

# *In search of high quality funds*

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Amsterdam, the Netherlands  
November 2009

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## Management summary

This research was conducted at Investment Products department (IPD) of ABN AMRO business unit the Netherlands (BUNL). One of IPD's responsibilities is to offer an attractive assortment of investment products to the retail clients. The idea is that this will result in a higher service level. But the IPD acknowledged that there were some shortfalls in offering an attractive assortment due to the lack of insights in the assortment. Therefore, this research explains 2 approaches on how IPD can offer its assortment to the clients. The first one is through the transaction proposals given to the clients, to switch from one fund to another that will give them in the bank's opinion a better performance outlook and/or risk spread. The second one is through the ABN AMRO Internal Market Funds (AIMF), which consists of around 300 funds. The clients do not have to pay custody fee, and also get a reduction in the transaction costs. The scope of this research is to analyze the process of transaction proposals which results in recommendations, and to construct an information system tool "Funds-Tool", to give more insights in the assortment of the AIMF.

### The transaction proposal

Through individual interviews with the stakeholders, the process was mapped out. There were two different procedures to generate transaction proposals: from the Investment-Desk and from the Investment Advisory Center (IAC). Next, a SWOT analysis was conducted and the following weaknesses were identified:

- *The client-advisors are not using the transaction proposals proactively to their clients.*
- *IAC has not enough capacity to check the suggestions sent by the Investment-Desk adequately on short notice.*
- *The time to market for the transaction proposals from IAC is too long.*
- *The Investment-Desk does not have access to the information it need to check whether a fund is commercially attractive.*

Next, the evaluation perspectives were derived from what the stakeholders see as desired situation and literature about the quality of process and the quality of advice:

- *Advice should come from the department with most experienced and knowledgeable specialists.*
- *All the client-advisors should analyze their clients' portfolio in order to see whether the client qualifies for a certain transaction proposal.*
- *Monitor the quality of the process.*
- *Process-based organization.*
- *Client orientation.*
- *The information ownership and stewardship responsibilities should be assigned to key executives.*

Furthermore, the following recommendations were proposed based on the SWOT analysis and the evaluation by the perspectives:

- *Analyze how to increase the commitment of client-advisors to the transaction proposals.*
- *The AA Advisors are the most experienced and knowledgeable specialists for investment funds within ABN AMRO. Thus, we recommend to incorporate the AA Advisors in the process.*
- *Incorporate IPD in the process.*
- *Monitor the performance of funds proposed in the transaction proposal.*
- *Reorganize the process where all the steps in the process have added value for the client; the process should have a clear initiation and end point; information ownership and stewardship responsibilities should be assigned to key executives. We suggest the optimal process given in the next paragraph.*

Based on the recommendations, we suggest the following optimal process, which should always include the IAC, AA Advisors and the IPD. First, the IAC checks whether the proposal is in accordance with its investment policy. Then AA Advisors select the best funds. Next, IPD checks whether the funds is in accordance with its assortment management. Furthermore, the initiation point should be triggered by the department with the most knowledge and insight about the specific trigger:

- *When the Joint Investment Committee changes the investment policy on asset class level, the IAC should initiate transaction proposals on product level.*
- *When AA Advisors see opportunities in the market in which ABN AMRO clients can utilize it; or when a key manager leaves the management of a certain fund and AA Advisors' opinion is that this will influence the fund's performance.*
- *When client-advisors observe some increased interest from clients in a certain theme or category of funds, they can send their finding to the Investment-Desk.*

### **The construction of the Funds-Tool**

In order to construct the Funds-Tool successfully, the System Development Life Cycle (SDLC) was followed. To recognize the need of the system users, a meeting was organized with the product managers of the IPD. They were asked to come up with properties they want to know. The needs can be divided into 5 main groups of properties:

- *Categorization: the funds should first be assigned to an asset class and then to a category; every asset class has different categories, which is mainly either a region or a sector.*
- *Performance measure: total return, volatility, beta, Sharpe ratio, Sortino ratio, Treynor ratio.*
- *ABN AMRO quantities: number of clients within ABN AMRO investing in a certain fund and the value of the invested amount.*
- *Product trend analysis: the historical development of the price and the ABN AMRO quantities.*
- *Transaction proposals: monitoring the performance and the capital in- or outflow of the advised funds.*

Next to the usefulness of the information produced by the Funds-Tool, the success of the system depends also on other critical factors. Therefore, the information system designed for the structured products was analyzed. The lessons learned from this system and the critical success factors derived from the literature were combined and taken into account by the construction of the Funds-Tool.

After the Funds-Tool was built, the tool was presented to the product managers and they came up with a number of suggestions for improvement. These suggestions were incorporated in the tool. Then a user guide and a maintenance guide were written. The product managers were asked to work individually with the tool and the user guide, to identify the bugs and inefficiencies in the system, which were corrected. Finally, they were asked to give their opinion whether the Funds-Tool generate the desired insights and meets the critical success factors. The Funds-Tool is received well by the product managers. The average score is 4,48 out of 5. Only 2 criteria have a score less than 4. The first one is the insights in the transaction proposals. Because transaction proposals also include other securities than only funds, it is better to measure the performance in a separate system. The second one is the tractability: the extent whether the system facilitates problem solving and future system development. The tractability stays a weak point and it cannot be improved in the current system environment.

ABN AMRO has already used the insights generated by the Funds-Tool. The bank decided to add 37 new funds to the assortment of AIMF, and delete 108 in the long term.

## Preface

This thesis is the final assignment of my master study Financial Engineering and Management at the University of Twente in the Netherlands. It is written in the context of an internship assignment at Investment Products department of ABN AMRO. In this section I would like to thank a number of people who supported me during my time at ABN AMRO and gave a valuable contribution to the end result of my graduation assignment.

In the first place, I want to thank my colleagues at Investment Products Department for their collegiality. I have had a good time at the department and I owe a lot to them for my professional growth during this period; especially my supervisor at the department, Servaas van der Eerden. During our private meetings, he helped and motivated me in developing my professional skills. I particularly, appreciate his trust in my capacities. Next, I want to thank Thomas Bunnik for his close cooperation in developing the Funds-Tool. I admire his desire to improve the current situation and his affection for the field of investment. My gratitude also goes to Bernard Glijnis. I appreciate our collaboration in developing many management reports and his sharp suggestions during the development of the Funds-Tool. I also want to mention my fellow intern, Daniel Cramer, who put effort in improving my writing.

In addition, I am very thankful for my supervisors from the University Twente, Toon de Bakker and Emad Imreizeeq. Next to his valuable feedback, Toon was also much interested in me personally and my future plans, which I appreciate. I am enormously thankful for the guidance of Emad during the first phase of the project when we got stuck. I have much respect for his sharp comments and his scientific way of looking at my assignment. The quality improvements of this thesis owe much to Toon and Emad.

The end of this assignment also marks the end of my student life. I am very thankful to God for the opportunity and skills to study. As I look back through these 5 years, I got much freedom to develop myself, met a lot of lifetime friends and underwent many experiences. I want to thank friends and family for their contribution.

With much expectation I look forward to the next phase of my life.

Zhu-Ming Jiang

November 2009

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## Abbreviation

ABR	ABN AMRO Beleggingsrekening
AIMF	ABN AMRO Internal Market Funds
AUA	Asset Under Administration
BU	Business Unit
BUNL	Business Unit Netherlands
CAPM	Capital Asset Pricing Model
CSC	Commercial Steering Committee of the Product Development Process
DPM	Discretionary Portfolio Management
IPD	Investment Products department
JIC	Joint Investment Committee
MPSP	Managerial Problem-Solving Method
NAV	Net asset value
PC Global	Business Unit Private Clients Global
PCNL	Business Unit Private Clients Netherlands
PSC	Product Steering Committee
SC	Support center
SDLC	System Development Life Cycle
UTP	Uniform Transaction Proposition
VC	Value center

## Main definitions

- *Volume*

Price multiplied by the number of shares within BUNL or ABN AMRO.

- *Transaction proposal*

These are proposals where the clients get advice in switching from one fund to another fund that will give them in the bank's opinion a better performance outlook.

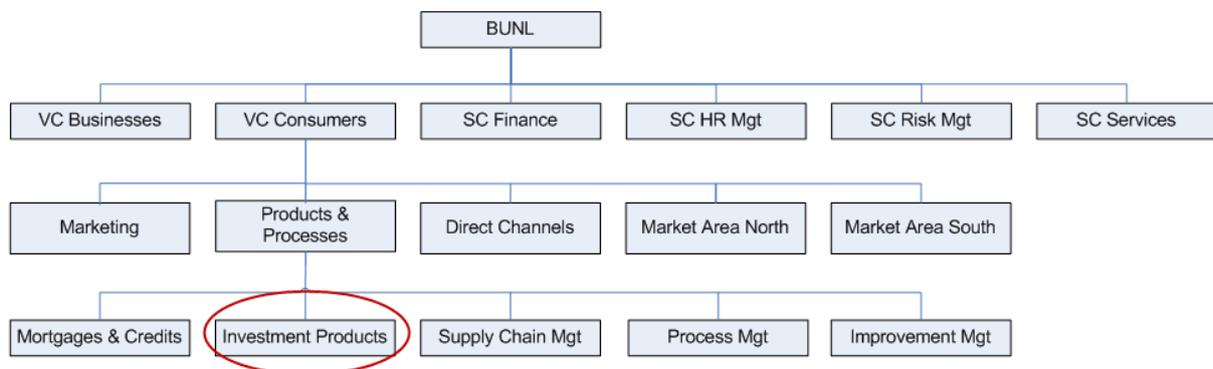
# 1. Research design

This first chapter gives an outline how this research is conducted. After an introduction of ABN AMRO and the problem, the problem definition is formulated together with the research questions and objectives. Next follows the scope, report structure, summary of this chapter and the scheme for the report.

## 1.1. Introduction

### 1.1.1 ABN AMRO Investment Product department

ABN AMRO Business Unit Netherlands (BUNL) is part of ABN AMRO N.V. The business unit focuses on all the activity of ABN AMRO in the Netherlands except for the Private Clients and Global Clients (Multinationals). The BUNL is an independent business unit. It is build up of 2 value centers (VC) and 4 support centers (SC). The value centers provide financial services to the clients and the support centers support the value centers with their area of expertise. In figure 1.1 is an overview of all the centers.



**Figure 1.1: organizational structure BUNL**

In 2008, BUNL had an operating income of 4,078 billion Euros, a profit of 306 million Euros and more than 20,000 employees. BUNL and business unit Private Clients Netherlands (PCNL) are the only two business units who made a profit in 2008, both are owned by the Dutch government. The focus within this report is in the Investments Products department (IPD). IPD is a department of Products & Processes under VC Consumers. The department is responsible for the policy and strategy in the area of investment products. Within this area, the focus is on the development and implementation of innovative investment concepts and product solutions. The department is also responsible for the assortment management of the investment products and the price policy.

### 1.1.2 Background of the problem

After a rough period for ABN AMRO, the government nationalized its Dutch activities in October 2008. This does not include ABN AMRO Asset Management. This business unit is responsible for the management of all the former ABN AMRO investment funds, with 180 billion Euros under administration (Website Morningstar) and owned by BNP Paribas. Now that ABN AMRO does not have its own investment funds anymore, the opportunity arises to become the independent broker; the idea is to create additional added value for the clients by selecting the best investment funds worldwide and advice them to the clients independently.

One of the IPD's responsibilities is to offer an attractive assortment of investment products to the clients. An attractive assortment is defined as a broad range of products, and each product is according to the bank's opinion best performing in their category due to the most recent market developments. The idea is that offering an attractive assortment will result in a higher service level; consequently causing the clients to stay at ABN AMRO and maybe even invest a further portion of their capital. But the IPD acknowledges that there are some shortfalls in offering an attractive

assortment due to the lack of insights in the assortment. Thus IPD started a project in order to make the assortment more attractive and take advantage of the independent position. A previous research focuses on the assortment of structured products (Spanjer, 2009). This research is especially focused around the question of how the IPD can offer an attractive assortment of **investment funds**.

## **1.2. Research objectives**

There are two approaches how IPD can offer its assortment of funds to the clients. The first one is by identifying the opportunities for **transaction proposals**. These are proposals to the clients to switch from one fund to another that will give them in the bank's opinion a better performance outlook. Its aim is that the client can utilize the knowledge of specialists within the bank. The proposals are important because they are also used to implement certain investment policy, for example to have more exposure to equities and less to bonds because of the bull market view. Furthermore, they supply the client with product updates due to the current market circumstances. The proposals can also increase the trading of investment funds which will result in more transaction fees for the bank. Because transaction proposals are an important way to give the client product updates, and the process has been set up only recently (since March 2009), it is useful to evaluate this process.

