WHY INFORMATION TECHNOLOGY SOFTWARE PROJECTS FAIL IN SOUTH AFRICA

BY

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TECHNIKON WITWATERSRAND

VALIDATED AND CONFERRED BY

THE UNIVERSITY OF WALES

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EXECUTIVE SUMMARY

The aim of this research was to determine why information technology software projects fail in South Africa in order to determine whether there is a cause and cost similarity between international first world and South African IT Software Project failures. This research topic was primarily chosen because there is a lack of research on IT Software project failure in South Africa.

The following objectives were defined to support the aim of the research:

- To ascertain project cost failure statistics sources internationally from relevant literature.
- To ascertain from literature what has been said about causes/reasons of project failure internationally.
- To ascertain South African IT Software Project failure statistics and reasons by means of a questionnaire.
- To determine whether the literature on international IT software project failure and South African IT software project failure compare.

The research project was conducted amongst members of the Project Management Institute of South Africa (PMISA). In addition, companies that are not members of PMISA were also contacted and requested to respond to an e-mail questionnaire.

The questionnaire requested information regarding:

- The respondent's company.
- Cost and project statistics on IT software projects.
- The reasons causing IT software projects to be challenged.
- The reasons for IT software projects being cancelled.
- The reasons causing IT software projects to be successful.

The South African research results were compared to the international research of the Standish Group. The main findings of the comparative study are:
South African companies experience less IT software project failure, 53.7% compared to the 82.3%.

- The mean time overrun percentage is significantly less, 27% compared to 222%.
- The mean cost overrun percentage is significantly less, 33% compared to 189%.
- The mean percentage of functionality delivered is considerably higher, 84% compared to 61%.

- The top three reasons for projects being challenged, although not in the same order, are the same for South African and Standish Group respondents.
  - Incomplete requirements and specifications. Rating RSA (1) Standish (2).
  - Changing requirements and specifications. Rating RSA (2) Standish (3).
  - Lack of user input. Rating RSA (3) Standish (1).

- The comparison of the top three reasons for projects being cancelled are different for the South African and Standish Group surveys. The top three reasons respectively, for projects being cancelled are:
  - Changing requirements versus incomplete requirements.
  - Did not need it anymore versus lack of user involvement.
  - Lack of executive support versus lack of resources.

It is interesting to note that one of the reasons for projects being challenged and cancelled, deals with, or is related to, requirements. Changing and / unclear user requirements was always listed in the top three reasons for projects being challenged and cancelled. The top three reasons listed by The Standish Group also lists changing and / unclear user requirements in the top three. This research would therefore suggest that effectively dealing with changing and / unclear user requirements would significantly increase project success.

In conclusion, the comparison between South African companies and International companies revealed that the causes are for the most part the same, and the costs appear to be vastly different, but similar in trend. As is evident from the research literature, this research topic is rarely studied, and therefore additional research can be done to explore this topic.
DECLARATION

I declare that "Why information technology software projects fail in South Africa" is my own work and that all the sources I have used have been indicated and acknowledged by means of detailed references.

This research paper has not been submitted for any other purpose to any other institution before.

Jurie Smith

UNIVERSITY OF JOHANNESBURG
ACKNOWLEDGEMENTS

I would like to acknowledge and thank the following individuals and organisations for assisting me in compiling this study:

- All the participants who took the time to complete the survey questionnaires for the study, and who were prepared to share their information and experiences with me.

- Mr Bruce Smit for assisting and supervising me during the study period. Without his assistance and inputs, it would have been difficult to have compiled and completed the study.

- My wife Fiona, who through the study period was always present to assist me, and regularly provided encouragement, especially when times got stressful.

- The Project Management Institute of South Africa that made their member's database available to me.
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1 Chapter 1 - Background

1.1 Introduction
The purpose of this chapter is to outline the research topic of "Why information technology software projects fail in South Africa". The aim of the research project and the objectives that need to be accomplished to achieve the aim, are presented. This chapter will also outline:

- The future value of the research project.
- The research methodology to be used.
- The layout of the research project.

1.2 Why investigate project failure?
We learn from success, but we can learn much more from failure. Further, it is far better, cheaper, and of course, wiser to learn from other people's failures than our own. Making this point in a formal manner, the great German statesman, Otto von Bismarck, observed: "Fools you are ... to say you learn by your experience ... I prefer to profit by others' mistakes and avoid the price of my own." (Kharbanda et al, 1996: 8).

May (1998: 1) states that most software projects can be considered at least partial failures because few projects meet all of their cost, schedule, quality, or requirements objectives. Failures are rarely caused by mysterious causes, but these causes are usually discovered post-mortem, or only after it is too late to change direction.

Other studies have likewise concluded that failure is rampant, although not necessarily to the same degree as the Standish Group survey, which found that only about one-sixth of all projects were completed on time and within budget. One reason for the varied conclusions is that most failed projects are never studied, even
by the organisation that experienced the failure. Having wasted so much on a fruitless venture, few organisations will invest more time or money to collect and analyse additional data, whereas any data that had been collected may be massaged or hidden to protect careers or reputations. May (1998: 1).

In 1986, Alfred Spector, President of Transarc Corporation, co-authored a paper comparing bridge building to software development. The premise: Bridges are normally built on time, on budget, and do not fall down. On the other hand, software never comes in on time or on budget and it always breaks down. (Nevertheless, bridge building did not always have such a stellar record. Many bridge building projects overshot their estimates, time frames, and some even fell down.) One of the biggest reasons bridges come in on time, on budget and do not fall down is because of the extreme detail of design. The design is frozen and the contractor has little flexibility in changing the specifications. However, in today's fast moving business environment, a frozen design does not accommodate changes in the business practices. Therefore a more flexible model must be used. This could be and has been used as a rationale for development failure. There is, however, another difference between software failures and bridge failures, besides 3,000 years of experience. When a bridge falls down, it is investigated and a report is written on the cause of the failure. This is not so in the computer industry where failures are covered up, ignored, and/or rationalised. As a result, we keep making the same mistakes over and over again. Standish Group (1995: 1).

In his book on why information systems fail, Sauer states that pioneers of computing might be excused for having supposed that early failures were an aberration, that they were just part of a learning experience, and that with time and the development of the right technologies would be prevented entirely. Today, however, writers on computing continue to draw attention to an apparently high level of failure. Thus it is no longer excusable to suppose that information systems problems will evaporate. Failure is a continuing fact of life. The costs of failure are various. Economically, there is the cost of wasted investment in equipment and labour. There is also the cost of missed opportunities when a system promises benefits or fails to provide them. The fact of failure has also caused damage to the image of the information
systems community. For all these reasons, then, failure is worth investigating, understanding, and where possible, avoiding. Sauer (1993: 1).

1.3 Failure research

The Standish Group (1995: 1-2) conducted research into reasons why IT software projects fail. They conducted a survey to which IT executive managers responded. The respondents operated in large, medium and small companies across major industry segments, e.g. banking, security, manufacturing, retail, wholesale, health care, insurance, services, and local, state, and federal organisations. The total sample size of 365 United States respondents represented 8,380 projects.

They found that in the United States, companies spend more than $250 billion each year on IT application development of approximately 175,000 projects. Many of these projects will fail. Software development projects are in chaos, and we can no longer imitate the three monkeys - hear no failures, see no failures, speak no failures.

The Standish Group research shows a staggering 31.1% of projects will be cancelled before they ever get completed. Further results indicate 52.7% of projects will cost 189% of their original estimates. The cost of these failures and overruns are just the tip of the iceberg. The lost opportunity costs are not measurable, but could easily be in the trillions of dollars. One just has to look to the City of Denver Airport project to realise the extent of this problem. The failure to produce reliable software to handle baggage at the new Denver airport cost the city $1.1 million per day.

Based on this research, the Standish Group estimated that in 1995 American companies and government agencies would spend $81 billion for cancelled software projects. These same organisations will pay an additional $59 billion for software projects that will be completed, but will exceed their original time estimates. Risk is always a factor when pushing the technology envelope, but many of these projects were as mundane as a driver's license database, a new accounting package, or an order entry system.
On the success side, the average is only 16.2% for software projects that are completed on time and on budget. In the larger companies, the news is even worse: only 9% of their projects come in on time and on budget. Even when these projects are completed, many are no more than a mere shadow of their original specification requirements. Projects completed by the largest American companies have only approximately 42% of the originally proposed features and functions. Smaller companies do much better. A total of 78.4% of their software projects will get deployed, with at least 74.2% of their originally proposed features and functions. This data may seem disheartening, and in fact, 48% of the IT executives in the Standish research sample were of the opinion that there were more failures in 1995 compared to five years earlier. The good news is that over 52% were of the opinion that there were fewer failures in 1995 than there were five years earlier.

For purposes of the study, projects were classified into three types (Standish Group, 1995: 2):

- **Project success:** The project is completed on time and on budget, with all features and functions as initially specified.
- **Project challenged:** The project is completed and operational but over budget, over the time estimate, and offers fewer features and functions than originally specified.
- **Project impaired:** The project is cancelled at some point during the development cycle.

The combination of challenged and impaired projects was considered to constitute failure, by the Standish Group.

The Standish Group summarised their findings by ranking the reasons for projects being challenged, according to the responses received by the respondents. Minor reasons for projects being challenged were included in the category named “other”. The reasons for projects being challenged are presented in Table 1.1 — Project Challenged Factors. The three reasons for projects being challenged that received a rating in excess of 10% of respondents are: lack of user input 12.8%; incomplete requirements and specifications 12.3%; and changing requirements and specifications 11.8%. It is interesting to note that the top three reasons for projects
being challenged related to either involvement of the users or specifications supplied/changed by the end users.

**Table 1-1 - Project Challenged Factors**
(Source: STANDISH GROUP, 1995: 3)

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<thead>
<tr>
<th>Project Challenged Factors</th>
<th>% Of Responses</th>
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<tr>
<td>1. Lack of User Input</td>
<td>12.8%</td>
</tr>
<tr>
<td>2. Incomplete Requirements &amp; Specifications</td>
<td>12.3%</td>
</tr>
<tr>
<td>3. Changing Requirements &amp; Specifications</td>
<td>11.8%</td>
</tr>
<tr>
<td>4. Lack of Executive Support</td>
<td>7.5%</td>
</tr>
<tr>
<td>5. Technology Incompetence</td>
<td>7.0%</td>
</tr>
<tr>
<td>6. Lack of Resources</td>
<td>6.4%</td>
</tr>
<tr>
<td>7. Unrealistic Expectations</td>
<td>5.9%</td>
</tr>
<tr>
<td>8. Unclear Objectives</td>
<td>5.3%</td>
</tr>
<tr>
<td>9. Unrealistic Time Frames</td>
<td>4.3%</td>
</tr>
<tr>
<td>10. New Technology</td>
<td>3.7%</td>
</tr>
<tr>
<td>Other</td>
<td>23.0%</td>
</tr>
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</table>

The Standish Group summarised their findings by ranking the reasons for projects being impaired, according to the responses received by the respondents. Minor reasons for projects being impaired were included in the category named “other”. The reasons for projects being impaired are presented in Table 1.2 - Project Impaired Factors. The three reasons for projects being impaired that received a rating in excess of 10% of respondents are: incomplete requirements 13.1%; lack of user involvement 12.4%; and lack of resources 10.6%. It is interesting to note that the top two reasons for projects being impaired related to either involvement of the users or specifications supplied by the end users.
Table 1-2 - Project Impaired Factors
(Source: STANDISH GROUP, 1995: 4)

<table>
<thead>
<tr>
<th>Project Impaired Factors</th>
<th>% Of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Incomplete Requirements</td>
<td>13.1%</td>
</tr>
<tr>
<td>2. Lack of User Involvement</td>
<td>12.4%</td>
</tr>
<tr>
<td>3. Lack of Resources</td>
<td>10.6%</td>
</tr>
<tr>
<td>4. Unrealistic Expectations</td>
<td>9.9%</td>
</tr>
<tr>
<td>5. Lack of Executive Support</td>
<td>9.3%</td>
</tr>
<tr>
<td>6. Changing Requirements &amp; Specifications</td>
<td>8.7%</td>
</tr>
<tr>
<td>7. Lack of Planning</td>
<td>8.1%</td>
</tr>
<tr>
<td>8. Didn't Need It Any Longer</td>
<td>7.5%</td>
</tr>
<tr>
<td>9. Lack of IT Management</td>
<td>6.2%</td>
</tr>
<tr>
<td>10. Technology Illiteracy</td>
<td>4.3%</td>
</tr>
<tr>
<td>Other</td>
<td>9.9%</td>
</tr>
</tbody>
</table>

1.4 South African IT Software Projects Background

With the exception of a couple of key players internationally, very little research has been conducted internationally on Information Technology Software Project failure. Birkhead (1999:1) presented a paper at the Project Management Institute of South Africa, in which he says “South Africa re-entered the global arena after three decades of social and economic isolation. The period of absence witnessed the global emergence of new technologies and the relaxation of trade regulations, both of which have resulted in a highly competitive marketplace.” This begs the question: Does the South African environment experience less or more failure than the international environment, especially since we have been isolated for over three decades? General opinion is that the South African environment has experienced project failure, although the degree of failure is not known. At the time of publishing this article, the literature research revealed no formal research on IT Software Projects in South Africa.
1.5 Problem Statement
Projects are known to fail in the USA, costing billions of dollars. Several reasons are tabled. Does this happen on the same scale in South Africa?

1.6 Aim of the research
The aim of the research is to determine why information technology software projects fail in South Africa in order to determine whether there is a cause and cost similarity between international first world and South African IT Software Project failures.

1.7 Objectives of the research
In order to satisfy the aim of the research project, the following objectives will need to be accomplished:
- To ascertain project cost failure statistics sources internationally from relevant literature.
- To ascertain from literature what has been said about causes/reasons of project failure internationally.
- To ascertain South African IT Software Project failure statistics and reasons by means of a questionnaire.
- To determine whether the literature on international IT software project failure and South African IT software project failure compare.

1.8 Value of the research
By completing and circulating the research project to interested parties, it is envisaged that the findings will offer the following values:
- Provide a South African benchmark and perspective for comparison to international project failure statistics.
- Provide interested IT Software Project parties with an improved understanding of the reasons for project failure.
- Be able to apply the research to projects, thereby improving the chances of successfully completing projects.
- Identify future areas to study the reasons on why South African IT projects fail.

1.9 Defining concepts

The definitions listed below have been provided in order to clarify the terminology used in the research paper.

