

CHAPTER 6: BI analysis and synthesis

*'So I want it fast, I want it factual, I want it integrated. Please don't come out with a wheelbarrow and say, Hey, look what I got! I got all these jigsaw puzzle parts, and dump them down on my carpet and sit there and try to guess with me what sort of picture it makes. Please, put the puzzle together before you see me.'*⁵

6.1 Introduction

After having collected data, information and knowledge during the collection stage of the BI process, the next stage deals with turning collected material into intelligence. The purpose of this stage is to produce intelligence output.

Although this stage of the BI process is referred to as the 'analysis stage', it should be noted that in order to generate intelligence, this stage involves the analysis, synthesis and interpretation of information. Rustman (2002:98) confirms this by stating that 'the term analysis as used in the intelligence profession is somewhat more than just analysing and picking apart the information that has been collected; it is more a process of synthesising and putting together all of the existing information that has been obtained on a particular topic and then examining it all to try make sense out of it'. This is also confirmed by Sandman (cited in Miller, 2000:69) who refers to analysis as the 'linkage between the raw-material data and the value-added product intelligence'.

Powell (2001:online) points out that an organisation's ability to perform accurate intelligence analysis may become a strategic differentiator for such an organisation, because 'All competing companies are, or soon will be, looking at more or less the same set of data, delivered in virtually real time. What will

Sharer (cited in Bernhardt, 1993:3)

differentiate them is their ability to analyse it, make sense of it, and formulate and execute actions based on it'.

The aim of this chapter is to:

- Firstly, review existing literature on the approaches, methods and models that could be applied during the BI analysis stage
- Secondly, refer to the BI analysis methods and models used by SA banking institutions and propose a practical step-by-step process for BI analysis.

The importance of this stage in the BI process is briefly discussed in paragraph 6.2. This is followed by a discussion of a number of analysis approaches that could be adopted by BI staff members during the analysis stage. Also an overview is given of those methods and models typically used by banking institutions during BI assignments. Reference is also made to the analysis methods applied by the SA banking institutions that participated in this research. This is followed by a brief discussion of a practical step-by-step process that could be used for BI analysis. In last two sections, the role of the BI analyst and a few guidelines for successful analysis are discussed.

6.2 Importance of the analysis stage

There are several reasons why the analysis stage of the BI process is of critical importance. Some of these reasons are briefly discussed below.

6.2.1 Collected information is not enough

Rustman (2002:98) indicates that even in professional intelligence organisations, those collecting information would argue that 'the raw data does usually speak for itself', and therefore the need for a specific analysis process and the role of intelligence analysts are often questioned. Rustman (2002:98) points out that 'raw data does not usually tell the whole story'. From the researcher's experience, the importance of a systematic analysis process is questioned in banking institutions, especially when BI analysts request intelligence users to give them enough time to perform proper analysis. Rustman (2002:99) confirms the important role of the intelligence analysis stage and the role of analysts in the following: 'The analysts play a critical role in the intelligence process by sifting through all the information ...putting all the information in one place, providing context and making sense out of it in a thoroughly dispassionate manner.'

6.2.2 Intelligence users are not intelligence analysts

The role of the intelligence user in the BI process is to identify BI requirements and use the disseminated intelligence product in order to deal with business issues, and not to conduct BI analysis process. As Rustman (2002:99) points out, decision-makers are typically too busy to perform a systematic analysis process. Kevin Sharer's (cited in Bernhardt, 1993:3) remarks about 'putting together the puzzle' before meeting with the intelligence users, confirm that the analysis stage should prevent an information overload by providing interpreted and actionable intelligence. Powell (2001:online) agrees with this when he states that analysis should reduce the number of input variables that reach the decision-maker, and not add to the flow of information. In cases where intelligence users are provided with substantial amounts of collected data/information, as opposed to executing the analysis process, their decision-

making processes could potentially be complicated and delayed due to the effort required from them to distil information that is relevant and accurate.

6.2.3 Providing context

During the analysis stage analysts generally collate all the relevant information and generate intelligence within the context of the BI requirement. Thus the intelligence generated is focussed on addressing the BI requirement, and ultimately the underlying business problem that prompted the identification of the BI requirement. By putting all relevant information in the context of the BI requirement and the business problem/issue, analysts are better able to interpret and make conclusions about a particular topic/situation. If intelligence users received the collected information without any indication of the context, they could easily interpret the information in the wrong context, make wrong decisions, and take inappropriate action.

6.2.4 Providing 'missing links'

Ackerman and Wickens (2001:102) state that, BI analysts rarely have all the pieces to complete 'the intelligence picture'. The intelligence picture is the picture/view of a situation/topic that an intelligence analysts aim to piece together from the pieces of information at their disposal. Having complete, accurate and relevant up-to-date information to answer all the KIQs is a situation not often experienced by those involved in intelligence analysis, especially when dealing with predicting the future. As Herring (cited in Sigurdson and Tagerud, 1992:162) points out, 'The future orientation of intelligence stems from the recognition that competitive advantage is derived not so much from knowing what has already happened, but from knowing what is likely to happen'. Therefore, finding links between bits of information where the collection process has failed to obtain all

the relevant data is one of the tasks of the BI analyst. By following an analysis process, analysts are guided to make assumptions, deductions and conclusions regarding aspects of the BI assignment where information is sketchy or inaccurate, or where there is a total lack of information. This can serve to compensate for the lack of information experienced, and can, to some extent, address critical BI gaps. The identification of links between existing information elements and the identification of missing links are both part of the collation and the contextualisation process during BI analysis.

6.2.5 The analysis process generates intelligence output

In order to turn information into intelligence output, relevant information (related to KITs and KIQs) must be analysed, synthesised and interpreted. Without the analysis and interpretation processes involved, the output of the BI staff would be nothing more than repackaged information that may not add much value to the intelligence user. The analysis process requires that BI staff analyse information in detail before synthesising it. As Ackerman and Wickens (2001:102) point out, 'We need to understand the meaning of each of the relevant BI information pieces through analysis before deciding how the pieces should fit together (synthesis)'. If the analysis stage of the BI process is not completed, there will be no intelligence output to address the BI requirements defined during the first stage of the BI process!

6.3 Approaches to analysis

Due to the importance of the BI analysis stage for the generation of intelligence, BI analysts should review the analysis approaches described in the literature before attempting to analyse in an ad hoc manner. In this regard, Bernhardt (1993:52) identifies three traditional approaches for the analysis stage, and

Ackerman and Wickens recommend an approach that is directly linked to the BI requirements definition stage of the BI process.

