (see section 7.2.2.4) there is a strong corporate commitment to quality within Kumba Resources, at least for the purposes of operational performance in the production areas (on the mines and in the processing plants and refineries). Exactly how that translates into quality of objectives for knowledge management is questionable, as the subject of quality management in a specific knowledge management context has received little attention in the literature, other than the specification, for example, of specific practices and tools for the implementation of knowledge management (see section 2.3.7). As was highlighted in section 4.6.3, the closest equivalent in the knowledge management field would be the Most Admired Knowledge Enterprise – MAKE - awards. Up to the completion of this research project, Kumba Resources had not been nominated for a MAKE award.

7.3.2.5 Capability Maturity Models in Kumba Resources knowledge management function

The concept of the capability maturity model (CMM) (in the context of the proposed world-class performance framework as presented in Figure 4.1) was discussed with the knowledge management team at the outset of this research project. The widespread use in Kumba Resources of the performance staircase (which is similar to the CMM levels of performance, see the example in Appendix 2) made the use of the CMM approach for the structured interviews assessment of knowledge sharing and the use of stories and storytelling acceptable to the knowledge management manager. However, no evidence was found that the knowledge management team itself is using any form of CMM in terms of measuring its performance or the services that it offers its clients. However, the knowledge management manager has been involved (as part of the external benchmarking activities), with at least one other South African-based organisation which has itself developed a maturity model, so that there is at least awareness of the possibility of applying this concept in the knowledge management function in Kumba Resources (see section 6.26.2(b)).

In summary, the scope, objectives and activities of the knowledge management team in Kumba Resources, represent a significant commitment on the part of the company's executive management and the knowledge management function itself to supporting and driving knowledge management as an element of the company's strategy. The knowledge management function, in turn, shows evidence of well-developed practices (in particular the establishment of communities of practice for knowledge sharing), benchmarking (albeit of a largely informal nature) and a commitment to quality and an understanding of organizational maturity which well positions the Kumba Resources knowledge management function in terms of fulfilling its role to its stakeholders.

Having discussed the Kumba Resources organisation as a whole and the knowledge management function specifically, the next section will focus on the CICOP and its role in the use of stories and storytelling as knowledge sharing practices.

7.4 Analysis of the Kumba Resources CICOP

7.4.1 Objectives and activities

The role of, and approach to, implementing the community of practice as discussed by a number of authors (see section 2.3.7) can be found in large part in the CICOP in Kumba Resources. Wenger's (2000) categories of COP membership, as presented in section 2.3.7, can be used to present an analysis of the membership of the Kumba Resources CICOP:

- Core group: these are the individuals who drive the community and include those listed in Table 6.2
- Full membership: these are all the members of the Kumba Resources continuous improvement function distributed throughout the business and who may participate in meetings and activities of the COP from time to time
- Peripheral membership: these are individuals in Kumba Resources who have an interest in the activities of this specific CICOP (such as members of the

knowledge management function, members of other communities, and representatives of key business areas such as the Kumba Way) and may participate in CICOP activities from time-to-time

- Transactional participation: a number of role players were identified (external to Kumba Resources) who provide services to the CICOP (consultants and service providers, offering professional advice and guidance in areas such as continuous improvement practices)
- Passive access: a large number of people inside Kumba Resources who benefit from the activities of the CICOP, including the majority of the operational and management level employees in each of the locations and functions where the CICOP operates.

Core members of the CICOP participate on a voluntary basis and represent the business functions or locations for which they are responsible. In most cases this means that the line management responsibility for CI has a direct parallel in membership of the CICOP. Some core members have alternate members (from the full membership category) nominated to represent them in case of absence at meetings or where they are unable to fulfil other commitments to the CICOP.

The CICOP operates as both a face-to-face and virtual community (see section 6.3.5 for a description of how the CICOP operates). CICOP meetings are used to bring members up to date with recent developments in the community as well as to act as a showcase for CI activities in the case of meetings hosted at an operational site (such as the meetings at Leeuwpan and Glen Douglas held in the first half of 2004, where the host CICOP member had an opportunity to share insights into the local operation with the other members of the community).

The CICOP has at its disposal the expertise from the continuous improvement functional management team spread across the Kumba Resources business. The extent to which the operations of this CICOP group are world-class will now be discussed.

7.4.2 World-class performance in Kumba Resources CICOP

7.4.2.1 Best practices in Kumba Resources CICOP

Extensive use is made by the members of the CICOP of best practices which have been acquired from both inside and outside the organisation. These best practices are identified in the 'CI code book' and other related documentation which helps to define the nature of what the CI function has as its mission to deliver to the organisation. Based on observation while attending a number of the periodic meetings of the community and during visits to several of the continuous improvement function locations, as well as inspection of CI function documentation, it became clear that the CICOP is conforming with the overall corporate commitment to the implementation of best practices. However, as at the corporate level, the CICOP does not appear to distinguish between the different types of practice in the way indicated by O'Dell and Grayson (2004) (see section 7.2.2.1).

7.4.2.2 Benchmarking at Kumba Resources CICOP

The very nature of the CICOP encourages internal benchmarking, as is to be expected from the findings from the literature (see section 4.4.1). Evidence of informal, internal benchmarking was observed during the regular meetings of the CICOP, which took place during the empirical research phase of this project (such as the presentation on the CI approach used at Glen Douglas mine as mentioned in section 6.3.5).

With respect to external benchmarking, external sources have been used to advise the CICOP, but although best practice information is flowing into the CICOP there was no evidence of any formal external benchmarking taking place during this project.

7.4.2.3 Standards at Kumba Resources CICOP

In the context of knowledge management, as previously discussed (section 4.5), there is very little opportunity for a community such as this CICOP to use formally recognised standards in connection with its knowledge sharing activities.

7.4.2.4 Quality at Kumba Resources CICOP

Although the CI function is a separate organisational unit from the SHEQ function, the members of the CICOP operate within the same quality management environment as the rest of the organisation in terms of meeting stated corporate quality objectives (championed by SHEQ). In addition, the very nature of the work within the continuous improvement function requires a commitment to meeting and exceeding quality targets. As part of that commitment, a significant component of the work of the CICOP is focused on quality issues.

In terms of quality of how it manages itself as a community, this is addressed by the core members of the CICOP who set the standards in terms of participation in the life of the community (for instance, flow of information in the community, attendance at meetings, and standards of presentations made). Judging by the performance of the community at the meetings attended (direct observation) as well as during the various interviews conducted (structured, semi-structured and unstructured) and inspection of artefacts (documents, copies of presentations) the CICOP lives the values statement included in other Kumba Resources business strategy in relation to quality.

7.4.2.5 Capability Maturity Models at Kumba Resources CICOP

The concept of maturity models in the CICOP was already well established in 2003 prior to the commencement of this research project. Evidence of this can be found in the CI assessment tools in use in the Kumba Resources CI function (the CI staircase

and code book already referred to, see Appendix 2)¹. The staircase (maturity) approach recognises different levels of achievement and different processes involved in each level. In that sense, the use of the staircase is very similar to the discrete version of the CMM as identified in section 4.7.

In summary, the CICOP (as established through observation, the collection of artefacts and the input received during a number of interviews conducted throughout the research) is active in the area of best practices, benchmarking, quality management and the use of the capability maturity model approach as elements of the overall objective for Kumba Resources of achieving world-class performance (see section 6.2.4).

7.4.3 Maturity of knowledge sharing in Kumba Resources CICOP

For the CICOP the findings of the maturity assessment interviews in the area of knowledge sharing (as presented in section 6.4.1) will be discussed in sections 7.4.3.1 to 7.4.3.9. It should be remembered that the construction of the research instrument was a unique development to answer the research problem of this project, and it was constructed through the application of what was discovered during the non-empirical research phase of this project.

