CHAPTER 4

RESEARCH METHODOLOGY

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4.1   Introduction

Research is the systematic, controlled and critical investigation of events, led by theories and hypothesis about the events. Business research, as was done extensively in this study, can be defined as the systematic investigation in order to provide information that may or may not be used to solve business problems.

In this research, the attributes of a proper business research process were followed closely:

i.   The *objective* of the research was described in detail in Chapter 1.

ii.   The research *procedures* will be clearly explained later on in this chapter.

iii.   Thorough *planning* took place throughout the whole research process.

iv.   All data (primary and secondary) was properly and thoroughly *analised* in order to determine its relevance, validity and importance to this study.

v.   *Conclusions and recommendations* will be limited to the information that was gathered and justified by the research and will be summarised in the last chapter.

4.2   Properties of the research

4.2.1   Rational and empirical thinking

Theoretical and empirical research was done throughout this study. Rational thinking played an important role in the evaluation of information as well as in the conclusions and recommendations at the end of the dissertation. Both rational and empirical thinking will be defined and discussed.

i.   Rational thinking

Rationalism implies that reason must be the primary source of knowledge. All information must be derived from rules, laws and basic truths. This is also

called deductive thinking, which is the deriving of a conclusion by reasoning – in other words the conclusion is reached by logical deduction.

It is thus clear that the conclusion must be derived from the gathered information and its reasons and explanations. The reasons implicate a conclusion and represent a proof. There is a very strong relationship (or connection) between the information and reasons, and the conclusion. A deduction can only be valid if it is impossible for the conclusion to be untrue if the assumptions are true. For example:

Assumption 1:	All *Bowline* employees are hard workers.
Assumption 2:	John is a *Bowline* employee.
Conclusion:	John is a hard worker.

ii.   Empirical thinking

On the other hand, empiricism means that the observations were mainly obtained through experiences in the business environment. Events are described, explained and predicted by means of observation and experience – this process is also called inductive thinking.

With induction, there is not such a strong connection between the information and its reasons, and the conclusions derived from this information. A conclusion is derived from one or more facts, and this conclusion explains this fact while the fact in turn explains the conclusion. It is very important to note that this conclusion is only a hypothesis, in other words only one explanation and there may be many other true hypotheses which can be derived from the same fact or set of facts. (A hypothesis is an assumption or concession made for the sake of argument.)

4.2.2   Different thinking styles

Some different thinking styles (also known as sources of knowledge) are:

i.   Untested opinions.

These are generally believed by most people, even though the opposite may have been proved to be true.

ii. Self-evident truths.

These basic truths are derived from the 'laws of nature'.

iii. Method of authority.

People with status or in high positions are automatically believed because of their social standing or business position.

iv. Literary style.

Information is gathered through the work done by others. Information is interpreted in terms of its scientific goal and perspective, and not in terms of the abstract and general categories of the researcher's own reference scheme.

v.   Postulational style.

Formal, mathematical terms and postulates are studied. A postulate is an essential presupposition, condition or premise of reasoning. These lead to logical information like mathematical models, simulations and business laws. This method can be used successfully to determine the composition of the market before a new product is launched. Postulational thinking is a good example of *deductive rationalism*.

vi. Scientific method.

This thinking style is a combination of logic and rationalism, in other words *inductive empiricism*. It is a direct observation of the phenomena in the market. The thinking is done through very clearly defined variables, methods and procedures. Hypotheses are tested empirically. The thinking has the capacity and ability to eliminate contradictory hypotheses - simply stated it can thus be viewed as a self-correcting process.

This last style discussed (*i.e.* Scientific thinking), is the source of knowledge that was most widely used throughout the entire research process. Although countless literary

sources were consulted (secondary information), the majority of the research concentrated on the information gathered from the completed questionnaires and interviews (primary sources of information used in a logical and rational way).

4.2.3   The role of a hypothesis

A good hypothesis has three very distinct qualities. In order to be true, a hypothesis must be adequate, testable and better than its rivals.

Furthermore, a hypothesis must:

- Lead the direction of the study and its research.
- Limit the data that is to be studied (set the parameters).
- Identify the relevant information.
- Provide a framework for the conclusions that will be derived from the research.

4.3   The research methodology

The research in this study was done by following seven basic steps, namely:

1. Identify the topic to be researched.
2. Exploration and judgement of the situation.
3. Design of the research study.
4. Sampling and data capturing.
5. Evaluation of the researched information.
6. Writing of the dissertation.
7. Constant analysis, interpretation and corrections.

4.3.1   Identify the topic to be researched

The title of this study is:

Logistics management in the information technology industry.

This topic can be split successfully into two meaningfully segments:

i.   Logistics management.

The total supply chain was researched and described in great detail in the third chapter. All elements from procurement, warehousing and assembly, up to final distribution and reporting were discussed. A new concept, namely *fulfilment*, was discovered and its characteristics, implementations and new possibilities were researched and documented in detail.

i.   Information technology industry.

This industry, and especially its performance in the South African market was scrutinised, thoroughly researched and explained in the first chapter.

4.3.2   Exploration and judgement of the situation

After the above-mentioned topic was chosen for the study, the overall South African situation was firstly explored. Fulfilment houses, as well as their suppliers and clients were questioned very early on in the research process (Questionnaires attached in Appendix). Where the South African market was lacking in sufficient examples, the international scene was also explored and judged in terms of its validity to be implemented in the current South African situation.