6.3.1 Top-down analysis approach

This approach is typically concerned with understanding the macro business environment, and especially the strategic issues of competitors/customers, therefore it is suitable for addressing BI requirements that require a macro perspective. Bernhardt refers to this as an approach that deals with the 'big picture'. Viewed from a competitor intelligence perspective, this approach is useful when BI staff need to analyse the horizontal strategies of a competitor company with multiple product/business units. The coordination of the various strategies of business units within such an organisation provides a view of the competitor's overall game plan. Bernhardt (1993:54) identifies a number of analytical methods/models that can be used to assist with top-down analysis. These include the Boston Consulting Group (BCG) growth-share matrix, the product/market attractiveness-competitive matrix and the industry maturity-competitive position matrix.

6.3.4 BI requirements-driven approach

6.3.2 Bottom-up analysis approach

Ackerman and Wickens (2001:103) suggest that, in addition to the top-down The bottom-up analysis approach, also referred to as micro-analysis, is well-suited to situations where BI analysts have to address BI requirements that relate to specific strategic and tactical KIAs (requiring a detailed analysis of a particular topic). This analytical approach is usually very focussed and systematic. Bernhardt (1993:55) points out that this approach is mostly used to generate intelligence input for strategic planning purposes. Some of the typical analysis methods that could be used for micro-analysis include the Porter's 5 Forces

Model, value-chain analysis, SWOT analysis, competitor/customer profiling, core competencies and network analysis.

6.3.3 Time-based analysis approach

The time-based analysis approach is particularly suitable for dealing with BI requirements that relate to determining the future strategies and plans of competitors, changes in the business environment and potential threats. This type of analysis can be used to position an organisation to deal with this 'predicted' future environment. From a competitor-intelligence perspective, this approach emphasises a sound understanding of a competitor's strategic intent, strategic capabilities and key success factors, all of which allow a competitor to compete. Based on this and an analysis of the business environment, likely future strategies of competitors can be predicted. Some of the typical methods of analysis that could be used for time-based analysis include SWOT analysis, scenario development, timeline analysis, war gaming and mathematical trend analysis.

6.3.4. BI requirements-driven approach

Ackerman and Wickens (2001:107) suggest that, in addition to the three approaches recommended by Bernhardt, a BI requirement-driven approach be adopted for analysis. This approach builds on some of the elements of Bernhardt's three approaches, but emphasises the importance of adapting the analysis process and methods in order to address different types of BI requirements. In this regard, Ackerman and Wickens distinguish between BI requirements related to the future, the current situation and past events. This approach can be depicted as follows:

Future Predictive Intelligence Estimative Intelligence	During Current Intelligence	Past Basic Intelligence Estimative Intelligence
The Analysis process and methods are geared towards predicting future events and identifying signals that could provide early warning	The Analysis process and methods are geared towards the analysis of events/topics while particular events unfold	The Analysis process and methods are geared towards analysis of past events and need to ensure completeness and often include a future orientated component.

Table 6.1 A BI requirements-driven analysis approach
 (Ackerman and Wickens, 2001:107)

- In the case of future-oriented BI requirements, the emphasis is placed on the identification and measurement of indicators or early warning signals that are typically related to market opportunities and threats. This usually requires detailed analysis of historic events, trend analysis and scenario development to identify future trends, indicators and scenarios. Once these indicators or warning signals have been identified, the BI collection effort is focussed on monitoring the environment for these signals and the analysis process is triggered when these signals are observed. The analysis of the strategic intent and capabilities of competitors in relation to predicted market/environmental conditions are also included in the analysis process.
- In addressing BI requirements related to current events, this approach requires that a near real-time analysis be conducted. This requires that collected data, information and knowledge be evaluated, collated and interpreted as analysts receive it. Ackerman and Wickens (2001:108)

point out that it is important must be filtered to establish relevance and confirm accuracy. In the light of current intelligence requirements, the analysis process is subject to severe time constraints and there is no time for the application of time-consuming analysis methods.

- Typically, requirements for basic and estimative intelligence involve intensive research and analytical processes, and are often less constrained by time issues. A typical example of this would be where BI staff members need to provide input for strategic planning cycles or deal with BI requirements related to a predetermined BI production schedule (see paragraph 4.4.4). In this regard, the analysts will emphasise the need to obtain as much as possible relevant information and to use a number of methods/models of analysis to ensure accuracy.

6.4 Methods and models for analysis

Just as there are numerous collection methods, there are also many analysis methods available for use during the BI analysis process. The methods/models used during the BI analysis are not necessarily restricted to methods that were designed with intelligence analysis in mind. According to Mignogna (2001:online), many of the analytical methods used for intelligence analysis are 'not indigenous' but have been adopted from a variety of disciplines, including strategic planning, market research, futures research and other social sciences. On the basis of research involving 33 international banking institutions and considering the three types of analysis methods, Ackerman and Wickens (2001:110) compiled a list of typical BI analysis methods, which include the following:

Because BI assignments often revolve around business problems that deal with external events and the activities of competitors and/or customers, the

Quantitative Analysis Methods	Hybrids	Qualitative Analysis Methods
Cross-tabulation Multi-dimensional Modelling Decision Tree Induction Multiple regression Association/Affinity Modelling Neural Networking	Visualisation Scenario Development	Hypothesis Generation & Testing Key Variable analysis SWOT analysis Value Chain analysis Porter's 5 Forces War Games Benchmarking Two-Dimensional Tables Contextual Analysis Network Analysis Time-line Analysis

Table 6.2 Analysis methods/models used by financial services institutions (Ackerman and Wickens, 2001:110)

With reference to intelligence analysis in financial services institutions, Ackerman and Wickens (2001:108) state that 'intelligence analysis methods are as a rule human intensive and more inclined towards the qualitative spectrum of analysis methods than is typically the case with the methods used by analysts that are involved in information analytics'. In the case of information analytics, where information summarisation is an important activity, analysts tend to rely mainly on quantitative methods such as statistical analysis and data mining techniques. As opposed to this, intelligence analysis is more than just the summarising or synthesising of information, and includes interpretations, predictions, judgements and conclusions, which require the application of that qualitative analysis methods.

Because BI assignments often revolve around business problems that deal with external events and the activities of competitors and/or customers, the

researcher believes that BI staff should ensure that quantitative, hybrid and qualitative analysis methods should be considered during the analysis stage. When attempting to gain insight into competitor/customer motivation, attitudes, decisions and behaviour, qualitative and hybrid methods would be more appropriate. Quantitative methods would, for instance, be more appropriate when doing financial predictions and determine potential trends. Ultimately the key for BI analysts is to use a combination of methods that will provide accurate and actionable BI output once the analysis process is completed.

6.4.1 Qualitative methods

Various qualitative methods for BI may be considered by analysts during the analysis stage of the BI process. Some of these will be discussed in the following paragraphs.