Part Four of Appendix 1, is the maturity rating scale that was used for both elements of the structured interviews assessing maturity in the areas of knowledge sharing and the use of stories and storytelling. Included here are the capability levels and titles²:

- Capability level Zero (0): not performed
- Capability level One (1): initial - Performed informally
- Capability level Two (2): repeatable - Planned and tracked
- Capability level Three (3): defined – Well defined
- Capability level Four (4): managed - Quantitatively controlled

¹ This familiarity of use of the maturity model concept made the selection and use of a maturity model rating scale a logical move when it came to designing the research instrument used in the maturity assessment of knowledge sharing and the use of storytelling.

² A more comprehensive description is available in Appendix 1, part 4.

- Capability level Five (5): optimising - Continuously improving.

The following sub-sections will now explore the issues assessed by the structured interviews as listed in Table 6.3. For ease of reference, Table 7.1³ is presented as a consolidated list of the knowledge sharing factors identified in the literature search and on which the research instrument was based:

Knowledge sharing issue	Source reference
Ownership	APQC, 2000; BSI, 2003a; Chase, 2003; Collison and Parcell, 2001; de Jager, 1999; Earl and Scott, 1999; Ehms and Langen, 2002; Kochikar, 2000; O'Dell and Grayson, 1998; Skyrme, 2000; Szulanski, 1994; TFPL 1999
Objectives	APQC, 2000; BSI, 2003a; Chase, 2003; de Jager, 1999; Ehms and Langen, 2002; Kochikar, 2000; O'Dell and Grayson, 1998, Skyrme, 2000; Szulanski, 1994; TFPL 1999
Tools & practices	BSI, 2003a; Demarest, 1997; Nonaka, 1994; Skyrme, 2000; TFPL 1999
Training & education	Boje, 1991; BSI, 2003a; Ehms and Langen, 2002; Hansen, 1993; TFPL, 1999
Measures	APQC, 2000; BSI, 2003a; Chase, 2003; Cohen, 1998; Davenport <i>et al.</i> , 1996; de Jager, 1999; Demarest, 1997; Ehms and Langen, 2002; Gold, Malhotra and Segars, 2001; Hiebeler, 1996; Kochikar, 2000; Liebowitz and Chen, 2004; O'Dell and Grayson, 1998; Ruggles, 1998; Skyrme, 2000
Success stories	BSI, 2003a; Collison and Parcell, 2001; Davenport, <i>et al.</i> , 1998; Elliott and O'Dell, 1999; Gill, 2001; Liebowitz and Chen, 2004; Reamy, 2002
Benchmarking	APQC, 1997, 2000; Chase, 2003; de Jager, 1999; Gardner and Winder, 1998; Kouzmin <i>et al.</i> , 1999; O'Dell and Grayson, 1998, 2004; Szulanski and Winter, 2002;
Reward and recognition	Davenport and Prusak, 1998; Hansen, 1993; Kochikar, 2000; Liebowitz and Chen (2004); Ruggles, 1998
Link to knowledge management strategy	APQC, 2000; BSI, 2003a; Collison and Parcell, 2001; Demarest, 1997; Ehms and Langen, 2002; Hansen, 1993; Kochikar, 2000; Zack, 1999

Table 7.1 Consolidated list of sources for knowledge sharing issues

³ This table is similar in nature to Table 3.6, which consolidates the literature sources for the stories and storytelling issues.

7.4.3.1 Ownership of knowledge sharing

For any management strategy to succeed there must be clearly defined ownership and the sources identified as part of the non-empirical phase of the research project clearly identify the importance of ownership of knowledge management (see Table 7.1).

The overall assessment of maturity for this question was 1.00 (see Table 6.3). This indicates that the ownership of knowledge sharing, in the opinion of the interviewees, is only at an informal level, suggesting significant room for growth in maturity in terms of the definition of ownership.

7.4.3.2 Objectives for knowledge sharing

Once ownership of the knowledge sharing initiative has been established then it is clearly useful to set objectives for knowledge sharing (see Table 7.1).

The overall assessment of maturity for this question was 1.20 (see Table 6.3). This indicates that for some interviewees the objectives for knowledge sharing were more clearly expressed than being informal, although this rating was only marginally higher than with the ownership item.

7.4.3.3 Tools and practices for knowledge sharing

Having established the ownership and objectives for knowledge sharing there are a number of possible tools and practices that can be used to make the knowledge sharing objectives a reality (see Table 7.1). The overall assessment of maturity for this question was 1.07. This result suggests that the selection of tools and practices for knowledge sharing is being performed only on an informal basis.

7.4.3.4 Training and education for knowledge sharing

Having selected the tools and practices to be used as part of the knowledge sharing initiative it may be appropriate to identify what training and education in knowledge sharing is required for those tools and practices (see Table 7.1). The overall assessment of maturity for this question was 0.60 (see Table 6.3) and that for the group as a whole, training and education for knowledge sharing remains, at best, an informal activity.

During the rest of the empirical data gathering, this topic was rarely raised during the unstructured interviews, except in relation to the training of managers in how to use the storyboards (see for example, section 6.5.8.3).

7.4.3.5 Measures of knowledge sharing

Once the knowledge sharing initiatives are under way, with appropriate ownership, objectives, tools and practices, training and education in place, it makes sense and becomes important to implement measures of knowledge sharing as for any other aspect of a knowledge management strategy (see Table 7.1).

The overall assessment of maturity for this question was 0.53 (see Table 6.3). This was one of the lowest scores recorded and indicates a significant lack of measurement of the knowledge sharing effort.

7.4.3.6 Success stories of knowledge sharing

Having implemented knowledge sharing and understanding the degree of success enjoyed by using appropriate measures, it becomes possible to develop and circulate success stories of knowledge sharing in the organisation (see Table 7.1).

The overall assessment of maturity for this question was 1.33 (see Table 6.3). This slightly higher score indicates that on average, all of the interviewees had some experience of informal success stories of knowledge sharing.

7.4.3.7 Benchmarking of knowledge sharing

Once the knowledge sharing practice is established and measures are available, it then becomes possible to consider the possibility of benchmarking, internally or externally, quantitatively or qualitatively in terms of the knowledge sharing achievements (see Table 7.1).

The overall assessment of maturity for this question was 0.60 (see Table 6.3). The low scoring here indicates that overall benchmarking of knowledge sharing is being performed informally at best.

7.4.3.8 Reward and recognition for knowledge sharing

One element to consider in a knowledge sharing strategy is the role of reward and recognition for knowledge sharing (see Table 7.1). The overall assessment of maturity for this question was 0.27 (see Table 6.3). This was the lowest score recorded overall for the maturity assessment of knowledge sharing and indicates that reward and recognition for knowledge sharing is largely non-existent.

7.4.3.9 Knowledge sharing as part of the overall knowledge management strategy

The last part of the overall assessment of knowledge sharing focuses on the position of knowledge sharing in the overall knowledge management strategy (see Table 7.1). The overall assessment of maturity for this question was 1.00 (see Table 6.3). This rating indicates the overall strategy for knowledge management within the CICOP is informal. This is in contrast to the corporate commitment to knowledge sharing.

