

# **CHAPTER 5**

## **QUANTITATIVE DATA ANALYSIS**

INDEX		5-144
SYNOPSIS		5-146
5.1	INTRODUCTION	5-147
5.2	DESCRIPTIVE DATA OF THE SURVEY	5-147
5.3	PRELIMINARY DATA ANALYSIS	5-148
5.3.1	An explanation of descriptive statistics used to inspect data	5-149
5.3.2	An analysis and survey of the data using descriptive statistical techniques	5-151
5.4	THE VALIDITY AND RELIABILITY OF THE MEASURES USED IN THE STUDY	5-155
5.5	THE SEARCH FOR RELATIONSHIPS	5-157
5.5.1	The relationship between the type of bank and the application of holistic risk management	5-163
5.5.2	The relationship between banks using a different number of departments to initiate holistic risk management and the application of holistic risk management	5-164
5.5.3	The relationship between the size of the bank (based on the number of employees) and the application of holistic risk management	5-165
5.5.4	The relationship between the size of the bank (based on turnover) and the application of holistic risk management	5-166
5.5.5	The relationship between listed banks and unlisted banks and the application of holistic risk management	5-167
5.5.6	The relationship between top banks and other banks and the application of holistic risk management	5-168
5.5.7	The relationship between the respondents' position in the bank and the application of holistic risk management	5-169
5.6	THE NATURE AND EXTENT OF THE DIFFERENCES BETWEEN THE DEPENDENT VARIABLES	5-172
5.6.1	Section B: holistic risk management analysis: category 1:	

	the analysis of the current position regarding holistic risk management operations	5-172
5.6.2	Section B: holistic risk management strategy: category 2: the formulation of holistic risk management strategy	5-174
5.6.3	Section B: holistic risk management planning: category 3: The establishment of a plan for holistic risk management	5-176
5.6.4	Section B: holistic risk management implementation, motivation and control: category 4: the implementation, motivation and control of holistic risk management strategy	5-177
5.6.5	Section B: holistic risk management review of results: category 5: the review of results	5-178
5.6.6	Section B: holistic risk management evaluation and plan modification: category 6: evaluation and plan modification	5-179
5.7	SUMMARY OF RELATIONSHIPS	5-181
5.8	SOPHISTICATED STATISTICAL ANALYSIS OF THE DATA	5-183
5.9	PRELIMINARY DATA ANALYSIS	5-183
5.10	THE VALIDITY AND RELIABILITY OF THE MEASURES USED	5-188
5.11	THE RELATIONSHIPS BETWEEN THE DIFFERENT VARIABLES	5-188
5.11.1	The relationship between the culture of the bank and the application of holistic risk management	5-192
5.11.2	Using Pearson r to predict scores	5-196
5.12	ESTIMATING NON-RESPONSE BIAS FROM THE SPEED OF RESPONSE	5-197
5.13	SUMMARY OF RESULTS	5-198
5.14	CONCLUSION	5-202

# **CHAPTER 5**

## **QUANTITATIVE DATA ANALYSIS**

### **SYNOPSIS**

This Chapter analyses, interprets and discusses the empirical results achieved, as described in Chapter 4. Descriptive data and statistics supported a number of qualitative interpretations and conclusions.

The results indicate that none of the variables differed regarding the factor, crucial aspects, included in the culture of the bank. Analysis of the nature and extent of the predetermined factors, namely norms, nature of work and external affairs, as well as the factor, crucial aspects, shows that the respondents do include these factors in the culture of the bank. South African banks thus do have an innovative culture and can implement Holistic Risk Management (HRM). The hypothesis that South African banks can implement HRM is therefore true.

Relationships between the culture of the bank and the application of holistic HRM were determined using Pearson's correlation coefficient. Results indicated that there was a positive correlation between the culture of the bank and the management of risk. The factor, crucial aspects, had the lowest correlation with the management of risk. The management step, review of results, resulted in the lowest correlation with the culture of bank.

To conclude, an estimation of non-response bias, assessed by the speed of response, was given. There was no significant difference between respondents and non-respondents and any inferences made are thus applicable to the whole population.

It must be emphasized that in this Chapter the results which includes a summary were given in an organized manner. In Chapter 7 deductions following from the results will be discussed and recommendations given.

# **CHAPTER 5**

## **QUANTITATIVE DATA ANALYSIS**

### **5.1 INTRODUCTION**

The main purpose of this chapter is to gain an insight into the application of Holistic Risk Management (HRM) in the South African banking industry. To accomplish this purpose a number of theoretical and empirical objectives were formulated in chapter 1. To achieve the empirical objectives data had to be collected from the management of banks in South Africa, who for the purpose of this study are the HRM drivers of the banking industry. The respondents in this study were managing directors, divisional directors, directors, board members, risk specialists, regional directors, general managers, deputy general managers, senior managers, area managers, and branch managers in the South African banking industry.

The previous chapter outlined the research procedures used to obtain the necessary data. In this chapter the empirical information obtained will be analysed and interpreted. Data was collected from the South African banking industry using the model outlined in Chapter 4.

### **5.2 DESCRIPTIVE DATA OF THE SURVEY**

Data analysis requires the use of a set of statistical tools that reduces the amount of detail in the data, summarizing it and making the most important facts and relationships apparent (Alreck and Settle, 2000 : 287).

The procedure used in analysing the data first involved a preliminary analysis of the results. This gave an overview of the results so that more sophisticated statistical techniques could be used (Parasuraman, 2004 : 576). Fallik and Brown (2000 : 24) emphasise that a preliminary analysis of data allows for the re-ordering of the data into a more understandable format. Descriptive statistics was used to summarise the results and to provide guidelines for a more advanced statistical analysis.

After summarizing the results by means of descriptive statistics, more sophisticated statistical techniques will be used to establish relationships between the variables.

Walizer and Wiener (2003 : 402) emphasise that measures used to obtain data should be reliable and valid for research to be accurate. The reliability and validity of the measures (questions in the questionnaire) used in this study, will be discussed before more sophisticated statistical techniques are applied.

The data obtained for this study was collected by means of a questionnaire using more than two variables (see Annexure A). In order to establish and investigate relationships between the variables, multivariate analysis statistical techniques will be used. After discussing the techniques, the extent of the relationships between the variables will be determined.

As a mail survey often produces a low response rate, non-response bias can occur. The measures taken to account for non-response bias will be discussed in order to justify any inferences made.

### **5.3 PRELIMINARY DATA ANALYSIS**

Parasuraman (2004 : 576) states that before analysing a data set by using sophisticated statistical techniques, a researcher should get a feeling for what the data is like. A method of summarizing results is to arrange them in a frequency distribution and make use of descriptive statistics.

Descriptive statistical techniques are a means of inspecting the data before testing formal research questions (Dillon, Madden and Firtle, 2000 : 458). This approach was also followed in this study. The most common descriptive statistics are those that provide the researcher with measures of central tendency and measures of variability (Dillon, Madden and Firtle, 2000 : 458).

The descriptive statistics for this study were obtained by using the SPSS-X computer package (see Paragraph 4.6). Although frequency tables for each individual question were also drawn and analysed, it was decided that the presentation of these tables in

this chapter was unnecessary as they only provide a means for the inspection of data (see Annexure D for a copy of the results of the frequency distributions).

In chapter 4 (see Paragraph 4.2.1) it was mentioned that the questionnaire used in this study consists of three sections. Section A of the questionnaire (see Annexure A for a copy of the questionnaire) established the culture of the bank in order to determine whether HRM can be implemented by South African banks. Section B of the questionnaire established the management of HRM used in the bank. Section C of the questionnaire consisted of classification data, which facilitated comparisons between the first two sections. The questions in section B of the questionnaire were grouped into six categories where each category emphasized a different step in the HRM process, namely: analysis (analysis of current situation regarding HRM); strategy (formulation of HRM strategies); planning (establishing a plan for HRM); implementation (implementation, motivation and control of HRM strategies); review of results and evaluation and plan modification. In this preliminary analysis of the results, descriptive statistics will be used to inspect the data of each category. The six categories each represent the different steps in the management of HRM process.

### **5.3.1 An explanation of descriptive statistics used to inspect data**

A variety of statistics are available to summarise data. The most common descriptive statistics suggested by Dillon, Madden and Firtle (2000 : 458) are measures of central tendency (the most likely response to a question) and measures of variability (how the data are dispersed around the measure of central tendency).

The techniques used to measure central tendency in this study are the mean, median and mode. The data obtained in this study was derived from an interval scale (Likert scale) and the choice of the technique best suited will depend on the shape of the distribution (Alreck and Settle, 2000 : 327). The guidelines provided by Alreck and Settle (2000 : 327) are summarized in EXHIBIT 5.1

**EXHIBIT: 5 : 1 GUIDELINES TO THE CHOICE OF CENTRAL TENDENCY  
TECHNIQUE CONSIDERING THE SHAPE OF THE DISTRIBUTION**

<b>SHAPE OF DISTRIBUTION</b>	<b>TECHNIQUE TO BE USED</b>
1 Normal distribution	1 Mean, mode and median will be the same value and no best method
2 Positively or negatively skewed and high peak (positive kurtosis)	2 The mode is an appropriate measure to use
3 Positively or negatively skewed and low peak (negative kurtosis)	3 The median is an appropriate measure to use

**Source: Adapted from Alreck and Settle (2000 : 327-329)**

The technique used to measure the variability of data is the standard deviation. Bryman and Cramer (2000 : 87) describe the standard deviation as calculating the average amount of deviation from the mean. However, it was indicated in the above EXHIBIT 5.1 that the mean is only a meaningful technique to use if the shape of the distribution of the data is normal. Then, the standard deviation provides a close estimate of the proportion of cases within a given range around a mean. The standard deviation for any other distribution will only indicate the degree of spread and not the proportion of data within a given range of standard deviations from the mean (Alreck and Settle, 2000 : 332).

When inspecting data, the reliability of the measures (questions in the questionnaire), should be established. One technique to establish reliability is to calculate the standard error of the estimate. The standard error of the estimate is directly related to the variation in the population. In other words, the more the responses to items, the higher the standard error will be (Alreck and Settle, 2000 : 339).

The descriptive statistics obtained in this study will be discussed in the next paragraph.

### 5.3.2 An analysis and survey of the data using descriptive statistical techniques

A summary of the results obtained in this study using descriptive statistical techniques is provided in EXHIBIT 5.2.

#### EXHIBIT: 5 : 2 A SUMMARY OF THE DESCRIPTIVE STATISTICS FOR THE VARIOUS CATEGORIES INCLUDED IN HRM

STATISTIC	HRM CATEGORIES					
	Analysis	Strategy	Planning	Implement	Review	Evaluation
1. Mean	21,537	14,083	11,563	22,020	13,905	10,424
2. Mode	23,000	15,000	12,000	22,000	14,000	10,000
3. Median	22,000	14,000	12,000	22,000	14,000	10,000
4. Standard deviation	3,331	2,680	2,651	3,276	2,065	1,776
5. Skew ness	-0,119	-0,284	0,006	0,290	-0,179	-0,216
6. Kurtosis	0,145	-0,140	-0,085	0,596	0,440	0,062
7. Standard error	0,156	0,125	0,124	0,153	0,096	0,083

**Source: Own research: results obtained from analysis of section B of the questionnaire (for a summary of the frequency tables see annexure B).**

From the above EXHIBIT 5.2 certain deductions can be made regarding the six categories included in the HRM in South African banks (Paragraph 5.3.2 describes the six categories).

