



## **CHAPTER 7: A STUDY OF THE KNOWLEDGE MANAGEMENT MATURITY OF SOUTH AFRICAN INDUSTRY**

### **7.1 Introduction**

In the previous chapters it is emphasized that literature dealing with knowledge management not only offers little in the way of practical assistance, but often gives a skew practitioners' perception of knowledge management towards the technological sphere. Careful not to remain encapsulated on purely theoretical propositions, in using the Knowledge Management Maturity Assessment Questionnaire proposed in chapter 6 as a baseline, this chapter reports on an empirical study conducted within 86 South African-based organizations, all to supply insight into the knowledge management maturity of organizations, from within a managerial, rather than from a technological perspective.

#### **7.1.1 Aim**

The aim of this chapter is therefore to supply knowledge management practitioners with data against which to benchmark their organizations' knowledge management performance, and also to heighten understanding of factors that play a role in the successful institutionalization of knowledge management.

#### **7.1.2 Scope**

In attempting to achieve this aim, the following aspects are given prominence:

- The handling of data.
- Analysis of the knowledge management maturity of organizations, viewed from within a holistic perspective.
- Knowledge Management Maturity according to organizational size.



- Knowledge Management Maturity as a function of different managerial levels.
- Knowledge Management Maturity as a function of different managerial levels within different organizational sizes.
- Assessment of Knowledge Management Maturity per different industry grouping.

Finally, this chapter concludes with a brief summary of the major findings, observations, deductions and conclusions reached.

## **7.2. The handling of data**

Due to the study being interpretive in nature, analysis of data consisted of either standard statistical techniques and/or qualitative methods, as used by the University of Pretoria, South Africa. Data collected by means of the structured Knowledge Management Maturity Assessment Questionnaire was meticulously transferred to the Knowledge Management Maturity Rating System (refer to Appendix C). Finally all data captured was digitalized through keyboard entry. In order to ensure a clean and error-free data set, the process of data capturing was closely monitored to ensure as few entering errors as possible. Newly imported data was checked for capturing errors via standard validation checks as applied by the University of Pretoria<sup>61</sup>. Checks included frequencies, maxima, minima, checks for missing values and checks for range of values. After the verification process had been completed, all data collected was carefully prepared for tabular and graphic presentation, analysis and interpretation. The computer software used for analysis and modelling was SAS version 8.3, from the SAS Institute<sup>TM</sup>. All graphs and figures

---

<sup>61</sup> All statistical calculations were verified by Statomet. Business Enterprises at the University of Pretoria (Pty) Ltd (BE at UP) offers research and consulting services through its Bureau for Statistical and Survey Methodology (Statomet) a facility that focuses on the scientific design and management of research. Statomet provides statistical advice on all aspects of research design and management, and aims to improve the quality of research by rendering a multidisciplinary service to public and private organisations.



were created using Microsoft Excel (2003). Human understanding and interpretation, both important factors contributing to valid knowledge, meant that the analysis of results had to be done in a more subjective and ‘interpretative’ manner.

Feedback from the majority (90%) of students conducting the interviews was that the questionnaire served the purpose it was meant for, i.e. the questionnaire covered the key aspects of Knowledge Management Maturity. Furthermore, it was established that the questionnaire was conducive towards conducting the structured interviews.

The analysis that follows consists of the descriptive statistics used for each question. Descriptive statistics involved arranging, summarising and presenting the data in such a way that the meaningful essentials of the data could be extracted and interpreted easily. Statistics used consisted of two parts, firstly establishing the basic statistical measures of the response variable for every question covering aspects pertaining to knowledge management maturity<sup>62</sup> and secondly, hypothesis testing of the relationships between certain response variables. Where the probability of exceeding the norm (p-value) was found to be less than 0.05, the decision rule was to reject the null hypothesis at a 5 % level of significance. In order to test statistically, the following research hypotheses were formulated:

- The mean scores decrease over maturity sections 1 to 5.
- Understanding the importance and role of information management lead to participation in information management.
- Understanding the reasoning and motivation behind establishing formal knowledge management activities lead to commitment to institutionalise knowledge management endeavours.
- Knowledge management endeavours supported by technology are preferred above knowledge management endeavours requiring personal support.

---

<sup>62</sup> Unless specifically stated, in all instances findings are elaborated upon from within a positive stance (yes, definitely and yes, but not significantly).

- The mean scores achieved over the different maturity sections depend on organizational size.
- The mean scores depend on the different managerial levels.

### 7.3 Analysis of the knowledge management maturity of organizations, viewed from within a holistic managerial/strategic perspective.

In total, 434 employees in 86 organizations participated in the study. The average knowledge management maturity score obtained by all organizations (86 organizations in nine industry groupings) totalled 175 points (Table 7.1). This constitutes an overall maturity of 49% (175/358). With regard to growth in knowledge management maturity, slightly more than twenty percent (20.28%) of interviewees indicated that their organizations experienced rapid growth in knowledge management maturity, 52.12% is of the opinion that although growth occurred, it was not significant, while 22.17% argued that although no growth took place there will probably be growth within the next five years. Slightly more than five percent (5.43%) were of the opinion that a decline in knowledge management growth occurred over the past five years.

Variable	N	Mean	Mean%	Std Dev	Std Error	Median	Min	Max	Max Possible
Section 1	433	14.72	73.60	4.50	0.21	16	2	20	20
Section 2	434	46.47	61.14	15.85	0.76	47	8	76	76
Section 3	434	45.54	51.75	19.25	0.92	45.5	0	88	88
Section 4	433	43.71	46.50	15.03	0.72	44	9	90	94
Section 5	434	23.01	30.27	12.80	0.61	21.5	0	76	76
Section 6	424	2.07	51.88	1.11	0.05	2	0	4	4
<b>Total All</b>	434	175.36		51.37	2.46	174	47	311	358

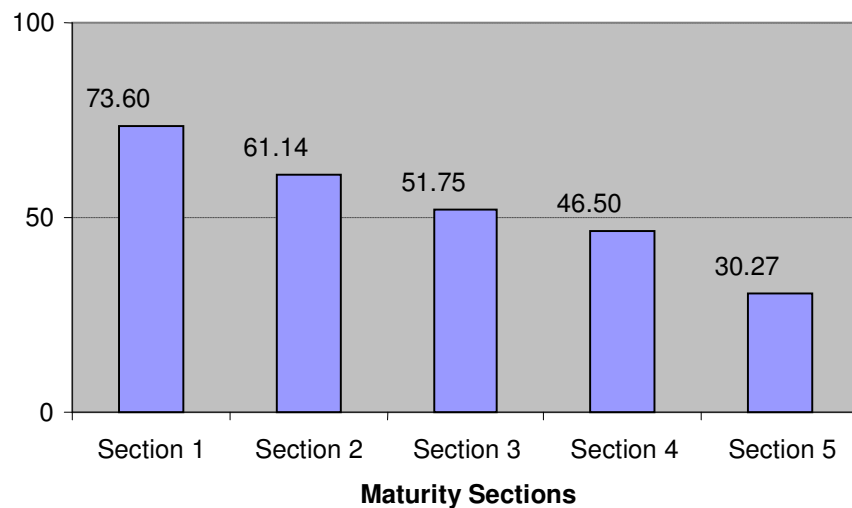
Table 7.1: Knowledge management maturity distribution

**Note:** To facilitate the comparison of sections, all data presented are expressed as percentages (the score achieved per maturity section divided by the maximum score achievable in that section).

The average maturity scores (mean value) obtained per section (maturity sections 1 to 5) gradually slopes downwards dropping by 12.5%, 9.4%, 5.3% with an extreme drop of 16.2% between sections 4 (implementation of knowledge management) and 5 (ubiquitous knowledge) (Figure 7.1). By conducting a Friedman Test (repeated measurements), it could be determined that there is a significant difference between the median values of the different maturity sections. Since the p-value was smaller than 0.05 (p-value = 0.0000), the null hypothesis that the medians of the sections are the same was rejected. In order to determine where specifically the differences lie, a multiple comparison between the different sections was done. It was found that there are significant differences among all sections. In conducting a Pearson Correlation Coefficient<sup>63</sup> on the measure of the linear relationship between the different variables (maturity sections 1 to 5), it was found that there is a significant statistical correlation ( $r = <0.0001$ ) (noticeable as the declining slope as maturity increase), between all five (5) maturity sections.

Figure 7.1: Knowledge Management Maturity distribution of all questionnaires

**Score as a percentage**



\*(All maturity scores presented as percentages)

<sup>63</sup> Correlation between the maturity levels (1 to 5), and the mean scores for each level. Values close to -1/+1 indicate a strong linear relationship and values close to zero indicate a weaker linear relationship. (Section 1 to 2 = 0.474, section 2 to 3 = 0.554, section 3 to 4 = 0.689, section 4 to 5 = 0.390).



The following segment supplies a summary of the major findings of maturity achievements when broken down into the different maturity sections, starting with a perspective on ICT management, as a prerequisite to knowledge management.

### ***7.3.1 ICT Management***

The average score obtained for ICT Management was 14.72 out of a maximum score of 20, or 73.60% (Table 7.1). With regard to ICT being an enabler of knowledge management (as suggested by Boon, 1990, Gurteen, 1998 and Gallager and Hazlett, 2004, section 4.4.1), findings suggest that South African industry is well on its way to reaching the preliminary level of aptitude needed to successfully institutionalize knowledge management endeavours.

Section 1 (ICT management) of the questionnaire revealed that most interviewees are positive (yes, definitely and yes, but not significantly) regarding the capability of their organization to evaluate (v5 - 91.44%), design (v6 - 81.21%) and plan (v7 - 90.26%) an ICT system (Appendix D, Table 1). Most of those interviewed were also positive (v8 - 82.68%) regarding the effectiveness of their organization's ICT infrastructure.

Unfortunately, even though most respondents agreed with the statement that ICT is an enabler of knowledge management (v9 - 78.69%), an alarming number of respondents are still under the impression that ICT is knowledge management (v9 - 21.31%).

### ***7.3.2 Information management***

The average score obtained for this maturity section was 46.47 out of a maximum score of 76, or 61.14% (Table 7.1). Answers indicated that organizations are comfortable regarding information management activities (Appendix D, Table 2). Information management tools and services are also for the most part successfully institutionalised. The majority of interviewees answered positively (yes, definitely, and yes, but not significantly) with regard to those questions regarding the identification of information needs (v16 - 81.11%), acquisition of information (v17 - 86.34%), information storage

(v18 - 84.30%), information distribution (v19 - 78.34%), information retrieval (v20 - 80.88%), protection of information (v22 - 77.88%), information management systems (v25 - 77.88%) and the management of databases (v26 - 85.25%).

When posed the question whether their organization had a clearly defined information policy (v10 - 69.35%) and strategy (v11 - 70.97%) in place, nearly the same number of respondents, as those that agreed that information management is a prerequisite for knowledge management (v28 - 69.65%), responded positively (yes, definitely and yes, but not significantly). By conducting a Proc Frequency Test of Variables<sup>64</sup> and also a Chi-square Test of Independence<sup>65</sup>, it was established that there is indeed a correlation between a clearly defined information management policy and strategy and the understanding of information management being a prerequisite for knowledge management. Yet, of those that agreed that their organization does have an information policy and an information strategy in place, half of the respondents were of the opinion that it is not significantly institutionalised.

Respondents indicated in a positive manner (yes, definitely, and yes, but not significantly) that they understood “which” information resources are crucial to their businesses (v12 - 88.94%). They are also clear about which managers are accountable for information resources (v13 - 80.18%). Also, key information is easily available (v14 - 76.27%). However, endeavours such as the training of employees to access sources of information relevant to their jobs (v15 - 65.21%), the disposal of information (v21 - 68.20%) and determining the value and cost of information (v23 - 59.12%), all achieved lower scores.

---

<sup>64</sup> Proc Frequency test of Variables: Drawing a table of questions v10 and v11 by v28. Of the respondents that answered “yes” in v10, 73.38% also answered “yes” in v28. Of the respondents that answered “yes” in v28, 72.64% also answered “yes” to v10. In a similar manner 73.42% of respondents that said “yes” to v11 also said “yes” to v28 and 74.66% saying “yes” to v28 also said “yes” to v11.