7.4.3.10 Summary of maturity of knowledge sharing within the CICOP

The analysis of the knowledge sharing maturity assessments in sections 7.4.3.1 to 7.4.3.9 indicate that knowledge sharing within the CICOP is being conducted on an informal basis. The implication of this is that there are significant opportunities to increase the maturity of knowledge sharing across the membership of the CICOP, and thus contribute to overall world-class performance improvement. In addition, assuming the validity of the research instrument, this indicates the possibility that although knowledge sharing is included as part of the overall commitment to knowledge management in the Kumba Resources organisation, there may be significant opportunities to improve the effectiveness with which knowledge is shared across not only the CICOP but potentially the rest of Kumba Resources (if the CICOP results were to be taken as in anyway representative of the organisation as a whole). As this is a small group compared to the total population of employees in Kumba Resources, this suggests a worthwhile area for future research.

7.5 Analysis of the use of stories and storytelling in the CICOP

7.5.1 Overview of the use of stories and storytelling in CICOP

As discussed in the main research problem, the focus was in understanding the potential of stories and storytelling as practices for knowledge sharing to enhance world-class performance. Once the empirical investigation had commenced and the maturity assessment interviews were completed, it became clear that the planned use of stories and storytelling in the CICOP during 2004 was essentially related to the use of the storytelling practice (including the development of stories, the training of storytellers and the delivery to listeners) supported by a number of media, in particular, printed storyboards (as have already been identified in section 6.5). The analysis of the evidence gathered in terms of the planned use of stories and storytelling for knowledge sharing in the CICOP will now draw upon the evidence already presented in sections 6.5.1 to 6.5.9.

The elements of the proposed world-class performance framework have been applied three times already in this chapter: at the level of Kumba Resources the organisation; to the Kumba Resources knowledge management function; and to the Kumba Resources CICOP. To apply the entire framework in the case of the use of stories and storytelling for knowledge sharing would require an agreed series of definitions, specifically related to stories and storytelling, of: best practices; benchmarking; standards; quality management, and capability maturity. As has been identified earlier in the chapter, the relative immaturity of the subject matter area (stories and storytelling used for knowledge sharing) excludes the possibility of applying explicit agreed measures (as no agreement exists) from the literature for the first four of these areas of the world-class performance model.

However, the relative maturity of the capability maturity model format in the knowledge management field and its use in terms of the construction of the research instrument (used for the maturity assessment for knowledge sharing and the use of stories and storytelling as knowledge sharing practices) in this research, provide the greatest opportunity to add value in terms of the findings of this research. Using the CMM approach, it is possible to further analyse the findings of the research in terms of the topics covered by the research instrument⁴ (see Appendix 1, Part Four), complemented by the data gathered in the rest of the empirical study, through the semi-structured and unstructured interviews, observation and collection of artefacts (in line with the data gathering methods proposed in section 5.4.2).

7.5.2 Ownership of stories and storytelling

If stories and storytelling are to be used in a meaningful way as practices for knowledge sharing, then like other elements of an overall approach to knowledge management, ownership is required (see Table 3.6). The overall assessment of

⁴ The same comments about the compilation and use of the research instrument apply here as in the case of knowledge sharing maturity in this chapter. In addition where the literature largely has a focus at the level of knowledge management initiatives as a whole, for the purposes of this research the sources identified have been applied more narrowly in the area of storytelling: in other words storytelling is implicitly rather than explicitly included in the comments made by those authors.

maturity for this question was 0.13 (see Table 6.4). This indicates that ownership in the CICOP is not well defined.

This ownership issue is capable of treatment on two levels: the ownership by individuals and the ownership by a group. Although there was no obvious claim to own a story from the maturity assessment structured interviews, when further discussion was held, it became apparent that the sense of ownership was, in fact, stronger than the maturity assessment structured interviews indicated. A good example of this is demonstrated by the stories in use at several of the mines where the localisation of the story was something that was evidently a source of pride (the 'it was invented here' approach), such as for the marula tree story at Grootegeluk. Other examples of this were found in the various stories (with their accompanying storyboards) that were in use in a variety of locations, such as at Grootegeluk, Thabazimbi and Sishen mines. In another sense, the stories in use through the storyboards could be seen to be in communal ownership, in such a way that there is a difference between 'custodial ownership' and 'control ownership'. In the case of custodial ownership the story could be seen to be owned by a group (such as the CI function at Grootegeluk for the marula tree story) whilst the control of the story could be seen as a much more communal activity: the story is developed and maintained through a coherent approach to involvement of the community it was intended to address (for example, the name 'Zimisele' for the campaign at Zincor refinery came from the employees, not management (see section 6.5.8.2).

The corollary of this ownership issue would be the sense of 'not-invented-here' resistance, where, because a story originates elsewhere, there is a possible sense of loss of ownership (or failure to own in the first instance) potentially making the story less attractive for use in other than the location of origin. In that sense the possibility of a story travelling could well be restricted by the possible resistance of community members and objection to the story from those not involved in its origination.

7.5.3 Executive sponsorship of the use of stories and storytelling

Executive sponsorship is the next issue for analysis as an important element of implementation (see Table 3.6). The overall assessment of maturity for this question was 0.00. This indicates that there is no perception of executive sponsorship for the use of stories and storytelling in the CICOP.

Perhaps this should not be surprising as, due to the generally low level of maturity associated with the use of stories and storytelling, a lack of executive sponsorship could be part of the reason for an overall informal approach. The only area where executive sponsorship was evident was for the ‘ants’ theme used in the story material in use supporting the Kumba Way strategy. In this case, the ownership was clearly seen to sit with the Kumba Way team and, through them, to a higher level with Kumba Resources executive management.

On investigation there were several cases, in particular at Sishen and Grootegeluk where the executive sponsorship was much more evident than would at first appear. At Grootegeluk the pro-active stance taken by the Mine Manager was clear from several indicators: from the obvious enthusiasm shown by the individual himself, the material on display in his office and at various locations around the mine and the reputation established in terms of his enthusiasm for the use of stories.

What also became clearer as the study progressed was that the cross-fertilisation of ideas in the use of storyboards was as a consequence of the appointment of members of the management team to new positions at a different Kumba Resources location, taking with them as they went lessons learned from the success at previous mines. Examples of this could be found in the move of a manager to Grootegeluk from Thabazimbi and another manager from Sishen to Zincor (see section 6.5.1.4). Hence, the executive sponsorship has the potential to act not only as a strong supporting mechanism ‘in situ’ but also act as a transfer of potential best practice on a broader front within the organisation.

7.5.4 Objectives for stories and storytelling

The importance of objectives in a knowledge management strategy (which includes knowledge sharing practices such as the use of stories and storytelling) has been widely recognised (see Table 3.6). The overall assessment of maturity for this question was 0.27 (see Table 6.4). This indicates that either the objectives had not been created, or if they had, they had not been communicated to members of the CICOP. Another possible interpretation is that the stories that exist in the CICOP and the tools and practices that are being used (such as the use of storyboards) are not recognised as stories and practices for the telling of stories.

In the case of the use of the ants theme in the Kumba Way, even though the story concept was generally not developed beyond individual scenes (episodes of a full story) on each poster or other promotional medium used (such as mouse pads), there could be seen a clear link to the overall objectives of the organisation for the use of the practice in the recognition given to the Kumba Way by members of the CICOP. A further example of this sense of clear objectives could be found in the marula tree story where the team that developed and delivered the story were easily able to explain their reasons for doing so.

After the maturity assessment interviews the further gathering of data revealed a rich source of objectives as summarised in Table 7.2. The table shows reasons identified by Sole and Wilson (2002) matched with the data from the empirical findings.