- Category 1: Analysis: analysis of current position regarding HRM

The first category of Section B of the questionnaire contains 7 questions, with a maximum score of 5 and a minimum score of 1, to establish the analysis of current position regarding HRM. The maximum score that can be obtained for this category is 35, which would indicate that respondents strongly agree with the questions on the analysis of the current position regarding HRM. A score of 7 would indicate the opposite; where as a score of 21 would indicate a neutral position.



The results show that the distribution is negatively skewed (Skewness = -0,119) and that it has a high peak (Kurtosis = 0,145). The mode would thus be an appropriate measure to use (see EXHIBIT 5.2). The mode is 23 which means that the sample banks on average tend to analyse their current position regarding HRM application (average indicates a positive response). However, considering the standard deviation of 3,331, the spread is quite large so that it can be concluded that there are a number of respondents who do and a number of respondents who do not analyse their current position regarding HRM.

The standard error of 0,156 ensures that the reliability of the measures (questions) is acceptable to items.

- Category 2: Strategy: formulation of HRM strategies

Four questions were used in Category 2 to establish the formulation of HRM strategies in the sample of South African banks. The maximum score is 20, indicating a “strongly agree” response for the questions establishing the formulation of HRM strategies. A score of 4 would mean the opposite and 12 would indicate a neutral position.

In this category the responses are negatively skewed (Skewness = -0,284) and the distribution has a low peak (Kurtosis = -0,140). The median would thus be an appropriate measure to use. The median is 14, which indicates that on average the respondents are positive in their response to the formulation of HRM strategies. The standard deviation of 2,680 is lower than the previous category (analysis of current position regarding HRM) which was 3,331. This can possibly indicate that more respondents tend to formulate HRM strategies than they tend to analyse the current position regarding HRM, as the spread of the results is lower (standard deviation of 2,680 versus 3,331).

The standard error of 0,125 is also acceptable as it indicates a low variation in the response to items.

- Category 3 : Planning: establishing a plan for HRM application

There were four questions in Category 3 to consider whether the sample South African banks establish a plan for HRM application. The maximum score for this category is thus 20 and the minimum 4, with a score of 12 indicating a neutral position.

The distribution of the responses is positively skewed (Skewness = 0,006) and has a low peak (Kurtosis = -0,085). It must be noted that the skewness and kurtosis are very close to a normal distribution. The median and the mode of this category reflect a neutral score of 12 whereas the mean indicates a slight negative response (11,563). The respondents on average tend to neglect the establishment of a plan for HRM application or they want to remain neutral in their answer.

As the distribution of the results of Category 3 is close to normal, a standard deviation of 2,651 indicates that there are approximately the same number of respondents who do establish a plan for HRM application as those who do not establish a plan for HRM application. The standard error of 0,124 indicates a low variation in the response to items and is acceptable.

- Category 4: Implementation: implementation, motivation and control of HRM application

The category, implementation, motivation and control, contains 7 questions where the maximum score is 35 and the minimum score 7 (see Section B of the questionnaire). A score of 21 would indicate a neutral position.

The distribution of the responses is positively skewed (Skewness = 0,290) and it has a high peak (Kurtosis = 0,596). The mode would thus be the most appropriate measure to use. The mode of this section is 22, which indicates that the respondents tend to implement HRM strategies as well as controlling them and motivating employees in the execution thereof. The high standard deviation of 3,276 emphasises that there are a number of respondents who are not, as well as a number of respondents who are, successful in implementation of HRM strategies and

motivation and control of employees. The standard error of 0,153 indicates that the measures are reliable as there is a low variation in the response to items.

- Category 5: Review: review of results of the application of HRM

Respondents were asked 4 questions to establish whether they review their results (see Section B of the questionnaire). A maximum score of 20 would indicate that they do so whereas the minimum score of 4 would indicate the opposite. A score of 12 would be the neutral position.

The distribution of this category is negatively skewed (Skewness = - 0,179) and it has a high peak (Kurtosis = 0,440). The mode would thus be an appropriate measure to use. The mode for this section is 14, which indicates that on average the respondents tend to review their results. The standard deviation of 2,065 is also lower than Category 4 (implementation, motivation and control). The low standard deviation indicates a smaller spread for the responses of the review of results. The standard error of 0,096 indicates that the measures of the category, review of results, are reliable.

- Category 6: Evaluation: evaluation and plan modification of the application of HRM

Three questions were used to establish whether respondents evaluate their plans and modify them accordingly (see Section B of the questionnaire). The maximum score for this category is 15, which would indicate that respondents do, while a minimum score of 3 would indicate that they do not evaluate and modify their plans. The neutral score for this category is 9. The distribution of the responses for this category is negatively skewed (Skewness = -0,216) and it has a high peak (Kurtosis = -0,062). The mode, which is 10, would be the most appropriate measure to use. This indicates that on average the respondents tend to evaluate their plans and modify them accordingly. The low standard deviation of 1,776 further strengthens the positive answer (the spread is low, indicating the majority of responses to be positive). A standard error of 0,083 is the lowest for this category which contains the lowest

number of questions (3 questions). The response to items will thus be low (the number of items is only 3).

To conclude, by examining the results using descriptive statistics, the nature of the results can be established. The descriptive statistics used to summarise the data have indicated the following:

The respondents to a certain extent make use of each category in the management of HRM process except that they tend to neglect the establishment of a plan for HRM. However, the establishment of a plan for HRM can form part of the overall planning process and is thus not treated separately.

The extent to which the respondents implement the proposed HRM process is on average not very high (averages are far less than maximum values of each category). The averages and spread obtained for each category nevertheless indicate a slightly positive response for each category in the management of HRM operations.

To establish whether South African banks do manage HRM operations requires further analysis of the data. The statistical techniques used in the above paragraph mainly portray or describe data. In the following paragraphs the statistical techniques used to determine relationships between survey items (variables) will be discussed.

The standard error was used as a technique to indicate the reliability of a measure as only descriptive statistics were employed. However, for research to be meaningful, it is necessary to use reliable and valid measures of the variables being studied (Walizer and Wiener, 2003 : 402). Before using more advanced statistical techniques it is necessary to establish the validity and reliability of the measures (questions in questionnaire) used in this study.

#### **5.4 THE VALIDITY AND RELIABILITY OF THE MEASURES USED IN THE STUDY**

Validity is concerned with whether the research actually measures what it intends to. On the other hand, reliability is concerned with the representative - ness of the data

(ErWee, 2001 : 139). To account for the reliability of the measures used in this study Cronbach's alpha was determined. Cronbach's alpha is a method where all possible split-half portions of a measurement scale are formed and a mean reliability coefficient calculated (Dillon, Madden and Firtle, 2000 : 371). This method indicates the internal consistency of the measures used. Bryman and Cramer (2000 : 71) suggest that the results of Cronbach's alpha should be above 0, 8 to indicate internally-reliable measures for the variables. The alphas obtained for Section B of the questionnaire, which consisted of 29 questions, are presented in EXHIBIT 5.3.

**EXHIBIT: 5 : 3 CRONBACH'S ALPHA TO TEST THE INTERNAL RELIABILITY  
FOR SECTION B OF THE QUESTIONNAIRE**

QUESTION	ALPHA	QUESTION	ALPHA
B1	0,8344	B19	0,8107
B2	0,8112	B20	0,8135
B3	0,8199	B21	0,8408
B4	0,8136	B22	0,8136
B5	0,8116	B23	0,8083
B6	0,8069	B24	0,8251
B7	0,8158	B25	0,8371
B8	0,8075	B26	0,8350
B9	0,8066	B27	0,8165
B10	0,8086	B28	0,8278
B11	0,8208	B29	0,8188
B12	0,8127		
B13	0,8081		
B14	0,8185		
B15	0,8071		
B16	0,8244		
B17	0,8083		
B18	0,8137		

**Source : Own research: results obtained from analysis of section B of the questionnaire.**

The alphas obtained in the above EXHIBIT 5.3 indicate Cronbach's alpha for the individual measures. The overall value of Cronbach's alpha for Section B is 0, 8228. The value of 0, 8228 indicates that the measures are internally reliable (Cronbach's

alpha > 0, 8). Bryman and Cramer (2000 : 71) emphasized that the results of Cronbach's alphas should be above 0, 8 to indicate internal reliability.

To test for external reliability, the degree of consistency over time is measured which involves a re-test of the same sample. This aspect was not calculated in this study as only one test was performed. It is not the objective of this study to develop a measurement instrument, but rather to ensure that the measurement instrument used is reliable. In the case of developing a measurement instrument the re-test would have been important.

Even if a measurement of reliable, it may not be valid. Bryman and Cramer (2000 : 72) emphasized that any researcher should at least establish the face validity of the measures (questions) if they are used for the first time (as was the case in this study). The face validity indicates the apparent reasonableness of the measures to an observer (Guy, Edgley and Arafat, 2003 : 449). To ensure that the measures possess face validity the researcher consulted secondary resources to incorporate the theoretical aspects in the measures to be used. Two pre-tests of the questionnaire (see Paragraph 4.6) indicated that the measures indeed measure what they are supposed to measure. Based on the literature study and pre-tests it is believed that the measures used in the questionnaire demonstrate face validity. It can therefore be said that the measurement instrument used in Section B of the questionnaire is both valid and reliable. Accordingly advanced statistical methods can be used in this study and the results will be meaningful.

Walizer and Wiener (2003 : 419) emphasized that if a researcher wants to search for relationships, measurements that are valid and reliable are important.

## **5.5 THE SEARCH FOR RELATIONSHIPS**

The statistical techniques used to describe or portray data gave an overview of the results achieved in this study regarding the application of HRM in the banking industry (Section B of the questionnaire). It is one of the objectives of this study to determine whether South African banks do manage holistic risk. The preliminary analysis did indicate that the sample South African banks to a limited extent do manage HRM, but

the results obtained were insufficient to prove the hypothesis in a rigorous and analytical manner.

Each question used to obtain data can be referred to as a variable, as the responses can vary. In Section B of the questionnaire there are six categories of variables with a total of 29 variables. In Paragraph 5.3 a description was given of the variables contained in Section C of the questionnaire. It was also indicated that the variables included in Section C would be used to establish relationships with the variables in Section B. To clarify the explanation, EXHIBIT 5.4 illustrates the number of the variables and categories of Section B and Section C of the questionnaire.