1.9.1 South African Environment

Although the 1995 survey by the Standish Group was used a base, the following amendments have been made to accommodate the South African environment:

1.9.1.1 Company Classification

The categories for companies, per The Standish Group, have been defined as: small $100 million to less than $200 million, medium $200 to $500 million, and large companies greater than $500 million. The South African equivalent that has been applied is: small less than R200 million, medium R200 - R500 million, and large greater than R500 million. The Rand/Dollar conversion rate was initially considered as a method of reclassifying the small, medium and large companies. The research of The Standish Group was conducted during 1995 and the South African research was conducted during 2001 / 2002. According to (Jeicorp: 1), the Rand to Dollar conversion rate during January 1995 was R5.95. According to the Federal Reserve Bank of New York (X-rates.com: 1) the Rand to Dollar depreciated to R13.60 to the Dollar on the 20th December 2001. Which conversion rate would therefore be representative? According to the Federal Reserve Bank of New York (X-rates.com: 1) the Rand to Dollar current conversion rate on the 18th May 2002 was R10.0604. On the basis that the current conversion rate is used, small, medium and large categories would be multiplied by R10.0604. The nett result is that all categories are escalated to billions of Rands. This is not representative of small, medium and large companies in the South African context. The categories as defined by The Standish
Group are much more representative, and this research paper therefore applied a conversion rate of R1 to the Dollar. This is more meaningful in terms of South African small, medium and large companies.

1.9.1.2 Failure Categories
The Standish Group has three categories for projects, namely challenged, impaired and successful. The South African equivalent study used the same terminology, with the exception of the word “impaired” that has been replaced by the word “cancelled”. The word “impaired” is used by The Standish Group in the context of a cancelled project, and in a South African context is a very confusing term.

1.9.1.3 Failure Defined
The definition of project failure as per The Standish Group has been aligned with an updated version of what project failure constitutes. The sources listed below provide an overview and insight into what modern day project failure is:

- According to the Oxford English Dictionary (by Allen, 1990: 421) failure is a lack of success, an unsuccessful attempt or thing, non-performance, breaking down or ceasing to exist, or non-occurrence.
- The Standish Group (1995: 2) has broken failure down into two descriptions:
  - **Project challenged**: The project is completed and operational but over budget, over the time estimate, and offers fewer features and functions than originally specified.
  - **Project impaired**: The project is cancelled at some point during the development cycle.
- According to Wysocki (1995: 57) project success is to reach a desired end, on time, within budget and according to specification.
- Gilbreath (1986: 3) argues that the definition of failure is merely the absence of success. Furthermore, it has to be recognised that failure is a perception rather than a physical reality, in that if we have failed only we, or others, perceive that we have actually failed. No matter how much we feel we have actually succeeded, if those around us perceive failure, then failure has occurred. People
perceive failure when their expectations are not met, of expected or planned accomplishment, irrespective if the expectations are reasonable or not. Failure exists when what should have happened did not happen, thus: Failure = Unmet Expectations.

- Glass (1998: 13), referencing the KPMG report "Runaway Projects – Causes and Effects", defines a runaway or failed project as "a project that has failed significantly to achieve its objectives and/or has exceeded its original budget by at least thirty percent". He further states that any project can succeed in certain areas and fail in other areas, however, we still persist in making a global pronouncement of success or failure. Success and failure are multi-dimensional measurements, and the three project performance factors (cost, schedule and technical) are highly interrelated and interdependent, in that changes in one factor will most certainly cause changes in the other factors.

- Kharbanda et al, (1996: 37) states that in the old days project managers used the "triple constraint" to evaluate a project at completion. The three constraints were:
  - Time – the project had to come in on or under its initially scheduled timeframe.
  - Money – the project had to be completed within its budget limits.
  - Performance – the end result had to perform in the manner in which it was intended.

This method is very simple to use but unfortunately, it has also become simplistic in the modern business world. He recommends that a fourth parameter of customer satisfaction be added. Client satisfaction refers to the idea that the project is only as successful as the extent to which it satisfies the needs of the customer.

- May (1998: 1) defined failure as any software project with severe cost or schedule overruns, quality problems, or that suffers outright cancellation.

- Kerzner (1998: 6) reasons that very few projects are completed within the original scope of the project and as a result scope changes are inevitable. Scope changes must be kept to a minimum and the changes that are required must be approved by both the project manager and the customer/user.
One can therefore reason that an unsuccessful project is defined as:

- Completed, but over time, or exceeding the cost, or not according to specifications, or perceived as a failure; or
- Cancelled prior to implementation.

### 1.9.2 IT Software Project

This includes any type of project initiated to implement software. This could range from a custom software development project to ERP implementation projects.

### 1.10 Limitations

The following limitations have been identified during the compilation of the research proposal:

- There is limited research available on project failure in general, especially in South Africa. Companies and the people involved are more prone to discuss project success, and the reasons for project failure are either not explored or only discussed on a need to know basis.
- The sample size is relatively small.
- There are only a few reports available that discuss Information Technology software project failure and the main reports are those of The Standish Group, KPMG and The Gartner Group. These research companies have examined project failure and have made the reports available to the general public, however, as with most profit organisations, the reports are for sale, e.g. The Standish Group reports cost about $3,000 or R32,000 each. Summaries of the reports were used where available.
- The available research only mentions the reasons for failure without discussing the reasons in detail. To complement the research, this paper will endeavour to find material supporting the reasons for failure presented in the published failure research.
No personal interviews were conducted with companies who participated in the research study, as it was believed that the research topic could be covered in detail by making use of a survey questionnaire only.

The study was limited to the amount of information that participating companies are willing to share, and the number of responses received from the survey questionnaires. In the event of a low response, the results are not as accurately representative of the total population.

1.11 Research Methodology and Design

1.11.1 Research Type
The aim of the research is to determine why Information Technology Software Projects fail in South Africa, in order to determine whether there is a cause and cost similarity between international first world and South African IT Software Project failures. The research presents the findings observed. Based on the research approach, the discipline of descriptive statistics was used.

According to Wegner (1998: 5), descriptive statistics are used when data needs to be organised and summarised so that they can be reported or communicated to management. The available literature was interrogated for the main project failure reasons. The aim, objectives and literature findings were used as a basis for compiling the research questionnaire.

1.11.2 Research Method and Data Collection Technique
Kotler (1997: 119) states that survey research is best suited for descriptive research. The research method and data collection technique was based on the use of e-mail survey questionnaires, as this is the most practical method of data collection.

1.11.3 Data Classification
The data collected from the questionnaires was in qualitative and quantitative format.
1.11.4 Data Collection

In order to compile this research project, secondary and primary data were collected and utilised from various sources. Research on project success is conducted more often, resulting in limited research being conducted into project failure, especially in the IT software field. It was therefore necessary for the data to be collected from a wide variety of sources.

Secondary data was obtained from the following sources:
- Available literature from journals, magazines, textbooks and compact discs related to the research topic.
- Compact discs of Project Management conferences, containing papers relating to the research topic.
- Case studies.
- Internet and related web sites.
- Project management organisations.

The primary data was obtained from the following source:
- Feedback from questionnaires issued.

1.11.5 Population and Sampling Techniques

The research project was conducted amongst members of the Project Management Institute of South Africa (PMISA). In addition, companies that are not members of PMISA were also contacted and requested to respond to the e-mail questionnaire. The PMISA were contacted and requested to distribute the questionnaire via e-mail to all their members who have an e-mail address recorded. The members were requested to respond to the questionnaire on project failure. Non-probability sampling, incorporating the concept of convenience and judgement sampling techniques, was used to refine the selection of participating companies.
1.11.6 Data Analysis and Techniques

Various statistical methods were used to analyse quantitative data received from the questionnaires. No coding techniques were used to analyse the results of the qualitative data received. The findings, of the data collected from the questionnaires, are presented in the form of tables, figures and discussions.

1.12 Layout of the research report

1.12.1 Chapter 1 - Background

The purpose of this chapter is to outline the research topic of “Why information technology software projects fail in South Africa”. Why this research is valuable, as well as causes of why projects fail, and the impact of this failure are discussed. The aim and objectives of the research are set out in this chapter. The available literature was researched and discussed to provide findings and details on the reasons to reach the aim. The research also aims to benchmark the literature research findings to South African survey findings, with the intention of providing South African companies and IT software practitioners with details on why projects fail. Concepts that appear in the aim of the research are defined, any limitations that might be experienced with regards to the study are highlighted, and the future value that the research project might hold is discussed. The methodology and research design that were used to obtain information from a sample population in order to be able to communicate findings based on the aim of the research project is presented.

The layout of the research report, which includes the main topics to be covered in all the chapters, is discussed.

1.12.2 Chapter 2 - Literature Review

The purpose of this chapter is to present, discuss and consider the reasons for software projects failing in the information technology arena. Topics to be considered include the relevant history of information technology, failure analysis and cost, and the percentage and costs of failed software projects. The chapter is
concluded with a compiled list of IT Software Project failure reasons and the failure statistics.

1.12.3 Chapter 3 - Research Design and Methodology
Explanations of the population and sampling techniques, showing why the sample selection method for the research project was chosen, are given. Similarities and differences between the South African and the International sample are discussed. The design and layout of the questionnaire, which includes the questionnaire contents, as well as the parameters relating to the questionnaire topics and the sources used for compiling the various question topics, are outlined. The following items are explained:
- The method used to circulate the survey questionnaires.
- The number of responses received from the survey questionnaires.
- The follow-up method used to ensure a reasonable response rate.

1.12.4 Chapter 4 - Research Findings
The purpose of this chapter is to discuss and analyse the various findings received from the surveyed responses. The findings such as respondents position, company annual sales / turnover, IT software projects undertaken per annum, IT software budget, statistics on challenged and cancelled projects, and the reasons for projects being challenged, cancelled and successful, are analysed and discussed in detail. The main aim of the discussion is to analyse and determine project failure in the South African context. A summary of the main conclusions is presented at the end of the chapter.

1.12.5 Chapter 5 - Analysis and Comparisons
The aim of this chapter is to compare the findings of the literature research from chapter 2 with the South African study, as per chapter 4. The South African perspective on Information Technology Software Project failure is compared to the international studies of primarily The Standish Group, supported by The Gartner
Group and KPMG. The chapter is concluded with a summary of the main conclusions.

1.12.6 Chapter 6 - Conclusions

This chapter presents conclusions based on the findings from chapter 5, with the intention of recommending improvement proposals based on the conclusions. The chapter also highlights the research limitations of the report. In addition, potential research opportunities related to this research topic are discussed and presented.
2 Chapter 2 - Literature Review

2.1 Introduction

The purpose of this chapter is to present, discuss and consider the reasons for software projects failing in the information technology arena. Topics to be considered include the relevant history of information technology, failure analysis and cost, and the percentage and costs of failed software projects. The benchmark study by The Standish Group is used as a departure point for compiling all the reasons for information technology software failures. The base of failure reasons is expanded with the additional research material available. The chapter is concluded with a compiled list of IT Software Project failure reasons and failure statistics.

2.2 Project failure statistics

Table 2.1 represents the overall failure percentages discussed during this section:

Table 2-1 - Comparison of IT Project Failure Percentages

<table>
<thead>
<tr>
<th>No</th>
<th>Reference</th>
<th>Failure Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Standish Group</td>
<td>82.3%</td>
</tr>
<tr>
<td>2.</td>
<td>Taylor</td>
<td>87.3%</td>
</tr>
<tr>
<td>3.</td>
<td>Gartner Group</td>
<td>70.0%</td>
</tr>
<tr>
<td>4.</td>
<td>Cable &amp; Wireless</td>
<td>90.0%</td>
</tr>
<tr>
<td>5.</td>
<td>Simpl</td>
<td>64%</td>
</tr>
<tr>
<td>6.</td>
<td>Dorsey</td>
<td>50-80%</td>
</tr>
</tbody>
</table>

Goldstein (2001: 2) presented a paper at the 2001 National Project Management Institute Conference in America. He said that in its 1995 study, the consulting group KPMG found that of the projects deemed to have failed by the study respondents:

- 75% exceeded their schedule by 30% or more.
- More than 50% exceeded their budgets by a substantial margin.
Glass (1998: 13) referenced the same KPMG report "Runaway Projects – Causes and Effects". KPMG conducted research on 250 United Kingdom based IT companies. The report defined a runaway or failed project as "a project that has failed significantly to achieve its objectives and/or has exceeded its original budget by at least thirty percent". KPMG presented the following additional findings:

- Schedule overruns were more common (89%) compared to cost overruns (62%).
- The use of packaged software did not help in reducing the incidents of runaways. The runaway projects that were studied consisted of 47% mixed custom or packaged software, 24% custom software and 22% packaged software.
- Most of the projects failed for various reasons and there may or may not have been a dominant cause, but there were several problems contributing to many of the runaways.
- Runaway projects showed their true colours early in the project history. More than half started showing failure symptoms during system development, and 25% already showed the abovementioned symptoms during the planning stage.
- Although the respondents thought that there would be runaways in the government and financial sectors, and fewer in service and manufacturing, the findings were that all sectors were equally susceptible.

Taylor (2001: 1) had his research on Information Technology project failure published by the British Computer Society. The research involved questioning 38 members of the British Computer Society, the Association of Project Managers and the Institute of Management. He concluded that out of 1,027 projects covered, only 130 or 12.7% were successful. The 130 successful projects consisted of 2.3% development projects, 18.2% maintenance projects and 79.5% data conversion projects. It is interesting to note that development projects made up half the 1,027 covered by the research. Thus out of 513 development projects only 2.3% were successful. These findings compared reasonably with those of The Standish Group, which found a success rate of around 16.2% in a 1995 study.

The Standish Group (1995: 1-6) found that in the United States, companies spend more than $250 billion each year on IT application development of approximately
175,000 projects. A great many of these projects will fail. The Standish Group further segmented these results by large, medium and small companies. A large company is any company with greater than $500 million dollars in revenue per year, a medium company is defined as having $200 million to $500 million in yearly revenue, and a small company is from $100 million to $200 million in yearly revenue.

Table 2-2 - Standish Group research results

<table>
<thead>
<tr>
<th>Size</th>
<th>Status</th>
<th>Percentage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Challenged</td>
<td>50.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>21.6</td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Challenged</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>37.1</td>
<td>83.8</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>Challenged</td>
<td>61.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>29.5</td>
<td>91.0</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Average:</strong></td>
<td><strong>82.3</strong></td>
<td></td>
</tr>
</tbody>
</table>

The Standish Group research shows a staggering 31.1% of projects are cancelled before they ever get completed. Further results indicate 52.7% of projects will cost 189% of their original estimates. Based on this research, the Standish Group estimated that in 1995 American companies and government agencies would spend $81 billion for cancelled software projects. These same organisations will pay an additional $59 billion for software projects that will be completed, but will exceed their original time estimates.

