

Financial and risk analysis

of a selection of pipeline projects between 2014-2020

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Executive summary

This master thesis consists of a feasibility study of a selection of future pipeline projects with taking into account the risk-return spectrum. The CAPM has been applied to find the most feasible future projects that will be build between 2014 and 2020.

Prior to this feasibility study, 54 future pipeline projects in and around Europe were assessed based on a screening model. This screening model takes into account the environmental criteria of the projects. Based on the assessment, ten projects were selected. Also the firm's characteristics have been discussed as both firm and environmental characteristics are important for international market selection. In total six interviews were conducted, to gain and validate information regarding the firm characteristics and the environmental criteria for the screening model.

In order to calculate the returns of a project, the net present value (NPV) and the internal rate of return were used to compare the projects from a financial perspective. The cash flows of a project are discounted at the risk-adjusted discount rate. This discount rate is based on the capital asset pricing model (CAPM) which takes into account market risks and country risks adjusted for the industry beta. The beta of an industry represents the volatility of market risks of the industry. The modified internal rate of return (MIRR) has been used to calculate the returns of projects. The MIRR takes away the assumption of the internal rate of return (IRR). Assumption of the IRR is that the reinvestment rate is equal to the return of a project. Based MIRR the reinvestment rate is the yearly interest rate of a 10 year government bond of the Netherlands. Based on the results of the MIRR, it was clearly visible that projects with a smaller time span were the most attractive. Therefore the MIRR was adjusted for this issue and showed a more reliable return. The AMIRR was consistent with the NPV.

Both systematic (non-diversifiable risks) and diversifiable risks regarding projects were taken into account in this thesis. Systematic risks in projects were found based on the CAPM. An interview was conducted to analyze the diversifiable risks in projects. Diversifiable risks are not included in the discount rate, because diversifiable risks can be diversified away. Therefore, scenario analysis is a more appropriate way to take in consideration diversifiable risks. All projects expected returns are still positive when the cash flows are decreased with 75%.

The first model in the risk-return spectrum applied is the security market line. This line implies that risky projects require a higher expected return and vice versa. The model also implies that a risk free asset has a beta of zero and the market portfolio a beta of one. The expected return of a project can be found by the use of the CAPM formula and plotting it against the beta of the industry. This report assumes there are two different betas, the industry beta for Europe and Emerging markets. According to the CAPM, the market is efficient therefore all projects should be on the security market line. Some projects did not lie on or near the security market line and could mean two things. The application of this model shows that the CAPM can be applied, but then the efficient market hypothesis is incorrect, due to irrationality which makes arbitrage possible. Otherwise, due to rationality, the CAPM cannot be applied, but then it supports the efficient market hypothesis.

The second model to compare the risks and return of a project is the efficient frontier. In this model the risks and returns of projects are plotted in a graph. The efficient frontier determines the most feasible projects with the lowest risks and highest possible returns. The risk premium was used to determine the risk level of a project. On the other hand, the adjusted modified internal rate of return (AMIRR) has been used to assess the projects returns. The AMIRR removes the differences in time span and scaling of projects. The AMIRR does not take into account the different risk levels of projects. If these risks and AMIRR are plotted in the efficient frontier, the most feasible projects can be found in the risk-return spectrum. There was a consistency between the AMIRR and the NPV (including the risk adjusted discount rate) of projects.

The CAPM cannot always be used to find an appropriate discount rate for projects, due to the underlying assumptions. The CAPM assumes that there is a single period transaction horizon, in order to be able to compare the returns of assets or financial securities. In this project portfolio all projects have different time spans, therefore it is difficult to compare the returns CAPM also assumes that is that the market is in equilibrium and all assets are on the security market line. Also several projects were below or under the security market line, this could lead to an over- or underestimation of the discount rate and can affect the project's net present value. Other factors such as the size of the project and the project's operating leverage may affects a project's return. In this case the discount rate should be adjusted for these factors as well. The financial feasibility of a project is a part of project appraisal, the non-financial criteria or characteristics plays a role in project appraisal as well.

Based on the efficient frontier, two projects were the most feasible in terms of risk and return. Project B - Nord Stream Lubmin - Rheden expansion gas pipeline and project G Yamal - Europe II Belarus to Hungary via Poland. Whereas project B is less risky than project G, the expected internal rate of return of Project G is higher. The most feasible is project B, due to the location of the project. This project will run through Germany and the Netherlands. At the one hand, where UT Quality's office is located the Netherlands and at the other hand UT Quality has a partnership in Germany which makes it easier to minimize cultural or language barriers. Therefore, the recommendation towards UT Quality is to aim to for this project, based on the feasibility study and the firm's characteristics.

Chapter 1. Introduction

This chapter introduces the company and its business sector. The organization's history and the state of current business will be discussed as well. At last, the research objective, main research question, sub-questions has been formulated.

1.1 Company information

UT Quality is a Canadian company which provides non-destructive testing (NDT) services to industrial clients over the world. UT Quality is using ultrasonic technology to inspect the quality of the welding of pipelines or any other welding constructions. UT Quality is in the top 3 of specialized companies in the field of Girth weld inspection. This company strives to continuously develop new technologies and application methods to increase weld quality and improve productivity. UT Quality has offices in countries around the world, such as Canada, USA, Brazil, Australia, Thailand, Indonesia and Europe.

The research was carried out for the office in Dordrecht. The division in the Netherlands has currently seven fulltime working employees. The company is centralized, what means that the organization is directed from Canada. In some occasions employees from the headquarters in Canada will fly over to Europe to work in a project. UT Quality hires also temporary personal to for the weld inspections.

Core purpose

UT Quality strives for improved welding quality and productivity through the application of innovative non-destructive testing techniques. The company is delivering fully customized non-destructive testing and inspection services to its clients.

Core values

The core values of the company are:

- Leadership
- Quality
- Innovation
- Teamwork
- Profitable growth
- Customer satisfaction
- Encouraging individual ability and creativity

1.2 Context

The research comprises an investigation in new oil pipeline projects (market opportunities) which will be built by contractors between 2014 and 2020. In addition, a risk and financial analysis of a selection of future pipeline projects will be made to see which project is financially the most viable. UT Quality seeks to diversify its project portfolio by looking into these future opportunities. UT Quality could provide services to inspect the quality of welding of these future oil pipeline projects. The strategic intent of the company is to increase revenue and its market share by increasing the number of NDT contracts of new pipeline projects all around the world. UT Quality

desires expand operations in Europe, North Africa and the CIS countries¹. The overview of projects is needed in order to prioritize the easiest opportunities that are the easiest to benefit from (low hanging fruit) for UT Quality. Based on the overview of the projects, the financial viability of the oil pipeline projects will be prioritized. An outdated report is available that includes market information of some of the future pipeline projects. This report will be used as background information. Based on this report, it was determined that an updated research in the financial consequences of future projects is needed in order to determine the 'low hanging fruits' and craft a strategy in how to consolidate on these opportunities.

1.3 Research objective

The objective of the research is to provide UT Quality a report which includes a financial and risk analysis of a selection of pipeline projects. Based on the financial and risk analysis, the projects with the most favorable opportunities will be recommended.

1.4 Problem statement

Derived from the above, the following problem statement is formulated:

UT Quality has outdated reports regarding the construction of future pipeline projects. In order to increase UT Quality's project portfolio and therefore its revenue, a new overview of future pipeline projects is needed. In addition, per project the costs, revenues and risks will be estimated. The future pipeline projects will be prioritized based on the return and risks.

1.5 Main research question

Following the problem statement, the main research question is formulated as follows:

Which future pipeline projects between 2014 and 2020 could provide the easiest opportunities to profit from for UT Quality based on the return and risks?

Derived from the above, the following relevant sub-questions have been formulated:

Theoretical questions

- *What models can be used for international market selection?*
- *How can project risk management be used to identify and quantify risks?*
- *What project analysis and valuation models can be applied?*
- *What model is used to assess projects in a risk-return spectrum?*

Empirical questions

- *What are UT Quality's core capabilities and criteria regarding the selection of the projects with the best fit?*
- *What are the risks per pipeline project and how big are these risks?*
- *What are the valuations of the pipeline projects based on the valuation methods?*
- *Is the model reliable for project selection?*

¹ CIS: Commonwealth of Independent States: Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Uzbekistan and Ukraine formed in 1991 (Cisstat, 2014)

Chapter 2. Theoretical framework

This chapter will discuss the literature that will be used to solve the problem statement. The theoretical framework consists of concepts, together with their definitions, and existing theories that will be used to explore the problem statement in more detail. The literature will be used as a framework to support the topic. A project selection model will be specifically designed for UT Quality. UT Quality's desire is to have market information and financial information of a relevant selection of projects.

2.1 Project selection

Before appraising projects it is important to identify the right markets by a selection screening model. Screening models can include non-financial criteria and financial criteria in order to select projects. The return and risks are examples of financial criteria, but it is necessary to assess both financial and non-financial criteria of projects (Hollensen, 2011), (Moutinho & Lopes, 2011). Due to time limitations, a screening model will be used to identify the potential low-hanging fruits via non-financial criteria. A recent study proves that firms using a model for international market selection show better results than companies which were not using a selection model (Brouthers & Nakos, 2005). For small medium enterprises, international market selection is a reaction to opportunities which were brought to the company's attention via agents such as the chamber of commerce and government agencies. These opportunities are externally driven, but in order to select project opportunities internally a market screening model is often used. The model can be classified in two groups: the firm characteristics and the environmental characteristics (Hollensen, 2011). The characteristics will be further explained in the next paragraphs.

2.1.1 Frameworks to identify a firm's characteristics/capabilities

Two frameworks can be used to analyze the business strategy of an organization. The first framework is based on the outside-in perspective and is named the five competitive forces of Porter. This model is used to find the market potential of a company (Porter, 1979). The second framework is the core competences or capabilities from (Prahalad & Hamel, 1990). In contrary to the five forces model of Porter, this model is focused to analyze the strategic intent via the inside-out perspective. Therefore, this model will be used to find the core capabilities of UT Quality. The core competence of a company is a unique aspect of a company. Examples of core competences are technological knowledge, design, and reliable processes. There are three criteria to identify the core competences in a company. Firstly, a core competence cannot be easily imitated by competitors, because of the integration of technology and the production skills. Secondly, a core competence can provide potential access to several markets. Finally, a core competence should make a significant contribution to the perceived customer benefits of the end service (Prahalad & Hamel, 1990).

Therefore, (Kaplan & Norton, 2004) made clear that the value of intangible assets is the alignment between the intangible assets and an organization's strategy. Intangible assets such as the skills of employees, IT systems and the organizational structure could worth more for a service providing company than a company which operates in real estate Industry. These intangible assets make the company unique, which means it is hard for a competitor to copy this unique powerful competitive advantage. The value of financial and physical assets can be

measured easily. In contrary, the value of intangibles of some companies could vary. For example, service companies value employees which have a good sense of customer service higher than it would be for employees of a fishing company. Intangible assets do not affect the financial performance directly, but they affect the results indirectly. An example is when companies obtain an ISO certification. An increase in quality is expected, but it indirectly improves customer satisfaction and loyalty. The last characteristic of an intangible asset is that it needs to be combined with other assets in order to create value. For example, an IT investment will not have any value when employees would not be trained. As a result, these characteristics of an intangible asset make it difficult to value these kinds of assets. The three categories of intangible assets are human capital, information capital and organization capital (Kaplan & Norton, 2004). Consequently, an investigation in the organization's strategy, core competence and the strategic readiness of the intangible assets regarding the pipeline projects will be carried out.

2.1.2 Environmental characteristics of markets

Furthermore, companies make several environmental criteria for effective segmentation. There are four criteria for effective segmentation: measurability, accessibility, actionability and profitability. Measurability is the degree of measurement of size and purchasing power of the segment. Accessibility is the degree to which segments can be effectively served and reached. Actionability is the degree of sufficiency of the organization's recourses. At last, profitability is the degree to which segments are sufficiently large and profitable. In addition, general characteristics of a market must be taken in consideration as well. The following general characteristics are presumably important for UT Quality to select projects: geographic location, language, political factors and economy (Hollensen, 2011). An interview will be conducted to define (additional) criteria for the selection of projects.

2.2 Analysis of projects

After the selection of projects, a financial and risk analysis will be carried out. Theory related to these subjects will be further explained in this paragraph. The risk and return of projects will be investigated, because risks and return are interrelated. A risky project with the same return as a less risky project should have a higher return in order to be appraised. If not, it is obvious that the last project would be appraised (Scott, Martin, & Petty, 2000). Therefore, these two subjects are important to analyze the most suitable projects for UT Quality. First of all, the method for a financial analysis will be discussed in order to successfully calculate the returns of the projects. In addition, a method for the risk analysis regarding the projects will be discussed. Last of all, a model for the assessment of projects in a return/risk spectrum will be explained in the next paragraph.

2.2.1 Financial analysis

UT Quality provides services which are project based, thus a mix of both project management and operational management is applicable to the operational activities of UT Quality. Projects are unique and temporary and help to attain the objective of a company. On the contrary, operational management is needed when the output is repetitive and helps to sustain the business strategy. Operational management requires a set of new objectives in order to increase continuity of the company. However, similarities do exist in project management en operational

management. Projects and operations are performed by people and are constrained by the available resources. Also planning, executing and controlling takes place for both project management and operational management (Srinivasan, 2008). In order to prioritize the pipeline projects it is necessary to calculate the returns of each project based on the cash flows. Two types of methods will be carried out for financial analysis: the net present value and the internal rate of return (Berk & Demarzo, 2011).

Net present value

The net present value (NPV)² is a method to calculate the cash flows with taking into account the time value of money. The weighted average cost of capital (WACC) is often used as a discount rate, but also the risk adjusted rate can be used to determine the discount rate. The WACC should be only used for project appraisal when the risk of a project is the same as the risks of the entire company. Therefore, discounting cash flows at the WACC could lead to distortions in project selection. The use of a single company discount rate does have effect on the firm value. Therefore, it could lead to an overinvestment in risky projects when the IRR's and discount rates are similar (Kruger & Landier, 2012). The risk adjusted discount rate is based on the capital asset pricing model (CAPM)³ and can be used for (marketing) investments and project appraisal, especially when these projects are executed in foreign markets (Brealey, Myers, & Allen, 2011). The CAPM takes into account non-diversifiable risks and will be used as a discount rate in this paper. The net present value of a project should be accepted when the NPV is above zero. Conversely, a project should be rejected when the NPV is below zero.

Internal rate of return

A second method to analyze financial viability of market investment is the internal rate of return (IRR). The internal rate of return calculates the return of an investment or project. If the internal rate is higher than the return of other project alternatives, the project should be the first priority. Furthermore, the IRR of a project should be exceeding the risk adjusted discount rate in order to be profitable. The formula can only be applied when the first cash flow is a negative number. Investments which do not have a negative initial cash flow will have an incorrect result. The second deficiency of the method is that it shows multiple rates of return, when decommissioning costs and clean-up costs occur at end of a project (Brealey, Myers, & Allen, 2011). Another deficiency of the IRR, is future cash flows which switch from positive to negative, and the opposite, show different outcomes. The IRR can distort decision making because the IRR is shown as percentage. Therefore, large projects with a low rate of return can be more attractive via the net present value method than smaller projects with a higher rate of return (McKinsey & Co., 2004). An assumption of using this rate for project appraisal is that the reinvestment rate is at the same level of the IRR. It is unlikely that a project with a high rate of return has the same reinvestment rate (Brealey, Myers, & Allen, 2011). A limitation of this method in project selection and comparing is that the IRR has one single discount rate for project selection (discounted at zero). Due to the simplicity of this method, the IRR is often used as a method in project selection. Therefore, the IRR of projects should be compared when they have the same duration, risks, discount rate and predictable cash flow (Renaud, 2009).

