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Knowledge management practices in the South African business sector: preliminary findings of a longitudinal study

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This article reports the findings of the first phase of a longitudinal research project on knowledge management (KM) practices in the South African business sector. The overall objectives of the research are to describe prevalent knowledge management practices, to identify patterns and trends, and to develop knowledge management benchmarking and strategic management tools for the business sector. During the first phase of the project a data collection and analysis instrument for a recurring survey of knowledge management practices was developed and verified. The statistical verification of the instrument was based on a pilot survey of seventy-four respondents representing fifty-three companies in the South African industry, using one-way analysis of variance, cross-tabular chi-squared tests and principal component analysis. The data collected during the pilot survey was considered to be sufficient for a first order analysis of KM practices. The survey tested respondent perceptions on six factors scored by aggregation from 24 indicators. The selection of the factors and indicators was based on a KM reference model developed for the purpose of the research. The findings indicated clear patterns of organisational performance related to the factors of the model. The patterns corroborated to a large extent the published findings of research on KM practices in industrialised countries. This provided the confidence to use the preliminary findings as the basis of hypotheses to guide the further phases of the project.

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Introduction

A growing body of research literature in the social sciences, including the discipline of management, bear testimony to the impact that the advent of the so-called knowledge economy had on approaches to the strategic management of organisations during the past two decades. Perhaps the outstanding feature of the changing landscape of strategic management in the knowledge era is the well-documented move to resource-based strategy (Grant, 1991). The essence of the resource-based view of the firm - in contrast to the Porterian strategy paradigm that dominated management thinking on the subject since the early nineteen-eighties (Porter, 1980) - is the emphasis that is placed on the organisation's ability to mobilise valuable resources as the basis of its competitive strategy which are difficult to imitate, substitute or appropriate by others (Collis & Montgomery in Zack, 1999: 25-40).

In the resource-based paradigm a high value has come to be placed on the distinctive and often intangible competences and capabilities of the organisation embodied in its human resources and embedded in technologies, products and organisational routines. (Prahalad & Hamel, 1990; Hall, 1992). This increasing focus on intellectual capital (Saint-Onge, 1996), and specifically organisational learning and knowledge application, is based on the insight (attributed to Penrose, 1959) that the acquisition and protection of strategic resources create the potential for competitive

advantage that can only be realised by the mobilisation of the resources through the application of human knowledge (Liebeskind, 1996). The conception of the organisation as 'a dynamic body of knowledge in action' (Spender, 1994) has become known as the knowledge-based theory of the firm. The body of concepts and practices which developed to mobilise organisational knowledge as a strategic resource by managing the collective knowledge creation, integration and application processes is known as knowledge management (Zack, 1999: vii-xii). The main tenet of the knowledge management approach is that in conditions of high business volatility as indicated by the increasing rate of technological innovation, shortening product life cycles and changing market requirements, a strategy based on the development and exploitation of knowledge resources hold out a better probability of providing a sustainable competitive advantage.

As in the case of industrialised countries in general, observation of the South African business environment seems to indicate a growing awareness and adoption of knowledge based strategies and knowledge management practices. This is evident from the many examples of organisations that have embarked on knowledge management initiatives, appointments of corporate knowledge management officers, and the proliferation of computer based knowledge management solutions offered by software vendors. The question is to what extent the business sector organisations in a developing country like

South Africa with its dual economy could benefit from the emulation of the knowledge strategies, practices and technologies developed in the industrialised world. As far as could be ascertained, no systematic survey of knowledge management practices in the South African business sector has been attempted to date.

The objective with this contribution is to report on the findings of the first phase of a longitudinal project to identify and assess the knowledge management practices of South African business organisations. During the first phase data collection and analysis instruments were developed and statistically verified on the basis of a pilot survey of a sample of seventy-four managers from fifty-three organisations. The findings of the pilot survey, although not statistically representative of the South African business sector, yielded data that will form the basis of the hypotheses that will guide the next phase of the research.

