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# The Intelligence Process at Royal Vopak:

# A Grounded Theory Approach

by

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## Acknowledgements

*"I keep six honest serving-men:*
*(They taught me all I knew)*
*Their names are What and Where and When*
*And How and Why and Who."*

- *Rudyard Kipling, 1902*

Kipling's quotation reminds us that nothing can be learned without the prior will to question our beliefs. For this thesis, my six honest men have served me well. However, they would not have made it back to me in time from their journey without the continual guidance, help, and encouragement of my supervisors - to who I am greatly in debt.

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## Abstract

The lack of foresight and reactivity by even the largest global companies at the first signs of the 2007-2009 financial crisis underlines the fact that corporate intelligence capabilities are still far from adequate. Intelligence, to be distinguished from industrial espionage, serves the dual purpose of sounding the alarm when a company's strategy is off course - as well as continually providing all important decision makers with the right information on the business environment to profitably execute company strategy.

This research serves to fill a theoretical and practical gap in intelligence literature. The current state of scientific research on intelligence is incoherent, conflicting, too broad in scope, and inconsistent in terms of measurement and output value. It critically lacks reliability and validity and is not considered to be in line with what intelligence managers actually do.

By taking a novel research approach, independent from prior literature and past empirical observations, this research uses the grounded theory approach to create a theoretically sound model of the intelligence process within Royal Vopak. The model, based upon the 'best-practice' case at Royal Vopak, is substantially different from what has been generally accepted for over sixty years by scholars and practitioners alike. Firmly grounded in the data collected, the new model improves upon the 'classical' or traditional model of intelligence in multiple ways. It is plausible that this model is equally suitable to interpret and guide 'world-class' intelligence capabilities within other organizational settings.

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# Research introduction and design

## 1.1 Research problem

The explosion of information, globalization, and increased competition has exacerbated the need for intelligence. In this research, 'intelligence' is defined as the process of satisfying a company's information needs for the formulation and implementation of strategy. A study by Hal Varian and Peter Lyman (2009) states that the amount of new information stored on print, film, magnetic and optical storage media in 2002 was about the equivalent of 37,000 times the information contained in the Library of Congress book collection. This increases the probability of missing, incorrect or incomplete information when making business decisions. The increasing globalization, leveling the competitive playing fields between industrial and emerging market countries, has also contributed to an increased need of being well informed on the environment (Friedman, 2005). Finally, adding to this the changing nature of competition in many industries (D'Aveni, 1994; Toffler, 1980), it is no wonder that interest in the field of intelligence has bloomed over the last decades. The information available is growing at an exponential rate and many companies have realized the need of having an intelligence process in place. The keen interest in intelligence is evidenced by the stream of literature in the field of environmental scanning and intelligence.

The problem is however, that although practitioner and business literature has exploded, very little serious academic research has been done on the definition of intelligence. Even academic journals like the 'Competitive Intelligence Review' and the 'Journal of Competitive Intelligence and Management' only have a handful of articles which explicitly define the concept of 'intelligence'. Moreover, in these rare instances the definition is usually accorded no more than a few sentences. To compound the confusion, at an academic forum organized by the leading professional intelligence association 'Society of Competitive Intelligence Professionals' (SCIP) it was suggested that the traditional model practitioners and academics are using to guide their research and actions to this day is not matched to what intelligence managers actually do (Calof, 2006). And thus, in most companies today, the competitive environment is all too often still shrouded in thick clouds of mystery or deception, complemented by forecasting 'guestimates' – lack of a clear idea of what an 'intelligence process' is and how to implement it.

## 1.2 Research objective

The purpose of this research is to contribute to academic research on the intelligence process and to provide a tool for practitioners. This research should culminate in a theoretical model that could help explain variations in the nature and performance of intelligence process implementations for different organizational settings. This results in a three-pronged objective:

1. To uncover and explore the processes directly responsible for identifying and satisfying intelligence needs related to the formulation and implementation of strategy within an organization.
2. To characterize these processes with the terminology of systems theory by building a theoretical model of the intelligence process that could help explain variations in the nature and performance of the intelligence process for different organizational settings.
3. To confront the resulting model with traditional theories on intelligence.

## 1.3 Research questions

**Primary research questions:**

- What is the current state of the intelligence process at Vopak?

- How can the current state of the intelligence process at Vopak be modeled?

- How does this relate to the current theory on intelligence and other academic disciplines?

## 1.4 Rationale for chosen methodology and company

The commonly used scientific method of testing hypotheses based on a theory requires a fairly coherent body of theory. Only a coherent and well-developed literature will allow the researcher to develop meaningful hypotheses. However, the current literature on intelligence is insufficiently delimited and internally conflicting. Moreover, the traditional model of intelligence is not matched to what intelligence managers actually do (Calof, 2006). Therefore the classic scientific method of testing hypotheses based on a theory is not chosen. Whenever the quality or quantity of literature on a subject is insufficient, alternative methods of theory development are called for. Since the intelligence process is in essence a social phenomenon within organizations and sufficient data is available for collection, a grounded theory methodology is considered appropriate. A grounded theory approach is particularly suited for novel research independent from prior literature and past empirical observations

Ideally, a broader sampling is preferred since it constrains extraneous variation and sharpens external validity. However, due to resource limitations, only a single case can be selected. In choosing the company for this research, theoretical sampling is preferred to random sampling. It focuses efforts on theoretically useful cases. Instead of trying to get a representative sample of the general population, the chosen case is the one best suited to gaining a better understanding.

This is why Royal Vopak is selected as the research setting. Contrary to most organizations, Vopak has a relatively well functioning intelligence system. René Loozen, Business Intelligence Manager at the Commercial Excellence Department of Vopak described the state of their intelligence system as ‘advanced’ (GIA, 2009). This corresponds to the fourth level in the life cycle typology of the Global Intelligence Alliance, just one step away from the final and ideal ‘world class’ system (GIA, 2009). By selecting this specific case based on its best practice status, it is more probable that the resulting grounded theory will represent a model where all right processes are accounted for in the right manner.

## 1.5 The adopted definition of intelligence

The definition of intelligence has been fundamentally disputed ever since the idea of intelligence was first conceived. Some definitions see 'intelligence' as a product, some see it as a process, and some combine the two definitions. Moreover, the way in which 'intelligence' is defined by practitioners often contains normative aspects that should be left out in a scientific definition. The way in which a process should ideally be implemented has got nothing to do with the definition of the process itself. A poor implementation of a process does not negate its identity – just like a poorly built house cannot be called anything but a house, be it poorly recognizable.

Practitioners and scholars have created an avalanche of intelligence definitions by dividing intelligence into specific subfields. The most frequently used terms are business intelligence, strategic intelligence, operational intelligence, technical intelligence, marketing intelligence, customer intelligence, and competitive intelligence. To avoid confusion, this paper will not attempt to sort out the differences between all these different approaches to intelligence. Instead, throughout this research **only one definition** of intelligence will be used:

***"The intelligence process is the process of satisfying a company's information needs for the formulation and implementation of strategy."***

The information needs for the formulation of strategy are fundamentally different from the information needs for the implementation of strategy. The absence of a clear separation between the two needs (and the processes and products satisfying them) causes conflicts and debate in the intelligence literature. In a general sense the intelligence capability for the formulation of strategy is based on an open-mind exploration of the competitive environment while the intelligence capability for the implementation of strategy is much more focused on clearly defined user-needs deduced from the chosen strategic course.

The adopted definition of strategy is Mintzberg's combination of five separate definitions which complement each other without taking precedence (Mintzberg et al., 1996). Strategy can be seen as a plan, dealing with "how leaders try to establish direction for organizations". Strategy can also be seen as a ploy, "a specific maneuver to outwit an opponent or competitor." Thirdly, strategy can be seen as a pattern of consistent behaviors, whether intended or not. Strategy as a position encourages us to "look at organizations in their competitive environments". And finally, as a perspective, strategy is more than just a chosen position, but "an ingrained way of perceiving the world."

## 1.6 Misconceptions about intelligence

Intelligence is not be confused with spying, at least not in the sense that spying involves illegal or unethical means of obtaining information. First of all, intelligence is performed by companies and as such is bound to strict regulations and often observes clear ethical standards. Governments have the means to circumvent these restrictions in the name of national security. When 'spying' is not performed by governments but by companies, this is not called intelligence but industrial espionage. There are however similarities between spying and intelligence that facilitate confusion; both involve individuals obtaining information that is considered secret or confidential without the permission of the holder of the information. The difference is that intelligence is legal, and industrial espionage is not.
Also, having an intelligence capability is not reserved to companies that can afford spending millions on it. The absolute minimum for an intelligence capability is a skilled set of brains, the internet and a telephone. It makes economic sense to expand or improve this capability as long as there is a marginal benefit for the company. It should be stressed, however, that brains are crucial in developing and expanding the intelligence capability. Tools like internet search-engines or software like the SAS intelligence suite are useless without a skilled analyst to process the data into a form that will impact the profitability of business decisions.
Lastly, intelligence is broader in scope than marketing. Intelligence goes beyond product-market combinations, market shares and customers to looks at the current and future competitive landscape, including all aspects of it (e.g. markets, customers, stakeholders, competitors, technology, society, politics, regulatory climate and environment). Moreover, as a business function, intelligence is cross-functional and independent, providing and collecting information from all divisions of the company whilst reporting directly to the executive board.

## 1.7 Early origins of intelligence

> "Formerly when great fortunes were only made in war, war was a business; but now, when great fortunes are only made by business, business is war."
> – Christian Nestell Bovee

The earliest examples of the intelligence concept predominantly have a war setting. Although not entirely analogous, a lot of thinking on business these days still refers to these early thoughts that can be traced back as far as 5,000 years to ancient China (Tao & Prescott, 2000). A frequently recurring example is Sun Tzu's 'Art of War' (1988). Frederick the Great is also repeatedly quoted to have said "it is pardonable to be defeated, but never to be surprised", although no written ideas by Frederick the Great on how to achieve this have been found to date. Shakespeare (1981) refers to the concept of intelligence when King John laments about his spies' work: "Oh where hath our Intelligence been drunk, where hath it slept?".

Wright and Calof (2008) provide an eloquent overview of the 'early adopters'. They see a form of industrial espionage (not to be confused with the contemporary interpretation of intelligence which excludes illegal practices) in the silk-making efforts of the Byzantine Emperor Justinian I (483-565). Justinian used monks to steal silk worms from the Chinese in an attempt to understand the silk production process (Fraumann, 1997). A similar illustration of early intelligence gathering is the story of Mr R.L. Wickham, who spent ten years in China for the English Tea Company and whose intelligence helped start the British tea industry (Nordegren, 2002).

Finally, a legendary example of intelligence in the use for war for business is the possibly fictional account of how Baron Nathan de Rothschild acquired his fortune. He is said to have learned about Napoléon Bonaparte's defeat at Waterloo in 1815 a full day earlier than the traders at the London exchange, fooling the investors there into a bearish frenzy whilst secretly buying up stock at rock-bottom prices (Birchler & Bütler, 2007).

## 1.8 Contemporary literature

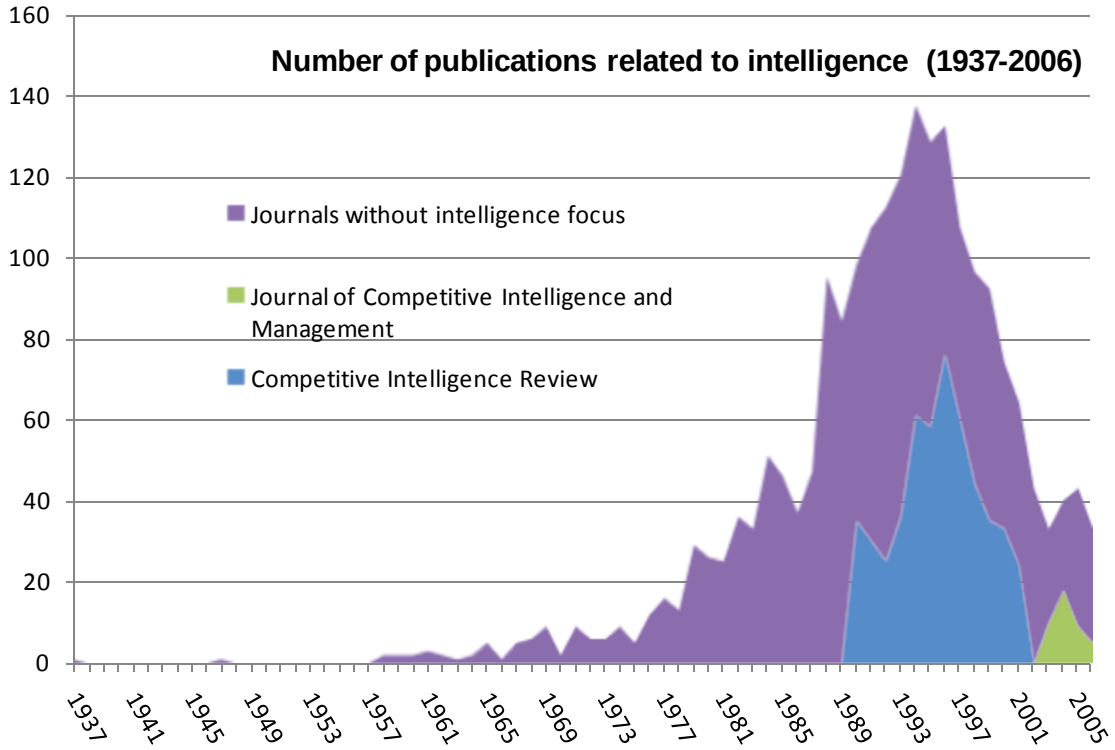


*Figure 1: Chart compiled with 2089 articles extracted from Dishman et al. (2003), by author*

Intelligence in contemporary literature developed from the concept of scanning the environment. While the first book mentioning competitive intelligence in its title only appeared in 1959 (Alden), the scanning concept appeared much earlier. Alderson (1939) describes marketers whose job is to "watch markets at work" so that the organization can adapt. For the eleven years, little was mentioned on the subject, but a reference by Dill underscores that although there was nothing published, the thinking had evolved. Dill (1958) states that a company's managers are not only affected by the structure of the environment, but also by the perceived meaning and accessability of information. After initial publications on the scanning concept in the 1960's (Etzioni, 1967; Aguilar, 1967), the number of articles mentioning scanning then steadily increased from an average of one per year in 1970 to four per year in 2006. The most notable are Fahey & King (1977), Daft et al. (1988), Hambrick (1982), Culnan (1983), Grabowski (1987), Daft and Macintosh (1981), Slater and Narver (1994), Beal (2000), Kourteli (2000), Saxby et al. (2002), Kumar et al. (2001), Voros (2001), Decker et al. (2005), Vojak and Suarez-Nunez (2005), Rajaniemi (2005), Brouard (2006), and Knip (2006).