**EXHIBIT: 5 : 4 A SUMMARY OF THE VARIABLES CONTAINED IN SECTION B AND SECTION C OF THE QUESTIONNAIRE**

<b>SECTION B OF THE QUESTIONNAIRE</b>	
<b>CATEGORY</b>	<b>NUMBER OF VARIABLES</b>
Analysis	7
Strategy	4
Planning	4
Implementation	7
Review of results	4
Evaluation and plan modification	3
<b>TOTAL</b>	<b>29</b>
<b>SECTION C OF THE QUESTIONNAIRE</b>	
<b>CATEGORY</b>	<b>NUMBER OF VARIABLES</b>
Type of bank	3
Number of departments initiating holistic risk management	4
Number of employees	2
Annual turnover	2
Respondent's position	2
<b>TOTAL</b>	<b>13</b>

**Source: Own research: section B and C of the questionnaire**

The variables of Section B of the questionnaire (29 in total) are all continuous variables as the data was obtained using a Likert type scale. The variables of Section C of the questionnaire are however, categorical as they involve classification of banks

in terms of a concept. Chapter 4 indicated that distinctions were made between listed banks and unlisted banks, and between top banks as selected by the (Financial Mail, 2004 : 36), they will only be called top banks.

Alreck and Settle (2000 : 301) state that there may be meaning in comparing variables with each other by using techniques for the measurement of association (relationship) between variables. To choose the proper statistical tool to measure a relationship, the researcher must determine the type of variable used as well as which variable will be viewed as dependent and which as independent (Alreck and Settle, 2000 : 301). Alreck and Settle (2000 : 302) further explain that the dependent variable is the one being affected while the independent variable is the one affecting the other.

To enable a proper analysis of the application of HRM in South African banking industry, it was decided to establish the following:

- In Chapter 4 it was emphasized that there is, in theory, a difference between the management of risk in the young bank, the growing bank and the mature bank. Does this difference also exist in South African banking industry, and if so, what is the difference?
- Do banks that use different numbers of departments to initiate HRM, differ regarding their application of HRM?
- Do banks of various sizes differ regarding their application of HRM?
- Do listed banks differ from unlisted banks regarding their application of HRM?
- Do top banks employ different HRM processes to other banks?
- Is the kind of information supplied by a respondent influenced by the respondent's hierarchical position in the bank?



To establish these relationships, the application of HRM (the variables of Section B) are the dependent variables as they will be affected by other variables. The variables of Section C and the two variables identified by means of reference numbers will be the independent variables.

Dillon et al (2000 : 563) describe multivariate analysis as the application of methods that simultaneously deal with a reasonably large number of variables. The statistical techniques used to establish the relationships required should be selected from multivariate techniques.

Baggaley (2000 : 619-620) provides an overview of the multivariate procedures included in multivariate analysis. The multivariate technique used in a given circumstance will depend on the nature of the dependent and independent variables. Baggaley (2000 : 619-620) suggests the multivariate technique to use from the alternative multivariate techniques (there are 5 multivariate techniques to choose from) included in the multivariate analysis procedure. The nature of the independent and dependent variables will influence the choice of the technique to select. Considering that the dependent variables (Section B of the questionnaire) are continuous variables and the independent variables (Section C of the questionnaire and two variables identified by means of reference numbers) are categorical variables, the suggestion of Baggaley (2000 : 619-620) can be used to establish the techniques for establishing relationships. A summary of these is given in EXHIBIT 5.5:

**EXHIBIT: 5 : 5 AN OVERVIEW OF MULTIVARIATE TECHNIQUES TO USE  
CONSIDERING THE NATURE OF THE VARIABLES**

<b>Techniques</b>	<b>NATURE OF THE VARIABLES:</b>	
	<b>Dependent variables</b>	<b>Independent variables</b>
Canonical correlation	Several continuous	Several continuous
Multivariate analysis of variance	Several continuous	One or more categorical
Discriminant analysis	One categorical	Several continuous
Multiple regression	One continuous	Several continuous
Univariate analysis of variance	One continuous	One or more categorical

**Source: Adapted from Baggaley (2000 : 619-620)**

From the above EXHIBIT 5.5 it can be deduced that the multivariate analysis of variance (Manova) as well as the univariate analysis of variance could be used to determine the relationships required. These techniques are the only techniques suggested (see EXHIBIT 5.5) to be used for continuous dependent variables and categorical independent variables (as is the case in this study). The results of the multivariate techniques were obtained using the SPSS-X computer package.

Before analysing the results, the statistical procedure applied in using multivariate analysis will be discussed. The procedure is carried out in two steps – hereafter referred to as step one and step two. The first step (step one) will be to establish whether there is any difference between the dependent variables (Section B of the questionnaire) based on the independent variables (Section C of the questionnaire and two variables identified by using reference numbers). For example, is there a difference between the type of bank (young, growing or mature) and the application of HRM process used (analysis, strategy, planning, implementation, review of results and evaluation and plan modification)? The Manova procedure, which uses the Wilks' lambda multivariate test of significance, will be used to establish if there is a difference between the dependent variables based on the independent variables or not. The Wilks' lambda multivariate test of significance is based on the hypothesis that there is no difference between the dependent variables of various groups as determined by the independent variable. The hypothesis is thus:

Ho = There is no difference between the  
dependent variables considering the independent variables

The value (p) obtained by the Wilks' lambda F-test of significance will be used to test this hypothesis.

If  $p < 0, 05$  then reject Ho

In other words there is a significant difference between the variables if  $p < 0, 05$ .  
There is a highly significant difference between the variables if  $p < 0, 01$ .

In the event that there is a difference between variables then proceed to step two in order to establish in which of the dependent variables the difference occurs. If Ho is

accepted then a conclusion can be made that there is no difference between the dependent variables, and it will not be necessary to execute step two.

Step two involves the determination of which variable differs from the other. The univariate analysis of variance utilizing the univariate F-test will be used to establish where the differences occur. This test uses the dependent variables individually in order to establish which of the dependent variables are different. The significance of the F value obtained ( $p$ ) will be analysed to establish if differences exist.

If  $p < 0,05$  it indicates a significant differences.

If  $p < 0,01$  then there is a highly significant difference.

The above procedure will be used to establish relationships between different variables. This procedure is summarized in EXHIBIT 5.6.

## EXHIBIT: 5 : 6 THE PROCEDURE USED TO ESTABLISH RELATIONSHIPS

**STEP 1: MANOVA PROCEDURE**

Establish whether any difference exist between dependent variables if they are grouped according to independent variables

USE: Wilks' lambda F-test of significance

THIS TEST IS BASED ON:  
The hypothesis that there is no difference between variables  
 $H_0$  = There is no difference

OBTAIN SIGNIFICANCE OF F VALUE ( $p$ ) AND ANALYSE AS FOLLOWS:  
If  $p < 0,05$  then reject  $H_0$  ( $p < 0,01$  highly significant difference) ( $p < 0,05$  significant difference)

**STEP 2: UNIVARIATE ANALYSIS OF VARIANCE PROCEDURE**

Establish where the differences occur. Will only execute this step if  $H_0$  was rejected in Step 1.

USE: The univariate F-test of significance

THIS TEST IS BASED ON:  
The dependent variables are measured individually

OBTAIN SIGNIFICANCE OF F VALUE ( $p$ ) AND ANALYSE AS FOLLOWS:  
If  $p < 0,05$  then there is a significant difference. If  $p < 0,01$  then there is a highly significant difference

### Source: Own research

In the following paragraphs the procedure summarized in the above EXHIBIT 5.6 will be used to establish relationships between the different variables.

### 5.5.1 The relationship between the type of bank and the application of holistic risk management

In this paragraph the relationship between the first independent variable (see item 1 of Section C in EXHIBIT 5.4), the type of bank and the dependent variables (Section B of the questionnaire) will be established. It will be determined whether the sample young, growing and mature banks differ in the application of HRM.

The results of the Manova and univariate analysis of variance tests used to establish these differences are given in EXHIBIT 5.7.

#### EXHIBIT: 5 : 7 THE RESULTS OF THE TESTS TO ESTABLISH RELATIONSHIPS BETWEEN THE TYPE OF BANK AND THE APPLICATION OF HRM

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda	All	0,013
Univariate F-test of significance	Analysis	0,028
	Strategy	0,001
	Planning	0,225
	Implementation	0,004
	Review	0,364
	Evaluation	0,323

**Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.**

Considering the p value of 0,013 of the Wilk's lambda F-test of significance, it can be concluded that there is a significant difference between the type of bank and the application of HRM process used ( $p < 0, 05$ ).

Analysing the p values of the univariate F-test of significance, the differences occur in the following dependent variables: analysis, strategy and implementation. Both strategy and implementation indicates a highly significant difference as  $p < 0, 01$ , whereas analysis indicates a significant difference as  $p < 0, 05$  (see Table 5.6).

Respondents from young, growing and mature South African banks reported results that indicate a difference in their application of HRM. The categories in the application of holistic risk process which were reported to be highly significantly

different are the following: Strategy: Formulation of HRM strategies, Implementation, motivation and control of HRM.

The category of analysing the current position regarding the application of HRM was reported to also differ significantly. As suggested in Chapter 4 (see Paragraph 4.3 to Paragraph 4.5) there tend to be differences in the way the sample young, growing and mature South African banks apply HRM.

### 5.5.2 The relationship between banks using a different number of departments to initiate holistic risk management and the application of holistic risk management

Kloman (2000 : 139) emphasizes that in order to make a bank more receptive HRM should be the norm, if not routine, in the bank. This implies that HRM should be present in all departments. Although Kloman (2000 : 149) suggests that the HRM unit should be set up separately from existing operations and have a specific person responsible for it, the fact that HRM should be present throughout the bank, cannot be ignored. This leads to the question of whether there are differences in the management process in South African banks where HRM is initiated from all departments and those where it is initiated from only a number of departments. The results obtained are given in EXHIBIT 5.8.

#### EXHIBIT: 5 : 8 THE RESULTS OF THE TESTS TO ESTABLISH RELATIONSHIPS BETWEEN BANKS USING A DIFFERENT NUMBER OF DEPARTMENTS TO INITIATE HRM AND THE APPLICATION OF HRM

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,000
Univariate F-test of significance	Analysis	0,000
	Strategy	0,000
	Planning	0,000
	Implementation	0,000
	Review	0,995
	Evaluation	0,000

Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.

From EXHIBIT 5.8 it can be deduced that there is a highly significant difference (Wilks' lambda  $p = 0,000$ ) between the responses of banks using a different number of departments to initiate HRM, and their application of HRM. Considering the values obtained by the univariate F-test of significance the differences occur in all the categories of the application of holistic risk process (dependent variables), except for the category: review of results ( $p > 0, 05$ ).

Lam's (2003 : 149) suggestion that HRM should be present throughout the bank, thus seems to apply to the sample of South African banks.

### **5.5.3 The relationship between the size of the bank (based on the number of employees) and the application of holistic risk management**

A study done by the Federal Reserve Bank (2002 : 121) concluded that in general large-scale operations are more productive, but less innovative, in both America and Japan. De Chambeau (2004 : 17) concludes that small banks in America are outperforming large banks with regard to the number of innovative HRM processes created per dollar spent on research.

For the purpose of this study it was decided to establish whether there are differences between the application of HRM in small and large banks in South Africa. For comparison the size of the bank will first be indicated by the number of employees. A large bank for the purpose of this study employs 1 000 or more people and a small bank less than a 1 000.

The results obtained for establishing the relationship between the number of employees in the bank and the application of HRM are given in EXHIBIT 5.9.