Objectives according to Sole and Wilson (2002)	Objectives at Kumba Resources (examples drawn from section 6.5)
Communicate embedded knowledge/share tacit knowledge	A number of different examples of communication of know-what and know-how in areas such as how to enhance organisational performance
Develop trust and commitment/resolve conflicts	Several cases of using stories to develop trust as well as encouraging teamwork to improve mutual understanding, in particular in relation to the values associated with each location as well as at the Kumba Resources corporate level
Simulate problem-solving	Although the focus was different from location to location in terms of the problem to be solved it was clear that the storytelling approach in each case involved problem

	solving whether through the individual scenarios depicted on the various scenes depicted on the mine storyboards.
Organisational renewal	This was a common focus on many of the storyboards used, with a sense of a journey from the current harsh reality through a series of challenges and opportunities towards the achievement of a future intent
Socialisation of new employees	This purpose was overtly stated in some cases (Leeuwpan) whilst providing a secondary reason in other locations
Sense-making	This was true of all of the mines and refinery locations. Of particular note is the Zincor Zimisele storyboard which raised sense making issues associated with specific business challenges and the Grootegeluk marula tree story in terms of understanding business fundamentals
Learning/facilitate unlearning	As can be seen from the messages contained on the storyboards (both in graphics and in text) the storyboards have been designed to enhance individual and group learning, including unlearning old, established ideas
Innovation and new product development	Although there was little emphasis on new product development (other than with the marula tree story) the innovation content was high in terms of organisation development
Share norms and values/generate emotional connection	This was particularly strong in the communications surrounding the integration of Kumba Way values (by stating those values and using the ant as symbols in the storyboards) and where explicit mention was made of location-specific values (such as at Thabazimbi)
Kickstarting a new idea (in a team setting)	The focus was on the achievement of business goals in several of the storyboards (in particular at Zincor and Sishen's 2 nd generation storyboard). In all of the other storyboards new ideas were also introduced
Socialising new members (team building)	Although not an explicit objective in every case, the design of the storyboard offers the opportunity for it to be used in teambuilding situations
Mending relationships (within and between teams)	This was much more difficult to identify, as in the Kumba Resources environment the emphasis is more on building relationships rather than repairing them. Also, the focus of the storyboards is on building relationships within a particular location (such as a Tshikondeni) rather than across the organisation as a whole
Sharing wisdom (within and between teams)	In every case each of the storyboards used created the opportunity for the storyteller as well as the audience (listeners) to participate in the sharing of a deeper understanding

Table 7.2 Objectives for the use of stories and storytelling in the CICOP

The indications from the literature were that a wide range of possible objectives (or reasons) for using stories exist. Within the context of the Kumba Resources CICOP,

the list of objectives is narrower and deeper. It is narrower in the sense that broader issues associated with the organisation as a whole (such as recruitment policies) are excluded, whilst the depth of explanation required to ensure that real value is added through the use of the stories and storytelling is enhanced by the richness of the experiences.

7.5.5 Funding of stories and storytelling

The next important issue for analysis is the issue of funding (see Table 3.6). The overall assessment of maturity for this question was 0.27 (see Table 6.4). This indicates that the funding of any storytelling initiatives is either not formally recognised (because it may be included in some other budget) or is at best informal where it is recognised.

That is not to say that the initiatives were unfunded, but rather that the funding did not represent such a large financial commitment that a more formal approach was required. This could and did result in funding being secured and managed at a local level without a single coherent overall sense of what funding was being put into the development and sustaining of the storytelling approach across the CICOP as a whole.

For the use of other storytelling methods, such as the support of the Kumba Way initiative (see section 6.5.1.3) the funding was drawn from outside of the CICOP area as the initiative was intended to meet a different set of objectives to only those of the CICOP. Here the CICOP community were on the receiving end of the initiative without being in any way involved in the funding decisions.

7.5.6 Tools for stories and storytelling

Once it has been agreed that stories and storytelling represent useful practices to assist with sharing knowledge in the organisation, it is necessary to select appropriate tools to use for the telling of stories, as has been recognised for other aspects of a knowledge management strategy (see Table 3.6).

The maturity rating for this question was 0.73 (see Table 6.4). This is one of the higher scores in this maturity assessment and indicates that the use of tools is recognised (for example, the deployment of the storyboard as a tool to support storytelling) although the use of these tools remains informal.

The primary storytelling tool that was identified and is under discussion in this analysis is the storyboard. This tool merits a more exhaustive investigation as there are many aspects to the use of the tool that need explanation. Amongst these are the following:

- The physical appearance of the storyboard (size; colour usage, logical flow of the story; ability to build the story, such as through the use of Velcro-backed panels)
- Which media to use to tell the story depicted on the storyboard (choice or mixture of various media such as personal computer-based tools, posters)
- What story theme to address with the storyboard (such as achieving objectives or educating listeners on a particular theme)
- Consistency (or intentional lack thereof) across the business units in the CICOP (such as with the use of a consistent ants theme for the Kumba Way strategy but not from mine to mine with their own locally-focused storyboards)
- How the storyboard story is told (for example: by a trained and dedicated storyteller; informally on a peer-group basis, or by a story-leader drawn from the ranks of management)
- Where, when and how the story would be listened to (issues such as: size and location of the story-listening group and language in which the story was to be received appropriate to the language of the listeners)
- Consistency in the use of the storyboard over time to convey the same or different messages (such as the multiple generations of storyboards or where multiple storyboards exist to tell different stories, such as at Grootegeluk and Zincor)
- The localization of the characters and themes (building in location-specific attributes, such as the reference to the marula tree in a part of the country)

where it grows and not mentioning it a part of the country where it does not grow)

- The consistency between local and corporate themes and objectives (such as the choice to consciously include or exclude the corporate flying ant character in local-produced storyboards).

A clearer understanding of these issues represents an opportunity to significantly raise the maturity level associated with the use of the storyboard as a tool and thus to contribute to an overall improvement in efforts to achieve world-class performance.

7.5.7 Training and education for stories and storytelling

In a number of areas associated specifically with storytelling (the development of the story; assisting in the role of the storyteller; training and education to improve the ability of the audience to listen to or receive the story), training and education may be required as for other elements of knowledge management strategy (see Table 3.6). The maturity rating for this question was 0.07 (see Table 6.4). This indicates that there is little recognition that specific training and education exists for the use of stories and storytelling as practices. This should be placed against the context that Kumba Resources management, based on statements made in a number of publications intended for both internal and external audiences, such as the Kumba Resources annual report (largely for an external audience) and 'Breaking Ground' (largely for an internal audience), has clearly stated and demonstrated the importance associated with education and training on a number of topics.

Perhaps the low level of assessment for the maturity identified in the area of storytelling is because of the low level of recognition overall for the role of storytelling in the business. Having said that, there were examples given (in particular at Grootegeluk) where a concerted effort had been made to train storytellers in the telling of the story, and another case (at Tshikondeni) where a course had been held to help listeners make the most of the storyboard tool. There seemed to be a recognition of the fact that training and education could be accomplished through a number of

mechanisms, such as coaching and mentoring rather than more formal, off-the-job approaches (such as classroom-based courses), such as for the storyteller's manual.

7.5.8 Measures of stories and storytelling

One of the critical issues in organisations is the ability to be able to measure the effectiveness of actions taken, as has been recognised in the area of knowledge management (see Table 3.6). The overall assessment of maturity for this question was 0.07 (see Table 6.4), indicating that there is no formal measurement of the value of the use of stories and storytelling taking place within the CICOP.

This low level of maturity was not contradicted through the later fieldwork in terms of a formal approach to how stories and storytelling were being used in the business. For an organisation that places such a significant emphasis on the use of measures for so many operational aspects of the business, it was interesting to see an almost total absence of measurement of almost any aspect of the use of storytelling.