Illegal intelligence or industrial espionage was given extensive coverage in the business and academic press during the 1960's, especially in comparison to the total volume of publications during that time (Lanke, 1958; Furash, 1959; Sonnecken, 1960; Gillespie, 1963; Granzeier, 1964; Hoover, 1964; Anonymous, 1965; Lachter, 1965; Fair, 1966; Anonymous, 1968; Baran, 1968; Lieberstein, 1969; Martyn, 1969). The hype on industrial espionage in the 'cloak and dagger' genre died off a little in the 1970's, making place for more serious considerations on the protection of secrets (Cade, 1971; Carson, 1971; Healy & Walsh, 1971; Ludlow, 1972; Glueck & Mittelstaedt, 1973; Wall, 1974; Anonymous, 1976; Milgrim, 1976; Milgrim, 1976; Mann, 1979). Just as in the 1970's the subject of industrial espionage in the 1980's was more focused on the protection of a company's own trade secrets (Varr, 1981; Relyea, 1982; Hartnick & Patry, 1984; Westermeier, 1984; Bequai, 1985, Brown & Swanson, 1985; Horgan, 1985; Sack, 1985; Derra & Agres, 1987; Jakes, 1987; Bell, 1988; Bennett & Snell, 1988; Epstein & Leric, 1988; Hodkinson, 1988; Wiseman, 1988; Wolfson, 1988; Dratler, 1989; Samuels, 1989; Steels, 1989) than with the illegal or legal means to obtain the competitor's trade secrets (Behof, 1986; Wiesner and Cava, 1988).

Technical intelligence is intelligence which is focused on technology and its impact for the company's competitiveness. Technical intelligence is a relatively stable topic in intelligence literature. From the 1960's up to today about 10% of the published articles relate to technical intelligence. Of this, more than half is related to patent scanning, although the general strategic importance of disruptive technologies and technological change has gotten increased attention in the last decade.

Relatively little attention (in terms of papers published) is directed to defining the boundary between illegal and legal intelligence. The first publication dedicated to ethics is dated 1974 (Wall). On average about 1.5% of all intelligence publications are related to ethics, with a peak of 7% in 1980's. Most articles focus on the ethical implications of collecting information.

Evaluating the quality and performance of intelligence has been a major topic since the beginning of the seventies. Since intelligence avoids disasters and indirectly points the company in the right directions, the value and profitability of intelligence is hard to measure. What is the optimal state of an intelligence process and what value does it bring to the company? Attempts have been made to answer these questions (Keegan, 1974; Fahey and King, 1977; Montgomery and Weinberg, 1979; Zinkhan and Gelb, 1985; Prescott and Smith, 1987; Daft et al., 1988; Gilad, 1989; Goshal and Westney, 1991; Gelb et al., 1991; Tyson and Swanson, 1993; Cartwright et al., 1995; Sawka et al., 1996; Maltz & Kohli, 1996; Solomon, 1996; Gibbons and Prescott, 1996; Wright et al., 2004; Nitse et al., 2003; Lönnqvist and Pirttimäki, 2003; Van der Kooij, 2003; Hasanali et al., 2004; Lichtenthaler, 2004; Greenley et al., 2004; Hodges, 2005; Pirttimäki and Karjaluoto, 2006; Blenkhorn & Fleisher, 2007; Buchda, 2007; Anita & Hesford, 2007). None of the attempts is considered to have given a complete answer.

In conclusion, the literature on intelligence, although abundant, is not coherent. A plethora of naming conventions and conflicting definitions is evidence of this. Also, the scholarly articles are mostly too broad in scope, tackling everything from the setting up of an intelligence capability to the evolution and performance of the mature system in a single paper. Since there is no consensus on a general model, in depth studies of a specific area, if done at all, are left without a reference framework and do not contribute to theory building. The literature is also inconsistent in terms of measurement and output value whilst lacking the necessary validity and reliability (Calof and Wright, 2006).

# Methodology

## 2.1 What is Grounded Theory?

The methodology used in this thesis is the grounded theory methodology. This methodology has developed from the seminal work of Glaser and Strauss (The discovery of the grounded theory, 1967). It is a qualitative inquiry method that looks systematically at qualitative data aiming at the generation of theory that accounts for a pattern of behavior that is relevant and problematic for those involved (Glaser, 2005). Charmaz (2000, p. 509) defines the grounded theory method as "systematic inductive guidelines for collecting and analyzing data to build middle-range theoretical frameworks that explain the collected data". This differs from the majority of scientific studies in that it does not formulate a hypothesis subsequently tested by data collection and analysis. Grounded theory operates in the inverse fashion of the hypothetico-deductive model. The theory is 'reverse-engineered' by starting from the data instead of the theory. The principles of the scientific method are respected through the structured and verifiable incremental empirical approach to the data. A grounded theory, although richly descriptive, is considered to be prematurely closed if *only* descriptive (Wilson & Hutchinson, 1996). When a grounded theory is merely descriptive it will "inadequately cover the behavioral variations" (Hutchinson, 1986). According to Sekaran (2002, p. 22), the hallmarks of scientific research are purposiveness, rigor, testability, replicability, precision and confidence, objectivity, generalizability, and parsimony. All of these distinguishing characteristics are present in the grounded theory methodology. Starting from the collection of the data from "the natural world" (Chenitz & Swanson, 1986), grounded theory evolves by the extensive use of coding elements. The coding elements are grouped into concepts and then into categories, ultimately resulting in a coherent and plausible theoretic framework, grounded in the data. Locke (1996, p. 123) describes this incremental process by saying that "at each level, the theory becomes more refined, yielding a parsimonious integration of abstract concepts that cover behavioral variation".

## 2.2 Applications of grounded theory

Although Glaser and Strauss initially claimed the use of grounded theory was restricted to use by professional sociologists (Glaser & Strauss, 1967), the method has since been recognized as a valid research method for fields as diverse as education (Piantanida, Tananis, & Grubs, 2004), nursing (Schreiber & Stern, 2001), psychology (Shaw, 2008), communication (Urquhart, 1997), software process improvement (Coleman & O'Connor, 2007), and management research (Locke, 2001; Goulding, 2002).

## 2.3 Definition of important terms

The grounded theory uses three basic elements: concepts, categories and propositions.

**Concepts**
Theories cannot be developed from data alone but the data needs to be 'encapsulated' by concepts. Corbin and Strauss (1990, p. 9) state:
"Theories can't be built with actual incidents or activities as observed or reported; that is, from 'raw data'. The incidents, events, happenings are taken as, or analyzed as, potential indicators of phenomena, which are thereby given conceptual labels. If a respondent says to the researcher, 'Each day I spread my activities over the morning, resting between shaving and bathing,' then the researcher might label this phenomenon as 'pacing'. As the researcher encounters other incidents, and when after comparison to the first, they appear to resemble the same phenomena, then these, too, can be labeled as 'pacing'. Only by comparing incidents and naming similar phenomena with the same term can the theorist accumulate the basic units for theory."

**Categories**
Categories are defined by Corbin and Strauss (1990, p. 7) as:
"Categories are higher in level and more abstract than the concepts they represent. They are generated through the same analytic process of making comparisons to highlight similarities and differences that is used to produce lower level concepts. Categories are the 'cornerstones' of developing theory. They provide the means by which the theory can be integrated. We can show how the grouping of concepts from categories by continuing with the example presented above. In addition to the concept of 'pacing', the analyst might generate the concepts of 'self-medicating', 'resting', and 'watching one's diet'. While coding, the analyst may note that, although these concepts are different in form, they seem to represent activities directed toward a similar process: keeping an illness under control. They could be grouped under a more abstract heading, the category: 'Self Strategies for Controlling Illness'."

**Propositions**
The third element of grounded theory is the proposition. Propositions indicate generalized relationships between a category and its concepts and between discrete categories. Although initially named 'hypotheses' by Glaser and Strauss (1967) the term 'proposition' is more appropriate since propositions involve conceptual relationships and hypotheses require measured relationships (Whetten, 1989, p. 492).

## 2.4 Validity and reliability of Grounded Theory method

According to Yin (1993), the final consideration when designing a case study research is to make sure that the research is valid and reliable. Yin distinguishes three types of validity: construct, internal, and external validity. A summary of how the research affects the different types of validity and the reliability is provided in the table below.

*Table 1: Validity and Reliability, by Yin (1993)*

| Tests | Tactics | Phase |
|---|---|---|
| **Construct Validity** | Multiple sources of evidence<br>Establish chain of evidence<br>Review draft report | Data collection<br>Data collection<br>Composition |
| **Internal Validity** | Pattern matching<br>Explanation building<br>Address rival explanations<br>Use logic models | Data analysis<br>Data analysis<br>Literature comparison<br>Data analysis |
| **External Validity** | Use theory in single-case studies<br>Use replication logic in multiple case | Research design<br>Research design |
| **Reliability** | Use case study protocols<br>Develop case study database | Data collection<br>Data collection |

**Reliability and construct validity**
Reliability is the extent to which the operations of a study can be repeated with the same results. The goal of reliability is to minimize the errors and biases in a study. Reliability can be increased by using protocols to make sure the same procedures are followed throughout the case (see table 1). An interview protocol is designed to make sure that the same subjects are covered during the interviews with the different respondents. Furthermore, in order to prevent misunderstanding or distortion of the data, all interviews are recorded on paper and an interview report will be established directly after the interview to minimize memory losses.

Construct validity asks whether the instruments are accurate measures of reality. Both reliability and construct validity can be enhanced by the use of data triangulation. If several sources point in the same direction, it is more likely to be reliable than when the data comes from one source (Yin, 1993). Yin (1989) lists six sources of evidence for data collection in the case study protocol: documentation, archival records, interviews, direct observation, participant observation, and physical artefacts. Not all of the abovementioned sources need to be used in every case study but the importance of multiple sources of data to the reliability of the study is well established (Yin, 1993). In this study, all sources are used, including the last two which are directly related sociological investigation. Employees with different positions from various departments will be formally and informally interviewed about the current intelligence system. Furthermore, as explained below, documentation, archival records, direct observation, participant observation, and physical artefacts are also used – although not all to the same extent. Interviews and direct observation remain the main methods of data collection.

**Internal validity**

Internal validity is concerned with the capability of the research design to eliminate bias and the effect of extraneous variables. Internal validity relates to causal relationships, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships. This type of validity is only of importance to causal studies, which is not the case for this research.

**External validity**

External validity involves the domains to which the result of the study may be generalized (Easterby-Smith, Thorpe, & Lowe, 1991). The external validity is concerned with the way the results of the study may be generalized. The results of the case study will not be generalized to a population, but to the theory on this subject. The focus of a case study is on analytical generalization instead of statistical generalization. Although it is recommended to increase the external validity by conducting multiple case studies this is unfortunately not possible due to resource constraints.

## 2.5 Evaluating Grounded Theory

The quality of a grounded theory is determined by four criteria (Glaser, 1978; 1992; Hutchinson, 1986; Charmaz, 2000): fit, work, relevance and modifiability.

**Fit**
'Fit' is achieved when the data is clearly explained (Morse & Singleton, 2001, p. 841). Fit refers to the process of identifying characteristics of one entity and comparing them with the characteristics of another entity to see if similar characteristics are present. Fit may also refer to complementary relationships, how the relationships integrate into a coherent whole. Fit is therefore the process of examining two entities and identifying their similarities or compatibilities along some identifiable dimensions.

**Work**
When a grounded theory 'works', it is useful in providing a theoretical construct that explains the phenomenon that is being studied (Charmaz, 2000). The major behavior in the substantive area must be explained by the theory. Variations in this behavior, as a result of supplementary case studies, should also be accounted for. If any observed variation cannot be explained then it must be accepted that the theory does not work (Charmaz, 2000).

**Relevance**
When the social processes in the context of the phenomenon are explained by the grounded theory it is assumed to be 'relevant' (Charmaz, 2000; Hutchinson, 1986).

**Modifiability**
The last criterion for the evaluation of a grounded theory is 'modifiability'. Researchers can "modify their emerging or established analyses as conditions change or further data are gathered" (Charmaz, 2000, p. 511).

# Data collection and analysis

## 3.1 Stages of collection and analysis

Since the data collection should occur simultaneously with analysis (Irurita, 1990; Glaser, 1992; Corbin J. , 1986), the process of constructing a grounded theory at Vopak was a difficult task. Everything remains concurrent until the theory is complete (Hutchinson, 1986) and no imaginative additions can be made without sufficient grounding in the data. With 20-20 hindsight, the whole data collection and analysis phase of the research can be classified into five distinct phases:

- Getting to know the industry and the company (people, processes and structure)
- General data collection without focus (indiscriminate open minded collection)
- Focussed data collection efforts (to investigate knowledge gaps)
- Analysis of the data (open coding, theoretical coding, categories, abstracting)
- Theoretical saturation (returns of marginal data collection low)

Coding qualitative material enables the researcher to recognise and re-contextualise data. During this activity, the researcher has to read the data repeatedly for analysis (Coffey & Atkinson, 1996). Coding techniques are summarized by Huberman and Miles (1984) with variations on this by other researchers (Gersick, 1988; Leonard-Barton, 1988; Harris & Sutton, 1986). Three questions should constantly be asked in creating open codes: What is this data a study of? What category does this incident indicate? What is actually happening in the data? Using these question to form open codes, the data is thus fractured (Glaser, 1978) and the codes provide the basis for the second stage of 'higher coding' (Punch, 1998).
In coding, the initial number of codes used went up to around 250 in the first weeks of the research. These codes were then consolidated, bringing them back to around 150 near the end of the research.