**EXHIBIT: 5 : 9 THE RESULTS OF THE TESTS TO ESTABLISH RELATIONSHIPS  
BETWEEN THE SIZE OF THE BANK (BASED ON THE NUMBER  
OF EMPLOYEES) AND THE APPLICATION OF HRM**

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,000
Univariate F-test of significance	Analysis	0,001
	Strategy	0,000
	Planning	0,007
	Implementation	0,001
	Review	0,028
	Evaluation	0,000

**Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.**

From EXHIBIT 5.9 it can be concluded that there is a highly significant difference between the responses of small and large South African banks (size based on the number of employees) and the application of HRM process (Wilks' lambda  $p = 0,000$ ). In analysing the results of the univariate F-test of significance, differences occur in all the categories, with review of results indicating the least significant difference ( $p = 0,028$ ).

It appears that size, as determined by the number of employees, does have an influence on how the respondents' application of holistic risks management process.

**5.5.4 The relationship between the size of the bank (based on turnover) and the application of holistic risk management**

The relationship to be established is similar to the one in Paragraph 5.4 except that the size of the bank will be determined by the annual turnover of the bank. A large bank will be one with an annual turnover of R10 million and above and a small bank will have a turnover of less than R10 million.

The results obtained for this section are given in EXHIBIT 5.10.

**EXHIBIT: 5 : 10 THE RESULTS OF THE TESTS TO ESTABLISH  
RELATIONSHIPS BETWEEN THE SIZE OF THE BANK (BASED  
ON TURNOVER) AND THE APPLICATION OF HRM**

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,001
Univariate F-test of significance	Analysis	0,071
	Strategy	0,009
	Planning	0,250
	Implementation	0,010
	Review	0,452
	Evaluation	0,000

**Source: Own research: results obtained from multivariate analysis of section B and an independent variable**

Considering the Wilks' lambda p value of 0,001, there is a significant difference between the responses of large and small banks and the way they manage the application of HRM.

These differences occur in the formulation, implementation and evaluation of strategies. (Univariate F-test indicate significant differences for these variables as p values < 0, 05).

It is important to note that when annual turnover determines the size of the bank, a different result is obtained than when the number of employees is used to determine size. When the number of employees is used as the criterion, differences occurred in nearly all the categories of the application of HRM process. This is not the case when annual turnover is used to determine the size of the bank.

**5.5.5 The relationship between listed banks and unlisted banks and the application of holistic risk management**

A bank which wants to be listed on the Johannesburg Stock Exchange (JSE) has to comply with rules laid down by the JSE committee and management (Sasfin, 2004 : 36). One of the requirements for listing on the JSE (Sasfin, 2004 : 36) is a proven financial track record. It can therefore be expected that banks listed on the JSE will be financially sound. The question can be asked whether such banks differ on the



application of HRM to those unlisted banks, which are not subjected to compulsory proof of a sound financial track record. The results on whether listed banks differ from unlisted banks regarding the manner in which they manage the operations of HRM are given in EXHIBIT 5.11.

**EXHIBIT: 5 : 11 THE RESULTS OF THE TESTS TO ESTABLISH RELATIONSHIPS BETWEEN LISTED AND UNLISTED BANKS AND THE APPLICATION OF HRM**

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,001
Univariate F-test of significance	Analysis	0,017
	Strategy	0,000
	Planning	0,151
	Implementation	0,064
	Review	0,042
	Evaluation	0,000

**Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.**

From EXHIBIT 5.11 it can be deduced that there is a significant difference between the responses of listed banks and unlisted banks and the manner in which they manage the operations of HRM. (Wilks' lambda  $p = 0,001$ ). The univariate F-test of significance indicates that highly significant differences occur in the strategy formulation and evaluation of strategy ( $p < 0,01$ ), while there are significant differences in their analyses of current situations as well as review of results ( $p < 0,05$ ).

**5.5.6 The relationship between top banks and other banks and the application of holistic risk management**

The responses received in this study include 8 of the banks which were rated among the top 100 organisations selected by the (Financial Mail, 2003 : 66). The question can be asked whether these top banks in South Africa differ from the other banks regarding the application of HRM. The results of this comparison are given in EXHIBIT 5.12.

**EXHIBIT: 5 : 12 THE RESULTS OF THE TESTS TO ESTABLISH RELATIONSHIP  
BETWEEN TOP BANKS AND OTHER BANKS AND THE  
APPLICATION OF HRM**

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,267

**Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.**

According to EXHIBIT 5.12 the Wilks' lambda p value of 0,267 indicates that there is no significant difference between the responses of top banks and other banks regarding the application of HRM. Respondents of top banks employ the HRM operations which do not differ significantly from the respondents of other banks which are not among top 100.

It must be stressed that the inclusion of the 8 banks among the top 100 organisations was obtained by chance. The intention was not to compare top banks with other banks, with the result that this independent variable was not controlled in the same manner as the rest of the independent variables. However, when it was found that 8 respondents were among the top 100 organisations, it was decided that such a comparison could possibly be meaningful. The results should however, be interpreted with caution.

**5.5.7 The relationship between the respondents' position in the bank and the application of holistic risk management**

Although the questionnaires in this study were personally addressed to the chief executive officer of the bank, the researcher was aware that not all chief executive officers would complete the questionnaire. To account for possible differences, of perception between top management (chief executive officers) and management, it was decided to evaluate the designation of the respondent and the manner in which they responded to the questions. The results obtained are given in EXHIBIT 5.13.

**EXHIBIT: 5 : 13 THE RESULTS OF THE TEST TO ESTABLISH RELATIONSHIPS BETWEEN THE RESPONDENTS' POSITION IN THE BANK AND THE APPLICATION OF HRM**

TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,224

**Source: Own research: results obtained from multivariate analysis of section B of the questionnaire and an independent variable.**

Considering the Wilks' lambda p value of 0,224 it can be concluded that the hierarchical position of the respondent in the bank and the manner in which they perceive the application of HRM do not differ significantly. Thus, regardless of who completed the questionnaire, the results obtained are similar.

A summary of all the results obtained in establishing relationships between all the dependent variables when grouped according to independent variables, is presented in EXHIBIT 5.14.



**EXHIBIT: 5 : 14 A SUMMARY OF THE RESULTS IN ESTABLISHING  
RELATIONSHIPS BETWEEN THE BANKS AS  
DISTINGUISHED BY MEANS OF INDEPENDENT  
VARIABLES AND THE APPLICATION OF HRM**

INDEPENDENT VARIABLES	MANOVA PROCEDURE: Establish if a difference occurs	UNIVARIATE ANALYSIS OF VARIANCE: Differences occurring in:
Type of bank (young, growing or nature)	Significant difference (p < 0,05)	Analysis Strategy Implementation
Banks using a different number of departments to initiate HRM (all, two or more, one and none)	Highly-significant difference (p<0,01)	Analysis Strategy Planning Implementation Evaluation
The size of the bank according to number of employees	Highly-significant difference	Analysis Strategy Planning Evaluation
The size of the bank according to annual turnover (large or small)	Significant difference (p<0,05)	Strategy Implementation Review
Listed and unlisted Banks	Significant difference (p<0,05)	Analysis Strategy Review Evaluation
Top Banks and other Banks	No significant difference (p>0,05)	
Position of respondent in bank (top management and management)	No significant difference (p>0,05)	

**Source: Own research: section B and section C of the questionnaire**

An analysis of relationships in EXHIBIT 5.14 indicates that there are differences between the application of HRM (dependent variables) when distinguished by means of independent variables. The analysis also indicates in which of the dependent variables (management of holistic risk operations) these differences occur. In the

next paragraph an outline will be given of the variables where differences were found in order to establish the extent and nature of the differences.

## **5.6 THE NATURE AND EXTENT OF THE DIFFERENCES BETWEEN THE DEPENDENT VARIABLES**

In Paragraph 5.5, statistical relationships indicated that there were differences between the dependent variables. However, it needs to be established to what extent the dependent variables, when distinguished by independent variables, differ.

The multivariate analysis procedure used to establish relationships in Paragraph 5.6, computes mean values. The SPSS-X computer package used for the multivariate analysis therefore also reports mean values, by category. The means obtained and their confidence intervals can be used to establish the nature and extent of the observed differences between the variables.

By inspecting the mean values of each category as well as the confidence interval, the responses can be observed, for each category in the application of HRM process. The confidence interval used in this analysis will be 95%. This means that 95% of the times, the mean obtained will fall within the calculated range. The results obtained will be discussed in the following paragraphs.

### **5.6.1 Section B: holistic risk management analysis: category 1: the analysis of the current position regarding holistic risk management operations.**

It was established that the independent variables: type of bank, banks using a different number of departments to initiate HRM, the size of the bank (based on the number of employees) and listed and unlisted banks, differ in their response to the first category of HRM. EXHIBIT 5.15 outlines the results obtained to establish the nature and extent of these differences.

**EXHIBIT: 5 : 15 THE MEAN VALUES OF CATEGORY 1: ANALYSIS OF THE CURRENT POSITION REGARDING THE APPLICATION OF HRM**

Independent Variables		Number Of responses	Mean value	95% Confidence interval
Type of bank:	Young	30	20,93	19,88-21,98
	Growing	242	21,95	21,53-22,37
	Mature	170	21,13	20,63-21,64
Banks using different departments to initiate risk	All	152	22,93	22,41-23,45
	Two +	181	21,67	21,23-22,11
	One	72	19,81	19,13-20,48
	None	38	19,16	18,18-20,14
Size of the bank	Small (<1000)	309	21,23	20,86-21,60
	Large (>1000)	137	22,34	21,27-21,88
Listed Banks		124	22,16	21,64-22,68
Unlisted Banks		324	21,33	20,95-21,70

**Source: Own research: section B and section C of the questionnaire.**

There are seven variables to establish the analysis of the current position regarding HRM (see EXHIBIT 5.15). A maximum value of 35 indicates that the respondents use category 1, analysis of current position regarding HRM, whereas a minimum value of 7 indicates the opposite and a value of 21 refers to a neutral position.

Respondents from young South African banks on average (mean = 20, 93) do not analyse their current position regarding the application of HRM according to the proposed model. However, respondents from growing banks on average (mean = 21, 95) are more inclined to analyse their current position regarding the application of HRM than respondents from mature banks (mean = 21, 13).

If HRM is present throughout the bank and all departments initiate the HRM process, the respondents tend to analyse their position regarding the application of HRM (mean = 22, 93). Respondents using two or more departments to initiate HRM tend to use this category according to the proposed model (mean = 21, 67). Where one or no department initiates HRM in a bank, respondents reported that they do not analyse their current position regarding the application of HRM (mean = 19, 81 and 19, 16 respectively).

It can also be deduced from EXHIBIT 5.15 that respondents from small banks (size determined by number of employees) tend to be neutral regarding this category (mean = 21, 23). Respondents from large banks (mean = 22, 34), however tend to analyse their current position regarding the application of HRM. Respondents from unlisted banks (mean = 21, 33) behave in the same manner as respondents from small banks by not analysing their current position regarding the application of HRM. Respondents from listed banks (mean = 22, 16) are like the respondents from large banks. They tend to analyse their current position regarding the application of HRM.