If measures were to be implemented, they could be expected to include:

- Frequency (of the telling of the story)
- Size of audience (minimum, maximum, average)
- Duration of the storytelling session (minimum, maximum, average)
- Effectiveness of the storyteller (through feedback assessments)
- Receptivity of the listeners
- Overall impact of the story
- Relative impact of the story compared to other methods of communicating the message (such as written or oral presentations or the use of PowerPoint)
- The relative impact of one story compared to another.

The implementation of measures of success could therefore clearly contribute to the overall achievement of world-class performance (there is an (anonymous) old adage: you cannot manage what you cannot measure).

7.5.9 Success stories of the use of stories and storytelling

The importance of creating success stories for knowledge management has been recognised (see Table 3.6) and it would seem to make good sense to have stories about the successful use of stories and storytelling as practices for sharing knowledge. The overall assessment of maturity for this question was 0.47 (see Table 6.4). This indicates that there is only an informal approach within the CICOP of the success stories of the use of storytelling. From the outset of the empirical research, there was clear evidence of the anecdotal, informal success associated with storytelling across the business. Within the CICOP, the marula tree story had a certain amount of exposure, albeit at an informal level. Within certain of the locations and communities (such as Zincor refinery and Thabazimbi mine), there was a sense of pride of ownership and success associated with the use of stories and storytelling. Semi-structured interviews held, indicated however, that even for the Kumba Way ants approach, there was no formal attempt made to build on the success of the story approach.

Listed below (in alphabetical order) are some of the widely reported successes arising from using stories and storytelling (often accompanied by the use of a storyboard) identified during the research (through interviews, observation and artefacts gathered)⁵:

- Improvement in best practices transfer
- Better way to share success stories
- Clearer communication
- Constant reminder of what's been learned (visual impact of the board)
- Cost effective to make and use storyboards
- Deeper understanding through stories
- Ease of use/flexibility with the removable sections of the storyboard
- Easier to comprehend/learn/understand using stories
- Improved recall as visual impact of storyboards is high
- Improved speed of learning through using a story

⁵ These items are a synthesis of the data presented in sections 6.5.1 to 6.5.9.

- Improved teamwork through shared learning while gathered around a storyboard
- Integration of local and corporate themes possible through the use of appropriate storyboard graphics
- Listeners receive a common message when it is drawn on a storyboard
- People feel involved where a story is used
- Stories and storyboards help listeners to see the bigger picture
- Stories cross cultural boundaries
- Stories encourage improved business performance through a change in employee performance
- Stories ensure improved buy-in to corporate values and to new ideas
- Stories help to learn from past experience
- Stories provide a trigger for creativity
- Storyboard entertainment value high
- Storyboard use provides evidence of innovation
- Visual aspect of the storyboards helps to identify with the objectives presented.

Even though these items represented elements of success stories, they remained largely anecdotal (they had not been formally developed into success stories about the use of stories and storytelling). Some of these issues had been covered in ‘Breaking Ground’, but there they were reported in an article stating facts rather than being presented as a story (in the way a story was defined in section 3.2.1). If these anecdotes were to be transformed into stories, they would have the potential to improve the maturity of the use of stories and storytelling and hence contribute to world-class performance in the CICOP.

7.5.10 Benchmarking internally or externally

Once the use of stories and storytelling as practices for knowledge sharing become established, it becomes possible that some form of benchmarking might be introduced to enable the organisation (in this case the CICOP) to assess the effectiveness with

which these practices are being used (the principle of benchmarking in the knowledge management field was clearly indicated in the literature, see Table 3.6). The overall assessment of maturity for this question was 0.27 (see Table 6.4). This indicates that there is very little maturity of any benchmarking of the use stories and storytelling in the CICOP and what benchmarking there is happens informally.

The researcher observed that the subject of benchmarking arose in discussion on a number of occasions in relation to the performance of the CI function, where performance was measured in relation to the standards as documented in the CI codebook (see Appendix 2 for an extract relating to maturity). The use of stories and storytelling however did not feature in these benchmarking activities. There was no evidence found of any attempt, other than informally, to assess the extent to which the use of storytelling as practices had been and could be effective in sharing knowledge in the CICOP between one Kumba Resources location and another.

Were it to exist, such benchmarking could explore the following attributes of the use of storytelling:

- The story itself: the subject matter of the story, the relative importance of different stories to the achievement of objectives, such as the sharing of knowledge
- The telling of the story: in multiple aspects such as the skills of the storyteller, the media used, and the frequency at which storytelling is used
- The listeners: how well the story was being received, the extent to which knowledge was transferred, and the extent to which beneficial action resulted from the listeners experiencing the story-listening experience.

Part of the explanation for the low level of maturity in benchmarking of storytelling may be the lack of focus on storytelling or the awareness that storytelling is a practice that lends itself to benchmarking, either internally or with other organisations. This area of benchmarking the use of stories and storytelling represents another opportunity for the CICOP to improve its world-class performance.

7.5.11 Reward and recognition for use of stories and storytelling

Reward and recognition for participating in knowledge management has been recognised as a potentially important factor in the overall success of a knowledge management strategy (see Table 3.6). Reward and recognition comes in many varieties, from the formal to the informal; from reward in tangible means (such as financial reward) to intangible (such as recognition by a peer group). In the maturity assessment structured interviews and later in the fieldwork there was no indication that any serious attempt had been made to adopt an approach to the formalisation of reward and recognition in the use of storytelling (as indicated in Table 6.4, the maturity rating for this question was 0.13).

In the case of the marula tree story at Grootegeluk and other uses of storytelling (including, but not limited to, the use of storyboards) there was evidence of an informal approach to recognition, through such means as the 'Breaking Ground' publication (Kumba Resources, 2002b; 2003b; 2004b), which over a significant period in a number of issues carried articles (stories) on the use of storytelling.

A more formal approach to the use of reward and recognition in connection with the use of stories and storytelling represents an opportunity to further improve the world-class performance of the CICOP.

7.5.12 Stories and storytelling model

The maturity assessment structured and semi-structured interviews indicated a low level of awareness and use of a formal model of storytelling (as indicated in Table 6.4, the overall assessment of maturity for this question was 0.33). However, in later observation and through artefacts gathered (such as the storyboards in use as tools to support storytelling) the elements of the Sole (2002) model (see section 3.4.1) were evident in practice in the actual execution of the use of storytelling in the CICOP (that is, the model was being followed without the users being aware of it).

The Sole (2002) model which was selected for the purposes of this research as the overall framework of analysis (see section 3.4.1), will now be used as an analysis tool for the empirical data gathered.

Story-crafting

During the semi-structured and unstructured interviews as well as through observation and collection of artefacts, it was made clear that the stories told (specifically in conjunction with a storyboard) had been specially constructed as a joint effort between members of the CICOP (although most often restricted to a particular Kumba Resources location). This typically involved the core and full members who specified the content and messages to be contained in the stories, in conjunction with views expressed on a consultative basis by other peripheral and passive members of the community, including using the professional services of a production company for the actual development of the storyboards (in the role of a transactional member of the CICOP). This is as discussed by the SAI (2001) (see section 3.4.2) who identified that stories may be developed with the assistance of internal or external facilitators.