The methodology of the project will be described briefly in the following paragraphs in order to provide a context for the discussion of the findings further on.

Methodology

The aim of the first phase of the research project was to develop and test tools and procedures, including a data collection and analysis instrument, for a recurring survey of knowledge management practices in the South African business sector. The objectives for subsequent phases are to use the accumulated data obtained from regular surveys to identify trends in knowledge management practices, to identify good practice and to provide the business sector with instruments for self-assessment and benchmarking. The methodology was designed around these main objectives.

The methodology for the first phase consisted of two steps, viz. firstly, the development of a reference model to provide a conceptual framework for the consistent description of the notion of knowledge management practices, and secondly the development and verification of the data collection instrument and data analysis procedures

Step 1 - Reference model: The objective of the reference model is to consistently define the core elements of what could be called the 'knowledge management business process' and to describe the relationships between the core elements. This is necessary to create a common frame of reference and vocabulary for all role players in the project - researchers as well as respondents and managers as users of the research results. In addition the reference model should guide the development of the data collection instrument by indicating the categories in which data should be collected.

The reference model was developed through a qualitative process of conceptual deconstruction and synthesis based on a comprehensive review of the extant subject literature, including examples of knowledge management surveys conducted elsewhere in the world such as the survey of David Skyrme Associates (Skyrme, 1999). During this process the mentions of various ideal-typical characteristics of knowledge management practices in the subject literature were noted and the findings of the authors compared and

assessed in terms of the research-based evidence provided and the logical reasoning employed. It is not the purpose of this contribution to review the voluminous literature on the subject as the justification of the reference model is the topic of a separate publication. However the reference model is described here briefly in order to explain the logic of the methodology employed.

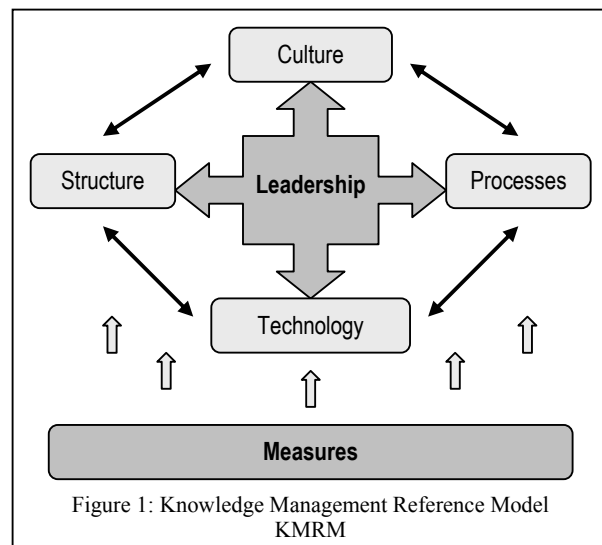
The research literature (*inter alia* Skyrme, 1998 & 1999; Davenport & Prusak, 1998; Allee, 1997; Myers, 1996; Nonaka & Takeuchi, 1995; Choo, 1998; Smith, 2000; McDermot, 1999; Cortada & Woods, 2001) indicated a high degree of consensus on the core components of the knowledge management business process and the nature of the relationship between the components. Six such components were identified and combined to define the reference model.

In summary, an organisation that has developed its processes and procedures of knowledge creation, sharing and application into a core competence displays a high degree of proficiency in executing the following six processes. These are firstly *knowledge leadership*, indicated not only by the existence of a compelling vision of the importance and role of knowledge for its future success but also by the ability to turn the vision into an executable strategy and measurable objectives, combined with the ability to align members and stakeholders with the vision and strategy. Secondly, the existence of an *organisational culture and values* conducive to the sharing of knowledge, experimentation and innovation is important. Furthermore the existence of *business processes* including ingrained organisational routines and systems as well as *organisational structures* and *technological infrastructure* supportive of the knowledge leadership and organisational culture characteristics described above are crucial. Last but not least is the existence of procedures to *measure* on an ongoing basis the organisation's proficiency in sustaining and improving the other five characteristics. These six processes constitute the main factors of the knowledge management business process or knowledge management practices of an organisation.