6.4.1.1 Hypothesis generation

This method is widely used by professional intelligence services and is well suited to the conduct of BI. The generation and evaluation of hypotheses are key steps in the analytical process used by the Central Intelligence Agency (CIA). Typically, BI analysts should consider generating hypotheses during the BI requirements definition process in order to direct the collection process to collect information specifically related to the evaluation of these hypotheses. In the researcher's experience, hypotheses are often generated during the analysis stage of the BI process, and not during the requirements definition stage. This often leads to a situation where additional requirements for the collection of information are determined during the analysis process in order to evaluate the hypotheses. Usually the process followed for hypothesis generation requires the analyst to see an existing situation as unique and to try to understand it without

making references to other similar situations. This is extremely difficult for analysts to do and, according to the Center for the Study of Intelligence (1999), it is advisable that hypothesis generation be done in teams using brainstorming techniques and, if possible, external parties to contribute to the process. The key is to challenge hypotheses rather than to accept them at face value. Davis (1999:online) states that the 'Analysis of Competing Hypothesis' concept, developed by Heuer, provides a methodology to rigorously test/challenge those hypotheses that are deemed to be the most plausible with available information. Heuer developed this methodology in order to assist intelligence analysts of the CIA to challenge and revise the mental models that are applied during the analytical process. Building on the research done by the CIA, Ackerman and Wickens (2001:111) developed a checklist for testing hypotheses, which could be used by banking institutions:

Hypothesis Status	Advice	Risk
Plausible but unproven	Do not reject too early and look for additional information	May be discarded if no information to prove the hypothesis is found. Having no information currently available does not imply that there is no information available to prove or disprove the hypothesis.
Plausible but proven	Beware not to test –what are the assumptions?	If a hypothesis is easily proven the risk is that other hypothesis may be discarded and not further developed.
Not Plausible	Why is this not plausible? Because we have no information? It may be a gap in our available information	May be discarded without having established factual basis for reasoning.

Table 6.3 Hypothesis testing checklist (Ackerman and Wickens, 2001:111)

Figure 6.1 SWOT Analysis (Sandman cited in Miller, 2000:90)

6.4.1.2 SWOT analysis

This analysis method is not only useful when analysing an organisation's internal strengths and weaknesses. As pointed out by Johnson and Scholes (1988:79), SWOT analysis provides 'a mechanism for systematically thinking through the extent to which the organisation can cope with its environment'. From a BI analysis perspective, this model could be applied to competitor organisations as well as customer organisations in order to determine how they cope with the business environment in which they operate. Based on this, BI staff can develop scenarios and attempt to predict the future strategy of banking competitors. This analysis method consists of four components. The first two components deal with strengths and weaknesses that must be identified and related to the organisation, competitors or customers. The other two components relate to threats and opportunities. As Sandman (cited in Miller,2000:90) points out, 'many people assume the opportunities and threats refer only to the opportunities and threats facing the company in question. But you must look beyond an individual company...'. One way of dealing with this is to refer to market opportunities and market threats. By identifying these the results of this analysis is typically mapped on a matrix as depicted below.



Figure 6.1 SWOT Analysis (Sandman cited in Miller, 2000:90)

Once the matrix has been completed, analysts need to determine which strategic options they expect the competitor or customer organisation would follow, given the picture they have at their disposal.

6.4.1.3 Value chain analysis

Originally this analysis method was introduced to analyse all the activities within a company and to determine the value added by primary and secondary activities. Sandman (cited in Miller, 2000:92) points out that value chain analysis 'becomes a useful tool for intelligence when you are comparing two competitors'. This is confirmed by Powell (2001:online) when he states that 'each activity in the value chain is a potential source of competitive advantage'. By understanding which activities in a value chain generate the most value for a competitor and which generate the least, analysts can determine where competitors would try to improve efficiency and where they would be vulnerable if attacked. From a banking perspective, value-chain analysis can be used for both customer and competitor intelligence purposes by determining which activity in the value chain of the banking institution creates most value for customers, and by doing a comparison on this between competitor banks. Value-chain analysis could also be used by banking institutions to help them understand where value is created in their corporate clients' business operations.

6.4.1.4 War Games

A well-known method used by military intelligence staff to assist with intelligence analysis is war games and, as Kahaner (1998:126) points out, 'the concept applied to business is simple'. The purpose of this method is to use groups of staff members to act out a war game and analyse the results. Typically, one

group would need to play/act the role of the competitor/customer and another group would act out their role as employees of the organisation having to deal with the competitor/customer. The number of groups can be expanded to include other role players such as regulating bodies, suppliers, etc. Kahaner (1998:126) also mentions that, during the course of the war-game, strategies and plans should be proposed and acted out, taking cognisance of the actual business environment, in order to make it as realistic as possible. The value of this method is to a large degree determined by participating staff members' in-depth knowledge of the methods, tactics and doctrine of the competition/customer, and in particular their knowledge of key senior staff members in competitive companies. The potential value of this method for SA banking institutions must not be underestimated as ex staff members from competitors could be well positioned to act out various scenarios as competitors, to which business leaders need to respond by making decisions and developing plans. The benefit of the method is that it can be used to test hypotheses and assist in the development of scenarios.

6.4.1.5 Network analysis

This is a useful method that assists analysts to identify and link various names and relationships in order to identify links in a network. Banking institutions can apply this method to identify and visualise customers' relationships with other market players such as competitors. This method can also be effectively applied to identify competitors' networks with suppliers and partners. To facilitate the use of this method, specific network analysis tools are commercially available to assist with determining relationships and graphically displaying the networks, but not to interpret the networks.

6.4.1.6 The Five Forces Model

This model, originally developed by Porter, is often used by BI analysts to analyse the competitive environment in a particular industry or market. According to Johnson and Scholes (1988:62), the Five Forces Model is 'essentially a structured means of examining the competitive environment of an organisation so as to provide a clear understanding of the forces at work'. In this model, a distinction is made between five competitive forces that influence the competitive environment in which an organisation conducts business. These forces are the power of customers, the power of suppliers, the threat of new entrants, the threat of substitutes and the existing competition amongst the key players in the market. This model can be depicted as follows:

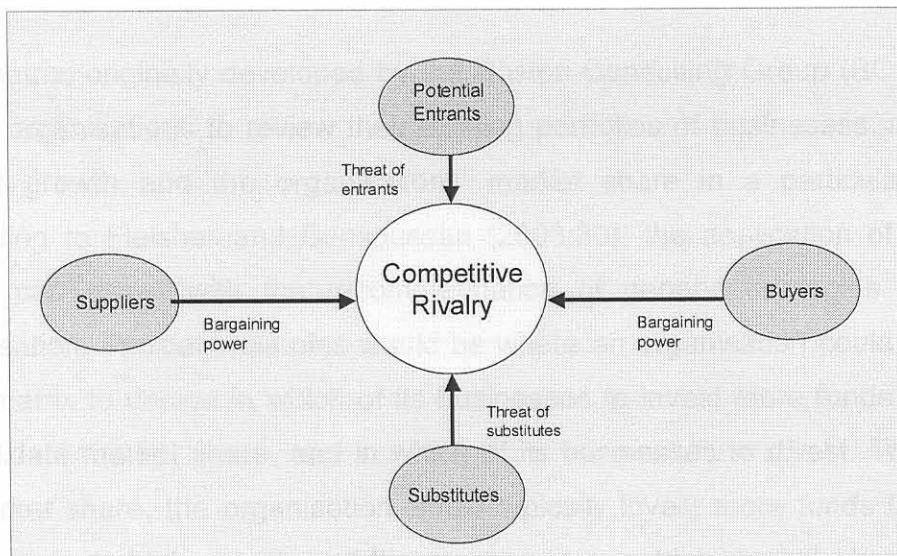


Figure 6.2 The five forces model (Johnson and Scholes, 1988:63)

Sandman (cited in Miller, 2000:72) points out that 'by understanding the relative importance of each of these forces, one can predict how the industry will work and how competitors will interact with each other'. Ultimately, all the competitors

have to deal with all these forces and take appropriate action, which, as Sandman points out, is the key lesson, namely 'that competitors do more than respond to each other'. This model could also be used to perceive the competitive environment from the perspective of existing and emerging competitors, customers and suppliers. In this regard, BI analysts should analyse how a competitor or customer would apply this model. This model is useful in a banking environment, not only for competitor analysis, but also to promote an understanding of the competitive forces that corporate customers have to deal with in running their business operations, which in turn can provide insight and identify opportunities for the banking institution to provide products to these clients.

Figure 9: The BCG Matrix (Fleisher and Bensoussan, 2003:34)

6.4.1.7 Growth-share matrix

The model can be used to good effect for BI analysis, especially when analysing

This matrix, originally developed by the Boston Consulting Group (BCG matrix), allows organisations to review their existing portfolios of businesses in terms of market growth and the organisations' market share in a particular market. According to Fleisher and Bensoussan (2003:30), the application of the BCG matrix can assist with the recommendation of generic strategies within an organisation. Typical examples would be where an organisation could apply the BCG matrix to decide in which of its businesses to invest more funds, where to consolidate market share, and in which of its businesses to divest. To increase its market share, the organisation would typically invest more funds in markets where there is high growth and the company has a high market share. Powell (2001:online) points out that this model can also be used to identify business sectors in which it would be advisable to make new acquisitions. Sandman (cited in Miller 2000:74) states that this model is especially useful for analysing multi-unit companies and product companies, but that it could also be applied to services businesses. The BCG matrix can be depicted as follows:

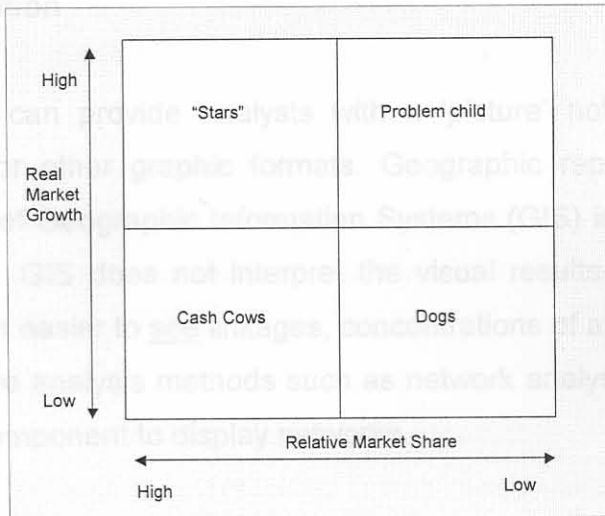


Figure 6.3 The BCG Matrix (Fleisher and Bensoussan, 2003:34)

This model can be used to good effect for BI analysis, especially when analysing competitors. By collecting information on the market growth and market share of competitors, this BCG matrix can be completed with competitors' information and BI analysts can determine in which businesses the competitors are likely to invest, and where they would typically aim to consolidate. This model can be applied to SA banking institutions, especially when taking a product view of a bank. In this regard the market attractiveness of typical banking products (e.g. deposits, mortgage loans, credit cards, etc.) and the market share of competitors in each of these products can be mapped on the matrix.

6.4.2 Hybrid analysis methods

The importance of hybrid analysis methods should not be discounted during the analysis process. Two of the hybrid methods that warrant further discussion are visualisation and scenarios.

6.4.2.1 Visualisation

These methods can provide analysts with a 'picture' not envisaged by just looking at text or other graphic formats. Geographic representation of facts through the use of Geographic Information Systems (GIS) is a good example of such a method. GIS does not interpret the visual results for the analyst, but makes it so much easier to see linkages, concentrations of activities, or emerging trends. Qualitative analysis methods such as network analysis also make use of a visualization component to display networks.

6.4.2.2 Scenarios

Another common hybrid analysis method used for intelligence purposes is scenarios development. Herring (cited in Sigurdson and Tagerud,1992:172) states that 'the use of scenarios is probably one of the most effective means of analytically describing an intelligence future'. In intelligence production, scenarios are typically used to describe a future situation and how an organisation may get to that envisaged future. In order to use this method properly, BI staff should not merely focus on extrapolating the present to the future. Herring (cited in Sigurdson and Tagerud,1992:172) suggests that three steps should be followed. First, scenarios should be used to describe 'a plausible evolution of current events and trends' that does not reflect a future situation differently on the basis of the extrapolation of past events. Once this has been done, a set of future possibilities should be developed using projections of important trends and events. The third step is to describe relevant future situations in relation to the organisation and its strategies in specific terms. In this regard analysts typically identify the 'best case/worst case' scenarios or those that are most or least likely to occur. The use of scenario development in conjunction with hypothesis

development and testing is a very powerful combination of analysis methods in the hands of skilled analysts.

During research for this dissertation, BI staff members of participating SA banking institutions were interviewed to identify the typical BI analysis methods/models used during the BI analysis process. The result of this research is presented in the following section.

6.4.3 Quantitative analysis methods

As was pointed out in the introduction to paragraph 6.4, quantitative analysis methods/models should preferably be used in combination with qualitative methods/model mainly, because of the typical nature of BI requirements. In the researcher's experience, the use of quantitative methods is often overemphasised in banking institutions, mainly because of huge investments made in IT to manipulate and analyse huge amounts of internal transactional data. Typically these analytical methods are used to generate management information reports and 'analytics'. One quantitative method used for intelligence analysis is mathematical trend analysis. According to Herring (cited in Sigurdson and Tagerud,1992:173), mathematical trend analysis is 'one of the most used of all forecasting techniques in intelligence production'. He also adds that trend analysis that combines both quantitative and qualitative methods is 'one of the most effective forecasting methodologies' when dealing with future-oriented intelligence. This method starts with using standard mathematical-based methods to project historical trends into the future. In addition to this, the qualitative judgements of experts are obtained and factored into the mathematical model to produce 'expected' trends. The historical and expected trends are then graphically presented and the impact of expected trends on existing trends are determined. This result is then used to identify a range of alternative future situations that the organisation would potentially have to deal with.