This second stage of coding is called axial coding (Corbin & Strauss, 1990) or theoretical coding (Glaser, 1992). Whichever name is used, the process is identical. According to Corbin and Strauss (1990), axial coding is defined as "making connections between a category and its sub-categories". Glaser (1992, p. 72) refers to theoretical coding as describing "how the substantive codes may relate to each other as hypotheses to be integrated into a theory. They, like substantive codes, are emergent; they weave the fractured story back together again". During this stage, the codes produced by the first phase are combined, aggregating them into higher conceptual codes and categories, whilst reviewing and substituting where necessary until the less useful ones are eliminated, resulting in a coherent and comprehensive framework of related concepts and categories of a substantial theoretical level. Care should be taken to limit elimination by the inquirer to the open codes that are outside of the "confines of his substantive area and the field of study" (Glaser, 1978, p. 6).

Categories that emerged in the data were mainly descriptions of activities that regroup a number of other activities. The activities identified were thus grouped into a common theme, simplifying the model. Relationships, or propositions, were then added between the categories. The type of relationships used in this research were “is part of”, “is input for”, “causes”, “is example of” and “influences”.

Of course, the different stages of the research have not been sequential but iterative in nature. The data collection was done simultaneously with the analysis and the discovery of the company, which somewhat complicated the process at times when the complexity was too overwhelming. Multiple conflicting thoughts and interpretations were often perceived from different subsets of the data and these had to be entertained in the mind without passing judgement whilst simultaneously looking at new data. The complexity problem was solved by taking notes or memos on virtually everything (even conflicting thoughts). The memos are “written records of analysis related to the formulation of theory” (Corbin & Strauss, 1990, p. 197) and the inquirer could rightly have been characterized in this process with the words of Neumann (1994, p. 411) as a ‘compulsive note-taker’. Thoughts that might be captured by the memo include the inquirer’s thought on the data at a certain time, what it appeared to mean to the participant, and the general meaning of the data. On the other hand the simultaneous analysis of material did ultimately provide a funnelling effect for the data collection, providing focus and snowballing particular areas of interest.

Theoretical saturation describes the end process of the grounded theory as the stage when marginal improvement of further analysis and data collection becomes small. Hutchinson (1986, p. 125) defines theoretical saturation as “the completeness of all levels of codes when no new conceptual information is available to indicate [the necessity for] new codes or the expansion of existing ones”. The value of new data will decrease as it will no longer contribute to the creation of new codes or concepts. Or in the words of Irurita, a stage in the analysis where “no additional data [has been] found to develop new categories or properties of the categories, as they related to the core category or process” (1996, p. 7). Theoretical saturation was deemed to have been achieved when the answers in additional interviews could be readily framed within the emerging grounded thesis and no new concepts were needed to do this. Whenever gaps were observed, additional purposive sampling was used to make sure the area that was inconsistent with the previous emerging theory was now sufficiently included in the data and allowed a new and adapted model to emerge, replacing the previously inadequate framework.

## 3.2 Data sources

Data collection in grounded theory is selective in scope but not in methods. In principle, the simple rule 'all is data' applies. During the course of the research the majority of phenomena were noted by direct observation and (in) formal interviews. Besides this, other sources for data collection consist of newspaper articles, internal newspapers, internal memos, research studies by consultancies, company brochures, artefacts, marketing material and press releases. For example, minutes of Comex and BI department meetings going back as far as 2007 were helpful in gaining insight into the history of certain company developments. Also, budgets and tracking documents were useful for establishing a timeline of events and evolution of the implemented systems and routines.

With a few exceptions, the inquirer was present and participated in daily operations at the Commercial Excellence Department (Comex) every workday between July 8th 2009 and September 25th, a total of 59 days. Comex is responsible for the intelligence process as well as implementing a 'service culture of commercial excellence'. The Comex department is cross-functional and reports directly to the Chief Executive Officer (CEO). Daily operations included attending meetings, workshops as well as informal happenings like birthdays, company parties and lunches. Notes were made of the observed phenomena without preconceptions of which code would eventually be appropriate. The notes include a general description of what was observed as well as the date, time and actors involved.

Initial participants for interviews were purposefully chosen, that is 'with some particular focus in mind' (Charmaz, 2000; Irurita, 1990). Informal interviews were also used as a source of information. This type of 'water cooler' talk was particularly helpful in establishing the soft side of the organization (i.e. cultural values, internal politics, company history). Certain key people like the intelligence team manager, the Comex director and an intelligence team member were interviewed several times during the research.

Interviewed directly by inquirer:
The intelligence team manager
The five members of the intelligence team
The Comex director
The four members of the Comex customer service department
One finance manager
One internal audit manager
One intern for LNG projects
Two shared services employees

Interviewed jointly or with help of BI team:
The three members of the executive board
The six division presidents
The six commercial directors
Three commercial managers
Two managing directors
Six key-account managers
One corporate communication manager

A semi-structured interview script (appendix A) was used for the joint interviews. The interviews were held on a face-to-face individual basis when the respondents were located in The Netherlands and the people abroad were interviewed by telephone. Prior to interviews, some participants were sent a power point presentation by email. Interviews were not recorded but the interviewer did rely on quick note-taking, usually transcribed into an interview minute report ex-post. Due to the relatively low availability of interviewees as well as the exclusion of the interview minutes from the final publication of the research, formal verification on the accurateness of the interview notes was not undertaken. Instead, the interviewees were provided with the conclusions from the research, giving them sufficient feedback and opportunity for voicing disagreements on the general research conclusions.

### 3.3 General description of the strategy process within Vopak

The strategy process at Vopak is based on three pillars: growth leadership, customer leadership and cost efficient operations. These main directives were construed during a strategy retreat in 2006 with 21 key executives and consultants from Bain & Company (Vopak Strategy, Bain, 2006). From then on the strategy process has been focussed on implementing this strategy using 17 company-wide initiatives. The initiatives can be classified into 'growth leadership', 'customer leadership', 'cost leadership', 'excellence' (safety, health, environment and pricing), and 'leadership enablers' (organisational redesign).

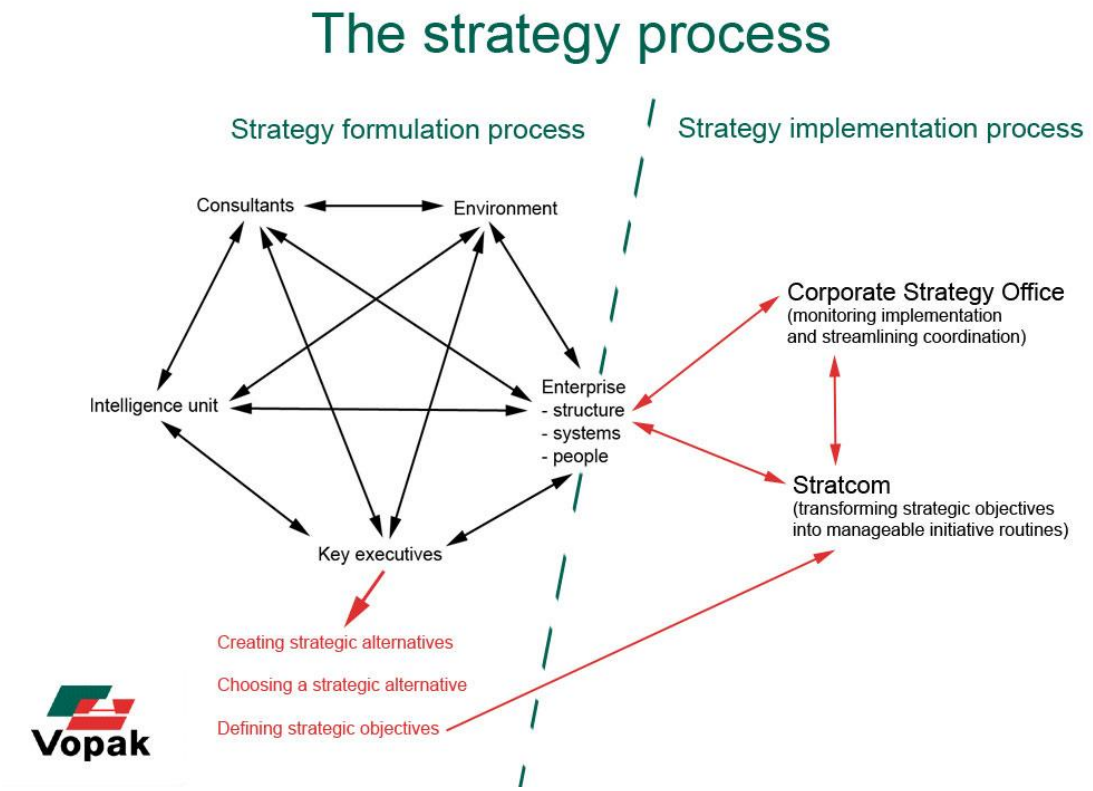


*Figure 2: The strategy process at Vopak, by author*

Each initiative is construed as a business case with a plan of execution, resourcing, and accountability. A 'steering committee' called StratCom provides general direction, clears roadblocks, prioritizes decisions, and provides resourcing and funding. StratCom is composed of the executive board and the division presidents. Each initiative is assigned to a team owner and a team sponsor with clear responsibilities, milestones, key performance indicators and financial outcomes. A 'corporate strategy office' monitors the implementations of all initiatives and streamlines coordination. The 'corporate strategy office' reports back to the board of directors and commissioners.

## 3.4 General description of the intelligence process within Vopak

The intelligence process within Vopak is one of the 17 strategic initiatives defined in 2006 (Vopak Strategy, Bain, 2006) and is referred to as 'Business Intelligence' (BI). The necessity of a structural approach to intelligence for enabling strong organic growth is captured in the following vision:

"As the business environment is changing faster and faster and the complexity is increasing more and more, a professional intelligence network is becoming more and more crucial to remain a market leader" (BI Business Plan, Comex, 2009)

Amongst these developments of the business environment are:
- Accelerating market dynamics
- Globalization of the oil and chemical industry
- Emerging economies
- Number and nature of competitors is growing

The BI Network at Vopak consists of members from each of the company's six divisions (Asia, Chemicals EMEA, Latin America, North America, Oil EMEA, China), and the network has 1-2 workshops each year in addition to a teleconference held on a monthly basis. Each member in the BI network has 20% of their time allocated to intelligence work, and they report to their respective superiors. The superior of the manager responsible for the BI Network reports directly to the CEO.

The focus of BI within Vopak is on:
- Competitor intelligence
- Product flow intelligence
- Market intelligence
- Customer intelligence
- Major trends in the business environment

The results of the intelligence activities are either distributed on a broad base throughout the organization in a pull-manner or are escalated up to the necessary decision-makers in case of strategic formulation products. The dissemination tools used are web-based systems, email, phone calls and direct face-to-face meetings.

## 3.5 The value of intelligence for Vopak

Vopak's competitive environment is defined as "non-captive marine tank storage for liquid oil and chemical products" (Relative Market Share Report, Comex, 2009). This definition is the result of the strategy formulated in 2006 (Bain). Non-captive means that at least part of the storage capacity is used for third parties. Vegetable oil and gasses are treated as chemicals. It is important to note that this definition does not restrain the scope of intelligence gathering for the formulation of strategy, where all bulk liquid storage, whether marine, inland or captive, is taken into account.

### *3.5.1 Competitor intelligence*

Competitor intelligence is intelligence about the actions, capabilities, and intentions of competitors. The value of competitor intelligence for Vopak is two-sided. Since capturing demand for storage (even in an expanding market) is essentially a zero-sum game, it will allow Vopak to maneuver better to beat the competitor in specific regions and activities. This includes benchmarking performance as well as competing for strategic locations and customers. Two examples of widely-distributed deliverables of competitor intelligence are alerts and profiles on competitor actions and intentions as well as a complete overview of the market shares of all the players in the market relative to Vopak, now and in the future. Narrowly distributed 'sensitive' products are products like the conclusions for action resulting from so called 'war gaming' or simulated role playing sessions in different scenarios. The other benefit of competitor intelligence for Vopak as the global leader is to be able to more readily identify targets for mergers and acquisitions.

### *3.5.2 Product flow intelligence*

Storage demand results from imbalances in demand and supply, as well as imbalances between producer and consumer regions. As such, product flow intelligence is essential in forecasting future areas of imbalance and demand for storage. Product flows are forecast simultaneously in house with the help of Vopak databases and by consultant studies (e.g. CMAI, SRI Consulting, Wood Mackenzie). The product flows are mainly attributed to drivers such as economic growth, population growth, industry sector growth, end user exposure, substitution, avoidance, inter product competition, and social and political stability. Assumptions about these drivers are explicitly stated and in most cases different scenarios are possible. Most of the interpretation of what the forecasted product flows mean for Vopak is not done by the consultants, as Vopak is better positioned to know the business implications.

### *3.5.3 Market intelligence*

Market intelligence gives Vopak insight into customer market dynamics and strategies. This helps Vopak to understand the key drivers of product flows better. This also includes global oil and chemical reports from agencies like the International Energy Agency, BP Statistical review, OPEC, ICIS and others. Transportation indicators are important for the sourcing and distribution of product flows as well as for the choice of transportation mode (container-based, pipeline, truck, train, barge, sea-tanker), especially for low-volume products. Financial market indicators such as futures, contango and backwardation curves are also closely monitored. This intelligence gives account managers a better idea of the needs of the industries and the characterization of future demand.