### **5.6.2 Section B: holistic risk management strategy: category 2: the formulation of holistic risk management strategy**

The results obtained for category 2, the formulation of HRM strategies, are given in EXHIBIT 5.16. All the independent variables indicate that if a significant difference is observable, such a difference will occur in the strategy formulation of the respondents (see EXHIBIT 5.15). The strategy formulation is the application of HRM category which differs the most among the various respondents. To establish the nature and extent of the category, the mean values obtained will be analysed.

**EXHIBIT: 5 : 16 THE MEAN VALUES OF THE CATEGORY 2: THE FORMULATION OF HRM STRATEGY**

Independent Variables		Number Of responses	Mean value	95% Confidence interval
Type of bank:	Young	30	13,63	12,76-14,50
	Growing	242	14,50	14,17-14,84
	Mature	170	13,54	13,13-13,95
Banks using different departments to manage risk	All	152	14,93	14,50-15,36
	Two +	181	14,45	14,12-14,79
	One	72	12,86	12,23-13,49
	None	38	11,28	10,58-12,00
Size of the bank	Small (<1000)	309	13,74	13,43-14,06
	Large (>1000)	137	14,86	14,48-15,25
Size of the bank	Small (<R10 mil)	94	13,44	12,83-14,05
	Large (>R10 mil)	353	14,25	13,98-14,52
Listed Banks		124	14,65	14,22-15,08
Unlisted Banks		324	13,86	13,55-14,16

**Source: Own research: section B and section C of the questionnaire.**

In EXHIBIT 5.16 it was indicated that there are 4 variables in Category 2: formulation of HRM strategies. The maximum value to be obtained for this category is 20, which indicates that the formulation of holistic risk strategy is like the proposed model. The minimum value of 4 indicates the opposite and a value of 12 indicates a neutral position. From EXHIBIT 5.16 it can be concluded that all respondents on average do formulate holistic strategies for HRM except for those respondents where HRM is not initiated by any department (mean value all above 12 except for respondents where no department initiates HRM).

Respondents from growing banks, banks utilizing two or more departments to initiate HRM, large banks (based on number of employees and annual turnover) and listed banks on average do formulate holistic risk strategies like the proposed model (mean values are higher).



Unlike the analysis of current position regarding HRM, respondents from young banks formulate strategies for HRM more like the proposed model than respondents from mature banks.

### 5.6.3 Section B: holistic risk management planning: category 3: the establishment of a plan for holistic risk management

There are 4 variables used in establishing Category 3: the establishment of a plan for HRM (see EXHIBIT 5.17). A maximum value of 20, a minimum value of 5 and a neutral value of 12 are applicable to this category. Considering the mean values in EXHIBIT 5.17, respondents on average do not establish a plan for HRM except for respondents using all departments to initiate HRM (all mean values below 12 except for respondents using all departments to initiate HRM).

#### EXHIBIT: 5 : 17 THE MEAN VALUES OF CATEGORY 3: THE ESTABLISHMENT OF A PLAN FOR HRM

Independent Variables		Number Of responses	Mean value	95% Confidence interval
Banks using different departments to manage risk	All	152	12,55	12,12-12,98
	Two +	181	11,90	11,55-12,24
	One	72	9,91	9,35-10,48
	None	38	9,47	8,85-10,09
Size of the bank	Small (<1000)	309	11,35	11,06-11,65
	Large (>1000)	137	12,09	11,64-12,54

**Source: Own research: section B and section C of the questionnaire.**

EXHIBIT 5.17 indicates that there are only two independent variables which indicated a difference for Category 3: The establishment of a plan for HRM. It thus seems that respondents on average establish a plan for HRM in a similar manner.

**5.6.4 Section B: Holistic risk management implementation, motivation and control: category 4: the implementation, motivation and control of holistic risk management strategy**

The results obtained for Category 4 are given in EXHIBIT 5.18. Four of the independent variables indicated a difference for category 4: the implementation of HRM strategy. Compared to Category 3: the formulation of HRM strategy, differences occur in the same independent variables, except for the independent variable: listed and unlisted banks. Respondents from listed and unlisted banks did not report meaningful differences with respect to the implementation of HRM strategies.

**EXHIBIT: 5 : 18 THE MEAN VALUES OF CATEGORY 4: THE IMPLEMENTATION OF HRM STRATEGY**

Independent Variables		Number Of responses	Mean value	95% Confidence interval
Type of bank:	Young	30	21,37	20,53-22,20
	Growing	242	22,49	22,09-22,88
	Mature	170	21,47	20,93-22,01
Banks using different departments to manage risk	All	152	23,07	22,55-23,59
	Two +	181	22,40	21,95-22,87
	One	72	20,08	19,42-20,74
	None	38	19,76	19,00-20,52
Size of the bank (Based on employees)	Small (<1000)	309	21,69	21,32-22,05
	Large (>1000)	137	22,76	22,22-23,30
Size of the bank (based on annual turnover)	Small (<R10 mil)	124	21,22	20,56-21,89
	Large (>R10 mil)	324	22,21	21,87-22,55

**Source: Own research: section B and section C of the questionnaire.**

The results in EXHIBIT 5.18 indicates that respondents representing growing banks, banks using two or more departments to initiate HRM and large banks reported results which coincide with the proposed model (mean values are the highest). There are 7 variables to establish the implementation of HRM strategies. A maximum value of 35 would indicate an implementation of strategy according to the proposed model, whereas a value of 7 would indicate the opposite and 21 would be a neutral value.

Considering these maximum, minimum and neutral values, it can be concluded that respondents from banks which use one department to initiate HRM, did not report implementation of HRM strategies (mean = 20, 08). The respondents from young banks reported results which are similar to the responses from mature banks (mean values = 21, 37 and 21, 47 respectively).

### 5.6.5 Section B: holistic risk management review of results: category 5: the review of results

The independent variables that do exhibit a significant difference in the review of results are the size of the bank (based on the number of employees and annual turnover) and listed and unlisted banks. Respondents from young, growing and mature banks did not differ meaningfully in how they review HRM results. Respondents from banks using a different number of departments to initiate HRM also show no meaningful difference in their responses with regard to the review of their results. The results obtained for this section are given in EXHIBIT 5.19.

**EXHIBIT: 5 : 19 THE MEAN VALUES OF CATEGORY 5: THE REVIEW OF RESULTS**

Independent Variables		Number Of responses	Mean value	95% Confidence interval
Size of the bank (Based on employees)	Small (<1000)	309	21,69	21,32-22,05
	Large (>1000)	137	22,76	22,22-23,30
Size of the bank (based on annual turnover)	Small (<R10 mil)	94	14,04	13,57-14,52
	Large (>R10 mil)	353	13,86	13,65-14,07
Listed Banks		124	13,58	13,21-13,95
Unlisted Banks		324	14,02	13,80-14,25

Source: Own research: section B and section C of the questionnaire.

From Table 5.19 it can be seen that there are 4 variables in this category. The maximum value of 20 indicates that the respondents reported that they review their results like the proposed model and a value of 4 means the opposite. A value of 12 indicates a neutral position. Although all the respondents indicated in EXHIBIT 5.19 reported to review results according to the proposed model (mean values above 12), differences exist. Contrary to the previous categories (all categories in the HRM process); it is the respondents from the small bank and unlisted bank who have reported to review results more like the proposed model than other banks. This response is the opposite to the responses of the other categories in the management of risk.

### 5.6.6 Section B: holistic risk management evaluation and plan modification: category 6: evaluation and plan modification

The responses in respect of evaluation and plan modification, the last category in the management of risk, only differs significantly for banks using a different number of departments to initiate HRM, the size of the bank (based on the number of employees) and listed and unlisted banks. The results obtained to illustrate these differences are given in EXHIBIT 5.20.

#### EXHIBIT: 5 : 20 THE MEAN VALUES OF CATEGORY 6: EVALUATION AND PLAN MODIFICATION

Independent variables	No: of responses	Mean value	95% Confidence interval	
Banks using a different number of departments to initiate HRM	All	152	10,73	10,42-11,04
	Two+	181	10,63	10,30-10,87
	One	72	9,74	9,37-10,10
	None	38	9,39	8,88-9,90
The size of the bank (based on the number of employees)	Small (<1000)	309	10,06	9,87-10,25
	Large (>1000)	137	11,19	10,90-11,48
Listed Banks	124	10,89	10,59-11,19	
Unlisted Banks	324	10,22	10,02-10,41	

Source: Own research: section B and section C of the questionnaire.

There are 3 variables in Category 6 (see EXHIBIT 5.20). The maximum value of 15 will thus indicate that the sample banks evaluate and modify plans like the proposed model, whereas a value of 3 means the opposite. A value of 9 indicates a neutral position.

From EXHIBIT 5.20 it can be deduced that all respondents reported that they evaluate their strategies and modify plans according to the proposed model. However, respondents from banks that use one or no department to initiate HRM (mean values all above 9) do not. Respondents from banks that use two or more departments to initiate HRM, large banks and listed banks reported results which are similar to the proposed model (mean value are highest). It can be concluded that the respondents reported that HRM is managed. Based on the responses, the extent to which, the process is managed differ meaningfully between the banks.

The argument that South African banks do manage HRM therefore seems to hold.

However, the above inference can be questioned considering the disadvantages of using a mail survey where the response rates are normally low (Nel, *et al* 2000 : 187). It was already emphasized in Chapter 4 that the researcher will account for non-response by using the speed of response. In the next paragraph non-response bias will be estimated from the speed of response.

Kanuk and Berenson (2001 : 440-453) suggest a method to predict non-response bias. This method will be used to account for non-response bias in this study.

In this study 448 responses were used in the multivariate analysis of Section B of the questionnaire. Of this number, 311 respondents completed their questionnaires after the first request and reminder letter, and 137 completed theirs only after a second postage of a questionnaire and a request for completion. These 137 respondents had thus responded as a result of an increased stimulus and can be seen as similar to the non-respondents.

The same procedure that was used to establish relationships between the independent variables and the application of HRM process (see Chapter 4) can be

used to establish if there are any differences between the responses of respondents and non-respondents.

The results of the multivariate analysis tests used to establish these differences are given in EXHIBIT 5.21.

**EXHIBIT: 5 : 21 THE RESULTS OF THE TESTS TO ESTABLISH  
RELATIONSHIPS BETWEEN NON-RESPONDENTS  
AND RESPONDENTS**

TEST	DEPENDENT VARIABLE	P VALUE
Wilks' lambda F-test of significant	All	0.540

**Source: Own research**

Considering the p value of 0,540 of the Wilks' lambda F-test of significance, it can be concluded that there is no significant differences between the responses of respondents and non-respondents ( $p > 0, 05$ ). The results of this study are therefore representative of the population as respondents do not differ in a significant way from the non-respondents.

**5.7 SUMMARY OF RELATIONSHIPS**

The hypothesis that South African banks do manage HRM was proved to be true. The procedure used to prove this hypothesis was firstly to provide an overview of the data by means of descriptive statistics. The descriptive statistics used to summarise the data indicated that South African banks do manage HRM.