² NPV formula: $\text{Sum of } (\text{Cash flow} / (1 + \text{Risk-adjusted discount rate})^t)$

³ CAPM formula: $\text{Risk free rate} + \text{Beta} * (\text{Expected market return} - \text{Risk free rate})$

The modified internal rate of return (MIRR) removes the assumptions of the IRR that the reinvestment rate is the same as the IRR. The assumption of the modified internal rate of return is that the positive cash flows are reinvested at an other rate than the discount rate of a project. This method will be used for the calculation of the returns of the projects (Brealey, Myers, & Allen, 2011). The MIRR does not take into account the different scales and the time span of projects, and could create differences in rankings⁴. The MIRR can be adjusted for projects with scale and time span differences, by using the biggest initial outlay and the longest time span of a project and adjust this for all the selected projects. Also one discount rate should be used because differences in risks and capital rationing do not exist in this method (Dunn & Cary, 1997).

In order to select the easiest projects, the non-diversifiable risks and diversifiable risks of each project will also be taken into consideration. The next paragraph discusses the non-diversifiable risks and diversifiable risks more detail.

2.2.2 Risk management

Risks which occur in projects are often seen as a potential (negative or positive) impact on the planned project objectives, in terms of costs and time. A risk is characterized by its probability of occurrence and the uncertain impact of certain activities (Sandøy, Aven, & Ford, 2005). As mentioned before, two types of risks will be taken into account in this report. For non-diversifiable risks, investors demand a higher rate of return. Diversifiable risks are unique and can be averaged out in a well-diversified portfolio. However, these risks can affect a company's profit when their project portfolio is relatively small (Berk & Demarzo, 2011).

Non-diversifiable risks

To adjust the project's non-diversifiable risks, the CAPM formula will be used as a discount rate. Non-diversifiable risks can affect a certain industry, country or global economy. Non-diversifiable risks such as economic downturn, interest rate risks, currency exchange rate risk are affecting all markets; therefore it is difficult to diversify the market risks. Under CAPM, the risk premium is the market rate of return minus the risk free rate times the beta of the project. There are three assumptions regarding to the CAPM. The first assumption is that there are many investors, so there is a competitive market (without transaction or taxes) and there is a possibility to lend at a risk-free rate. Secondly, all investors hold an efficient portfolio with the maximum expected return for a given level of volatility. This also means that the expected return is equal to the required rate of return. Last assumption is that investors have the same expectation about the investment's volatility, correlations and expected returns. The beta which can be used is the beta of multiple firms in the same industry. The industry beta can replace the company's beta, in order to reduce the estimation error and improve the accuracy of the determining of the beta for a project. The unlevered beta will be used in the CAPM formula. An unlevered beta is the volatility of market risks regards to equity (stocks) for companies without any debt. Therefore the unlevered beta can be used to compare the base level of risks of companies by eliminating the

⁴ Formula adjusted MIRR*:

$$MIRR = \left(\frac{(IO + NPV) (1 + k)^N}{IO} \right)^{1/N} - 1$$

* (Dunn & Cary, 1997)

debt component (Berk & Demarzo, 2011). The risk-free rate, market risk premium and industry beta can be found via desk research. The risk-free rate of an asset has to meet two criteria: there can be no risk of default related to the cash flows and there is no reinvestment risk in the asset. In practice the long term government bond rates can be used as risk free rate. The risk free rate must be related to the currency of the cash flows. An example of the risk-free rate of a US dollar denominated cash flow is a ten year government bond of the US. The ten year German government bond can be used as a risk-free rate for Euro denominated cash flows (Damodaran, A., 2002). There is a limitation in the use of CAPM as a discount rate for the NPV. The CAPM is a single period return model and the NPV calculation has a multiple period rate. Therefore, the assumption is that the risk free return and the risk premium have to be constant during the life time of a project. The application of CAPM as a discount rate gives a more correct estimation of the non-diversifiable risks in projects, than when the WACC is used as discount rate. At the moment, the CAPM is the best method for adjusting risks in the calculation of the net present value (Lumby & Jones, 2007). For international projects a country risk premium should be added in the CAPM formula in order to adjust risks in a particular country⁵. A country risk premium should be added when a company is not globally diversified. The second assumption is that country risks must be country specific in order to diversify the country risks. In studies in the 1970's and 1980's there was a low correlation and this means diversification of country risk was possible. However, according to recent studies over the last few decades economies around the world became laced together. This situation made it difficult to diversify the country risks. Therefore, country risk premium will be included in the calculation of the CAPM (Damodaran, 2003).

Diversifiable risks

Diversifiable risks are risks which are project specific and can be diversified in a portfolio of projects. In the case of UT Quality the portfolio of international projects is relatively small. Therefore, diversifiable or unsystematic risks can affect the future projects significantly. An assessment of the possible impacts of diversifiable risks will be carried out via scenario analysis. Often financial managers increase the discount rate for these risks and could lead to wrong estimation of a discount rate. In many cases the discount rate is not accurate and lead to a under- or overcompensation of the risks in a certain project. In contrast, scenario analysis is practical and has more advantages. Scenario analysis provides more information to the decision makers. When a discount rate is used to take in consideration the diversifiable risks, there is only a single estimate of the value of the project. It is more useful to provide the decision makers chance occurrence of a certain cash flow of a project by making the risk assumptions more explicit. The second advantage of scenario analysis is that it encourages managers to implement strategies to mitigate these risks by estimating the value of a failed project and a successful project. By active project management the chance of a project failure will be reduced. The last advantage is the acknowledgement of the different possible outcomes of a project. Multiple cash flow scenarios show the full upside potential, the realistic targets and the possible downside risk. (Davies & Koller, 2012). Examples of diversifiable or non-systematic risks are business risk, financial risk and operational risk. First of all, business risks are risks related to

⁵ CAPM formula adjusted for country risk: Risk free rate + Beta * (Expected market return – Risk free rate + country risk premium)

asset liquidity risk⁶ and funding liquidity risk⁷. Secondly, financial risks are related to exchange rates, recovery rate⁸ and sovereign risks. Last of all, examples of operational risks are model risks⁹, people risks, legal risk and political risk (Akrani, 2012). These diversifiable risks can be mitigated and controlled. In order to control these risks, the costs of control should be below the reduction of expected value of the risk (Alexander & Marshall, 2006). An interview will be conducted to identify the diversifiable risks of projects in order to do the scenario analysis.

2.3 Risk-return spectrum

A risk-return spectrum suggests that low risks of a security are linked with low returns and high risks are linked with high returns. However, it does not mean that the returns are guaranteed, with higher risks higher returns are expected but also higher probability of losses. The efficient frontier and the security market line can be used to find the right expected return of an asset for its given risk. Both models are part of the modern portfolio theory. The modern portfolio theory is an investment theory where the investors can optimize the expected return of a portfolio of financial assets. Harry Markowitz wrote an article about the portfolio selection, this article was the basis of the modern portfolio theory (Markowitz, 1952). In the past the modern portfolio theory has been applied to project portfolio and other assets than financial assets, such as the application of the theory to find an optimum in the Real Estate market (Hishamuddin, 2006). There are some differences between the application of the theory for financial assets portfolio and the portfolio of projects. The division of assets in a financial portfolio can be changed easily, for a project portfolio or portfolio of real estate the optimal portfolio cannot be changed, due to the fact that the amount of money spent on a project cannot be changed. Secondly, financial assets are liquid and can be bought or sold any time. However, in project portfolios the availability of projects is less and when a project has been appraised it cannot be aborted without losing the invested money (Hubbard, 2010).

A way to find the right return for a project is based on the CAPM and the beta. Therefore, the security market line (SML) can be applied to find an expected return for a given beta. The theory suggests there is a linear relationship between the beta and the expected return for stocks. A risk-free investment has a beta of zero, and the efficient market portfolio has a beta of 1. All other market portfolios should be on the security market line. Assets below the SML are overvalued because the investor takes higher risks compared to the return of an asset. For assets which are above the line can be seen as undervalued because there is a higher return for the given risks (beta). The distance between the security market line and the assets return is called alpha (Berk & Demarzo, 2011). The alpha was found by M.C. Jensen et al as they tested the CAPM empirically (Jensen, Black, & Scholes, 1972).

⁶ Asset liquidity risk: Losses due to the inability to sell assets to its book value

⁷ Funding liquidity risk: The insufficiency funds to make a payment

⁸ Recovery rate: Expected recovery rate of funds given to customers

⁹ Model risk: Possibility of obtaining a loss resulting from the weaknesses of using valuation models

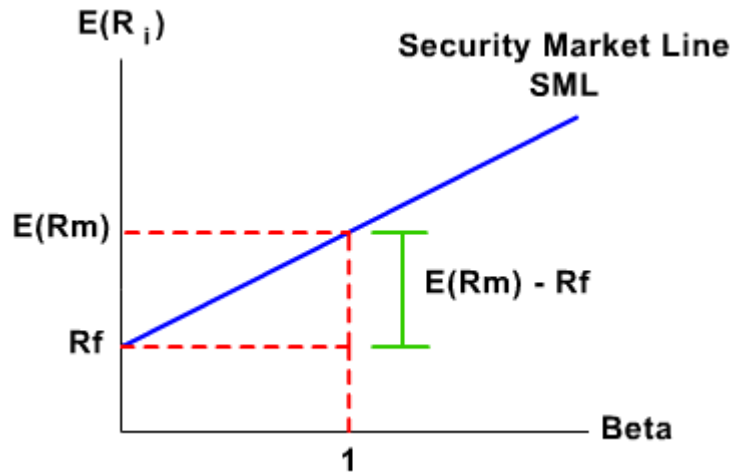


Figure 1. Security Market Line (Randeniya, 2012)

In order to find the optimum of the project portfolio, the risk premium and the MIRR of the project will be plotted in a graph (efficient frontier). Figure 3 shows the efficient frontier to find the lowest given risk level for a given rate of return of projects (Evans & Souder, 1998). The graph shows that project A, project E and project F do have the lowest risk compared to the returns. This theory will test the application and implications of modern portfolio theory regarding the future pipeline projects of UT Quality.

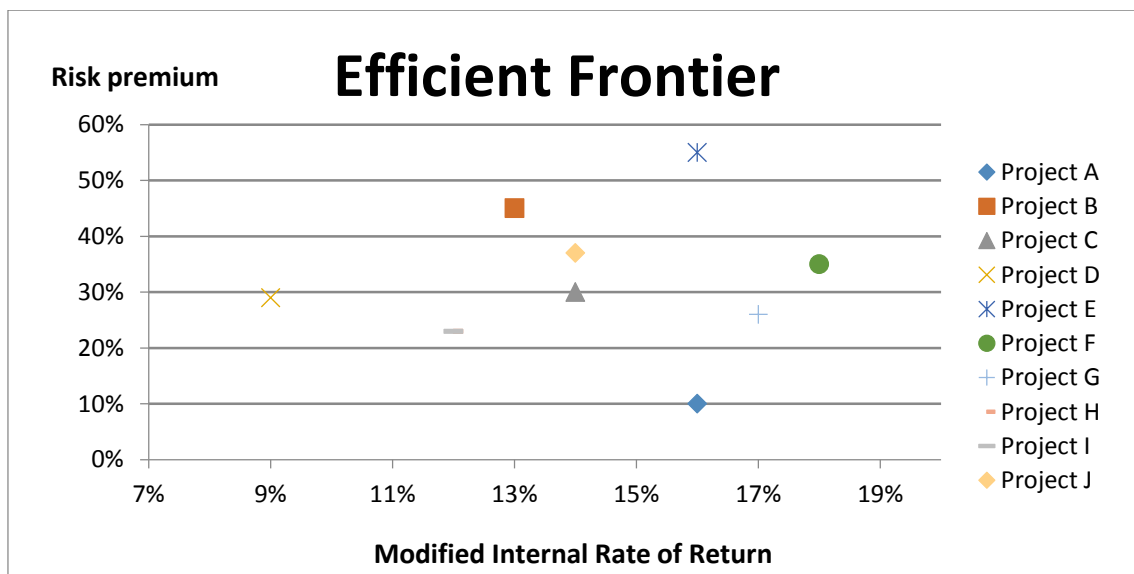


Figure 2. Efficient Frontier

2.4 Summary

In order to select the pipeline projects with the right fit, UT Quality's core capabilities and strategic readiness will be investigated. Therefore, an interview with the director will be conducted. Secondly, a preliminary screening model will be made in order to make a selection of available pipeline projects between 2014 and 2020. This screening model will be used to select up to ten available projects in Europe, North Africa and the CIS countries. After the selection of projects, a financial and risk analysis will be carried out. The financial analysis for the feasibility study includes the NPV and the IRR method. Each method has implications and deficiencies, but a combination of the two methods will give a clear overview in the valuation of projects.

The IRR calculates the rate of return (percentage) of a project and takes into account the time value of money. A project is feasible when the IRR of a project exceeds the risk-adjusted discount rate. The assumption of the IRR method is that the reinvestment rate is the same as the IRR, by using the MIRR which removes this assumption makes the calculation of the return more accurate. The adjusted MIRR will be used to adjust the project's return for the differences in time spans and scaling of the selected projects. The NPV calculates the value of a project and takes into account the time value of money and systematic risks of a project in a particular market. The CAPM is used as discount rate in order to adjust the non-diversifiable risks. The CAPM method is derived from the risk free rate and risk premium adjusted for the industry's beta. The CAPM will also include country risk premium, since country risks are nowadays difficult to diversify due to the fact that the economies of countries are intertwined. Diversifiable or non-systematic risks can be diversified in a large portfolio. However, in a small project portfolio diversifiable risks could have a significant impact on the firm's financial performance. Therefore, a scenario analysis with a best-case, base-case and worst-case scenarios gives more insight in the upside and downside potential of a project. The diversifiable risks can be mitigated, but the mitigation of risks can be costly. Therefore, the mitigation costs should be lower than the expected value of the diversifiable risks. The theoretical framework discusses two models, the efficient frontier and the security market line to assess projects according to the risk/return spectrum. The security market line suggests that there is a linear correlation with the risk and return of an asset. The efficient frontier finds the most feasible project by plotting the risk premiums and AMIRR in one graph. The projects with the lowest risk and highest return should be appraised. The riskier the project the higher the return should be asked.

Chapter 3. Methodology

This chapter discusses the methodology. The research is a qualitative research, is practice oriented, and is based on a case study. The methodology discusses which methods are applied in the research and which will contribute to a valid and reliable research. Reliability refers to the consistency of the results in relation to the measures of the concepts used. Validity is concerned with the integrity of the results that the research generates (Verschuren & Doorewaard, 2005).