In terms of the literature reviewed, do the stories presented on the storyboards meet the criteria of being stories? Two of the sources that were mentioned in Table 3.2 will be used as analysis tools for the Kumba Resources storyboards and are presented in Table 7.3 and Table 7.4:

Story characteristics (BSI, 2003a)	Kumba Resources storyboards
The main character/setting	A mixture of human and non-human character types are used, in a setting appropriate to the location (for example the mountainous terrain surrounding Thabazimbi, the refinery buildings at Zincor)
The task and mission	Identifying the current situation and the desired future states (both the first and second generation storyboard used at Sishen, provide an excellent example)
The helpers	The many characters displayed in the storyboards are the helpers
The obstacle	The challenges identified (in particular in the strengths, weaknesses, opportunities and threats analysed in several of the boards) including the external environment (such as the external threats identified in the Grootegeluk storyboard)
The way the characters cope	Illustrated by the actions taken by a number of the characters on the storyboards (in individual scenes associated with the

with the obstacle	objectives identified on the storyboards)
The outcome	The achievement of the stated business goals or desired outcome or intent (such as on the Sishen first and second generation storyboards and the Thabazimbi example)

Table 7.3 Story characteristics according to BSI (2003a)

Story characteristics (Parkin, 2004)	Kumba Resources storyboards
Once upon a time -- the status quo	The opening scenes depicted on the storyboards (typically on the left-hand side of the board) including specific statements concerning the status quo (such as on the Zincor board)
Then one day -- the characters encountered some problem or challenge	The depiction of a series of challenges (some internal, some external) to the current situation interpreted as the difference between the current reality and future objectives
Because of this -- the story changes direction	The sense of a journey from the current situation into the future, by moving from left to right across the storyboard
The climax -- the characters deal with the challenge	The scenes depicting specific actions to achieve strategic objectives or strategic thrusts (Sishen, Thabazimbi, Zincor, Grootegeeluk)
The resolution -- the results of the action	The completion of the journey to the right-hand side of the board either in stages (in line with the individual scenes depicted on the board and steps on the journey) or the journey as a whole (achievement of the future desired state or intent)
The moral -- their lives are changed	The graphical representation of achievement and satisfaction (through the depiction of smiling and celebrating characters)

Table 7.4 Story characteristics according to Parkin (2004)

Based on this analysis, the Kumba Resources CICOP storyboards are clearly ‘stories’ depicted in graphical format.

In addition, Hattersley (1997) identified three structural characteristics of a story in a knowledge management setting (as discussed in section 3.2.3): opening strategy, building strategy, concluding strategy. This approach can be clearly seen using the Zincor storyboard as an example (as shown in Figure 6.12). The story commences by

getting the listener's attention to an explanation of the current situation and the vision of Kumba Resources and Zincor as the starting point for the story. The story is then developed through a focus on the Zincor strategy and strategic thrusts, building towards a conclusion. The third element, on the right-hand side of the storyboard, highlights the future intent of the organisation.

This approach to the development of the story is in stark contrast to the Snowden (1999a) model (see Table 3.5 and section 3.4.1) which starts with the gathering of anecdotes within the organisation and results in the final construction of a story. In the approach adopted by Kumba Resources CICOP, the purpose of the story and flow of the story are determined by the organisation where the anecdotes are introduced into the story both by the storyteller and the story listener (to be discussed later in this section).

Sole (2002) (see Table 3.5) advised that the first part of the story model includes a focus aimed at the design of the story, specifically looking at complexity and relevance to the audience. The development of the marula tree story at Grootegeluk mine is an indication that the complexity entailed in at least one of the storyboards (the main Grootegeluk mine storyboard) was too great for the intended audience, at least in the opinion of some of the members of the CICOP at that location. Hence the development of the marula tree story.

The storyboards used in Kumba Resources, although not large in number (in terms of versions or editions, although widely dispersed at the locations where they are used), do have the potential to be used in many other areas of Kumba Resources business, supporting a variety of objectives. However, at present there is no central coordination of which stories or storyboards exist, for what purpose they are used and how and when they are introduced, updated and eventually retired.

Story-telling

A choice exists as to whether to have a story told by a dedicated (although not necessarily professional) storyteller or to leave the responsibility for telling the story

to a member of the organisation or team involved in the story (as was discussed in section 3.4.3), or a mixture of the two alternatives.

In the case of the Kumba Resources CICOP, both alternatives have been used. In some cases (such as at Sishen and Zincor) the line manager (see, for example section 6.5.8.3) takes responsibility for the telling of the story, whilst at Grootegeluk mine a particular team of people within the CICOP at the mine has been made responsible for the telling of the marula tree story.

Whether or not the storyteller in Kumba Resources is a dedicated person, he or she has access to a manual that can assist them in preparing to tell the story and even to make notes carrying feedback on the story as it is told. In addition, many of the storytellers in the various locations are not only known to the audience (because they are either colleagues or members of the management team) but are also able to address the audience in a language with which they are familiar (whether that is English, Afrikaans or a variety of African indigenous languages). Boje (1991) (see section 3.4.3) identified that some coaching or training of the storyteller may be required, and evidence was found during the research project that Kumba Resources takes this approach. A key element of the use of stories and storytelling in the CICOP was the use of storyboards and tools to support oral storytelling.

The designs of the storyboards have made them easy to use. These designs include the use of colour, interesting settings aligned to the specific Kumba Resources location in which the stories are to be told (such as the geography, vegetation and equipment depicted in the graphics), as well as a particularly useful device in the removable story section which serves two purposes: to allow the story to be told in an episodic way, helping to build the tension (as recommended by Hattersley (1997), see Table 3.2), as well as allowing for the story to be updated (such as accommodating changes to specific objectives).

In addition, care has been taken to ensure the neutrality of the characters depicted, so as to avoid any offence being caused in the minds of the audience. The symbolic representations, including the selection of a mixture of human and non-human character types, have been made in line with the preferences of the Kumba Resources

representatives on the development team. This is in line with expectations of Sole (2002) who advised careful consideration of the audience in the development and telling of the story (see section 3.4.2). As was mentioned in section 3.4.3., BSI (2003a:61) advised that, the “key to the art of storytelling is to trigger dramatic and memorable pictures in the minds of the listeners.” With the storyboards at Kumba Resources, this principle has been taken further by presenting dramatic and memorable pictures to the listeners at the time that the story is being told. This is in line with the advice of a number of other authors (see section 3.4.3) who identified that the telling of stories can be usefully accompanied by a number of props⁶.

Story-listening

The third element of the model proposed by Sole (2002) (see section 3.4.4) is story-listening. This includes monitoring the reception of the story, and using feedback for future story development.

Denning (2000, 2001, 2002, 2004a, 2004b) and Swap *et al.* (2001) (see section 3.4.4) recommended that the audience must be able to identify with the story as it is told. In the case of the Kumba Resources CICOP storytelling, this has been achieved by tailoring the content of the story to the level at which the listener is expected to operate. An example of this is found by providing visual links between the listeners’ normal working environment and the messages containing the stories (see Figure 6.6 as an example of this).

There was little in the literature regarding the optimum size of a story listening group. In the case of Kumba Resources, a number of different group sizes have been used for the telling of the stories according to the operational setting involved. Group sizes varied according to the location, from under twenty to close to fifty (see sections 6.5.5.3 and 6.5.8.3).

In terms of the timing for storytelling, Kaye and Jacobson (1999) (as discussed in section 3.4.3) identified three major classes of storytelling opportunity, all of which are used at Kumba Resources: spontaneous (casual or opportunistic) storytelling is

⁶ For a more detailed profile of the storyboards, see Appendix 3.

facilitated on a peer-to-peer basis by leaving the storyboards on permanent display in public areas so that individuals working in that area can pause in front of the story board to discuss the story as and when they wish. Existing (regular, ongoing occurrences during which stories are told) opportunities are used during management meetings, performance reviews, and other forms of regular ongoing management communication, and thirdly deliberate opportunities for storytelling are created by scheduling the telling of the story on the storyboard specifically for that purpose (this is where the rollout of the story takes place initially and with the periodic retelling of the story to update listeners in terms of progress being made on the ‘story journey’).