<sup>65</sup> Chi-square test of Independence. Hypothesis proposed: Ho: v10 and v28 are independent, Ha: v10 and v28 are dependent. P-value = 0.0127 < 0.05 thus Ho was rejected. v10 and v28 was found to be “dependent”. Hypothesis proposed: Ho: v11 and v28 are independent, Ha: v11 and v28 are dependent. P-value = 0.0084 < 0.05 thus Ho was rejected. v11 and v28 was found to be “dependent”.



Findings revealed that endeavours in information management, for the most part directly supported by ICT, are easier to implement and/or better managed and institutionalised, than information management endeavours that require human intervention and/or a human component to succeed. Endeavours such as the training of employees to access sources of information relevant to their jobs (v15 - 65.21%), the disposal of information (v21 - 68.20%), determining the value and cost of information (v23 - 59.12%), and the institutionalisation of an information service/library (v27 - 66.82%), that is all endeavours requiring human intervention and dedicated commitment to succeed, scored considerably lower (by 10% to 20%) than endeavours such as the institutionalization of information management systems (v25 - 77.88%) and Databases (v26 - 85.25%). Of interest is that the identification of information needs (v16), also requiring human intervention, received a high score of 81.11%. Possibly, this is due to identification of information needs being a prerequisite to the building of databases and the institutionalisation of information systems.

Analysis of the difference in the mean score of questions that test the importance of understanding the value of information resources (v12 - 88.94%), accountability for information resources (v13 - 80.18%), whether key information is easily available (v14 - 76.27%), the training to access sources of information relevant to their jobs (v15 - 65.21%), information disposal (v21 - 68.20%), determining the value and cost of information (v23 - 59.12%) and the institutionalisation of an information service/library (v27 - 66.82%) indicated that there is a significant difference in scores between endeavours that require understanding, compared to endeavours that require active participation<sup>66</sup>.

---

<sup>66</sup> Questions v15, v21, v23 and v27, all scored considerably lower than endeavours analysed in questions v12 - v14. Tests for Normality (Shapiro-Wilk Test) revealed that the data is not normal. However tests for Location (Wilcoxon Signed Rank) at a p value < 0.001 rejected the null hypothesis that Ho: Mean understanding = Mean participation (the average calculated for v12 - v14 and the average calculated for v15, v21, v23 and v27 were compared), and accepted the stance that Ha: Understanding ≠ Participation, i.e. There is statistically significant differences between the scores achieved in "Understanding" information management and "participating" in information management.





Of interest is that protection of information (v22 - 77.88%), scored considerably higher than information disposal (v21 - 68.20%) and determining the value and cost of information (v23 - 59.12%). A possible explanation for this could be that protection of information is governed by South African laws such as the South African Electronic Communications and Transactions Act (SA ECT Act) and the South African Public Finance Management Act (SA PFM Act). Arguably, due to the above-mentioned acts there is a stronger emphasis on the protection of information than on information disposal and cost estimation.

### ***7.3.3 Knowledge management issues (principles), policies and strategy***

The average score obtained for this maturity section was 45.54 out of a maximum score of 88, or 51.75% (Table 7.1). Organizations are not only aware of the power of knowledge (knowledge is seen as a strategic corporate resource) (v29 - 83.83%), but, knowledge management is also regarded as one of the top five internal priorities of organizations (v30 - 64.20%). Slightly more than half of interviewees (v31 - 53.94%) went as far as to indicate that knowledge management is supplying a direct input to the strategic management process, although not yet of a significant nature (Appendix D, Table 3).

Improving work efficiency and/or productivity by sharing knowledge within organizations (v32 - 84.76%), decentralization of authority (v33 - 67.90%), releasing information more rapidly and making it more widely available to staff (v34 - 79.91%), promoting life long learning (v35 - 79.91%), improving transparency (v36 - 75.29%), and relationships and trust (v37 - 77.19%), and making up for loss of knowledge (v38 - 68.36%), are regarded by most (yes, definitely and yes, but not significantly) to be important goals in motivating the establishment of formal knowledge management practices.



Most respondents (v40 - 75.29%) positively indicated (yes, definitely and yes, but not significantly) that there is agreement within their organizations for hybrid knowledge management environments that include technology and people. Organizations have taken a conscious decision to invest in knowledge management (v39 - 69.75%). Unfortunately, there is only moderate commitment from top management to establish formal knowledge management functions (v42 - 57.91%), identify high ranking knowledge champions (v41 - 53.81%), improve work processes (v44 - 56.71%), and gaining involvement from employees regarding knowledge sharing exercises (v45 - 53.47%).

When posed with the question whether the decision was taken by top management to judge people according to their ability to share knowledge (v43), most respondents argued negatively, with only 8.35% arguing Yes, definitely, and 25.52% arguing that although such a decision was taken, the decision was not taken at a significant level.

In contrast to the high number of organizations in possession of an information policy and an information strategy, only 44.24% (v47) of respondents indicated that their organizations do have a knowledge management strategy in place. Similarly, only 42.86% (v46) of respondents have a clearly defined knowledge management policy in place. Thirty-one point three four percent (v48 – 31.34%) are under the impression that it has been communicated to staff. Of the 192 respondents who answered Yes, definitely and yes, but not significantly about having a clearly defined knowledge management strategy, eighty-five point two eight percent (v49 – 85.28%) indicated that their knowledge management strategy includes information management aspects, 80.52% (v50) that it includes ICT aspects, 71.00% (v51) that it incorporates human resource aspects and 61.80% (v52) that it includes organizational aspects such as communities of practice, decentralization of authority and networks.

There is a strong suggestion that organizations are slow in starting off and driving knowledge management. Using the Friedman Test followed by Multiple Comparison Testing indicated that there is a statistically significant difference between understanding the power of knowledge and the reasoning and motivation behind establishing formal

knowledge management activities (as indicated by the answers supplied to questions v29, v32 to v39 and v42); and the institutionalisation of knowledge management endeavours (as indicated by the answers supplied to questions v53 to v61<sup>67</sup> (as discussed in the next section – Implementation of knowledge management).

#### **7.3.4 Implementation of knowledge management**

The average knowledge management score for this maturity section was 43.71 out of a possible score of 94, or 46.50% (Table 7.1). Questions such as the opening up of bureaucratic divisions (v53 - 48.03%), the creation of a central coordinating unit for knowledge management (v54 - 43.72%), the appointment of a chief knowledge officer with executive status (v55 - 25.00%), and the establishment of incentive schemes for knowledge sharing (v60 - 21.76%) all hinted towards the negative (Appendix D, Table 4).

Endeavours such as reorganization of offices (v56 - 51.27%), the establishment of informal networks (v57 - 57.34%), the institutionalisation of training and mentoring programmes (v58 - 68.36%), and communication with suppliers (v61 - 67.76%) all achieved positive scores, while findings hinted at these endeavours not yet being of a significant nature.

Although small in percentage, most respondents (v62 - 39.67%) are under the impression that the overall responsibility for knowledge management resides with top management. Twenty-three point four seven percent (v62 - 23.47%) believe that the responsibility for knowledge management resides with the information technology team while 19.25% is of the opinion that the responsibility resides with a special knowledge management unit. Eight point six nine percent (v62 - 8.69%) is of the opinion that the responsibility for knowledge management resides with the human resources management team, while eight

---

<sup>67</sup> Friedman Test Statistics. If  $t = \text{sum}(v29, v32 \text{ to } v39 \text{ and } v42) * 100 / 48$  (representing an understanding of the power of knowledge management) and  $h = \text{sum}(v53 \text{ to } v61) * 100 / 36$  (representing the institutionalization of knowledge management), then the Friedman test was used to test the null hypothesis that the mean of  $t$  is equal to the mean of  $h$ . Since the  $p$ -value at 0.0000 was smaller than 0.05 the null hypothesis that the mean of  $h$  and  $t$  are indeed the same was rejected.



point nine two percent (v62 - 8.92%) believe it resides with some “other” organizational group.

When faced with the question “In your organization staff members spend an increased amount of time on the following activities”, answers hinted at technology-enabled endeavours such as information sharing by electronic devices (v66 - 87.44%) and the presentation of projects and activities, (v65 - 71.23%) being preferred above endeavours such as information meetings (v63 - 68.82%), peer review/quality reviews (v64 - 50.69%), or the building of databases (v67 - 60.09%).

The majority of respondents indicated that good work practices have been outlined and updated on a regular basis in organizational guidelines and training manuals (v70 - 66.82% and v68 - 60.79%). However, only 48.25% are of the opinion that best practices (v69) have been outlined and updated on a regular basis.

Responses were indifferent concerning whether factors such as focusing more strongly on information and communications technology than on people and organizational matters (v78 - 46.64%), resistance of certain groups against knowledge management (v80 - 50.23%), the making available of documents spontaneously (v81 - 51.29%), and access to sensitive and/or confidential information (v83 - 50.00%), contribute to difficulties in implementing knowledge management practice. Respondents, however, indicated that lack of time or resources to concretely share knowledge on a day-to-day basis (v79 - 74.71%) and difficulty in capturing an employee’s undocumented knowledge (know-how) (v82 - 82.52%) strongly contribute to experiencing difficulty in implementing knowledge management practices.

Regarding the implementation of a knowledge-sharing culture, slightly more than half (v75 - 53.36%) of all interviewed indicated that they consider the sharing of knowledge to be good for their careers, with 50.12% indicating that documents are made available spontaneously (v77). Only 35.03% of all respondents indicated that staff members



spontaneously organize knowledge events such as meeting with staff from other divisions/departments (v76).

Organizations scored low with regard to measuring the progress made in the implementation of knowledge management practices in organizations. Only 24.71% of all interviewed indicated that their organization makes use of indicators to assess the implementation of knowledge management practice (v71), 29.63% use scorecards (v72), while 41.40% use written or oral feedback from staff on achievement in knowledge management (v73). Only 37.96% indicated that comparisons are made between their and peer organizations (v74).

Findings suggest that there is an element of “testing the ground” before full engagement in knowledge management. Examples of this can be found in answers supplied to section 4.1 of the questionnaire where the establishment of incentive schemes (v60 - 21.767%), the appointment of a Chief knowledge officer (v55 - 25.00%) and the opening of bureaucratic divisions (v53 - 48.03%) fared lower than endeavours such as the establishment of informal networks (v57 - 57.34%), institutionalisation of training and mentoring programs (v58 - 68.36%) and reorganization of offices (v56 - 51.27%). This strongly hints at endeavours that require large changes to organizational structures and real and dedicated commitment from top management being less supported than endeavours that require smaller changes to organizational structures, less commitment and fewer resources. The above-mentioned argument is strongly supported by the finding of question v79, where 74.71% of all interviewed was of the opinion that there is a lack of time and resources to concretely share knowledge on a day-to-day basis.

Lack of genuine commitment from top management’s side, and/or inability of top management to successfully sell the benefits of knowledge management impacted negatively on the establishment of a knowledge sharing culture within organizations. As mentioned, only about half (53.36%) of all interviewees indicated that they consider the sharing of knowledge to be good for their careers (v75), and only 50.12% indicated that documents are made available spontaneously (v77). In emphasis of this point, slightly



more than half (50.23%) of all interviewees also indicated that there is resistance in certain groups of staff to the implementation of knowledge management practices (v80).

There is a definite preference to share information by electronic devices (v66 - 87.44%), above the sharing of knowledge in a personal manner. When it comes to the domain of personal knowledge sharing, “presentations of project and activities” scored the highest (v65 - 71.23%), “informal meetings” came in second (v63 - 68.82%) with peer review/quality reviews being the least preferred method (v64 - 50.69%). Capturing employees’ undocumented knowledge (v82 - 82.52%) was perceived to be the most difficult with regard to the implementing of knowledge management practice. In comparing the difference in the mean score of questions v63 to v65 (people orientated) with scores obtained in questions v66 and v67 (technology orientated), it was found that that there is a definite inclination towards using technology rather than sharing knowledge and information in a personal manner<sup>68</sup>.