### *3.5.4 Customer intelligence*

Customer intelligence is focused on improving customer service. This is achieved by constantly monitoring the customer and third-party satisfaction, enabling Vopak to score higher than competitors on responding to changing customer needs. Examples of this include yearly satisfaction surveys including more than 2500 customers and 1400 third parties (2008 data). The results are integrated into the Customer Relationship Management system (CRM system) for continuous improvement. Also, every important interaction with customers (i.e. a visit of a key-account manager to the company) is documented as a “visit-call report” within the CRM system and can be used for data-mining or real-time distribution via mobile devices to the right people (i.e. CEO or a regional account manager wanting to be updated on what is happening with the account in other regions).

### *3.5.5 Major trends in the business environment*

The intelligence on the major trends in the business environment focuses on emerging trends. These are ambiguous signals that might develop into drivers of change and as such should be actively monitored to ensure future profitability. The potential trends are identified through workshops or specific projects. An example of such a project is ‘Terminalling in the Future” (Vopak, 2008) in which the possibilities of future terminals are examined. Results from this specific study include the identification of external drivers of innovation like ecological sustainability, zero-risk management, smart operations, functional terminal construction and capacity and infrastructure optimization. Technologies that are monitored as a result include nano technology, sensor technology, robotics, energy transition and intelligent networking.

## 3.6 Findings

### *3.6.1 Findings: Process analysis*

Process analysis is a category that emerged from the data only near the end of the research. However, it is considered key to the overall direction and development of the intelligence process. Therefore, it will be discussed first. What appeared to be a simple question to users on their intelligence demands soon proved to be much more complicated. First of all, users do not always know what they need. Secondly, in interviewing the intelligence staff, the question of input for the planning and budgeting activity was repeatedly answered with complex monologues that went beyond simple user wants. Only then did it occur that there was something going on that extended beyond simple translation of user feedback into input for planning and budgeting. It was, however not clear what the real input entailed beyond the translation of user wants. Near the end of the research, the researcher got involved in an annual needs evaluation exercise that was initiated by the intelligence department and by being a part of this activity a first hand view of the elaborate evaluations preceding the planning and budgeting phase was gained. What then also emerged from the data is that although the exercise in which the inquirer participated was a formal one, the core principles of the exercise were practiced throughout the year by the intelligence department. Process analysis was finally defined as a reconciliation activity between what users expected, what the analysts thought the company needed and what was best for the improvement of the intelligence process itself, given its current development stage.

The process analysis activity is the consolidation of the different drivers of the intelligence process. These are:

**- The user wants**
User wants can be identified by asking the user what he or she wants. Care should be taken to manage expectations, as users sometimes demand more than they actually need, or ask for products that they do not need at all. Not everything that is 'nice to know' is 'need to know'.

**- The company needs translated into user needs**
The assessment of the competitive environment of the company results in a specific set of intelligence topic crucial for the future competitiveness of the company. These are connected to key-decision makers who can and should act when intelligence mandates action.

**- The process needs and possibilities**
Developing an intelligence capability takes time. One cannot make complicated scenarios for the future without basic competitor and market data. Culture is also slow to adapt and should be taken in to consideration. Realistic steps in the development of the intelligence capability are a must for successful goals and implementation.

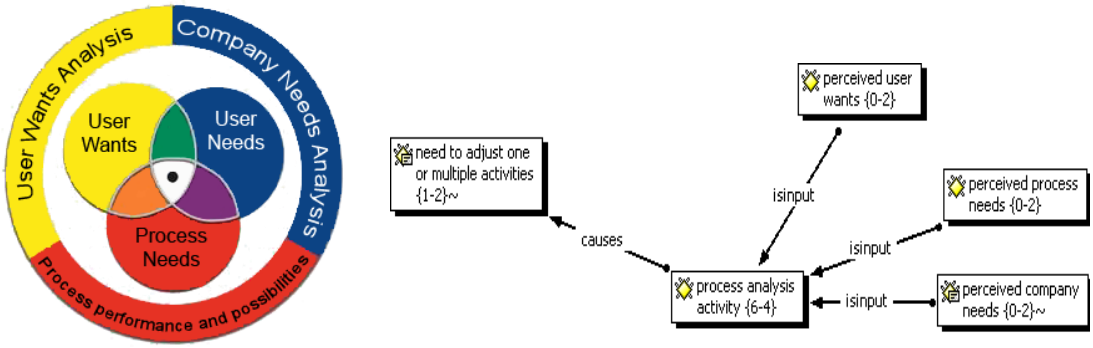


*Figure 3: Two views on the process analysis, by author*

### *3.6.2 Findings: Planning and budgeting*

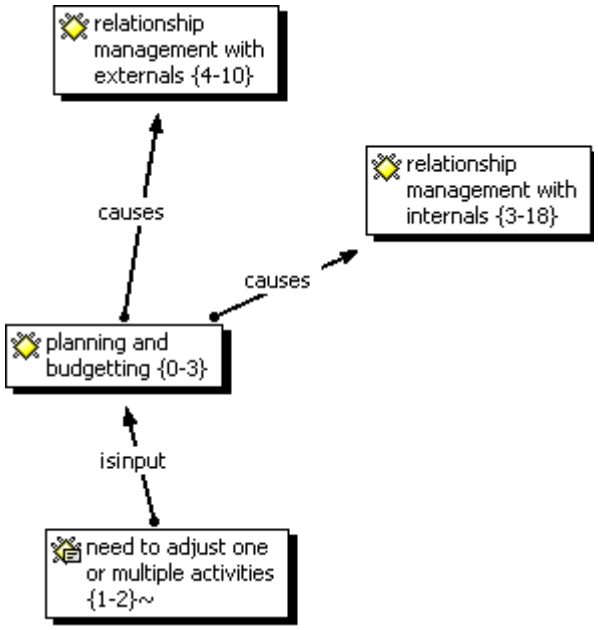


*Figure 4: Planning and budgeting, by author*

Planning and budgeting was a category that was fairly easy to perceive in the data.

Budgets of the departments' expenditures and previsions for the next year's expenditures are a good example of this. These budgets are so closely linked to the yearly 'BI business plan' that there is no sense in separating the two and they thus form the category of planning and budgeting.

Planning and budgeting is a continuous activity in the sense that it builds upon what is already in motion and merely has to make adjustments and small additions instead of reinventing the wheel each year.

### *3.6.3 Findings: Internal and external relationship management*

The first real surprise and excitement came when the seemingly random and uncoordinated activities of the BI staff were grouped together. Seen individually, the endless stream of phone calls, small talk and email writing did not seem to 'fit' or to be captured by any sort of common header. After a few weeks though, recurring concepts like 'handling internal requests', 'requesting internal feedback', 'attending meetings' (seemingly without a clear goal), and 'managing expectations' were identified.

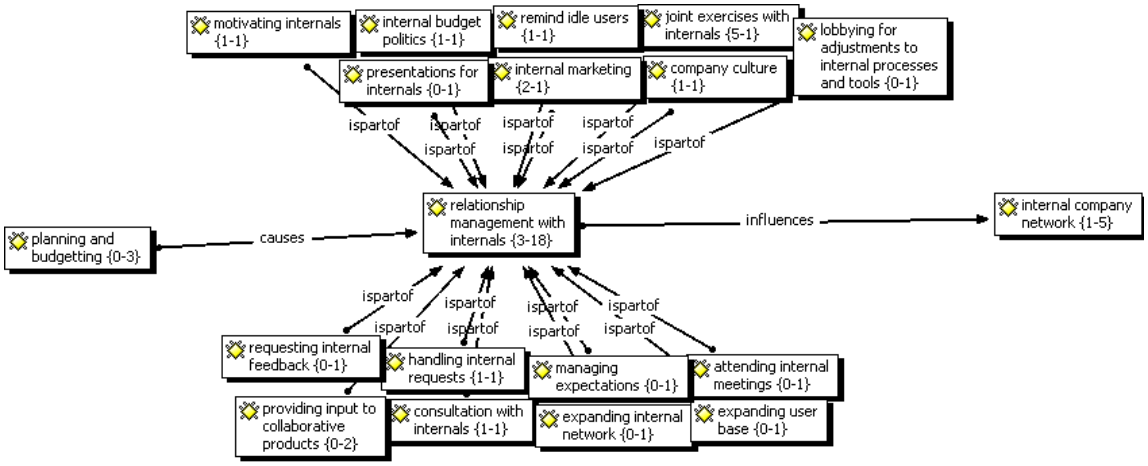


*Figure 5: Relationship management with internals, by author*

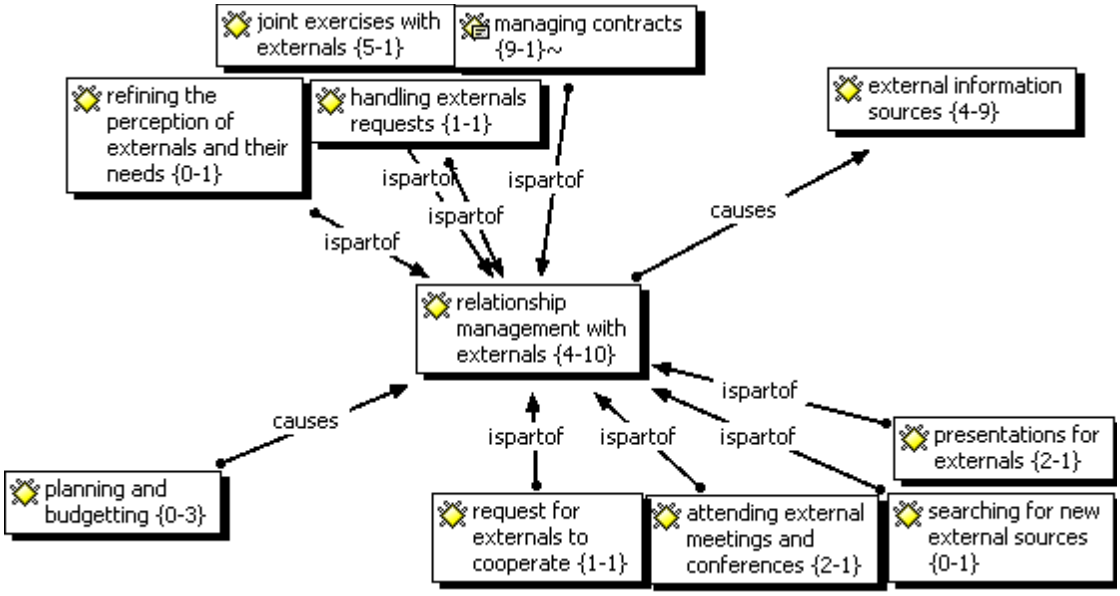


*Figure 6: Relationship management with externals, by author*

Eventually, theses concepts were regrouped under the general abstract header of ‘relationship management’, which fit well, even when additional concepts were identified much later on. However, since there was a clear difference in the way the relationship management was executed with internal contacts and the way it was done with externals it was deemed appropriate to split this general container of activities into two conceptually different categories: internal and external relationship management. For example, formal contracts were only needed with external contacts. Also, the way in which concessions were given without an immediate quid-pro-quo was not surprisingly far more common and easier to achieve when dealing with people within Vopak than when dealing with externals.

### *3.6.4 Findings: Information collection, processing, and storage*

The activity of information collection, processing, and storage is well grounded in the data, probably because it actually involves three concepts which have been grouped together. The reason why these three concepts are not separated is because the activities that constitute them are so closely linked in time. They are based upon cognitive steps which have no identifiable intermediate stage.

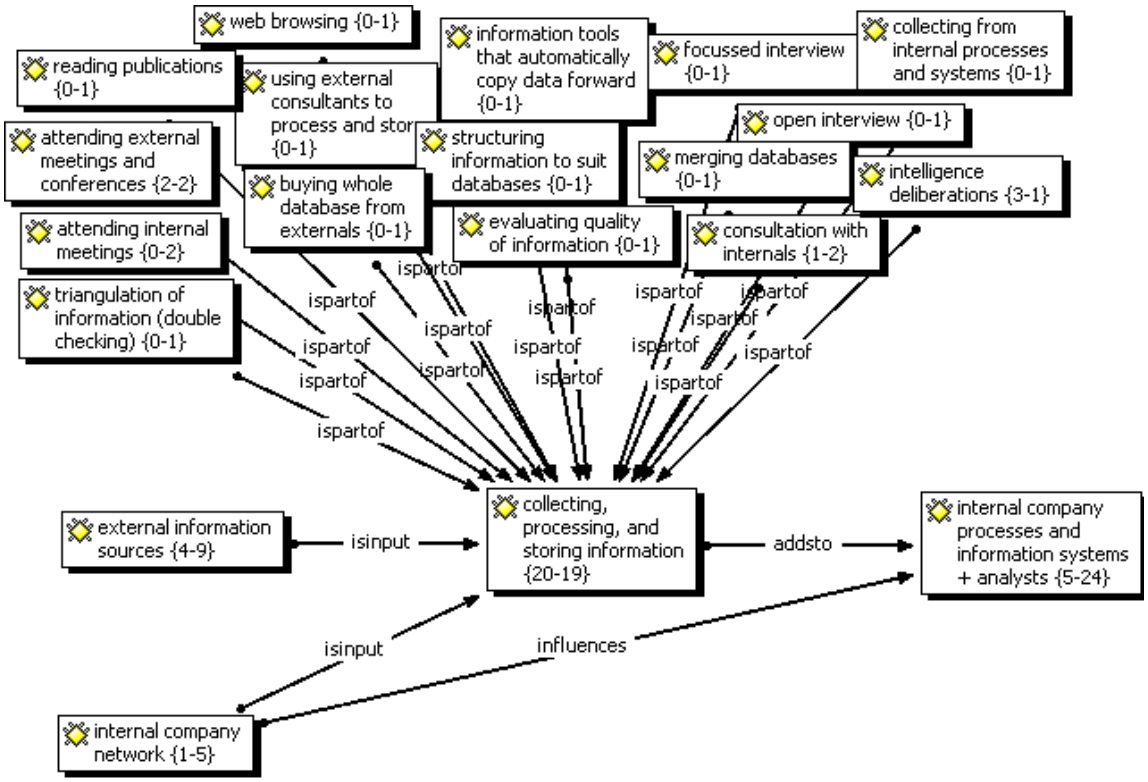


*Figure 7: Information collection, processing and storage, by author*

The processing activity is always performed or initiated by a human. Only a person can distinguish relevant information within its context. For example, reports on forecasted product flows done by different consultancies seldom predict the same thing. Based upon the drivers of the product flows, the most relevant predictions and themes are identified and inputted into the Vopak databases. Lessons learned from comparing different sources in a critical manner aid in the later stage of analyzing the data obtained. Within Vopak several systems exist for the collection, processing and storing of information.