On the success side, the average is only 16.2% for software projects that are completed on time and on budget. In the larger companies, the news is even worse: only 9% of their projects come in on time and on budget. Even when these projects are completed, many are no more than a mere shadow of their original specification requirements. Projects completed by the largest American companies have only approximately 42% of the originally proposed features and functions. Smaller companies do much better. A total of 78.4% of their software projects will get deployed, with at least 74.2% of their original features and functions.
At the time of the research study, this data may seem disheartening, and in fact, 48% of the IT executives in the research sample felt that there were more failures than five years previously. However, the good news was that 52% felt there were fewer or the same number of failures then, than there were five years previously.

Only 9% of projects in large companies were successful. At 16.2% and 28% respectively, medium and small companies were somewhat more successful. A whopping 61.5% of all large company projects were challenged, compared to 46.7% for medium companies, and 50.4% for small companies. The most projects, 37.1%, were impaired and subsequently cancelled in medium companies, compared to 29.5% in large companies and 21.6% in small companies.

One of the major causes of both cost and time overruns is restarts. For every 100 projects that start, there are 94 restarts. This does not mean that 94 of 100 will have one restart, some projects can have several restarts.

Equally telling were the results for cost overruns, time overruns, and failure of the applications to provide expected features. Almost a third of projects experienced cost overruns of 150% to 200%. The average across all companies is 189% of the original cost estimate. The average cost overrun is 178% for large companies, 182% for medium companies and 214% for small companies.

The average time overrun, for all company sizes, is 222% of the original time estimate. Over one-third of projects experienced time overruns of between 200% and 300%. The average time overrun for large companies is 230%; for medium companies 202%; and for small companies 239%.

For challenged projects, more than one quarter were completed with only 25% to 49% of originally specified features and functions. On average, only 61% of originally specified features and functions were available on these projects. Large companies have the worst record with only 42% of the features and functions in the
end product. For medium companies, the percentage is 65%. For small companies, the percentage is 74%.

According to Kreitzberg (1999: 30) far too many projects crash and burn. Information Technology managers surveyed by The Gartner Group consider 70% of development projects to be failures. Most Information Technology managers do not blame technology for the problem but surprisingly believe that the top 10 risk factors are all human problems.

In a report published by Cable and Wireless, 90% of information technology projects fail to achieve their objectives, while 40% fail altogether. According to Scotts (2000: 1) the mistakes can cost as much as $240 billion a year worldwide.

Small (2000: 1) references the Simpl report, which states that the track record for the successful completion of large IT projects in New Zealand, has been poor. The Simpl report shows only 38% of projects were successfully completed in New Zealand in terms of time and dollars, only slightly better than the experience overseas.

DeMarco (1982: 3) stated that there are some disquieting facts to consider:
- 15% of all software projects never deliver anything: that is, they fail utterly to achieve their established goals.
- Overruns of 100% to 200% are common on software projects.
He further noted that a construction job is considered to be debacle if it overruns by 6%. Comparing that measure to software projects, there have been awfully few successful software projects.

Dorsey (2001: 1) claims that information systems projects frequently fail and that this is a catastrophe. Depending upon which academic study is referenced, the failure rate of large projects is reported as being between 50% and 80%. This occurs because of the natural human tendency to hide bad news and consequently the real statistic may be even higher. This claim is supported by May (1998: 1) who found
that one of the reasons for the varied conclusions is that most failed projects are never studied, even by the organisation that experienced the failure. In addition, where data is collected and analysed, the results may be massaged or hidden to protect careers or reputations. Thus, information about project failures often relies heavily on subjective assessments.

2.3 What about the future?

This begs the question, is there hope for the future?

Robert Glass (Glass 2001: 1) in a modified excerpt from his book Failure.com, reported on the latest Standish Group research and claims that there are significant improvements in the 2000 statistics compared to the 1995 findings. The Standish Group, in its year 2000 data, has numbers directly comparable to those failure rates:

- In 2000 23% of all software projects were cancelled compared to 31% in 1995.
- In 2000 49% were challenged compared to 53% in 1995.
- In 2000 28% were successful compared to 16% in 1995.

These are very nice improvements. Not as good as we software folk would like, of course, but improvements nevertheless. Specifically the rise in successful projects, from 16% to 28%, means an improvement of 75% in five years!

The 2000 data from The Standish Group also found:

- The percentage of applications completed 200% or more over the original schedule has fallen from 12% in 1995 to 2.5% in 2000.
- The cost of failed projects decreased from $81 billion in 1995 to $75 billion in 2000.
- There was a "dramatic" shift in cost overruns from $59 billion spent in 1995 to $22 billion in 2000.

The Gartner Group (1998: 1) report titled "Want better productivity? Kill projects early and often", forecasts that during the next five years, without significant changes
to its project management processes, an Application Development (AD) organisation of 100 developers can expect to spend more than $10 million on cancelled software projects (0.8 probability). Through 2001, organisations using rigorous gating criteria to move projects from the requirements-gathering phase to the development phase will save more than 80% in wasted development costs on single-project cancellations, and more than 25% in total organisational costs for cancelled projects (0.7 probability).

2.4 Causes of IT Software Project Failure

This section analyses the reasons for project failure. The reasons for failure, challenged and impaired factors, from The Standish Group will be used as a departure point and these reasons will be supplemented by additional reasons for failure found in the available research. The available research will also be analysed to find research corroborating the reasons for project failure.

2.4.1 Lack of User Input

This section analyses the literature regarding lack of user input and discusses what the impact is when users do not provide input.

The Standish Group (1995: 3-4) survey concluded that lack of user input was rated by 12.8% of respondents as the number 1 reason for projects being challenged, i.e. the project is completed and operational but over budget, over the time estimate, and offers fewer features and functions than originally specified. A further 12.4% of respondents concluded lack of user involvement was the number 2 reason for projects being impaired, i.e. the project is cancelled at some point during the development cycle.

In a report on how to avoid Information Technology project failure, the Gartner Group (1998: 1) states that one of the reasons for project failure is lack of explicit involvement of business experts. A mismatch between the expectations of business units and the IT department's solution often occurs because the business units
abdicate their responsibilities of problem ownership to the IT department. By the time the IT department provides the solution it is also late in the life cycle. Business units must own all projects, other than IT infrastructure projects.

May (1998: 1) authored an article in the Crosstalk magazine, based on interviews with software consultants and practitioners, who were asked to provide "autopsies" of failed projects with which they have been acquainted.

May (1998: 1) explains how the lack of user input can result in project failure by referencing a military project named the Titanic project. The project, conducted a few years ago, marked the rollout of what could have been called the Titanic of military projects, except the original Titanic was ahead of schedule when it sank. Hundreds of millions of dollars over budget and years behind schedule, the project was finally handed to the users for user acceptance testing. The intended users refused to use the system because:

- The system lacked features they said were essential to their jobs.
- The system required steps they considered unnecessary or burdensome.

Because the system did not meet the user needs, the system and project eventually died a visible, painful death amid litigation and congressional inquiries. This failed project was not atypical of chronic problems in the software industry.

May (1998: 1) interviewed Paul Hewitt, a consultant with the Software Technology Support Center (STSC), who stated that the acquirers and the developers of this system had received most of their requirements from higher-level supervisors and so-called "users" who were not regularly using the existing system. Hewitt said projects are likely headed for trouble unless informed end users are giving meaningful input during every phase of requirements elicitation, product design, and building.

Earnshaw (2001: 1), in his white paper on why large IT projects fail, states that even if the project meets its specifications and is delivered on time and within budget, if
the end users are not willing to use it, the project will fail. Users are often unwilling to use a new system if they do not understand it, it does not integrate well with their other systems, which include both computer-based and manual, or it fails to meet their needs. Systems are often developed with inadequate or no input from the end users of the system, so unless the designers are very much in tune with the needs of the end users, the system may have to struggle for acceptance.

2.4.2 Incomplete Requirements and Specifications

Rodgers (2000: 1) notes that one of the root causes of IT project failure is not properly defining the project at the very beginning. All users will present different views about what they want a system to do or how they would use a new system. An old project management proverb states: “A user will tell you anything you ask about and nothing more”, and users should therefore be questioned about everything. He concludes that a project definition cannot contain everything that every single user wants and therefore the users should approve a specific and detailed project definition to ensure the project is well defined.

In a survey conducted by The Standish Group (1995: 3-4), incomplete requirements was rated as the number 1 reason for projects being impaired, i.e. the project is cancelled at some point during the development cycle. Incomplete requirements and specifications were rated as the number 2 reason for projects being challenged.

May (1998: 1) interviewed Shari Lawrence Pfleeger, president of Systems/Software in Washington, D.C., who stated that there can also be problems if the users are too close to the requirements. She said that she had just started consulting on a large federal system acquisition when she started to study its requirements, which were supposedly "clean" due to the input of highly knowledgeable users. She found that the requirements were full of hidden assumptions and conflicts. The users assumed that how things were done in the past was how they would always be done in the future, and that the consultants extracting the requirements understood more than they did about the users' jobs. All involved parties, including the developers, must
understand the business of the other parties. Should this not happen, important issues will fall between the cracks. This need continues throughout the development process.

2.4.3 Changing Requirements & Specifications

Changing requirements and specifications occur when the users depart from the requirements and specifications originally specified at the start of the project. The available research was analysed to determine what the impact and reasons for changing requirements and specifications are.

According to Moad (1998: 30-31), in a study of 500 IT managers in the US and UK, 76% of the managers surveyed reported having a project completely fail; most stated that changing user requirements were the main cause.

The Standish Group (1995: 3-4) survey concluded that changing requirements were rated as the number 3 reason for projects being challenged, and lack of user involvement as the number 6 reason for projects being impaired.

The Gartner Group (1998: 1), in an article titled "Is your IT project doomed?", states that scope creep is the main reason why big projects fail, resulting in slippage of the project where the original estimates of budget and time are exceeded. Scope creep is the gradual addition of new requirements to the original specification. As the requirements list increases, project complexity increases even more. Although it is required due to essential changes, it is more often the result of poor management and monitoring.

An effective change control system should cater for scope creep by effectively managing and authorising the change requests. The increase in scope will therefore be compensated by budget and time increases.

The Gartner Group (1998: 1), in an article titled "Want better productivity? Kill projects early and often", found that three- to five-year projects typically experience "scope creep" of 33% to 60%. These overruns can (and usually should) result in the
project's cancellation. They recommend that to avoid scope creep, the implementation of major functional pieces should be planned in 6 to 12 month increments.

Voelker (1999: 4) references The Gartner Group who believe that scope creep is present whenever the project scope changes by more than 5%, and that this is one of the warning signs of a runaway. He concedes that change is inevitable, but that all players should understand the ramifications on the project, especially if these changes are introduced late in the project.

The Project Management Institute (PMI), in its guide to the Project Management Body of Knowledge (PMBOK®) Duncan (1996: 47), states that product scope are the features and functions that are to be included in a product. Completion of the product scope is measured against the requirements. The requirements must therefore be defined and baselined at the start of a project to control the unauthorised scope additions called "scope creep".

Taylor (2001: 1), in his research on Information Technology project failure published by the British Computer Society, found that unclear objectives and requirements was the number 1 reason why projects fail.

In a survey conducted by The Standish Group (1995: 3-4), 13.4% of respondents indicated incomplete requirements as the number 1 reason for projects being impaired, i.e. the project is cancelled at some point during the development cycle. Incomplete requirements and specifications were rated by 12.3% of respondents as the number 2 reason for projects being challenged (May 1998: 1).

Dorsey (2001: 1) confirms that, unless you set a formal rule that prevents the majority of well meaning suggestions about improvements from "creeping" into the system, the system will never be completed. Although there will always be new requirements to support, it is important to prevent the onset of "scope creep" on a project and freeze deliverables, i.e. there should be a cut-off date for scope changes.
Zucker (2001: 1) says scope creep happens because mortals cannot always anticipate and identify all requirements at the start of the project because systems are too complex and the business and technical environments change too quickly. Scope creep is an evil that we created for ourselves. It is a function of our past. In the old days, systems were large and based on sequential processing rules. Common wisdom was that if the requirements were not clearly defined “up front”, then the cost of changes would be high. So, we got caught into the scope creep trap. We wanted to make it perfect with the first release, because we knew scope creep was “bad”. The fact of the matter was, we crept the scope and had subsequent releases in order to get it right.

Rodgers (2001: 1) references Matt Light, a research analyst at The Gartner Group in Stanford, CA, who describes what happens when a project definition does not define the meaning of complete. Light says the project definition becomes a parasite that just grows and grows until it kills the host. Improperly defining the project at the outset allows users and management to increase the project requirements, otherwise known as scope creep. Rodgers (2001: 1) also references Alan S. Harowitz, whose book "The Never Ending Project" describes scope creep as an insidious disease that takes hold when the scope of a project slowly and almost unnoticeably increases in size.

O'Connor (2001: 1) states that unless the customer need is clearly identified and understood by all the stakeholders, the project team may produce a product or service that does not meet that need. In that case, the project is considered a failure.

2.4.4 Lack of Executive Support

When executives are not seen or are not actively supporting a project, a subsequent lack of executive support occurs. The available research was analysed to determine what the impact and reasons for lack of executive support are.
According to a report published by Cable & Wireless (Scotts: 2000: 1), all too often IT objectives are missed through lack of senior management support and a failure to create the right environment to maximise the impact of IT.

The Standish Group (1995: 3) survey concluded that 7.5% of respondents indicated lack of executive support as the number 4 reason for projects being impaired. Lack of executive support was rated as the number 5 reason for projects being challenged by 9.3% of respondents.

A 1997 survey conducted across a broad segment of Canadian public and private sector organisations revealed significant failure rates. One of the main reasons given for projects failing was lack of top management involvement and support (Goldstein: 2001:2).

Lack of business support was rated by IT managers surveyed by Informationweek as the number 3 reason for projects failing, resulting in technology being deployed in a vacuum, and users resisting it (Wilder et al, 1998: 1).

McConnell (1996: 42) references Australian consultant Rob Thomsett, who argues that lack of an effective project sponsor virtually guarantees project failure. High-level project sponsorship is necessary to support many aspects of rapid development, including realistic planning, change control, and the introduction of new development practices. Without an effective project sponsor, other high-level personnel in your organisation can force you to accept unrealistic deadlines, or make changes that undermine your project.