Before the multivariate analysis procedure was used to establish relationships between variables, the validity and reliability of the measures used to obtain the data were discussed. By using the multivariate analysis procedure, various relationships were established. EXHIBIT 5.22 provides a summary of the relationships established using the multivariate analysis procedure.

**EXHIBIT: 5 : 22 SUMMARY OF THE RESULTS OF THE MULTIVARIATE ANALYSIS TO ESTABLISH RELATIONSHIPS BETWEEN VARIABLES**

Independent Variables	Manova Procedure (Difference or not)	Univariate Analysis of Variance (Difference occur in )	Mean Values (Extent of the differences)
Type of bank (young, growing or mature)	Significant difference	Analysis Strategy Implementation	Growing Banks manage more like proposed model. Behavior of young and mature Banks similar
Banks using a different number of departments to initiate HRM (All, two+, one and none)	Highly significant difference	Analysis Strategy Planning Implementation Evaluation	Banks using one or no departments do not manage risk according to the proposed model while Banks using 2+ departments do
The size of the bank (based on the number of employees) (large or small)	Highly significant difference	Analysis Strategy Planning Implementation Review Evaluation	Large Banks manage more like the proposed model except for review of results which small Banks execute better
The size of bank (based on annual turnover) (large or small)	Significant difference	Strategy Implementation Review	Large Banks superior in their management except for review of results
Listed and unlisted Banks	Significant difference	Analysis Strategy Review Evaluation	Listed Banks manage more like the proposed model except for review
Top Banks and other Banks	No significant difference		
Position of respondent in the bank (top management and management)	No significant difference		

**Source: Own research section B and section C of the questionnaire**

To account for non-response bias, the speed of response was used. It was established that there are no significant differences between respondents and non-respondents. The respondents are thus representative of the population and the statistical inferences valid.

## **5.8 SOPHISTICATED STATISTICAL ANALYSIS OF THE DATA**

In Chapter 4 it was emphasized that the culture of a bank should be analysed to establish if it is suitable for the implementation of HRM. One of the objectives of this study is to gain an understanding of the critical success factors for the implementation of HRM as a strategy in the banking industry. Thus, if the culture of South African banks is analysed, it can be established whether they can implement HRM or not.

In this section the empirical information obtained will be analysed to achieve the set objective. A preliminary analysis of the empirical data will provide an overview of the results. Thereafter the validity and reliability of the measures used will be discussed. This will enable the use of more sophisticated statistical methods to analyse the data. Before any relationships between the culture of the bank and various independent variables (for a definition of the independent variables are established, factor analysis will be used to group variables included in the culture of the bank.

An analysis of the relationships between the culture of the bank and the independent variables will show whether the culture is of such a nature that HRM can be implemented. The relationship between the culture of the bank and the management of risk will be determined to establish whether a bank with a specific culture uses a certain strategy to manage risk.

To conclude, non-response bias will be discussed to account for non-response bias due to the low response rates found in mail surveys.

## **5.9 PRELIMINARY DATA ANALYSIS**

In Chapter 4, it was stated that the first step was a preliminary data analysis. The same procedure will be used in this chapter. The most commonly used descriptive statistics, obtained using the SPSS-X computer package, will again be used to summarise the results. The descriptive statistics used will be the same as those used to establish the management of risk in South African banks.



Section A of the questionnaire used in this study, which deals with the organizational culture of the bank (hereafter referred to as the culture of the bank). Consists of 23 questions (see Annexure A for a copy of the element of the culture of the bank. Section A of the questionnaire can also be divided into three sub-sections where each sub-section includes questions on aspects such as norms, nature of work and external affairs (see HRM culture in Chapter 2). Annexure A provides a complete summary of the elements included in each question contained in Section A of the questionnaire. There are 23 elements included in the culture of the bank (see Annexure A). These elements can be referred to as variables, as the answer to each element can vary.

The results obtained using descriptive statistical techniques are given in EXHIBIT 5.23.

**EXHIBIT: 5 : 23 SUMMARY OF THE DESCRIPTIVE STATISTICS FOR THE TWENTY THREE ELEMENTS INCLUDED IN SECTION A OF THE SURVEY QUESTIONNAIRE**

Variables (elements)	Mean	Mode	Median	Std deviation	Skewness	Kurtosis	Std error
Norms:							
A1- Interaction	3,874	4,000	4,000	0,821	-0,874	1,029	0,038
A2- decision – making	3,494	4,000	4,000	0,949	-0,516	-0,342	0,044
A3-New ideas	4,229	4,000	4,000	0,703	-0,811	1,196	0,033
A4-Honesty	4,063	4,000	4,000	0,967	-1,041	0,771	0,045
A5- Coertion	3,095	4,000	3,000	1,059	-0,302	-0,661	0,049
A6- Performance	4,050	4,000	4,000	0,829	-1,199	2,206	0,039
A7- Responsibility	3,738	4,000	4,000	0,854	-0,774	0,640	0,040
A8-Crisis handling	3,199	4,000	3,000	1,064	-0,294	-0,754	0,050
A9- Productivity incentives	3,537	4,000	4,000	0,928	-0,623	-0,042	0,043
A10-Risk-taking	2,684	2,000	3,000	0,966	-0,131	-0,577	0,045
A11- Management example	3,896	4,000	4,000	0,805	-1,010	1,702	0,037

A12- Introspection performance	3,882	4,000	4,000	0,801	-0,784	0,904	0,037
A13-Quality	4,216	4,000	4,000	0,740	-1,014	1,596	0,034
NATURE OF WORK							
A14- Work quantity	3,653	4,000	4,000	0,848	-0,368	-0,212	0,039
A15- Work quality	4,093	4,000	4,000	0,767	-0,798	0,862	0,036
A16- Advancement	3,758	4,000	4,000	0,808	-0,598	0,304	0,038
A17-Working conditions	2,399	2,000	2,000	0,935	0,791	0,264	0,044
A18-Jb routine	3,009	3,000	3,000	0,836	0,006	-0,543	0,030
A19- Feedback	3,260	4,000	3,000	0,897	-0,317	-0,415	0,042
EXTERNAL AFFAIRS							
A20- Social responsibility	3,238	4,000	3,000	0,992	-0,277	-0,546	0,046
A21- Customer orientation	4,372	5,000	4,000	0,724	-1,112	1,391	0,034
A22- Outside criticism	3,844	4,000	4,000	0,865	-1,189	2,219	0,040
A23- Ethics	4,311	4,000	4,000	0,715	-1,112	2,132	0,033

**Source: Own research results obtained from analysing section A of the questionnaire (see annexure F description of the variables)**

EXHIBIT 5.23 indicates that the majority of the variables have a mean value above the neutral value of 3. This indicates that, taking the mean as an appropriate measure, the respondents on average tend to have a culture which corresponds with the model on the HRM culture. However, it was indicated in Chapter 5 (see EXHIBIT 5.1) that the mean is not always the best measure to use when continuous data is analysed. The shape of the distribution will influence the choice of the central tendency technique.

From EXHIBIT 5.23, it can be seen that there are 8 variables with a mean score below 3.5. The low score indicates that these variables in the culture of the sample banks need attention as it may not be included in the culture of the banks (the

researcher used judgement to establish 3.5 as a low score, based on the score of 3 indicating a neutral position). It is necessary to analyse these 8 variables to investigate the elements of the HRM culture which need to be addressed.

The first variable to be analysed is decision-making (A2), with a mean score of 3,494. The distribution of A2 is negatively skewed (skewness = -0,516) and has a low peak (kurtosis = -0,342). The median will be the most appropriate measure to use. The median of A2 is 4. This value shows that on average, the respondents tend to employ participative decision-making techniques.

The second variable, coercion (A5), which has a mean score of 3,095 is also negatively skewed (skewness = -0,302) and has a low peak (kurtosis = -0,661). The median will thus be an appropriate measure to use. The score of 3 for the median indicates that the respondents on average tend to be neutral in their response to coercive techniques in managing their employees. Coercion in a culture has a negative effect on HRM. Freedom to act is very important to an entrepreneurial or growing bank.

A third variable, crisis-handling (A8), which has a mean score of 3,199, is also negatively skewed (skewness = -0,294) and has a low peak (kurtosis = -0,754). The median of 3 indicates that the respondents on average tend to be neutral in their response to crisis-handling. Crisis management does not enhance good HRM in a bank.

Risk-taking (A10) is the fourth variable, with a mean score of 2,684, which should be analysed. Descriptive statistics for A10 indicate that it is positively skewed (skewness = 0,131) and has a low peak (kurtosis = -0,577). The median of 3 is an appropriate measure to use. The respondents on average tend to be neutral in their response to risk-taking (median is neutral). In the banking industry employees should be encouraged to take risks to aid innovation.

Variables included in the nature of work, such as working conditions (A17), job routine (A18) and feedback (A19), all indicated a low mean score. An analysis the shape of the distribution of these results shows the following:

•The results of the variable job routine (A18) indicate that it is positively skewed (skewness = 0,006) and has a low peak (kurtosis = -0,543).

On average (median = 3) the respondents remain neutral in their response to job routine. The reduction of job routine is necessary to stimulate individual initiative in HRM and the culture of the bank.

•The results of the variable working conditions (A17) (mean = 2,399), indicate that it is positively skewed (skewness = 0,791) and has a high peak (kurtosis = 0,264). The mode of 2 is thus the most appropriate measure to use. This low average indicates that flexibility in working conditions seems not to be a common practice among the respondents.

•The results of the variable feedback (A19) (mean = 3,260), indicates that it is negatively skewed (skewness = -0,317) and has a low peak (kurtosis = -0,415). The median of 3 indicates that the respondents remain neutral in their response to feedback. Quick and clear feedback is important to motivate employees in terms of HRM and the culture of the bank.

Another variable included in external affairs, namely social responsibility (A20), has a mean score of 3,238. The shape of distribution for A20 indicates that it is negatively skewed (skewness = -0,277) and has a low peak (kurtosis = -0,546). The median score of 3 indicates that the respondents on average tend to remain neutral to social responsibility. Social responsibility programmes are beneficial to banks.

The standard error, which indicates the reliability of the estimates (variables), is also acceptable for Section A of the questionnaire. The respondents do not vary to a great extent from one another in their responses to items in Section A.

Before using more advanced statistical techniques, the validity and reliability of the measures used in Section A of the questionnaire will be discussed.

## 5.10 THE VALIDITY AND RELIABILITY OF THE MEASURES USED

Chapter 4 discussed the validity of the measures used in Section B of the questionnaire. To account for reliability, Cronbach's alpha was used to test the measures' internal reliability. The results obtained for Section A of the questionnaire are given in EXHIBIT 5.24.

### EXHIBIT: 5 : 24 CRONBACH'S ALPHA TEST OF INTERNAL RELIABILITY FOR SECTION A OF THE QUESTIONNAIRE

Question	Alpha	Question	Alpha
A1	0,8446	A13	0,8473
A2	0,8429	A14	0,8632
A3	0,8425	A15	0,8422
A4	0,8551	A16	0,8412
A5	0,8622	A17	0,8517
A6	0,8452	A18	0,8416
A7	0,8469	A19	0,8401
A8	0,8504	A20	0,8508
A9	0,8446	A21	0,8466
A10	0,8555	A21	0,8425
A11	0,8409	A23	0,8476
A12	0,8413		

**Source: Own research: section A of the questionnaire**

The alphas obtained in EXHIBIT 5.24 indicate Cronbach's alpha for the individual measures. The overall value of Cronbach's alpha for Section A is 0,8531. The value of 0,8531 indicates that the measures are internally reliable (Cronbach's alpha > 0,8). Bryman and Cramer (2000 : 71) emphasized that the results of Cronbach's alphas should be above 0,8 to indicate internal reliability.