Findings indicated that knowledge management activities between organizations and its customers (v59 - 81.71%) scored higher than internal knowledge sharing endeavours such as opening up bureaucratic divisions (v53 - 48.03%), the creation of a central co-ordinating unit for knowledge management (v54 - 43.72%), the appointment of a chief knowledge officer (v55 - 25.00%), reorganization of offices (v56 - 51.27%), establishment of informal networks (v57 - 57.34%), institutionalization of training and mentoring programmes (v58 - 68.36%) and the establishment of incentive schemes (v60 - 21.76%). A possible explanation for this phenomenon could be that interviewees considering endeavours such as communication with customers to strongly depend on e-commerce and/or ICT initiatives. As indicated earlier many organizations are more comfortable with applying ICT and technology than to embark on endeavours heavily dependent on the culture set by top management, and/or the satisfaction of intangible

---

<sup>68</sup> In using the Univariate Procedure the difference in mean score between People (p) = mean (v63+v64+v65)/3, and Technology (t) = mean (v66+v67)/2 were determined. A Signed Rank Test for location was done. With a p Value < .0001 this test indicated that there is a statistically significant difference between the means of “people” and “technology”. Finally DIFFTP Analysis (DIFFTP = t - p) indicated a (stronger) inclination towards “technology” than towards “People” since the mean of the DIFFTP (t-p) was 0.412, i.e. positive.



criteria. This line of reasoning is supported by the finding of v84 where 42.89% of respondents indicated that knowledge and information management is not a top priority in the modernization programme of their organization.

### **7.3.5 Ubiquitous knowledge**

The average score for this maturity section was 23.01 out of a possible 76 points, or 30.27% (Table 7.1). Findings indicated that organizations do indeed rely on outside knowledge to carry out their daily activities. Findings, however, hinted at such endeavours, especially reliance on knowledge contained within trade unions (v92 - 33.41%) and local government (v86 - 48.38%), not being of a significant nature. Unfortunately, organizations do not yet encourage the sharing of knowledge beyond organizational borders. Responses to questions were consistently negative, indicating that the vast majority of organizations do not yet take up positions in local government (v95 - 10.51%), peer organizations (v96 - 21.08%), universities/research centres (v97 - 21.55%), supplier organizations (v98 - 14.52%), customer organizations (v99 - 21.50%), consulting firms (v100 - 17.10%) and trade unions (v101 - 11.90%). Nor does organizations second staff to other organizations (v103 - 31.85%).

## **7.4 Knowledge management maturity according to organizational size<sup>69</sup>**

In order to determine if size plays a role in the maturity score achieved by organizations, it was decided to group organizations into four (4) categories. Organizations with 100 and less employees were grouped into the “small organization” category. Organizations with between 101 and 2000 employees were grouped into “medium-sized” organizations, 2001 to 25000 employees into “large organizations” and 25001 and the above grouped into “extra-large organizations (refer table 7.2).

---

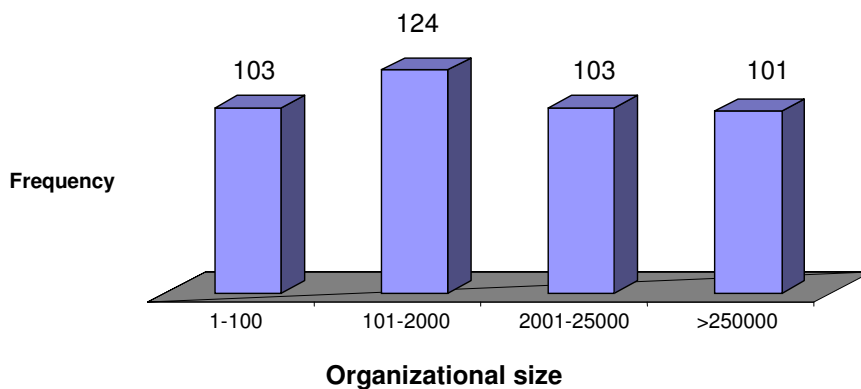
<sup>69</sup> Information obtained via mandatory background information (refer Chapter 6 and Appendix B)

Category (Number of employees)	Number of organizations per category	Percentage
Small (1-100)	21	24.42%
Medium (101 – 2000)	24	27.90%
Large (2001 – 25000)	21	24.42%
Extra-Large (25001 and above)	20	23.26%

Table 7.2: Number of organizations per organizational category

Dividing organizations according to the number of employees employed resulted in a fairly even distribution, simplifying all statistical comparisons that followed (refer figure 7.2).

Figure 7.2: Distribution of organizational sizes according to the number of employees employed



As a point of departure it was established if there is indeed a statistically significant difference between the mean scores achieved in different size organizations, especially regarding different maturity sections (refer figure 7.3 and table 7.3)<sup>70</sup>. Multiple comparisons (Least Squares Means) identify that the biggest differences occur between small and all other organization sizes. Medium-sized organizations achieved similar

<sup>70</sup> ANOVA (Analysis of variance). Ho: means of different company sizes are the same. Ha: some means differ.

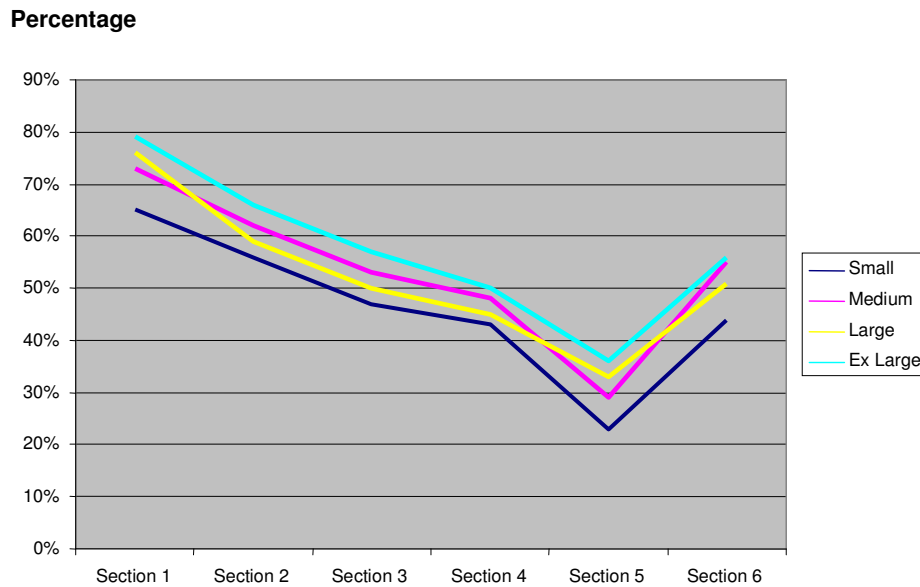




scores (5% and less than 5%) to large and extra-large organizations, except for maturity section 1 (ICT management) and section 5 (Ubiquitous knowledge) where the mean scores of medium-sized organizations were significantly lower (more than 5% lower), than the scores of extra-large organizations. Scores of large organizations were similar (5% and less than 5%) to other organizations' scores, except for sections 1 (ICT management) and 5 (Ubiquitous knowledge), where it was significantly higher (more than 5% difference), than small organizations' scores. Over all maturity sections, extra-large organizations scores' were significantly higher (5% and more difference) than the scores achieved by small organizations. There was also a significant difference of more than 5% in scores achieved by extra-large organizations, compared to large organizations in section 2 (Information management), and between extra-large and medium-sized organizations in section 5 (Ubiquitous knowledge). In essence small and extra-large organizations yielded significantly different scores, with medium and large organizations forwarding similar scores.

**Note:** To facilitate with the comparison of data, all data presented is expressed as percentages (the score achieved per maturity section divided by the maximum score achievable in that section). As an example the score achieved by small organizations in section 1 of the questionnaire was 13.07/20 or 65.38%. With reference to chapter 6, section 6.4, the **sum of all scores** (the overall knowledge management maturity score achieved) is therefore calculated by adding the scores achieved over the six maturity sections together. The maximum score any organization can achieve is therefore the sum of 20 + 76 + 88 + 94 + 76 + 4, totalling 358. In the example of small organizations the **Total (Sum of all scores)** achieved by small organizations was therefore calculated by adding the scores achieved per maturity section together, i.e. 13.07 + 42.25 + 41.19 + 40.29 + 17.22 + 1.74 totalling 155.76 or 43.51% (155.76/358).

Figure 7.3: Distribution of maturity according to organizational size



Viewed holistically, organizations with 100 and less employees (small organizations) achieved a maturity score of 43.51%. Organizations with between 101 and 2000 employees (medium-sized organizations) achieved a score of 50.03%. Large organizations (between 2001- 25000 employees) scored a bit lower than medium-sized organizations totalling a score of 48.87%. Organizations with more than 25000 employees (extra-large organizations) consistently outperformed all other organizations, on average scoring 53.75%.

	Section 1 (Mean)	Section 2 (Mean)	Section 3 (Mean)	Section 4 (Mean)	Section 5 (Mean)	Section 6 (Mean)	Total (Sum of all scores)
<b>Small</b>	65.38% (13.07/20)	55.59% (42.25/76)	46.81% (41.19/88)	42.87% (40.29/94)	22.66% (17.22/76)	43.68% (1.74/4)	43.51% (155.76)
<b>Medium</b>	73.91%	62.78%	53.47%	47.80%	29.53%	55.24%	50.03%
<b>Large</b>	76.01%	59.75%	50.38%	45.40%	33.39%	51.78%	48.87
<b>Ex Large</b>	79.10%	66.71%	56.58%	50.04%	36.29%	56.25%	53.75%

Table 7.3: Distribution of maturity achievements per organizational category



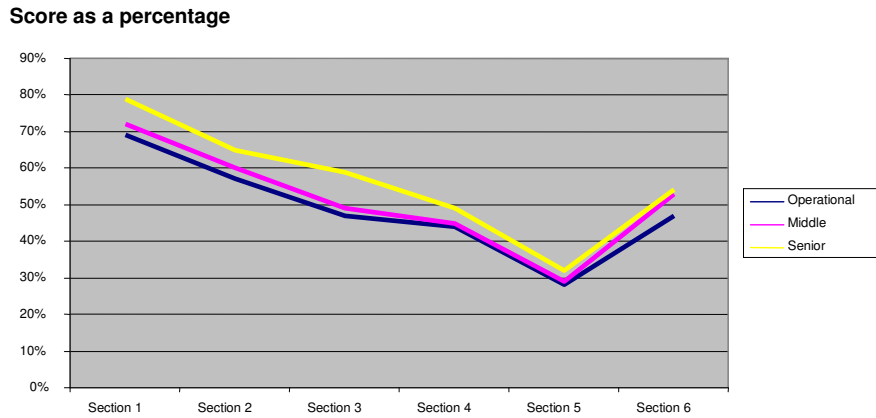
Findings hint that extra-large organizations are at an advantage when it comes to the institutionalisation of formal knowledge management practice over all maturity sections. However, of interest is that although large organizations outperformed smaller organizations (small- and medium-sized organizations), in sections 1 (ICT management) and 5 (ubiquitous knowledge) of the questionnaire they were outperformed by medium-sized organizations when it comes to the management of information (section 2), the formulation of knowledge management issues, policy and strategy (section 3), and the institutionalisation of knowledge management practice (sections 4).

As a rule extra-large organizations do have access to considerably more resources than smaller sized organizations, possibly explaining why extra-large organizations (25000+ employees) obtained higher scores over all maturity levels, than all other organization sizes. Due to legal and mandatory requirements, extra-large organizations are more mature with regard to implementing policies and strategies. The lower scores achieved by large organizations compared to the scores achieved by medium-sized organizations, especially in maturity sections 2, 3 and 4 suggests that there could be a “break even point” between resources available and the successful institutionalisation of knowledge management. This argument necessitated that for analysis purposes a more holistic stance needed to be taken. Note had to be taken of not only the achievement of organizations according to size, but also of the achievements in relation to the different managerial levels present within organizations. Specifically, analysis needed to include a study of the diffusion, (the spread in score between the different managerial levels), of knowledge management in different organizational sizes and organizational settings.