The second one is by providing attractive and balanced assortment of investment funds through the **ABN AMRO Internal Market Funds (AIMF)**, in Dutch ABR: ABN AMRO Beleggingsrekening). The AIMF consists of around 300 investment funds of different categories, selected as best from thousands funds. The clients get a reduction in the transaction costs when they trade through the AIMF, and clients do not have to pay custody fees. More details are given in section 3.4. In order to provide transaction proposals to the clients and offer an attractive mix of funds in the AIMF, insights in the investment funds is needed. These insights are important for ABN AMRO in order to implement any kind of policy on investment funds. For example if ABN AMRO gives the advice to have less exposure to North America and more in Europe, the advice cannot be implemented if there is no insights in which funds are investing in North America and Europe. Another issue is the management of the assortment of investment funds. For example if ABN AMRO offers many investment funds from the same category, but there is not much money invested by the clients, then the number of funds can be reduced. IPD acknowledges this lack of insights. Therefore an information system is needed, where the product managers can get insights in the assortment of investment products. The goal of this information system is to provide information for decision making and steering of the assortment of investment funds.

Therefore this research is separated into two parts. The first part is the evaluation of the process of transaction proposal, which results in recommendation for improvement. Based among these recommendations we construct an information system in the second part, which will contribute in recognizing opportunities for the transaction proposals and in managing an attractive mix of AIMF funds.

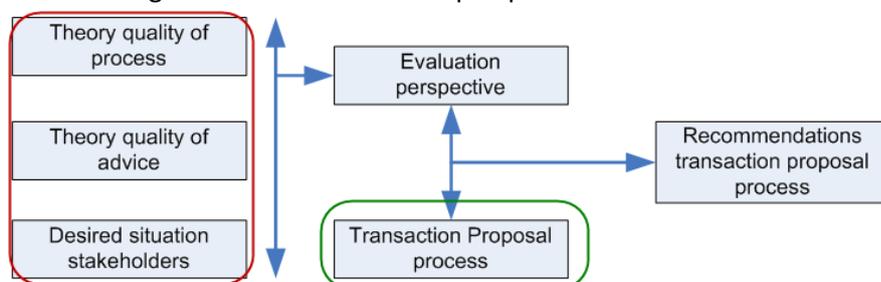
The objective of the research assignment is therefore in twofold:

1. *Make recommendations for improvement about the process of transaction proposal.*
2. *Design an information system which will give the product managers of IPD insights in the assortment of investment products offered by ABN AMRO.*

## **1.3. Research framework**

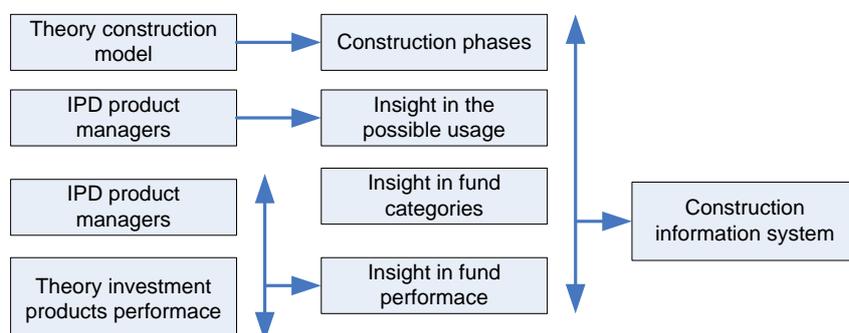
According to Verschuren and Dooreward, (2000) it is useful to come to a general understanding of different steps that need to be taken in order to realize the objectives. A practical way of gaining this understanding is by drawing up a research framework. A research framework is a schematic representation of the research objectives and includes the approximate steps that need to be taken in order to realize the objectives.

The first objective is to give recommendations about the process of transaction proposal. In order to do so, we need to analyze the research object: the process of transaction proposal. We evaluate the process according to some **perspectives**. The evaluation perspectives are based on what the stakeholders see as desired and the theory about the quality of the process and advice. The steps that have to be taken are depicted in figure 1.2. The current situation of the transaction proposal is encircled in green and the evaluation perspectives are encircled in red.



**Figure 1.2: research model objective 1**

The second objective is to construct an information system which will contribute in recognizing opportunities for the transaction proposals and manage an attractive assortment of AIMF funds. To reach the objective, first theory is searched about the phases we have to take in constructing the information system. Then through interviews with product managers of IDP, the possible usage and the need for insight in the investment funds are mapped out. The next step is to determine the categorization and performance measures that meet the insights. Finally all the components are integrated into the information system. The steps are shown in figure 1.3.



**Figure 1.3: research model objective 2**

### **1.4 Central questions and research questions**

In order to reach objective 1, the following central and research questions need to be answered:

- *Which perspectives are important for the evaluation of the transaction proposal process?*
  - *Which perspectives can be derived from the scientific literature about quality of a process?*
  - *Which perspectives can be derived from the scientific literature about quality of advice within the financial industry?*
  - *Which perspectives can be derived from what the stakeholders see as desired situation?*
- *How will the transaction proposal process be evaluated by the appointed perspective?*

In order to reach objective 2, the following central and research questions need to be answered:

- *What are the phases derived from the scientific literature about constructing an information system?*
- *What are the situations in which the product managers need more insights in the assortment of investment funds?*
- *What are the relevant investment funds categories?*
- *Which properties of the investment funds are relevant in order fulfill the appointed insights?*
  - *What are the relevant properties of investment funds derived from scientific literature?*
  - *What are the relevant properties of investment funds according to the product managers?*
- *What are the indicators that determine the success when the information system is implemented?*

### **1.5 Scope**

The objects being researched are the transaction proposal process and the assortment of investment funds. The sources used to reach the objectives are employees of ABN AMRO, documents available within ABN AMRO and the scientific literature. The IPD has a Bloomberg Terminal which provides live performance data for all kind of securities. On the Bloomberg Terminal, live data can be uploaded in Microsoft Excel. In order to utilize the facilities available, Microsoft Excel integrated with Bloomberg is chosen as the application platform for our information system. We choose IPD as our problem owner. This also implies that the focus is on the head office and not on individual client contacts. But nevertheless, we keep in mind that the activities that IPD performs should have added value for the clients.

### **1.6 Report structure**

The buildup of the report is as follows. The first chapter discusses the research approach. Chapter 2 gives an overview of the used scientific literature. Chapter 3 set out the current practice about the process of transaction proposal and the desired situation. In order to design the information system, the System Development Life Cycle (**SDLC**) is followed; Chapter 4 and 5 describe the first two steps of the SDLC, system analysis and conceptual design respectively. Finally chapter 6 gives the conclusions and recommendations.

The list below explains how the steps in the SDLC are documented in this report.

1. *System analysis: this step is described in chapter 4.*
2. *Conceptual Design: this step is described in chapter 5.*
3. *Physical Design: this step is an executing step and no documentation is needed.*
4. *Implementation and Conversion: this step is described in chapter 6.*
5. *Operation and Maintenance: this step should take place in the future.*

## 2. Literature review

In this chapter, the literature used in this research is set out. Section 2.1 and section 2.2 describe the literature derived to evaluate the process of transaction proposals. Section 2.3 set out the steps that could be followed in order to construct an information system, and the critical success factor of such system. Then the literature about how to compare the performance of funds is given in section 2.4. The performance measures described are used in the information system.

### 2.1 Quality of process

#### 2.1.1 Business Process Reengineering (BPR)

By means of Business Process Reengineering (BPR), many business processes were renewed in recent years. In the most pure form, BPR is according to Kallio et al. (1999) radical changes of the whole business. But they conclude that the radical changes were not discovered. The focus of the projects studied has obviously been mainly operational and has created performance improvements on current working processes. The lessons learned in these projects are taken into account to form the evaluation perspectives for quality of process:

- *Radical change: Reengineering literature advocates radical change as opposed to small incremental steps (Hammer, 1990; Venkatraman, 1991). BPR projects attempt to question and usually abandon, or even obliterate, old ways of operating and replace them with less hierarchical organizational structures and team-based work arrangements. This often leads to many simultaneous changes, not only in organizational structures, but also in individual tasks, required skills and responsibilities.*
- *High potential business benefits: In addition to quantitatively measurable and explicit performance improvements, BPR often leads to additional benefits creating opportunities for future success. These may include improved customer satisfaction, increased flexibility and better information and control of both internal work processes and customer behavior.*
- *Process-based organizations: Reengineering literature also argues that the organizations employing functional specialization and structures have too narrow perspectives and are not flexible enough to succeed in the current turbulent business environment. Solution to these problems is to arrange the work cross-functionally along the natural flow of work resulting in organizations based on core business processes, shared information and objectives.*
- *Customer orientation: The objectives of reengineering should be based on the needs of the customer, which can be internal or external to the company. Every step of the business process should be designed to concretely add value to the customer (Hammer, 1990).*

#### 2.1.2 Process Innovation

In more and more businesses, the end product is a unit of information, for example insurance policy, consulting report, stock transfer, legal brief or movie. According to Davenport (1993), these end products are unlikely to have been viewed and managed as processes. No one knows where they start or end, or even how their performance should be measured. Those who perform such activities, usually professionals, are however unlikely to view their work in process terms, and often there is no vision of how the process will be performed in the future. Davenport's main conclusions on this subject are used to form the evaluation perspectives of good process:

- *Process-based organizations: view and manage the end product, in our case the transaction proposal, as a process. Arrange work along the natural flow of work of work.*
- *Process performance monitoring: quality cannot be improved without knowing the quality of existing activities.*
- *Information ownership to key executives: assign information ownership and stewardship responsibilities to key executives is more effective than to form information functions.*

## 2.2 Quality of Advice

Oehler and Daniel (2009) wrote about the financial advice of retail banks using the Perspective of Information, Principal-Agent Theory and Behavioral Economics. Their conclusion is that there is no functioning quality competition with regard to the core qualities of financial advice that could lead to a strong position of the customer, and there is no regulation which can assure this. Within the retail banking area there are information and interest asymmetries between the client and the advisor, which will give high probability that the advisor capitalize on the client's information disadvantage. The quality properties of financial advice given by Oehler and Kohlert (2009) are used as evaluation perspectives of quality of advice:

1. *Information collection: whether the advisor is gathering all information necessary to allow for custom-tailored recommendations.*
2. *Information: whether the advisor is providing all the information the clients need for their investment decision.*
3. *Recommendation: whether he is effectively giving custom-tailored recommendations.*

## 2.3 Constructing information system

### 2.3.1 System Development Life Cycle (SDLC)

Romney and Steinbart (2003) propose a five-step process as a guideline for system development of large Accounting Information System, known as the System Development Life Cycle (SDLC). The five steps are used as guideline to construct our information system. The steps are as follows:

1. *System analysis: during this step, the information needed to develop a new system is gathered. The current problems, the reasons for the change and the proposed system's objectives are determined and documented. The most important part of the system analysis is to identify the information needs of system users.*
2. *Conceptual Design: during this step, we decide how to meet user needs and translate these needs into requirements.*
3. *Physical Design: during this step, requirement of the conceptual design are used to create databases, files, procedures and programs.*
4. *Implementation and Conversion: during this step, standards and controls for the new system must be established and system documentation completed. Any fine-tuning adjustments needed are made and a review is conducted to detect and correct any design deficiencies.*
5. *Operation and Maintenance: during its life, the system is periodically reviewed. Modifications are made as problems arise or as new needs become evident.*

### 2.3.2 Success factors of information systems

Next to the system requirement there are other factors that influence the success of an information system. The developers should keep these factors in mind through all the steps of the SDLC. Romney and Steinbart (2003) have identified the following factors:

- *Usefulness: information produced by the system should help users in decision making.*
- *Economy: the benefit of the system should exceed cost.*
- *Reliability: the system should process data accurately and completely.*
- *Ease of use: the system should be user-friendly.*
- *Flexibility: the system should accommodate reasonable system requirements changes.*
- *Tractability: the system should be easily understood by the users and facilitate problem solving and future systems development.*

## 2.4. Investment funds

In this section literature is discussed about how to compare the performance of funds with each other. The performance measures discussed in this section are readily available by Bloomberg (see section 5.1 for an explanation of Bloomberg). In appendix D, we explain how Bloomberg calculates these performance measures.

### 2.4.1 Closed-end or open-end investment funds

An investment fund is a portfolio of different kinds of asset bought with money of different investors. The return of a portfolio of assets is equal to the weighted sum of the corresponding individual assets, with the weight of an asset being its relative weight in purchase cost in the portfolio. Suppose there are  $n$  securities in the portfolio. The portfolio return can be defined as follows (Luenberger, 1998):

$$\sum_{i=1}^n w_i = 1$$
$$E_p = \sum_{i=1}^n w_i r_i$$

Where  $w_i$  is the weight of security  $i$ ,  $r_i$  is the return and  $E_p$  is the return of the portfolio.

There is an important difference between other securities and **open-end** investment funds: while the price of securities like bonds and stocks is determined by the supply and demand, the price of an open-end investment fund is determined by the value of all the assets within the portfolio. This weighted value of all the assets within a fund divided by the number of shares in the fund, is called the net asset value (NAV) and for most investment funds determined once a day. A **closed-end** fund will liquidate at some determined date. The price of the closed-end fund is determined by the market through supply and demand. An open-end fund does not have a liquidation date and the price is determined by the NAV.