3.1 Theoretical research

The theoretical research shapes the theoretical framework is based on literature. The information that has been used for the theoretical framework is collected from books, articles or internet sources. First of all, theory related to international marketing and core competences is used in order to create a framework for selecting suitable pipeline projects. Secondly, theory about risk management or project risk management is applied, in order to shape the whole theoretical framework. The sources that will be used are collected from books, articles or internet. Last of all, the theory related to project valuation is included in the theoretical framework. All authors of books, papers, text, journals and internet sites which have been used in the report as a source are acknowledged according to the Harvard referencing format (which is based on APA style).

3.2 Empirical research

As stated, this research is practice oriented, in which applicable theory is used to find the project which is the most feasible in terms of return and risk. The theoretical framework gives a structure to the empirical research and will be used to answer the problem statement (Verschuren & Doorewaard, 2005). Primary sources for the empirical research are the interviews. Secondary sources for this research are databases, internal documents and internet. In total six interviews were conducted in order to increase the reliability of the report.

Firstly, the strategic readiness and the core capabilities of UT Quality have been analyzed. This analysis is based on the inside-out perspective. To analyze the strategic readiness and the core capabilities, a semi-structured interview with the director of UT Quality was necessary. On the other hand, the environmental criteria regarding to the pipeline projects needed to be defined. Therefore, an interview with the commercial director has been conducted in order to determine the environmental criteria to accept pipeline projects. Environmental criteria can, for example, be geographical thresholds and political factors (Hollensen, 2011). In order to validate the information, four other interviews have been conducted to increase the credibility of the thesis. Interviews have been conducted within the organization with the director of the subsidiary in Indonesia and a Dutch speaking operator with experience. Also a customer of UT Quality has been approached to verify information. An employee from the inspection department and purchasing department from Kuwait Petroleum Europoort was interviewed. The type of interviewing was semi-structured (Bryman & Bell, 2007). Ten projects were consequently selected out of a sample of 54 based on the established criteria.

Secondly, the planned pipeline projects were found via desk research. The future projects can be found on the internet, the outdated report or via a program called SIMDEX. This data from SIMDEX can be accessed by buying a license for a period. This program shows all information

that is related to the future pipeline projects, such as type of project, zone, country, project owners, contractors etc. Based on the screening model, pipeline projects within the criteria of UT Quality were selected (Simdex Future Pipeline Projects, 2013).

The following step was to determine the initial investment, costs and revenues for each of the projects. The returns of each project were calculated and were prioritized. The data was retrieved from internal documents from similar projects that have been done in the past with the similar initial investment, costs and revenues (desk research). If the documents were unclear or elaboration was needed on a certain point, the director R. Bezemer or commercial director M. Bezemer were asked for clarification.

At last, per project the involved diversifiable and non-diversifiable risks were determined. UT Quality's director and commercial director have knowledge in the diversifiable risks involved in (similar) pipeline projects. Therefore, several interviews were held with these people with the knowledge of risks related to projects to increase the reliability and credibility of the research. The interviews were semi-structured to gain more insight in the risks that could occur during the project. A scenario analysis was made to adjust diversifiable risks of a project. (Bryman & Bell, 2007). The CAPM was used to adjust non-diversifiable risks. Therefore, desk research was carried out in order to find average beta of the industry, the risk-free rate, market risk premium and country risk premium of the projects. By taking account both type of risks in the quite important as risks are significantly linked to the return of a project (Brealey, Myers, & Allen, 2011).

3.3 Sampling

In this qualitative research judgemental sampling was used. Judgemental sampling is when interviewees are chosen based on their knowledge and experience regarding to the field of interest (Marshall, 1996). Judgemental sampling is used because within the organization only a few employees have the knowledge regarding the risks and financials the selected projects. However, consequent snowball sampling is possible when one of the employees refer to other persons with specific knowledge in the area of interest (Goodman, 1961).

3.4 Gathering of data

The primary data was obtained by conducting qualitative interviews with expert informants, who have knowledge about the oil projects. An interview guide was used to maximize output of the interviews. An interview guide will help with the structure and makes sure that all the topics are issued (Kvale, 1996). The informants were chosen based on their field of expertise. Most interviews were conducted in a semi-structured method. The interview questions were structured, but there was room for follow up questions. The questions were structured in a way that the informants have to explain precisely about the researcher's field of interest. Likewise, follow up questions were used to keep a focus on the field of interest and there was a possibility to elaborate on a certain issue, when something was not covered for example. Therefore, semi-structured interviews were chosen in this qualitative research, to explore and gain more data about the topic (Bryman & Bell, 2007). In addition, desk research was carried out in order to find general information of the future pipeline projects and support the primary data.

3.5 Qualitative assessment criteria

E.G. Cuba wrote about how trustworthy qualitative research should be; therefore he proposed four criteria for a trustworthy qualitative research. These criteria were taken into account when this research was written (Guba, 1981). The first criterion is credibility, credibility this shows the congruency between the findings of the research and the real situation. In order to increase the credibility of this research, the interviewer should be well prepared and have some expertise about the subject before the interview is conducted. The second criterion is transferability, transferability is that results of a research can be generalized or transferred to other similar situations. The third criterion is dependability, which means that the results will be the same when the research is done twice. The dependability was secured by sending the questions in advance. The informants should also be informed about the purpose of the research, to retrieve correct and precise answers. The interviews were recorded on a device if the informants agreed with it. Recording of interviews allowed the interviewer to transcribe the interview. Transcription of the interview will minimize the number of mistakes and misinterpretations. The last criterion is confirmability, confirmability is ensuring real objectivity. To ensure objectivity, the gathered primary data was confirmed by the informants/interviewees (Shenton, 2004). Bias could occur in this study, because the case study is supported by UT Quality. Therefore, the progress of the research was discussed with the supervisor to confirm the objectivity as an external judge and a customer of UT-Quality, Kuwait Petroleum Europe to confirm information from UT Quality.

Chapter 4. Findings

This chapter discusses the findings of the research. This analysis is based on the theoretical framework that has been introduced earlier.

4.1 Core capabilities and strategic readiness of intangible assets

Before investigating the potential markets, it is necessary to define the core capabilities and the strategic readiness of UT Quality regarding internationalization. The core capabilities of a company are unique and cannot be imitated by competitors. The capabilities can provide potential access to several markets and it should make a significant contribution to the perceived customer benefits of the end product. The strategic readiness of intangible assets has been examined as well. The strategic readiness of intangible assets can be divided into human capital, information capital and organization capital. An interview with two directors and two employees has been conducted to determine the core capabilities and the strategic readiness of intangible assets (Appendix A). In addition, a customer of UT Quality was approached to verify some information from UT Quality. The strategic intent of UT Quality is to roll out the business in Europe and to grow aggressively. UT Quality is a young company and was recently taken over by RAE Energy. With this acquisition the objectives can be accomplished. RAE Energy is committed to invest a lot in the development of UT Quality. RAE Energy would like set up a training center, where all other NDT techniques can be trained, such as magnetic examination and radiography. In the coming years the strategy will not change, but the goal to increase the revenue approximately ten times within four years.

The competitive advantage of UT Quality is providing NDT services with a newly specialized NDT technique called phased array. This technique is significantly more efficient than the techniques employed by competitors. This is due to UT Quality's research and development department where the systems are developed. An interview with an employee of the inspection department of Kuwait Petroleum Europe has been conducted to ask about existing NDT techniques. This company has been a customer of UT Quality in the past. Jos de Visser knew about the phased array technique and said it will become a popular technique in the coming years. This technique is not yet commonly accepted in Europe, as most companies still rely on conventional techniques such as, UT, TOFD (time of flight diffraction) and radiography.

The core capabilities of UT Quality are the specialized equipment developed by the R&D department. UT Quality's R&D department receives continuous feedback from the users of the equipment and tries to improve the system. Therefore, for example, the noise pollution of UT Quality's NDT systems is much lower than the systems of competitors. Cor Brouwer, purchaser at Kuwait Petroleum, remarked that the services provided by UT Quality were of high quality and were surprised by the availability of operators.

There is some alignment between the strategy and the human capital in order to do business in Europe, North-Africa and the CIS. UT Quality has over 300 NDT operators from Canada available to do operations in the other areas. In the past UT Quality Europe used to get Canadian employees for its projects. For the Canadian operators it was difficult to obtain working permits for some projects. Also the (salary) costs of the Canadian operators were high. In the

Netherlands it was difficult to find the right people. Therefore, RAE energy is willing to invest to build a training center in the Netherlands to train European employees. Also finding partnerships in the countries are needed in order to execute projects in, for example, the CIS and North-African countries. UT Quality currently has partnerships in Germany and United Kingdom, and wishes to obtain partnerships in France and Morocco in order to achieve its strategy. There some full alignment with the information capital and the strategy. The director of UT Quality explained that they had done some small projects abroad at the same time and everything was well managed. There are no special requirements regarding to the management of the projects. The employees need an accommodation, a truck and a small office space. In addition, UT Quality demands that the customer arranges certain things such as safety, first aid, water, power and internet. It is most important that the audit systems are working properly and that internet is available. However, the director of Indonesia suggested that the information capital should be improved. He notified that there was no real time ERP-system at the moment, to see where exactly equipment is and real time registration of the use of consumables. Currently, this is all tracked manually. However, the new owner (RAE Energy), pledged to implement Netsuite (ERP-system) for all the subsidiaries of UT Quality. The director expected that things would run more smoothly as a result.

The organization capital can be measured by the degree of culture, leadership, alignment and teamwork. It is important to investigate the alignment of the organization capital and the strategy. For the culture aspect it is important that employees are aware of the mission, vision and core values of UT Quality. At UT Quality every employee knows that the company has to grow. Also safety is an important aspect of the company. This company is confident in the new techniques for NDT such as Phased Array and discourages the use of radiography. For the leadership aspect, it is the degree how employees are mobilized towards the strategy. The director told that they regularly schedule (safety) meetings and commercial trainings. The commercial trainings are especially aimed at operators find a potential contract, because they are the closest persons to the customer and will be able to see the potential projects first. The aspect alignment is the degree of the alignment of the goals and strategy in all lines of the organization. This is a small organization, so it is obvious that the goals and strategy can be transferred easily via meetings or personal communication. The aspect teamwork is the degree of knowledge with strategic potential being shared in the organization. The knowledge, comments or ideas are shared due to the small size of the organization. In order to transfer the knowledge, new employees are working together with the more experienced employees. The director is also on a short line with the operators even when they work abroad. The director thinks it is important to be in connection with the operators to receive feedback. This feedback is important for the development and improvement of the inspection systems.

4.2 Market screening model

A market screening model has been created based on non-financial criteria. These criteria were determined based on the interview with M. Bezemer, commercial director of the company (Appendix A). The market screening model has been used to select ten pipeline projects. The model includes environmental factors such as: size of the project, accessibility, political/legal risks, labor costs and ease of doing business. The scaling for the environmental factors is 1 to

10. The scaling for the first environmental criteria is as follows: per 20 km of pipeline a point is given (Simdex Future Pipeline Projects, 2013). The scaling for the accessibility is 10 for EU¹⁰ or EEA¹¹ countries and for non-EU or non-EEA countries 1 point is given. The EU and EEA ensure free movement of people, goods, services and capital, this improves the ease of doing business within the EU and EEA (EFTA, 2014). Therefore, more points are given to EU or EEA countries. The political and legal risks are scaled based on the level of political risk. A country with low risk is given high points and vice versa (Maplecroft, Marsh, 2014). The scaling of the labor costs depends on the level of costs, a low cost is preferred and high costs are less preferred. A way to estimate the level of labor costs of a country is the GDP per capita, where the aggregate value of services and goods is divided by the average population of a country (International Monetary Fund, 2013). Therefore, countries with low GDP per capita, high points are allocated and for a high GDP per capita, low points are given. The last environmental factor is the ease of doing business. UT Quality can execute a project in any foreign country, but the desire is to do business in countries with fewer restrictions as possible. The World Bank ranked countries on the ease of doing business (The World Bank, 2013). Therefore, this ranking will be used to allocate points to the countries of the projects. In total a sample of 54 future pipeline projects were taken in the screening model. These projects have been screened based on these criteria. An example of the screening model and the ranking of the projects are included to this report (appendix B).

4.3 Information of the selected pipeline projects

This paragraph discusses the general information of projects, such as the location, size, pipeline owners and subcontractors.

Project A - Odessa-Brody Project – Poland section

Project A was the most attractive project based on the environmental factors; it received the most points in the screening. This project is part of a master project named Odessa – Brody oil pipeline extension. This extension is in total 257km and the start of the construction takes place in 2015, the expected completion of the project is for the end of 2015 (estimation). The pipeline owner is Sarmatia ICC, which is an international pipeline company. This section starts in Brody near the Ukrainian border and ends in Plock (Poland). The EU allocated funds to this project, but under the condition that it would be finished by the end of 2015. As a result, Poland postponed this project and will be a reserve project, because of the expectation that this project will be completed in 2017 (Enerdata, 2013). However, this project is seen as very interesting and there is still a possibility that this pipeline will be constructed.

Project B – North-Stream Britain link- onshore section

Project B is considered to be interesting because the pipeline goes from Lubmin (Germany) to Rheden (Germany) and then to Rotterdam (The Netherlands). The length of the pipeline is 900km and is one of the largest future pipeline projects in West-Europe. The idea behind this

¹⁰ EEA: European Economic area: Non-EU countries Iceland, Liechtenstein, and Norway agreed to ensure free movement of capital, goods and services within the EU.

¹¹ EU: Belgium, Bulgaria, Croatia, Cyprus, Denmark, Germany, Estonia, Finland, France, Greece, United Kingdom, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Czech Republic and Sweden.

extension is to supply the British market via Rotterdam. Russia could also supply the Dutch market due to declining production of gas in 2020. This project is part of the Nord Stream Pipeline. The start of construction is planned for 2016 and the completion is 2020. The owners of this pipeline are Gazprom, BP and TNK-BP. There is a big chance this project will be appraised, because West-Europe will be supplied directly without transit risks and it will meet Europe's demand for gas in the future (Natural Gas Europe, 2013).

Project C - Galsi gas pipeline - Cagliari to Olbia

Project C is part of a future master project named Galsi gas pipeline, which is planned to run from Algeria to Italy. This section is 300km long and the route is from Cagliari to Olbia in Sardinia in Italy. The project owners are Sonatrach (36%) as biggest shareholder, Edison, Enel, Wintershall, Hera Trading, Sfirz and Progemisa. The start of the construction is 2014 and is expected to be completed in 2015. Due to a drop in gas demand in Italy, final investment decision of this project is postponed to May 2014 (SNAM, 2013).

Project D - Nord III gas pipeline

Project D is a standalone project owned by GRTgaz and is 125 km long. This pipeline will go from Taisnieres (interconnection and compressor station) and the Cuvilly (Oise) interconnection and compressor station. The start of construction is 2014 and will be completed in 2016. A final investment decision has been made on this project. This project will increase gas supply from Belgium to France (GRTgaz, 2011).

Project E - East med pipeline Cyprus and Israel to Western Europe

Project E is a proposed pipeline between Israel, Cyprus to Greece and is approximately 1150km. The project has three sections. The first section is from the gas field Levantine Basin to Cyprus (150km). The second section is a pipeline connecting Cyprus with Crete which will be 600km. The third section will be from Crete to Greece (405km). This pipeline will allow the EU to be less dependent on Russia and Azerbaijan gas supplies. The owner of this pipeline is DEPA, a public gas corporation owned by the Greek government. J P Kenny Engineering will be conducting the feasibility study. Several memorandums and agreements were signed between Greece and Israel regarding this project (Natural Gas Europe , 2013).