The Gartner Group (1998:1) in their report on “Is Your IT Project Doomed?” says, “Good business sponsors states that doomed projects have sponsors who come up with the idea, get buy-in, and disappear”.
The Gartner Group (1998: 1) report titled "Want better productivity?" states that multiple studies indicate a direct correlation between lack of project sponsorship and project failure. Big projects lose direction more easily than small ones, especially when there is no sponsor to drive a shared vision. The sponsor has the authority to define project goals, secure resources, and resolve organisational and priority conflicts. One of the well-meaning but costly mistakes is to substitute a steering committee for a sponsor, and assuming that a big budget and highly visible project does not need a formal sponsor. Steering committees are useful for monitoring project progress, but often lack unified goals or a mechanism for resolving conflicts.

Dorsey (2001: 1) found that every study ever done about Information Technology system success or failure has identified top management support as a critical success factor because, without full commitment from top management, the project will collapse when problems arise. Management should always be visible and remain vocally behind the project, even if serious setbacks are encountered, or else the project is doomed to failure.

Watkins (1999:1) states that without a core of believers at every level of the company a project is probably doomed to failure. Not everyone needs to be onboard, just a core group who will be the champions and cheerleaders. Senior management is especially important, because without senior management leadership, the implementation could get bogged down and not get off the ground. The core group includes the following stakeholders:

- Senior Management
- Middle Management
- Project Managers
- Team Members
- Vendors
- Contractors
- Consultants
Winning executive support has become a black art among project managers. Getting senior management involved can be an uphill task, but there are ways to make the task easier. These include talking to the board in "execu-speak" and not project management jargon, persuading bosses to see the project in terms of the benefits to the organisation, and involving board members with previous project management experience in helping to shape the process (Bicknell, 1995: 28).

2.4.5 New Technology, Technology Incompetence / Illiteracy

New technology, technology incompetence / illiteracy occur when the organisation does not have the necessary skills to deal with technology. The available research was analysed to determine what the impact and reasons for new technology, technology incompetence / illiteracy are.

The Standish Group (1995: 3-4) survey concluded that technology incompetence was rated by 7.0% of respondents as the number 5 reason for projects being challenged. A further 4.3% of respondents concluded technology illiteracy as the number 10 reason for projects being impaired.

May (1998: 1) in an article in Crosstalk magazine available online, references Morris Dovey, Information Director for Check Control, Inc. in West Des Moines, Iowa, who worked on major government software contracts, before becoming so frustrated he decided to never work with government contracting again. Avoidable delays and mistakes occurred because people were making decisions with no technical expertise in the area, but having all the authority.

The above view is also supported by Earnshaw (2001: 1), who states that it is unlikely that a CEO would allow the head of the Information Technology department to decide where to build a new factory, but corporate executives often read an article about some new technology or process and ask the Information Technology department when it will be implemented. Although it is certainly appropriate for management to ask IT to investigate a new technology, it is foolish to insist that a
company adopt a technology simply because a major competitor or some other large company is using it. Nevertheless, IT departments are often pressured to install inappropriate technology because upper management is unaware of crucial technical details.

May (1998: 1) also interviewed Michael Allen Latta, Chief Executive Officer of Ohana Technologies Corporation in Lafayette, Colo. Latta, who warns that managers can perform poorly if they lead projects that do not match their strengths. Projects dealing with high technology need managers with solid technical skills, but he warns that the best technologists are not necessarily always poised to be the best managers.

Rodgers (2001: 1), in an article on overcoming Information Technology project failure, states that time and time again companies are implementing projects that involve new technologies. Often these projects are created just so the company can stay up to date with the latest technologies, but they fail to recognise that the newest technologies are also the immature technologies. A Denver-based medical insurance provider fell into this trap when they attempted to change their claims payment system. Rob Norris, CIO of the company, states that the company succumbed to the lure of new technology and decided to move from the reliable and trusted Oracle forms and PL/SQL to Java. The project ended in disaster when they discovered Java had no good database connectivity at that time.

2.4.6 Lack of Resources

Projects may also fail due to a lack of resources. The lack of resources could be internal or external. The available research was analysed to determine what the impact and reasons for lack of resources are.

Duncan (1996: 95), in the PMBOK, defines staff acquisition as involving getting the human resources needed (individuals or groups) assigned to and working on the project. In most environments, the best resources may not be available, and the
project management team must take care to ensure that the resources, which are available, will meet project requirements.

The Standish Group (1995: 3-4) survey concluded that lack of resources was rated by 6.4% of respondents as the number 6 reason for projects being challenged. A further 10.6% of respondents concluded lack of resources as the number 3 reason for projects being impaired.

A Gartner Group (1997: 1) report on systems implementations estimates that there are eight Information Technology professionals to fill every ten open positions. Information and technology resources are becoming increasingly scarce, making it difficult to replace staff members who leave out of frustration after a particularly (and probably unnecessarily) arduous implementation.

A Gartner Group (1998: 1) report on how to avoid Information Technology project failure found that management of human resources issues is a significant contributor to project failure. Lack of resources, inexperienced staff, and staff turnover can devastate a project schedule, budget, and scope. Due to the shortage of IT specialists, both the Canadian and United States government have increased the number of foreign high-tech work visas over the last year to provide some relief in this area.

2.4.7 Unrealistic Expectations

Expectations that are set too high result in the client not receiving the expected product, resulting in the project being classified a failure. The available research was analysed to determine what the impact and reasons for unrealistic expectations are.

According to a study of 500 IT managers in the US and UK, 76% of the managers surveyed reported having a project completely fail; most stated that changing user requirements were the cause, while poor planning and unrealistic expectations were
ranked second and third respectively (Moad, 1998: 30-31). The Standish Group (1995: 3-4) survey concluded that unrealistic expectations were rated by 5.9% of respondents as the number 7 reason for projects being challenged. A further 9.9% of respondents concluded lack of resources as the number 4 reason for projects being impaired.

DeMarco (1982: 4) found that many software projects do not fail because the design was of poor quality, or coding was done slowly, or too many bugs were introduced. In most cases, they simply failed to fulfil original expectations. Inflated and unreasonable expectations, and not the project team, are to blame for the project failure.

Moad (1998: 80-81) references Bob Rubin, Vice President and CIO at Elf Atochem Inc., Philadelphia, who found that the Information Technology resources are now being called on to be more important to the business, and therefore user expectations are sky high. "People tend to take for granted some of the success when it does come", he said.

2.4.8 Unclear Objectives
Should the project objectives not be defined in clear terms, the project team has no direction and guidance as to what to deliver at the end of the project, resulting in the project being termed a failure. The available research was analysed to determine what the impact and reasons for unclear objectives are.

The Standish Group (1995: 3-4) survey concluded that unrealistic expectations were rated by 5.3% of respondents as the number 8 reason for projects being challenged.

Gartner (2001: 1) published an article on software applications for sales organisations, and found that 55% of projects to supply sales with technology failed to deliver measurable ROI benefits. That number is now approaching 85%, due in large part to a lack of alignment between business objectives and application selection. These types of intended uses of technology often suffer the same fate as
other purchases that are of little value to the sales professionals, ending up in the trunks of their cars.

Terblanche (1999: 1) states that typical software projects are usually late because of the fact that the objectives of the project are not properly defined.

Reddy (2001: 1) published an article in *Informationweek*, in which he found that, as a rule, the seeds of IT project failure are sown in three stages. At the start of a project, vague problem statements and imprecise scope definition lead to unstable user requirements that result in an unstable application development environment. Even if an application is built and delivered on time and within budget, under such circumstances it is unlikely to meet the objectives of the stakeholders. What yardstick can you use to measure the output if the business objectives and scope were not clearly defined at the start of the project?

### 2.4.9 Unrealistic Timeframes

The timeframe for project implementation should be agreed at the start of a project and most critically, the timeframe should be realistic. An unrealistic timeframe will most certainly result in a failed project. The available research was analysed to determine what the impact and reasons for unrealistic timeframes are.

The Standish Group (1995: 3-4) survey concluded that unrealistic timeframes were rated by 4.3% of respondents as the number 8 reason for projects being challenged.

The Gartner Group (1997: 1) article on "System implementations: Basic project management", states that overly aggressive schedules that require all participants to work at 150% for the entire length of the project are subject to failure. Staff burnout results in low staff morale and high staff turnover, both impediments to timely implementations. Expedient implementations have to be balanced against realistic expectations, and therefore realistic project plan objectives and schedules have to be set. Large-scale implementation projects should be run like marathons, not sprint
races; some slack should be built into the project plan to accommodate holiday, vacation and even sick time.

A sure way to guarantee project failure, that is an all too common practice in the IT community, is to work backwards from a fixed project completion date (Dorsey: 2001: 1). This is due to managers making a decision about when a new or re-engineered system would be useful to have in production without the necessary technical knowledge to determine whether or not it is possible to accomplish successfully in the given time period. There are many places in the SDLC where schedules can go awry:

- Failure to perform careful analysis, resulting in critical new requirements being uncovered late in the development process.
- Failure to take data migration into account.
- Failure to accurately assess the political climate of the organisation regarding the project.
- Failure to enlist approval at all levels of the user community.

May (1998: 1) interviewed Tom DeMarco, principle of the Atlantic Systems Guild, who believes managers and technologists are generally competent and getting better every year. IT people are forced into overtime work because of the 1990’s stupid flirtation with lean and mean, cutting jobs and expecting the same work with fewer people and less money, whether such a feat is possible or not. Failed projects simply had goals that were inherently unattainable.

McMillan (1998: 1), in an article for ComputerWorld Canada, references Frank Magee, Vice President and Research Director at the Gartner Group, who found that people routinely set end dates for projects instead of setting a range of possible end dates, so deadlines become unrealistic. Monica Semenluk, a project manager at the Ontario based IT consultancy Compugen Professional Services, states that too many schedules are based on nothing but initial assumptions and the whims of users, and as such are doomed to fail.
Mulcahy (1999: 1) found that the following are reasons why unrealistic schedules occur:

- Delays in authorising a project.
- Management thinks they are supposed to “keep the team in line” by making the schedule tight.
- Changes in the competition or the marketplace.
- The project is at the tail end of a series of related projects.
- Project problems cause delays.

2.4.10 Does not need it anymore

This relates to projects being cancelled at any point of the project life cycle because the company executives decide that the project is not needed anymore. The available research was analysed to determine what the impact and reasons are for projects not being required anymore.

The Standish Group (1995: 3-4) survey concluded that the users did not need the solution were rated by 7.5% of respondents as the number 8 reason for projects being impaired.

Terblanche (1999: 1) states that one of the outcomes of late delivery that is experienced is that the software could be out of date, and is never implemented.

2.4.11 Lack of IT Management

The availability of IT management to ensure project success is discussed in this section. Without the presence and support of IT management, projects are destined to failure. The available research was analysed to determine what the impact and reasons for lack of IT management are.

The Standish Group (1995: 3-4) survey concluded that lack of Information Technology management was rated by 6.2% of respondents as the number 9 reason for projects being impaired.
Another reason for Chief Information Officers not being available could be that they are unavailable. Porter (2000: 1) references a Business Week article in 1990 that reported that CIOs were being fired at nearly twice the rate of 1988, and 50% more frequently than other senior executives. CIOs become natural scapegoats for computer-related debacles even when other managers may be more at fault.

Moad (1998: 80-81), in an article in PC Week online, reported that IT managers are performing their jobs under a great amount of stress and it is increasingly affecting their personal lives. This is due to the growth mode companies are now in, as IT departments are asked to trim down their development cycles and complete projects quicker than ever before. As a result, there are more cases of project failure, according to a study of 500 IT managers in the US and UK. 76% of the managers surveyed reported having a project completely fail; most stated that changing user requirements were the cause, while poor planning and unrealistic expectations were ranked second and third.

2.4.12 Lack of Planning

Lack of planning could result in project failure. A plan is a roadmap that steers the project team to final project completion. Without a plan the project is like a rudderless boat. The available research was analysed to determine what the impact and reasons for lack of planning are.

The Standish Group (1995: 3-4) survey concluded that lack of planning was rated by 8.7% of respondents as the number 7 reason for projects being impaired. The 1997 KPMG study titled "Survey of Unsuccessful Information Technology Projects" revealed that one of the common causes of project failure was poor project planning, specifically inadequate risk management and a weak project plan (Porter: 2000: 1).
According to the study of 500 IT managers in the US and UK, 76% of the managers surveyed reported having a project completely fail. Poor planning was listed as the number 2 reason for projects failing (Moad, 1998: 30-31).

May (1998: 1) references Humphrey, who took charge of commercial software development for IBM at a point when the company was taking too long to finish projects and was missing all its announced deadlines. He found that the people were working hard, but no one had plans because no one required them to make plans. May also references Reuel Alder, a manager at the STSC, who states that inadequate planning is a major reason software projects spin out of control. He says "If software developers built bridges, they would show up at the site with some scrap iron and say let's start building!".

Roetzheim (1999: 1), in an article titled "Project failure: Mismanaged or poorly planned", states that as software turnaround specialists they have observed a recurring theme with problem software projects. In the vast majority of cases the project was not the victim of mismanagement, lazy staff, or office politics, but more commonly the problem was that the initial project baseline was flawed from the very beginning. In many cases, the project team was committed to their deliverable in a set time period and resources that are woefully inadequate. In other cases, the project plan simply failed to account for significant activities such as conversion or documentation. He references Ed Yourdon, who calls these miss-planned projects death march projects, in his book "Death March". A death march project is one whose project parameters, (including schedule, staff/resources, budget, functionality or other technical requirements) exceeds the norm by at least 50%. Teams may not have the experience to estimate constructing, e.g. built a multi-tier, web-enabled client server application using Java before, and therefore their estimate that the new centralised accounting application can be up and running might seem feasible.
2.4.13 No Business Case

Without a business case the metrics of project implementation are not known, therefore the success of the project can not be measured, resulting in failure. The available research was analysed to determine what the impact and reasons for there not being a business case are.

In 1997, KPMG Consulting conducted a survey of IT projects in Canada, finding that the common reasons for project failures are poor planning, a weak business case and lack of top management involvement (Porter: 2000: 1).

A PC Week article by Paul (1997: 115) titled "Knowing when to abandon the ship (IS project failures)", states that it may sound obvious, but another way to avoid having a project derail is to articulate the business case in the pre-launch stage. He states that it is not a trivial matter and Information Technology executives typically do not do a business case analysis prior to launch of a project, and if they do the business case is not used once the project gets under way. Lack of a credible business plan, while it might seem like the most obvious part of a major project, is a step that is often overlooked. Lack of such a plan should stop the project from proceeding beyond even the most basic stage.

A Gartner Group (2001) report on how Small Medium Businesses (SMBs) can achieve commitment for project success found that there are three interlocking patterns behind most IT project failures:

- Underestimating the size and range of the project's effects.
- Lack of a true business imperative.
- Inadequate executive involvement.