There was significant anecdotal evidence collected during the semi-structured and unstructured interviews as well as from analysing reports appearing in the Kumba Resources internal publication (‘Breaking Ground’) that the use of storyboards as a tool to assist in knowledge sharing has been a great success. However, there was no evidence that any formal effort has been taken to assess the use of storytelling as a practice for knowledge sharing, nor any effort to modify or improve the way in which stories are told (assess whether or not using the storyboard in the future).

7.5.13 Capture and reuse of stories

More than one author has identified that it is possible to capture and reuse stories in a number of different ways (see Table 3.6) and the ability to do so becomes more important as the reliance of the organisation on the use of stories and storytelling to carry knowledge increases. However, the situation in the CICOP was relatively immature in this respect (as indicated in Table 6.4, the maturity rating for this topic was 0.53).

The use of storyboards is itself a useful mechanism to capture the story to be told. Through the representation of the characters and the setting of individual scenes in the story depicted on the storyboard, the essential elements of the story are captured. However, there is still a good deal of flexibility inherent in such an approach, as the actual relating of the story depicted on the storyboard is subject to interpretation by

whoever may be telling the story, as well as the way in which responses from the listeners are handled.

A more complete form of capture would be represented by having a supporting document (similar to a script), which would allow the structure of the story depicted on the storyboard to be further supported (this is akin to the storyteller's manual which was used).

The fact that the stories depicted on the various storyboards encountered in the fieldwork exist is testimony to their longevity and their potential for re-use. However, there was no evidence from the case study that the stories were being captured other than at the locations in which they were originally being used (that is, a central story database did not exist). Therefore there exists the possibility that, over time, the stories may be lost for a variety of reasons: where the story owner (or custodian) leaves the organisation, taking the knowledge of the story with them; and where the story's useful life has been exhausted in the current instance and, as a result, is discarded as being of no further use (regardless as to whether or not it may be of use again at some point in the future should similar circumstances arise or, indeed, is still of use elsewhere in the organisation). There was certainly no evidence that a central or co-ordinated approach was being taken to capture and reuse the stories depicted on the storyboards.

7.5.14 Catalogue of stories maintained

If the stories identified, created, told and retold are to be captured for reuse then, according to the literature reviewed, some form of cataloguing system becomes desirable to allow for easier retrieval and appropriate application (see Table 3.6). However, in the case of the CICOP this issue of cataloguing stories has largely not been addressed (the maturity rating for this question was 0.13 – see Table 6.4). The only example found in the research of a formal approach to documenting and cataloguing stories was in the Cynefin project, although at the close of the empirical research that particular project had not been completed (see section 6.5.1.2).

Such a focus on maintaining a catalogue of stories might include a number of elements:

- Basic identification of each story (with a number of common data elements for each story such as name, description, creation date, owner, format of story, when last updated and so on)
- Creation of multiple indices to assist with the retrieval of the stories
- Creation of a cross-indexing of stories to indicate where stories serving a similar purpose, meeting a similar need or carrying a similar message exist
- A record of the search and retrieval of stories from the catalogue (indicating the potential for use of the stories once retrieved)
- Annotation of the stories to indicate the success of the stories where used
- A record of the formats in which the story exists (such as a storyboard; with industrial theatre; or by oral means only)
- Classification under a story-labelling scheme (categorised in a number of possible ways)
- A record of whether or not the story has been translated and, if so, into which language.

7.5.15 Use of stories and storytelling internally and externally

It is possible to use stories and storytelling both inside the organisational unit (in this case the CICOP) as well as outside the organisation (as recognised in the literature, see Table 3.6). The ability to use stories and storytelling both internally and externally may increase not only the value of the stories but also the ability to share knowledge on a broader front (more widely across the organisation or between external organisations). However, the overall assessment of maturity for this question was 0.73, representing an informal approach in the CICOP.

The empirical data revealed that the focus on sharing knowledge was within locations, such as in the case of storytelling (supported by the use of storyboards) in use at Thabazimbi, Sishen, Grootegeeluk, Zincor and Leeuwpan. There was no clear plan to take the stories used in the CICOP and ensure they were shared on a systematic basis

between the various members of the CICOP (across locations other than where the story originated). Nor was there a plan to ensure that they were shared more widely throughout other organisational units in Kumba Resources, nor outside of the company as a whole. This represents another area where a more formal approach could significantly contribute to an overall improvement in pursuit of world-class performance.

7.5.16 Role of technology in stories and storytelling

One of the main considerations when developing a knowledge management strategy includes a decision on the role of technology (see Table 3.6) and this also applies to the use of stories and storytelling as knowledge sharing practices. However, in the case of the CICOP only an informal approach to the use of technology in the support of stories and storytelling as knowledge sharing practices was found (as indicated in Table 6.4, the maturity rating for this question was 0.60).

Kumba Resources represents an interesting case of an organisation that is made up of two groups on either side of the digital divide: those who are knowledge workers, widely equipped with all the technology-enabled devices so common in the businesses of the 21st century (most commonplace of which are the mobile phone and the personal computer) and those who have either little or no access to the world of technology in their day-to-day work environment (although many of the Kumba Resources operational people may be cell-phone enabled in their private capacity at an individual level, this does not mean that they are so equipped for business purposes).

This presents an interesting situation not only for both the past and the present but also for possible future scenarios. In the past, there was little, if any, access to other than the most basic and traditional forms of technology (in other words, excluding information technology) to support knowledge sharing at whatever level in organisations. This situation held true right up to the advent of the personal computer in the workplace, which for many organisations, certainly in South Africa, occurred

only fifteen to twenty years ago (with the widespread introduction of the personal computer to South Africa from the mid-1980s).

Since then, a multiplicity of technology tools have become available, such as the personal computer itself and a variety of associated tools such as electronic mail and access to the World Wide Web (and all that it entails). These tools have themselves raised the possibility of granting access to many, if not all, role players in business to information technology and the possibilities for improved communication that the technology offers.

In the case of Kumba Resources CICOP, that now opens the door to the use of technology in support of storytelling just as storytelling itself is used to support the sharing of knowledge. This use is limited by a number of factors, including:

- Access to the technology
- Ability to use the technology
- Establishing the work patterns which include the use of the technology (as opposed to just the ability to use the technology)
- Identifying applications for the use of the technology (such as for storytelling).

Kumba Resources has at its disposal a number of such technology tools. Members of the CICOP reported having access to such tools as email; internet; intranet; and collaboration tools (specifically Microsoft SharePoint) (see section 6.3.4 and 6.3.5). The access to such tools need not be limited to only those with permanent, dedicated access through their own devices, but could be enhanced through shared facilities in the workplace at communal areas (such as cafeteria and restroom facilities) to enable a broader audience to be reached.

Although in Kumba Resources there was some use made of IT in support of the Kumba Way ants posters initiative (specifically with a screensaver application and PowerPoint presentations) there was little in the way of evidence of a more formal approach in support of storytelling, either in the maturity assessment structured

interviews or in the later fieldwork research (with the exception of Zincor who had some personal computer-based material).

The approach taken by Kumba Resources in the development and use of storyboards would appear to lend itself well to the use of software tools to assist in the dissemination of stories. The natural extension of this approach would be to look at other possible media, such as the availability of audio and animated multi-media as well as text and non-animated graphics.

With the rapid advance of low-cost, mobile devices, it is possible to foresee, in the not too distant future, a time when a variety of media options (including such vehicles as music compact discs and digital video discs) might be used in the support of digitally-supported storytelling. Increasingly, this digital support could expect to become both interactive (with the story being developed in line with the participation of the listener / viewer) but also for distribution to a variety of increasingly low-cost devices such as cellular telephones and Personal Digital Assistants. In fact, the role of technology in support of storytelling probably represents a significant area of future research in itself.