Finally the ideal-type characteristics identified and described above were combined into a composite reference model as represented by the Knowledge Management Reference Model (KMRM) in Figure 1. The model suggests that the factors are interrelated. There is a strong supposition of a causal relationship between knowledge leadership and the other main factors. The factor of measurement affects the leadership ability to improve the proficiency of the organisation in building a core competence in creating and applying distinctive knowledge for competitive advantage.

Step 2 - Development and testing of the data collection instrument: For each of the six main factors discussed above a set of knowledge management practices deemed to be an ontological subset of these factors were selected, again based on the findings of research reported in the subject literature. Criteria used for this selection were the quantitative and qualitative mention and discussion in the subject literature of these practices as indicators of sustainable KM practices by notable practitioners and

researchers. In the process of identifying discrete knowledge management practices as indicators of the six main factors it became clear that a specific knowledge management practice can contribute to more than one of the main factors. A set of statements on knowledge management practices was formulated for each of the six factors. Each statement attempts to describe a knowledge management practice, employed by a world-class organization in pursuit of sustainable competitive advantage. After the statements were refined and tested for clarity during several interviews with knowledgeable practitioners at selected companies renowned for their proficiency in knowledge management, a final set of twenty-four statements were formulated.



A modified Likert ordinal scoring scale was designed to indicate progressive degrees in the state of the implementation of knowledge management practices. This scale guides individuals in their assessment of the present status of a specific KM practice in their organisations. The modified Likert scale conforms to the criteria as proposed by Sedlack and Stanley (1992). The twenty-four statements constituting the knowledge management practices and the Likert scoring scale were composed into a KM audit or assessment questionnaire, further referred to as the Knowledge Management Audit Instrument (KMAI) or 'the data collection instrument'.

In summary, the data-model therefore consists of the six main factors, each dependent on three or more observable variables, counting as twenty-four indicators in total. Respondents could score these twenty-four indicators over a range of six intervals counting from zero to five, where a score of five indicates the highest state of implementation of a KM practice and zero the lowest. Data were collected by doing several presentations on the knowledge management reference model to groups of South African company representatives at venues in Cape Town, Johannesburg and Pretoria. These targeted respondents were largely from the upper echelons of the companies they represented. After the presentations the attendees were requested to fill out the questionnaire. Usable data were received from seventy-four respondents representing fifty-three organisations.

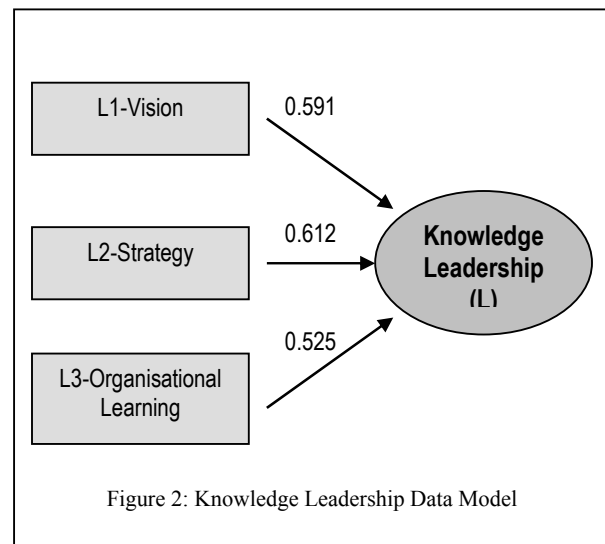
The data analysis was aimed at the verification of the data collection instrument. Statistical techniques employed for this purpose were one-way analysis of variance, Chi-squared tests and Principal Component analysis. The survey data on the main factor Leadership (L) provides a good example of the statistical verification of the data collection instrument, as shown in Table 1 and Figure 2 below. Three statements - one each on the knowledge leadership indicators of vision (L1), strategy (L2) and organisational learning (L3) - were formulated to gauge the perceptions of respondents on the quality of knowledge leadership as a main factor of knowledge management practice in their organisations.