One of the banking institutions also makes use of both trend and scenario analysis. With regard to war games it was established that two of the banking institutions viewed this method as an important analysis method, whereas the other participating institution used the method, but did not view it to be of

6.4.4 BI analysis methods used in participating SA banking institutions

During research for this dissertation, BI staff members of participating SA banking institutions were requested to identify the typical BI analysis methods/models used during the BI analysis process. The result of this research can be depicted as follows:

Analysis method	Used by participating SA banking Institutions	Percentage of sample SA banking institutions using the method
Hypothesis generation and testing	✓	100%
SWOT analysis	✓	100%
Value-chain analysis	✓	100%
5 Forces	✓	100%
Key variable analysis		0%
Network analysis	✓	33%
Timeline analysis	✓	33%
Two-dimensional tables	✓	33%
War games	✓	100%
Scenario development	✓	33%
Multi-dimensional modelling	✓	66%
Data mining	✓	100%
Financial ratio analysis		0%

Table 6.4 Analysis methods used by participating SA banking institutions

Although the above table does not indicate the relative importance of the analysis methods, but rather the prevalence of use, it is clear that all the banking institutions that participated in the research make use of hypothesis generation, SWOT analysis, Five Forces and value-chain analysis for BI analysis purposes. One of the banking institutions also makes use of both network and timeline analysis. With regard to war games it was established that two of the banking institutions viewed this methods as an important analysis method, whereas the other participating institution used the method, but did not deem it to be of

particular significance. One of the banking institutions involved envisaged using war-gaming for analysis purposes at business-unit level, with the intention of integrating the output of all the war-gaming exercises at group level. Of interest is the relatively low use of scenario development. Only one of the participating banking institutions indicated that this method was used for BI analysis purposes. This prompts the question whether the other banking institutions use war-gaming as a substitute method for scenario development. The use of data mining and multi-dimensional modelling is prominent, but all the participating banking institutions indicated that the output of these methods was typically used as input for the BI analysis process.

6.5 A BI analysis process

According to the Centre for the Study of Intelligence (1999:online), the intelligence analysis process 'is above all a mental process' in which intelligence analysts play a pivotal role.

While conducting the research on which this dissertation is based, the researcher found that although BI staff in participating banking institutions had access to analysis methods/models, and in some cases to specialised intelligence systems, a formal step-by-step BI analysis procedure was not necessarily followed. In one of the banking institutions, senior BI staff confirmed that although a generic analysis process that focussed on the use of specific methods had been designed, the implementation thereof in the various business units proved to be a major challenge, mainly because of a lack of analysis skills. One banking institution also confirmed that the analysis process that was utilised consisted of the application of a number of analysis models in a particular sequence, depending on the BI requirement. Another of the banking institutions

confirmed that extensive use was made of external analysts who apply their own internal analysis processes.

According to the researcher's experience, placing emphasis on a BI analysis process that consists of applying various methods could have disadvantages in that the application of methods become critical to the process. In this regard the researcher would suggest that a seven-step analysis process be considered during which appropriate methods must be identified and applied, and where a specific step is followed to integrate and interpret the results of the application of these methods. This process can be depicted as follows:

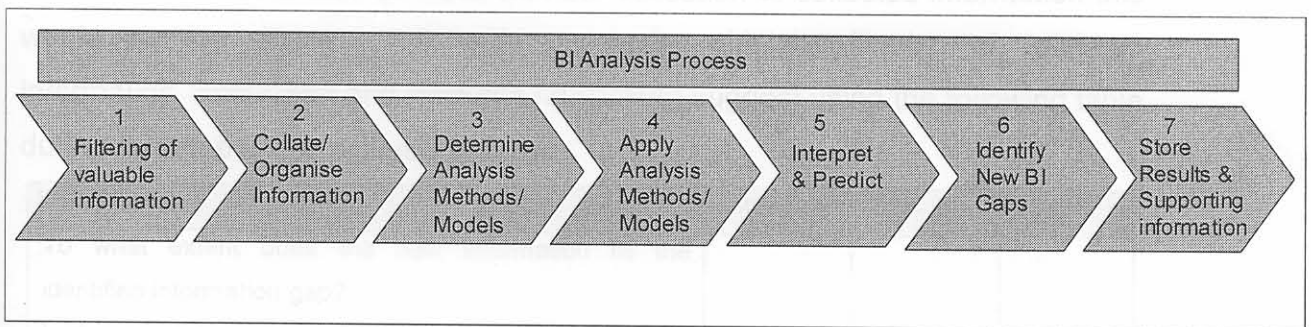


Figure 6.4. A seven-step analysis process

Step 1: Filtering of valuable new information. Typically the first step in an analysis process relates to the filtering and evaluation of collected data, information and knowledge. In order to filter this new information, the intelligence value of the information for analysis purposes needs to be determined. Once this has been done, valuable information needs to be filtered from information that has little or no value for the analysis process. Generally the value for analysis purposes is determined by the accuracy of the information, the relevancy to the intelligence gap/KIT/KIQ, and its timeliness. The purpose of this step is to focus the analysis effort on information that has value in terms of the BI assignment, as it makes little sense to analyse new information that has very little value for the

generation of relevant and actionable BI output. The accuracy of collected information is usually determined during Step 6 of the collection process, when BI sources are evaluated and all newly collected data/information/knowledge is evaluated and validated. In this regard it should be noted that where specialist collection staff members are used during the collection process, these staff members might not necessarily have the in-depth knowledge of a particular topic to validate the information, as does an analyst who specialises in a particular subject area. Therefore it is suggested that BI analysts need to decide whether to review the validation performed during the collection process, or to accept the validation done during the collection process. In cases where BI analysts are involved in the collection process with the validation of collected information this would not be required. In order to assist with the filtering of validated information, Ackerman and Wickens (2001:105) suggest using the following table during this step in the analysis process:

Question	High	Medium	Low
To what extent does the new information fill the identified information gap?			
Is the new information applicable to the BI requirement even though it does not address the information gap?			
Should the new information be disseminated to decision-makers without analysis due to its potential impact or urgency?			
To what extent does the new information link with existing information and intelligence?			
To what extent does new information contradict existing information and intelligence?			
To what extent is new information confirmed by other BI sources (new or existing)?			