### **7.5 Knowledge management maturity as a function of different managerial levels**

With reference to Figure 7.4 and Table 7.4, senior managers scored maturity at 53.48%, middle managers forwarded a figure of 47.89% and operational personnel forwarding a figure of 46.00%. This constitutes an overall difference in scores between senior management and operational personnel of 7.5%.

Figure 7.4: Knowledge management maturity plotted as a function of different managerial levels (v4)



With reference to table 7.4, it is of interest that the difference between the scores of senior managers and middle managers, is consistently higher<sup>71</sup> than the difference in scores forwarded by middle managers and operational personnel. An interesting observation is that there is about a 10% discrepancy between the scores allocated by senior - and middle managers to section 3 of the questionnaire which deals with the formulation of knowledge management issues, policies and strategies.

	Section 1 (Mean)	Section 2 (Mean)	Section 3 (Mean)	Section 4 (Mean)	Section 5 (Mean)	Section 6 (Mean)	Total
<b>Operational</b>	69.79%	57.80%	47.10%	44.38%	28.62%	47.69%	46.00%
<b>Middle</b>	72.15%	60.32%	49.59%	45.94%	29.65%	53.22%	47.89%
<b>Senior</b>	79.46%	65.72%	59.33%	49.46%	32.79%	54.88%	53.48%

Table 7.4: Knowledge management maturity as a function of different managerial levels

<sup>71</sup> Senior managers consistently rated the maturity of the different sections higher than middle and operational personnel did. Also the difference in scores allocated by middle and operational personnel is consistently smaller than the difference in scores between senior and middle management.

Analysis of variances (ANOVA)<sup>72</sup> indicated that there is indeed a statistical difference between the score forwarded by the different managerial levels over maturity sections 1 to 4. However, scores forwarded for maturity sections 5 and 6 were found not to differ significantly between the different managerial levels. In order to determine where specifically difference occurred<sup>73</sup>, it was established that within section 2 (Information management), section 3 (Knowledge management issues, policy, and strategy), and section 4 (Implementation of knowledge management) differences were vested primarily between the values forwarded by operational and senior managers and middle and senior managers. The values forwarded by operational personnel and middle managers were however found not to be significantly different. This indicates an over-estimation, or difference in perception by senior managers, regarding; (1) the success of implementation of information management; (2) the efficiency and effectiveness of knowledge management issues, policies and strategies; and (3) sufficient support given to the institutionalization of knowledge management endeavours.

Middle and especially operational personnel are not sharing the same sentiment regarding the success of knowledge management as senior management. This quandary is supported, although not statistically proven, by the fact that operational personnel rate the growth of knowledge management over the past five years lower than middle and senior managers.

## **7.6 Knowledge management maturity as a function of different managerial levels within different organizational sizes**

When differences in opinion with regard to knowledge management maturity, as forwarded by the different managerial levels, are viewed from within the perspective of different organizational sizes, the picture changes dramatically (refer Figure 7.5 and Table 7.5). As a point of departure, an Analysis of Variances (2 way ANOVA), was done

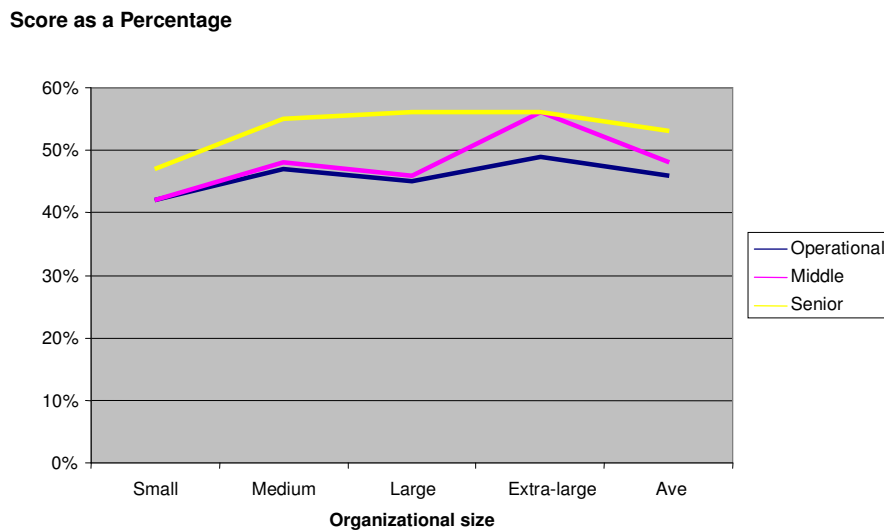
---

<sup>72</sup> ANOVA (Analysis of variance). Ho: means of different managerial levels are the same, Ha: means differ. With a p Value < .0001 this test indicated that there is statistically significant difference between the means of the different managerial levels.

<sup>73</sup> The GLM procedure (Least Squares Means) was used to determine where specifically difference occurred.

to determine if there is indeed a difference between the score achieved per organization size and the scores forwarded per managerial level. Again it was confirmed that the mean values forwarded by the different managerial level and organizational size are statistically different.

Figure 7.5: Knowledge management maturity ratings as a function of different managerial levels within different organizational sizes



In comparing the totals forwarded by operational, middle and senior personnel to one another, by means of a GLM Procedure - Least Square Means, it was confirmed that the scores forwarded by operational personnel and middle managers are similar in small, medium and large organizations. However, scores forwarded by operational personnel and middle managers in extra-large organizations were different. Also, within extra-large organizations, the scores forwarded by senior managers were found to be similar to the scores forwarded by middle management.

	Small	Medium	Large	Ex-large	Ave
<b>Operational</b>	41.94%	47.55%	45.18%	49.45%	46.00%
<b>Middle</b>	42.27%	48.34%	46.08%	55.62%	47.89%
<b>Senior</b>	47.10%	54.83%	55.67%	56.26%	53.48%

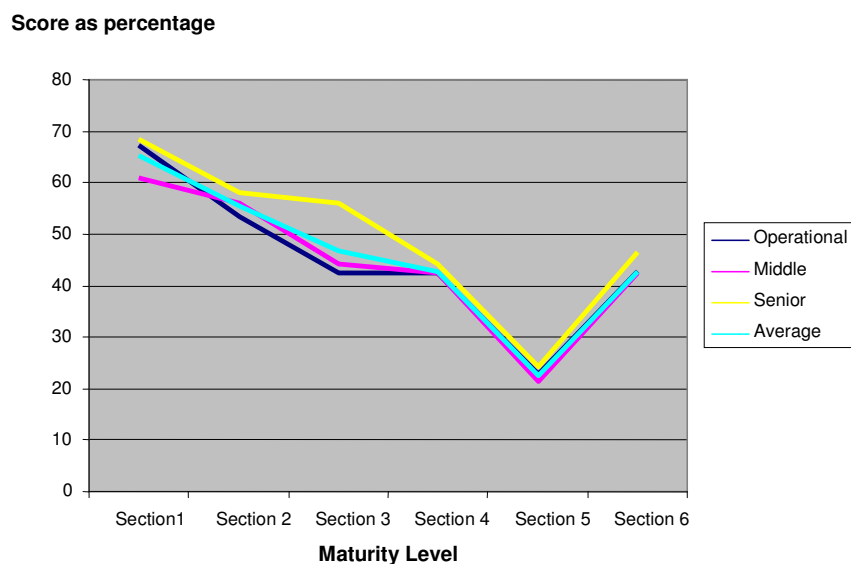
Table 7.5: Knowledge management maturity ratings as a function of different managerial

levels within different organizational sizes

With reference to Figure 7.5, excluding small organizations, senior managers scored knowledge management maturity fairly even over all maturity sections. In contrast, middle managers within extra-large organizations scored maturity considerably higher than middle managers in other organizations. Of interest is that the decline in score between senior and middle managers is the smallest within extra-large organizations, and the largest within large organizations. In contrast, the difference in score between middle and operational personnel is the smallest within large- and medium-sized organizations, and the largest in extra-large organizations. These findings again indicate that the size of the organization does play a role in the diffusion of knowledge management between the different managerial levels.

### 7.6.1 *The distribution of scores in small organizations*

Figure 7.6: Distribution of scores in small organizations



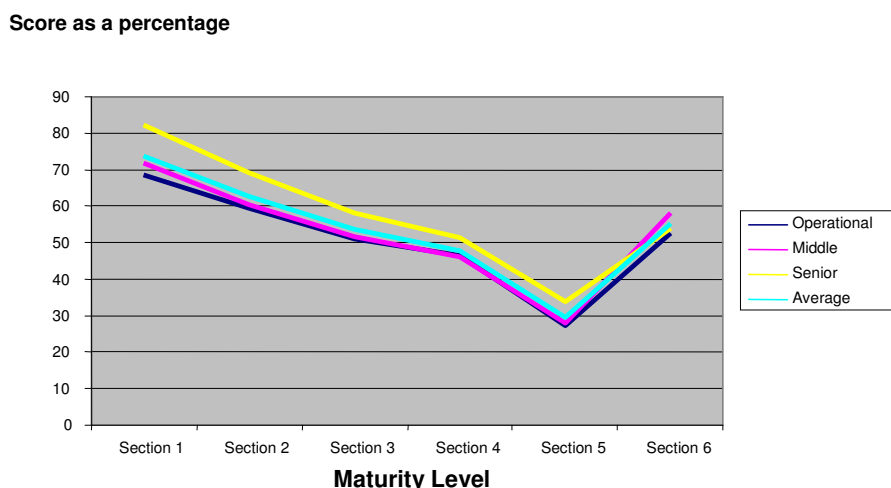
Within small organizations, operational personnel rated knowledge management maturity at 41.94%, middle management scored maturity basically the same at 42.27%, while senior managers forward a maturity score of 47.10%. The difference in score between top and operational personnel, at 5.2%, is also the lowest of all organization sizes analysed.

Of interest is that within small organizations there is a fairly even distribution between the overall scores attributed to senior, middle, and operational personnel with regard to maturity in sections 2, 4, 5, and 6. However, in section 3 senior managers' consistently allocated scores higher than those forwarded by interviewees from middle and operational personnel, hinting that middle and operational personnel within small organizations view the vesting and institutionalization of knowledge management issues, policies and strategies to be less successful than senior managers do.

### 7.6.2 *The distribution of scores in medium-sized organizations*

In contrast to small organizations, scores attributed to senior managers were at 54.83%, consistently higher over all maturity sections than the scores forwarded by middle and operational personnel totalling 48.34% and 47.55% respectively. Scores forwarded by middle and operational personnel are nearly identical over all sections. Viewed holistically, over all maturity sections there is a difference of about 7% between the scores forwarded by senior managers on the one hand, and middle and operational personnel on the other hand (refer figure 7.7).

Figure 7.7: Distribution of scores in medium-sized organizations

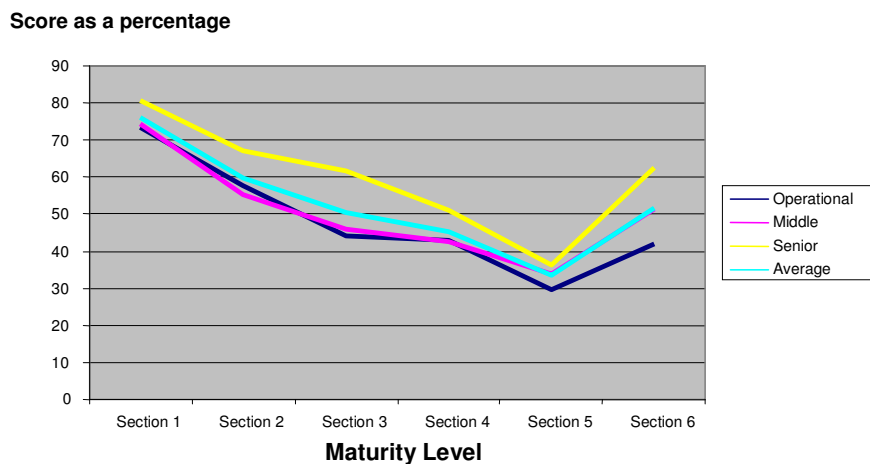




### 7.6.3 *The distribution of scores in large organizations*

Scores attributed to senior managers were at 55.67% considerably higher than the scores attributed to middle 46.08%, and operational personnel, 45.18% (Figure 7.8). Scores forwarded by middle and operational personnel were again nearly identical over all maturity sections. The disparity of about 10% between the scores attributed to senior and middle management is mostly attributed to differences in scores in section 2 (Information management), section 3 (Formulation of knowledge management issues, policy and strategy), and section 4 (Implementation of knowledge management) of the questionnaire.