### 2.4.2 Total return

Probably all investment funds have securities that pay either dividend or coupon. The fund itself can choose to pay out dividend on a regular basis, called **distributing fund**, or to reinvest all the dividends and coupons in the fund and thus pays no dividend, called **accumulating fund**. In order to facilitate performance comparison between these two different funds type, the **total return** is used. For accumulating fund the total return is:

$$\frac{\text{current value} - \text{amount invested}}{\text{amount invested}}$$

But for distributing funds, we presume that the dividends received will directly be reinvested in the fund, thus creating the same conditions as the accumulating funds. By doing this, the movement of the NAV has consequences for the dividend. For example if the NAV goes up, this dividend will go up too. If the NAV goes down, the dividend will also shrink.

### 2.4.3 Volatility

The volatility  $\sigma$  is defined as the standard deviation of the return per unit of time (Hull, 2007):

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2}$$

Where  $N$  is the number of period,  $x_i$  is the return of the asset in period  $i$  and  $\bar{x}$  is the average return. Depending on the unit of time of period  $i$ , the standard deviation of the desired unit of time can be calculated by  $\sigma\sqrt{T}$ . In financial market, the volatility is expressed as percentage of the average return and the annual volatility is used (Alexander, 2001):

$$\text{Annual volatility} = (100\sigma\sqrt{T})\%$$

For example the unit of time of period  $i$  is 1 week, and the volatility is 4,16%. The volatility per year is then:

$$4,16\% \times \sqrt{52} = 30\%$$

### 2.5 Return versus risk

In order to have an effective and fair comparison between portfolios we need to consider both risk and return characteristics. If one only considers return then too much capital would be allocated to a high-return but high-risky activity, and if one only considers the risk then too little capital would be allocated to the same activities (Alexander, 2001). The next sections show how we can incorporate both risk and return from the portfolio theory.

#### 2.5.1 Beta of the Capital Asset Pricing Model

One of the fundamental questions in finance is how risk of an investment should affect its expected return. The Capital Asset Pricing Model (CAPM) provided the first coherent framework for answering this question. It was developed in the 1960's by William Sharpe, Jack Treynor, John Lintner and Jan Mossin (Perold, 2004). The model is based on the following 4 assumptions:

- *The investors are risk averse and evaluate their portfolio only in terms of expected return and standard deviation.*
- *There are no transaction costs, short selling restrictions or taxes; information is costless and available to everyone; and all investors can borrow and lend at the risk-free rate.*
- *The investors all have access to the same investments opportunities.*
- *The investors all make the same estimates of expected return, standard deviation of return and the correlations among asset returns.*

According the CAPM, the expect return of an asset can be expressed as follows:

$$r_i = R_f + \beta_i(E_m - R_f)$$

Here,  $r_i$  is the return of asset  $i$ ,  $R_f$  is the risk free interest rate,  $E_m$  is the return of the market portfolio and  $\beta_i$  is the sensitivity of the asset  $i$ 's return to the return of the market portfolio. According to Sharpe (1970), the beta can then be defined as follows:

$$\beta_i = \frac{\rho_{im}\sigma_i}{\sigma_m}$$

In this equation,  $\rho_{im}$  is the correlation coefficient between the return of asset  $i$  and the return of the market portfolio  $m$ ;  $\sigma_i$  and  $\sigma_m$  are the standard deviation of return of asset  $i$  and of the market portfolio respectively. The beta offers a method of measuring risk of an asset that cannot be diversified way, in other words, the beta measures the systematic risk. It measures the volatility of the asset's rate of return relative to the changes in the market rate of return. An asset with a value of  $\beta_i$  below 1 is said to be defensive. A 1% increase in the market rate of return is likely to be accompanied by a less than 1 percent increase in the asset's rate of return. On the other hand, a 1% decrease in the market rate of return is likely to be accompanied by a less than 1% decrease in the

asset's return. The smaller the value of  $\beta_i$ , the greater his defense. On the contrary, an asset with a value of  $\beta_i$  above 1 is said to be aggressive. The larger the value of  $\beta_i$ , the more aggressive the asset.

### 2.5.2 Efficient portfolio

According to Sharpe (1970) portfolio theory involves decision making under conditions of risk. The desirability of a portfolio is expressed by the values of  $E_p$  and  $\sigma_p$  which are defined as follows:

$$E_p = \sum_{i=1}^n w_i r_i$$

$$\sigma_p^2 = \sum_{i=1}^n w_i [(r_i - E_p)^2]$$

Where  $w_i$  is the weight of security  $i$ ,  $r_i$  is the return,  $E_p$  is the return of the portfolio, and  $\sigma_p$  is the standard deviation of the portfolio return. This theory assumes that an investor chooses portfolios with the following rules:

- If two portfolios have the same standard deviation of return and different expected returns, the one with the larger expected return is preferred.
- If two portfolios have the same expected return and different standard deviations of return, the one with the smaller standard deviation is preferred.
- If one portfolio has a smaller standard deviation of return and a larger expected return than another, it is preferred.

Basically the portfolio theory assumes that investors like  $E_p$  and dislike  $\sigma_p$ . From this we can draw the indifference curve as in figure 2.1:

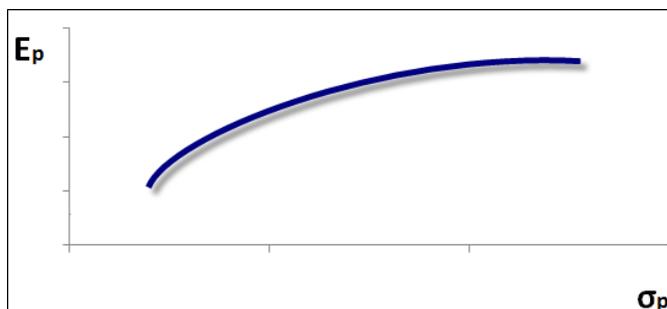


Figure 2.1: the indifference curve

Every portfolio that is designated below the blue line is considered to be inferior. Every point on the blue line is equally preferred, thus the preference in the points on the blue line is indifferent. The portfolios that reside on this line is said to be an efficient portfolio and the blue line is called efficient frontier (Sharpe, 1970).

### 2.5.3 The Sharpe ratio

In 1966, W.F. Sharpe (1994) introduces a measure for the performance of funds, the reward-to-variability ratio, which is frequently called the Sharpe Ratio. Since then, the measure gained considerable popularity. The ratio is just excess return divided by the standard deviation. Let  $E_p$  be the return of the portfolio,  $\sigma_p$  be the standard deviation of the portfolio return and  $R_f$  be the risk free interest rate. The Sharpe ratio is then:

$$\text{Sharpe Ratio} = \frac{E_p - R_f}{\sigma_p}$$

Sharpe (1994) chooses the excess return deliberately. It becomes clear in the following example. Let us consider the following three investment opportunities:

- *Fund A has an expected return of 5% and a standard deviation of 10%.*
- *Fund B has an expected return of 8% and a standard deviation of 20%.*
- *The risk free interest rate is 3%.*

If we use the return divided by the standard deviation, it becomes clear that A ( $5/10=0,5$ ) is better than B ( $8/20=0,4$ ). But if we use the Sharpe ratio, then B ( $(8-3)/20=0,25$ ) is better than A ( $(5-3)/10=0,2$ ). Let us consider that we have an investor that wants to attain a standard deviation of 10%. This can be achieved with fund A, which will provide an expected return of 5%. It can also be achieved by investing 50% in B and 50% in the risk free asset. The latter portfolio will provide an expected return of 5,5%. According to the portfolio theory of section 2.4.4, the latter (B) will thus be preferred over A.

By using the Sharpe Ratio we make a number of assumptions. It is based on the Capital Asset Pricing Model (CAPM) (Luenberger, 1998), assuming normality in return distributions. In reality returns of portfolios are not strictly normal distributed. In order to overcome this predicament, asymmetrical parameter-dependent performance ratios have been proposed in the literature. Farinelli et al. (2008) conducted a research using different ratios to determine the optimal asset allocation. The result is that many ratios like Generalized Rachev and Sortino-Satchell did outperform the Sharpe Ratio. Because the Sortino Ratio and Treynor ratio are readily available in Bloomberg, they are explained below. They will be used in our information system.

#### 2.5.4 Sortino ratio

According to Chaudhry and Johnson (2008) the Sharpe ratio implicitly assumes that investors are indifferent to upside and downside risk. If the distribution of excess returns is symmetric this will make no difference to the performance estimate. But Bawa and Lindenberg (1977) suggest that underperformance to a certain benchmark is a more appropriate measure of risk. If the excess returns are positively skewed (see figure 2.2), this will increase the standard deviation and thus reduce the Sharpe ratio, whilst the risk of significantly underperforming the benchmark is lower relative to a symmetric or negatively skewed distribution. As a result, a given fund manager will be penalized for obtaining high excess returns. Conversely, a negative skewed distribution of excess returns will have a higher probability of obtaining a large negative return relative to the benchmark with limited upside potential. Therefore Sortino and Price (1994) suggest that if there is a minimum return that must be earned to accomplish some goal (the minimal acceptable return (MAR)), then any returns below the MAR will produce unfavorable outcomes. Any returns greater will conversely produce favorable outcomes. Risk is associated only with bad outcomes, therefore, only returns below the MAR are associated with risk. As a result, the Sortino Ratio was developed, which estimates the average excess return relative to the downside deviation.



Figure 2.2: positively and negatively skewed distribution

Then the Sortino ratio is defined as follows:

$$DD^2 = \frac{1}{N} \sum_{t=1}^N (r_t - MAR)^2 I(x)$$

$$\text{Sortino ratio} = \frac{E_p - MAR}{DD}$$

Where:

- *DD* is the downside deviation.
- *N* is the number of returns below *MAR*.
- $r_t$  is the return at time *t*.
- *MAR* is the minimal acceptable return.
- $I(x)$  is a Boolean logic where  $x = (r_t - MAR)$  and  $I(x) = \begin{cases} 0 & \text{if } x > 0 \\ 1 & \text{if } x \leq 0 \end{cases}$ .
- $E_p$  is the return of the portfolio.

### 2.5.6 Treynor ratio

The Sharpe ratio is based on the total risk of an investment (Pilotte and Sterbenz, 2006). Its use is most appropriate when an investor want to place all or nearly all his wealth in one security or portfolio. When an investor is considering the addition of an investment to a well-diversified portfolio, the Treynor ratio is more appropriate, because it is based on systematic risk. The Treynor ratio (1965) evaluates the investment performance by comparing the expected excess return to the expected systematic risk of the asset. The Treynor ratio can be expressed as follows:

$$T_i = \frac{r_i - R_f}{\beta_i}$$

Where  $T_i$  is the Treynor ratio for asset *i*,  $r_i$  is the return of asset *i*,  $R_f$  is the risk free interest rate and  $\beta_i$  is the return beta of asset *i* as described in section 2.4.4. The higher the Treynor ratio, the better the performance under analysis.

## 2.6 Chapter summary

In this chapter, the literature used in this research was described. We found the following literature:

- *Perspectives for quality of process*
- *Perspectives for quality of advice*
- *The System Development Life Cycle as guideline to construct the information system*
- *The success factors of information system*
- *Performance measures to compare investment funds:*
- *Total return*
- *Volatility*
- *Beta*
- *Sharpe ratio*
- *Sortino ratio*
- *Treynor ratio*

### 3. Transaction proposal: current and desired situation

In order to come to the recommendations, first the stakeholders of the transaction proposal are set out. Then the current workflows are mapped out. Through individual interviews with the stakeholders, a SWOT analysis is conducted. Next, the desired situation is derived from interviews with stakeholders and from the literature to evaluate the current situation. In chapter 6, the recommendations are given.

#### 3.1 Stakeholders

Before going further in the process, we need to explain the other important stakeholders. This is needed for better understanding of the next sections. There are 5 important stakeholders:

- *Clients*

The transaction proposals are made for the clients that have the investment form “Investment Advice” or “Fund Advice Preferred Banking” (see appendix A for an overview of the investment forms); with an investment capital of at least € 100.000 and € 50.000, respectively. From the client point of view, the transaction proposals should result in better performance and or more risk spread to their portfolio. But because the time limit and the scope of this research, the clients are not interviewed.

- *Investment Advisory Center (IAC)*

The backbone of ABN AMRO’s investment advice is the IAC. At the heart of which is a group of experienced and knowledgeable specialists and analysts, drawn from across the globe. The IAC monitors markets across the globe, providing macro overviews, market outlooks, strategic and tactical asset allocation recommendations, and fact-based analyses of all kinds of securities. The IAC also determines the investment policy, which is binding for the advice to the clients. The IAC is an investment research center for private clients. This is unique in Europe, most other investment research center focus on professional parties. The investment policy of the IAC focuses on the clients from PCNL. Then the policy is translated to retail clients from BUNL.

- *AA Advisors*

AA Advisors is an independent operating subsidiary of ABN AMRO and it is an investment funds’ specialized research and selection center. It is settled in Paris and selects from an objective point of view the best performing investment funds from asset managers on a global basis known for their quality.