**Table 6. 5 Filtering of validated information
(Ackerman and Wickens, 2001:105)**

Step 2: Collate information. Being able to integrate and compare all the BI information (new and existing information) at the disposal of the BI analyst is crucial for the analysis and synthesis of information. In this regard, IT can assist in collating information. McGonagle and Vella (1993:184) refer to this as 'organizing the data'. One way of collating information is to standardise or integrate information from disparate sources and in a single format (e.g. electronic media or paper reports). Working with information in various media complicates the process of collation and the ability of BI analysts to identify linkages and determine trends between pieces of information. In essence this fragments the analysis process to some degree and it is up to the analyst to integrate the various pieces of information. It may not be feasible sacrifice time or budgetary constraints to develop an integrated analysis environment that caters for the transformation and storage of all types of BI information input.

Step 3: Determine analysis method/model: Determining the best combination of methods/models to use for analysis constitutes another integral part of the analysis process. Powell (2001:online) points to the importance of using several methods when he states that 'any given business situation often demands the use of more than one technique...it may even be appropriate to use competing techniques as checks against each other'. There are a number of factors that should be considered when making a choice between various methods for BI analysis. One of the most important factors to consider relates to the particular intelligence output required from the analysis process. In this regard, BI analysts may refer to the verified BI requirement (Step 4 of the BI requirements definition process as discussed in Chapter 4). As was pointed out in the discussion on methods/models, some methods are more appropriate for specific types of BI requirements.

In addition to this, the choice of an analysis method/model could also be determined by the following:

- Time constraints – some methods require more time than others to apply properly.
- Availability of skills – although methods may be available for use by analysts, some methods could require special training/skills.
- Types and format of the information at the disposal of the analyst - typically data-mining methods will not be feasible in cases where the BI information is not in electronic format and/or structured.
- The availability of various analysis methods and their supporting technology – some methods require IT support and analysis tools without which the method may not be feasible.

One important issue to take note of regarding this step relates to whether a method for analysis should be chosen before information is collected or thereafter. Powell (2001:online) argues that analysis methods must be determined before embarking on the collecting stage in order to ensure the compatibility of the information collected and the chosen method and associated IT 'tools'. From the researcher's perspective, this should preferably not be done because the danger exists that the collection effort may be directed by the choice of analysis method and not by the BI gap, as determined during the BI requirements definition process. Based on the researcher's experience, it is best to determine the most appropriate analysis methods once all the relevant BI information has been collected and evaluated. As noted by Sandman (cited in Miller 2000:69), choosing the right method/model to apply does not guarantee that the analyst will be able to generate actionable intelligence output.

Step 4: Application of analysis methods. In this step the chosen analysis methods are applied to the relevant and evaluated information. In this regard, both the newly collected information and already existing information should be used as input. According to Webster (cited in Powell, 2001:online), analysis, in essence, deals with 'the separation of a whole into its components parts'. Some of the analysis methods/models also allow for the synthesis of the information, which is the opposite of analysis. According to Webster (cited in Powell, 2001:online) synthesis is 'the combination of parts so as to form a whole'. The methods described in paragraph 6.4 can also assist with synthesis. When the Five Forces model is used, for example, existing and new information regarding the competitive environment is analysed in order to populate the model. Once all relevant information has been depicted in the model, it assists the analysts to create an 'intelligence picture' of the competitive environment, which is in fact the synthesis of the information. In using methods, BI analysts should know exactly how to apply the chosen methods and what the limitations of each of these are. Care should be taken that BI analysts do not become too dependent on the use of specific methods for the analysis of information. A method in itself does not guarantee that BI analysts will be able to create an accurate intelligence picture. As Sandman (cited in Miller 2000:69) points out, these methods/models require the relevant inputs in order to achieve accurate intelligence outputs. Sandman also emphasise a critical issue, which is that analytical methods and models are 'not substitutes for diligence, skilled data collection and an open, inquiring mind'.

Step 5: Interpretation of the results of analysis. In the researcher's experience, BI analysts often believe that once the above analysis and synthesis step has been completed, they have intelligence output on which predictions can be based. However, this is not the case, mainly because the results obtained from the application of the analysis methods/models need to be integrated and

interpreted in the context of the KITs and KIQs, and the BI requirement. The purpose of the interpretation step is to interpret and reach conclusions.

Guidelines provided by McGonagle and Vella (1993:193) to assist BI analysts to complete this step include the following:

- **Noting patterns.** According to McGonagle and Vella (1993:193), pattern recognition 'is critical'. In some cases there are 'direct indications' that allow for pattern recognition. An example of this would be where a banking institution increases its marketing effort for a particular market/product, and through analysts applying a different set of information in the BCG matrix, the particular market/product was identified as a 'star' for the institution. Visualization can also assist BI analysts with noting patterns. The network analysis method is a typical example of how information is visually presented in order for analysts to note patterns. Although pattern recognition is important, McGonagle and Vella (1993:193) also note that BI staff should determine the significance of patterns within the context of the KIT/KIQs of BI requirements.
- **Omissions and displacement.** The identification of omissions can also assist BI analysts during the interpretation step. McGonagle and Vella (1993:194) state that 'the absence of something expected may be an important fact'. When analysts have completed the previous step in this process and find that there are some parts of the intelligence picture missing, this should prompt them to do further analysis to determine the reason for the omission. A typical example in a banking environment could be where a bank's marketing message does not give the same prominence to the marketing of a particular product or to a particular segment (e.g. the people used in advertisements for a product do not

include males). This omission could have various meanings, ranging from the perception that the banking institution is trying to target females, the product is not aimed at the male segment, or that the banking institution tries to target a new market segment. In one of the banking institutions that participated in this study, omissions in marketing messages are often used for interpretation purposes. Displacement, which is defined by McGonagle and Vella (1993:194) as 'facts or operations that should be there but are not', also provides an indication for analysts to do further analysis and try to establish a reason for the displacement. The fact that a competing banking institution is not as prominent in terms of marketing its products as it used to be in the past can be ascribed to a number of reasons ranging from complacency to financial pressure that prevents the spending of funds on marketing.

- **Drawing inferences.** In order to assist BI analysts to reach conclusions, McGonagle and Vella (1993:195) suggest that drawing inferences should be considered. This involves using both the logic and experience of the analyst in an inductive reasoning process. According to McGonagle and Vella (1993:196), when applying inductive reasoning, 'you contend that the premises you use give some support for your conclusion', whereas with deductive reasoning an analyst would contend that if the premises are correct, the conclusion must be accurate. Analysts should realise that this process may cause them to fit incoming information into pre-existing beliefs or perceptions. This issue will be discussed in the following section dealing with the role of humans in the analysis process.