**- Astragy**
Astragy is a web-based interface connected to a database. The different members of the BI team can use this interface to update information on terminals, ports and countries, as well as competitors. They can do so simultaneously from any location in the world. The Astragy database is used as a basis for competitor profiles and for the calculation of market shares of participants in the liquid bulk storage market.

**- CRM project**
The CRM project is an integration of several databases, again with a web-based interface. It allows the Vopak staff to monitor all interactions with customers, from filing a complaint to reporting on a new prospect all through to the finalization of the lead and customization of the corresponding contract. It is a systemized way of handling existing and new customers, increasing simultaneously the efficiency and the quality of interactions. All customer interactions are logged into the system, some with detailed reports. These reports and metrics can then be automatically distributed to all members of the system according to the preferences in their profile and access level.

**- Vopak Earth**
Vopak Earth is a visual tool allowing Vopak to visualize oil and chemical streams on a global, regional and national level. The input for the model is construed in cooperation with specialized consultancies. Visualization helps determine where imbalances in supply and demand will arise, as well as account for certain scenario's (i.e. a refinery failure or a politically motivated boycott of a certain country). While the data for the flows are inputted with the help of industry databases, the impact for Vopak is done by workshops amongst Vopak staff.

**- Vopak Intelligence Plaza**
Vopak Intelligence Plaza (VIP) is a web-based distribution tool for news articles and research reports. Each user has a profile based on his or her information needs. This could be a set of specific customers, competitors, market regions, product types or strategic themes. Research articles and news can be posted by any user, but in principle the BI team will post the gross of the news articles by systematically scanning all the necessary news sources. Current examples of news sources are industry journals, consultancy reports, web feeds, conference briefs, and Vopak-produced intelligence products. The Relative Market Share reports, as well as Market Alerts and Competition Alerts are all disseminated with the VIP system. Users can choose to receive updates by email as they are published, or grouped by day or week. Since the VIP also has a search function, it becomes a storage tool next to being a dissemination tool, and users can pull customized data from it on demand.

### *3.6.5 Findings: Monitoring user wants and feedback*

The goal of the intelligence process is to satisfy the information needs of the internal users and the company for the purpose of strategy formulation and implementation. However, as customers of the system, the choice of actually using the intelligence products lies with the user – giving the user the power to annihilate the effect of superior intelligence production. The user has to understand the importance of the intelligence products for his bottom line, or the products will not be utilized. This is why user wants and feedback is closely monitored. In this way, the user has a word to say in the process, creating ownership and a culture of alertness for intelligence. The Vopak culture is strong and users highly appreciate and contribute to the intelligence solutions. For example, VIP scored an overall 4.7 out of 5 on a recent survey (BI Business Plan 2009, 2009).

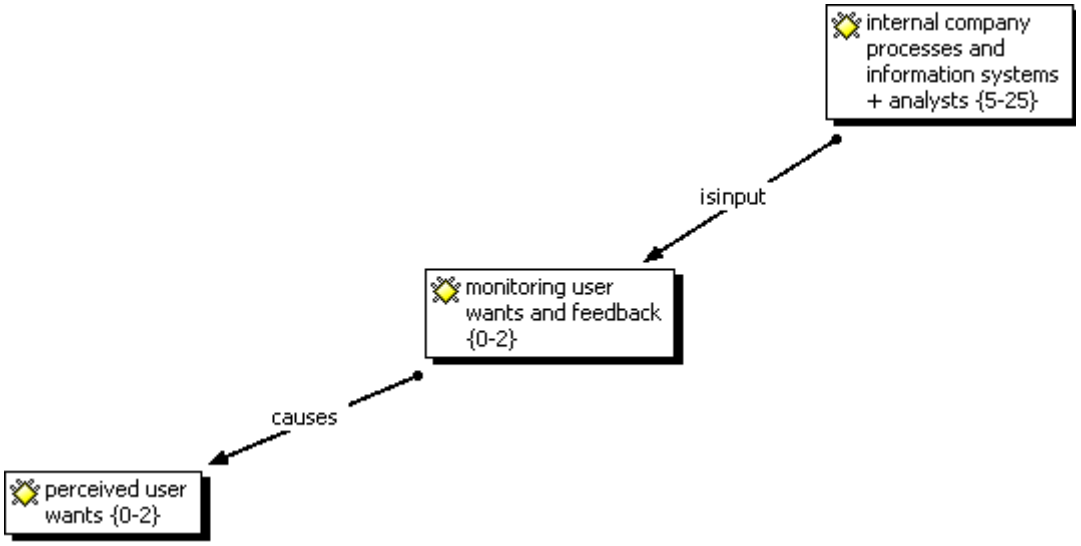


*Figure 8: Monitoring user wants and feedback, by author*

### *3.6.6 Findings: Monitoring process performance*

A difficult concept to bring to the surface was the monitoring of process performance. It is a cognitive activity which has no visible output and takes place continually in the mind of the analyst responsible for the implementation of the intelligence process. There have however been attempts to formalize the different stages of evolution for an intelligence capability.

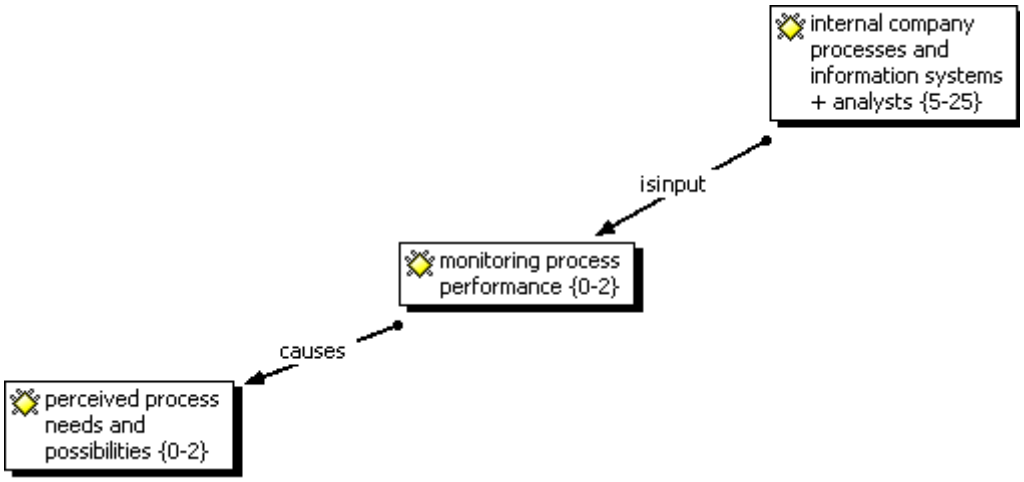


*Figure 9: Monitoring process performance, by author*

Vopak uses the framework developed by the Global Intelligence Alliance (GIA, 2009) for assessing different dimensions of an intelligence capability. The different dimensions are:

**- Intelligence scope**
The intelligence scope can range from ad-hoc needs driving the process to a future-oriented scope that also covers topics outside of the current micro business environment. Vopak is currently at the the latter end of the scale.

**- Intelligence process**
Besides scope, the intelligence activities themselves can also be ad-hoc or structured. The basic situation is a reactive approach. The best developed situation is to have intelligence integrated with key business processes and utilized in key decisions. This includes future oriented analysis and early warning capabilities for emerging trends. Again Vopak scores high on this scale.

**- Intelligence deliverables**
Intelligence deliverables range from ad-hoc reports quickly put together from scrath to a high degree of future orientation and insight creation in the process of producing and delivering intelligence output. Workshops and seminars are in regular use when this dimension is 'world class'. Vopak is near to achieving this for product flows, markets, customers and competitors.

**- Intelligence tools**
When intelligence tools are not developed, email and shared folders on a central computer are the primary means for sharing and archiving information. No databases exist. The best-case scenario is a centralized database which supports the intelligence process and is being frequently used for end-user collaboration. Vopak currently has multiple such systems in place, each with a specific scope (e.g. customer service, competitors). However, since the systems are based on a common standard and platform, it is easy to virtually integrated them into a single system whenever necessary.

**- Intelligence organization**
When an intelligence capability is in its beginnings, no resources are dedicated to the person responsible for the process. Individuals conduct intelligence activities on a non-structured base and have to 'lend' resources from other budgets. When an intelligence capability is world class, the intelligence organization is well integrated with the internal organization and business processes. A steering group is in place to guide the intelligence process and the intelligence department is independent with its own budget. The current situation at Vopak, BI being one of the strategic initiatives, is world class.

**- Intelligence culture**
The intelligence culture is a crucial but difficult to manage process. At the lower end of the scale, no shared understanding exists of the role and benefits of systematic intelligence operations. Each individual is responsible for his or her own information needs and does not contribute to satisfying the information needs of others. In a world class system, however, a strong intelligence culture is reflected in the way the organization shares information and acts upon it. In this system, the CEO is a strong supporter of intelligence. For Vopak, the situation is at the upper end of the scale, with the CEO bragging about all the intelligence reports he can receive in real-time on his blackberry during the presentation of the semi-annual results to shareholders on Friday August 28th 2009. One of Vopak's mottos is "We watch out for surprises".

### *3.6.7 Findings: Analysis*

A category that emerged almost immediately from the data was the activity of 'analysis'.

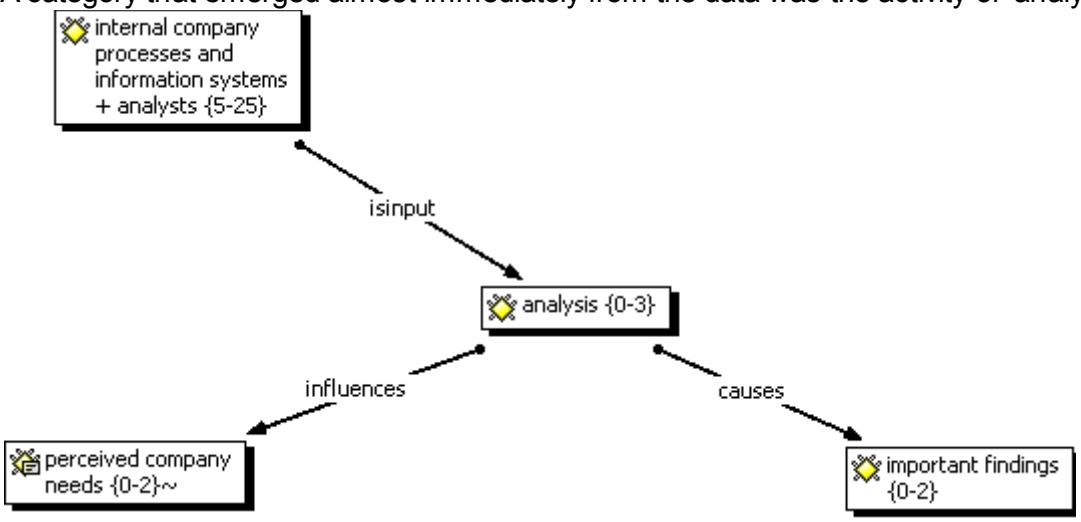


*Figure 10: Analysis, by author*

Analysis can be defined as "an investigation of the component parts of a whole and their relations in making up the whole". This quasi-immediate recognition was is in part due to the inevitable expectations and concepts the inquirer had already formed prior to starting the research. Sitting at a desk in the intelligence analysts' department, who would not expect to find the analysts there doing 'analysis of data' during a good part of their working day? The expectations were however proven correct by the data, and no bias in the interpretation of data is thought to have arisen from these expectations. The concept of the analysis activity was then refined into its smaller components; the analysis techniques and the analysis tools. Analysis tools are mainly pencil and paper, brains, databases and statistical analysis programs. Analysis techniques can be divided into three main groups: diagnostic techniques, contrarian techniques and imaginative thinking techniques.

**Diagnostic techniques:**

A 'key assumptions check' is a useful check when receiving analysis from third parties, but can serve equally well for in house analysis. Its purpose is to expose faulty logic by explaining the logic of the analytical argument. By explicitly listing and reviewing the key assumptions that underlie the analysis, analysts can more readily identify hidden relationships between key factors. This will also lead to recognition of alternative scenarios that undermine current assumptions and which would cause the analysts to abandon the applicability of the analysis.

A 'quality of information check' is essentially a background check on information sources. The confidence that one can put into any analysis based on faulty or unreliable information is shaky, to say the least. The quality of information check prevents this.

Another technique is to actively look for signposts of change, also called the 'early warning system'. It consists in continually monitor indicators earmarked as drivers of change. Whenever changes reach a certain threshold, current strategies should be reviewed to re-think their applicability. This technique avoids surprises.
The 'analysis of competing hypotheses' is a technique that avoids the analysts picking the first solution that fits the problem in a satisfactory way. Instead, analysts are forced to go through all alternative explanations and all evidence that will disconfirm rather than confirm the first solutions systematically.

**Contrarian techniques:**
The devil's advocate is a person responsible of continually building the best possible case or alternate hypothesis against the prevailing thoughts of the intelligence team.
The 'team A/ team B' technique closely resembles the devil's advocate in that the two teams work on competing hypotheses. However, the difference lies in the fact that the teams develop a full blown analysis separately from each other and subsequently confront each other in a debate. This is different from just challenging a key assumption as in the devil's advocate technique.
A 'high-impact/low-probability analysis' does just what its title implies. It highlights low-probability events that could have far-reaching consequences on policies. Preliminary plans should be developed for these circumstances just in case.
Finally, a "What if?" analysis works back from the imaginary occurrence of an event to pin-point triggering events or different paths that lead up to the event. This 'backwards' thinking is useful for identifying key drivers of change that could be monitored by an early-warning capability.