4.3.3   Design of the research study

The format of the research study was designed in accordance with the prescribed methodology of a proper research proposal:

-   The study started off in broad terms, describing the information technology industry as a whole.
-   Secondly the parameters were narrowed to include only certain selected aspects of this industry, namely the supply chain and the outsourcing of some or all operational business processes.
-   Next a new trend in supply chain management, namely fulfilment, was extensively researched and explained.

- Lastly conclusions, new possibilities for the future and specific recommendations were made in the final chapter.

- Both primary and secondary information were used in the research process. Company websites and brochures were examined in order to obtain background information on the various companies, their suppliers and clients. Secondary information was obtained mostly via phone calls, personal visits and interviews with key personnel. Supply Chain Management / fulfiment companies that were interviewed over a period of time are:

  - *Siltek*

  - *Memtek - MultiMedia Warehouse*

  - *Workgroups*

  - *Bowline*

  - *Modus Media*

The following clients and / or suppliers of such fulfilment houses were also interviewed:

- *Sonopress* (Compact Disc manufacturer)

- *Artone* (printer)

- *Microsoft* (operating system)

- *Linux* (operating system)

- *MWeb* (Internet Service Provider)

- *UUNET* (Internet Service Provider)

- *AfriMusic* (on-line e-commerce shop)

- *Brilliant Business Systems* (accounting software packs e.g. Tax Return)

- *Masterskill* (educational software packs e.g. A+, MCSG)

- *Idion Technology Holdings* (software developers)

Questionnaires to Supply Chain Management companies as well as to their clients are attached in Appendix.

4.3.4   Sampling and data capturing

a)   Major players to be considered.

The information technology (IT) industry in South Africa is dominated by a small number of big players. Examples of IT distributors (hardware and software) are *Microsoft*, *MMW* (Multimedia Warehouse), *Workgroup* and *Acer*. Some big ISP's (Internet Service Providers) are *MWeb*, *IAfrica*, *UUNET*, *Africa Online* and *World Online*. Because of the relative small group of major players in the South African IT industry, most of the bigger companies were researched, interviewed and asked to complete questionnaires (refer to point 4.3.3 above). The findings are discussed in detail in Chapters 2, 3 and 5.

b) Measurement scales.

Concepts used in research may be classified as objects or as properties:

Objects include the things of ordinary experience, such as companies and their employees. Objects may also include things that are not as concrete, for example attitudes, cultures and peer-group pressure.

Properties, on the other hand, are the characteristics of the objects. This may include things like an employee's physical and psychological characteristics. It may also include his social properties such as leadership ability and class affiliation or status.

Much of the gathered data were encoded to make it easier for the information to be analysed and compared. Depending on its nature, the data was grouped into one of the four main scale-types:

i. Nominal scale.
    This measurement scale is the least powerful of the four types. It has no order, distance or origin and its basic empirical operation is to determine equality. The data set is partitioned into subsets or categories that are mutually exclusive and collectively exhaustive. Even though some purists argue that the use of a nominal scale does not qualify as measurement, it is the scale that is most widely used in business research.

ii.   Ordinal scale.

This scale has order but no distance or unique origin. It is used in the determination of greater or lesser values. It implies that one statement is 'greater than' or 'lesser than' or even 'equal to' another statement, without stating how much greater or less.

iii.   Interval scale.

The interval scale has the powers of nominal and ordinal scales (order and distance), plus one additional strength: it incorporates the concept of equality of interval (the distance between 1 and 2 equals the distance between 2 and 3). Still, the interval scale has no unique origin and can be used only in the determination of equality of intervals.

iv.   Ratio scale.

This scale possesses order, distance as well as a unique origin. Its empirical operation is the determination of equality of ratios.

4.3.5   Evaluation and interpretation of the researched information

The data that was used in the writing of this dissertation, was mainly obtained in three ways:

i.   Primary data, which is data that already exists. Many literary sources were consulted in order to collaborate the most accurate, current and widely accepted market trends.

ii.   Secondary data was collected for the purpose of evaluating the most relevant information pertaining to the topic of this thesis.

iii.   Interviews were conducted with managers and lower-level employees at some of the biggest IT and supply chain management companies in the country, as well as with their main suppliers and clients. The interviews were designed with the specific purpose of obtaining hands-on information relevant to the

current local and global trends in the IT market (Questionnaires attached in Appendix).

All gathered data was scrutinised and then reduced to a manageable quantity. It was then used to develop summaries, look for patterns and apply statistical techniques. None of the data was ignored. It was either catagorised as irrelevant, or as relevant, current and topical in which case it was used as information.

4.3.6   Writing of the dissertation

Finally, the text was written where all findings, conclusions and recommendations were reported. This dissertation is the result of the study on logistics management in the IT industry.

4.4   Summary

As mentioned in the introduction to this chapter, research can be defined as the investigation of events as well as the theories and hypotheses relating to these events. When the topic of this dissertation was chosen, the research of relevant events, market trends and relevant business processes were undertaken in a systematic, controlled and critical manner. In order to ensure that all relevant data was given an equal chance to be incorporated into the end-results, different thinking style were used as sources of knowledge. The research methodology were explained in detail in points 4.3.1 to 4.3.6. In the last chapter, all findings will be summarised. Recommendations for the future will also be discussed in detail.