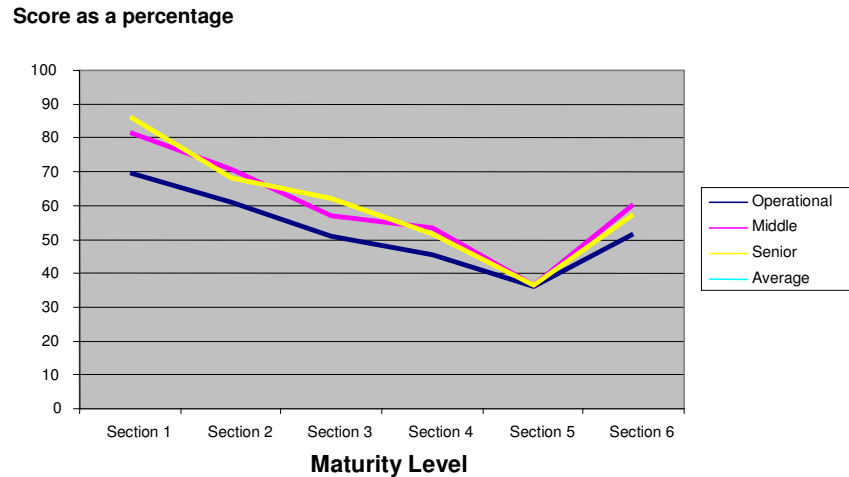
Figure 7.8: Distribution of scores in large organizations



### 7.6.4 *Distribution of scores in extra-large organizations*

Apart from section 5, scores attributed to senior (56.26%) and middle managers (55.62%) are significantly higher, and smaller in difference, than the scores forwarded by operational personnel (49.45%) (Figure 7.8). In some instances scores forwarded by middle managers were even slightly higher than the scores forwarded by senior managers (sections 2 - information management and 4 - implementation of knowledge management).

Figure 7.9: Distribution of scores in extra-large organizations



### 7.7 Assessment of the knowledge management maturity per industry grouping

Due to the structure of the questionnaire used, captured data also enabled the analysis of knowledge management maturity for different organizational types, as applicable to South African Industries.

Allowing respondents to add to already specified organizational types led to the identification of 19 different organizational types (14 organization types initially specified, and 5 types added by respondents). However, in order to simplify statistical comparisons, it was decided to group similar organizational types into similar organizational categories or sectors (refer table 7.6). The decision to select organizational sectors were guided by the organizational sectors as prescribed by the Johannesburg Stock Exchange (JSE) and guidelines provided by McGregor BFA<sup>74</sup>.

<sup>74</sup>McGregor BFA supplies real-time and historical fundamental information on South African listed companies, top unlisted companies, local and international economic data as well as international financial indicators and currency exchange data.

In essence the Automotive industry was added to the Transport industry (Auto), Banks to Insurance (Financials); Chemicals to Pharmaceuticals (Pharm); Technology to Telecommunications (TT); Construction and Building materials to Mining (Resources); Consulting and Auditing to Service delivery (Service); and Consumer goods to Utilities (Goods). Due to the number of respondents working in the educational sector and also Government departments (National, provincial and local), it was decided to evaluate Education and Government as unique entities. No respondents indicating that they worked within the Capital goods or Media sector, thus it was decided to disregard these types of organizations altogether.

Type	Abbreviation	Percentage
<b>Automobiles/Transport</b>	Auto/Trans	4.38%
<b>Banks and Insurance</b>	Fin	10.14%
<b>Chemicals, Pharmaceuticals</b>	Pharma	6.68%
<b>Construction, building materials to mining</b>	Resources	6.22%
<b>Consumer goods to utilities</b>	Goods	13.36%
<b>Technology to Telecommunications</b>	TT	17.05%
<b>Education</b>	Educ	10.83%
<b>Consulting to auditing, to service delivery</b>	Service	12.90%
<b>Government</b>	Gov	18.43%

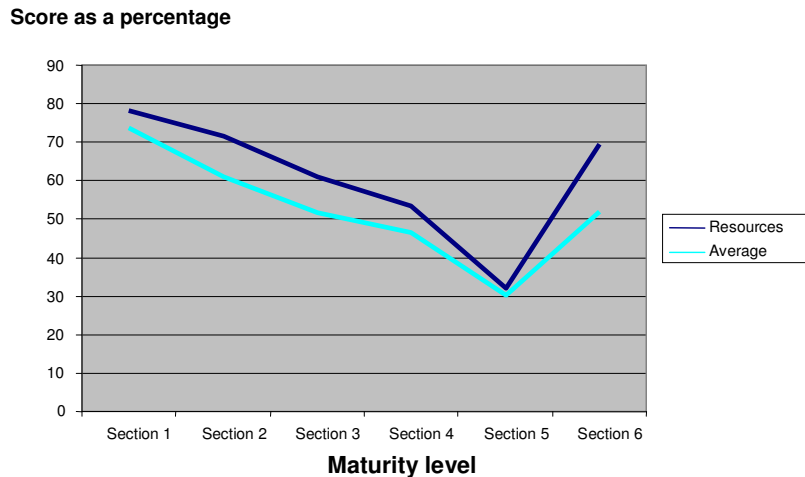
Table 7.6: Grouping of organizations

With reference to table 7.6, the distribution of questionnaires according to the different industry categories or sectors chosen, led to a fairly even distribution of the total population under research with government representing the highest population (18.43%), and automotive and transport (Auto/Tran) representing the smallest population (4.38%).

### 7.7.1 *Resources grouping*

The industry sector that achieved the highest overall knowledge management maturity score was the Resources sector, with a total score of 199.33/358 or 55.67% (Figure 7.10). Resource organizations not only recorded the highest growth in maturity over the past five years (69.44%), but also achieved the highest percentages in sections 2, 3, and 6 of the questionnaire. Also, in sections 1 and 5, their scores were not significantly lower than the highest scores forwarded.

Figure 7.10: Maturity achievements in the resources grouping

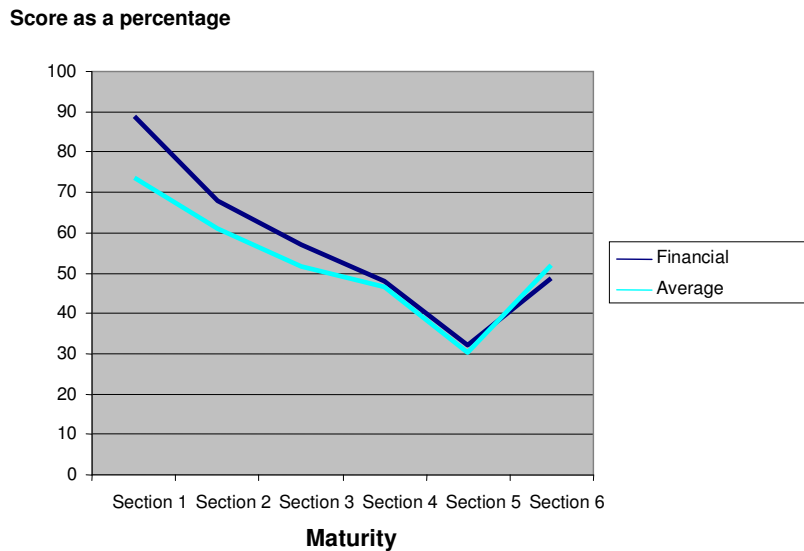


Forty eight percent indicated that they work for extra-large organizations, 22% work for large organizations and 30% for medium-sized organizations. At 57.5% medium-sized organizations achieved the highest overall score, with large and extra-large organizations both scoring slightly lower at 54.8% respectively.

### 7.7.2 *Financial grouping*

The organization type that achieved the second highest overall score was the financial sector with a total score of 190.79/358 or 53.29%. In comparison to other industries, the financial industry obtained relatively high scores in sections 2 and 3 with slightly above average scores in sections 4 and 5. The Financial sector, however, significantly outperformed all other organizational types regarding the management of ICT (section 1). An interesting finding is that the maturity growth of these organizations is perceived to be extremely moderate, achieving only a sixth place with an average score of 49% (Figure 7.11).

Figure 7.11: Maturity achievements in the financial grouping

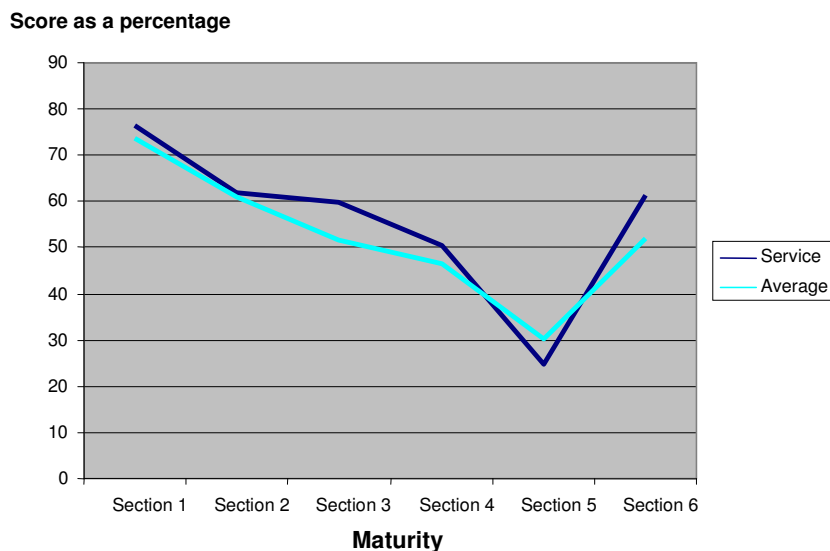


Most respondents (62%) indicated that they work for extra-large organizations, 19% work for large organizations, and 19% for medium-sized organizations. Extra-large organizations within the financial sector achieved a score of 201/358 or 56.2%, large organizations achieved a score of 151/358 or 42.1%, while medium-sized organizations again achieved the highest score at 207/358 or 57.8%. Closer scrutiny of results revealed that the low score achieved by large organizations was primarily the result of low score awarded to sections 2, 3, and 4 of the maturity questionnaire.

### 7.7.3 *Service grouping*

The third highest score was achieved by organizations in the Service delivery grouping with an overall score of 183.64/358 or 51.22%. These organizations received high scores in sections 3, 4 and 6, moderate scores in sections 1, and 2, and extremely low scores in section 5 of the maturity questionnaire (Figure 7.12).

Figure 7.12: Maturity achievements in the service grouping



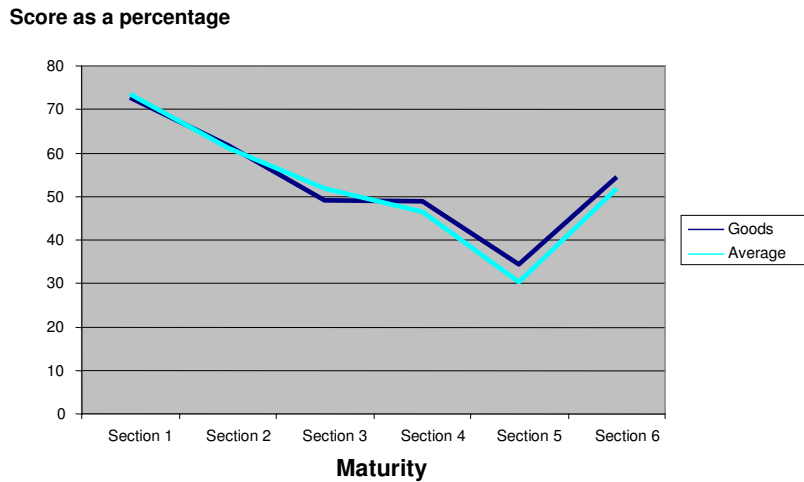
Fifty-five percent of respondents indicated that they work for small organizations while 45% indicated that they work for medium-sized organizations. Medium-sized organizations at 56.5% achieved the highest overall maturity score, with small organizations in this industry obtaining a score of only 47.7%.