Checking for anomalies. McGonagle and Vella (1993:196) define anomalies as 'data that does not fit; usually an indication that one's working assumptions are wrong or that an unknown factor is affecting

results'. The key for BI analysts when identifying an anomaly after completing Step 4 of this process, is to first verify the accuracy of the information they received. Once accuracy has been verified, analysts should determine why this information does not fit within their existing intelligence picture. Analysts should also ensure that they are not dealing with disinformation, which McGonagle and Vella (1993:188) define as 'something that looks like information but is not information. It is designed to mislead others'.

Step 7: Storage of intelligence and supporting information. The final step in this process is **Drawing conclusions.** In order to complete the interpretation steps, BI analysts need to pass judgements, draw conclusions and make predictions (if required). Once this has been completed, BI analysts have generated intelligence. The drawing of conclusions requires good judgement and knowledge on the part of the analyst. Judgement requires that analysts move beyond the intelligence picture that is revealed by the facts at their disposal, towards making conclusions based what they know and what they think. In this regard, Ackerman and Wickens (2001:107) suggest that BI analysts should consider asking themselves five key questions:

- What does the BI picture convey (meaning) once new information has been integrated?
- What could/will probably change?
- Why does the analyst regard this as a true reflection of the BI picture?
- So what?
- How can this interpretation add value to the intelligence user and address the BI requirement?

Step 6: Identification of new BI gaps. It is not uncommon for BI analysts to identify a need for additional information when they are in the process of

applying analysis methods and executing the interpretation step of this process. Should the information required not be found within the existing intelligence storage system, the BI collection process should be triggered with this new BI gap, typically starting with Step 3 of the collection process (refer to paragraph 5.6.2). As the BI gap is usually very well defined and specific at this stage of the BI process, it typically does not require the first two steps of the collection process to be completed.

Step 7: Storage of intelligence and supporting information. The final step in this process involves the storage of the intelligence generated and the supporting information. This is an important step because analysts would need access to this during the dissemination stage of the BI process. It is suggested that all the evaluated information used to populate analysis models and the results of these methods/models be stored in an intelligence storage/retrieval system, preferably an intelligence database. Furthermore, the intelligence conclusions reached and the basis for these conclusions should also be documented and stored in this database. Based on the researcher's experience in this particular field, it is suggested that such an intelligence database should consist of various levels, which could be depicted as follows:

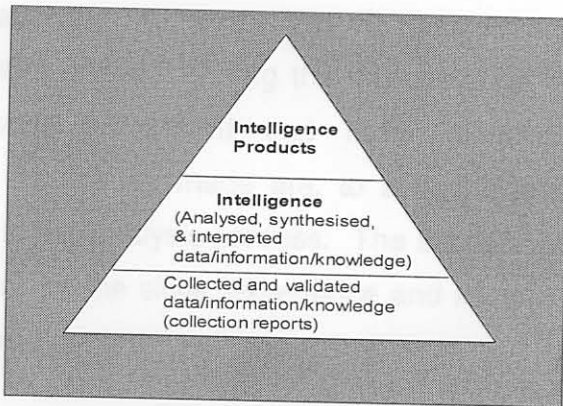


Figure 6.5. Suggested levels of an intelligence database

process is determined and understood. Understanding the psychology of

Once the validation step of the collection process has been completed, all data/information/knowledge collected for addressing a BI requirement should be stored in the database. The analyst should then be able to access this newly collected information, as well as relevant information already in existence within the organisation, and use this as input to populate and apply the analysis methods/models chosen for use during the BI assignment. These populated models and the results should then be stored. Finally, the output of the interpretation step is also stored. During the dissemination stage of the BI process, analysts will be able to retrieve the intelligence in order to generate BI products, which are typically stored separately for use by both BI staff and intelligence users (see Chapter 7 on dissemination of BI products).

6.6 The role of the analyst in the analysis process

According to Ackerman and Wickens (2001:114) the BI analysis process is more human intensive than is usually recognised. In this regard it should be noted that when quantitative analysis methods are used, some level of human input and manipulation is required. As was pointed out in the Step 3 of the analysis process, the choice of analysis methods relies on the judgement of the BI staff involved. When applying methods (Step 4), analysts need to ensure that the methods are properly applied. During the interpretation step, analysts are also responsible to pass judgement and reach conclusions. Ultimately the interpretation and predictions made are, to a high degree, dependent on the analyst/s involved in the analysis process. The success of the analysis process is largely dependent on the skills, experience and knowledge of the BI analysts involved in the BI assignment.

Due to fact that the analysis process is a human-intensive process executed by BI analysts, it is important that the impact of this 'human element' on the analysis

process is determined and understood. Understanding the psychology of intelligence analysis and the implications thereof for the analysis process is something that BI managers and intelligence users should be aware of. Being human allows analysts to interpret and understand the behaviour and activities of humans better than a machine could, but as humans, analysts could have inherent difficulties with regard to facing various challenges, such as the following:

6.6.1 Mental processes of analysts

Typically, intelligence analysts could experience inherent difficulties when faced with the processing of complex information. The manner in which analysts create 'intelligence' pictures, is determined by the mental processes of the analyst. This in turn is influenced by past experience, education, upbringing, social and cultural values and the filtering of the information provided. Heuer (cited in Davis, 1999:online), points out that 'analysts should be self-conscious about their reasoning processes. They should think about how they make judgements and reach conclusions, not just about the judgements and conclusions themselves'. In this regard the Center for the Study of Intelligence (1999:online) proposes that intelligence analysts should spend more time in training on thinking and reasoning processes. Furthermore, it is also emphasised that analysts should be more exposed to different mind-sets and cultures to provide new experience and knowledge.

6.6.2 Disinformation

Ackerman and Wickens point out that intelligence organisations have found that analysts often reject the possibility of deception because they have no information to the contrary. McGonagle and Vella (1993:188) confirm that

although disinformation in the business world is not 'as expansive as it is in politics and espionage', analysts need to be aware of the fact that it does exist and might have to be dealt with in the BI process.

6.6.3 Challenges during the analysis process

In addition to the above, analysts typically also have to deal with a number of challenges during the analysis process. Very often pressure is put to bear from intelligence users on analysts to complete the BI process in order for users to address the business issue/problem at hand. Procyshyn (2001:online) refers to the 'political pressure' that analysts could face when intelligence users expect intelligence output that fits well with the views of the intelligence user. Also dealing with this, Procyshyn (2001:online) refers to the challenge for BI analysts not to try to oversimplify the analysis process due to time or budgetary constraints. Analysts seldom have all the relevant information at their disposal, which challenges them to fill the gaps by using their ability to make judgements. Another challenge that analysts have to deal with is the internal pressure created by themselves to prevent analysis failures. Procyshyn (2001:online) confirms that analysts could prefer to 'play it safe', especially during high-profile/high-risk assignments which could see a suppression of the 'real' interpretation of the situation for fear of being responsible for faulty decisions.