## 5.11 THE RELATIONSHIPS BETWEEN THE DIFFERENT VARIABLES

The questionnaire used in this study (see Annexure A for a copy) consisted of various sections, of which Section A established the culture of the bank. The variables in Section A are divided into three groups, each measuring a specific aspect of the culture of the bank such as norms, nature of work and external affairs (see Annexure

A). These groups were established by using the HRM culture discussed in Section 2.10.

Another method which can be used to group a number of variables is factor analysis. Kerlinger (2002 : 569) states that factor analysis indicates which variables (measures) belong together, in other words, which variables measure the same aspects. A group of variables measuring the same aspect constitutes a factor.

The three groups that were established and discussed in Chapter 2 namely norms, nature of work and external affairs, each also contain variables which measure the same aspect and can be referred to as factors. Thus, based on the discussion in Chapter 2 the culture of the bank consists of three factors, namely: norms, nature of work and external affairs.

A further factor analysis on the variables of Section A of the questionnaire was performed to determine whether the results obtained also constitute the same factors as established in Chapter 4. The SPSS-X computer package was used to perform this factor analysis. The results were obtained by selecting three factors from the variables and using the quartimax rotation of factors. Factor rotation is necessary as it facilitates interpretation of results (Kerlinger, 2002 : 579). The results obtained are given in EXHIBIT 5.25.

**EXHIBIT: 5 : 25 A ROTATED FACTOR MATRIX OF THE TWENTY THREE BANK CULTURE VARIABLES**

Variable	Factor 1	Factor 2	Factor 3
A11	0,68747		
A19	0,68147		
A15	0,67358	-0,26447	
A16	0,67106		
A12	0,66025		
A18	0,65620		
A3	0,64078		
A2	0,61167		
A22	0,59129		0,30440
A6	0,57584		
A1	0,57336		
A9	0,57043		-0,32917
A7	0,52079		
A13	0,50768	-0,27302	
A20	0,39096		-0,25303
A14		-0,75747	
A5		0,55657	
A8	0,40012	0,43678	
A10		0,37423	
A21	0,49297		0,56323
A23	0,45879		-0,46899
A17	0,35696		-0,42802
A4	0,28234		-0,28557

**Source: Own research: section A of the questionnaire.**

EXHIBIT 5.25 outlines the factor loadings obtained. It can be seen, for example, that variable A11 has a factor loading of 0, 68747 on Factor 1. Using the factor loadings the variables can be grouped into the three respective factors according to the highest values obtained. It should be noted that if two factor loadings appear for the same variable, the one with the highest factor loading should be selected. The negative sign does not indicate a negative value for the factor loading, but rather the direction of the correlation (Bryman and Cramer, 2000 : 260). Thus, considering variable A17 with a factor loading of 0, 35696 for Factor 1 and –0, 42802 for Factor 3, the highest factor loading is (-) 0, 42802, with variable A17 loading the highest on Factor 3. If this procedure is used for all the variables, then they can be grouped into three factors. EXHIBIT 5.26 outlines the variables grouped into three factors.

**EXHIBIT: 5 : 26 RESULTS OF THE FACTOR ANALYSIS OF THE BANK  
CULTURE VARIABLES**

Factor 1	Factor 2	Factor 3
A1-Interaction A2-Decision-making A3- New ideas A6- Performance A7- Responsibility A9-Productivity-incentives A11-Management examples A12- Introspection A13- Performance quality A15- Work quality A16- Advancement A18-Job routine A19-Feedback A20- Social responsibility A22- Outside criticism	A5- Coercion A8- Crisis handling A10- Risk-taking A14- Work quality	A4- Honesty A17-Working-conditions A21- Customer orientation A23-Ethics

**Source: Own research section A of the questionnaire.**

From EXHIBIT 5.26 it can be deduced that there is a difference between the variables included in the three factors obtained by factor analysis and the three factors established in (also see EXHIBIT 5.26). However, Walizer and Wiener (2003 : 416) indicate that variables can be grouped by definition (as was done by the researcher) and these variables do not specifically have to be interrelated. Therefore another set of factors can be established using factor analysis.

If the factors in EXHIBIT 5.26 are analysed, Factor 1 includes the variables related to corporate policy (Haskins and Williams, 2002 : 62). Factor 2 contains the variables which are crucial for an innovative climate (Haskins and Williams, 2000 : 53). Factor 3 includes the variables related to business ethics and relations to customers. To facilitate further discussion, Factor 1 will be referred to as corporate policy (it includes variables related to corporate policy), Factor 2 as crucial aspects (it contains variables related to crucial aspects) and Factor 3 as ethics and relations (it includes variables related to ethics and external relations).



### **5.11.1 The relationship between the culture of the bank and the application of holistic risk management**

In the previous paragraph relationships between variables were established. This was achieved by determining the differences between the independent and dependent variables.

Dominowski (2001 : 30) states that there is another way to establish relationships between variables. According to Dominowski (2001 : 30), relationships between variables are described rather than established. In other words, after deciding that there is a relationship between variables, the kind of relationship is determined. The method determining the kind of relationship will be used to establish the relationship between the culture of the bank and the management of risk. Variables measuring the culture of the bank and those measuring the management of risk both use interval scales. None of the variables are independent or dependent. Alreck and Settle (2000 : 352) suggest that Pearson's coefficient of correlation method can be used to establish the required relationships.

A correlation coefficient (such as Pearson's  $r$ ) indicates both the direction and the strength of the relationship between two continuous variables, in a single number (Parasuraman 2004 : 645). The value of Pearson's  $r$  varies between  $-1$  and  $+1$ . A relationship of  $-1$  or  $+1$  indicates a perfect relationship whereas  $0$  indicates no relationship (Bryman and Cramer, 2000 : 168). Bryman and Cramer (2000 : 171) further explain that the statistical significance of the correlation coefficient ( $r$ ) can be determined. Both the correlation coefficient ( $r$ ) and the significance level should be interpreted when computing correlations (Bryman and Cramer, 2000 : 171).

The results obtained from using the predetermined factors of the culture of the bank as a group of variables (see EXHIBIT 5.26), and the management of risk as another group of variables, are given in EXHIBIT 5.27.

**EXHIBIT: 5 : 27 THE CORRELATION COEFFICIENTS OF THE PREDETERMINED FACTORS OF THE CULTURE OF THE BANK AND THE MANAGEMENT OF RISK**

	Norms	Nature of work	External affairs	Analysis	Strategy	Planning	Implementation	Review of results	Evaluation
1 Norms p=	1,000								
2 Nature of work p=	0,6306 0,000	1,000							
3 External affairs p=	0,5339 0,000	0,5052 0,000	1,000						
4 Analysis p=	0,5251 0,000	0,5764 0,000	0,4675 0,000	1,000					
5 Strategy p=	0,4900 0,000	0,4732 0,000	0,4753 0,000	0,6163 0,000	1,000				
6 Planning p=	0,3634 0,000	0,4462 0,000	0,3505 0,000	0,6244 0,000	0,5677 0,000	1,000			
7 Implementation p=	0,4633 0,000	0,4829 0,000	0,4515 0,000	0,6204 0,000	0,5032 0,000	0,5980 0,000	1,000 0,000		
8 Review p=	-0,0002 0,996	0,1415 0,002	0,1480 0,001	0,0118 0,801	0,1203 0,010	0,0757 0,105	0,0184 0,694	1,000	
9 Evaluation p=	0,3094 0,000	0,2300 0,000	0,2980 0,000	0,3122 0,000	0,3451 0,000	0,3007 0,000	0,2933 0,000	0,0805 0,085	1,000

**Source: Own research: section A and section B of the questionnaire.**

From EXHIBIT 5.27 the following conclusions can be made:

- There is a positive relationship between all the variables (Pearson's correlation coefficient > 0). This implies that if one variable increases, the other variable will also increase. The only negative correlation is review of results and norms. This indicates that if one variable increases, the other variable will decrease.

- The p value indicates the level of significance. The level of significance indicates whether the relationships have arisen by chance or not (Bryman and Cramer, 2000 : 171). A low level of significance (p value < 0.001) indicates that it was unlikely that the relationships have arisen by chance, and that the established relationships also hold in the population. If a p value > 0,099 exists, this would indicate that the

relationship has indeed arisen by chance and therefore there can be no statistical relationship between the variables. It must be noted that the review of results revealed a high level of significance ( $p > 0,099$ ) for the variables norms, analysis, planning and implementation. Review of results has indicated no relationship with analysis, planning and implementation.

- The factors of the culture of the bank correlate highly with each other (Pearson's correlation coefficients  $> 0,5$ ). In other words, a bank with norms like the HRM culture will tend to also have nature of work and external affairs close to the HRM culture. The correlation between the factors of the bank culture and the analysis of current situation is also high (lowest correlation =  $0,4675$ ). This implies that a bank with a culture close to that of the HRM model will also tend to formulate innovation risk strategies.

- The establishment of a plan for HRM also correlates highly with the factors of the culture of the bank. External affairs show the lowest correlation (Pearson's coefficient  $r = 0,3505$ ).

- The correlation between the factors of the culture of the bank and the implementation of HRM strategy is also high (lowest correlation coefficient  $r = 0,4515$ ).

- Review of results, however, indicates a low correlation with the factors of the culture of the bank (lowest correlation =  $-0,0002$ ). The significance level ( $p$  value  $> 0,099$ ) has indicated that no relationships exist.

- Evaluation and plan modification correlates more than the review of results, but not as much as the other steps in the HRM process. The significance level of this step indicates that there are relationships ( $p < 0,001$ ).

- The various steps in HRM also correlate highly with each other, with the exception of review of results which does not correlate with the other steps in the process (the only correlation is with strategy formulation  $r = 0,1203$  and  $p = 0,010$ ).

It can be concluded that there is in general a positive correlation between the factors of the culture of the bank and the application of HRM process. The results obtained using the factors as determined by factor analysis and the HRM are given in EXHIBIT 5.28.