Project F – South Stream – Serbia and Bulgaria section

Project F is a part of a master project called South Stream. South Stream is a pipeline project that starts in Russia and ends over the border of Italy. The total size of the project is 2.400km and runs through the Black Sea and limits the transit risks. The Serbia and Bulgaria section is in total 960km long and the project has been started and the completion date is in 2015 for this project. Gazprom is the main owner of this project, other companies such as Srbijgas (Serbia), Bulgarian Energy Holding (Bulgaria) and Stroytransgaz are involved in this project as well (South-Stream info, 2014).

Project G - Yamal Europe II – Belarus to Hungary via Poland and Slovakia

Project G is part of a master project called Yamal-Europe II gas pipeline. This section of the master project runs through Russia, Belarus, Poland, Hungary and Slovakia. The reason for the future construction of this project is the gas war between Russia and Ukraine. By placing a pipeline through Belarus instead of Ukraine the reliability of gas supplies to Poland, Slovakia and

Hungary will be improved. Gazprom and EuRoPol GAZ signed a memorandum of understanding regarding this project and will be in total 1400km long. The start of construction is in 2017 and is planned to be completed in 2019 (Gazprom, 2013).

Project H - Caux-Roumois gas pipelines

Project D is a standalone project owned by GRTgaz is 90 km long. GRTgaz wished to build a link between Saint-Jouin-Bruneva (Seine-Maritime) and Saint-Pierre du Bosguerard (Eure). The guesstimated start and completion date will be 2014 and 2015 respectively. This project will be build in order to increase gas supply in the North-Zone of France. However, no final investment decision has been taken regarding this project (GRTgaz, 2011).

Project I - Trans Adriatic Pipeline (TAP) – Greece section

Project H is part of the Trans Adriatic Pipeline (master project). This section runs through Greece and is 186km. The Greece section of the gas pipeline runs from Thessaloniki to Dipotamia near the Albanian/Greece border. The shareholders of the pipeline are: Axpo (Switzerland 42,5%), Statoil (Norway 42,5%) and E.on Ruhrgas (Germany 15%). The start of construction is estimated in 2014 and the completion is in 2018. The final investment decision has been taken in June 2013 (Trans Adriatic Pipeline, 2013).

Project J - Galsi pipeline – Corsica branch

Project I is part of the master project named Galsi gas pipeline, which is planned to run from Algeria to Italy. This offshore section is 100km long and starts from Olbia in Sardinia (Italy) to Corsica. The project owners are Sonatrach (36%) as biggest shareholder, Edison, Enel, Wintershall, Hera Trading, Sfirz and Progremsa. The start of the construction is 2014 and is expected to be completed in 2015. Due to a drop of gas demand in Italy, the final investment decision of this project is postponed to May 2014 (SNAM, 2013).

Project number	Project name
<i>Project A</i>	Odessa-Brody Project Poland section
<i>Project B</i>	Nord Stream Britain Link - Lubmin to Rheden (expansion)
<i>Project C</i>	Galsi gas pipeline - Cagliari - Olbia
<i>Project D</i>	Nord III gas pipeline
<i>Project E</i>	East Med Pipeline - Cyprus and Israel to Western Europe
<i>Project F</i>	South Stream Bulgaria and Serbia
<i>Project G</i>	Yamal-Europe II - Belarus to Hungary via Poland and Slovakia
<i>Project H</i>	Caux-Roumois gas pipelines
<i>Project I</i>	Trans Adriatic Pipeline (TAP) - Greece section
<i>Project J</i>	Galsi gas pipeline - Corsica branch

Table 1. Project Information

4.4 Project costs and revenues

This paragraph discusses the initial outlays, costs and revenues for the projects. Based on internal documents, the standard initial costs, costs and revenues per project were calculated. The initial costs per project are fixed. The costs related to the initial outlays are as follows: procedure and calibration block development €1.000, the calibration block itself is €3.500 and

the costs to set up the AUT systems are €10.000. This can take up to one week and requires two operators. The total initial costs will be spread over the total duration of the project. It is possible that UT Quality has to validate the company for a certain project. These validation costs approximately €25.000. At last, both employees and equipment must be mobilized to the destination of the project. Costs for mobilization of employees are budgeted for €500 per person and equipment for €3.200 per unit. These costs do also occur at the end of a project.

During the execution of the project, all costs occurred during the project will be surcharged to the customer. Only for the day rate of the operators and helpers a profit margin is added as a mark-up. The margin on these operators and the helpers are 35% above the daily costs of the operators and helpers of €450 and €350. The total costs for day rate covers the costs for product development and overhead costs. Other costs which will be surcharged to the customer are the AUT unit, AUT truck/pick up, diesel costs, hotel surcharge weekend/week, surcharge abroad week/weekend, reserve AUT unit, administration costs and miscellaneous costs. The surcharges for the weekend will be spread over de week and will be included in the day rate. The costs for the use of AUT unit, AUT truck/pick up are depreciation costs, and thus are not shown in the negative cash flows. These costs however, will be surcharged to the customer and is included in the daily revenue rate of the project. In case of a large project, extra teams will be used for pipeline inspection. An extra team will be added in the calculation when one team exceeds the estimated completion date of a project. The AUT unit and AUT truck will not be purchased prior to the project, because these recourses are already purchased. These costs can be seen as sunk costs and will be neglected in the calculation of the NPV and MIRR. Additional information regarding the timing of invoicing is: two weeks to prepare the invoices, 37 days is the average payment period. Therefore, negative cash flows occur in the first two months of a project and positive cash flows occur in the last two months of the project. The project variables are the length of the project, number of teams and helpers. The weld rate is on average 30 inspections per day. The standard length of one pipe is 12 meter; 18 meter pipes are uncommon. A format of the calculation of the preparation outlays, costs, revenues will be attached to this report (Appendix C). Also the variables and day rates per project are attached to this report (appendix D).

4.5 NPV and AMIRR of the pipeline projects

This paragraph will discuss the valuation of the pipeline projects. The values of the projects are measured via the NPV and AMIRR method. The NPV of the projects are based on the CAPM adjusted with the country risk premium. The assumption is that the risk-free rate is a ten year government bond of Germany on January 2014 1,94% per year (Financial Times , 2014). The equity risk premium and country risk premium data were found on the site of New York University (Damodaran, A., 2014). The risk free rates, equity risk and country premiums per country are attached to this report (appendix E). The unlevered industry beta was also found on the site of New York University. The name of the industry sector of UT Quality is oil/gas (production and exploration). The unlevered industry beta in Europe is 0,99 and for emerging markets 1,23 (Damodaran, A., 2014). Both industry betas for oil/gas (production and exploration) are relatively high compared to the total market beta. The assumption is for this sample that all countries outside the EU are seen as emerging countries. The reinvestment rate is the risk free

rate of the Netherlands ten year government bond on 1/1/2014. The reinvestment rate is 0,19% on a monthly basis (Financial Times , 2014).

Based on the CAPM formula, the risk-adjusted discount rates have been determined for the following projects. The risk premiums consist of the market premium and country risk premium. Table 2 shows the yearly and monthly discount rate and the risk premium (equity risk and market risk) for each project.

Risk-adjusted discount rates	Yearly discount rate	Monthly discount rate	Equity risk premium	Country risk premium
<i>Project A</i>	9,3%	0,75%	6,2%	1,2%
<i>Project B</i>	7,5%	0,60%	5,3%	0,3%
<i>Project C</i>	11,8%	0,93%	7,5%	2,5%
<i>Project D</i>	8,7%	0,70%	5,9%	0,9%
<i>Project E</i>	29,8%	2,07%	15,5%	10,5%
<i>Project F</i>	17,4%	1,37%	9,5%	4,5%
<i>Project G</i>	15,7%	1,25%	9,0%	4,0%
<i>Project H</i>	8,7%	0,70%	5,9%	0,9%
<i>Project I</i>	36,6%	2,63%	20,0%	15,0%
<i>Project J</i>	8,7%	0,70%	5,0%	0,9%

Table 2. Risk-adjusted discount rates

Project name	NPV	MIRR	AMIRR
<i>Project A</i>	744.675	14,7%	6,1%
<i>Project B</i>	2.319.189	7,1%	8,8%
<i>Project C</i>	829.756	10,6%	6,4%
<i>Project D</i>	396.827	10,8%	4,8%
<i>Project E</i>	2.236.505	8,8%	8,7%
<i>Project F</i>	2.128.129	8,5%	8,6%
<i>Project G</i>	3.042.409	7,7%	9,4%
<i>Project H</i>	290.541	12,7%	4,2%
<i>Project I</i>	418.953	8,7%	4,9%
<i>Project J</i>	321.540	11,6%	4,4%

Table 3. NPV, MIRR, AMIRR projects

4.6 Diversifiable risks

This paragraph discusses the diversifiable risks of pipeline projects. The diversifiable risks will be taken into account by calculating different cash flow scenarios. An interview was conducted to gain information about the diversifiable of risks in projects (Appendix A). The project specific risks for UT Quality are mainly risks related to non-payment, safety, illness, resources, failure of equipment/cars and legal risks.

The biggest risk for UT Quality is the risk for non-payment of the clients. During the project UT Quality sends invoices on a weekly basis to minimize the risk for non-payment. When non-

payment occurs, and the project owner will not pay or is not able to pay, the project will be aborted. Before projects get aborted, UT Quality will negotiate with the customer about these non-payment issues. In some cases, and especially risky projects a bank guarantee is needed in order to be certain of the payment.

Some customers do not acknowledge the defects in the welds of pipelines. The AUT technique which UT Quality is using is unconventional. Therefore, customers are quite reluctant to non-clear defects which can be seen by the technique of UT Quality and not by other common techniques such as radiography. There is a risk that the clients do not want to pay for the repair of the weld, when the defects can be found with AUT and not with other techniques. Repairing welds can end up costly, because the contractor has to bring back the machines and manpower to fix the weld and may charge it to UT Quality.

The project owner is responsible for the safety of the operators. The project owners must create a safe working place for the operators. UT Quality provides the project owner a list of requirements prior to the start project. The contractor is responsible for a safe working site including a proper accessible terrain for the AUT-trucks. Resource risks are related the availability of resources such as workers or equipment especially in periods of high work load. Resource risks are can also be risks when there is not enough fuel, water and electricity available. In this case, the customer is responsible for the supply of the fuel, water and electricity.

In case of an illness of injury of an operator, new replacement can be found easily with minimal delay of a project. Despite the small subsidiary in the Netherlands, there are operators available from Canada or other subsidiaries.

There is a chance that the AUT truck or AUT equipment will not function properly. This risk could lead to delays in the project. The AUT truck can be fixed by mechanics in the country of the particular project or new trucks have to be bought. There is extra AUT equipment available as a back-up when equipment fails to work properly. New AUT can be transported to the project's country. Both risks lead to a delay of the project. In case of a serious delay UT Quality might be fined.

Bringing in the AUT equipment in some countries can be difficult, due to legal rules. There is a possibility that the equipment will be stuck at the customs. The risk is that UT Quality has to pay an additional fee to let the equipment goes through the customs and that the project will be delayed. Otherwise, in risky countries where the chance where equipment will be held or stolen, the costs of new equipment will be included the price of the day rate.

It is difficult to include diversifiable risks into the discount rate. Therefore scenario analysis has been made to see whether the worst-case scenario will lead to a negative NPV. The scenario analyses of projects are attached to this report (appendix F). The worst-case scenario suggest a 20% decrease in the present values and the best-case scenario a 20% increase in the present values. The net present values for the worst-case scenarios for all the selected projects are all positive. Even when the worst-case scenarios of all projects suggest a decrease in present values by 75%, all projects will have a positive NPV. A note to this is that the purchases of new

equipment and cars/truck are neglected in the cash flow analysis. This is due to the reason that the purchases of equipment and vehicles are not for a particular project.

4.7 Prioritizing the feasibility of the pipeline projects

This paragraph will show the feasibility of the pipeline projects. All projects will be prioritized based on the risk and return. A project is feasible when the MIRR is greater than the risk-adjusted discount rate and when the risk premium of a project is lower than a riskier project with the same return.

A way to find a project's required returns is the security market line, which is based on the CAPM. There was no specific industry beta per country available. Thus, two different betas have been used in the calculation of the expected returns of a project. The industry beta for European countries was 0,99 and for the other countries the beta of emerging countries was 1,23 (Damodaran, A., 2014). The betas per project would have changed if industry betas per country were available. The theory implies that the projects should be on the security market line, and the expected returns are proportional to the beta of a security (in this case a project). Project I and E are highly overvalued, because the required rates of return are above the SML for its given risk level. These projects are located in Greece (project I) and in Israel, Cyprus and Greece (project E).

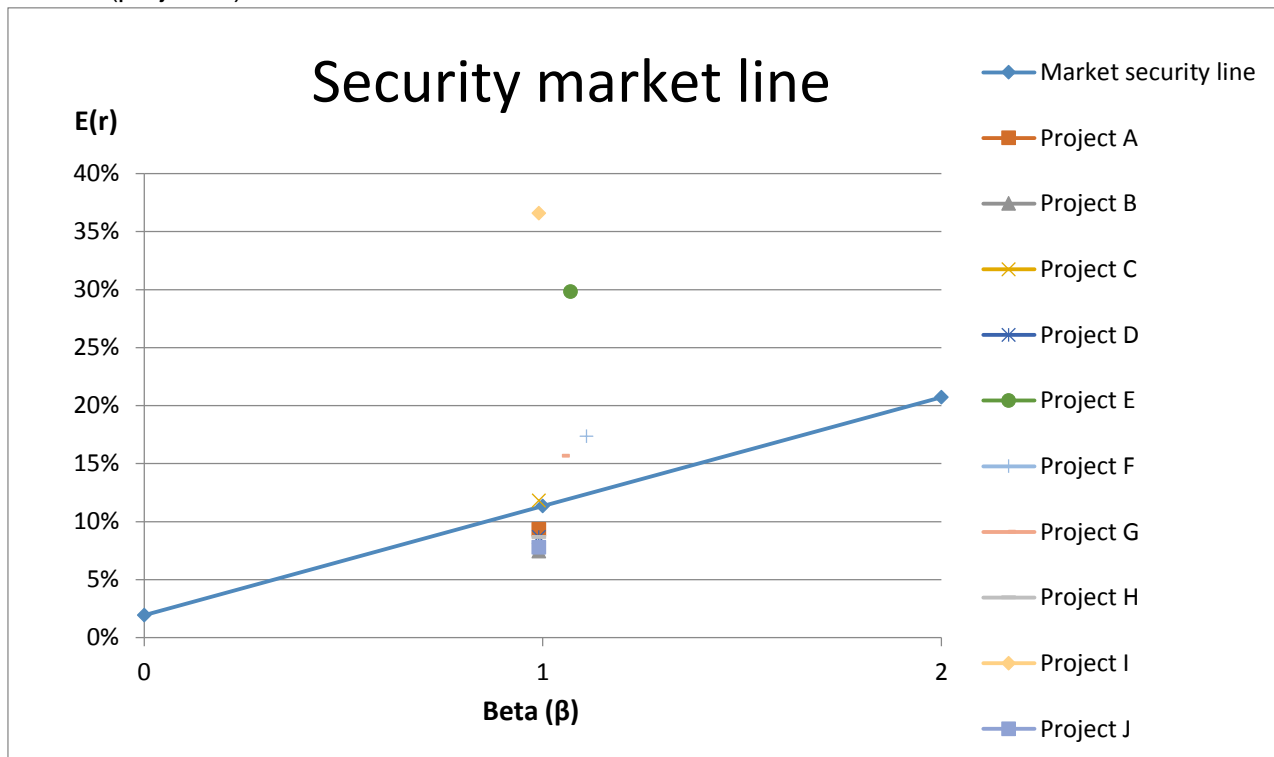


Figure 3. Security market line

All the returns of the future pipeline projects were higher than the risk adjusted discount rate. All projects could be executed. However, due to the limitation of resources, a list has been made to prioritize the most feasible project. The risk premiums of projects are plotted against the returns of the project. The efficient frontier (figure 4) shows the returns and risks premiums of the selected projects.