The three Leadership (L) scores are quite highly correlated with each other, as shown in the following table of correlation coefficients:

Table 1: Correlation of knowledge leadership indicators

	L1	L2
L2	0.804	
L3	0.523	0.606

A Principal Component Analysis of these scores revealed that 77% of total variation is explained by the first principal component (LPr1). It is expressed as a linear function of the three scores: $LPr1 = 0.591 \cdot L1 + 0.612 \cdot L2 + 0.525 \cdot L3$ where L1, L2 and L3 are standardized versions of the original scores (see Figure 2). LPr1 can be re-written in terms of the original scores, but for the purpose of this analysis the relative weights of the scores are more meaningful, as shown in the diagram. Due to a very convincing LPr1 the relative contributions of L1, L2 and L3 are sufficient to use their mean score as a single score for Leadership, i.e. $L = 2.63$ for the surveyed sample. Because of the high correlation between L1 and L2 it can be considered to use only one of the scores in a revised instrument.



A further example of the statistical verification of the instrument is provided by the data on the correlation between the six main factors of the reference model. Table 2 shows the correlations between the main factors viz. Knowledge leadership (L), Organisational culture (C),

Organisational structure (S), Knowledge processes (P), Measurement (M) and Technology (T).

Table 2: Correlation of the principal components (Pr1) of the six main factors

	LPr1	CPr1	SPr1	PPr1	TPr1
CPr1	0.629				
SPr1	0.707	0.724			
PPr1	0.493	0.581	0.637		
TPr1	0.350	0.478	0.493	0.639	
MPr1	0.579	0.404	0.675	0.653	0.424

C = Culture S = Structure P = Process
T = Technology M = Measurement L = Leadership

These correlations are in general relatively high; all are statistically significant on the 5% level. This signifies that the instrument, as suggested by the Knowledge Management Reference Model, detected strong relationships between the main factors.

Findings related to the demographics of the sample

In the following paragraphs an overview is given of some of the findings of the pilot survey on the effect of demographic factors on the perceptions of respondents.

Respondent seniority

The Knowledge Management Audit Instrument (KMAI) made provision for the testing of significance in differences in the perception of respondents at various levels of seniority in the company hierarchy. In survey research, targeted respondents assume the role of a key informant, and provide information on an aggregated unit of analysis, by reporting on organizational properties rather than personal attitudes and behaviours. This approach was followed by selecting executives and senior managers as the key informants about the application of knowledge management practices within their organisations. By focussing on senior management, the perspective of Hambrick and Mason as reported in Marchand, Kettinger and Rollins (2001) was adopted. They argue that the organisation becomes a reflection over time of the values and views of its top executives. In the analysis of the data no significant differences between the perceptions of executives and senior managers on the status of KM practices in their organisations were found. The one-way analysis of variance test was used.

Respondent function

The perceptions on KM practices by the different functional groupings in companies, i.e. general management, IT management, HR management, and financial and marketing management were also analysed. According to a the one-way analysis of variance test supported by a cross-table chi-square control test, the HR management grouping differed

significantly from the other functional groupings on the factor of *technology* (TPr1 test). Given the focus of HR managers on the primacy of human beings as the factors of production and the supportive role of information technology and systems, this finding is not unexpected.

Company size

Company size was defined by number of employees and annual turnover. Analysis of variance on the principal component factor *organizational culture* (CPr1 test) showed that the mean CPr1 of smaller companies (<30 employees and < R30m turnover) was significantly different from that of larger companies. These groupings held significantly better perceptions of their organisational culture as conducive to good KM practices than the larger companies. According to Myers (1996) it is a reasonable deduction that smaller companies tend to lean more towards knowledge and information sharing than bigger companies due to communication integration and communication density.