The report further found that when project initiative magnitudes are misunderstood the business justifications are commensurately inadequate. Unfortunately, many funding decisions within SMBs are based on political agendas and ad hoc behaviours as opposed to business cases and overall initiative portfolio
management. Gartner further analysed the business rationale behind cancelled projects, and two patterns on why projects are most often terminated emerged:

- The business imperative was assumed rather than proven.
- The enterprise's employees were not persuaded that the imperative was real.

2.4.14 Poor Risk Management

Poor risk management is like the Titanic without radar, resulting in the project sinking. Risk management enables the project team to identify hazards and anticipate and take corrective action in a timely manner. The available research was analysed to determine what the impact and reasons for poor risk management are.

The 1997 KPMG study titled “Survey of Unsuccessful Information Technology Projects” revealed that one of the common causes of project failure was poor project planning, specifically inadequate risk management and a weak project plan (Porter: 2000: 1).

In his book on Rapid Development, McConnell (1996: 44) found that failure to manage risks is one of the most common classic mistakes. He states that if risks are not managed actively, only one thing has to go wrong to change your project from a rapid-development project to a slow-development one.

Moad (1998: 80-81) in an article in PC Week online, reports on a survey of 500 Information Technology managers in the United States and the United Kingdom. The survey found that the risk of Information Technology project failure is increasing, as is on-the-job stress for IT managers. 63% said risks involved in projects have increased since they became involved in projects, while 43% said they have increased significantly.

A Gartner Group article (2001: 1) on managing risk in large-enterprise projects found that in the past managing risk was not considered a valued project activity, because it did not directly result in the completion of project deliverables. Because risk
management was given little or no priority on enterprise resource planning (ERP) projects, frequently no one was assigned to manage and monitor risks and initiate corrective actions when risk factors changed from low- to high-impact. The resulting resource issues, missed target dates, cost overruns and other traumas could have been avoided, or at least minimised, if someone had paid attention to the indicators (risk factors) and made changes before minor issues became serious problems.

2.4.15 Poor communication

With poor communication projects are destined for failure. The available research was analysed to determine what the impact and reasons for poor communication are.

Goldstein (2001: 2) references the research of Taylor who had his research of more than a thousand Information Technology projects published by the British Computer Society. The survey found that poor communication was one of the causes of project failure. This is confirmed in an article in Computing SA (1998: 1), where Jim Johnson, the chairman of the Standish Group, states that one of the main reasons projects fail is a lack of communication.

The Gartner Group (1998: 1), in the article titled “Is your IT project doomed?”, found that sound projects have simple, short chains of communication and face-to-face communications wherever possible. On the other hand, doomed projects have long, complex communication channels, with detailed memos, e-mails and reports. More time is spent on doomed projects trying to communicate than doing the work.

The seeds of failure with most troubled Information Technology projects are usually sown at the project's start because there is not enough communication with users, and not enough business-side buy-in at the right management levels (Wilder et al, 1998: 1).
2.5 Summary

2.5.1 Conclusions
During the literature survey on project failure statistics it became evident that various Information Technology Software Project studies have been conducted, and that the results varied significantly. This significant variation is supported by Dorsey (2001: 1), who claims that Information Systems projects are a catastrophe, and frequently fail. Depending upon which academic study is referenced, the failure rate of large projects is reported as being between 50% and 80%. This occurs because of the natural human tendency to hide bad news, and consequently the real statistic may be even higher. This is supported by Glass (2001: 1) in a summary on his book “Computing Calamities: Lessons Learned From Products, Projects, and Companies” that found that several computing surveys are detailed in literature stating that 57%, or 68%, or 95% of computing projects fail.

It is interesting to observe that the reasons for project failure mirrored or were similar to the research detailed in the Standish Group report. The Standish Group report was also the only report that differentiated between projects that failed and projects that were cancelled before implementation. It was surprising to find that the Standish Group report did not list poor risk management, poor communication, and to a lesser degree, no business case as major or at least minor reasons for project failure. In general the most interesting observation is that project failure is rarely studied, although the studies have concluded that failure is rampant, although not to the same degree.

2.5.2 Comparison Base
The tables listed below will be used as the base for comparison between the South African and International projects. The international norms, as per the Standish Group (1995), for project failure statistics are presented in table 2.3.
Table 2-3 - The Standish Group - Percentage of Time, Cost and Functionality Delivered

<table>
<thead>
<tr>
<th>Company Size</th>
<th>% Cost Overrun</th>
<th>% Time Overrun</th>
<th>% Functionality Delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>214%</td>
<td>239%</td>
<td>74%</td>
</tr>
<tr>
<td>Medium</td>
<td>182%</td>
<td>202%</td>
<td>65%</td>
</tr>
<tr>
<td>Large</td>
<td>178%</td>
<td>230%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Average:</strong></td>
<td><strong>189%</strong></td>
<td><strong>222%</strong></td>
<td><strong>61%</strong></td>
</tr>
</tbody>
</table>

The statistics on failed (challenged and cancelled) and successful projects, as per the Standish Group, are presented in table 2.4.

Table 2-4 - The Standish Group - Project Failure and Success Percentages

<table>
<thead>
<tr>
<th>Size</th>
<th>Status</th>
<th>Percentage</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Challenged</td>
<td>50.4</td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>21.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Challenged</td>
<td>46.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>37.1</td>
<td>83.8</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>16.2</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>Challenged</td>
<td>61.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>29.5</td>
<td>91.0</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>9.0</td>
<td></td>
</tr>
<tr>
<td><strong>Average:</strong></td>
<td></td>
<td><strong>82.3</strong></td>
<td></td>
</tr>
</tbody>
</table>

The reasons for projects being challenged and impaired are shown in table 2.5.
Table 2-5 - International Project Challenged and Cancelled Factors

<table>
<thead>
<tr>
<th>Project Challenged Factors</th>
<th>Project Cancelled Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrealistic Expectations</td>
<td>Unrealistic Expectations</td>
</tr>
<tr>
<td>Unclear Objectives</td>
<td>Weak Business Case</td>
</tr>
<tr>
<td>Unrealistic Time Frames</td>
<td>Inadequate Risk Management</td>
</tr>
<tr>
<td>New Technology</td>
<td>Poor Communication</td>
</tr>
<tr>
<td>Weak Business Case</td>
<td>Lack of User Involvement</td>
</tr>
<tr>
<td>Inadequate Risk Management</td>
<td>Incomplete Requirements</td>
</tr>
<tr>
<td>Poor Communication</td>
<td>Changing Requirements &amp;</td>
</tr>
<tr>
<td>Lack of User Input</td>
<td>Lack of Executive Support</td>
</tr>
<tr>
<td>Incomplete Requirements &amp;</td>
<td>Technology Illiteracy</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>Changing Requirements &amp;</td>
<td>Lack of Resources</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>Lack of Executive Support</td>
<td>Lack of Planning</td>
</tr>
<tr>
<td>Technology Incompetence</td>
<td>Didn't Need It Any Longer</td>
</tr>
<tr>
<td>Lack of Resources</td>
<td></td>
</tr>
</tbody>
</table>

The reasons for projects being successful are shown in table 2.6.

Table 2-6 - International Project Success Reasons

<table>
<thead>
<tr>
<th>Project Success Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong Business Case</td>
</tr>
<tr>
<td>Adequate Risk Management</td>
</tr>
<tr>
<td>Effective Communication</td>
</tr>
<tr>
<td>User Involvement</td>
</tr>
<tr>
<td>Executive Management Support</td>
</tr>
<tr>
<td>Clear Statement of Requirements</td>
</tr>
<tr>
<td>Proper Planning</td>
</tr>
<tr>
<td>Realistic Expectations</td>
</tr>
<tr>
<td>Smaller Project Milestones</td>
</tr>
<tr>
<td>Competent Staff</td>
</tr>
<tr>
<td>Ownership</td>
</tr>
<tr>
<td>Clear Vision &amp; Objectives</td>
</tr>
<tr>
<td>Hard-Working, Focused Staff</td>
</tr>
</tbody>
</table>
3 Chapter 3 - Research Design and Methodology

3.1 Introduction
The various techniques used to identify sample respondents and the reasons for using these techniques are discussed in this chapter. The foundation of the questionnaire content is discussed, which include the focus areas of the questions. The layout of the questionnaire and the various themes per questionnaire section is covered. The method used to circulate the research questionnaire to the target companies is explained, as well as the response rates received from the circulated questionnaires. Lastly, details of the tools used to ensure that data received is recorded accurately, correctly and representatively is presented.

3.2 Sample Selection for Research Project
As previously stated in chapter one, the research project was conducted amongst project management members of the Project Management Institute of South Africa (PMISA). In addition, companies that are not members of PMISA were also contacted and requested to respond to the e-mail questionnaire. Non-probability sampling, incorporating convenience sampling and judgement sampling, were used to identify the 31 Information Technology Software companies. The reason for using this approach were:

- The company and contact information of the PMISA population samples were readily available.
- A large portion of the PMISA membership are active in the Information Technology sector.
- Since the PMISA is a registered organisation in South Africa, it was believed that the participating PMISA member companies were representative of the population.
Besides choosing PMISA members, convenience sampling and judgement sampling techniques were also used to secure 18 additional non-PMISA companies as samples for the research project. Reasons for using this approach were:

- Information on the contact information for the additional companies could also be obtained readily.
- To ensure as large a sample size as possible.
- Based on past experience, it was anticipated that only a small percentage of PMISA members would respond.

The Standish Group survey, conducted in the USA, had a total sample size of 365 respondents and 8,380 projects. The South African study had a relatively small sample size of 31 respondents and 390 projects. Although the South African market is significantly smaller than the USA market, a sample size larger than 31 would have been preferred. The author is therefore of the opinion that the confidence level in the sample is not high.

3.3 Questionnaire Design

3.3.1 Basis of the Questionnaire Content

The benchmark study by The Standish Group was used as a departure point for compiling all the reasons for information technology software failures. The base of failure reasons was expanded with additional research material. The sequence of the reasons for projects being challenged, cancelled and successful, as per The Standish Group, were also re-sorted to maximise the chances of the users being objective.

3.3.2 Layout of the Research Questionnaire

The research questionnaire was accompanied with a covering letter requesting respondents to participate in the research study, together with explanations and contact details. Attached, as Appendix A, is the covering letter with contact details and five sections of questionnaire. The questionnaire sections are:
3.3.2.1 Section 1 - General Information

This section contained closed-ended questions and was focused on gathering information such as:

- Respondent’s company name.
- Primary industry that the company operates in.
- Respondent’s name.
- Respondent’s position within the company.
- The various company sizes (annual turnover) surveyed.

The data gathered from this section is classified as nominal-scaled data and ordinal-scaled data. The data gathered from this section is used to obtain general information pertaining to the research sample of companies.

The respondents were also asked whether a copy of the completed study was required and the contact detail of the respondents was also obtained. A completed copy of the final report will be distributed to all respondents that requested a copy of the final research report.

3.3.2.2 Section 2 - IT Software Project Information

Closed-ended questions were used in this section. The data collected from this section is classified as nominal-scaled data and ratio-scaled data. The section was initiated with an explanation of the objectives. The rationale for explaining the objective was so as to inform the respondents of the section content and topic, and
also to ensure that the respondents were comfortable and/or able to answer the section questions. The second item to be addressed was a glossary of definitions. The rationale for providing a glossary of definitions was that it is imperative for the respondents to thoroughly grasp the meaning of each defining concept. The accuracy of the respondent answers greatly depended on a thorough understanding of the definitions.

The intention of this section was to obtain the respondents' company experience on Information Technology Software projects. The intention was to use these questions in the research questionnaire, as it was believed that the questions asked covered the particular section topic, namely IT Software Project Information.

The structure and format of this section decided upon, was to enable a comparison between The Standish Group research results and the South African perspective. The data gathered from this section has been identified as nominal-scaled data and ordinal-scaled data. In particular, this section sought to obtain Information Technology Software project details on:

- The company Information Technology software project budget.
- Number of projects undertaken per annum.
- Statistics on challenged, cancelled and successful projects.
- Cost and time statistics of challenged projects.
- Restart statistics of cancelled projects.

3.3.2.3 Section 3 - Information on Challenged IT Software Projects

The first point addressed in this section was to explain its objective to the respondents. Closed-ended and open questions were used in this section. The data gathered from this section has been identified as ordinal-scaled data. To ensure that the respondents were comfortable and/or able to answer the questions in this section, the objective aimed to inform the respondents of the section content and topic. Detailed instructions on how to complete the section were also supplied. The rationale for providing detailed instructions was that it is imperative for the
respondents to thoroughly understand the approach for completing this section. The accuracy of the respondent answers greatly depended on a thorough understanding of the approach to completing this section.

The purpose of this section was to obtain the respondents' company experience of challenged Information Technology Software projects. The particular questions were used, as it covers the particular topic in the section.

The structure and format of this section decided upon, was to enable a comparison between the Standish Group, the Gartner Group and KPMG research results, and the South African perspective. The reasons for projects being challenged were primarily obtained from the research of the Standish Group, and additional reasons for project failure were obtained from the literature reviewed, in particular the Gartner Group and KPMG. The data gathered from this section has been identified as nominal-scaled data and ordinal-scaled data. In particular, this section sought to obtain challenged Information Technology Software project details on:
- Additional reasons on why Information Technology projects are challenged.
- A ranking of the supplied and additional challenged reasons.

3.3.2.4 Section 4 - Information on Cancelled IT Software Projects

This section consisted of closed-ended and open questions. Ordinal-scaled data is gathered from this section. The objective of the section was explained to the respondents. The motive behind explaining the objective was so as to inform the respondents of the section content and topic, and also to ensure that the respondents were comfortable and/or able to answer the section questions. Detailed instructions on how to complete the section were also supplied. The rationale for providing detailed instructions was that it is imperative for the respondents to thoroughly understand the approach for completing this section. The accuracy of the respondent answers greatly depended on a thorough understanding of the approach to completing this section.
The intention of this section was to obtain the respondents' company experience of cancelled Information Technology Software projects. The author is of the opinion that the questions asked covered the particular section topic. The structure and format of this section was decided upon to enable a comparison between the Standish Group, the Gartner Group and KPMG research results, and the South African perspective. The reasons for projects being cancelled were primarily obtained from the research of the Standish Group, and additional reasons for project failure were obtained from the literature reviewed, in particular the Gartner Group and KPMG. The data gathered from this section has been identified as nominal-scaled data and ordinal-scaled data. In particular, this section sought to obtain cancelled Information Technology Software project details on:

- Additional reasons on why Information Technology projects are cancelled.
- A ranking of the supplied and additional cancelled reasons.