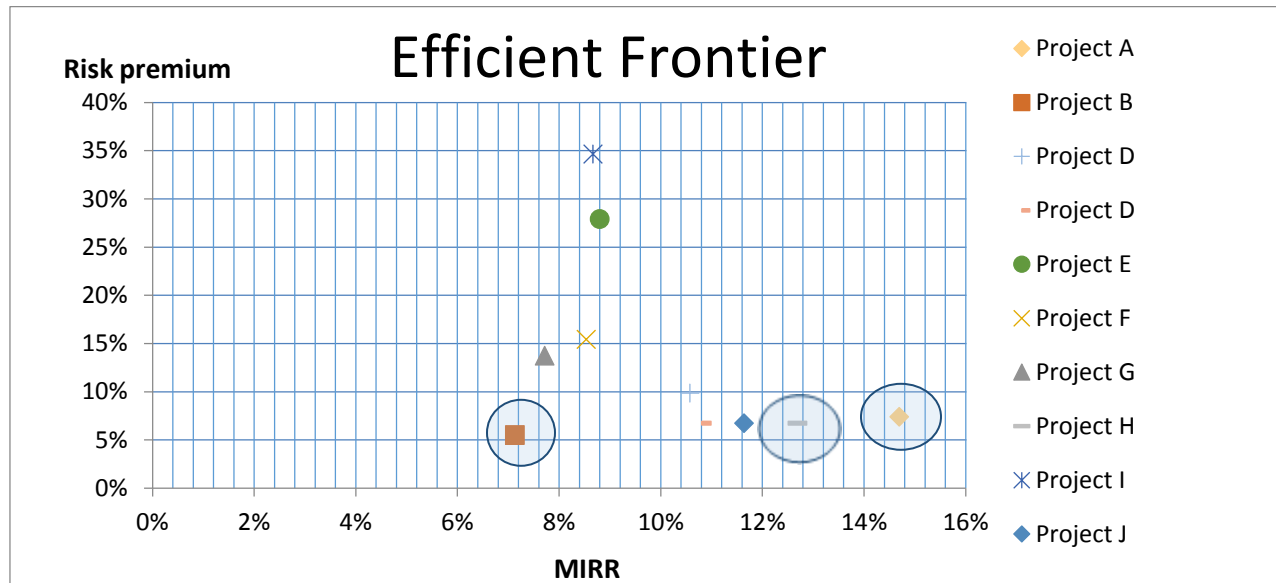


Figure 4. Efficient Frontier based on MIRR

The previous graph shows that three projects are most feasible when compared to the return and risk. Other projects can be neglected due to the higher risks and similar return. The most feasible projects in terms of risk and return as follows. Note: figure 3 does take into account the scale and time span differences of the project. Therefore, the following projects may look like they are most feasible, but these projects do have a relatively small time span.

Project	Project name	Countries
Project A	Odessa-Brody Project Poland section	Poland
Project B	Nordstream expansion of Lubmin- Rehden line	Netherlands, Germany
Project H	Caux-Roumois gas pipelines	France

Table 4. Feasible project's based on MIRR

Figure 5 shows the efficient frontier plotted against the adjusted MIRR and the risk-adjusted discount rate of the projects. Whereas the adjusted MIRR method takes into account the time span and the scaling of projects, but neglects risks and capital rationing. Therefore, all projects are discounted at the risk free rate of a ten year government bond of Germany 0,16% on a monthly basis and plotted against the risk premiums of the particular project.

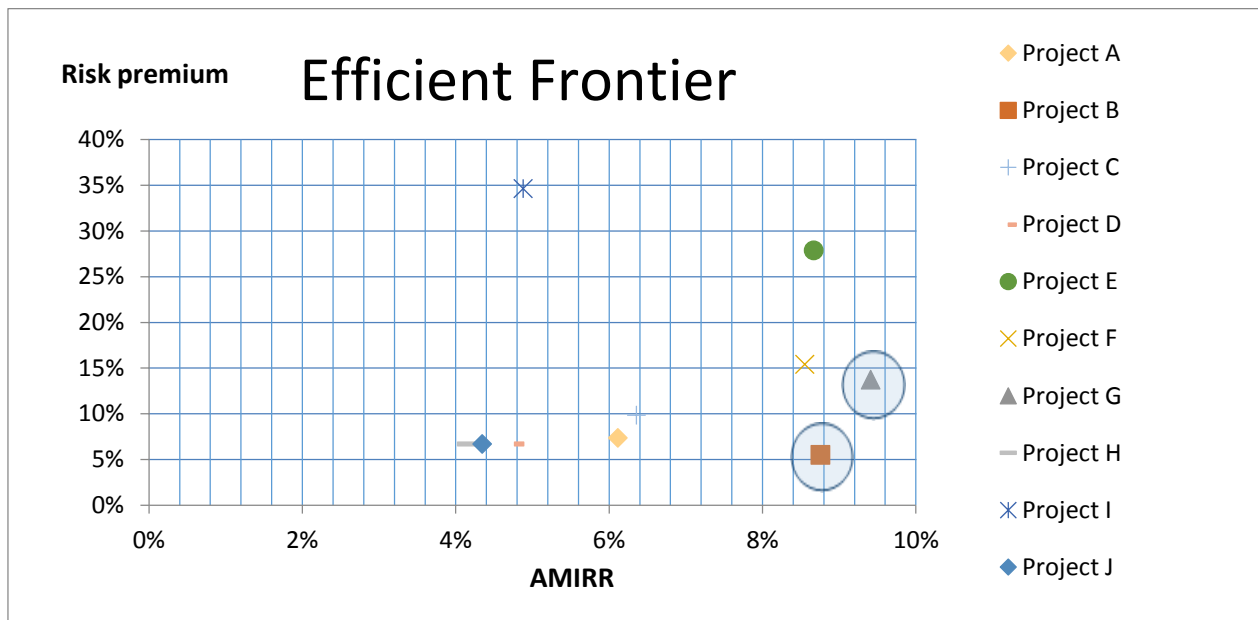


Figure 5. Efficient Frontier based on AMIRR

Project	Project name	Countries
Project B	Nord Stream expansion of Lubmin- Rehden line	Netherlands, Germany
Project G	Yamal Europe II Belarus to Hungary via Poland and Slovakia	Hungary, Poland, Slovakia, Belarus

Table 5. Feasible projects based on AMIRR

Chapter 5. Discussion

Organization's characteristics

UT Quality is a young company and was recently acquired by RAE energy. The strategic intent of UT quality is to roll out business in Europe. The company's competitive advantage is to provide specialized NDT service, such as Phased Array and UT technology. These services are more efficient than traditional technologies such as radiography. The core capabilities of UT Quality are the R&D in new techniques for NDT inspection. The competitive advantage of UT Quality is that it is one of the few players in the market that provide phased array services. Phased array is a relatively new technique in weld inspection, will become a popular technique in the near future. However, conventional techniques such as UT, TOFD and magnetic penetrant will not completely be cannibalized by this technique.

Based on the organization's characteristics and capabilities it is found that UT Quality is able to execute international projects. There is some alignment between the strategy and the intangible assets (human, information and organization capital). However, the human capital should be slightly improved. UT Quality is a young organization and struggles to find qualified personal for AUT inspection. In previous projects, Canadian operators were placed for projects in Europe. It turned out that these Canadian operators were more expensive than European operators. Also, retrieving a working permit for the Canadian operators was difficult and time consuming. UT Quality is planning to invest in a training center in order to qualify (new) operators for NDT techniques. At the current state UT Quality is training its operators at external companies. UT Quality has partnerships with companies in UK and Germany and wishes to have more partnerships in the France and Morocco in order to reduce language and culture barriers. According to the director of Indonesia, there should be a real time ERM system to automatically track all the locations of the equipment. Currently, all offices have an old-school system. According to the new owner of UT Quality, a new ERM-system called Netsuite will be implemented. This system will increase transparency and is able to show real time figures.

Selection of 10 projects

Ten projects have been selected out of a sample of 54 available future projects in and around Europe. The developed market screening model for project selection has been used to select the ten most interesting projects, based on size, accessibility, political risk, labor costs and ease of doing business. The market screening model (excluding the size criteria) and the discount rate of a project has been correlated. The sizes of projects were taken out of the correlation, because the size of a project is not related to characteristics of a country. A negative correlation can be maximum -1 and a correlation of 0 means there is no correlation between the variables. The correlation between the screening model and the discount rate is -0,76. The results suggest there is a strong negative correlation between the screening model and discount rates. Therefore, the market screening model is quite reliable for finding the most attractive markets as the discount rate of projects are correlated with the criteria in the market screening model. Figure 1 shows the correlation between the market screening points and the discount rates. Project D, H and J do have the same discount rate and points, because the projects are located in France.

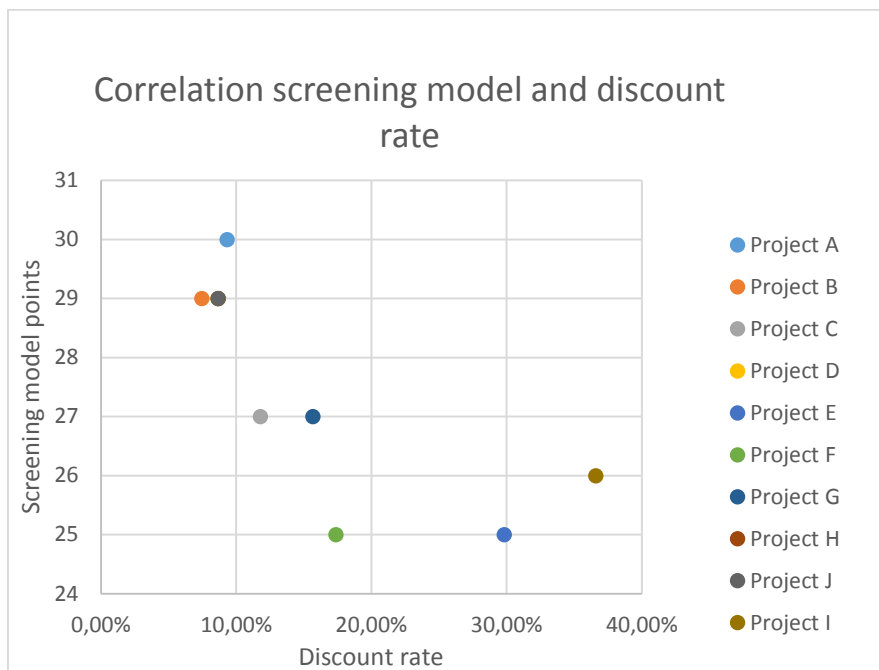


Figure 6. Correlation between discount rate and screening model

Among the large number of pipeline projects, very few projects can be selected to be executed. In order to select the right projects, 54 have been screened. There are various methods for the valuation of these projects. The most common method is the IRR which has major limitations. The limitation of the IRR method does not have a reinvestment rate, does not take in consideration the difference in (market) risks, time spans and scaling of projects. The NPV is a method where the discount rate itself is the major limitation, if a discount rate is overestimated, a project could be rejected, while it could increase the company's value. The MIRR does not take into account the differences time spans and scaling of project, but takes into account the reinvestment rate and risks related to projects. This method is clearly different from the easy IRR method. The MIRR can be adjusted to remove the time spans and the scaling differences of project by adjusting for all alternative projects to the largest life span and largest initial outflow. In addition, one discount rate should be used for all project alternatives to adjust the MIRR formula. This method leads to a consistency between the NPV and the adjusted MIRR.

Net present value

The projects with the highest net present value are Project G, Project E and B: Project G - Yamal Europe II pipeline has a NPV of € 3 million. Project B – the Nord Stream UK link that will run from Germany to the Netherlands has a NPV of € 2,3 million. Project E – East Med pipeline has a NPV of € 2.2 million.

Modified adjusted internal rate of return

Projects with the highest MIRR are projects Project A – Odessa Brody –Poland section with a MIRR of 14,69%, Project H Caux-Roumois – gas pipeline and project J Galsi pipeline - Corsica branch with a MIRR of 12,89%. The MIRR does not take into account the differences in time

spans and scaling, therefore smaller sized, low risk projects might appear more attractive compared to projects with a larger time span.

Ranking of selected projects based on the MIRR, it is clearly visible there is a consistency between the AMIRR and NPV. The AMIRR however does not take into account market risks, therefore the risks were plotted in a graph to find the efficient frontier. This efficient frontier was made in order to include the risks to the MIRR. The three most feasible projects are Project G, Project E and Project B according to the results of the AMIRR method.

Project name	AMIRR	NPV (€)
Project G	9,67%	3.042.409
Project B	9,01%	2.319.189
Project E	8,93%	2.236.505
Project F	8,81%	2.128.129
Project C	6,61%	829.756
Project A	6,37%	744.675
Project I	5,13%	418.953
Project D	5,02%	396.827
Project J	4,59%	321.540
Project H	4,39%	290.541

Table 6 Consistency AMIRR and NPV

Non-diversifiable risks

The project which bears the most risk is project is the I - Trans Adriatic Pipeline - Greece section. In order adjust risks in this project, the highest discount rate has been used (2,07% monthly). The second risky project is project E - East Med Pipeline. The discount rate for this project is 2,07% monthly. The least risky projects are project B, project D, project H and project J. The first project is a future pipeline that runs through Germany and Holland and a monthly discount rate of 0,60% has been used. The three other projects are small projects which are located in France and had a discount rate of 0,70%.

Diversifiable risks

Diversifiable risks can be diversified away in a large portfolio and these risks should not be included in the discount rate. However, scenarios offer insight in the project's return by adjusting cash flows of projects. When cash flows are adjusted to a 75% decrease as a worst case scenario, all returns and net present values of projects show a positive result. The costs of purchasing new equipment or a new car are not included in the cash flows, as they are not specifically purchased for a project. Thus, these costs can be seen as sunk costs.

Prioritizing via the risk-return spectrum

The market security line which is based on the CAPM formula has been applied to find an appropriate discount rate. The discount rates which were on or near the security market line, can be seen as quite reliable. But projects where the distance between the expected return and the SML was too big, those discount rates could be under or over estimated. Besides, there is a possibility that the betas of projects are not accurate, due to the fact that only two different beta's

have been used in the CAPM formula. On the other hand it could show that the application of the model is contradicts the assumptions of CAPM. For example the low beta of some projects will request a higher rate of return than other projects with the same beta. This supports the efficient market hypothesis, because it states that it is impossible to beat the market (all investors are rational). But in that case it shows that the CAPM does not work in applied research. Otherwise it can be seen as a irrational which supports the CAPM and shows that it can be applied. But then the efficient market hypothesis does not work. This model might be useful for assessing financial securities but it cannot always be used to estimate a right required rate of return for a project. However, other factors such as the size and the operating leverage of a project may affect a project's return and thus its discount rate as well.