- *Investment-Desk*

The Investment-Desk is part of the Sales department within BUNL. The department performs mainly supporting activities for the regional offices throughout the Netherlands. It offers training for the client-advisors and makes the policies on different area practicable for the regional offices.

- *Client-advisors*

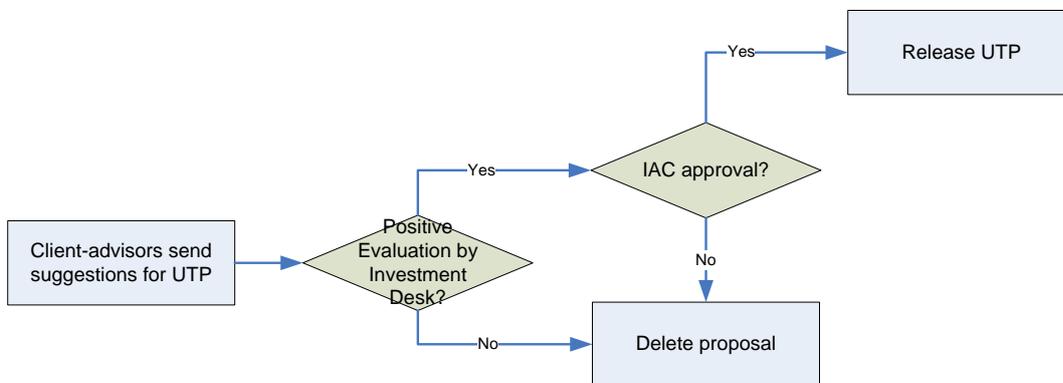
The client-advisors are the front-end employees that will interact directly with the clients. The frequency of meetings between the client-advisor and the client depend on the investment form and the client’s capital. The client-advisors are spread throughout the Netherlands in regional offices.

#### 3.2 The process of transaction proposals

The purpose of transaction proposals is to give clients the chance to switch to another fund that has a better performance outlook - in the bank’s opinion. The proposals are also used to implement certain investment policy, for example to have more exposure to equities and less to bonds because of the bull market view. The transaction proposals are used by the client-advisors to advise the clients. There are 2 different procedures to generate transaction proposals.

- *Procedure 1: from the client-advisors and the Investment-Desk*

In order to facilitate the exchange of good ideas for transaction proposals between the regional offices, the Uniform Transaction Proposal was (UTP) set up in March 2009. The goal is to translate the market circumstances into transaction proposals so that the client can utilize it. The proposals advise the client to switch from one fund to another in the same category (NB: the funds are classified in asset classes and every asset class has different category, see section 5.2). The UTP is released once every two weeks. Client-advisors can send their suggestions for UTP to the Investment-Desk. The Investment-Desk evaluates the suggestions by whether they are commercially attractive: whether the securities have enough volume within BUNL. If there is not enough volume, especially for the security where the advice is to sell it, then the cost in setting up this UTP will exceed the benefit. Next the Investment-Desk selects the best suggestions and makes the argumentation for the proposal. Then the Investment-Desk sends the proposals to the IAC. The IAC checks whether the proposal is in accordance with its investment policy and whether the argumentation is correct. After the feedback from IAC, Investment-Desk sends out the UTP to all the client-advisors. The process is depicted in figure 3.1.



**Figure 3.1: procedure 1 for generating transaction proposal**

- *Procedure 2: from the IAC*

The Joint Investment Committee (JIC) is the highest organ in determining the investment policy. It consists of 4 executive voting members and other specialist for decision support. The JIC determines the outline of the investment policy periodically. The aim is to translate the specialists' expectations of the market to the asset allocation recommendations for the clients. The advice could be, for example because of the bull market view, to have less exposure in fixed income and more exposure in equities, especially in emerging markets from Asia Pacific. The committee can also decide to have more diversification for risk reasons. This results in the asset allocations as depicted in table 3.1. The asset allocation recommendations are released periodically. In the same way, there is an allocation recommendation for the categories, exist mainly in regions and sectors. In the advices to the clients, the client-advisors have to take these recommendations into account. Next IAC specialists translate the outline of the investment policy to instrument level. This can result in transaction proposals for funds from one category to another or even from one asset class to another.

Risk profile	I	II	III	IV	V	VI
Equities	0	18	35	55	75	100
Fixed Income	60	50	50	35	15	0
Properties	0	5	10	10	10	0
Liquidities	40	27	5	0	0	0
Total	100	100	100	100	100	100

**Table 3.1: asset allocation (in %) for all the risk profiles. Risk profile 1: most defensive; 6: most offensive**

An important side note with respect to advising is **risk profiling**. In line with the new directive from the European Union (the Market in Financial Instruments Directive (**MiFID**)), no advice is given to clients who have not been risk profiled. This precondition stands for all types of advice to the clients. Through the classification made in the Funds-Tool, we incorporated the risk profiles. For example if a client has risk profile 1 (most defensive), then the client-advisor is not allowed to advice equity fund; and if the client has risk profile 3, and his portfolio exposure to equities is already 36%, then the client-advisor is not allowed to advice equity funds anymore.

### **3.3 SWOT analysis**

To finish the analysis of the current situation, a SWOT analysis was conducted through individual interviews with the stakeholders. In Appendix B the interview questions are set out. We distinguish 2 different transaction proposals: UTP from Investment-Desk (procedure 1) and IAC transaction proposals (procedure 2). The results are set out below.

Strengths:

- *Flexibility: the UTP can be made easily and fast.*
- *More involvement of client-advisors: because UTP come from the client-advisors the involvement and commitment should be increased.*
- *Uniform and confirm the investment policy: in the past, the client-advisors have to come up with transaction proposal by themselves. These proposals could conflict with the investment policy and could be commercially unattractive. Now the UTP is checked for both.*
- *IAC is an investment research center for private clients. Most other investment research centers are for professional investment parties. IAC transaction proposals give the ABN AMRO clients the opportunities to utilize the knowledge from this investment research center.*

Weakness:

- *The involvement potential is high, but the reality is that client-advisors are not using the proposals proactively to their clients. Some local office managers do not oblige or encourage their client-advisors to use the transaction proposals. This could be seen from the monitoring of the changes in participation of the relevant funds.*
- *IAC has not enough capacity to check the UTP sent by Investment-Desk adequately on short notice.*
- *The time to market of the IAC transaction proposals is too long. The time between the moment when a specialist from IAC has a idea to the moment that the client-advisors receive the transaction proposal is too long.*
- *The Investment-Desk has to perform the check whether the fund is commercially attractive: whether the securities have enough volume within BUNL. But the department does not have access to the information of the volume within BUNL. Only IPD has access to this information.*

Opportunities:

- *The AA Advisor is an independent subsidiary which is specialized in investment funds. It can help the IAC to select the best funds of certain category when the investment policy is changed by JIC. Furthermore, the AA Advisors can recognize opportunities for the client to utilize the current market circumstances, which could result in transaction proposals. Next, the AA Advisors know the managers of the funds and its strategy. So when a key manager of a certain fund leaves or when the investment strategy of the fund is changed, and AA Advisors' opinion is that this will influence the performance, they can propose transaction proposals. Thus AA Advisors should be more actively involved in the process of transaction proposals.*

- *Because the reasons mentioned earlier, the AA Advisors can be promoted as a unique selling point to the clients.*

Threats:

- *The profit margins for retail banking advice are under pressure. If there is more outflow of AUA, the continuity of entire advice department will be at risk.*

### **3.4 Evaluation perspectives**

In this section the evaluation perspectives is derived from interviews with stakeholders and from the literature based on section 2.1 and 2.2.

#### **3.4.1 From stakeholders**

During the interviews with stakeholders, they were asked what they see as desired situation for the process of transaction proposals. The following perspectives can be derived from the interviews:

- *Advice should come from the department with most experienced and knowledgeable specialists. This is from the client's point of view the most valuable advice.*
- *All the client-advisors should analyze their clients' portfolio in order to see whether the client qualifies for a certain transaction proposal. Only in this way, BUNL can achieve its objectives to supply products update and generate economical benefits for the bank. This is also in accordance with the ideas of Oehler and Kohlert (2009), described in section 2.2. According to them, the quality of advice is determined by whether an advisor is gathering all the information necessary for custom-tailored recommendations; providing all the information the clients need for their investment decision; and whether the advisor is effectively giving custom-tailored advice. It is difficult to monitor the quality of advice. But instead, an indirect indicator can be used. The changes in volume can be monitored for every regional office. The thought is that if the advisors from this office are actively analyzing the portfolio of their clients and effectively gathering and providing information for custom-tailored recommendations, this office should generate changes in volumes of the products being advised. This under the assumption that the transaction proposal will always benefit the clients. But in reality, there could be cases in which this is not true. For example if a client's portfolio has far more risk exposure than what his risk profile suggests, the advisor could come to the conclusion that this client should balance the portfolio with less risky securities.*

#### **3.4.2 From literature**

Based on section 2.1 and 2.2 of the literature review, this section gives an overview of the lessons that can be used as perspective to evaluate the process of transaction proposal.

- *Monitoring the quality of the transaction proposal: applied to our case, the effectiveness of certain transaction proposal can be measured for both the bank and the client. A transaction proposal is successful for the bank if much capital is exchanged between the funds. This will generate transaction income and the client gets a products update. The other important measure is the performance of the funds itself which the investment advisors advice their clients to buy. The client's satisfaction is logically based on the performance of the fund and is subsequently the quality of the transaction proposal. BUNL should monitor both in order to recognize problems in an early phase and solve the problem.*
- *Process-based organizations: work should be arranged along the natural flow of work and the product should be viewed and managed as process. This is a qualitative criterion.*
- *Client orientation: all the steps in the process should have added value for the client. This is a qualitative criterion.*
- *The information ownership and stewardship responsibilities should be assigned to key executives. This is important because a key executive can better establish a willingness and priority to change in order to make the product or service a success.*

### 3.5 Evaluation

- *The success of the transaction proposal*

According to Davenport (1993), the quality cannot be improved without knowing the quality of existing activities. After the transaction proposal is sent to the investment advisors, the initial volume (price multiplied by the number of shares within BUNL), number of shares and number of clients within BUNL is measured. Then this is done again in week 2 and 4 and the final changes are measured between the initial measurement and measurement in week 4.

- *The quality of the transaction proposal*

The quality of a transaction proposal depends on the performance of the funds that have been advised to buy or sell in the transaction proposal. The performance of both the sell - and buy fund should be monitored in order to see whether the client is better off with or without the transaction proposal. The IAC transaction proposals are monitored by IAC itself. The performance of the UTPs, however, was not monitored.

- *Client orientation*

From the client's point of view, he wants to get advice from the most knowledgeable and experienced specialists of ABN AMRO. For advice in investment funds, this should be the IAC and preferably the AA Advisors. But at the moment AA Advisor are not actively included in the process. BUNL should consider how AA Advisors can be incorporated as a core player in the transaction proposals. This should increase the quality of a transaction proposal and BUNL can use AA Advisors as a unique selling point.

- *The initial process set up of the transaction proposal*

As said earlier the uniform transaction proposal is new for the organization. When it was set up, there were no organizational changes made concerning the transaction proposal. There was a cross-department cooperation in the form of electronic information exchange. Only the Sales department meets with the heads of regional offices to discuss the progress of the transaction proposals. Even though many departments are involved, there is no key executive actively involved in the process.

### 3.6 Chapter summary

Through individual interviews with the stakeholders, the process is mapped out. There are two different procedures to generate transaction proposals: from the Investment-Desk and from the Investment Advisory Center (IAC). Next, a SWOT analysis is conducted and the following weaknesses were identified:

- *The client-advisors are not using the transaction proposals proactively to their clients.*
- *IAC has not enough capacity to check the suggestions sent by the Investment-Desk adequately on short notice.*
- *The time to market for the transaction proposals from IAC is too long.*
- *The Investment-Desk does not have access to the information it need to check whether a fund is commercially attractive.*

Furthermore, the evaluation perspectives are derived from what the stakeholders see as desired situation and literature about the quality of process and the quality of advice:

- *Advice should come from the department with most experienced and knowledgeable specialists.*
- *All the client-advisors should analyze their clients' portfolio in order to see whether the client qualifies for a certain transaction proposal.*
- *Monitor the quality of the process.*
- *Process-based organization.*
- *Client orientation.*
- *The information ownership and stewardship responsibilities should be assigned to key executives.*

Then the current situation is evaluated by the perspectives. In section 6.1, the recommendations for improvement of the process of transaction proposal are given.

## 4. System analysis

In order to construct an information system successfully, the System Development Life Cycle (SDLC) is followed (see section 2.3 for more details). This chapter gives an overview of how the first step, system analysis is conducted. During this step, information needed to develop a new system is gathered. First an introduction to the ABN AMRO Internal Market Funds (AIMF) is given. Then the current problems are analyzed and objectives are determined. In chapter 1, we already described the first step of the SDLC partly. In this chapter, we will build upon these findings. After the introduction to the AIMF, the current problem and objectives are derived from individual interviews conducted with product managers of IPD (see Appendix C for more information about the interview questions). Next we will identify the needs of the system users.