Industry class categories

The one-way analysis of variance test was used to examine differences in mean scores between companies from different sectors in industry on the six main factors. Significant differences were found in certain industry categories on knowledge leadership, culture, structures, and measures, but not on processes and technology. This was confirmed by calculating confidence intervals. In particular consulting companies scored significantly higher than the rest of the survey respondents on the factor of an organisational culture conducive to knowledge sharing. As indicated by figure 3 the information and communication technology industry reflects the knowledge management pattern of the business sector as a whole but with higher scores on all the factors and indicators

General findings on the status of organisational KM practices

The data were analysed to determine the status of KM practices in the sample of companies that took part in the survey. For this purpose the scores on the six point modified Likert scale were divided into two categories. The percentage of scores above 2 on the indicators of the main factors were considered to be the percentage of companies that's *doing something about KM practices*, whilst scores of 2 and below likewise denoted companies that's *doing nothing about KM practices*. The following findings categorized according to the six factors can be reported:

Knowledge leadership

Analysis of the response indicated that 57% of the surveyed companies have a vision and strategy on KM that is well communicated and mutually shared at all levels and that they consider themselves to be learning organizations.

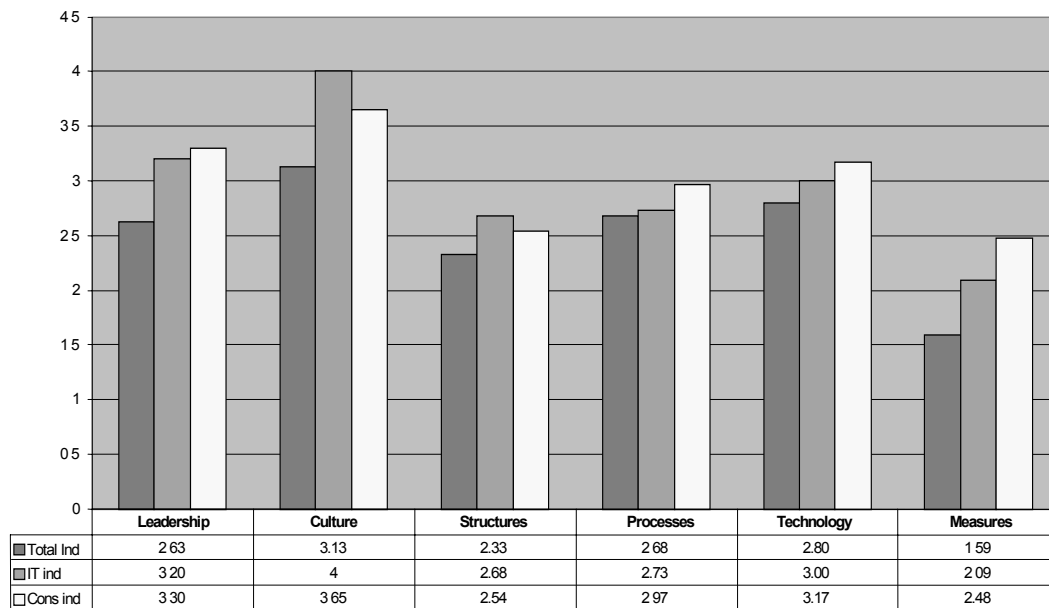


Figure 3 - Comparison of KM practices for 3 industry categories on the 6 main factors

Organizational culture

On the factor organisational culture, 68% of companies consider their cultures to be conducive to good KM practices and that their members have a natural awareness of the mutual benefits of sharing knowledge, whilst 50% see their members as making some voluntary contribution to the knowledge-base and using this base regularly. These findings tend to confirm research done by Dixon (2000), whom found that people in organisations tend to share knowledge willingly and easily in informal situations but to a lesser extent when expected to share through formal structures and systems.