3.3.2.5 Section 5 - Information on Successful IT Software Projects

The initial point to be addressed in this section was to explain the objective of the section to the respondents. This section consisted of closed-ended and open questions. Ordinal-scaled data is collected from this section. The motivation for explaining the objective was so as to inform the respondents of the section content and topic, and also to ensure that the respondents were comfortable and/or able to answer the section questions. The second item to be addressed was detailed instructions on how to complete the section. The reason for providing detailed instructions was that it is imperative for the respondents to thoroughly understand the approach for completing this section. The accuracy of the respondent answers greatly depended on a thorough understanding of the approach to completing this section.

The intention of this section was to obtain the respondents' company experience of successful Information Technology Software projects. The intention was to use these questions in the research questionnaire, as it was believed that the questions asked covered the particular section topic.
The structure and format of this section decided upon, was to enable a comparison between the Standish Group, the Gartner Group and KPMG research results, and the South African perspective. The reasons for projects being successful were primarily obtained from the research of the Standish Group, and additional reasons for project success were obtained from the literature reviewed, in particular the Gartner Group and KPMG. The data gathered from this section has been identified as nominal-scaled data and ordinal-scaled data.

In particular this section sought to obtain successful Information Technology Software project details on:

- Additional reasons on why Information Technology projects are successful.
- A ranking of the supplied and additional reasons for project success.

### 3.4 Circulation of the Research Questionnaire

Prior to releasing the final questionnaire to the various companies surveyed, a draft questionnaire was circulated to various people, who in turn were requested to complete the questionnaire and report back on any sections or questions that were either misleading, ambiguous or not required. Once all requested changes were made, the questionnaire was ready to be circulated.

The PMISA was contacted and a request was made to distribute the questionnaire to all the members with an e-mail address recorded. The PMISA agreed to permit distribution of the questionnaire to all their members and requested the researcher to distribute the questionnaire. A copy of the member database was made available to the researcher. In addition to the PMISA members, additional companies were identified, via IT professionals and practitioners, for inclusion in the research. One thousand and ninety three (1,093) questionnaires were distributed to the PMISA members with an e-mail address recorded. In total thirty-six additional companies were requested to participate in the research.
The questionnaire is laid out in the form of a template, which meant that all the respondents had to do was fill in the answers in the text boxes provided, and once completed, send the questionnaire back to the sender via e-mail. Thirty-one (31) questionnaires were received electronically and only one (1) was received in hard-copy format.

3.5 Survey Responses

E-mails were posted to all respondents on the 27th February 2002 and they were requested to complete the attached questionnaire by the 12th March 2002. A substantial number of the e-mail addresses in the PMISA database returned with a message indicating that the e-mail address is not valid or does not exist. The initial reaction to the questionnaire varied significantly and the following responses were received:

- Several respondents replied and indicated that they were willing to participate in the study.
- Some respondents were either not IT practitioners or their company did not have an IT software department, and therefore did not have access to the information.
- Several respondents indicated that as the information related to IT performance of the company surveyed, the company policy prohibited them from publishing confidential information.
- As failure statistics are not generally recorded or analysed, some respondents did not feel comfortable to complete the questionnaire.
- A few did mention that they were busy and would (if possible) try and complete the questionnaire in the time given.

In order to ensure a higher response rate, all participants were informed that the due date was extended to the 15th April 2002. During the extension period, outstanding respondents and additional respondents were both contacted telephonically or via e-mail and requested to assist with the survey. By the end of the extension period, thirteen (13) responses from PMISA member companies were received at a response rate of 1.4%; eighteen (18) responses from non-PMISA companies were
received at a response rate of 50%. The author is not confident that the PMISA sample is representative of the population, although the confidence level in the non-PMISA sample is higher. Overall, the author is therefore of the opinion that the confidence level in the sample is not high.

3.6 Data Analysis Techniques and Verification

With the availability of computer technology and various spreadsheet and statistical software packages, data collection, input and analysis was made possible by transferring the electronically received questionnaires into an Excel spreadsheet. Using various statistical functions available in Excel, data could be meaningfully and accurately calculated. Where questionnaires were received in hard-copy format, data entry into the spreadsheet had to be done manually. To ensure that the data that was either transferred electronically or input manually into the spreadsheet was correct, randomly sampled questionnaires and their respective answers were manually verified to that in the spreadsheet.

3.7 Summary

The concepts of convenience and judgement sampling techniques were used to identify the sample of survey companies belonging to the Project Management Institute of South Africa and additional non-PMISA companies. Data for the study was obtained by making use of a survey questionnaire. The questionnaire topics were primarily based on the topics surveyed by the Standish Group, and supported by research from the Gartner Group and KPMG. The questionnaire papers were circulated electronically by e-mail among the various survey companies. The completed questionnaires were also returned electronically by e-mail, which accelerated the distribution and return process. Overall, thirty-one (31) companies responded. The data analysis was performed by making use of an Excel spreadsheet, which ensured that calculation errors were minimised. Various random checks were made to ensure that data was entered correctly and accurately.
4 Chapter 4 - Research Findings

4.1 Introduction
The purpose of this chapter is to discuss and analyse the various findings received from the surveyed responses. The respondents' findings such as respondent's position, company annual sales / turnover, IT software projects undertaken per annum, Information Technology Software budget, statistics on challenged and cancelled projects, and the reasons for projects being challenged, cancelled and successful, are analysed and discussed in detail. The main aim of the discussion is to analyse and determine project failure in the South African context. The chapter ends with a summary of the main conclusions.

4.2 Section 1 - General Information
4.2.1 Respondent Information
Appendix B depicts the positions of the respondents surveyed within their respective companies. The respondents targeted should have one or more of the following characteristics:
- Be involved in Information Technology.
- Operate in a project management environment.
- Occupy a relatively senior position in the company.
- Have access to information on Information Technology failure statistics and budget information.

The table indicates that the ideal target market for the survey has been reached, as the bulk of the respondents are in senior management positions. A high percentage of respondents are in project management positions (22.58%), and a substantial number have Information Technology as part of their title. Given the above facts, it would be reasonable to conclude that the respondents should have access to the information required in the questionnaire. The author therefore believes that the
respondents were in suitable positions within their organisations, and as a result contributed to the research project regarding Information Technology Software Project Failure in South Africa.

4.2.2 Primary Company Industry
The aim of the primary company sector analysis, refer Appendix C, was to provide a view of the primary industry sectors that the respondents operated in. The population distribution spans a wide variety of company industries, and the population is not concentrated in one or a couple of industries. The highest concentration of the population occurs in the engineering (16.13%), retail (12.90%), and software development (9.68%) industries, comprising 38.71% of the total population. The balance of the population (61.28%), representing thirteen of the sixteen industries, consists of five industries with an individual representation of 6.45% each, and nine industries with an individual representation of 3.23% each. Considering the above details, it is the view of the author that the population is not concentrated in a couple of industries.

4.2.3 Company Category
The respondents were requested to indicate their annual sales / turnover category for their respective companies. The category data was requested with the aim of establishing the small, medium and large company classification. The data, together with the related frequencies, was captured and converted to the three categories of small, medium and large. Figure 4.1 represents a frequency histogram of the number of respondents per company category. A total of 31 companies responded to the research questionnaire. 14 of the companies have been classed as small companies, 6 companies were classified as medium size companies, and 11 companies represented the larger companies. The distribution is therefore more representative of smaller, then larger and lastly medium size companies.
4.3 Section 2 – IT Software Project Information

4.3.1 IT Software budget

Respondents indicated their annual Information Technology software budget. The data was requested with the objective of comparing the mean annual Information Technology budget with the annual company turnover segments of small, medium and large. The data was analysed by capturing all the annual Information Technology budgets and then calculating the mean. Figure 4.2 represents a bar chart of the annual Information Technology Software Project Budget compared to the company categories. Small companies have a mean of R 4,155,214, the medium size company mean is R 18,900,000, and the large companies mean is R 38,827,273.
4.3.2 Project Failure and Success Statistics

The respondents were requested to supply details on the number of Information Technology projects that are initiated per annum and then categorise these projects under the headings of challenged, cancelled and successful. The data was requested with the aim of calculating the mean percentage of projects that were challenged, cancelled and successful per company category. Figure 4.3 represents a bar chart of the mean annual Information Technology Software Projects on challenged, cancelled, successful and total project initiated per annum, compared to the company categories. The mean small company project percentages are: challenged 38.57%, cancelled 11.61% and successful 49.82%. The mean medium size company project percentages are: challenged 53.33%, cancelled 10.83% and successful 35.83%. The mean large company project percentages are: challenged 41.09%, cancelled 5.76% and successful 53.15%.

Figure 4-2 - Mean IT software project budget
4.3.3 Cost overrun amount per project

The respondents were requested to supply details on approximate cost overrun amounts per project. The data was requested with the aim of determining the mean cost overrun per project. Figure 4.4 represents a bar chart of the mean cost overrun per company category. For challenged projects, small companies have a mean cost overrun of R 70,417, medium size companies have a mean cost overrun of R 723,750, and large companies have a mean cost overrun of R 1,645,455. The respondents did not supply any information on cost overrun amounts for cancelled medium sized company projects, and therefore the average for challenged projects was applied. For cancelled projects, small companies have a mean cost overrun of R 76,250 and large companies have a mean cost overrun of R 170,000. The combined averages for all failed projects (challenged and cancelled) are: small companies R 73,333, medium sized companies R 723,750, and large companies R 907,727. Figure 4.4 represents the mean cost overrun, for failed projects, compared to company category.
4.3.4 Cost overrun percentage per project

The respondents were requested to supply details on approximate cost overrun percentages per project. The data was requested with the aim of determining the mean percentage overrun per project. Figure 4.5 represents a bar chart of the mean cost overrun value for all failed projects. For challenged projects, small companies have a mean cost overrun percentage of 21%, medium size companies have a mean cost overrun percentage of 33%, and large companies have a mean cost overrun percentage of 23%. The respondents did not supply any information on cost overrun percentages for cancelled medium sized company projects, and therefore the average for challenged projects was applied. For cancelled projects, small companies have a mean cost overrun percentage of 35% and large companies have a mean cost overrun percentage of 55%. The combined mean for all failed projects (challenged and cancelled) are: small companies 28%, medium sized companies 33%, and large companies 39%.
4.3.5 Time overrun per project in weeks

These questions were intended to supply details on the approximate time overrun per project in weeks. The data was requested with the aim of determining the mean percentage time overrun per project. For challenged projects, small companies have a mean time overrun of 8 weeks, medium size companies have a mean time overrun of 15 weeks, and large companies have a mean time overrun of 12 weeks. The respondents did not supply any information on time overruns for cancelled medium sized company projects, and therefore the average for challenged projects was applied. For cancelled projects, small companies have a mean time overrun of 5 weeks and large companies have a mean time overrun of 10 weeks. The combined mean for all failed projects (challenged and cancelled) are: small companies 6 weeks, medium sized companies 15 weeks, and large companies 11 weeks. Figure 4.6 represents a bar chart of the mean time overrun for failed projects, compared to company category.
4.3.6 Time overrun percentage per project

Details on the approximate time overrun percentage per project in weeks were required. The data was requested with the aim of determining the mean time overrun percentage per project. For challenged projects, small companies have a mean cost overrun of 15 percent, medium size companies have a mean cost time overrun of 27 percent, and large companies have a mean time overrun of 25 percent. The respondents did not supply any information on time percentages for cancelled medium sized company projects, and therefore the average for challenged projects was applied. For cancelled projects, small companies have a mean time overrun of 25 percent and large companies have a mean time overrun of 47 percent. The mean for all failed projects is 20%, 27% and 36% for small, medium and large companies respectively. Figure 4.7 represents a bar chart of the mean time overrun percentage for all failed projects.
4.3.7 Functionality Delivered Per Project

This section gives details on the approximate functionality delivered per project. The data was requested with the aim of determining the mean functionality delivered per project. Small companies delivered a mean functionality of 82 percent, medium size companies delivered a mean functionality of 80 percent, and large companies delivered a mean functionality of 90 percent. Figure 4.8 represents a bar chart of the mean functionality delivered per project compared to company category.
4.3.8 Are more projects challenged now than 5 years ago?

Opinions on whether more projects are challenged now than five years ago were requested here. The data was requested with the aim of determining the mean answers in the categories of yes and no. Thirty nine percent of the respondents answered yes, fifty eight percent answered no, and three percent did not supply an answer.

The respondents were requested to express an opinion on whether more projects are cancelled now than five years ago. The data was requested with the aim of determining the mean answers in the categories of yes and no. Twenty six percent of the respondents answered yes, forty five percent answered no, and twenty nine percent did not supply an answer.
4.3.9 Approximate Percentage of Cancelled Projects That Are Restarted
The respondents were requested to supply details on the approximate percentage of cancelled projects that are restarted. The data was requested with the aim of determining the mean percentage of cancelled projects that are restarted per company category. Small companies restarted 8 percent of cancelled projects, medium size companies restarted 6 percent of cancelled projects, and large companies restarted a massive 58 percent of cancelled projects.

4.3.10 Number Of Times a Cancelled Project is Restarted
The respondents were requested to supply details on the approximate number of times a cancelled project is restarted. The data was requested with the aim of determining the number of times a cancelled project is restarted per company category. The small companies restarted mean for cancelled projects is 1.56 times, the medium size companies restarted mean for cancelled projects is 0.67 times, and large companies restarted mean for cancelled projects is 2.00 times.