6.6.4 Preferences of analysts

Procyshyn (2001:online) refers to the phenomenon of subjectivity when dealing with intelligence analysis and points out that when analysts are confronted with an incomplete intelligence picture, 'clouded situations can be clarified with circumstantial evidence or plausible rationalization and are subject to human bias'. To this one might add that, based on the researcher's experience,

subjectivity/preference often plays a role when BI analysts decide on using/not using specific intelligence analysis methods/models. Typically intelligence analysts show a preference for the use of specific analysis methods, as a result of which the analysis methods might not necessarily be the most appropriate for dealing with BI requirements. A statistician assigned to a BI analysis team will probably favour the use of data-mining tools, whereas a BI analyst with a formal intelligence background will tend to favour qualitative intelligence analysis methods, such as hypothesis generation.

6.7 Guidelines for successful analysis

There is a lot to be learned from professional intelligence organisations when it comes to ensuring that intelligence analysis provides understandable and actionable output of high quality. In this regard, the CIA's Centre for the Study of Intelligence (1999) has done research to address the factors that have had a negative impact on the quality of analysis in the past and have devised methods to improve their intelligence analysis capability. This research provided guidelines for executing the BI analysis stage that could also be used by banking institutions. Some of these guidelines are briefly described in the following paragraphs.

6.7.1 Prevent the mixing of interpretation with facts

During the analysis process, it is critical for analysts to draw clear distinctions between facts, assumptions, deductions and conclusions. Failing to do this could result in the interpretation of analysts being considered as fact by intelligence users. It is also important that all the underlying information used during this process should be available, should other analysts or intelligence users require the BI analyst to explain the process, models, information and reasoning used during the analysis process.

6.7.2 Impact of information input

Inaccurate, incomplete and out-dated information will have an adverse effect of the quality of the intelligence analysis process, as well as on the output generated. Having access to analysis methods/models and skilled BI analysts does not imply that miracles can be performed with low-quality information input. On the other hand, it is also important to note that having high-quality information as input to the analysis process does not guarantee the quality of the analysis process either. This is typically the case when using inappropriate analysis methods or inexperienced BI analysts who are unable to correctly interpret the results of the analysis methods applied.

6.7.3 Challenging interpretation

Even the most plausible hypothesis or confirmed results obtained from a number of different analysis methods should be open to challenge. It is not uncommon to find that even good analysts show weakness of analysing in order to confirm existing assertions or theorems. One way of dealing with this is to ensure that BI analysts challenge the analysis and interpretation of their fellow analysts. The Centre for the Study of Intelligence (1999) emphasises that all analysis should be reviewed before it is disseminated to intelligence users. The Centre for the Study of Intelligence (1999) has also recommended the formation of a corps of retired executives from the CIA so that their skills and experience can be imparted to junior analysts as part of a mentoring programme.

6.7.6 Focus on addressing the BI requirement

6.7.4 Obtain expert advice

The analysis process should remain focussed on addressing the BI requirement.

In the course of their careers, BI analysts would typically have to deal with many different types of BI requirements, and through experience they will develop expertise in specific areas/topics. Although specialisation is encouraged in the CIA, there is also a danger in that the organisation might develop internal experts that become so involved in their areas of expertise that they could lose sight of other important issues. Consulting with external experts, especially when having to make significant judgements, is recommended by the Centre for the Study of Intelligence (1999), especially after having fallen victim to the so called 'everybody-thinks-likes-us mindset'. Ackerman and Wickens (2001:117) state that it becomes important to obtain input from other experts, especially when 'analysts think they do know everything there is to know about the subject, and when they are not open for the advice and input from external experts'.

6.7.5 Balance between qualitative and quantitative analysis methods

Especially when it comes to gaining insight into **why** competitors/customers do the things they do and what they plan to do next, the role of quantitative methods have limitations. Through experience, the researcher has learned that qualitative analysis methods work better on the soft issues of competitor/customer behaviour, attitudes, motivation, decision-making and preferences. The same applies to quantitative methods when there is a need to analyse **what** competitors/customers did in the past.

Ultimately it is the BI analyst that plays a pivotal role in ensuring that quality intelligence is generated during the process and even though technological advances may create the impression that the analysis, synthesis and interpretation steps could be automated with it, the future of the BI analyst is

6.7.6 Focus on addressing the BI requirement

The analysis process should remain focussed on addressing the BI requirement. The possibility exists that interesting or unique new information obtained during the collection process could prompt analysts to divert some attention to peripheral issues. For the BI analysis process to be effective, the focus must remain on addressing the KITs/KIQs, and ultimately the business issue/problem that gave rise to the BI requirement.

6.8 Conclusion

The analysis process of the BI process revolves around the generation of intelligence from various pieces of information collected, often from disparate sources and often with contradictory content. The importance of this stage of the BI process cannot be overemphasised, especially since this stage can reduce the flow of information or the number of input variables to the intelligence user by providing analysed, integrated and interpreted intelligence output within the context of the defined BI requirement.

Although there are various approaches to consider when attempting the analysis stage of the BI process, and numerous methods and models available to assist BI analysts to deal with this stage, these do not guarantee that information will be turned into intelligence. Of critical importance is that BI analysts follow a step-by-step process that places particular emphasis on the interpretation of the information that was analysed and synthesised.

Ultimately it is the BI analyst that plays a pivotal role in ensuring that quality intelligence is generated during this process, and even though technological advances may create the impression that the analysis, synthesis and interpretation steps could be automated with IT, the future of the BI analyst is

secure. As Kent (cited in Davis, 2001:online) remarked, 'Whatever the complexities of the puzzles we strive to solve and whatever the sophisticated techniques we may use to collect the pieces to store them, there can never be a time when the thoughtful man can be supplanted as the intelligence device supreme'.

7.1 Introduction

Once data, information and knowledge have been turned into intelligence during the analysis and synthesis stage of the BI process, the intelligence output needs to be disseminated to intelligence users in order to complete the BI process. Kantana (1998:132) refers to the dissemination stage as the 'harvest' of truth.

The output of the dissemination stage of the BI process is to provide the right intelligence product to the right person in the form of intelligence products and services.

The dissemination stage of the BI process is defined as providing intelligence products to intelligence users in order to add value to the output of BI analysis and synthesis stage of the BI process by using further analysis and processing the intelligence products to create intelligence products. The dissemination stage is the final stage of the BI process, which is the final step in the intelligence process.

The dissemination process

- Review existing literature on the formats and methods used for the dissemination of BI products
- Refer to the BI dissemination formats and methods used by SA banking institutions and to propose a BI dissemination process that could be applied within a banking institution