#### 7.7.4 Goods grouping

Organizations within the Goods grouping received the fourth highest maturity score, obtaining an average score of 178.55/358 or 49.87%. Most respondents indicated that they work for either large (38%) or extra-large (43%) organizations, with 10% working for medium-sized and 9% working for small organizations. Extra-large organizations at 52.4% outperformed both large and medium-sized organizations at 51.0% and 43.7% respectively. At 38.9% small organizations recorded the lowest overall score of all organizations interviewed within this industry.

Although organizations in this sector achieved just above average to just below average scores in sections 1, 2, 3, and 4 of the maturity questionnaire, they received the third highest score in section 6 and the second highest score in section 5.

Figure 7.13: Maturity achievements in the goods grouping

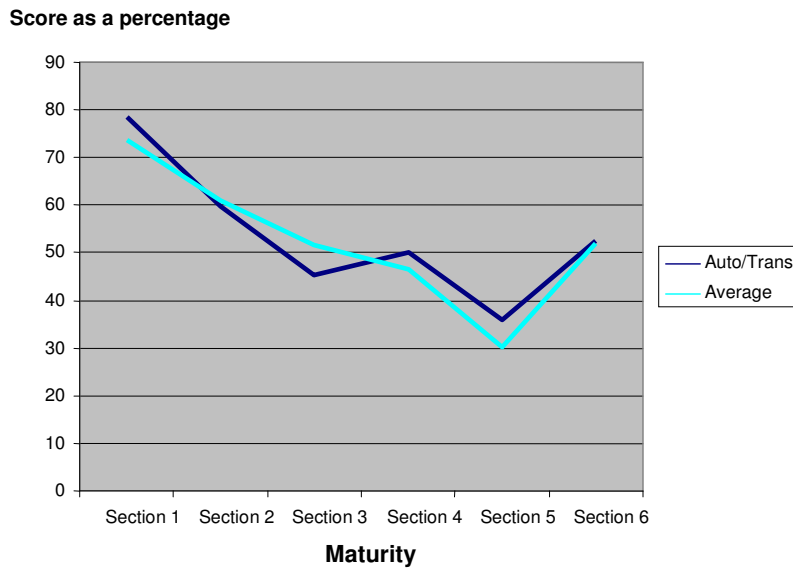


### 7.7.5 *Automobiles/Transport grouping*

Automobiles/Transport organizations received the fifth highest score, totalling an average score of 177.52/358 or 49.58% (Figure 7.14). An interesting finding is that these organizations scored the lowest average score in section 3, formulation of knowledge management issues, policies and strategies. In comparison scores achieved in sections 1 and 4 are moderate, with the highest score obtained in section 5 (Ubiquitous knowledge) for all sectors covered.

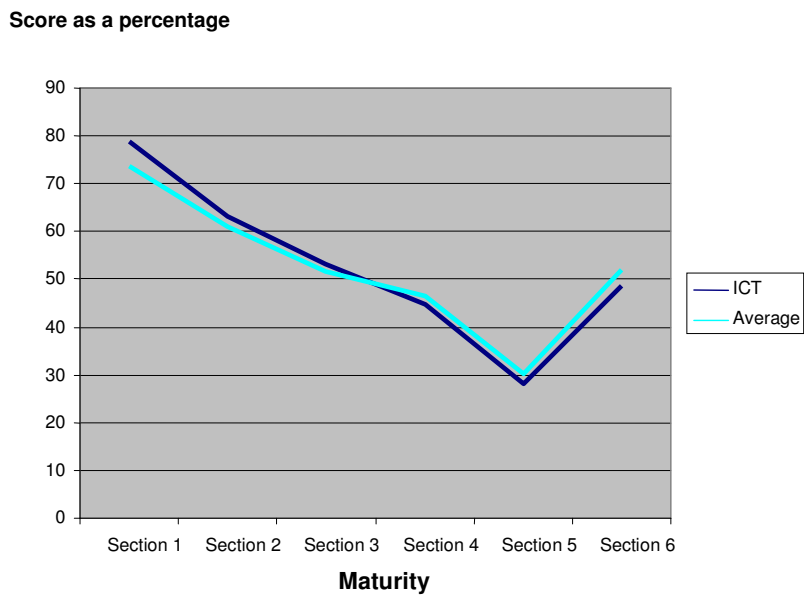
Maturity growth for Auto/Transport organizations is moderate at 52.63%. Most respondents (53%) indicated that they work for extra-large organizations, with an equal number of employees working in smaller organizations (16%). An interesting observation is that medium and large organizations at 60.5% and 59.0% respectively, outperformed both extra-large and small organizations at 44.1% and 47.2%.

Figure 7.14: Maturity achievements in the Automobiles/Transport grouping



### 7.7.6 Technology and telecommunications (TT) grouping

Figure 7.15: Maturity achievements in the TT grouping







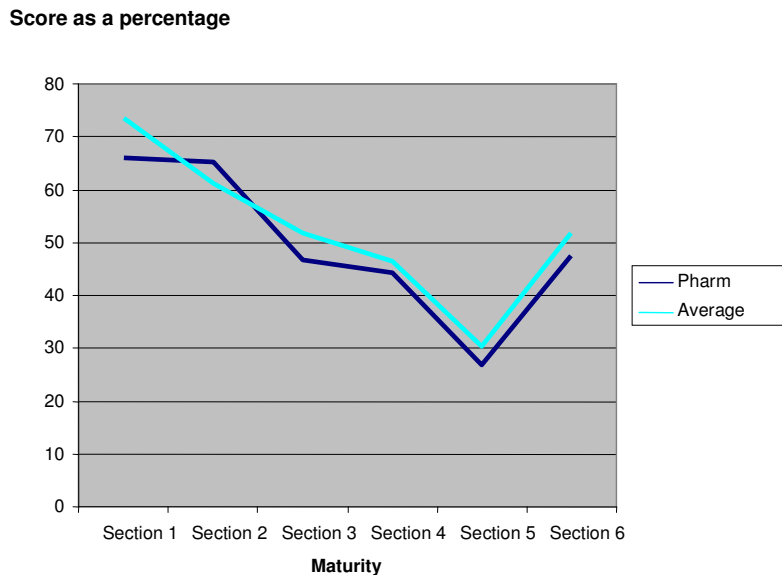
The TT grouping seems to follow the average trend most closely than other groups. Arguably, due to the nature of their business, TT organizations scored extremely high in section 1 (ICT management) of the questionnaire, achieving an average score of 78.85%. Subsequent maturity levels follow a trend similar to the average maturity score achieved by all industries, become incrementally smaller as the level of maturity increases (Figure 7.15). At 58.6% and 55.6% extra-large and large organizations outperformed all other organizational sizes. Medium-sized and small organizations forwarded considerably lower scores of 44.3% and 37.5% respectively. Although small and medium-sized organizations scored relatively high in section 1 (ICT management) of the questionnaire, they achieved only moderate scores in section 2 and 3 of the questionnaire.

Top managers in TT organizations, at 60.0%, rated the overall maturity to be considerably higher than the rating attributed to middle management (46%) and operational personnel (43%). Of interest is that the bulk of the differences in scores between top, middle and operational personnel are vested primarily in the scores allocated to sections 2, 3 and 4 of the questionnaire, i.e. information management, formulation of knowledge management issues, policies and strategies and the implementation of knowledge management.

#### **7.7.7 Chemical and Pharmaceutical (Pharm) grouping**

Chemical and Pharmaceutical organizations achieved an overall maturity score of 168.00/358 or 46.9% (Figure 7.16). Apart from section 2 (Information management) scores achieved in all sections of the questionnaire are lower than the average score achieved per maturity section by all organizational groupings interviewed. Maturity growth over the last five years is 47% and is also below the average score of 51%. This is only slightly better than the lowest score achieved by the worst performer (the educational industry) at 42%.

Figure 7.16: Maturity achievements in the chemical and pharmaceutical grouping



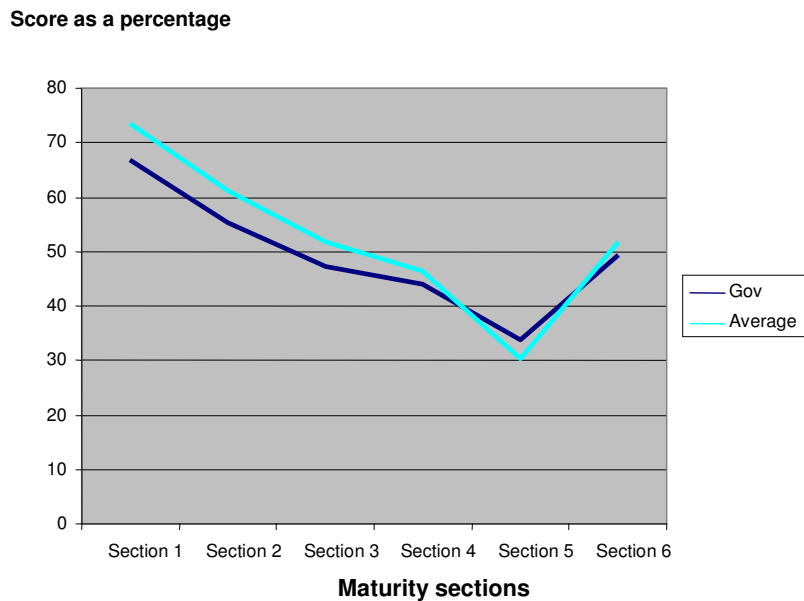
Respondents indicated that they either work for small organizations (65%) or extra-large organizations (35%), with extra-large organizations achieving an overall score of 50.6%, and small organizations a score of 44.9%. An interesting observation is that although senior managers in this industry scored the overall maturity at 55%, operational personnel at 44% rated the overall maturity slightly higher than middle management did at 43%. The low score attributed to middle management is primarily due to middle managers perceiving level 3 (formulation of knowledge management issues, policies and strategies) to be inadequate. Apart from maturity section 2 (Information management) organizations in the Pharm grouping achieved lower than average scores over all maturity sections.

### 7.7.8 Government grouping

The governmental sector achieved an overall maturity score of 166.11/358 or 46.39% (Figure 7.17). Most respondents indicated that they work for medium-sized Government Departments. Large departments within this sector on average achieved a maturity score of 52.5%, with medium and extra-large departments achieving scores of 47.2% and

47.4% respectively. Small departments fared considerably worse achieving scores of only 41.7%.

Figure 7.17: Maturity achievements in the government grouping



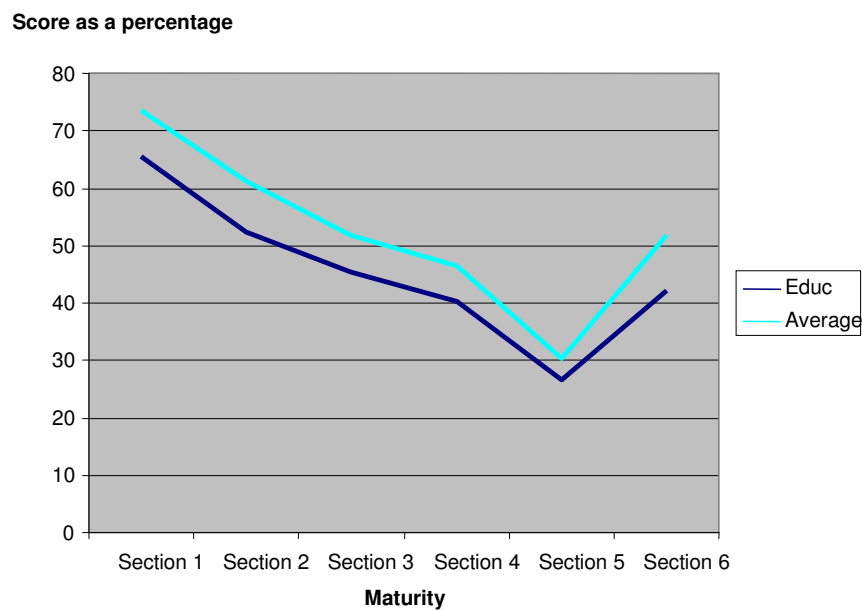
Government departments achieved scores over all maturity levels (except section 5) considerably lower than the average score obtained by all participating organizations. However, an interesting finding is that growth of maturity over the past 5 years at 49% are moderate compared to other groupings.