The efficient frontier is a way to determine the most feasible projects based on risks and the AMIRR. The AMIRR takes into account the different time spans and scaling of projects. This method does not take into consideration the level of country and market risks, because the AMIRR assumes one single discount rate (risk free rate) for all projects. The risk premiums of projects can be taken into account when these premiums are plotted on the y-axes of the efficient frontier. This model is sufficient in finding the most attractive projects, because of the consistency between the AMIRR and the NPV. The projects which had lowest risks compared to the return the Nord Stream gas pipeline which is the expansion of Lubmin - Rehden line that will run from Germany and the Netherlands. The second project is the Yamal Europe II gas pipeline that will run from Belarus to Hungary via Poland and Slovakia.

Chapter 6. Conclusions, recommendations and limitations

Based on the results of preceding chapters, a conclusion will be made. The conclusion relates to the main question: *Which future pipeline projects between 2014 and 2020 could provide the easiest opportunities to profit from for UT Quality based on the return and risks?* In order to answer the question, research has been done regarding to the core capabilities and strategic readiness of the organization as well as the feasibility study of ten selected projects. This chapter also discusses the limitations of the applied research.

In order to answer the main question, both firm characteristics and the environmental characteristics were analyzed. The firm's characteristics gave an overview of the competitive advantage, core capabilities and the strategic readiness of the intangibles. The strategic intent of UT Quality is to grow aggressively in the European market with the focus on pipeline projects. From the perspective of the firm, UT Quality is providing innovative techniques for weld inspection and there is a possibility that it will convince contractors that phased array will be the future inspection method, due to its efficiency and it's a relatively safe method. The takeover of UT Quality by RAE Energy will lead to a full alignment between the human capital and the information capital. A new real time ERM-system will be implemented and the planning is to build a training center to train Dutch operators.

The screening model was needed in order to select ten projects based on five environmental criteria such as the size of the project, accessibility, political/legal risks, labor costs and bureaucratic delays. Out of a sample of 54 projects in and around Europe ten projects were chosen. There was a strong negative correlation between the points of the screening model and the discount rate of projects.

The MIRR, AMIRR and NPV of the selected projects have been calculated. Due to the differences in time spans and scaling of projects, there was an inconsistency between the MIRR and the NPV. Therefore the MIRR has been adjusted for these differences. These ten projects were assessed on their market risks via the CAPM and diversifiable risks via scenario analysis. The CAPM has been used as discount rate in the NPV calculations. Scenario analysis has been made in order to take into account the diversifiable risks. The scenario analysis showed that all projects net present value were positive if the cash flows were decreased by 75%.

Two models have been applied to find the most feasible projects according to the risk/return spectrum. The first model which has been used is the security market line and suggested that the most risky projects would give a higher expected returns and were linear correlated compared to less risky projects. The second model that has been applied is the efficient frontier where the AMIRR returns are plotted against the risk premium, provides an insight in the most feasible projects. All projects would add value to the company, but two projects were seen as the efficient frontier. As a result, project G and B were the most feasible projects in terms of return and risk. These projects run through the Netherlands, Germany (Project B) and Slovakia, Poland, Hungary, Belarus (Project G).

The results would not imply that the CAPM can be used for project appraisal, its assumptions are quite unrealistic. The discount rates which were on or near the security market line can be seen as quite reliable. But projects where the distance between the expected return and the SML was too big, those discount rates could be under or over estimated. Besides, there is a possibility that the betas of projects are not accurate, due to the fact that only two different beta's have been used in the CAPM formula. For now the CAPM calculates the required return of a specific project adjusted for its systematic risks. As mentioned before, return and risks do count for project appraisal but also the non-financial criteria do count, therefore the firm's characteristics have been taken into account in this research in order to recommend the most feasible project in terms of risk, return and the firm's characteristics.

Recommendations

Based on the firm's characteristics and valuation of the selected projects, UT Quality should aim for the expansion of the Nord Stream pipeline from Rheden to Rotterdam (Project B). UT Quality has a German partner and the fact that this project is very close the office of UT Quality, makes this project very attractive. This future project is very attractive due to its low market risk, high net present value € 2.319.189 and a relative high monthly internal rate of return of 9,0%.

The market screening model is an easy way to find attractive markets based on criteria. There was a strong negative correlation between the risks premiums of projects and the scores of the screening model. The criteria of the screening model have been developed based on data of the interview regarding this topic. This screening model did consist of five factors: size, accessibility, political risk, labor costs and ease of doing business. There are commercial screening models available to assess countries. An example of a screening model is the BERI index. The BERI index is a qualitative analysis of countries, and evaluates a country's investment environment on three area, operations risk, political risks and foreign exchange risk. The BERI index includes several factors related to these three areas and also includes a weighting on this factors. This index is presumably a better model to assess countries, but a subscription is needed to access this index.

This research limits its results by the application of the CAPM regarding the discount rate and security market line. There are existing models which can be used for determining discount rates, for example the Fama - French 3 - Factor model and the Arbitrage Pricing Theory. The Fama-French 3 factor model is based on the CAPM, but two extra factors are added; the firm size and market-to-book value ratio (Fama & French, 1993). Arbitrage Pricing Theory is also based on the CAPM, but includes several factors ranging from firm-specific factors to macroeconomic factor. This theory has an assumption which that the market is open to arbitrage. This implies that risk and return of a particular asset does not have to be linear related. The arbitrage of an asset would continue until it the risks and return are in equilibrium (Roll & Stephen, 1976). These two theories do provide a different and probably a better accurate discount rate, but these models are time consuming as there are more factors.

Limitations

This feasibility study provides a clear overview of the returns and risks of projects. However there are some limitations in this paper. The first limitation is that the costs of purchasing new equipment and vehicles are not included in the feasibility study due to the fact that the costs of these equipment are high. Therefore, the project's returns might look distorted. Secondly, UT Quality surcharges the customer with a standard for the costs of fuel, hotel, helpers and miscellaneous costs. Normally these costs are lower than the given surcharge. UT Quality could make more profit on a project when the real costs are lower than the given surcharge. Also the discount rate of projects in two or more countries is an average number. As a result, a project with an extreme risky country can be averaged out when it is among safe countries. Last of all, a discount rate is based on the CAPM. This model determines the discount rate of projects by taking into account the beta, market risk premium and the country risk premium. In the calculations of the CAPM, two different betas have been used EU industry beta and emerging market industry beta. Projects in countries such as Greece and Cyprus do have the same beta (volatility) as Germany and The Netherlands. The calculations would have been better if there were country specific industry beta's available. The country risk premiums are based on the CDS spread of countries or based upon country ratings by Moody's of January 2014. However, these spreads or ratings could have changed by time of writing this report. Therefore, the risk premiums of a project starting in 2015 can change significantly compared to the premiums in 2014, and so will be the discount rate.

Bibliography

- Akrani, G. (2012, January 25). *Types of Risk: Unsystematic and Systematic risk in Finance*. Retrieved January 7, 2014, from Kalyan City Life: <http://kalyan-city.blogspot.com/2012/01/types-of-risk-systematic-and.html>
- Alexander, C., & Marshall, M. (2006, April). *The Risk Matrix: Illustrating the importance of Risk Management Strategy*. Retrieved January 7, 2014, from Journal of Extension: <http://www.joe.org/joe/2006april/tt1.php>
- Baker, M. (2001). *Marketing: Critical Perspectives on Business and Management*. London, New York: Taylor & Francis group Imprint of Routledge.
- Berk, J., & Demarzo, P. (2011). *Corporate Finance*. Essex: Pearson Education Ltd.
- Brealey, R., Myers, S., & Allen, F. (2011). *Principles of Corporate Finance*. Singapore: MCGraw-Hill Inc.
- Brouthers, L., & Nakos, G. (2005). The role of systematic international market selection of small firms 'export performance. *Journal of Small Business Management*.
- Bryman, A., & Bell, E. (2007). *Business Research Methods Third Edition*. New York: Oxford University Press Inc.
- Cam, C. (2013, January 7). *Target Costing vs Cost-plus pricing* . Retrieved January 7, 2013, from Chron.com by Demand Media: <http://smallbusiness.chron.com/target-costing-vs-costplus-pricing-35302.html>
- Cbonds. (2011, January 19). *International bonds Belarus 2018*. Retrieved February 18, 2014, from Cbonds Financial Information: <http://cbonds.com/emissions/issue/14035>
- Cbonds. (2013, November 21). *International bonds: Serbia 2018*. Retrieved February 23, 2014, from Cbonds Financial information : <http://em.cbonds.com/emissions/issue/59597>
- Cisstat. (2014, January 8). *About Commonwealth of Independent States*. Retrieved from Cisstat: <http://www.cisstat.com/eng/cis.htm>
- Damodaran, A. (2002, January 25). *Estimating Risk free Rates*. Retrieved from New York University: people.stern.nyu.edu/adamodar/pdfiles/papers/riskfree.pdf
- Damodaran, A. (2003). Measuring Company Exposure to Country Risk: Theory and Practice. *Stern School of Business*.
- Damodaran, A. (2014, January). *New York University, Damodaran*. Retrieved February 6, 2014, from The data page: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html
- Davies, R., & Koller, T. M. (2012). Avoiding a Risk Premium That Unnecessarily Kills Your Project. *McKinsey on Finance* , 7-10.

- Dorfman, M. (2007). *Introduction to Risk Management and Insurance*. Englewood Cliffs: Prentice Hall.
- Dunn, M., & Cary, D. (1997). Adjustment of Modified Internal Rate of Return For Scale and Time span. *Proceedings of the Academy of Accounting and Financial Studies Volume 2*, 7.
- Economics, T. (2014, January 1). *Trading economics government bond yield Slovakia*. Retrieved February 23, 2014, from Trading economics: <http://www.tradingeconomics.com/slovakia/indicators>
- EFTA. (2014, January 27). *About EFTA*. Retrieved January 27, 2014, from EFTA: <http://www.efta.int/about-efta>
- Enerdata. (2013, October 7). *Poland postpones Brody-Plock oil pipeline with Ukraine*. Retrieved February 11, 2014, from Enerdata: http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/poland-postpones-brody-plock-oil-pipeline-ukraine_22738.html
- Eurostat. (2014, February 1). *Eurostat*. Retrieved February 20, 2014, from Long term government bond yields: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=0&language=en&pcode=teimf050>
- Eurozone Portal. (2014, February 7). *Euro area member states*. Retrieved from Eurozone Portal : www.eurozone.europa.eu/euro-area/euro-area-member-states/
- Evans, D., & Souder, W. (1998). *Methods for selecting and evaluating projects*. San Francisco: Jossey-Bass.
- Fama, E., & French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33.
- Fernandez, P. e. (2013). *Market risk premium and Risk free Rate used for 51 countries in 2013*. Madrid: IESE Business School.
- Financial Times . (2014, January 2). *Markets.FT.com*. Retrieved from Financial times: <http://markets.ft.com/research/Markets/Overview>
- GAZ system. (2011, March 1). *POLKOWICE-ŻARY GAS PIPELINE*. Retrieved February 21, 2014, from GAZ system: <http://en.gaz-system.pl/nasze-inwestycje/krajowy-system-przesylowy/polkowice-zary/>
- Gazprom. (2013, April 1). *Yamal - Europe 2*. Retrieved February 19, 2014, from Gazprom: <http://www.gazprom.com/about/production/projects/pipelines/yamal-evropa-2/>
- Goodman, L. (1961). Snowball Sampling. *Annals of Mathematical Statistics* 32, 148-170.
- GRTgaz. (2011, October 1). *Ten year development plan for the GRTgaz transmission network 2011-2020*. Retrieved January 15, 2014, from GRTgaz: <http://www.cre.fr/content/download/7982/70721/version/1/file/Annexe1GRTgazplana10ans-ve.pdf>.

- Guba, E. (1981). Criteria for Assessing the Trustworthiness of Naturalistic Inquiries. *Educational Communication and Technology Journal* 29, 75-91.
- Hishamuddin, M. (2006). Modern Portfolio Theory: Is There Any Opportunity for Real Estate Portfolio. *Malaysian Journal of Real Estate*, 13.
- Hollensen, S. (2011). *Global Marketing a decision-oriented approach*. Essex: Pearson Education Ltd.
- Hubbard, D. (2010). *Finding the Value of Intangibles in Business*. New Jersey: John Wiley and Sons Inc.
- International Monetary Fund. (2013, October 31). *World Economic Outlook Database GDP per capita in 2012*. Retrieved January 25, 2014, from International Monetary Fund:
<http://www.imf.org/external/pubs/ft/weo/2013/02/weodata/weoselco.aspx?g=2001&sg=All+countries>
- Jensen, M., Black, F., & Scholes, M. (1972). The Capital Asset Pricing Model: Some Empirical Tests. *Studies In The Theory of Capital Markets*.
- Kaplan, R., & Norton, D. (2004). Measuring the strategic readiness of intangible assets. *Harvard Business Review*.
- Kotler, P., & Armstrong, G. (2010). *Principles of Marketing 13th edition*. London: Pearson Prentice Hall.
- Kruger, P., & Landier, A. (2012). The WACC Fallacy: The Real Effects of Using a Unique Discount Rate. *Geneva Finance Research Institute*, 54.
- Kvale, S. (1996). *Interviews - An introduction to Qualitative Research Interviewing*. California: Sage Publications.
- Lanctot, P. (n.d.). *The Advantages and Disadvantages of the Internal rate of Return Method*. Retrieved December 19, 2013, from Chron: <http://smallbusiness.chron.com/advantages-disadvantages-internal-rate-return-method-60935.html>
- Lozier, T. (2011, March 4). *Risk Assessment: Creating a Risk Matrix*. Retrieved from ETQ:
<http://blog.etq.com/blog/bid/57768/Risk-Assessment-Creating-a-Risk-Matrix>
- Lumby, S., & Jones, C. (2007). *Corporate Finance: Theory and Practice*. London: Thomson Learning .
- Maplecroft, Marsh. (2014, January 1). *Maplecroft Political Risk 2014*. Retrieved January 27, 2014, from Maplecroft :
http://usa.marsh.com/Portals/9/Documents/Political_Risk_Map_MARSH_MAPLECROFT_2014.pdf
- Markowitz, H. (1952). Portfolio Selection. *Journal of Finance* vol 7, 16.
- Marshall, M. (1996). Sampling for Qualitative Research. *Family Practice* 13, 522-526.