Organizational structures

The use of cross-functional, multi-disciplinary project teams, task forces and workgroups to exploit embodied knowledge was found to be standard practice in 75% of the companies surveyed although only 29% indicated that they have some sort of incentive scheme to reward knowledge sharing and knowledge contributions. Between 40 and 50 percent of company respondents reported that they have some KM roles defined and that KM issues were formally discussed and communicated during regular meetings between management and employees. Of significance is that 62% of companies have established external structures in the value chain with the potential to collaborate on and exploit knowledge for shared objectives.

Processes and routines

More than half (52%) of the respondents claim that their organisations use some sort of knowledge integration process to exploit knowledge across organizational boundaries to face new customer-centric challenges, whilst 65% use information management processes to enhance new knowledge creation, innovation and customer value addition. On business intelligence, 56% of respondents

reported that their companies have some initiatives and systems institutionalised.

Knowledge Technologies

A very high percentage (72%) of companies consider themselves to have good information systems architecture and information technology infrastructure to support information management and knowledge management practices, although only 32% have implemented some kind of knowledge management application software which is dedicated to customer value creation.

Measures

Very low scores on most of the indicators for this factor category were recorded. Only 18% of companies have some metrics on the exploitation of intellectual capital and intangible assets, on the deployment of KM applications and tools, and on the effectiveness of KM programs and practices, whilst only 10% do indeed use these tools to align KM practices with organizational vision, objectives and strategy.

High flyers

From the analysis of the data four companies could be distinguished for the excellence of their knowledge management practices in the perceptions of the particular respondents. The criterion was that companies should have at least 75% of their scores at >3 level for all 24 indicators and likewise 50% on level 5. These organisations could be investigated for best practices and benchmarking purposes during the next phases of the project.

Other significant correlations

In addition to the correlation between the main factors indicated by Table 2, which indicated a particularly strong correlation between the main factors of knowledge leadership and organisational culture (0.629), and knowledge leadership and organisational structure (0.707), as well as organisational culture and structure (0.724) other correlations between some of the twenty-four indicators are also noteworthy. The following correlations (Table 3) are indicative of aspects that should be followed up in the next phase of the research

Table 3: Correlations: knowledge leadership, vision, strategy, culture and structure

	S14	C6	S11	S12
L1	0.245	0.252	0.745	0.616
L2	0.218	0.316	0.686	0.589

These results suggest that companies that score high on knowledge vision (L1) and knowledge strategy (L2) also score high on KM roles (S11) and interpersonal communication (S12), but they are weaker in establishing well-structured external formal relationships (S14) and to create collaborative relationships with external members of their value-chain (C6).

Another example relates to the correlation of knowledge leadership with aspects of organisational culture and structure.

Table 4: Correlations: organisational learning and aspects of culture and structure

	C6	C8	C9	S10	C5	S14
L3	0.449	0.541	0.633	0.404	0.315	0.200

As indicated in Table 4 companies that score high on Organizational Learning (L3) tend to be very good at knowledge sharing (C8) and knowledge contribution (C9), good at collaboration (C6) and the use of teams and groups (S10) but not as proficient in their customer orientation (C5) and establishing external structures (S14).

Conclusion

The findings reported in this paper are preliminary in the sense that they derive from a relatively small sample that should not be considered to be representative of the South African business sector. However, the primary focus of the analysis of the survey data was on verifying the data collection instrument and not in the first instance on the extent to which the findings on knowledge practices as such are representative of a given population. Strong correlations between particular variables both at the level of the main factors and the indicators have been established. The analysis of the data confirmed the postulated strong interrelationship of the main factors of the reference model. It also illuminated the discriminatory power of various

indicators as valid descriptors of the main factors. In several cases improvements to the efficiency of the data collection instrument were indicated in this way.

In general the findings on the pattern of knowledge management practices are also supported by the published findings of research carried out elsewhere. A case in point is the perceived absence of instruments and practices to measure and assess the quality of organisational knowledge management practices. This provides further confidence in the validity and discriminatory power of the data collection instrument and the data analysis procedures. It also provides justification for the use of the findings in formulating hypotheses for the next phase of the research and for applying the methodology and the data collection and analysis instruments in a full-blown survey of knowledge management practices.

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