4.4 Section 3 – Information on Challenged IT Software Projects
A table of reasons on why projects are challenged was supplied to the respondents. Respondents were requested to add additional reasons to the table and then rate the reasons on why projects are challenged. The data was requested with the aim of determining the reasons why projects fail, by calculating the mean of the population. Figure 4.9 represents a bar chart of the reasons on why projects are challenged.
The following additional reasons, categorised as other, were supplied for projects being challenged:

- Political Leaders / Affirmative Action
- Inadequate Change Management
- Rate of Organisational Change
- Overselling the Product
- Underestimate Effort
- Prefer Old Technology
- Lack of Discipline
- Lack of Implementation Methodology
- Poor Quality Management
- Incomplete Product Functionality
- Poor Product Knowledge (own staff)
4.5 Section 4 - Information On Cancelled Information Technology Projects

A table of reasons on why projects are cancelled was supplied to the respondents. Respondents were requested to add additional reasons to the table and then rate the reasons on why projects are cancelled. The data was requested with the aim of determining the reasons why projects fail, by calculating the mean of the population. Figure 4.10 represents a bar chart of the reasons on why projects are cancelled.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Mean Rated Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changing Requirements &amp; Specifications</td>
<td>9.40%</td>
</tr>
<tr>
<td>Didn't Need It Any Longer</td>
<td>8.23%</td>
</tr>
<tr>
<td>Lack of Executive Support</td>
<td>8.23%</td>
</tr>
<tr>
<td>Unrealistic Expectations</td>
<td>8.23%</td>
</tr>
<tr>
<td>Weak Business Case</td>
<td>7.59%</td>
</tr>
<tr>
<td>Lack of Planning</td>
<td>7.59%</td>
</tr>
<tr>
<td>Poor Communication</td>
<td>6.96%</td>
</tr>
<tr>
<td>Lack of User Involvement</td>
<td>6.96%</td>
</tr>
<tr>
<td>Incomplete Requirements</td>
<td>6.96%</td>
</tr>
<tr>
<td>Lack of Resources</td>
<td>6.33%</td>
</tr>
<tr>
<td>Technology Illiteracy</td>
<td>5.70%</td>
</tr>
<tr>
<td>Inadequate Risk Management</td>
<td>5.06%</td>
</tr>
<tr>
<td>Lack of IT Management</td>
<td>5.06%</td>
</tr>
<tr>
<td>Other</td>
<td>7.59%</td>
</tr>
</tbody>
</table>

Figure 4-10 - Reasons why projects are cancelled
The following additional reasons, categorised as other, were supplied for projects being cancelled:

- Politics
- Resistance to Change
- Installation/Software Problems
- Project too Long
- Scope too Big
- Lack of Implementation Methodology
- Poor Quality Management
- Incomplete Product Functionality
- Poor Product Knowledge (own staff)
- Poor Knowledge (own staff) of Required IT Infrastructure for Effective Operation
- Changes in External Business Environment
- Changes in Organisational Structure

4.6 Section 5 - Information On Successful Information Technology Projects

A table of reasons on why projects are successful was supplied to the respondents. Respondents were requested to add additional reasons to the table and then rate the reasons on why projects are successful. The data was requested with the aim of determining the reasons why projects are successful, by calculating the mean of the population. Figure 4.11 represents a bar chart of the reasons on why projects are successful.
Figure 4-11 - Reasons why projects are successful

The following additional reasons, categorised as other, were supplied for projects being successful:

- Internal Project Procedures
- Easier Than Old Technology
- Draconian Discipline
- Software Development and Implementation Methodologies
- Proper Change Management
4.7 Summary

South African companies have indicated that:

- A substantial number of projects, 53.5%, fail on average.
- The average time overrun for failed projects is eleven weeks.
- Failed projects experience a mean time overrun percentage of 27%.
- The mean cost overrun percentage of failed projects is 33%.
- Failed projects, on average, overrun by R 568,270.
- Challenged projects delivered 84% of functionality.
- The top three reasons for projects being challenged are:
  - Incomplete requirements and specifications.
  - Changing requirements and specifications.
  - Lack of user input.
- The top three reasons for projects being cancelled are:
  - Changing requirements.
  - Did not need it anymore.
  - Lack of executive support.
- The top three reasons for projects being successful are:
  - Clear vision and objectives.
  - Realistic expectations.
  - Clear statement of requirements.

The only subject that is prevalent in all three categories is requirements. This would indicate that South African respondents are of the opinion that not dealing effectively with user requirements contributes to project failure.
5 Chapter 5 – Analysis and Comparisons

The aim of this chapter is to compare the findings of the literature research from chapter 2 with the South African study, as per chapter 4. The South African perspective on Information Technology Software Project failure is compared to the international studies of primarily the Standish Group, supported by the Gartner Group and KPMG.

5.1 Rate of Failure / Success of Challenged IT Software Projects

Appendix D reflects the success, challenge and failure rates comparison between the South African study and the Standish Group. In general South African companies experience less failure compared to the results of the Standish Group. For small companies we experience 11.8% less challenged projects, 10.0% less cancelled projects, resulting in 21.8% more successful projects. For medium size companies we have 6.6% more challenged projects, 26.6% less cancelled projects, resulting in 19.6% more successful projects. The general trend for small size companies continues for large companies, with 20.4% less challenged projects, 23.7% less cancelled projects, and 44.1% more successful projects. Comparing the mean failure rate of South African companies to the Standish Group reflects that the South African companies experience less project failure. The mean failure rates are:

- Small South African companies, 50.2% compared to the 72% of the Standish Group.
- Medium South African companies, 64.2% compared to the 83.8% of the Standish Group.
- Large South African companies, 46.9% compared to the 91% of the Standish Group.

South African companies experience the most failure in the medium size industries, whereas the Standish Group experience the most failure in the large size company industries. South African companies experience less failure than the failure statistics
identified during the literature review. The mean failure rate for South African companies is 53.7% compared to the 82.3% of the Standish Group, Taylor 87.3% and Gartner Group 70%.

5.2 Cost Overrun percentage per project

Figure 5.1 reflects the mean cost overrun percentage for failed projects experienced by South African companies, compared to the results of the Standish Group. South African companies have a significantly smaller mean cost overrun percentage across all company sizes, compared to the Standish Group. The mean cost overrun percentage across all company sizes is 33% compared to 189%. The individual mean cost overrun percentages are:

- Small South African companies, 28.0% compared to the 214% of the Standish Group.
- Medium South African companies, 33% compared to the 182% of the Standish Group.
- Large South African companies, 39% compared to the 178% of the Standish Group.

Figure 5-1 - Mean cost overrun percentage for failed projects
5.2.1 Time Overrun Percentage

Figure 5.2 reflects the mean time overrun percentage experienced by South African companies compared to the results of the Standish Group. South African companies have a significantly smaller mean time overrun percentage across all company sizes, compared to the Standish Group. The mean time overrun percentage is 27% compared to 222%. The individual mean time overrun percentages are:

- Small South African companies, 20% compared to the 239% of the Standish Group.
- Medium South African companies, 27% compared to the 202% of the Standish Group.
- Large South African companies, 36% compared to the 230% of the Standish Group.

![Mean Time Overrun Percentage for Failed Projects](image)

**Figure 5-2 - Mean Time Overrun Percentage for Failed Projects**
5.2.2 Functionality Delivered per Challenged Project

South African companies delivered a significantly higher percentage of functionality across all company sizes, compared to the Standish Group. The mean percentage of functionality delivered is 84% compared to 61%. The individual mean percentage of functionality delivered is:

- Small South African companies, 82% compared to the 42% of the Standish Group.
- Medium South African companies, 80% compared to the 65% of the Standish Group.
- Large South African companies, 90% compared to the 74% of the Standish Group.

Figure 5.3 reflects the mean functionality delivered per challenged project experienced by South African companies compared to the results of the Standish Group.

![Figure 5.3 - Mean Functionality Delivered Per Challenged Project](image-url)
Refer to Appendix E for the categorised functionality delivered per project experienced by South African companies compared to the results of the Standish Group. The Standish Group found that more than a quarter of projects delivered between 15-49% functionality, whilst South African companies delivered 0 percent of functionality in that range, and only 8.1 percent of respondents indicated that projects with less than 25% were delivered. South African companies mostly deliver between 75%-99% of functionality, whereas the Standish Group delivers 39.1% of functionality in said category.

5.3 Do more projects fail?
The Standish Group research concluded that 48% of the respondents were of the opinion that more projects failed currently than just five years ago, compared to 32% for the South African study. The good news is that the research of the Standish group also concluded that 52% of the respondents thought that there are fewer or the same number of failures today than there were five years ago, compared to 52% for the South African study. The remaining 16% of respondents of the South African study were either unsure or did not express an opinion.

5.4 Project Challenged Factors
This section will compare the South African and the Standish Group results on why projects are challenged.
Figure 5-4 - RSA vs. Standish Group Project Challenged Reasons

Figure 5.4 represents a comparison of the South African and the Standish Group survey results. Poor communication, weak business case and inadequate risk management were added to the South African survey, and therefore will not be compared to the Standish Group results. It is interesting to note that poor communication was rated as the number 8 reason (7.09%), and weak business case and inadequate risk management were rated as the number 12 (5.6%) and 13 (5.22%) reasons respectively. With the exception of poor communication, the South African respondents considered weak business case and inadequate risk management to contribute least to projects being challenged.
It is interesting to observe that the top three reasons for projects being challenged for the Standish Group and the South African studies are the same, although not in the same sequence. Incomplete requirements was rated as the number 1 reason (9.33%) for projects being challenged by the South African respondents, and the number 2 reason by the Standish Group (12.3%). Changing requirements and specifications was rated as the number 2 reason (8.96%) for projects being challenged by the South African respondents, and the number 3 reason by the Standish Group (11.8%). Lack of user input was rated as the number 3 reason (8.21%) for projects being challenged by the South African respondents, and the number 1 reason by the Standish Group (12.8%).

The South African and Standish Group respondents rated lack of user input as the number 6 reason for projects being challenged, 7.84% and 6.4% respectively. The South African and Standish Group respondents rated new technology as the number 10 reason for projects being challenged, 5.97% and 3.7% respectively.

5.5 Project Cancelled Factors

This section will compare the South African and the Standish Group results on why projects are cancelled. Figure 5.5 represents a comparison of the South African and the Standish Group survey results.
Changing Requirements & Specifications 8.70% 9.49%
Didn't Need It Any Longer 7.50% 8.23%
Lack of Executive Support 9.30% 8.23%
Unrealistic Expectations 8.23% 9.90%
Weak Business Case 0.00% 7.59%
Lack of Planning 8.10% 7.59%
Poor Communication 0.00% 6.96%
Lack of User Involvement 6.96% 12.40%
Incomplete Requirements 6.96% 13.10%
Lack of Resources 4.30% 10.60%
Technology Illiteracy 6.33% 5.70%
Inadequate Risk Management 0.00% 5.06%
Lack of IT Management 6.20% 5.06%
Other 9.90% 7.59%

Figure 5-5 - RSA vs. Standish Group Project Cancelled Reasons

Poor communication, weak business case and inadequate risk management were added to the South African survey, and therefore will not be compared to the Standish Group results. It is interesting to note that weak business case was rated as the number 5 reason (7.59%), and poor communication and inadequate risk management were rated as the number 7 (6.96%) and 12 (5.06%) reasons respectively. Weak business case and poor communication are listed in the top seven reasons for project failure by the South African respondents, whilst inadequate risk management was rated as the second least reason for contributing to projects being challenged.
The top three reasons for projects being cancelled are vastly different when comparing the South African and Standish Group results. The top three reasons for projects being cancelled according to the South African respondents are changing requirements and specifications (9.49%), did not need it anymore (8.23%), and lack of executive support (8.23%). By comparison, the top three Standish Group reasons are incomplete requirements (13.1%), lack of user involvement (12.4%), and lack of resources (10.6%). The two most rated reasons by the Standish Group for projects being challenged and cancelled are incomplete requirements and lack of user involvement / input. By comparison, South African respondents rate only changing requirements in the top three for challenged and cancelled projects.

The South African and Standish Group respondents rated unrealistic expectations as the number 4 reason for projects being challenged, 8.23% and 9.9% respectively.

5.6 Project Success Factors

This section will compare the South African and the Standish Group results on why projects are successful. Figure 5.6 represents a comparison of the South African and the Standish Group survey results.
Effective communication, strong business case and adequate risk management were added to the South African survey, and therefore will not be compared to the Standish Group results. Sound project management was rated by the South African respondents as a project success factor. It is interesting to note that strong business case was rated as the number 10 reason (7.24%), and effective communication and adequate risk management were rated as the number 12 (6.9%) and 13 (5.52%) reasons respectively, with sound project management as the number 14 (0.69%) reason. This could indicate that the South African respondents generally support the Standish Groups’ research results on successful projects.

The top three reasons for projects being successful are vastly different when comparing the South African and Standish Group results. The top two reasons for projects being successful according to the South African respondents are clear vision and objectives (8.62%) and realistic expectations (8.2%). By comparison, the top two Standish reasons are user involvement (15.9%) and executive management.
support (13.9%). It is also interesting to note that the South African and Standish Group respondents had the same rating for clear statement of requirements and ownership. Clear statement of requirements was rated as the number 3 reason for projects being successful, South Africa (8.28%) and Standish Group (8.2%). Ownership was rated as the number 8 reason for projects being successful, South Africa (7.24%) and Standish Group (5.3%).
6 Chapter 6 - Conclusions

6.1 Introduction
This chapter will present conclusions based on the findings from chapter 5, with the intention of recommending improvement proposals based on the conclusions. The chapter also intends highlighting the research limitations of the report, and in addition will discuss and present potential research opportunities related to this research topic.

6.2 Research Conclusions
South African companies experience less failure than the failure statistics identified during the literature review. The mean failure rate for South African companies is 53.7% compared to the 82.3% of the Standish Group, Taylor 87.3% and Gartner Group 70%. South African companies have a significantly smaller mean cost overrun percentage across all company sizes, compared to the Standish Group. The mean cost overrun percentage is 33% compared to 189%. South African companies also have a significantly smaller mean time overrun percentage across all company sizes, compared to the Standish Group. The mean time overrun percentage is 27% compared to 222%. South African companies delivered a significantly higher percentage of functionality across all company sizes, compared to the Standish Group. The mean percentage of functionality delivered is 84% compared to 61%.

The top three reasons for projects being challenged, although not in the same order, are the same for South African and Standish Group respondents. The ratings are:
- Incomplete requirements and specifications. Rating RSA (1) Standish (2).
- Changing requirements and specifications. Rating RSA (2) Standish (3).
- Lack of user input. Rating RSA (3) Standish (1).
The comparison of the top three reasons for projects being cancelled are different for the South African and Standish surveys. The top three reasons for projects being cancelled are:

- Changing requirements versus incomplete requirements.
- Did not need it anymore versus lack of user involvement.
- Lack of executive support versus lack of resources.

It is interesting to note that one of the reasons for projects being challenged and cancelled deals with or is related to requirements. Changing and / unclear user requirements was always listed in the top three reasons for projects being challenged and cancelled. The top three reasons listed by the Standish Group also lists changing and / unclear user requirements in the top three. This research would therefore suggest that effectively dealing with changing and / unclear user requirements would significantly increase project success.