**Imaginative thinking techniques:**
Brainstorming is a structured process to creative thinking. It builds on the free flow of thoughts and ideas without inhibitions or criticism. After a divergent phase in which ideas are generated, participants then try to converge the ideas into clusters of coherent actions.
Outside-in thinking gets analysts away from the drivers they can influence and force them to reconsider their whole field of action. All external drivers of change are identified and classified according to the influence the company can exert on them. This technique will help to avoid being surprised by shifts in the competitive environment over which the company has little or no control.
A 'red team analysis' or 'war-game' is essentially a role play of the adversary. It models the behaviour of a competitor, explicitly avoiding mirror-imaging of the own company. The language, culture and personal background of the competitor's key decision makers should be accurately modelled by including people with a deep understanding of the competitor or at least a common background.
Finally, alternate futures analysis is applicable when there is high complexity and uncertainty about the future. By developing scenarios decision makers can map the most probable combinations of uncertain factors and readily recognize these pathways as they are evolving. It can also help to develop early warning indicators by working backwards from the scenario endpoints.

### *3.6.8 Findings: Production*

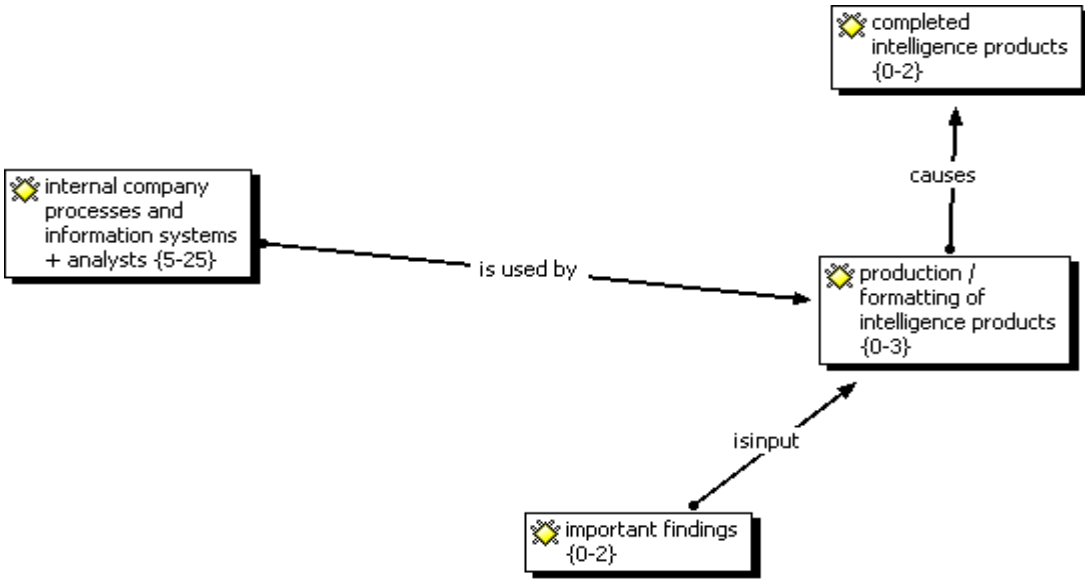


*Figure 11: Production, by author*

Production of intelligence products is done with the help of common desktop tools like Microsoft Office and graphical tools used for making charts, figures and tables. Some intelligence productions are automated using the internal company processes. An example of this automated process is the Relative Market Share report, which is extracted from the database into a standard format ready for dissemination. Other products, usually tailored to a specific situation, do not have an automated production method.

### *3.6.9 Findings: Dissemination*

Dissemination is a concept that regroups all the activities which bring finished intelligence products to the end user. This can be via email, phone or a face-to-face discussion. The most common method within Vopak is through the CRM system portal or through the VIP delivery system. Both systems are web-based and based on a user pull or a profile-determined push of information.

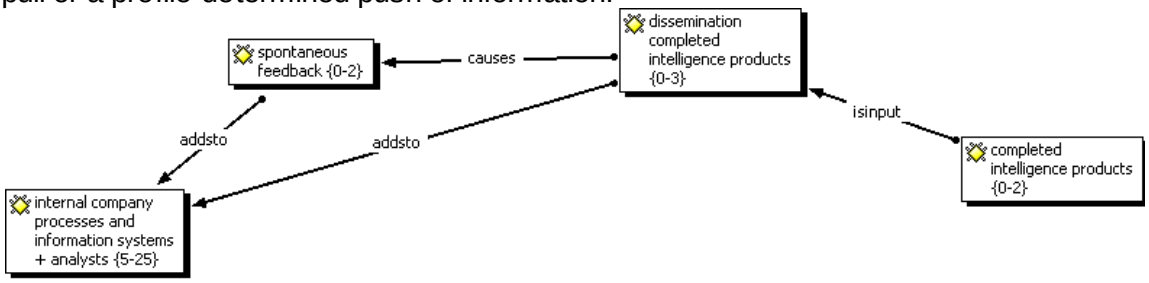


*Figure 12: Dissemination, by author*

## 3.7 Abstracting categories to a higher level

The activities described in the findings above are all connected in the final model. Interestingly, after having gone from observations to concepts to sub-activities to interconnected general activities, an even higher level of abstraction was discovered. Two separate cycles of activities were identified, splitting the eleven activities into two circular flows, with the internal 'company information systems and analysts' at the center of each flow. The common denominator of the first cycle is that all activities are focused either on improving the performance of the intelligence capability or on collecting information. This is why the researcher thought it appropriate to name it the 'improvement and collection' cycle. The activities of the second cycle are 'analysis, production and dissemination'. This is why it is called the 'analysis and delivery cycle'.

Due to space considerations the two cycles are represented on the next page.

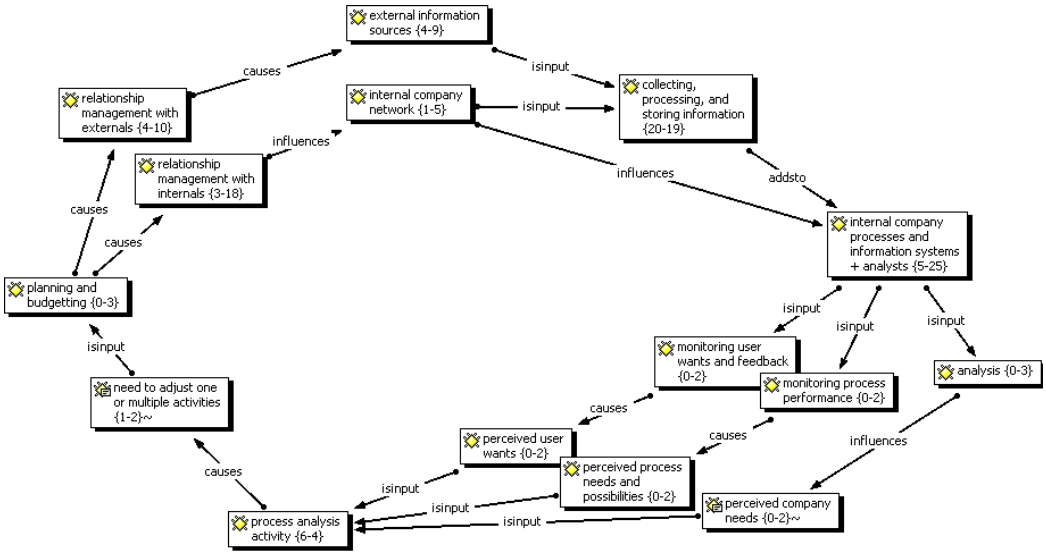


*Figure 13: Implementation and collection cycle, by author*

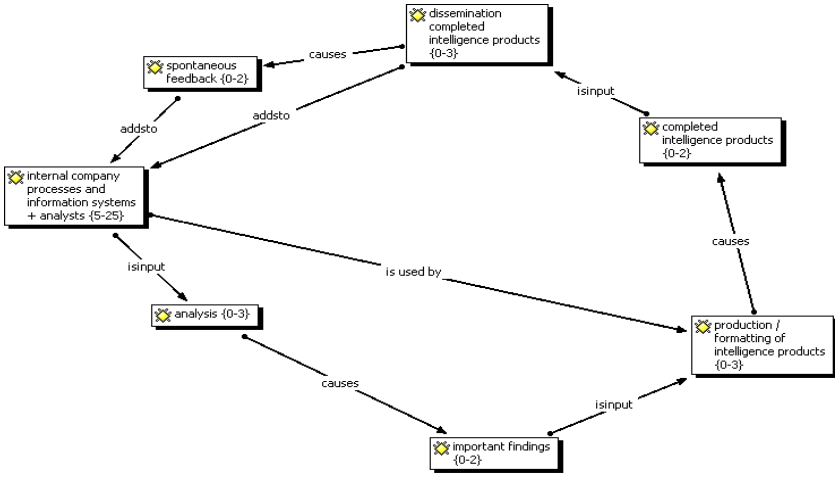


*Figure 14: Analysis and delivery cycle, by author*

## 3.8 Conclusion case findings

To conclude, the analysis of the collected data, through repeated conceptualization and regression of the theory, culminated in a framework that is more than merely descriptive of the case setting. The grounded theory is able to account and explain all of the nuances and widely diverging phenomena encountered in this particular case. Theoretical saturation of the model was achieved since the marginal value of new information declined to low levels. Also, no new information could be found that conflicted with the model as it has been developed. It is thus suited to account for the social behavior and processes related to intelligence within Vopak. The possibility exists that the grounded theory will be equally suited to predict and account for varying phenomena in other settings - be it with slight modifications to the theory which is, after all, never perfect. The following chapter will review the grounded theory in detail, without referring to Vopak.

# Grounded Theory: The model

## 4.1 Introduction to the intelligence process model

This chapter introduces the theory abstracted from the data collected at Royal Vopak Since the focus is on the theoretical model that emerged from the data, no references will be made to the data. Also, since the model was constructed using the grounded theory method, no reference will be made to existing literature (for a confrontation of the model with current literature please refer to the next chapter). This chapter explains in detail how the eleven main activities of the intelligence process model work and are how they are linked.

## 4.2 The intelligence process model

The intelligence process model of the grounded theory has eleven main activities. These activities are linked with each other, either directly or through the intermediary of one or more others. Each activity is in turn comprised of a number of sub-activities. For sake of clarity, the following depiction is a simplification of the complete model including sub-activities.

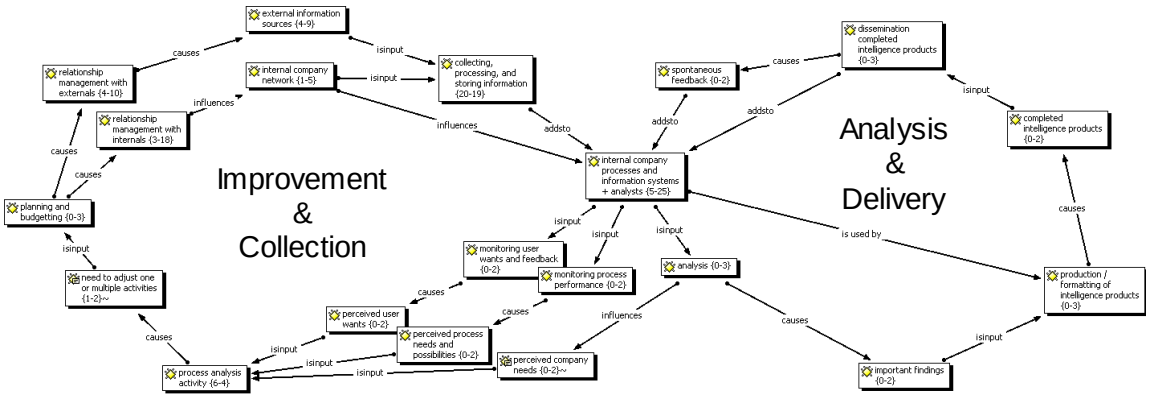


*Figure 15: The intelligence process model, by author*

The eleven activities of the intelligence process model will be explained below by stating the '*raison d'être*' of each activity and how it achieves this goal. The nine activities can be grouped into two continuous cycles, as depicted in figures xx and xx. The goal of the cycle on the left is to get the information needed and to optimize the development and performance of the process (including the development and performance of the analysis and delivery cycle). The goal of the analysis and delivery cycle is to analyze the collected information and to deliver completed intelligence products to the users.

## 4.3 The improvement and collection cycle

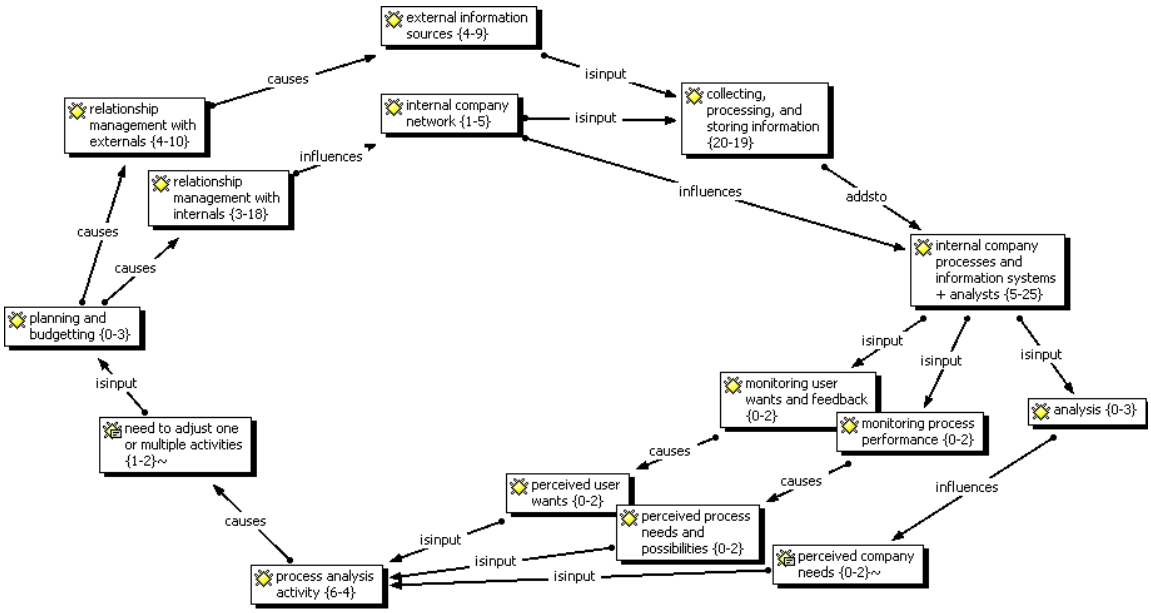


*Figure 16: The improvement and collection cycle, by author*

### *4.3.1 Process analysis*

The purpose of the process analysis activity is to provide the basis of the planning and budgeting activity. Without this activity the intelligence process would not be able to adjust itself to changing conditions. The process analysis activity defines the process gap between what is currently done and what should be done. What should be done is given by the overlap between what users want, what the company needs, and what is possible given the circumstances.