7.5.17 Understanding of where not to use stories and storytelling

It has been recognised in the literature that the indiscriminate use of stories and storytelling may not be in the best interests of the organisation (see section 3.3.3 and Table 3.6). This suggests that there should be a clear understanding of where to and where not to use stories and storytelling as a practice for knowledge sharing. In the case of the CICOP, there was a low level of maturity for the recognition of where the use of a story is appropriate or inappropriate (the maturity rating for this question was 0.20).

Circumstances where it might be inappropriate to use stories and storytelling include:

- In cases of extreme urgency where there is no time to use storytelling (such as during an industrial accidents)

- Where there is known resistance to storytelling (either on the part of the storyteller or the listeners)
- Where no suitable story has been developed (see section 3.3.3).

In the maturity assessment structured interviews and later in the fieldwork there was no hard evidence that a clear understanding of when not to use a story existed, other than the intuitive and informal sense of appropriateness. Should such an ability to successfully identify the appropriate time, place and mechanism for the use of stories and storytelling exist, then the effectiveness of the use of stories and storytelling would naturally rise as a consequence, as would the potential for an increase in world-class performance for the CICOP as a whole.

7.5.18 Stories and storytelling community of practice

The principle of using a community of practice as a practice to assist in the effective implementation of a knowledge management approach in the organisation appears now to be well-established (see section 2.3.7 and Table 3.6). The COP approach can be used in supporting storytelling initiatives in the organisation, in effect, creating a community of story-crafters, storytellers and story listeners (along with other such possible roles, such as for those who design and catalogue stories). For the CICOP, the overall assessment of maturity for this question was 0.00. This indicates that there is no community of practice devoted to storytelling in place, even at an informal level.

It is interesting to note that while anecdotal evidence (as presented at various points through section 6.5.1 to 6.5.9) found in the empirical data indicates the success of the use of stories and storytelling along with the widespread use of the COP in Kumba Resources as a whole (see section 6.3.4), these two concepts have not been brought together. If they were, the potential exists to make a further contribution to improved, world-class performance, through the forming of a “Storytelling COP”.

7.5.19 Stories and storytelling value rating scale

If an organisation is to make a significant commitment to the use of stories and storytelling then it seems reasonable that it should be possible to rate the value of these stories (collected, created, used and reused) to support more effective use of stories and storytelling as a practice. However, during the non-empirical phase of the research no specific references could be found to the use of such a value rating scale. For the purposes of this research project, however, this issue was added to the list of maturity assessment items by the researcher, for inclusion in the research instrument for use during the structured interviews. In the empirical data gathered it was not possible through either the maturity assessment structured interviews or the following fieldwork to identify anything other than an informal approach to the rating of the value of stories and the telling of the stories (the maturity rating for this question was 0.13).

Should such a value scale be created, it might address a number of issues, such as:

- Value to one or more stakeholders in terms of the success of communicating a particular message
- Value to the listener(s) in terms of the ability to understand a particular message (such as knowledge to be shared)
- Value in terms of the relative value of the impact between stories (paired value ratings for stories of the same or similar themes)
- An overall ranking of stories and their effectiveness for the purpose of agreeing future funding for the development of the story in future
- Value in terms of the use of a story rather than an alternate (perhaps more traditional tool or technique) for communicating the message concerned.

It is suggested that the adoption of such a value rating system and its use may represent a further useful contribution to world-class performance.

7.5.20 Summary of the use of stories and storytelling in CICOP

No single area of those assessed (see Appendix 1, Part Three, for the full list, as covered in sections 7.5.2 to 7.5.19) reached a score as high as 2.0. Based on the rating scale used (see Appendix 1, Part Four), this represents an overall informal approach to the use of stories and storytelling in the CICOP. This also falls well short of the maximum score on the scale (5.0) in each and all areas.

If these ratings were to have been taken at face value, as the only means of assessing the use of stories and storytelling in the CICOP, it might easily have been assumed that those practices were little used or nonexistent within the CICOP. However, through the rest of the empirical data gathering that followed the structured maturity assessments (the semi-structured and unstructured interviews, observation and gathering of artefacts), it became clear that the use of stories and storytelling to support knowledge sharing in the CICOP was relatively widespread. In addition, the further investigation conducted as part of the empirical research identified extensive use of storyboards as part of the toolset for knowledge sharing.

The analysis revealed that at every level (Kumba Resources as a whole; the Kumba Resources knowledge management function, and the Kumba Resources CICOP) there is an objective to achieve and sustain world-class performance. How that performance is defined has not been generally agreed in the literature (see section 4.2.1) and thus the researcher proposed a model of world-class performance for the purposes of this research project against which Kumba Resources could be positioned.

In addition, the world-class performance model was applied specifically to the use of stories and storytelling in the CICOP. The aspects to be assessed and analysed were identified through the literature search (the non-empirical phase of the research) and, as a result, the research instrument was developed. The application of the research instrument to the CICOP has allowed the following:

- The identification of a specific maturity rating through structured interviews
- Additional data to be gathered to further explore the use of stories and storytelling, using the maturity rating as a starting point.

Overall, the relatively low level of maturity in the areas assessed provides an opportunity for a significant improvement in world-class performance of the use of stories and storytelling in the CICOP, as follows:

- Through identifying and using best practices: for example, the use of storyboards to support oral storytelling
- Benchmarking the use of stories and storytelling in the CICOP (this is taking place informally at present)
- Applying recognised local or international standards (this is not possible as they do not currently exist)
- Compliance with quality frameworks and objectives (this requires a definition of the meaning of quality in the field of stories and storytelling, which has yet to take place)
- Applying the capability maturity approach to the use of stories and storytelling in the CICOP (this has happened as an assessment and analytical approach through this research, but could also be used as a performance improvement approach in the CICOP).

In summary, the potential exists for the CICOP to improve the level of world-class performance in those aspects that have been analysed in this chapter.

7.6 Summary

The analysis presented in this chapter has demonstrated that the Kumba Resources CICOP presents an interesting case in the use of stories and storytelling as practices for the sharing of knowledge in that organisation.

Overall, the analysis conducted in this chapter shows the following:

- Kumba Resources as a whole has a commitment to many of the characteristics of an organisation that is world-class when judged by the world-class performance framework that had been proposed in this research project
- The Kumba Resources Knowledge Management function is well positioned to fulfil its role in supporting the organisation as a whole, in furthering the implementation of knowledge management and displays a number of characteristics of being a world-class knowledge management team
- The Kumba Resources CICOP provided a useful insight into the functioning of one of the communities of practice in Kumba Resources. The research focused on the use of stories and storytelling in the CICOP to share knowledge. Although the overall level of maturity identified during the research project in terms of knowledge sharing and the use of stories and storytelling was at the informal level, it should be seen as providing a useful starting point in terms of better understanding the potential for achieving a more mature approach within this community of practice, and thus contributing to world-class performance for the CICOP and Kumba Resources as a whole. The potential also exists that the lessons learned from this analysis may extend to other communities of practice within Kumba Resources and possibly as useful learning points for other organisations who are planning on making use of stories for knowledge sharing, particularly where the use of storyboards is being considered⁷.

The objective of this chapter was to analyse the data which was gathered during the empirical phase of the research and that has already been presented in Chapter 6. Having completed that analysis, the next chapter will be devoted to some final conclusions, recommended actions and possible areas for future research.

⁷ These issues will be explored further in the next chapter.