6.3 Further Study Opportunities

The author is of the opinion that the study covered a variety of topics related to why Information Technology software projects fail, however, additional topics that are closely related to IT software project failure have been identified. These topics that require further research include:

- Determine the causes of the significantly lower cost overrun and time overrun percentages of the South African study compared to the Standish Group study.
- Determine the reasons for South African companies implementing IT software projects with a significantly higher percentage of functionality, compared to the Standish Group.
- Investigate the reasons for IT software project failure from a client or end user perspective.
- Ascertain the cost impact of IT software project failure.
- Correlate the reasons for failure to the software development life cycle to determine:
• At what stage of the software development life cycle every failure reason is most prevalent.
• The actions required to reduce software project failure.
• What the effect of eliminating a specific project or group of failure reasons is on project success.
• What the impact of IT infrastructure failure is on IT software project failure.

6.4 Summary
The aim of the research paper, to determine whether there is a similarity between the causes and costs of South African and first world International Information Technology Software Project failure, has been addressed. The objectives as defined in paragraph 1.7 have also been achieved.
The comparison between South African companies and International companies revealed that the causes are for the most part the same, and the costs appear to be vastly different, but similar in trend.
As is evident from the research literature, this research topic is rarely studied, and therefore additional research can be done to explore this topic.
7 Bibliography


To whom it may concern,

Introduction

I am currently completing my MBA dissertation, and have chosen the topic of “Why Information Technology Software Projects Fail in South Africa”. As one of the companies in South Africa who participate in IT Software Projects, I would appreciate your participation in assisting me in answering the attached survey questionnaire. The questionnaire results and company information will be kept confidential, as I will be combining the findings from a number of different questionnaire findings.

Questionnaire layout

The questionnaire consists of 7 pages, including the covering letter. Five (5) sections have been compiled in the questionnaire, which cover the following topics:

Section 1: General information
Section 2: IT Software Project Information
Section 3: Information on challenged IT Software Projects
Section 4: Information on cancelled IT Software Projects
Section 5: Information on successful IT Software Projects

Contact information/inquiries

Should you have any questions or inquiries regarding the questionnaire, please do not hesitate to contact me at:

- (011) 797-4070 (work)
- 083 709 2244 (cell)
- jurie.smith@za.pwglobal.com

Returning questionnaires

I would appreciate it if you could return the completed questionnaire to me by Tuesday 12 March 2002.

For Attention: Jude Smith

E-mail: jurie.smith@za.pwglobal.com

OR Alternatively:

Fax: (011) 209-4070

Once again, thank you for your valued participation.

Yours truly,
Jurie Smith (MBA Student Technikon Witwatersrand)
SECTION 1
GENERAL INFORMATION

Name of Company: 

Respondents Name: 

Respondents Position: 

Primary company industry: 

Total annual company sales
(Turnover): 

(Please mark the appropriate box with an X)

Less than R200 million  Between R200 - R500 million  More than R500 million

Would you like a copy of the completed study?  YES  NO

(Please mark the appropriate box with an X)

If you would like a copy of the completed study, please supply your details below:

Telephone No.: (W) ( )

(Cell)

Fax No.: ( )

E-mail Address: 

SECTION 2
IT SOFTWARE PROJECT INFORMATION

Objective:

This section deals with the overall statistics of Information Technology Software Projects. Please study the following definitions before answering.

Definitions:

Per Annum: All IT Software Projects undertaken during the last financial year cycle of an organisation.

IT Software Project: This includes any type of project initiated to implement software. This includes customised software, package software, e.g. ERP packages and a mixture of customised and packaged software.

IT Software failure: IT Software failure is divided into two categories: Project challenged and Project cancelled.

- **A Challenged project** is completed and operational but over-budget, or over the time estimate, or delivered with fewer functions than originally specified or the general perception is that the project is a failure.

- **A cancelled project** is considered to be a failure if the project is cancelled at some point during the project life cycle.

Restarted Projects: Restarted projects originate from cancelled projects. Restarted projects are started again with the same objectives as the original cancelled project.

Total budget for IT Software Projects initiated per annum: R

Number of IT Software Projects initiated per annum:

Approximate number of IT Software projects initiated per annum that:

<table>
<thead>
<tr>
<th>Are Challenged (A)</th>
<th>Are Cancelled (B)</th>
<th>Are Successful (C)</th>
<th>Total (A+B+C)</th>
</tr>
</thead>
</table>
SECTION 2 (CONTINUED)
IT SOFTWARE PROJECT INFORMATION

**Challenged IT Software Projects:**

Approximate average value of cost overrun per challenged project: \( R \)

Approximate average percentage of cost overrun per challenged project: \( \% \)

Approximate average time overrun per challenged project in weeks: \( \text{weeks} \)

Approximate average percentage of time overrun per challenged project in weeks: \( \% \)

Approximate average percentage of functionality delivered per challenged project: \( \% \)

Are more projects in your organisation currently challenged than 5 years ago? (Please mark the appropriate box with an X)\[ YES \quad NO \]

**Cancelled IT Software Projects:**

Approximate percentage of all cancelled projects that are restarted: \( \% \)

Approximate total number of attempted restarts per cancelled project: \( \text{ } \)
(Note: The restarted project may be initiated at any period after the cancellation of the original project)

Are more projects in your organisation currently cancelled than 5 years ago? (Please mark the appropriate box with an X)\[ YES \quad NO \]
SECTION 3
INFORMATION ON CHALLENGED IT SOFTWARE PROJECTS

Objective:
This section deals with the reasons why Information Technology Software Project are challenged.

Instructions:
Listed below is an initial list of reasons why IT Software projects are challenged. Please follow the following instructions:

1. Study the initial list below
2. If there are additional reasons on why IT Software Projects are challenged in your organisation, add the reasons to the list
3. Rank the reasons on why IT Software Projects are challenged in your organisation. Starting at 1 (One) for the most frequent reason for projects being challenged, 2 (Two) as the second most frequent reason for projects being challenged.
4. Do not rank challenged reasons that do not occur in your organisation.

<table>
<thead>
<tr>
<th>Project Challenged Factors</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrealistic Expectations</td>
<td></td>
</tr>
<tr>
<td>Unclear Objectives</td>
<td></td>
</tr>
<tr>
<td>Unrealistic Time Frames</td>
<td></td>
</tr>
<tr>
<td>New Technology</td>
<td></td>
</tr>
<tr>
<td>Weak Business Case</td>
<td></td>
</tr>
<tr>
<td>Inadequate Risk Management</td>
<td></td>
</tr>
<tr>
<td>Poor Communication</td>
<td></td>
</tr>
<tr>
<td>Lack of User Input</td>
<td></td>
</tr>
<tr>
<td>Incomplete Requirements &amp; Specifications</td>
<td></td>
</tr>
<tr>
<td>Changing Requirements &amp; Specifications</td>
<td></td>
</tr>
<tr>
<td>Lack of Executive Support</td>
<td></td>
</tr>
<tr>
<td>Technology Incompetence</td>
<td></td>
</tr>
<tr>
<td>Lack of Resources</td>
<td></td>
</tr>
<tr>
<td>Other: (Please Specify)</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 4
INFORMATION ON CANCELLED IT SOFTWARE PROJECTS

Objective:
This section deals with the reasons why Information Technology Software Project are cancelled.

Instructions:
Listed below is an initial list of reasons why IT Software projects are cancelled. Please follow the following instructions:

1. Study the initial list below
2. If there are additional reasons on why IT Software Projects are cancelled in your organisation, add the reasons to the list
3. Rank the reasons on why IT Software Projects are cancelled in your organisation. Starting at 1 (One) for the most frequent reason for projects being cancelled, 2 (Two) as the second most frequent reason for projects being cancelled.
4. Do not rank cancelled reasons that do not occur in your organisation.

<table>
<thead>
<tr>
<th>Project Cancelled Factors</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrealistic Expectations</td>
<td></td>
</tr>
<tr>
<td>Lack of Executive Support</td>
<td></td>
</tr>
<tr>
<td>Changing Requirements &amp; Specifications</td>
<td></td>
</tr>
<tr>
<td>Lack of Planning</td>
<td></td>
</tr>
<tr>
<td>Didn't Need It Any Longer</td>
<td></td>
</tr>
<tr>
<td>Incomplete Requirements</td>
<td></td>
</tr>
<tr>
<td>Lack of User Involvement</td>
<td></td>
</tr>
<tr>
<td>Lack of Resources</td>
<td></td>
</tr>
<tr>
<td>Lack of IT Management</td>
<td></td>
</tr>
<tr>
<td>Technology Illiteracy</td>
<td></td>
</tr>
<tr>
<td>Weak Business Case</td>
<td></td>
</tr>
<tr>
<td>Inadequate Risk Management</td>
<td></td>
</tr>
<tr>
<td>Poor Communication</td>
<td></td>
</tr>
<tr>
<td>Other: (Please Specify)</td>
<td></td>
</tr>
</tbody>
</table>


**SECTION 5**

**INFORMATION ON SUCCESSFUL IT SOFTWARE PROJECTS**

**Objective:**
This section deals with the reasons why Information Technology Software Projects are successful.

**Instructions:**
Listed below is an initial list of reasons why IT Software projects are successful. Please follow the following instructions:

1. Study the initial list below
2. If there are additional reasons on why IT Software Projects are successful in your organisation, add the reasons to the list
3. Rank the reasons on why IT Software Projects are successful in your organisation. Starting at 1 (One) for the most frequent reason for projects being successful, 2 (Two) as the second most frequent reason for projects being successful.
4. Do not rank success reasons that do not occur in your organisation.

<table>
<thead>
<tr>
<th>Project Success Factors</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong Business Case</td>
<td></td>
</tr>
<tr>
<td>Adequate Risk Management</td>
<td></td>
</tr>
<tr>
<td>Effective Communication</td>
<td></td>
</tr>
<tr>
<td>User Involvement</td>
<td></td>
</tr>
<tr>
<td>Executive Management Support</td>
<td></td>
</tr>
<tr>
<td>Clear Statement of Requirements</td>
<td></td>
</tr>
<tr>
<td>Proper Planning</td>
<td></td>
</tr>
<tr>
<td>Realistic Expectations</td>
<td></td>
</tr>
<tr>
<td>Smaller Project Milestones</td>
<td></td>
</tr>
<tr>
<td>Competent Staff</td>
<td></td>
</tr>
<tr>
<td>Ownership</td>
<td></td>
</tr>
<tr>
<td>Clear Vision &amp; Objectives</td>
<td></td>
</tr>
<tr>
<td>Hard-Working, Focused Staff</td>
<td></td>
</tr>
<tr>
<td>Other: (Please Specify)</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

RESPONDENT TITLES
### Appendix B - Respondent Titles

<table>
<thead>
<tr>
<th>Company Position</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architect</td>
<td>2.00</td>
<td>6.45</td>
</tr>
<tr>
<td>Business Development Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Business Engineer</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Chief Information Officer</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Director</td>
<td>2.00</td>
<td>6.45</td>
</tr>
<tr>
<td>Executive Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>IT Development Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>IT Director</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>IT General Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>IT Manager</td>
<td>2.00</td>
<td>6.45</td>
</tr>
<tr>
<td>IT Regional Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>IT Senior Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Managing Director</td>
<td>3.00</td>
<td>9.68</td>
</tr>
<tr>
<td>Project / Programme Manager</td>
<td>7.00</td>
<td>22.58</td>
</tr>
<tr>
<td>Sales Manager ERP</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Senior Advisor Information management</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Senior Analyst</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Systems Analyst</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Systems Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td>Technical Manager</td>
<td>1.00</td>
<td>3.23</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>31.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
APPENDIX C

PRIMARY COMPANY INDUSTRY

JOHANNESBURG
Appendix C - Primary Company Industry

<table>
<thead>
<tr>
<th>Primary Company Industry</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>2</td>
<td>6.45</td>
</tr>
<tr>
<td>Electricity Utility</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Energy</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Engineering</td>
<td>5</td>
<td>16.13</td>
</tr>
<tr>
<td>Financial Services</td>
<td>2</td>
<td>6.45</td>
</tr>
<tr>
<td>Human Resources</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Information technology</td>
<td>2</td>
<td>6.45</td>
</tr>
<tr>
<td>IT Insurance/Banking</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>2</td>
<td>6.45</td>
</tr>
<tr>
<td>Pension Fund Administration</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>2</td>
<td>6.45</td>
</tr>
<tr>
<td>Publishing/Advertising</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Retail</td>
<td>4</td>
<td>12.90</td>
</tr>
<tr>
<td>Sector Education Training Authority (SETA)</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Software Development</td>
<td>3</td>
<td>9.68</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td>Water Treatment</td>
<td>1</td>
<td>3.23</td>
</tr>
<tr>
<td><strong>Totals:</strong></td>
<td><strong>31</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>
APPENDIX D

COMPARISON OF THE STANDISH AND RSA RESULTS FOR PROJECTS BEING CHALLENGED, CANCELLED AND SUCCESSFUL, ACROSS COMPANY SIZES
Appendix D - Comparison of the Standish and RSA results for projects being challenged, cancelled and successful, across company sizes.

<table>
<thead>
<tr>
<th>Company</th>
<th>Status</th>
<th>Standish Percentage</th>
<th>RSA Percentage</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Challenged</td>
<td>50.4</td>
<td>38.6</td>
<td>11.8</td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>21.6</td>
<td>11.6</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>28.0</td>
<td>49.8</td>
<td>-21.8</td>
</tr>
<tr>
<td>Medium</td>
<td>Challenged</td>
<td>46.7</td>
<td>53.3</td>
<td>-6.6</td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>37.1</td>
<td>10.8</td>
<td>26.3</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>16.2</td>
<td>35.8</td>
<td>-19.6</td>
</tr>
<tr>
<td>Large</td>
<td>Challenged</td>
<td>61.5</td>
<td>41.1</td>
<td>20.4</td>
</tr>
<tr>
<td></td>
<td>Cancelled</td>
<td>29.5</td>
<td>5.8</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td>Successful</td>
<td>9.0</td>
<td>53.1</td>
<td>-44.1</td>
</tr>
</tbody>
</table>

The table above represents the challenged, cancelled and successful IT Software project statistics for Standish Group and South African research. The variances value is calculated by deducting the South African percentage from the Standish Group percentage. A positive variance for challenged and cancelled projects indicates that South African companies have less failed projects. A negative variance for successful projects indicates that South African companies have more successful projects.
APPENDIX E

COMPARISON OF RSA AND STANDISH GROUP

FUNCTIONALITY DELIVERED
The table above presents the percentage of functionality delivered, for the Standish Group and South African studies. The percentage of functionality delivered per challenged project, as supplied by the various respondents, was categorised in the five different ranges. Therefore 39.1% and 69.1% of the Standish Group and South African respondents, respectively, were of the opinion that 75-99% of functionality was delivered by challenged projects.
Please return this item on or before the last date stamped. NO RENEWALS ALLOWED. Fines are charged on overdue items.