- McKinsey & Co. (2004, October 20). *Internal Rate of Return: A Cautionary Tale*. Retrieved December 19, 2013, from CFO: <http://ww2.cfo.com/strategy/2004/10/internal-rate-of-return-a-cautionary-tale/>
- Moutinho, N., & Lopes, M. (2011). *Non-financial analysis in project appraisal - An empirical study*. Singapore: International Conference in Construction and Project Management.
- Natural Gas Europe . (2013, October 30). *Greece Hopes for Revival of East Med Pipeline Project*. Retrieved February 11, 2014, from Natural Gas Europe: <http://www.naturalgaseurope.com/greece-israel-cooperation-east-med-pipeline-revival>
- Natural Gas Europe. (2013, April 16). *A Possible Nord Stream Expansion*. Retrieved February 11, 2014, from Natural Gas Europe: <http://www.naturalgaseurope.com/a-possible-nord-stream-expansion>
- Porter, M. (1979). How competitive forces shape strategy. *Harvard Business Review*.
- Prahalad, C., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*.
- Randeniya, J. (2012, June 12). *Risk and Return asset pricing: An introduction to CAPM*. Retrieved March 3, 2014, from Let's learn Finance: <http://letslearnfinance.net/risk-and-return-asset-capm-2/>
- Renaud, R. (2009, February 26). *Investopedia: FAQ which is a better measure for capital budgeting, IRR or NPV*. Retrieved December 19, 2013, from Investopedia: <http://www.investopedia.com/ask/answers/05/irrvsnpvcapitalbudgeting.asp>
- Roll, R., & Stephen, R. (1976). An Empirical investigation of the Arbitrage Pricing Theory. *Journal of Economics Theory* 13, 341-360.
- Sandøy, M., Aven, T., & Ford, D. (2005). On Integrating Risk Perspectives in Project Management. *Risk Management: An International Journal*, 7-21.
- Scott, D., Martin, J., & Petty, J. K. (2000). *Basic Financial Management*. New Jersey: Prentice Hall Inc.
- Shenton, A. (2004). Strategies for Ensuring Trustworthiness in Qualitative Research Projects. *Education for Information* 22 , 63-75.
- Simdex Future Pipeline Projects*. (2013, December 17). Retrieved December 17, 2013, from Simdex: https://www.simdex.com/future_pipeline_projects.php
- SNAM. (2013, June 4). *Galsi, the decision about investment rescheduled*. Retrieved February 11, 2014, from Snam: <http://www.snam.it/en/Media/energy-morning/news-upload257.html>
- South-Stream info. (2014, January 1). *South stream information*. Retrieved February 21, 2014, from Sotuh Stream: <http://www.south-stream.info/en/pipeline/>

Srinivasan, B. (2008, February 19). *Project Vs Operational Work*. Retrieved December 13, 2013, from Leadership Champions: <http://leadershipchamps.wordpress.com/2008/02/19/project-vs-operational-work/>

The World Bank. (2013, December 31). *Ease of doing business index*. Retrieved January 27, 2014, from The World Bank: <http://data.worldbank.org/indicator/IC.BUS.EASE.XQ>

Trans Adriatic Pipeline. (2013, December 17). *Tap Confirms to Resolution to Construct TAP*. Retrieved February 19, 2014, from Trans Adriatic Pipeline: <http://www.trans-adriatic-pipeline.com/news/news/detail-view/article/430/>

Verschuren, P., & Doorewaard, H. (2005). *Designing a Research Project First Edition*. Utrecht: Lemma.

Appendix A –Interview transcripts

Interview - Rene Bezemer

Topic interview: Core capabilities and strategic readiness of intangible assets

Type of interview: semi-structured

Name informant: Rene Bezemer

Date: 27 January 2014

Duration: 30 min

File: Record_0001

MP = Maarten Polak

RB = Rene Bezemer (informant)

The purpose of the interview is to find the core capabilities and strategic readiness of intangible assets of UT Quality.

Introduction

MP: What is your position in this company?

RB: I am the general director of this company for Europe.

MP: What are the strategy and objectives of UT Quality between 2014 and 2020?

RB: The main strategy for UT Quality is to roll out the business in Europe. Recently, RAE services acquired UT Quality recently and they want to invest a lot of money in UT Quality by setting up a training center. UT Quality is specialized in Automated Ultrasonic Testing (AUT) and Phased Array. But with the training center we would like to train people as such that they can do other techniques as well like magnetic examination and radiography. The goal is to have a double turnover compared to last year and in 4 years it has to be 10 times.

MP: What is the competitive advantage of UT Quality?

RB: Until now we have specialized in AUT and Phased Ray, but due to the acquisition we have to test with several techniques, while the competitors use less advanced and fewer techniques.

Firm's characteristics

MP: The core capabilities of a company cannot be imitated can provide potential access to several markets and should make significant contribution to the customer benefits. Therefore, I would like to know what the core capabilities are of UT Quality.

RB: We have good systems due to the development department; UT Quality builds their own machines, while competitors are buying them. When we make such systems we continuously get feedback from the

users and customers, and by this the research department is able to improve its systems what could increase the customer benefits. Also the employees are skilled and well trained, and if they have problems with the systems, they give feedback to improve it.

MP: Intangible assets can be divided in three categories of intangible assets such as Human Capital, Information Capital and Organization Capital. Each aspect can be measured and compared with the strategy of the company. If you look at the strategy of UT Quality, in what extend are the skills, talents, and knowledge of employees aligned with the strategy. I.e. is there a gap between the organization's capabilities and the human capital in order to carry out the international projects?

RB: We have in Canada 300 NDT employees, the idea is to let them come over and do the work. But that was not that easy because we had to get the working permit and we first needed to prove in Holland that there were no NDT-skilled people before we could get the Canadian employees here. So we have invested a lot in advertisements and such. First we placed advertisements in the Dutch media, and then we had to advertise for a European advertisement agency. We did not get the people we needed so finally we did get our working visa for the Canadians. However, they were consuming all the profit, because they were expensive. It was nice to start up, but now we are looking for new guys therefore RAE and we want to build a training center here in the Netherlands to acquire local employees. This will lead to a reduction of costs because normally we train employees at costly external training centers. We would like to make a step to have a partnership in France and Morocco. We have partnerships in England, Germany and we are looking for more partnerships.

MP: Information capital measures how well the IT portfolio the critical internal process supports. In what extend is the IT portfolio ready to support UT Quality's strategy to execute projects in Europe, North Africa and CIS-countries?

RB: We had 4 small projects in abroad, and that went very well. So we are also ready for more business in the European markets and further. There are not so much requirements to do a project abroad. The employees need a hotel and a truck for the testing and a small office space. It is not so shocking. When we received a contract we ask also the customer to arrange certain things, safety, first aid, water, power and internet. We have a check list for that. In order to send information to the office, the availability of internet is the most important.

MP: Organization capital can be measured by the degree of culture, leadership, alignment and teamwork. For culture: to what degree are the people in the organization aware of and internalized the mission, vision and core values?

RB: We need to grow everyone knows that here, we also look at the safety of employees and we don't want to use radiography as it is dangerous, therefore we signal that to the customers that we got other techniques to test the quality of welds.

MP: For leadership: to what degree are employees mobilized towards the strategy?

RB: We have a meetings for example safety meeting, and we have a commercial training for the employees. The operators need to realize that where they work there is a potential contract in the future. They know the first news, because they are the closest to the persons with the knowledge of interesting projects. Also we have frequent meetings.

MP: In what extent are goals and incentives with the strategy at all levels of the organization?

RB: We are a small company so the goals and the strategy can be easily transferred to all the levels. This is done via meetings and such.

MP: To what degree is knowledge with strategic potential shared in the organization?

RB: We are a small company, so every employee is more able to tell more ideas. When we hire new people we let them work together with the more experienced employees in order to transfer the knowledge. I also visit often people who are working abroad to keep in touch with them and share experience and knowledge. And every signal will be picked up and send to the R&D department.

RB: Overall, what of the categories can be improved (culture, leadership, alignment and teamwork) in order to be ready for executing international projects?

We need to do a lot because we are so small and we want to grow. We need to do more frequent meetings, and a later stage we will have project leaders. They will bring everything in line as well. At the moment we have small projects, but at a later stage we need project managers to make an alignment.

Interview – Michel Bezemer

Topic interview: Defining selection environmental criteria

Type of interview: semi-structured

Name informant: Michel Bezemer

Date: 17 January 2014

Duration: 45 min

File: Spraak001 (only 5:00 minutes, by accident due to limit of record application)

MP = Maarten Polak

RJ = Reinier Jumelet

MB = Michel Bezemer (informant)

Purpose of interview: define the non-financial criteria used for the selection of projects.

MP: What is your position in this organization?

MB: I am commercial manager of UT Quality in Europe, my function is to obtain contracts from contractors to inspect the quality of the welding. In short words, improve business growth.

MP: What is the organizational structure of UT Quality?

MB: The core business of UT Quality is inspecting the quality of welds for pipelines and for industrial welds such as tank inspection etc. UT Quality has several offices on the world in almost every continent. The headquarters of UT Quality is placed in Canada.

RJ: Are the decision rights of the company centralized?

RB: Not really, every subsidiary is directed by a general director, the director makes decision for the subsidiary. Only decisions related to investments and such are taken by the CEO in Canada. Furthermore, every subsidiary has its own commercial director, project manager and administration staff.

MP: What sizes of pipeline projects are seen as an opportunity?

MB: Every size of the pipeline is welcome. We should take all possible opportunities in a range from 1km to 2000km. The financial margin of pipelines is something where we look at.

RJ: If you have to transport equipment to Southern Europe for a small pipeline, is it feasible to do the project?

MB: Well, it depends on the location of the project, in particular the transportation costs of the equipment for a project. For example in the Benelux all lengths of pipelines are feasible. In France, Germany, United Kingdom and Scandinavian countries pipelines approximately 50km pipelines are feasible. In Southern Europe, the Balkan and Turkey pipelines of around 150km are attractive. In the CIS countries pipelines of around 200km are preferred. At the end it is the margin what counts.

MP: What European, North African, Middle Eastern and CIS countries are in favor to investigate?

MB: Well, we would like to focus on Western Europe, the Balkan region, South Africa maybe and North African countries are interesting. But we do not favor to do business in African countries which are unstable/dangerous.

MP: What are the capabilities of UT quality regarding the allocation of resources to particular projects? (employees, machinery etc)

MB: It depends on the size or diameter of the pipeline projects. With long pipeline projects we often find partners in the country or we fly people over from other subsidiaries of UT Quality. The capabilities are sufficient for current and future business.

RJ: How do you find the suitable partners in the particular country?

MB: We look at competitors in the country of the planned project, and then we find a suitable competitor to work together. The competitor must be relatively small compared to us, so the partner will not be a threat to us. The partner often does not have the equipment or experience to do tests. We definitely will not work together with companies with the same size as UT quality.

MP: Would UT Quality execute projects in countries with a poor skill level of English?

MB: Well, we would still do the projects, the lack of English skill level does not really matter. There is always someone who speaks the language. However, at partnerships in particular countries it is useful that workers speak English.

MP: Does the state of the economy of a country matter for the selection of projects?

MB: The state of the economy of a country does not matter, because we do business with private companies. We just want to be sure that the account receivables will be paid. The only exception is when the government contracts UT Quality, but that is rarely the case.

MP: Would UT Quality select projects in countries with political or legal risks?

MB: It is possible that we lose equipment in the country due to regulation, we can write the equipment of during the project. So the risk of missing equipment due to regulation will be avoided by including the total value of the equipment in the invoice. We will select any project, but we have to be sure of the safety of personnel. We absolutely do not want to do projects where the safety of employees is in danger.

MP: What political issues or legal issues are affecting the selection of projects?

MB: I have been explaining legal risk but you should focus at the overall risk of executing a project and not only legal issues or political issues. We just want to be certain that the contractor pays the invoice and that is a main risk. Therefore to, avoid payment risks we have bank guarantees or we ask the payment in advance from the contractor.

MP: Are countries with a high or low labor cost in favor for project execution?

MB: We look at the margin of the projects, not necessarily the labor costs in different countries. For example we could do a project in Norway where labor costs are high. The revenue should be also higher in Norway than in a country where labor costs are cheaper. We ask a customer a fixed amount of money for the costs of a helper. For example, we can get this helper from the Netherlands, but if the project is in Poland we would like to hire local people, because it will increase the project's margin.

MP: How are volatile currencies managed during the project of a particular country?

MB: Outside of Europe everything is being paid in US dollar. So we reduce currency risks by invoicing in US dollar.

MP: Are there other not mentioned criteria that UT Quality uses for market selection?

MB: It is not that we only select the projects, the contractors of a project select us to do the job. The contractors ask several quotations of several NDT companies and will select the NDT company with the right price and quality. But take in consideration that we always can reject a project opportunity. Usually, we take project opportunities but we have to look at the pre-validation and risks. We calculate per invoice the daily rate and the associated costs. We will reject the project if the project's returns are negative.

RJ: Does UT Quality approach contractors or do they approach UT Quality?

MB: Sometimes we get approached and sometimes they approach us. It totally depends on the situation. Day to day contacts also provides information about projects.

MP: If UT Quality got selected for the projects, will UT Quality get contracted for the whole project?

MB: Usually, UT Quality get selected for a part of the pipeline project and other contractors get the rest of the pipeline project, but it is also possible that UT Quality will be selected for the whole project. It depends on the size of the project and the desires of the contractor. With smaller projects we usually get the whole project but with large projects we receive a contract for a part of the project. It can also happen that we work together with a NDT company where they test with less advanced techniques and UT Quality tests with more advanced techniques.

MP: Are there any other criteria used for project selection such as climate and geographic location of the projects?

MB: Not really, because we take any opportunity there is. The contractor must take action when the soil is not good for operations. They also should make the pipeline accessible to other machinery, so this should be no problem for us. We do not take in consideration the climate in project selection, because in the past we have had operators working in arctic temperatures and extreme warm weather.

Interview - Rene Bezemer and Michel Bezemer

Topic interview: Diversifiable risks

Type of interview: semi-structured

Name informants: Michel Bezemer, Rene Bezemer

Date: 6-2-2014

Duration: 20 min

MP: Maarten Polak

MP: Michel Bezemer

RB: Rene Bezemer

The purpose of the interview is to gain information about the diversifiable risks during a project.

MP: Could you tell me what the diversifiable or project-specific risks are during the preparation and execution of a project. You can think of business risks, financial risks and operational risks in similar projects.

MB: Personal risk, such as safety related issues and illness. Other risks are related to the availability of resources such as workers or equipment especially in periods of high work load. Risks related to other resources such as diesel, water, electricity are the responsibility of the contractor. The contractor is also responsible for a safe working site.

RB: Also the risks of failure or malfunctioning of equipment or cars are important risks for executing the project. The weather and terrain has some influence as well. In the worst case, the contractor should provide UT Quality solutions for the bad accessible terrain. Often the contractors don't provide solutions for the bad terrain and it can happen that an AUT Truck can be destroyed by pulling out the trucks from the mud.

MP: What are the financial risks occurring during projects?

RB: Non-payment is the financial risks for UT Quality regarding, we invoice every single week. If a contractor stops paying we stop business. Before that we negotiate about the non-payment (why or issues). For example when a contractor refuses to pay after 1 or 2 months there might be consequences for the project, with eventually aborting the project. Some customers do not acknowledge the defects in the welds we find. With our techniques we find defects which cannot be seen by conventional machines. We use new and more precise ultrasonic sound to find defects, but conventional techniques such as radiography do not see all defects in the welding techniques. With these non-clear defects the customer does not want to repair the welds for these non-clear defects, due to the high amount of costs. So the customers do not want to pay for the costs of bringing back the machines and manpower to fix the weld again.

MP: Considering the above-mentioned risks, what risks are considered important?

MB: Well non-payment is the biggest risk for us, without money inflows we cannot invest in new equipment, trucks and leaves a negative return of the project.