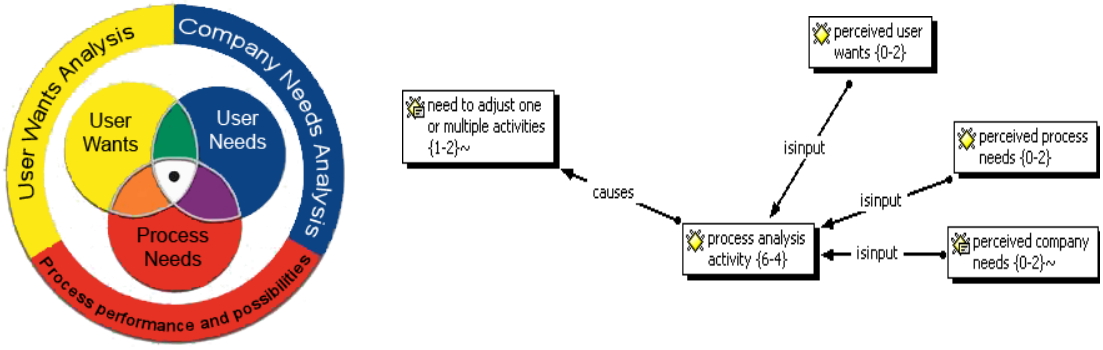


*Figure 17: Two views on process analysis, by author*

**- The user wants**

User wants can be identified by asking the user what he wants. Care should be taken to manage expectations, as users sometimes demand more than they actually need, or ask for products that they do not need at all. Not everything that is 'nice to know' is 'need to know'.

**- The company needs translated into user needs**

The assessment of the competitive environment of the company results in a specific set of intelligence topic crucial for the future competitiveness of the company. These are connected to key-decision makers who can act when intelligence mandates action.

**- The process needs and possibilities**

Developing an intelligence capability takes time. One cannot make complicated scenarios for the future without basic competitor and market data. Culture is also slow to adapt and should be accounted for. Realistic steps in the development of the intelligence capability are a must for successful goals and implementation.

### *4.3.2 Planning and budgeting*

The purpose of the planning and budgeting activity is to provide guidance to the execution of the intelligence process. Without this activity the intelligence process would be inefficient and incoherent. The planning and budgeting activity creates an action plan and allocates resources.

### *4.3.3 Internal relationship management*

The purpose of the internal relationship management activity is to improve the quality of the internal network so as to find the optimal trade-off between the network's functionality and its cost. Without this activity the intelligence process would have no internal information sources, no users, and no power to lobby for adjustments to the internal processes and tools. The internal relationship management activity is comprises the following sub-activities:

- Attending internal meetings
- Making presentations
- Consulting with the internal network
- Managing user expectations
- Handling internal requests
- Lobbying for adjustments to processes and tools (including budgets)
- Expanding the internal network
- Promoting intelligence culture
- Educating users on intelligence
- Provide training to users of intelligence systems
- Reminding idle users and asking for feedback
- Providing input to collaborative products
- Motivating internals
- Internal marketing

### *4.3.4 External relationship management*

The purpose of the external relationship management activity is to improve the quality of the external network so as to find the optimal trade-off between the network's functionality and its cost. Without this activity the intelligence process would have to rely solely on internal information sources. The external relationship management activity is comprised of the following sub-activities:

- Joint exercises with externals
- Requests for externals to cooperate
- Handling external requests
- Managing contracts
- Presentations for externals
- Attending external meetings and conferences
- Searching for new external sources
- Refining the perception of externals and their needs

### *4.3.5 Information collection, processing and storage*

The purpose of the information collection activity is to gather the information needed by the intelligence process. Without this activity the intelligence process would have no input and thus no output. The information collection activity reaches its goals by using the methods and guidelines as specified by the action plan, collecting information in a focused and efficient manner.
The purpose of the information processing activity is the storage of information in a useful form for later use. Without this activity the intelligence process would have no historical data and no means of combining disparate data collection into a coherent whole. The information processing activity is an activity that selects, structures and stores pertinent information using internal company processes and tools.

### *4.3.6 Monitoring user wants and feedback*

The purpose of the user wants and feedback monitoring is to provide input for the process analysis. Without this activity the intelligence process would not be able to verify to what extent user needs are satisfied. The user wants and feedback monitoring activity prioritizes user wants and evaluates the current performance of intelligence products.

Feedback can be given spontaneously, as a reaction to a person's interaction with the intelligence department or its products. It can also be asked for by the intelligence staff and this is more common. When asking a person for feedback, a passive approach and active approach can be taken. The passive approach encourages users to give feedback but does not result in consequences if none is given. The active approach forces users to give a response, but this is not a guarantee for an accurate depiction of the true feelings and opinions.

### *4.3.7 Monitoring process performance*

The purpose of the monitoring of process performance is obviously to signal whether stages of development (in terms of nature and quality of the processes involved) have been reached and to allow further improvement. Without this activity the intelligence process would not be able to verify to what extent the intelligence department has achieved its objectives in terms of process development. The process monitoring signals the nature and quality of the different processes involved and prioritizes the actions to be taken to correct or to further improve the processes. Above you said this is the most difficult part. Examples are needed of ways processes are assessed.

## 4.4 The analysis and delivery cycle

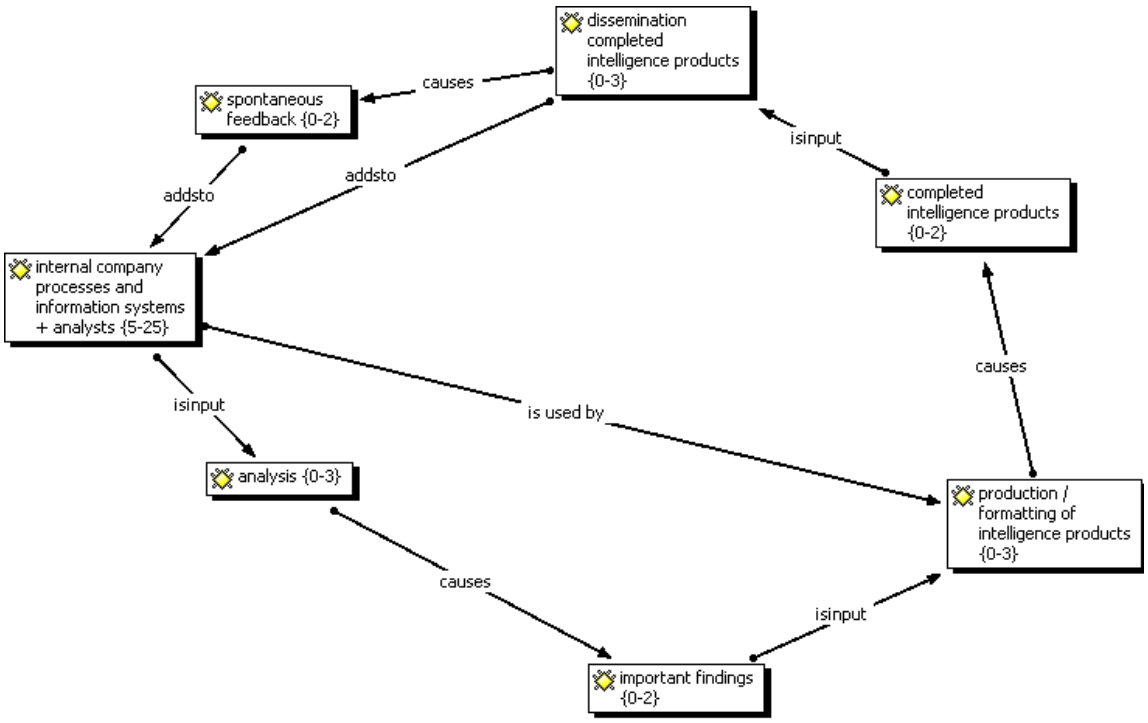


*Figure 18: The analysis and delivery cycle, by author*

### *4.4.1 Analysis*

The purpose of analysis activity is to extract meaningful and important findings from the information available. Without this activity the intelligence process would only be able to relay an archaic and overwhelming collection of information fragments to its users, leaving each individual receiver to do the time-consuming and difficult analysis activity. The analysis activity uses a range of analytical techniques to distill actionable answers to tactical, technological and strategic issues the company is dealing with. Besides dealing with specific issues, the analysis process also monitors the general environment to continually define the company's intelligence needs independently from user wants.

### *4.4.2 Production*

The purpose of the production activity is to put the findings of the analysis into a user-friendly form. Without this activity the communication of findings to the user might be hindered or even blocked. The production activity uses information storage processes and tools to create a suitable intelligence product ready for dissemination.

### *4.4.3 Dissemination*

The purpose of the dissemination activity is to communicate finished intelligence products to the users. Without this activity the users would not benefit from the intelligence process. The dissemination activity can use any method of communication, from a simple face to face meeting to advanced IT-solutions.

While the intelligence products are designed to overcome the information overload of users, when an intelligence process is adequately developed the suite of products available is too great for any one user. This introduces the necessity of selective dissemination, giving individual users an adapted range of products to choose from based upon their own preferences and needs.

Another way of looking at methods of dissemination is to characterize the process as push or pull. In push-mode the dissemination is done proactively by the intelligence staff, giving the user little room for ignoring the product. A more passive approach is the pull-mode of dissemination where the products are available to the user, but the user has to take the initiative to go get the product.

## 4.5 Evaluating the intelligence process model

The quality of a grounded theory is determined by four criteria (Glaser, 1978; 1992; Hutchinson, 1986; Charmaz, 2000): fit, work, relevance and modifiability. As explained in the methodology chapter:

- '**Fit**' is achieved when the data is clearly explained (Morse & Singleton, 2001, p. 841). This research has let the concepts and categories emerge from the data, adhering strictly to the grounded theory methodology. This ensures that fit is achieved. Even if a-priori concepts were to be used, they would not survive the coding procedures if there is no data to fit the concepts.

- '**Work**' is achieved when it is useful in providing a theoretical construct that explains the phenomenon that is being studied (Charmaz, 2000). It is difficult to say that the current grounded theory 'works' since this research is based on a single case study. At least for all the behavior observed within this case study, no new data could be identified which would change the categories. The literature comparison phase will attempt to confront the grounded theory with results from other case studies and as such provide a very premature opinion on possible workability of the theory. Further research will have to verify whether the grounded theory actually 'works' in other case settings.
- '**Relevance**' is achieved when the social processes in the context of the phenomenon are explained by the grounded theory (Charmaz, 2000; Hutchinson, 1986). In this research, the core variable is the process by which a company's information needs for theory formulation and implementation are satisfied. The grounded theory established provides a detailed and comprehensive explanation of this process.
- '**Modifiability**' is achieved if researchers can "modify their emerging or established analyses as conditions change or further data are gathered" (Charmaz, 2000, p. 511). If subsequent research should indicate the existence of additional variables or processes within the core variable, the theory should be able to accommodate for such changes.

The current model complies with all evaluation criteria for a grounded theory and is therefore deemed of good quality.

## 4.6 Conclusion of the intelligence process model

The grounded theory methodology used in this research has produced a complete model of the intelligence process. Although based on a single case study, the quality of the model suggests that it is possible that this model will be of use in other settings too. In the next chapter a first attempt is made as to how the model could be used in further research as well as application in the field. This is done by confronting the model with conflicting and complementary literature.

## 5.1 Literature comparison phase

Glaser, as well as Strauss and Corbin argue that one should not “contaminate one’s efforts to generate concepts from the data with preconceived concepts that may not really fit, work or be relevant” (Glaser, 1978, p. 31) and that one should avoid being “constrained by having to adhere to a previously developed theory that may or may not apply to the area under investigation” (Corbin & Strauss, 1990, p. 49). So although ‘theoretical sensitivity’ explained above might accelerate the research and improve the quality, literature is not used a priori in the creation of the grounded theory. It can however, serve as a sounding board for the evaluation and integration of the grounded theory in the light of previous work. If done correctly, a completed grounded theory is possibly both predictivist and accomodationist but does not have to be either (Miller & Fredericks, 1999). Once the theory is saturated to the point that marginal improvement becomes small, and highly abstract concepts are able to fit all areas of inquiry, it is predictivist in that it can predict the outcome of any problem in that particular context (Miller & Fredericks, 1999, p. 550). The grounded theory can also be accommodationist in that, if it is true, it will accommodate any literature in the same context.
Comparison with conflicting literature will build internal validity while comparison with similar literature will sharpen generalizability. Both comparisons will improve construct definition and raise the theoretical level. This phase will be presented in the chapter “Theoretical considerations”, after the final grounded theory model has been established and explained in detail.