### 4.1. Introduction to the ABN AMRO Internal Market Fund (AIMF)

The AIMF (in Dutch ABR) consists of around 300 investment funds. Orders from ABN AMRO clients will be aggregated together. Then the buying and selling orders of the same fund will efface each other so that a net order will be sent to the fund managers. In turn, the fund managers will do the same with all the orders from different banks and interact with the stock market according to the net order. Through this way of trading, the bank can execute the order more cost efficient. Therefore the client has to pay less transaction costs compared to the other investment funds (the rate differs per investment form and order channel). ABN AMRO has a special agreement with all the suppliers of the AIMF Funds about the portion of management fee to be received. The management fee is a periodic payment that is paid for the portfolio management services. This is often a fixed percentage of the total value, generally around the 1% per year, depending on the risk profile of the invested asset class. In this way the bank generates income through management fees.

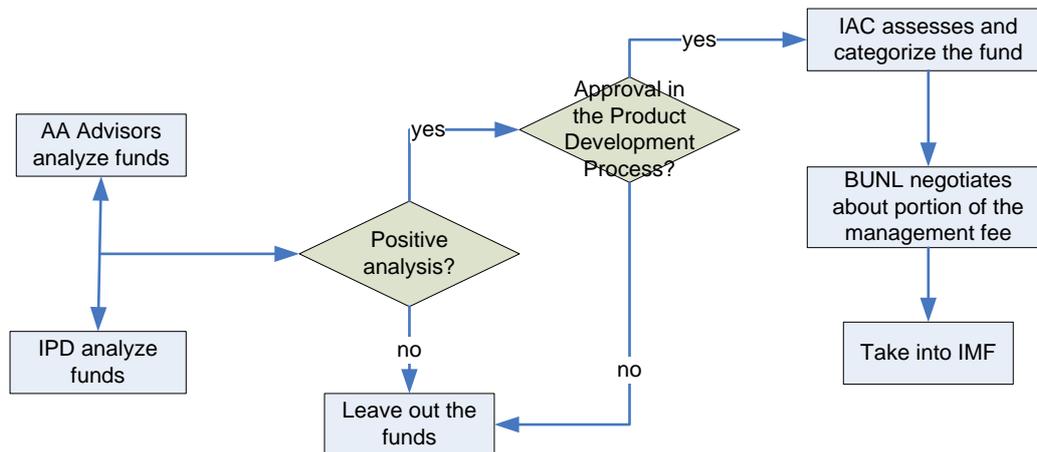
The purpose of the AIMF is to offer ABN AMRO clients the opportunity to invest in a broad assortment of best performing funds in their category. But the product managers of IPD acknowledge that the assortment is historically grown to the current mix - and that there was no policy on this area in the past. The assortment should be balanced, which means there should be at least 3 funds in a certain category where the client can choose from. Every fund is classified into one of the 4 asset classes. Every asset class has different categories to which the funds are classified to, see section 5.2 for more information about the categorization of the assortment.

Next, all the funds in the AIMF are recommended by ABN AMRO. Within the AIMF funds, AA Advisors have another recommended list consisting of around 80 funds. IDP and AA Advisors can both initiate to take certain funds into the AIMF. They work closely to assess the quality of a certain fund and if they are both positive, the product is sent to the **Product Development Process**. This is a structured process to introduce new products where several departments have to give their approval before the products will be launched. There are two approvals: a commercial approval and a technical approval. The commercial approval means that the relevant departments think the product is commercially attractive and the technical approval means that the relevant departments think the product will not generate future risk or claims for the bank. The process has the following phases:

- *Commercial Steering Committee (CSC): an orientation phase to search for products based on the current market outlook. The result of this phase is a number of concrete products proposals. After the meeting the suppliers are approached with the ideas from this meeting.*
- *Product Steering Committee (PSC): an assessment phase where the products are evaluated by technical as well as commercial criteria. The suppliers have the opportunity to present their products to the Committee. The result of this phase is two Go or No-Go: commercial Go/No-Go (IPD, Marketing and Sales); technical Go/No-Go (Legal, Compliance and Operational Risk Management). The technical Go/No-Go is binding while the commercial Go/No-Go is not.*
- *Product Approval Committee (PAC): an endorsement phase where the actual approval is granted.*

- *Preparation, Introduction and Administration (PIA): an implementation phase where the approved products are brought to market in a good and fast way.*

If the investment fund is approved, then the IAC assesses the fund and determines to which asset categories it belongs and to which kind of clients it is suitable based on the clients' risk aversion, the so called risk profile. Then BUNL can start negotiations with the supplier of the fund about the portion of management fee. Finally the fund can be added to the AIMF. Graphically the process is shown on figure 4.1.



**Figure 4.1: Process of selecting funds for the AIMF**

When there was an idea from the CSC to add a certain fund, the product managers had no insight whether a similar fund already exist in the AIMF. Thus, they hope the Funds-Tool should provide such insight.

## 4.2 The needs of system users

The main problem of the current situation is that there no insight in the assortment of investment funds for active steering and management, as discussed in section 1.2. Thus the objective is to make an information system that facilitates these insights. We shall, for clarity purposes, call the new to set up information system the "Funds-Tool". In order to reach the objective, the first step is to identify the information needs of system users. Therefore a structured interview session was organized with the product managers. The objective of the session is to derive their needs. In order to facilitate creativeness, the product managers were asked to come up with different situation where they need insights in the assortment of investment funds. Then they were asked to come up with properties they want to know. First an example was given, and then product managers came with the following dimensions where they need more insights in the assortment:

### **Dimension 1: IAC investment policies**

IAC makes asset allocation recommendations based on their analyses and market outlook. They do this for all the risk profiles. These allocation recommendations are leading when advising to the clients. Thus it is important to base the categorization of the investment funds on the IAC categorization. IAC categorizes investment funds into a main asset class and a category. This category can be either a region category or a sector category. So any investment fund has an asset class and a category that could be either a region category or sector category. In this way product managers can get insight in which funds are in a certain category when IAC changes its allocation recommendations to have less exposure in one category and more in another. The properties were:

- *Asset class*
- *Category: every fund is assigned to either a region or a sector*
- *Price and the currency in which the price is expressed*
- *Volumes*
- *Number of clients*
- *Management fee of BUNL*
- *Transaction fee*
- *Number of shares*
- *All kind of performance measures*

For the volume property, the products managers are also interested in the bigger picture. Therefore, segmentation on departmental level, i.e. BUNL or investment forms like Fund Advice (see Appendix A for an overview of all the investment forms). This is because IPD is responsible for the product assortment of BUNL and it gives advice to the clients of the 3 mentioned investment forms. Also they want to know the volumes of the investment forms Fund Management and Discretionary Portfolio Management (DPM). These volumes are management by ABN AMRO and thus are not interesting for advice purposes.

### **Dimension 2: after the CSC meeting**

During the CSC (see section 4.1) meeting, specialists from different departments come together to discuss the current market outlook and to come up with new ideas for investment products. After the meeting the product managers can look into the Funds-Tool to see whether there are existing products that meet these new ideas. The need for information is similar to dimension 1.

### **Dimension 3: suppliers**

The suppliers are fund houses. The product managers want to know the portion of volumes and fees from certain supplier; also how many funds each fund house supplies. This could recognize the importance of certain suppliers. Thus we add the following property to the list of dimension 1:

- *Fund house*

### **Dimension 4: transaction proposals**

Taking the recommendation of chapter 3 into consideration, the date of the transaction proposal should be recorded in order see what changes take place in terms of volume, transaction fee and price. Sometimes suppliers have also their own marketing campaign and it is interesting to see what will happen to the properties mentioned. Thus we add the following property to the list:

- *Date of transaction proposal and supplier's marketing campaign*

## Dimension 5: product trend analysis

In order to recognize certain trends in the assortment, product managers want to get deeper insights about a certain fund or category of funds. They want to perform trend analyses. This is a simple form of the technical analysis, known in finance as a discipline for forecasting the future direction of prices through the study of historical prices and other historical statistics (Zhu and Zhou, 2009). In order to perform these trend analyses, the product managers want to get insight in the historical prices of a certain fund, if possible with the price of the benchmark and the historical volumes within ABN AMRO and the historical management fees. Also the Funds-Tool should facilitate performance comparison between funds. Thus we add three properties to the list:

- *Historical prices*
- *Performance comparisons with benchmark*
- *Historical volumes and management fees*

### 4.2.1 The 5 main groups of properties

From the dimensions described earlier, we can divide the properties into 5 main groups:

- *Categorization*
- *Performance measure*
- *ABN AMRO quantities*
- *Product trend analysis*
- *Transaction proposals*

Chapter 5 goes further in how these 5 main groups of properties are incorporated in the Funds-Tool to give insights into the assortment of investment funds.

## 4.3 Critical success factors

Next to the usefulness of the information produced by the Funds-Tool, the success of the system depends also on other critical factors. In order to determine these critical success factors, first the existing system for structured products is analyzed. This system was designed by Spanjer (2009), in Microsoft Excel. The purpose of this analysis is draw lessons to better implement the Funds-Tool. The strengths and weaknesses of the structured product system are set out below.

Strengths:

- *Graphic design: the menu bar and the tabs look attractive.*
- *Ease of use: the system is user-friendly.*
- *Protection: unauthorized users cannot modify the system.*

Weaknesses:

- *Tractability: the graphic design is attractive, but it is at the same time a weakness because the Excel menus were hidden. It does not look like an Excel application anymore. Thus the user cannot build further on his Excel experience and feels that it is too complex to understand the working of the system*
- *Low speed because of loading some unnecessary data: when the system is opened, it takes more than 10 minutes before it operates fully. In this way the user will not use the system. Later we came to the conclusion that it was loading too much data from Bloomberg. These datasets were however not needed.*
- *Reliability: some functions are not working well, like the treatment of expired products. When this function is activated, the system stays in a loop and fails to restore itself.*
- *Flexibility: the possibility to add a certain property is not present.*
- *Data file: there is a lot of data redundancy. For example the name of a product is stored twice. Many properties that are not used anymore are still present and some calculations can be calculated in one cell instead of several calculations. Furthermore much data is not correct or missing.*

- *Protection: even though some level of protection is desired, the system is now overprotected for its current purpose. When modifying the system, the user has to key in the password too many times. The protection also costs CPU time, which subsequently makes the system slower. A better idea is just leave out the data that a certain user may not see. In this way, other employees can see how the system works and will facilitate learning about system building in Microsoft Excel and Bloomberg.*

Many of the weaknesses of the structured product system are also identified by Romney and Steinbart (2003) as critical success factors, see section 2.3.2. Together they will form the indicators of success for this project. During all the phases in this project these factors will be taken into consideration. At the end, the end user should give their opinion about these indicators. They are set out below:

- *Usefulness: information produced by the system should help users in decision making.*
- *Economy: the benefit of the system should exceed its cost.*
- *Reliability: the system should process data accurately and completely.*
- *Ease of use: the system should be user-friendly.*
- *Flexibility: the system should accommodate reasonable system requirements changes.*
- *Tractability: the system should be easily understood by the users and facilitate problem solving and future systems development.*
- *Speed: the system should respond quick enough.*

#### **4.4 Chapter summary**

This chapter gives an overview of how the first step of the System Development Life Cycle, system analysis, is conducted. First a general introduction to the assortment of investment funds and the process to add funds to the assortment are given.

Then a structured interview session was held with the product managers to identify their information needs. We can divide the information needs of the product managers into 5 main groups:

- *Categorization*
- *Performance measure*
- *ABN AMRO quantities*
- *Product trend analysis*
- *Transaction proposals*

Next to the usefulness of the information produced by the Funds-Tool, the success of the system also depends on other critical factors. Consequently, we scrutinized the existing system of structured products designed by Spanjer (2009). Lessons learned from this project are taken into account during the implementation of the Funds-Tool. The critical success factors of the Funds-Tool are derived from the literature. The end-user should indicate the extent whether these factors are met.

## 5. Conceptual Design

The second step in the SDLC is the conceptual design. During this step, we decide how to meet user needs. These needs are divided into 5 main property groups, as in section 4.2. Every main group is discussed in this chapter. But first we explain the reason to use Microsoft Excel as the platform to build our Funds-Tool.

### 5.1 Microsoft Excel with Bloomberg Add in

We choose Microsoft Excel 2003 as the application for our information system. Excel is the most widely used data application within the company. Furthermore Bloomberg Terminal is used to provide performance data. Bloomberg provides historical and live data from the stock markets worldwide. Bloomberg can be integrated within Excel, where we can load the price, all kind of performance data - and even historical data. Some processes can be automated in the programming language behind Excel: Visual Basic Programming.