When findings are broken down to reveal the scores allocated by the different managerial levels within the different organizational sizes that made up the Government departments, it was found that the difference in score between the different managerial levels within large Government departments take on an extremely interesting dimension with senior and middle management rating maturity the same at 56%. This is considerably higher than the score attributed to operational personnel at 42%. Within extra-large departments the picture changes drastically with middle managers rating maturity at 39%. This is considerably lower than the scores attributed to senior management at 48% and operational management at 56%.

### 7.7.9 Educational grouping

Educational institutions not only received the lowest maturity score of all groupings interviewed (152/358 or 42,45%), but also forwarded the lowest maturity scores over nearly all maturity levels (Figure 7.18). Growth of maturity over the past five year was also the lowest of all organizational sectors interviewed, receiving a score of 42.02%. Most interviewees (76%) indicated that they work for large organizations, while 13% work for small institutions, and 11% work for medium-sized organizations. Medium-sized organizations at 45.9% outperformed both large and small organizations at 41.8% and 43.9% respectively.

Figure 7.18: Knowledge management maturity distribution of educational institutions.



Senior managers rated the overall maturity at 47%, middle management at 41% and operational personnel at 39%. The relatively low score attributed to middle management could be traced to middle managers scoring levels 2 (Information management) significantly lower than any other maturity sections.



## **7.8. Summary of the major findings with regard to the knowledge management maturity of South African industry.**


Findings indicated that enablers to knowledge management (ICT and Information management) are fairly well-institutionalised within South African industry (Sections 7.3.1 and Section 7.3.2). Unfortunately, there is a strong indication that a large number of South African industries still consider ICT, and especially Information management, to be knowledge management. Most organizations understand the concepts and issues surrounding Knowledge management (Section 7.3.3), and even though most agree to the benefits of Knowledge management (Section 7.3.4 and Section 7.3.5), there seem to be an element of testing the ground, before full commitment and implementation of knowledge management endeavours (Section 7.3.3 and Section 7.3.4) occur. In essence there is statistical support that organizations start with endeavours that are technologically supported and/or easy to implement, before moving to endeavours that require greater human intervention to succeed.


Analysis of knowledge management maturity as it relates to different organizational sizes reveals that there is statistical differences between the score forwarded by small, medium, large and extra-large organizations (Section 7.6). In essence small and extra-large organizations yielded different scores, with medium and large organizations forwarding similar scores over most maturity sections.

Viewed holistically, much larger organizations are at an advantage with regard to the institutionalisation of knowledge management practice over most maturity levels, especially with regard to the sharing of knowledge beyond organizational boundaries. Of interest is that although large organizations (**please note:** not extra-large organizations) outperformed medium-sized organizations in sections 1 (ICT management) and 5 (ubiquitous knowledge) of the questionnaire, they were often outperformed by medium-sized organizations with regard to the management of information (Section 2), the vesting of knowledge management issues, policy and strategy (Section 3), and the institutionalisation of formal knowledge management endeavours (Sections 4).

With reference to Section 7.5, analysis of knowledge management performance, as it relates to scores forwarded by senior, middle and operational personnel revealed that there are statistical differences between the score forwarded by the different managerial levels present within organizations. Findings revealed that differences occurred primarily between the scores forwarded by operational and senior managers and middle and senior managers, especially with regard to maturity in information management (Section 2), the identification of knowledge management issues, policy, and strategy (Section 3), and the implementation of knowledge management (Section 4).

	Resources	Fin	Services	Goods	Auto/Tran	ICT	Pharma	Gov	Edu	Ave	
<b>Operational</b>			47%	41%	32%	36%	42%	41%	52%	42%	<b>Small</b>
<b>Middle</b>			47%	41%	46%	32%	44%	43%	39%	42%	
<b>Senior</b>			49%	37%	63%	51%	51%	40%	41%	47%	
<b>Operational</b>	53%	54%	53%	42%	50%	44%		44%	50%	47%	<b>Medium</b>
<b>Middle</b>	56%	65%	60%	39%	58%	33%		47%	32%	48%	
<b>Senior</b>	62%	54%	55%	49%	73%	55%		51%	65%	55%	
<b>Operational</b>		40%		54%	41%	49%		42%	38%	45%	<b>Large</b>
<b>Middle</b>	58%	41%		45%	59%	53%		56%	41%	46%	
<b>Senior</b>	51%	56%		55%	76%	63%		56%	48%	56%	
<b>Operational</b>	53%	50%		49%	39%	47%	54%	56%		49%	<b>Ex-Large</b>
<b>Middle</b>	58%	58%		53%	52%	60%	41%	39%		56%	
<b>Senior</b>	55%	60%		55%	42%	48%	59%	48%		56%	

**Top achievers in Industry** 

**1<sup>st</sup> runners up in industry** 


**2<sup>nd</sup> runners up in industry** 

Table 7.8: Comparison of scores per organizational grouping broken down per organizational sizes and managerial level

Findings suggest that the South African industry not only struggles with the successful institutionalization of formal knowledge management endeavours beyond their borders but, also gains “buy in” and real commitment from operational personnel.



Findings indicated that organizations in the Resources, Financial, Services and Consumer goods and utilities groupings, are the leaders regarding knowledge management maturity. Organizations in the Automobiles/Transport, and ICT groupings achieved scores on a par with the average knowledge management maturity score achieved. In contrast organizations in the Chemicals and Pharmaceuticals, Government and Educational sectors all recorded below average scores.

In the Resources grouping scores were consistently higher than average over all maturity sections. In the Financial grouping scores were higher than average regarding ICT management, information management and the formulation of knowledge management issues, policy and strategy. In Service organizations scores were high regarding the formulation of knowledge management issues, policy and strategy, the implementation of knowledge management and the sharing of knowledge beyond organizational boundaries.

Viewed holistically, irrespective of organizational size and industry, commitment and diffusion of knowledge management, especially between senior and middle management are cardinal to the success of knowledge management endeavours. There is a strong indication that middle management (supported by senior management) holds the key to successful implementation of knowledge management. In top achievers, middle manager's scores were on average similar or slightly higher than senior managers (Table 7.8).

Findings confirm that leading knowledge management maturity organizations have sound ICT management practices in place. Medium-sized organizations in both the Financial and Resources industries are typical examples in case (Sections 7.7.1 and 7.7.2). However, even with strong ICT support and having sufficient knowledge management policies and strategies in place, insufficient Information management was also found to negatively impact on the overall ability to institutionalise knowledge management successfully. The dramatic decline in knowledge management maturity in the latter stages of large financial organizations' scores, primarily due to insufficient information management, proved to be a definite point in case.



Insufficient and/or immature ICT and Information management lead to problems with regard to supporting knowledge management endeavours beyond organizational borders. Findings indicated that even though Services organizations know how to formulate and implement knowledge management issues, policies and strategies successfully, they struggle with coming to grips with managing knowledge situated outside the borders of their organizations. Similarly, the below average performance in ICT management (66% compared to an average score of 73%), achieved in the Pharmaceutical organizations filtering through to successive maturity levels. This again strongly hints at the enabling role of ICT being insufficient. The relatively low score achieved in the Educational industry, primarily due to middle managers perceiving information management to be inadequate, strengthening the argument that Information management, similar to ICT is a prerequisite to successful institutionalization of knowledge management.

Explanations regarding knowledge management maturity spanning beyond and across organizational borders must be seen in conjunction with the findings of Section 7.3. Not only did findings indicate that South African organizations are not mature in extending knowledge management beyond organizational borders, but there seem to be a perception that extending knowledge management beyond organizational borders impact negatively on knowledge management maturity. Possibly, this explains why most South African organizations are not actively encouraging or driving knowledge management endeavours beyond the borders of their country.





## CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

### 8.1 Introduction

In the knowledge-networked economy the success of an organisation will be determined by the ability of the organization to combine knowledge with business strategy. In combining business strategy with the management of knowledge resources through technology, an organisation can perform efficiently and effectively. The shift in the strategic role that knowledge plays in business is forcing business managers to actively participate, if not lead, knowledge management for decision making. It is therefore not surprising to find business managers increasingly relied upon to play a leadership role in the management of knowledge. Managers, therefore, need to know the technology plus have business leadership and knowledge management experience. Without question, a sound understanding of the formulation of business strategy is crucial in the formulation of an efficient and effective knowledge management strategy, and vice versa. Unfortunately there is no generic model or even guidelines for incorporating the management of knowledge into business and especially business strategy formulation, from within a managerial/strategic rather than from a purely technological perspective. This leads to business managers considering knowledge management as being separate from business, leading to an inability to align knowledge management goals with corporate goals.

The aim of the study was to investigate the interdependencies between knowledge, knowledge management and business from within a managerial/strategic perspective rather than from a technological perspective. This was done to supply practitioners and managers with guidelines to not only successfully institutionalize and manage knowledge as a managerial/strategic enabler, but also to assess the level of knowledge management maturity already reached.

By drawing together the results from the previous chapters, the main findings will be highlighted here in chapter eight. Connections will be drawn between the results obtained in Chapter 7, and the literature review conducted in Chapters 1 to 5, relating the broader



fields of knowledge -, business - and strategic management. Finally, this chapter ends with recommendations to fill the gaps and uncertainties that will lead to further study.

This final chapter gives a summary of all the chapters from 1 to 7. The aim is to summarise all facts, arguments and conclusions presented in this thesis and give responses to all of the arguments proposed.

Emphasis is therefore placed on the following topics:

- Summary of methodology used.
- Main findings of the thesis
- Anomalies and surprising results
- Larger relevance of the study
- Recommendations regarding further research

## **8.2 Summary of methodology used**

Because the study is interpretive in nature, a combination of non-empirical and empirical (quantitative and qualitative) research was used. In Chapter's 2 to 5, the literature was analyzed in order to understand the:

- critical role knowledge and knowledge management plays in any organization,
- issues involved in knowledge management implementation and maturity, and
- why knowledge management success is measured in an organizational context.

In chapter 4, using the grounded theory approach of analogical and inductive reasoning plus model building, a new perspective in terms of knowledge management's maturity was formulated.

In order to test these theoretical insights, the model proposed in Chapter 4 was used as the basis for a questionnaire. This questionnaire was pre-tested by a number of scholars



and knowledge management practitioners with regard to applicability and usability<sup>75</sup> (Section 6.2). After multiple revisions, the questionnaire was used to determine a baseline for knowledge management maturity of 86 organizations. Each organization competes within different organizational groupings in the South African industrial environment (Section 7.3).

In the assessment of organizations knowledge management maturity, Likert type scales<sup>76</sup> were used. In all cases, analysis of data consisted of the use of either standard statistical techniques and/or qualitative methods, as determined by the standards of the University of Pretoria, South Africa.

### **8.3 Main findings of the research**

In Chapter 1, it was argued that although knowledge is regarded as a strategic resource it is not managed accordingly. In questioning why knowledge is not well managed, it was found to be primarily due to not understanding the relationship between knowledge, knowledge management, business and strategy. It was proposed that the failure of knowledge management is the result of treating knowledge management as a technology. It was therefore concluded that managers are in need of guidelines to aid in the successful institutionalization of knowledge management, from within a strategic/managerial perspective rather than from a technological perspective.

---

<sup>75</sup> Through a process of methodological study, to determine if knowledge management maturity does indeed enhance organizational performance, i.e. “Studies aimed to develop new methods (such as questionnaires, scales and tests) of data collection and sometimes also validating a newly developed instrument through a pilot study” (Mouton 2001:173).

<sup>76</sup> To determine and express knowledge management maturity over five maturity sections as a percentage – refer to Appendix D: Knowledge management maturity rating system.