## 5.2 Shortcomings of the traditional process model

The 'classic' or traditional model of the intelligence process, discarding minor variations, is considered to be a continuous cycle of five interactive and iterative steps (McGonagle, 2007):

- **Planning and direction**
  (working with decision makers to hone their intelligence needs)
- **Collection activities**
  (conducted legally and ethically)
- **Analysis**
  (interpreting data and compiling recommended actions)
- **Production and dissemination**
  (presenting findings to decision makers)
- **Feedback**
  (taking into account the response of decision makers and their needs for continuous intelligence)

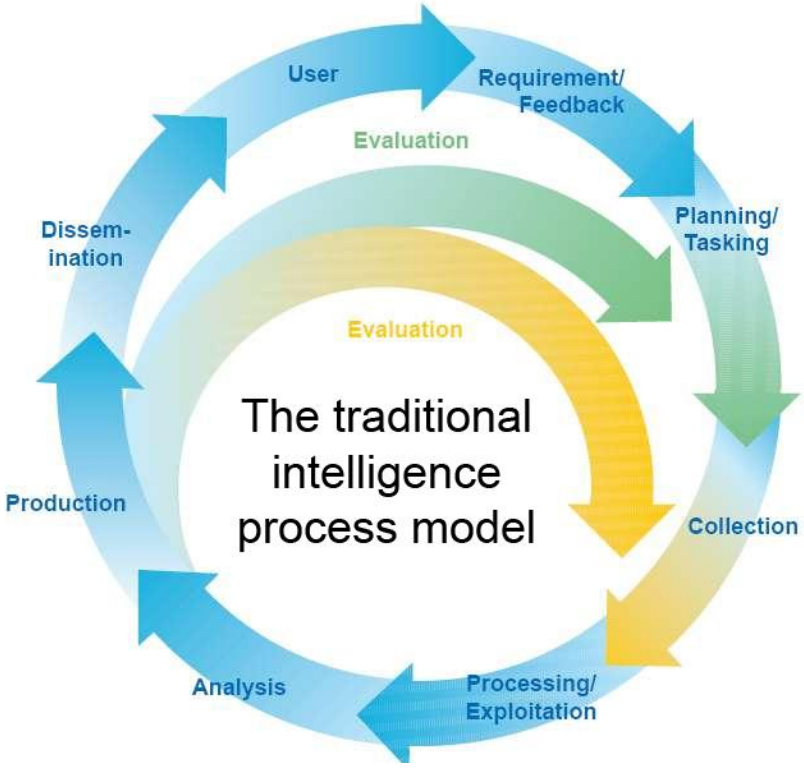


*Figure 19: The traditional intelligence model, by Dearth (1995)*

The model has been referred to by numerous practitioners and academics alike (Ransom, 1959; Zlotnick, 1964; Eells & Nehemis, 1984; Kelly, 1987; Meyer, 1987; Conley, 1987; Fuld, 1988; Prescott, 1989; McGonagle & Vella, 1990; Dearth, 1995; Rumizen, 1996; Calof, 2006) and is considered to be the 'standard' model, with multiple variations on the same theme but with no known alternative that substantially differs. Surprisingly however, in an academic forum organized by the Society of Competitive Intelligence Professionals it was suggested that the traditional model practitioners and academics are using to guide their research and actions is not matched to what intelligence managers actually do (Calof, 2006). These statements were motivated by the difficulties associated with researching and using the model. Admittedly, the model presents its user with four main difficulties (McGonagle, 2007):

**- The danger of bureaucracy**
The traditional model of the intelligence process has been adapted from the US Government's classic model, which is now widely recognized as being dysfunctional and bureaucratic (McGonagle, 2007). It suggests a separation of activities by functional specialization, adherance to strict rules and a hierarchy of authority (each step being 'commanded' by the activities in the preceding steps). All these characteristics are typical of a bureaucratic system, with the associated dangers of miscommunication and red tape. It is expected that the bureaucratic traditional model of intelligence will suffer the same fate as corporate planning, going from a business function to a business process. Boje and Dennehey (1999) have described this development of corporate planning as one going from being split up between planning and doing, to a postmodern or network style where "planning head and handwork is recombined and planning is de-centered to include the needs of customers and suppliers, as well as managers and teams of workers".

**- The user provides restricted direction and too narrow a scope**
Although there is nothing wrong with being customer-oriented in a general sense, using the internal users' input as the sole compas for the direction of the intelligence process is counter productive. User-articulated needs might function relatively well for strategical-decision oriented users, provided they have no blindspots and ask the right questions. However, this way of organizing the intelligence process completely overlooks the valuable intelligence areas of long term trends and technological assessments, as well as tactical intelligence.

**- The user will either get tired or too demanding**
Intelligence practitioners often refer to the 'three-year cycle' of intelligence programs (McGonagle, 2007). This is the phenomenon of intelligence programs blooming quickly, climaxing, and then dying – all within three years. It is attributed to the fact that when users determine the activities of the intelligence process, the assignments given are of increasing complexity (McGonagle & Vella, 2003). An additional cause might be that users simply can't think of any new assignments to give or are tired of continually articulating their needs.nice

**- The model provides no practical guidance**

The different steps of the traditional intelligence model are not clearly linked to each other. The process is “multidimensional, multidirectional, and - most importantly - interactive and iterative” (Dearth, 1996). This provides no guidance whatsoever for a practical implementation. No clear structure of the process flow can be derived of such a multitude of unspecified interactions amongst the different activities.

## 5.3 The grounded theory model in comparison

In contrast with the traditional intelligence model, the intelligence process model of the grounded theory has eleven main activities. On top of the six activities of the traditional model (planning and direction, collection, analysis, production and dissemination, user feedback) the new intelligence model also has the following activities:
- Relationship management with internals
- Relationship management with externals
- Monitoring for company needs
- Monitoring for process needs
- Process analysis

It is to be stressed that the two major differences in the models lie in the inclusion of internal and external relationship management on the one hand, and the inclusion of process analysis reconciling between users wants, company needs and process capabilities on the other. The traditional cycle does not account for relationship management and takes user needs as the sole driver of the whole process. Also, the production and dissemination stage of the traditional model is separated into two distinct activities in the new model. So in total, the new model has eleven activities instead of the traditional five.
All these activities are linked with each other, either directly or through the intermediary of one or more others. Each activity is in turn comprised of a number of sub-activities. For sake of clarity, the following depiction is a simplification of the complete model and does not show the sub-activities.

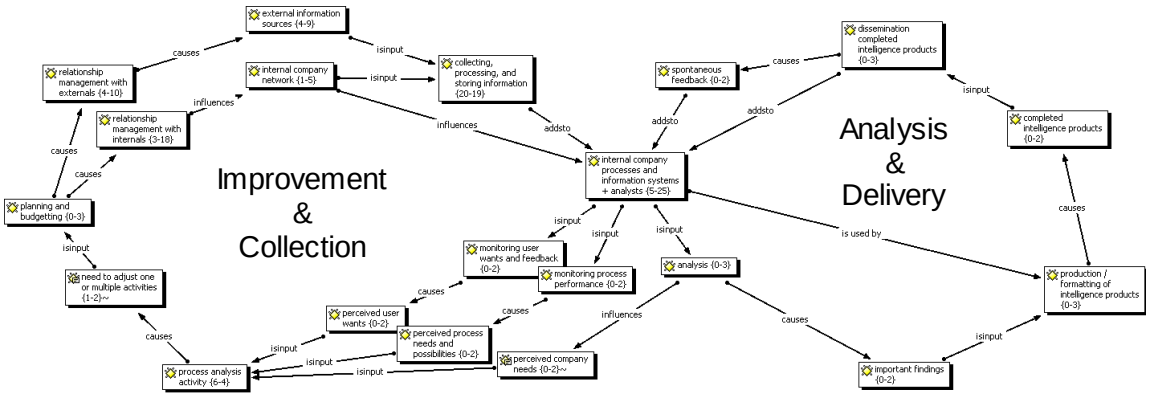


*Figure 20: The new intelligence process model, by author*

**- The danger of bureaucracy?**

The danger of bureaucracy in the traditional intelligence model, creating a hierarchy of minimally five layers, each dependent on - or at least influenced by - the policy and rules of the preceding layer, has been widely recognized (McGonagle, 2007). How does the new grounded theory model of intelligence compare to this?

In the new intelligence model, some sort of systematic organization conforming to the definition of bureaucracy is necessary. However, there are only two levels of hierarchy, significantly reducing the threat of a counter-productive bureaucracy. The planning and budgeting activity is the top level. It is master and commander of the plotted course and directs all other eleven activities of the cycle. Some activities have to work with the output of the other but they are not subordinated to the processes providing the input. All activities are equal in rights and authority. Each activity can signal process performance issues to the process analysis activity which then balances requirements amongst activities to an optimal level. Hence, no one activity has undue dominance over the next.

**- No long term trends, technological and tactical intelligence?**

In contrast to the traditional model, which only focuses on user-articulated needs, usually on a strategic level, the new model of intelligence includes process needs and company needs on top of user needs when planning the priorities of the department. And who and how controls this? This puts long term trends and tactical intelligence back on the agenda as company needs. Since company needs are evaluated independent of user wants and needs, they do not require or depend upon the explicitly formulated demands of a user.

**- The user will get tired or too demanding?**

The three-year cycle of traditional intelligence programs is a reality. Since the grounded theory has provided a new model of structuring the process, it has yet to be proven that it is also subject to the same three-year issues as the traditional model. The new model is not completely dependent on the user articulating its needs, but also tries to guess the users needs proactively and balance them with the needs of the company. This puts a lot less stress on the users and reduces the effort necessary from them. If the new model is not completely freed of the three-year 'virus', the new model at least provides an improvement over the traditional model.

**- No guidance?**

In contrast to the traditional model - in which all activities are interlinked and interact with each other - the new model of intelligence provides a clear structure for the activities to be planned and executed. Activities are monitored by the process analysis activity. The process analysis, combining feedback from the various activities with perceived user and company needs, provides new input for the next cycle of coordination between activities through the planning and budgeting activity.

## 5.4 Conclusion on the differences with the traditional model

The grounded theory approach has generated a model which seems to remediate the flaws of the traditional intelligence model. The new model is much less bureaucratic in its organization, is useable for the implementation of intelligence products other than solely user-articulated strategic requests, puts less stress on the input of the user and finally provides clear guidance to the practitioner building up an intelligence capability within a company.

# Conclusions

## 6.1 Research conclusion

To conclude, the grounded theory methodology chosen for this research has proven to deliver its promises. Starting from no theory whatsoever, the inquirer has spent a total of 57 working days at Royal Vopak headquarters, gathering and analyzing data from multiple sources. This ultimately generated a grounded theory that satisfies the quality criteria of fit, relevance, workability and modifiability.

The first objective of the research was achieved by discovering the multiple processes directly responsible for identifying and satisfying intelligence needs related to the formulation and implementation of strategy within an organization. This was achieved by grouping the data into concepts, or sub-activities, which were subsequently grouped together under eleven general activity categories. Major discoveries were the activities of relationship management and of process analysis, which have never been included in previous intelligence models. The eleven activities identified have then been linked together in a coherent model called the intelligence process model. Two cycles of higher abstraction were identified: the implementation and collection cycle and the analysis and delivery cycle. Each cycle requires a different type of skill set.

By creating this innovative model, the second objective of the research is simultaneously satisfied, namely to characterize these processes with the terminology of systems theory. The new theoretical model of the intelligence process is hoped to be able to help explain variations in the nature and performance of the intelligence process for organizational settings different from the one at Royal Vopak.

Finally, the resulting model was confronted with traditional theories on intelligence. The conclusion of this is that the model has some major theoretical advantages over the classical model, which has been in use for over sixty years now. The new model is much less bureaucratic in its organization since no single activity has precedence over the other. Moreover, all activities are controlled in a holistic way by the process analysis and planning and budgeting activity. The model is also suitable for the implementation of intelligence products other than solely user-articulated strategic requests. It puts less stress on the input of the user, since company and process needs are equally important in driving the intelligence activity. Lastly, it provides clearer guidance to the practitioner planning on building up an intelligence capability within a company by dividing the intelligence process into two manageable cycles of eleven activities, for which it is deemed possible to create efficient and effective performance guidelines.

## 6.2 Research limitations

Every research has its limitations. The grounded theory that emerged from the data is based on the observations at one single company, Royal Vopak. And although internally valid, the model might not be externally valid or equally appropriate in other case settings. Testing for the model within other companies will confirm or disconfirm the model's validity and reliability.

Since the research was executed under sever time limitations, some more complex issues might not have come to the surface. Instead of a cross-sectional study, a longitudinal study within one or several companies would have been better for the reliability of the results.

Also, the model was the result of the interpretation of only one researcher, although aided by the feedback of the intelligence manager at Vopak and an expert consultant in the field of intelligence. Still, one could argue that the data might have been interpreted differently by another researcher.

Finally, it has to be said that the world class intelligence capability within Vopak is not very old. Set up in 2007, there is no proof yet that it will be a sustainable success. A common reason of failure for intelligence programs is that after three years or so, users get tired of formulating needs and giving feedback, ultimately choosing to ignore the possibilities for having intelligence products altogether. Since the current model does not depend solely on user-articulated needs there is cause to believe that the Vopak intelligence capability will not suffer this fate – although no guarantees are given.

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# Appendices

## Appendix A – Interview script

### Questionnaire Needs Analysis Business Intelligence

- Explain the purpose of the Needs Analysis
- Explain the role of Business Intelligence, show the deliverables, use the BI Business Plan
- What are for the interviewee the top 3 challenges for the next 2 years?
- How can the Business Intelligence contribute to realize these challenges?
- What do you think are the Critical Success Factors for Vopak now and in the future?
- What BI type information / reports do you already receive?

- What additional BI information / reports do you need to receive?
- What additional information / reports would you have loved to have had 6 months ago

- Regarding Vopak Intelligence Plaza, what additional requirements do you have?
- Regarding Competitor Intelligence, what additional requirements do you have?
- Regarding Product Flow Intelligence, what additional requirements do you have?
- Regarding Market Intelligence, what additional requirements do you have?
- Regarding Customer Intelligence, what additional requirements do you have?
- Regarding Major Trends, what additional requirements do you have?

- What strategic impact does CI deliver today?
- How does CI influence significant decisions?
- Intelligence culture improvements needed?
- How is intelligence mandated, sponsored?