### 5.2 Categorization

The IAC gives out investment policies on asset allocation recommendations and market outlook. Based on these investment policies, IPD should identify opportunities for the clients. Thus it is important to have the same categorization as the IAC. The IAC has categorized most of the funds within the AIMF. For the remaining fund, we categorized them with the help of a product manager, the IAC and AA Advisors. The funds are first assigned to an Asset-Class:

- *Alternatives: these are funds that invest in different asset classes as equities, commodities, fixed incomes and currencies, and utilize different investment strategies with long and short positions. The markets where these funds invest in are normally not accessible by normal investors, for example commodities and currencies.*
- *Diversified: these are funds that invest in different asset classes and utilizes investment strategy with long only positions.*
- *Equities: these are funds that invest in stocks or securities that have the same risk behavior as stocks.*
- *Fixed-Income: these are funds that invest in securities with a guaranteed payoff at maturity like government bonds.*

Depending on the risk profile of the client, the IAC makes recommendations to investment a certain percentage of the client's portfolio in each Asset-Class. For example if the client has a very defensive profile, the percentage of the client's portfolio invested in Fixed-Income should be, according to IAC's recommendations, relatively high, and Equities should be relatively low. On the other hand, if the risk profile is offensive, the percentage of Fixed-Income should be relatively low and Equities high.

Next, depending on the Asset-Class assigned, the funds are further specified to a Category. The Category assigns funds mainly to either a region or sector. The IAC makes also recommendations to invest a certain percentage of the client's portfolio in the different regions and sectors. Figure 5.2 depicts the Categories for every Asset-Class.

Furthermore, every fund is categorized by the following properties:

- *Fund house: this property categorizes the fund by its supplier.*
- *Currency: this property categorizes the fund by the currency in which its value is expressed. But in the Funds-Tool, the prices of the funds are always given in Euros.*
- *Acc/Dis: this property categorizes the fund by whether it is distributing or accumulating the dividends.*
- *Region/Sector: this property indicates whether an Equity fund is assigned to a region or a sector.*
- *Steering-Action: with the information made available in the Funds-Tool, ABN AMRO has already decided to remove some funds from the AIMF assortment. But these funds cannot be deleted directly because clients investing in these funds should be noticed and advised instead to invest in a similar fund within the AIMF. Thus, this property categorizes the fund by whether it will be kept, removed or is newly added. In this way we can easily get insight in the changes of the volumes of the funds, to be removed or are just added.*

In the Funds-Tool, insight into the number of funds, management fee per month, volume within ABN AMRO and volume of DPM are made available for each property. This data is made accessible using the Excel function Pivot Table. Also you can choose to sort the funds according to a certain property, for example range the funds with the highest total return on the top and the lowest in the bottom. With the function Pivot Table, many other tables can be constructed in order to get insights in the assortment of investment funds. In the Funds-Tool, a special interface is made to facilitate the Pivot Table function.

### **5.3 Performance Comparison**

The Excel application we used is integrated with Bloomberg. Many performance measures of the investment funds are measured by Bloomberg and offered through Excel. This data is live-stream, which means that they are updated automatically when a change occurs. The Funds-Tool offers next to the price also the following performance measures to compare investment funds (see section 2.4 for more detailed information about the performance measures):

- *Total return: Year-to-date (YTD), 1 day, 3 day, 5 day, 1 month, 3 month, 6 month, 1 year, 3 year and 5 year.*
- *Standard deviation (annualized): 1 year, 3 year and 5 year.*
- *Sharpe ratio: 1 year, 3 year and 5 year.*
- *Sortino ratio: 1 year, 3 year and 5 year.*
- *Beta: 1 year, 3 year and 5 year.*
- *Treynor ratio: 1 year, 3 year and 5 year.*

As explained in the previous section, the investment funds can be compared by any performance measures available. The table can be made using the Pivot Table interface in the Funds-Tool. In appendix D, the different ratios are further detailed and the calculations by Bloomberg are explained.

### **5.4 ABN AMRO quantities**

One of the main benefits of the Funds-Tool is the aggregation of all information about the funds. Some of the quantities are readily available every month. They can be easily incorporated in the Funds-Tool. These quantities are:

- *Volumes of all the funds within the AIMF; can be specified for ABN AMRO.*
- *Number of shares of all the funds within the AIMF; can be specified for ABN AMRO.*
- *Volumes of the investment form DPM; can be specified for BUNL and PCNL. These volumes are managed by the bank and cannot be influenced by the advice channel. Thus it is interesting to know the total volume without DPM.*
- *Management fee for all the funds; can be specified for all the business units.*

Other quantities in which the product managers are interested in are not readily available. The IPD, can in this case, write a program for the ABN AMRO mainframe to get the specific data out. With such data, we should ask the question whether the usefulness of the information exceeds the labor to get the data. In order to determine the data that qualifies, a discussion between the product managers is facilitated and as result the following quantities are wanted:

- *Volumes of all the funds within the AIMF, specified for BUNL.*
- *Number of shares of all the funds within the AIMF, specified for BUNL.*
- *Number clients investing in a certain fund within the AIMF, specified for BUNL.*

The investment funds can be compared by the different quantities mentioned. The table can be made using the Pivot Table interface in the Funds-Tool. It is important to mention that all the historical data of these quantities are retained in the Funds-Tool in order to facilitate trend analysis.

### ***5.5 Product trend analysis***

The Funds-Tool facilitates 2 different product trend analyses: historical prices and historical volumes. The historical prices can be uploaded in Excel automatically through the Bloomberg Terminal. The Funds-Tool has an interface where the user can choose different types of historical graphs. The following steps have to be followed:

- *The user can first choose which funds to compare.*
- *The user selects the frequency of the historical prices: daily, weekly or monthly.*
- *The user selects the time period to specify how long he wants to look back. For example if monthly is selected in step 2, and we fill in this step "36", then it means we look back 3 years with 36 monthly data point.*

Then the historical prices are uploaded in another Excel file. If a certain chosen fund has a benchmark, its historical prices will also be uploaded. Next, the user can choose between the following options to draw the graphs:

- *Historical price graph or performance-index: Bloomberg offers normal historical prices and historical prices that take dividend into account (see appendix D.7 how Bloomberg cope with historical prices including dividends)*
- *Graph with price: every fund selected is depicted alone against the time and price.*
- *Graph with benchmark: every fund selected is depicted with the benchmark. In order to compare the performance, the prices of both the benchmark and fund are normalized to start from 1 (see figure 5.1 as an example). If a benchmark is not available, the fund is set out against its real price instead of to be normalized.*
- *Aggregated graph: all the funds selected are depicted in a graph. In order to compare the performance, the prices are normalized to start from 1 (see figure 5.2 as an example).*

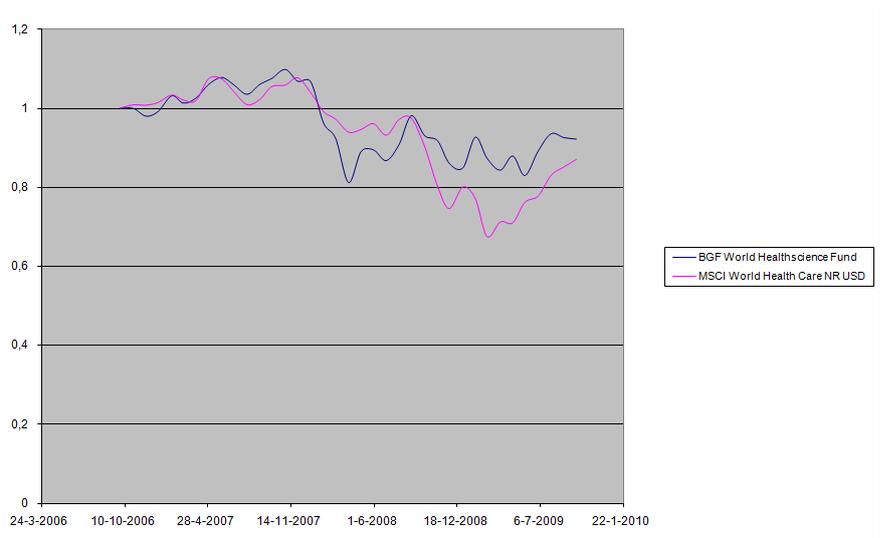


Figure 5.1: graph with benchmark

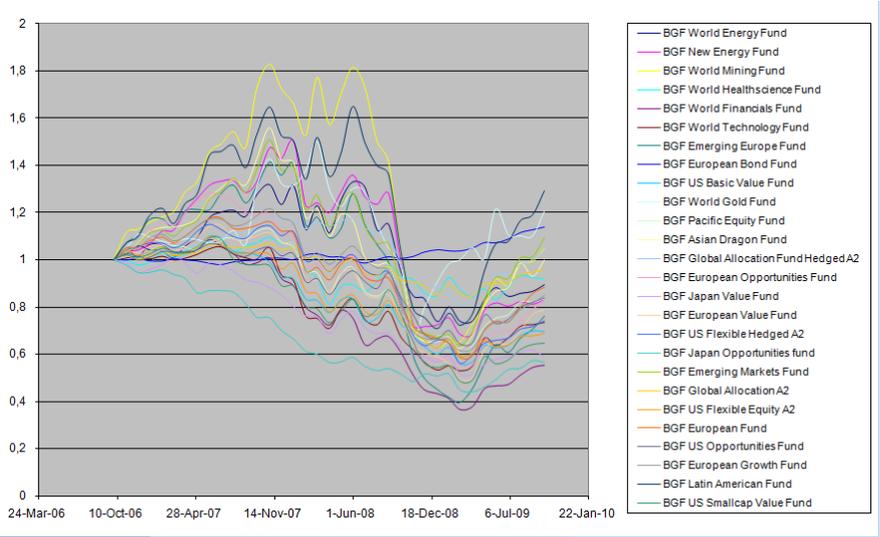


Figure 5.2: aggregated graph

All the historical quantities are retained in the information system. The Funds-Tool offers 2 different ways to get insight into these quantities. The first one is by “zooming” into a specific fund. The Funds-Tool has an interface to facilitate this function. Then all the information inside the tool about this fund is displayed and 2 graphs are made: first one showing the historical number of shares and the second one showing the historical volumes. Next, Pivot Tables can be made to show the change of the quantities by different category. Furthermore, there is a possibility to select a fund and automatically go to the description page of the fund in Bloomberg Terminal itself. This page shows all the information and performance data available about this fund.

**5.6 Transaction proposals**

In order to monitor the effectiveness of the transaction proposal, the Funds-Tool incorporated the opportunities to retain all the transaction. Here the price of the start date of the transaction proposal are shown and also the price of today. Next, the total return from the start date till today is given. The user can also zoom in the specific fund in order to see the development of the volume and the number of share within ABN AMRO. In this way the product managers can see the successfulness of the transaction proposal for the bank through the volume changes and for the clients through the performance measures.

## ***5.7 Chapter summary***

This chapter gives an overview of how the second step of the System Development Life Cycle, conceptual design, is conducted. During this step, we decide how to meet user needs. These needs are divided into 5 main groups of properties. Every main group is discussed how the Funds-Tool meets these needs.

IAC gives out investment policies on asset allocation and market outlook, where all the departments have to comply to. Thus it is important to have the same categorization as IAC. All the funds are first assigned to an Asset-Class. Then depending on the Asset-Class assigned, the funds are further specified to a Category. The Categories consist of mainly regions and sectors.

From Bloomberg, we found many performances measures that can automatically be loaded and updated in Excel. The following performances measures are offered by the Funds-Tool: total return, standard deviation, Sharpe ratio, Sortino ratio, beta and Treynor ratio.

Different quantities are periodically available, like volumes, number of shares and clients within certain funds. These quantities are retained in order to facilitate trend analyses. The Funds-Tool also supports analysis of the historical prices, and comparison of the historical prices between the funds. Furthermore, the transaction proposals can also be monitored in the Funds-Tool. The total return from the start date of the proposal till today is given.

## 6. Conclusions and recommendations

### 6.1 Recommendations: the process of transaction proposal

This section formulates recommendations, based on the evaluation of chapter 3, to the management of BUNL in order to improve the process of transaction proposal.

- *Analyze how to increase the commitment of client-advisors to the transaction proposals*

Because client-advisors play a key role in the success of transaction proposals and the overall quality of the advice to the clients, it is useful and important to conduct a research how to increase the commitment of client-advisors to the transaction proposals.

- *Incorporate AA Advisors in the process*

The AA Advisors are the most experienced and knowledgeable specialists for investment funds. From the client's point of view, it is desirable that the AA Advisors are actively involved in the process. Besides, they are independent and objective which make the transaction proposal more trustworthy. BUNL should analyze how they can incorporate AA Advisors in the current process.

- *Incorporate IPD in the process*

IPD has access to the information of how much volume is invested in every fund. The product managers from IPD talk to suppliers and know when funds undergo changes. Sometimes there are changes in the assortment of funds; that information could not yet be spread out through the organization. If IPD is not actively involved in the process, the IAC and Investment-Desk could end up advising to buy certain fund that will be deleted from the assortment. Therefore IPD should be more actively involved in the process.