**EXHIBIT: 5 : 28 THE CORRELATION COEFFICIENTS OF THE ESTABLISHED FACTORS IN THE CULTURE OF THE BANK AND THE APPLICATION OF HRM**

		Corporate policy	Crucial aspects	Ethics and relations
Corporate policy	r=	1,000		
Crucial aspects	r=	0,3374	1,000	
	P=	0,000		
Ethics and relations	r=	0,5963	0,2436	1,000
	P=	0,000	0,000	
Analysis	r=	0,6131	0,2740	0,3984
	P=	0,000	0,000	0,000
Strategy	r=	0,5506	0,2414	0,4081
	P=	0,000	0,000	0,000
Planning	r=	0,4614	0,0917	0,3242
	P=	0,000	0,031	0,000
Implementation	r=	0,5405	0,1814	0,3831
	P=	0,000	0,000	0,000
Review of results	r=	0,0843	-0,0257	0,0895
	P=	0,074	0,585	0,056
Evaluation	r=	0,3133	0,1370	0,2725
	P=	0,000	0,003	0,000

**Source: Own research: section A and section B of the questionnaire**

From EXHIBIT 5.28 the following conclusions can be made:

- The Pearson's correlation coefficients (r) are all positive, which indicates that an increase in one variable will also lead to an increase in another variable (except for review of results and crucial aspects)
- The significance level (p) is very low ( $p < 0,001$ ). This means that the relationships did not occur by chance and these relationships will also be found in the population (except for review of results).

- The review of results correlates minimally with the culture of the bank (lowest correlation = -0, 0257). The significance level (p value) for the factor crucial aspects, indicates that there is no relationship with this variable (p = 0,585).

- The factor crucial aspect in general does not correlate highly with the application of HRM (correlations [r] range from -0, 0257 to 0, and 2740).

To conclude, there is a positive relationship between the culture of the bank and the application of HRM. The factor, crucial aspects, in the culture of the bank, however, does not correlate as highly as the other factors.

Dominowski (2001 : 250) emphasized that the Pearson's r correlation coefficients can be used to predict scores. If the correlation between two variables is known, then the correlation (r) can be used to predict scores in one distribution on the basis of scores in the other distribution. The use of Pearson's r to predict scores will be discussed in the following paragraph.

### 5.11.2 Using Pearson r to predict scores

In the above two paragraphs the relationships between the culture of the bank and the applications of HRM were discussed. It was established that there is a positive correlation between variables in the culture of the bank and the application of HRM. The Pearson correlation coefficient (r) indicated the extent of the correlation.

Dominowski (2001 : 250) suggests a method which can be used to predict scores in one variable if the scores in another variable are known, using Pearson correlation coefficients. If the scores of culture of the bank are known, the scores for the application of HRM can be predicted. Prediction of the scores of the culture, if the scores of the application of HRM are known, is also possible.

This method is based on the linear relationship between the variables. Thus, if the scores of the culture of the bank ( $Z_x$ ) are known, then the scores for the management of risk ( $Z_y$ ) can be predicted by using the following formula:

$$\text{Predicted } Z_y = rZ_x$$

$r$  = the Pearson's correlation coefficient.

$Z$  = constant

This formula can then be used to predict scores.

It must be emphasized that the data used in this study was obtained through a mail survey. The use of mail surveys, however, can lead to response bias due to the low response rates achieved with it. In the next paragraph the procedure used to account for non-response bias will be discussed.

## **5.12 ESTIMATING NON-RESPONSE BIAS FROM THE SPEED OF RESPONSE**

Kanuk and Berenson (2001 : 440-453) suggest a method to estimate non-response bias from the speed of response. Kanuk and Berenson (2001 : 440-453) stated that people who respond because of an increased stimulus are expected to look like the non-respondents.



In this study 448 responses were used in the multivariate analysis of Section B of the questionnaire. Of this number, 311 respondents completed their questionnaires after the first request and reminder letter, and 137 completed theirs only after a second postage of a questionnaire and a request for completion. These 137 respondents had thus responded as a result of an increased stimulus and can be seen as similar to the non-respondents.

The same multivariate analysis procedure stated in chapter 4 can be used to establish if there is any difference between the responses of respondents and non-respondents. It must be noted that when the factors as established by factor analysis of the culture of the bank are used the number of respondents and non-respondents will be 309 and 131 respectively. This difference in number of respondents is used to the multivariate procedure used which eliminates any response with an item coded 0 (question not answered).

The results of the multivariate analysis methods used to establish differences in the non-respondents and respondents are given in EXHIBIT 5.29.

**EXHIBIT: 5 : 29 THE RESULTS OBTAINED TO ESTABLISH RELATIONSHIPS BETWEEN RESPONDENTS AND NON-RESPONDENTS**

CULTURE OF THE BANK ACCORDING TO PREDETERMINED FACTORS		
TEST	DEPENDENT VARIABLES	P VALUE
Wilks lambda F-test of significance	All	0,212
CULTURE OF THE BANK ACCORDING TO ESTABLISHED FACTORS		
TEST	DEPENDENT VARIABLES	P VALUE
Wilks' lambda F-test of significance	All	0,646

**Source: Own research**

In EXHIBIT 5.29, the Wilks' lambda p values are 0,212 and 0,646, both of which are greater than 0, 05. This implies that there is no significant difference between the responses of respondents and non-respondents.

As there is no significant difference between the responses of respondents and non-respondents, the statistical inferences made will be applicable to the population as a whole.

**5.13 SUMMARY OF THE RESULTS**

This chapter commenced with a discussion of a number of descriptive statistics which was selected for the purpose of this study.

The analysis of data was done in line with the main objectives of this chapter. Firstly to gain an insight into the culture of the South African banks; secondly to ascertain the relationship between the culture of the bank and the application of HRM; thirdly to establish the application of HRM in the South African banking industry, and fourthly to establish the relationships between various variables and draw conclusions thereto.

Preliminary analysis of the culture of South African banks indicates that they have a culture which is similar to the proposed HRM culture. To enable the use of more sophisticated statistical techniques, the reliability and validity of the measures used were established. A high value for Cronbach's alpha and other techniques indicated

that the measures used were both reliable and valid. Factor analysis was used to establish which variables in the culture of the bank were related to the same concepts. Contrary to the factors indicated by the researcher's judgements, three other factors emerged. Besides norms, nature of work and external affairs as factors of the culture of the bank, corporate policy, crucial aspects, ethics and relations made another set of factors.

EXHIBIT 5.30 summarises the results obtained in the search for relationships between the independent variables and the culture of the respondents' bank.

**EXHIBIT: 5 : 30 A SUMMARY OF THE RESULTS OBTAINED IN DETERMINING RELATIONSHIPS BETWEEN THE INDEPENDENT VARIABLES AND THE CULTURE OF THE BANK**

INDEPENDENT VARIABLES	MANOVA PROCEDURE: WILKS' LAMBDA F-TEST OF SIGNIFICANCE		UNIVARIATE F-TEST OF SIGNIFICANCE Differences occur in:
	Pre-determined factors of the culture of the bank (A)	Established factors of the culture of the bank(B)	
Type of bank	Highly significant difference	Highly significant difference	Norms and external affairs Corporate policy and ethics and relations
Banks using different number of departments to initiate HRM	Highly significant difference	Highly significant difference	(A) Norms Nature of work External affairs (B) Corporate policy
Size of the bank (based on the number of employees)	Highly significant difference	Highly significant difference	(A) External affairs (B) Ethics and relations
Size of the bank (based on annual turnover)	Highly significant difference	Highly significant difference	(A) External affairs (B) Ethics and relations
Listed and unlisted	No significant difference	No significant difference	
Top Banks and other Banks	No significant difference	No significant difference	
Top management and management of risk	Highly significant difference	Highly significant difference	(A) Norms Nature of work External affairs Corporate policy Ethics and relations

**Source: Own research**



EXHIBIT 5.30 indicates that none of the variables differed regarding the factor, crucial aspects, included in the culture of the bank. Analysis of the nature and extent of the predetermined factors, namely norms, nature of work and external affairs, as well as the factor, crucial aspects, shows that the respondents do include these factors in the culture of the bank. South African banks thus do have an innovative culture and can implement HRM.

Relationships between the culture of the bank and the application of HRM were determined using Pearson's correlation coefficient. Results indicated that there was a positive correlation between the culture of the bank and the application of HRM. The factor, crucial aspects, had the lowest correlation with the application of HRM. The HRM step, review of results, resulted in the lowest correlation with the culture of bank. The growing banks in the South African banking industry manage HRM more like the proposed framework than young and mature banks. Young and mature banks on the other hand tend to manage HRM in a similar manner. The mature banks, with its many advantages such as established banking practices, market knowledge, contacts, credibility and financial strength should be in a far better position than the young banks to manage the HRM process. This is, however, not the case for the mature South African banks. It is necessary for mature South African banks to discover the possible barriers preventing them from being more successful in managing risk from the HRM viewpoint. The results emphasized that banks using two or more departments to initiate risk management manage HRM like the proposed framework. Banks using one or no department to initiate risk management do not manage HRM. This indicates the importance of HRM throughout the bank. The initiation of HRM should not be restricted to one department only. The results obtained indicated that large banks manage holistic risk more like the proposed framework than small banks. Small banks, however, seemed to be superior on the step, risk analysis, planning, strategy, and review of results. The number of employees in a bank and its turnover influence its management of risk. A bank employing a large number of employees and which has a large turnover manages HRM more like the proposed framework than banks with a small number of employees and a small turnover. Listed banks in South Africa manage HRM like the proposed framework. Unlisted banks behave more like small banks in their management of HRM. The step, review of results, is executed more like the

framework by unlisted banks, which strengthens their similarity to the small banks. Top banks, which are superior regarding annual turnover and assets, manage risk in a similar manner to other banks. Considering the lack of international competition, it is not surprising that banks in South Africa are not attentive to HRM.

Respondents were both from managerial positions and top management positions. Statistical relationships between these two groups of respondents indicated that they did not differ in their responses. Top management and management in the South African banking industry agree on HRM in their banks. Analysis of all the independent variables led to the conclusion that whenever differences occurred in the management of HRM; these differences appeared in the formulation of strategies. It appeared that South African banks differed on how they formulated HRM strategies. This aspect needs particular attention. Implementation of HRM strategies also needs attention as it indicated a large difference among banks. Analysis of risk management indicated that South African banks vary on how they manage risk.

The implication of this proposition is that although South African banks manage risk holistically they should attend to their strategy formulation and implementation. When the number of departments used to initiate risk management was used as a criterion to distinguish between banks, results indicated that all banks had an innovative risk management culture. However, banks using one or no department to initiate risk management have an innovative risk management culture, which is inferior to banks using two or more departments to initiate risk management. Contrary to not managing risk holistically, banks using one or no department to initiate risk management nevertheless have an innovative risk culture. The only difference that occurs in the culture of large banks (based on the number of employees and annual turnover) is that they attend more to their external relations than smaller banks (based on the number of employees and annual turnover). The small South African banks therefore should attend to external affairs in their culture. Banks, which are listed on the Johannesburg Stock Exchange and unlisted banks tend to, have the same cultures. Although listed banks manage HRM to a larger extent than unlisted banks, they are not in any better position to do so, because they have the same

culture as unlisted banks. Unlisted banks have innovative cultures and should therefore seriously address their management of HRM.

#### **5.14 CONCLUSION**

To conclude, an estimation of non-response bias, assessed by the speed of response, was given. There was no significant difference between respondents and non-respondents and any inferences made are thus applicable to the whole population.

It must be emphasized that in this chapter the results were given in an organized manner and a summary of the results were given. In Chapter 7 deductions following from the results will be discussed and recommendations given. The next Chapter (Chapter 6) is the qualitative component of the study. The aim of Chapter six is to confirm or reject the results of the quantitative study under the armpit of this research study.