In order to achieve this goal of supplying managers with guidelines to aid in the successful institutionalization of knowledge management, from within a strategic/managerial perspective rather than from a technological perspective, research focused on:

Objective 1: Heightening awareness of the critical role knowledge plays as a strategic corporate resource.

In Chapter 2 (Sections 2.2, 2.3 and 2.4), the complexity and strategic importance of knowledge was addressed. Special emphasis was also placed on the major impact knowledge has on corporate strategy and organizational success. It was found that there is a constant reassessment of the way in which strategy is perceived. Also, different strategy formulation models follow the same general path, which is based on researching answers to satisfy stakeholder needs (Section 2.4). In focusing on the evolution of strategy, it was determined that knowledge has played an enabling role in the formulation of strategies. It was therefore proposed that the evolution of strategy will continue not by replacing previous notions, but rather by building knowledgeably upon previous thought.

Objective 2: Determine the issues/models/methods and perspectives available, to guide strategists in the quest to efficiently and effectively manage knowledge, within a strategic/managerial perspective.

Chapter 3 focused on identifying issues, policies and strategies to guide strategists to effectively and efficiently manage knowledge. It was found that these fields of study overlap. The principles proposed by Davenport (1998), the elements proposed by Taylor Small et al., (2000), the knowledge management “schools” proposed by Earl (2001), and the success factors proposed by Logan (2001) all address the same issues and concerns (Section 3.4). Unfortunately, even though it was found that issues pertinent to the success of knowledge management are well documented, very little is revealed on how to successfully institutionalise these issues.



The main finding of chapter 3 is that even though knowledge drives strategy (as argued in chapter 2) strategy in turn drives the institutionalisation of knowledge management. Thus, the proposition was made that in order to set the stage for the successful institutionalization of knowledge management, organizations should decide upon issues that are proven to lead to the implementation of a knowledge management culture. In order to ensure uniformity in the institutionalizing of these issues, it was proposed that not only should issues be encapsulated within policy, but also that the strategic management process be used to determine the priority of issues (Section 3.5). In debating how these issues relate to one another, Chapter 3 concluded that there is a chronological sequence of events that need to take place if knowledge management is to be institutionalized successfully.

Objective 3: Elucidate the progression of knowledge management maturity from a strategic/managerial perspective.

Chapter 4 elaborated on the argument that certain knowledge management issues, due to their reoccurring nature within literature, is deemed to be of such importance that they could be used as a baseline in the quest to successfully institutionalize knowledge management (Section 4.2). However, it is also revealed that the successful institutionalization of knowledge management is dependent on the implementation of knowledge management maturity within the organization (Section 4.3). Chapter 4 therefore demonstrated that maturity models could aid in the successful institutionalization of knowledge management issues, policy and strategy from a strategic/managerial, rather than from a technological perspective.

An in-depth review of knowledge management maturity models revealed that most models are derived from the Software Engineering Institute's Capability Maturity Model (Section 4.4). Thus, it was found that there are numerous similarities between models, especially with regard to the progression of stages in maturity (i.e., initiate, be aware, manage and optimize). It was also found that there are major disagreements in what



specifically constitute areas of importance within the different maturity levels. Findings strongly indicated that most models based on software and ICT theoretical concepts, over-estimate the role of ICT. Therefore, it was concluded that most models neglect to emphasize the enabling role that strategy plays in knowledge management maturity. Current knowledge management models were therefore found to be unsuitable. In placing knowledge management issues, policies and strategies, as identified in chapter 3, in a chronological order, a new maturity model was formulated to reflect the progression of knowledge management endeavours from within a strategic/managerial perspective. An outcome of chapter 4 is the proposal of an evolutionary methodology with regard to knowledge management maturity.

Objective 4: Investigate knowledge management's performance in relation to the objectives and measures that determine the overall efficiency and effectiveness of an organization.

Chapter 5 returned to questions surrounding "how to measure the value of knowledge management from within an organizational perspective". Differences in opinion with regard to innovation's role as measurement criteria for knowledge management were critically reviewed in Section 5.2. It was found that although numerous authors support a link between knowledge management and innovation, empirical evidence is not supportive. It was argued that the link between knowledge management and innovation is blurred, primarily due to the interdependency between knowledge, strategy and knowledge management. This link was neglected in most arguments (Chapter 2, Section 2.4 and Chapter 3, Section 3.3). The prevailing notion of relating endeavours in knowledge management to a specific form of output (i.e., innovation) was therefore strongly rejected (Section 5.4). Owing to the complex nature of managing knowledge as a strategic enabler, the argument was proposed that the sum of the input will not equal the output. It was therefore proposed that knowledge management enables strategists to formulate winning strategies, of which innovative strategies are but one. Therefore, a yardstick for the success of strategy is also a yardstick for the value of knowledge management. Chapter 5 emphasises that the key to determining the value of knowledge



management lies in the extent to which knowledgeable reasoning leads to organisational growth, profitability and sustainability (Section 5.5) and not purely within the amount of innovation it sparks.

Objective 5: Formulate guidelines to aid practitioners and strategists to successfully institutionalize and assess the knowledge management maturity of their respective organizations.

In chapter 6 it is argued that unless theory develops usable tools, contributions made by knowledge management scholars will be of little value to organizations embarking on knowledge management endeavours. Building on the inductive reasoning in the previous chapters, a questionnaire of six sections, constituting 101 descriptive questions, was developed and thereafter tested as a knowledge management maturity measurement tool in industry. Feedback was that the questionnaire served the purpose for which it was meant, i.e. the questionnaire covered the key aspects of Knowledge Management Maturity. Furthermore, it was established that the questionnaire was conducive towards conducting structured interviews.

As a lesser objective, to supply knowledge management practitioners with a baseline of data to benchmark their organizations' knowledge management maturity upon, data and insight gained from the process of conducting structured interviews in the industry, were also included in this thesis.

Objective 6: Baseline data upon which to benchmark knowledge management maturity.

Chapter 7 reported on the results and findings deduced from the empirical research conducted within the 86 South African organizations interviewed. With regard to the level of knowledge management maturity reached by organizations, it was found that:

- ICT and Information management are fairly well institutionalised within the South African industry (Sections 7.4.1 and Section 7.4.2).



- A large number of South African organizations still consider ICT, and especially Information management, to be knowledge management (Section 7.4.1 and Section 7.4.2).
- Most organizations understand the concepts and issues surrounding Knowledge management (Section 7.4.3).
- Most organizations agree to the benefits of Knowledge management (Section 7.4.4 and Section 7.4.5).
- There is an element of testing the ground, starting with endeavours that are “hard” and tangible in nature, before full commitment and implementation of “softer” knowledge management endeavours (Section 7.4.3 and Section 7.4.4).
- There are differences between the score forwarded for small, medium, large and extra-large organizations (Section 7.5).
- There are differences between the score forwarded by the different managerial levels present within organizations.
- Organizations in general struggle with the successful institutionalization of formal knowledge management endeavours beyond their borders. This was indicated by maturity section 5 that dealt with ubiquitous knowledge.
- All organizations, irrespective of the organizational type and organizational size struggled to get “buy in” from operational personnel.
- There is a strong indication that middle management (supported by senior management) holds the key to successful implementation and diffusion of knowledge management.





- Knowledge management maturity achievements seem to be more dependent on a deliberate, conscious and calculated managerial effort, than on factors such as organizational size, the industry competing within, number of managerial levels present and resources such as ICT, available.

#### **8.4 Anomalies and surprising results**

The findings in section 7.3 indicate that most South African organizations are not mature in extending knowledge management beyond organizational boundaries. There seems to be a perception that extending knowledge management beyond organizational borders impacts negatively on knowledge management maturity. Most South African organizations are therefore not actively encouraging, or driving, knowledge management endeavours to span their organizational borders.

Another surprising result was that even with strong ICT support and sufficient knowledge management policies and strategies in place, insufficient information management was consistently found to negatively impact on the overall ability to institutionalise knowledge management successfully.

Arguably, the most surprising result obtained from the empirical study conducted was the finding that Educational institutions achieved the lowest overall knowledge management maturity scores of all organizations interviewed. Educational institutions not only received the lowest scores over nearly all maturity levels, but growth of maturity over the past five years was also the lowest of all organizational groupings interviewed. Possibly, the low score attributed to maturity Section 2 (Information management) carried through to the subsequent maturity sections. Another explanation could be the hoarding culture associated with academics resulted in the guarding of knowledge as a strategic differentiator.



## 8.5 Larger relevance of the study (gaps and uncertainties)

The contribution of the study to the literature and Knowledge management body of knowledge provides insight into:

- The important role knowledge plays in organizations as a strategic corporate resource and that knowledge management plays as a managerial enabler (Chapter 2).
- Issues, policies and strategies that are pertinent to the effective management of knowledge (Chapter 3).
- The progression of knowledge management maturity within an organizational setting from within a strategic/managerial rather than from within a technological perspective (Chapter 4).
- Knowledge management's performance in relation to the overall performance of an organization (profitability, growth and sustainability) (Chapter 5).

To expand this research beyond purely theoretical and/or academic value, the research also provided a practical “toolkit” for managers to assess their organizations' knowledge management maturity through the knowledge management maturity questionnaire and rating system (Appendix B, C).

The study not only comments on the knowledge management maturity of the 86 South African-based organizations, but also identifies the extent to which South African organizations and industry groupings are mature. This maturity is in regard to the institutionalisation of formal knowledge management endeavours, especially beyond their organizational borders.



Organizations in the Resources (Construction, building materials and mining), Financial (Banks and Insurance), Services (Consulting, Auditing, and Service delivery) and Goods (Consumer goods and utilities) groupings were found to be the leaders regarding knowledge management maturity. In the Resources grouping scores were consistently higher than average over all maturity sections. In the Financial grouping scores were higher than average over mainly sections 1 (ICT Management), 2 (Information management) and 3 (Formulation of knowledge management issues, policy and strategy) of the questionnaire. In the Services grouping, scores were mainly higher than average in sections 3 (Formulation of knowledge management issues, policy and strategy), 4 (Implementation of knowledge management) and 5 (Ubiquitous knowledge). As expected IT organizations were found to be the most mature regarding ICT management. An interesting finding was that Chemical and Pharmaceutical organizations achieved high scores in Information management, while Government departments and Automotive and Transport companies achieved higher than average scores in the sharing of knowledge beyond their borders.

Score differences between groupings could mainly be attributed to consistency in achievement over all maturity sections. Especially, it was noted that leaders all achieved higher than average scores over all maturity sections, and in particular over sections 1 (ICT Management), 2 (Information management) and 3 (Formulation of knowledge management issues, policy and strategy) of the questionnaire. In contrast, even though companies in the Chemical and Pharmaceutical and government sectors achieved high scores in certain maturity sections, score hikes were for the most part isolated. On average organizations that did not fare as well as leaders, achieving below-average scores over especially maturity sections 1, 2 and 3 of the knowledge management maturity questionnaire.

## **8.6 Recommendations regarding further research**

Most of the essential aspects needed to successfully manage knowledge were covered in the proposed questionnaire, but the practical applications and testing indicated that



further research is needed. This is especially true regarding the implementation of knowledge management and the assessment of knowledge management maturity in non-profit, as well as small and micro organizations. It must be acknowledged that the management of knowledge, in all its complexity, constitutes much more than the issues, principles and policies identified in this research. As the body of knowledge evolves, the model and associated questionnaire must be updated and revised on a regular basis. Another area for further study would be to critically analyse the diffusion of knowledge management between managerial levels within an organization. Arguably, the diffusion of knowledge management between senior, middle and operational levels, encompasses yet another dimension to the management of knowledge.

The use of scales, such as the Likert-type, used in the knowledge management maturity questionnaire, may not appropriately have captured data. Of interest would be to repeat the experiment and change the description of the incision points used, and/or alter the number of incision points used. The study may therefore be viewed as a “pilot study” to provide insights. To take into account the (1) historical nature of performance measurement, (2) time it takes for knowledge management endeavours to impact on organizational performance and (3) differences regarding organizational sizes and industries, more research is needed before determining the true value knowledge adds to an organization. Such a study should span a number of years and be inclusive of additional industries, within different managerial and strategic settings.