- *Performance monitoring*

Next to the monitoring of changes within BUNL concerning the volume and number clients, the performance of the funds itself should also be monitored and incorporated in management reports. This helps employees and management of BUNL to be aware of how effective the transaction proposals are for the bank and the clients.

- *Reorganize the process*

The literature from Business Process Reengineering and Process Innovation of section 2.1, suggest that a products should be viewed and managed as a process; all the steps in the process should have added value for the client; the process should have a clear initiation and an end point; information ownership and stewardship responsibilities should be assigned to key executives. We suggest that all the stakeholders come together and rethink the process of transaction proposal with the perspectives described. The proposed optimal process is given in the next section.

### 6.1.2 Proposed optimal process

In this section we propose an optimal process for the transaction proposals. We assume here that all the departments have enough capacity to perform the activities in the process. Furthermore the process should have a clear initiation and end point. The process is given by the different trigger of the transaction proposal. We think that the initiation point should be triggered by the department with the most knowledge and insight about that specific trigger. We identified the following triggers:

#### **Change in the investment policy**

First JIC makes investment policy with the corresponding asset allocation recommendations. Then the IAC could ask AA Advisors to select the best option of funds that fit the investment policy. Their findings are given back to the IAC to check whether it is in accordance with the investment policy; and back to IPD to check whether the funds is in accordance with its assortment management and whether it is commercially attractive by checking the volume of the funds. If both IAC and IPD approve, then the transaction proposal can be send to the client-advisors.

#### **Change in the market circumstances or change in the management of a certain fund**

When AA Advisors see opportunities in the market in which ABN AMRO clients can utilize it, then they should generate transaction proposals. Furthermore, when a key manager leaves the management of a certain fund and AA Advisors' opinion is that it will influence the fund's performance, then AA Advisors send the transaction proposal to IAC and IPD for approval as described earlier.

#### **Change in the clients' preference**

When a client-advisor observes some increased interest from clients in a certain theme or category of funds, for example funds investing in China, they can send their findings to the Investment-Desk and IPD. IPD can ask AA Advisors to select some funds that fits the increased interest of clients. Finally AA Advisors send their possible transaction proposal to IPD and IAC for approval as described earlier.

## 6.2 Conclusions concerning the construction the Funds-Tool

To complete the Funds-Tool, standards sand controls must be established, and a review must be conduct to detect and correct any design deficiencies. The standards and controls are documented in the form of a user- and maintenance guide, respectively. Section 6.1 set out the review conducted with the product managers. This section ends with a description of the preliminary insights generated by the Funds-Tool.

### 6.2.1 Review by the product managers

After the tool was fully working, first the Funds-Tool was presented to the product managers. There were 3 product managers actively involved in developing the Funds-Tool (the same persons as the interviewees in appendix C). They were asked to give suggestions to improve the system. Their main suggestions were:

- *Apply grid to the table so that information can be read more easily.*
- *Volumes without DPM volumes.*
- *Correcting some definitions.*
- *Take the management fee in basis points into account.*

The Funds-Tool was modified in accordance with these suggestions.

The product managers individually worked through the tool with the user guide and maintenance guide. Many small bugs were discovered and corrected. Next they were asked to fill in a questionnaire to indicate whether the tool generate the insights described in section 4.2, and meets the critical success factors defined in section 4.3. The result of the questionnaire is depicted in table 6.1.

<i>Insights</i>	<i>1. Very bad</i>	<i>2. Bad</i>	<i>3. Neutral</i>	<i>4. Good</i>	<i>5. Very good</i>	<i>Average score</i>
Insights in the categories					III	5,00
Performance comparison				I	II	4,67
Insights in the ABN AMRO quantities					III	5,00
Technical analyses				II	I	4,33
Transaction Proposals			I	II		3,67
<i>Criteria</i>						
Economy: the benefit of the system should exceed its cost.					III	5,00
Reliability: the system should process data accurately and completely.				I	II	4,67
Ease of use: the system should be user-friendly.				III		4,00
Flexibility: the system should accommodate reasonable system requirements changes.				I	II	4,67
Tractability: the system should be easily understood by the users and facilitate problem solving and future systems development.			I	II		3,67
Speed: the system should respond quick enough.				I	II	4,67

**Table 6.1: questionnaire**

The Funds-Tool was received well by the product managers. The average score is 4,48 out of 5. Only 2 criteria have a score less than 4. The first one is the insights in the transaction proposals. Because transaction proposals also include other securities than only funds, it is better to measure the performance in a separate system.

The second one is the tractability. To fully understand the system, the user needs knowledge and experienced with Excel VBA. When problems occur, it is difficult for an average user to find out what the cause of the problem is. Even though the Funds-Tool is designed as flexible as possible, the user has to stay within some boundaries defined in the manuals (see appendix E and F). To solve this issue, all the 3 product managers worked through the manuals in order to find as much bugs and inefficiencies as possible. For some frequent occurring inefficiencies, the user will be warned by a pop-up where the problem and solution are explained. But for the tractability, it stays a weak point and it cannot be improved by the current system environment.

**6.2.2 Primarily insights**

Parallel to this research, another project is conducted to make the assortment of investment funds more attractive. A session with IPD, IAC, AA Advisors, PCNL and PC Global is held to discuss about the assortment. The questions were which categories should be defined and how much funds should be in each category. The result is the categories as in figure 5.2 and in each category, there should be at least 3 funds. In this way, ABN AMRO is confident that it offers the clients enough variety in the assortment.

The project team has already used the insights generated by the Funds-Tool. It decided to add 37 new funds to the assortment, and delete 108 from the assortment in the long term. These funds cannot be deleted directly because ABN AMRO first has to notify the clients and advise them to sell their positions. This procedure takes time.

### ***6.3 Recommendations for further research***

Between the moment when the product manager has an idea for a new fund and the moment the fund is added to the assortment, there is at least 3 months in between. This is because the fund has to go through the Product Development Process where different departments have to give their approval. This process proves to work well, but it makes the time to market unnecessary long. The market outlook over 3 month can be totally different from now, especially under the current market circumstances. ABN AMRO should seek a solution to solve this problem.

ABN AMRO Asset Management is sold to Fortis Belgium. Thus the bank is not funds supplier anymore. This means that ABN AMRO could be independent in advising the clients the best funds worldwide. The bank uses also the service of its independent operating subsidiary, AA Advisors. AA Advisors select from an objective point of view the best performing investment funds from asset managers on a global basis known for their quality. ABN AMRO should advertise the elements mentioned as a unique selling point.

As said in section 6.1, client-advisors play a key role in the success of any investment policy implementation, and the overall quality of the advice to the clients. We suggest that ABN AMRO should conduct a research how to help the client-advisors to improve the quality of advice as described in section 2.2. This could include how the IT systems can help the advisors to analyze the risk of client's portfolio, whether the client has a risk profile and what information should be provided to the client-advisors. An important issue and a critical success factor is how the client-advisors are accepting the changes that are going on. This should result in more commitment of the client-advisors to the investment policy from the head office. This commitment is important because the Authority for the Financial Markets (AFM) demands more consistency in relation with the Markets in Financial Instruments Directive (MiFID).

According to Haenlein et al. (2007), many investment forms are not profitable to the retail banks. ABN AMRO should investigate how much each client in a certain investment form costs in order to determine the capital the clients should have before they can step in.

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<http://www.businessballs.com/swotanalysisfreetemplate.htm>

## Appendix A: investment forms and products

In June 2007, there was a large-scale campaign, TradeGlobe: Self, With & By, where the different investment forms of ABN AMRO were once again positioned. For many years ABN AMRO was the market leader on the area of investment, but in the last few years it has lost ground to other parties. ABN AMRO wants to offer all the possible investment forms. Therefore the following investment forms are created.

### Invest self

- *Direct Invest*

Direct Invest is the investment form where the client can do everything by himself. The bank will not provide any advice, but offers a range of professional tools which will help with the investment decisions. With this investment form, the client can execute transactions for relatively low costs.

### Invest with ABN AMRO

- *Fund Advice*

Fund Advice is the investment form where the client gets advice for the selection and management of investment funds. The advice depends on the risk profile and the portfolio asset allocation of the client. Fund Advice is divided in 2 sub forms depending on the investment capital:

- *Fund Advice Retail: < €50.000,-.*
- *Fund Advice Preferred banking: > €50.000,-.*

- *Investment Advice*

Investment Advice is the investment form where the client gets advice from a private advisor. The advisor helps the client to determine the best investment portfolio. Investment Advice is possible from an investment capital of € 100.000,-.

- *Trading*

Trading is the investment form for the experienced investor. The client has the possibility to contact directly with the dealing room of ABN AMRO and gets the most current information. Trading is possible from an investment capital of € 100.000,-.

### Invest By ABN AMRO

- *Funds Management*

Funds Management is the investment form for people with an investment capital from € 25.000,- who do not want to be active involved with the investment. Funds Management takes over the control and invests for the client according to his risk profile. Hereby the best performing funds will be selected.

- *Discretionary Portfolio Management*

Discretionary Portfolio Management (DPM) is the investment form whereby the capital is managed by experts according to the chosen risk profile. The client does not have to look after his portfolio and receives a monthly personal report. DPM is possible from an investment capital of €100.000,-.

## Appendix B: interview questions transaction proposal

In order to get a good understanding of the current processes around the transaction proposal the following questions were asked during interviews.

- *Who are the stakeholders in the processes around the transaction proposal?*
- *What are the current practice and processes around the transaction proposal?*
- *What are the strengths and weaknesses of the current process?*
- *What are the opportunities and threats from outside the organization?*
- *What is the desired situation?*

Interviewees:

- *Thomas Bunnik: product manager, Investment Products Department*
- *Bernard Glijnis: product manager, Investment Products Department*
- *Servaas van der Eerden: product manager, Investment Products Department*
- *Hannah Cardinaal: product manager, Investment Products Department*
- *Sam Lepelaar: General employee, Investment Advisory Center*
- *Guus Pennings: General employee, Investment Desk*

## Appendix C: interview questions AIMF, current problems and objectives

In order to get a good understanding of the AIMF, current problems and objectives the following questions were asked during interviews.

- *What is the AIMF?*
- *How is the assortment of funds in the AIMF managed?*
- *What are the current problems?*
- *What are the objectives of the Funds-Tool?*

Interviewees:

- *Thomas Bunnik: product manager, Investment Products Department*
- *Bernard Glijnis: product manager, Investment Products Department*
- *Servaas van der Eerden: product manager, Investment Products Department*

## Appendix D: explanation of the Bloomberg ratios

In order to have a better understanding of the ratios uploaded from Bloomberg, this section recomposes the calculation using the historical prices. Fidelity European Larger Companies fund is taken as example. As we can see in figure D.1, we have the following values (date: 20 oktober 2009):

- *Total return 1 year:* 10,16
- *Standard deviation 1 year:* 24,01
- *Beta:* 0,88
- *Sharpe ratio 1 year:* 0,50
- *Sortino ratio 1 year:* 0,46
- *Treynor ratio 1 year:* 0,31

Fondsnaam	Sharpe ratio 1 year	Sortino ratio 1 year	Treynor_ratio_1 year	Return Beta 1 year	Stdev 1 year (%/jaar)	Total_Return_1YR(%)
Fidelity American Diversified Fund € share	0,45	0,49	0,00	0,00	21,39	8,23
Fidelity Euro Blue Chip Fund	0,62	0,55	0,39	0,89	27,65	12,79
Fidelity Euro Bond Fund	1,87	1,39	0,00	0,00	8,11	13,08
Fidelity European Aggressive Fund	0,68	0,60	0,39	1,10	42,35	16,92
Fidelity European Growth Fund	0,63	0,59	0,40	0,89	25,99	13,76
Fidelity European Larger Companies	0,50	0,46	0,31	0,88	24,01	10,16
Fidelity European Smaller Companies Fund	1,38	1,14	0,76	0,76	34,38	31,47
Fidelity Funds European High Yield Fund	2,49	2,28	0,00	0,00	29,09	40,16
Fidelity Funds South East Asia Fund € Share	1,92	1,97	0,96	0,91	28,63	49,29

Figure D.1: example to recompose the ratios

### D.1 Total return

The 1 year total return takes the last close price and the price of the first business day 12 months ago. Dividends are reinvested. We have the following historical prices for the fund:

Fidelity European Larger Companies			
Date	20-10-2008	20-10-2009	Return excl div
Price	24,45	26,38	7,89%

Date	3-8-2009	20-10-2009	Return excl div
Price	24,14	26,38	9,28%

Table D.1: historical prices total return

The return exclusive dividends is  $26,38/24,45 - 1 = 7,89\%$ . But we know that the fund has paid 0,5072 dividend per share on 3-8-2009. The return from 3-8-2009 to 20-10-2009 is 9,28%. If the dividend was reinvested directly, it will be worth  $0,5072 * 1,0928 = 0,54$ . The 1 year total return for 1 year is  $(26,38 + 0,54)/24,45 - 1 = 10,16\%$ . The value calculated is in accordance with the value found by Bloomberg. The 3 and 5 year total returns are annualized.

### D.2 Standard deviation

We have the following historical monthly prices:

Date	Historical performance index	monthly return (%)
30-9-2008	27,015	
31-10-2008	24,979	-7,54%
28-11-2008	22,893	-8,35%
31-12-2008	22,374	-2,27%
30-1-2009	21,591	-3,50%
27-2-2009	19,348	-10,39%
31-3-2009	19,672	1,67%
30-4-2009	22,492	14,34%
29-5-2009	23,118	2,78%
30-6-2009	22,736	-1,65%
31-7-2009	23,843	4,87%
31-8-2009	24,83	4,14%
30-9-2009	25,87	4,19%

Table D.2: monthly prices

The historical prices take also dividends into account. The monthly returns are calculated in the last column. When we use the Excel function “=stdev()” for the monthly return, we get 0,06933 as standard deviation. In order to have the annualized standard deviation, we perform the following calculation:  $0,06933 * \sqrt{12} = 24,0\%$ . This value is in accordance with the value found by Bloomberg. The 3 and 5 year standard deviations are annualized.

### D.3 Beta

We take the Dow Jones Stoxx 50 Index as the market portfolio. This is a capitalization-weighted index of 50 European blue-chip (relatively huge companies) stocks. For the beta we take the weekly returns of both the fund and the index. We found the following the values:

Parameter	Value
Standard deviation Fidelity European Larger Companies	0,043722032
Standard deviation DJ Stoxx 50 Index.	0,04778802
Correlation m	0,974583024

**Table D.3: parameters for the beta calculation**

The formula for the beta is

$$\beta_i = \frac{\rho_{im} \sigma_i}{\sigma_m} = \frac{0,0437 * 0,0478}{0,9746} = 0,89$$

The value differs 0,01 from the value found by Bloomberg.

### D.4 Sharpe ratio

The Sharpe ratio has the following formula:

$$\text{Sharpe Ratio} = \frac{E_p - R_f}{\sigma_p}$$

We take the average return of the 3 month Euribor as the risk free interest rate. Bloomberg offers 2 different 1 year Sharpe ratio using weekly or monthly returns. If we take monthly returns for 1 year period as in table D.2, we have an average monthly return of  $-0,142\%$  and a standard deviation of  $6,933\%$ . The annualized values are  $(1 - 0,00142)^{12} - 1 = -1,69\%$  and  $0,06933 * \sqrt{12} = 24,0\%$  respectively. The 3 month Euribor rates are given in table D.4. The monthly rates in the last column are calculated as follows:

$$\text{monthly rate} = \left( \left( 1 + \frac{\text{Euribor}}{100} \right)^{\frac{1}{12}} - 1 \right) * 100$$

Date	3 month Euribor rate (%)	Monthly risk free rate (%)
29-8-2008	4,96	0,40
30-9-2008	5,28	0,43
31-10-2008	4,76	0,39
28-11-2008	3,85	0,32
31-12-2008	2,89	0,24
30-1-2009	2,09	0,17
27-2-2009	1,83	0,15
31-3-2009	1,51	0,12
30-4-2009	1,37	0,11
29-5-2009	1,27	0,11
30-6-2009	1,10	0,09
31-7-2009	0,89	0,07
31-8-2009	0,82	0,07
30-9-2009	0,75	0,06

**Table D.4: monthly risk free rate**

The average monthly risk free rate is  $0,20\%$ . The annualized rate is  $(1 + 0,002)^{12} - 1 = 2,37\%$ . Now the 1 year Sharpe ratio is:

$$\frac{E_p - R_f}{\sigma_p} = \frac{-1,69\% - 2,37\%}{24\%} = -0,17$$

But as we can see in figure D.1, we have a 1 year total return of 10,16%. This minus the risk free interest rate of 2,37% should generate a positive number. Again the standard deviation is always a positive number. So intuitively, the 1 year Sharpe ratio should be a positively number. We did the same calculations, but now we take weekly returns (see table D.5) instead of monthly returns. We get the following annualized parameters:

- *Mean return: 17,58%*
- *Standard deviation: 31,53%*
- *Average 3 month Euribor: 1,84%*

The 1 year Sharpe ratio based on weekly prices is:

$$\frac{E_p - R_f}{\sigma_p} = \frac{17,58\% - 1,87\%}{31,53\%} = 0,50$$

The Funds-Tool uses the Sharpe ratio with weekly granularity. The value calculated is the same as the value found by Bloomberg. It is interesting to see that how greater the granularity how more accurate the Sharpe ratio gets. We get totally different Sharpe ratio with monthly and weekly granularity. The 3 and 5 year total returns are annualized using monthly returns.

### ***D.5 Sortino ratio***

The Sortino ratio is defined as follows:

$$DD^2 = \frac{1}{N} \sum_{t=1}^N (r_t - MAR)^2 I(r_t \leq MAR)$$

$$Sortino\ ratio = \frac{E_p - MAR}{DD}$$

The minimal acceptable return (MAR) is in our case in our case again the 3 month Euribor rate. The weekly prices of the Fidelity European Larger Companies fund (inclusive dividend), and the weekly rate of the 3 month Euribor are given in table D.5, column 3 and 4 respectively. In column 5 the weekly returns are calculated, and column 6 the weekly 3 month Euribor rate. Column 7 calculates the following formula:

$$(r_t - MAR)^2 I(r_t \leq MAR)$$

Week	Date	Fid Eur Larger Comp	Yearly 3m Euribor (%)	Weekly return	Weekly 3m Euribor	(r-MAR)^2*I(r≤Mar)
0	17-10-2008	23,353				
1	24-10-2008	22,501	4,918	-3,65%	0,092%	0,001399299
2	31-10-2008	24,979	4,76	11,01%	0,089%	0
3	7-11-2008	24,46	4,474	-2,08%	0,084%	0,000467403
4	14-11-2008	23,392	4,223	-4,37%	0,080%	0,001976592
5	21-11-2008	20,641	4,021	-11,76%	0,076%	0,014009734
6	28-11-2008	22,893	3,853	10,91%	0,073%	0
7	5-12-2008	21,473	3,563	-6,20%	0,067%	0,003931439
8	12-12-2008	22,276	3,282	3,74%	0,062%	0
9	19-12-2008	22,247	3,082	-0,13%	0,058%	3,5561E-06
10	26-12-2008	21,649	2,991	-2,69%	0,057%	0,000753335
11	2-1-2009	23,02	2,859	6,33%	0,054%	0
12	9-1-2009	23,402	2,692	1,66%	0,051%	0
13	16-1-2009	21,875	2,453	-6,53%	0,047%	0,004318721
14	23-1-2009	20,729	2,199	-5,24%	0,042%	0,002788575
15	30-1-2009	21,591	2,086	4,16%	0,040%	0
16	6-2-2009	22,257	2,022	3,08%	0,039%	0
17	13-2-2009	21,414	1,943	-3,79%	0,037%	0,001462746
18	20-2-2009	19,818	1,875	-7,45%	0,036%	0,00560821
19	27-2-2009	19,348	1,825	-2,37%	0,035%	0,00057906
20	6-3-2009	17,674	1,726	-8,65%	0,033%	0,007542873
21	13-3-2009	18,741	1,64	6,04%	0,031%	0
22	20-3-2009	19,26	1,574	2,77%	0,030%	0
23	27-3-2009	19,534	1,531	1,42%	0,029%	0
24	3-4-2009	20,572	1,479	5,31%	0,028%	0
25	10-4-2009	20,807	1,435	1,14%	0,027%	0
26	17-4-2009	21,591	1,405	3,77%	0,027%	0
27	24-4-2009	21,63	1,4	0,18%	0,027%	0
28	1-5-2009	22,501	1,365	4,03%	0,026%	0
29	8-5-2009	22,962	1,313	2,05%	0,025%	0
30	15-5-2009	22,756	1,25	-0,90%	0,024%	8,4829E-05
31	22-5-2009	23,02	1,259	1,16%	0,024%	0
32	29-5-2009	23,118	1,269	0,43%	0,024%	0
33	5-6-2009	23,402	1,268	1,23%	0,024%	0
34	12-6-2009	23,618	1,268	0,92%	0,024%	0
35	19-6-2009	23,05	1,224	-2,40%	0,023%	0,000589685
36	26-6-2009	22,58	1,12	-2,04%	0,021%	0,000424552
37	3-7-2009	22,394	1,059	-0,82%	0,020%	7,12333E-05
38	10-7-2009	21,845	1,007	-2,45%	0,019%	0,000610495
39	17-7-2009	22,913	0,954	4,89%	0,018%	0
40	24-7-2009	23,735	0,921	3,59%	0,018%	0
41	31-7-2009	23,843	0,893	0,46%	0,017%	0
42	7-8-2009	24,3	0,881	1,92%	0,017%	0
43	14-8-2009	24,34	0,869	0,16%	0,017%	0
44	21-8-2009	24,99	0,849	2,67%	0,016%	0
45	28-8-2009	25	0,825	0,04%	0,016%	0
46	4-9-2009	24,73	0,803	-1,08%	0,015%	0,000119986
47	11-9-2009	25,7	0,773	3,92%	0,015%	0
48	18-9-2009	26,2	0,762	1,95%	0,015%	0
49	25-9-2009	25,56	0,741	-2,44%	0,014%	0,000603659
50	2-10-2009	25,22	0,752	-1,33%	0,014%	0,000180798
51	9-10-2009	25,85	0,743	2,50%	0,014%	0
52	16-10-2009	26,15	0,739	1,16%	0,014%	0
<b>Total</b>						<b>0,047526782</b>

Table D.5: weekly return

Next  $\sum_{t=1}^N (r_t - MAR)^2 I(r_t \leq MAR) = 0,0475$ , where  $N = 21$ , the number of returns exceeding the MAR. Then the weekly DD is  $\sqrt{\frac{0,0475}{21}} = 0,0475$ . Then the annualized value of DD is  $0,0475 * \sqrt{52} = 0,343$ . The annualized return of the fund is again 17,58% and the average yearly 3 month Euribor rate is 1,84%. The 1 year Sortino ratio is then:

$$\frac{E_p - MAR}{DD} = \frac{17,58\% - 1,84\%}{0,343} = 0,46$$

The value calculated is the same as the value found by Bloomberg. The 3 and 5 year total returns are annualized using monthly returns. Table D.6 gives the summary of the statistics of the Sharpe and Sortino ratio.

Parameter	Weekly average	Annualized
Return Fid Eur Larger Comp	0,31%	17,58%
Rate 3 month Euribor	0,04%	1,84%
Standard deviation Fid Eur Larger Comp	0,04373	0,31532
Sharpe ratio Fid Eur Larger Comp	0,06331	0,49917
Downside deviation Fid Eur Larger Comp	0,04757	0,34305
Sortino ratio Fid Eur Larger Comp	0,05819	0,45881

**Table D.6: summary statistics Sharpe and Sortino ratio**

### *D.6 Treynor ratio*

The Treynor ratio can be expressed as follows:

$$T = \frac{r - R_f}{\beta} = \frac{17,58\% - 1,84\%}{0,88} = 17,89\%$$

The value calculated differs significantly from the value (0,31) found by Bloomberg. We ask Bloomberg to show their calculations and clarify the difference. Bloomberg acknowledges that there is a problem in the calculation of the Treynor ratio and they will give feedback to us later.

### *D.7 Historical prices including dividends*

Table D.7 gives an example how of Bloomberg copes with historical prices including or excluding dividends for the fund Fidelity European Larger Companies. Column 3 of table D.7 gives the historical prices. Column 5 gives the historical performance prices that take dividends into account. We can see that the prices in week 12 and 11 are the same. The prices of the remaining weeks are not equal. This is because the fund paid € 0,5072 dividend on 3-8-2009. Dividends are reinvested directly. We can see how Bloomberg cope that with the monthly returns in column 4 and 6. They exactly the same for both columns except for week 11, because of the dividend paid. We can see that the return in column 6 week 11 is higher than that of column 4. So Bloomberg gives the most recent price, and calculated it backwards with the same return. When a dividend is paid, the price will be corrected in the price as the reverse procedure described in section D.1 of the total return.

Fidelity European Larger Companies					
Week	Date	Historical price	monthly return (%)	Historical perf index	monthly return (%)
	30-9-2008	27,59		27,02	
1	31-10-2008	25,51	-7,54%	24,98	-7,54%
2	28-11-2008	23,38	-8,35%	22,89	-8,35%
3	31-12-2008	22,85	-2,27%	22,37	-2,27%
4	30-1-2009	22,05	-3,50%	21,59	-3,50%
5	27-2-2009	19,76	-10,39%	19,35	-10,39%
6	31-3-2009	20,09	1,67%	19,67	1,67%
7	30-4-2009	22,97	14,34%	22,49	14,34%
8	29-5-2009	23,61	2,79%	23,12	2,78%
9	30-6-2009	23,22	-1,65%	22,74	-1,65%
10	31-7-2009	24,35	4,87%	23,84	4,87%
11	31-8-2009	24,83	1,97%	24,83	4,14%
12	30-9-2009	25,87	4,19%	25,87	4,19%

**Table D.7: historical prices including**