MP: How are the risks of non-payment mitigated?

MB: In the case of non-payment some cases we ask bank guarantee with the customer so we are guaranteed that UTQ will be paid or the customer should pay the costs of preparation(validation, calibration block etc) prior to the project. We send the customer weekly invoices to minimize the risk of non-payment as it can be detected at an early stage of the project.

MP: How about the risks for the illness and safety of personal?

MB: These risks can be solved, for example when our crew is on a project and the operators get ill or something. They can be easily replaced. There is always extra AUT equipment available at a project. More equipment can be send to the working site in case of the need of more equipment. In case of a broken AUT-truck, new ones can be bought in the project's country or can be driven from the Netherlands to the project working site.

RB: It is still a risk it does not mean we got a box with operators here, but we can always fly in personal from Canada or other subsidiaries. There will be some delays in the project but we are able to continue with the project, and it is possible that we get a penalty from the customer in that case.

RB: In the case of that equipment is stuck at the customs, we cannot deal with this risk, if it happens we cannot keep on sending this equipment to a particular country. This issue is quite common. Within the European Union it is no problem at all. When a project is outside the European Union this risk is quite big. If you want to ship it to Africa or Asia is will become an issue. First of all, it is for political reasons we have to pay a lot of money to get the equipment though the customs. Secondly the equipment will be delayed on the working site.

MP: How do you mitigate the risks of losing equipment in a particular country?

MB: For the risk of losing equipment in high risk countries, we include the cost of the equipment in the day rate price of the project.

Interview - Tim Polinelli

Topic interview: Firm characteristics, pipeline questions

Type of interview: semi-structured

Name informant: Tim Polinelli, General Manager Indonesia

Date: 26 March 2014

Duration: 60 min

File: Record_0003

MP: Maarten Polak

TP: Tim Polinelli

The purpose of interview is to verify data about topics related to the firm's characteristics and pipeline projects.

Questions

MP: What is the competitive advantage of UT Quality?

TP: Innovation of our AUT equipment that is how it was over the past few years, with the new acquisition there will be new competitive advantage will be created, due to the future vision that other processes will be included in the services of UT Quality such as coating etc.

MP: What is UT Quality's strategy and objectives between 2014 and 2020?

TP: People are getting their heads around due to the acquisition, but the aims in to grow aggressively in the coming years with exponential numbers.

Firms characteristics

MP: The core capabilities of a company cannot be imitated can provide potential access to several markets and should make a significant contribution to the customer benefits.

TP: Besides our own equipment, every engineer must have competences regarding the testing.

MP : According to Kaplan and Norton (developers of the Balanced Score Card) the value of the intangible assets can be measured between the degree of alignment between the strategy and the intangibles.

Categories of intangible assets are Human Capital, Information Capital and Organizations capital

TP: Is there is a full alignment between the strategy and the Human Capital (skills, talents and knowledge)?

There are 300 NDT technicians which are mainly local people. We need to train these people. From what I know all country must first find local people before hiring expats. We train our own people in our own training centre instead of training people externally. Training people externally would costs us significantly more. We try to hire people who are coming directly from university, because they are more English skilled and have a high degree of knowledge.

MP: Is there a full alignment between the strategy and Information Capital of an organization? I.e To what extent are the IT systems ready to support UT Quality's critical internal processes?

TP: Regarding to pipelines, the IT systems are old school as they are not in the real time, in a global environment on a daily basis, a real time system is a must but it requires the correct in and out put. It's hard to see where the AUT systems are on real time basis. However with the new acquisition a new ERM system called Net Suite will be implemented

MP: Last, the Organization Capital can be measured by the degree of culture, leadership alignment and teamwork. For the culture: to what degree are the people in the organization aware of the mission, vision and core values?

TP: The values of UT Quality is family, everyone in the organization is a family. Here in Indonesia we offer Indonesians a healthcare insurance for the employees and his/her family. We sell this to others that we are one family.

MP: For leadership: to what degree are employees mobilized towards the strategy?

TP: The strategy we use is focus on the client and we base our strategy towards the needs of a client. The reason for this is that we don't want to spend money on things the client does not need.

MP: Are all the goals, incentives and strategy at all levels of the organization?

TP: As the roll of the director here in Indonesia, I am here to service my people I need to make sure everything what my employees need they will get it with my allowance. This is to motivate the people to do their work. We have incentives here for people for at all levels of the organisation as well, bonuses are given based on the achievement.

MP: For knowledge to what degree is knowledge with strategic potential shared in UT Quality?

TP: The supervisor on site sends a daily report (with the needs and comments of the supervisor) also monthly reports. The office manager and the store manager needs to send monthly reports as well. Other departments such as finance we get a daily report, due to the fact we are a cash flow company. We send the reports to Canada, based on two formats: health and safety and finance.

Pipeline projects

MP: What sizes of projects abroad can be seen as an opportunity ?

TP: Well any kind of pipeline project, but what counts it the technical aspect of the job, the more techniques used the more profit etc.

MP: What are the capabilities of UT Quality regarding the allocation of resources to particular projects?

TP: From a global perspective, we have the most equipment available compared to other competitors. At the moment the majority of the equipment is stored in Canada (as it functions as a hub). However transportation from Canada to other countries is very expensive. The new owner would like to make another hub in Indonesia to reduce transport costs.

MP: If UT Quality wants to partner in a foreign country, how does UT Quality finds suitable partners?

TP: In Malaysia you need a physical office, we currently have a joint venture or partnership with another company in order to do a project in Malaysia. The downside is that you lose profit and control. And some cases you basically give away the technique. In some countries, the local companies find the local people to do a project and UT Quality provides this partner the procedures and the techniques, and this is dangerous.

MP: Would UT Quality select projects in countries with political or legal risks?

TP: We do look at political risks, the subsidiaries are self directed companies (bv's etc) therefore we can reach different markets. For example the office in Dordrecht is not allowed to work in Iran for example due to Western Governance. The Indonesian subsidiary is allowed to do a project for example in Muslim country. However, with the acquisition we are not allowed anymore to execute projects in Iran because the

new owner is an American entity. To bring in consumables or equipment in a political risky country, we have to set up a partnership or joint venture with a company in that particular country.

MP: How are (volatile) currencies managed during a project?

TP: Here in Indonesia we invoice either rupiah, US dollar and Sing dollar. Especially the rupiah has declined and is highly fluctuating, we have to take that in consideration. Also when we do overseas projects for a company in US dollar and have to exchange them in to rupiah this is a big risk. In case of this risk, we share this risk together with company by writing down the exchange rate in the tender document.

MP: How does UT Quality acquire projects, do the contractors get approached or do the contractors approach UT Quality?

TP: In the start we had to approach clients from the start up in 2007, now we have a lot of memorandum of understandings and we get a lot referrals. However we still have to approach new customers, because new appointed project managers do not know us. So there are three ways of acquiring projects.

Interview - Jerry Henzen

Topic interview: Firm characteristics, pipeline questions
Type of interview: semi-structured
Name informant: Jerry Henzen Operator
Date: 26 March 2014
Duration: 25 min
File: Record_0004

MP: Maarten Polak
JH: Jerry Henzen

The purpose of interview is to verify data about topics related to the firm's characteristics and pipeline projects.

MP : What techniques of NDT are available?

JH: Phased array, this company is one of the few company who is providing phased array in the European market. We also offer clients phased array combined with TOFD (AUT). Other techniques we provide is hand US, radiography, magnetic penetrant.

MP: What are the disadvantages and advantages of NDT technique?

JH: Radiography – radiation, everyone has to leave the area, less efficient, works in unreachable areas with more pipes in a row.

Phased array – Several angles of UT, fast, everyone can do their work in the same room, does not work in unreachable areas with more pipes in a row. We can see exactly where the weld error is, and the weld can be faster repaired.

Hand UT – one angle, simple technique but
TOFD, UT

MP: How about the competitors that use the same techniques?

JH: We have a specialized system (helix scanner) which a click system, while others for example RTD the biggest player in the market have a loose system. This system is fixed and no movements will occur.

MP: What is the competitive advantage of UT Quality?

JH: The quality of the images of the inspected welds, we are faster and the R&D is developing this machine and is continuously improving the equipment.

MP: What method will be used in the future?

JH: In the coming years Phased Array will be popular and radiography will be less popular. In the start we did not have much work, but now we see an increase in orders for NDT testing via Phased array.

MP: The core capabilities of a company cannot be imitated can provide potential access to several markets and should make a significant contribution to the customer benefits. What are the core capabilities of UT Quality?

JH: The system is the core capability of the company, because it is developed by our own research department.

MP: According to Kaplan and Norton (developers of the Balanced Score Card) the value of the intangible assets can be measured between the degree of alignment between the strategy and the intangibles. Categories of intangible assets are Human Capital, Information Capital and Organizations capital? Human Capital: With recent take over and strategy of UT quality, will there be enough Human capital to execute the jobs?

JH: We do not have enough employees here in Dordrecht, but we always can get people from subsidiaries from Canada, USA and even Flexibel (freelance company). Here in Holland it is difficult to train and keep the employees within the organization, due to the fact that the work is irregular and employees might work abroad for a while. This industry is also not known and this could be also a reason why not so many people are interested to work for us.

MP: Organization Capital can be measured by the degree of culture, leadership alignment and teamwork. For the culture: to what degree are the people in the organization aware and internalized the mission, vision and core values?

JH: We are a small company, no one is a number and we are a small family since most of the employees work here since the establishment of this subsidiary.

MP: For leadership: to what degree are employees mobilized towards the strategy?

JH: Everyone here is listening to the director, during lunch for example. We are all aware for the future growth of this company and we need to penetrate the market with phased array.

MP: Are all the goals, incentives and strategy at all levels of the organization?

JH: This is a flat organization so almost everything is discussed with each other. The most important things do even the operators.

MP: For knowledge to what degree is knowledge with strategic potential shared in UT Quality?

JH: We give feedback to the director of what we do on site. This feedback will be taken into consideration and used for next project. At the other knowledge from the top is shared via meetings or personal communication.

Pipeline projects

MP: What resources are required in order to execute projects?

JH: Besides the equipment, you definitely need a four-wheel drive, an operator, a technician and a helper. I prefer always an extra employee with the knowledge of the AUT systems. Calibration block, fuel, a band for the equipment so it can roll around the pipe. Water, or water with anti freeze.

MP: Would UT Quality select projects in countries with political or legal risks?

JH: We have had no projects in risky countries, because we are in Europe but it is a possibility that we can execute projects in risky countries, but in that case we only provide the equipment en knowledge to a local company. So the risk will be reduced.

MP: Which operational risks are related to the execution of projects?

JH: Failure equipment is a big risk, therefore we have extra equipment . Cars can stuck in the soil and this could lead to a delay in the project, but also the welders will experience the same with their trucks. Health or safety risk can happen, for example last year an operator had a pin in his hand. But it did not lead to a delay of the project, because we are always right after the welders. In the case of illness of injury of an operator a new one will be called.

MP: How much does a new machine cost?

JH: The whole system costs 250.000, but we got an reserve system with us during a project and most of the time only parts of the system breaks down.

Interview – Jos de Visser

Topic interview: NDT techniques

Type of interview: semi-structured

Name informant: Jos de Visser, Inspection Kuwait Petroleum Europoort

Date: 27 March 2014

Duration: 25 mins

MP: Maarten Polak

JV: Jos de Visser

The purpose of interview is to verify data about topics related to the firm's characteristics and NDT techniques.

MP: What techniques for NDT are available?

JV: TOFD, UT, Magnetic testing, Visual inspection and radiography is also important and must be a core competence of a operator, Eddy current testing, Magnetic Flux leakage. The most common techniques is TOFD, UT, MT and radiography. Phased array is a new technique on the market and will become bigger in the coming years. However, it is still not accepted by the EU and it will take a few years before phased array will become accepted in this market. But in my opinion this new technique has potential and will be more used in the near future.

MP: What are the disadvantages and advantages of NDT technique?

JV: Each technique has its advantages and disadvantages and therefore these techniques will not replace each other. For example radiography will be used in rooms for pipes which is fixed to a plate. Phased ray, UT or TOFD can only measure a pipe when it is able to scan around the whole weld. Regarding to pipelines, the two or three techniques are used and if all techniques do not find weld defects then a team could move on.

MP: Is UT Quality's technique more efficient than the technique of competitors?

JV: We hired UT Quality's services via another NDT company named SGS, they had been working on the turnaround for a few months already and the operators of SGS were fatigue, and were not able to work in the holidays. Then SGS hired UT Quality to work in the holiday. It was difficult because the employees of UT Quality were here for the first time and did not know the way on the plant. However, these people were not fatigue were able to do a lot of work. But we cannot compare the differences in the techniques UT Quality used and its competitors, but we only know that during the turnaround in the holiday the work of the NDT operators was good and within schedule.

Interview - Cor Brouwer

Topic interview: Information about UT Quality regarding

Type of interview: semi-structured

Name informant: Cor Brouwer, Purchaser Kuwait Petroleum Europoort

Date: 28 March 2014

Duration: 10 mins

MP: Maarten Polak

CB: Cor Brouwer

The purpose of interview is to verify data about topics related to the firm's characteristics

MP: What are your experiences with UT Quality?

CB: Well the first time UT Quality did a job for us was during the turnaround of this plant. SGS is our main contractor regarding weld inspection , but they subcontracted UT Quality in the Christmas holiday. We were very glad, with the results and quality delivered by UT Quality. Other subcontractors did not deliver such good services as UT Quality. UT Quality was able to immediately provide employees who were able to work at different shifts and we needed this. The turnaround of the plant was behind schedule, and they helped us out.

MP: How was the contact established between the company and UT Quality?

CB: Two months after the job was done, Michel Bezemer went to us for a visit to give a presentation about the company. I was there during the presentation and I have forwarded the presentation to the inspection department.

MP: Based on what criteria or reasons did you decide to do business with UT Quality?

CB: UT Quality was contracted by SGS and therefore we did not involve in the decision, we were surprised by the quality of the services. We have told our main contractor that they should sub contract UT Quality if there is extra work.

Appendix B - Project screening model

Project screening model example

Project name	Polkowice to Zary gas pipeline
Total size project in km	66 km
Countries	Poland
1. Size in km	3
2. Accessibility	10
3. Political or legal risks	7
4. Labor costs	5
5. Ease of doing business	8
Total points	33

Project ranking

Project number	Project name	Total score
27	Odessa-Brody Project Poland section	40
43	Nord Stream Britain Link - Onshore section Lubmin to Rheden (expansion)	39
12	Galsi gas pipeline - Cagliari - Olbia	37
14	Yamal-Europe II - Belarus to Hungary via Poland and Slovakia	37
3	Nord III gas pipeline	35
52	East Med Pipeline - Cyprus and Israel to Western Europe - gas pipeline	35
54	South Stream Bulgaria and Serbia	35
2	Caux-Roumois gas pipelines	34
8	Trans Adriatic Pipeline (TAP) - Greece section	34
13	Galsi gas pipeline - Corsica branch	34
1	Polkowice to Zary gas pipeline	33
35	White Stream - Phase 1 - Onshore Section Sangachal to Supsa gas pipeline	33
40	Nord-est pipeline Loop - Morelmaison and Voisines gas pipeline	33
45	Ludwigshafen to Carling ethylene and propylene pipeline	33
47	Galsi gas pipeline - Olbia to Piombino - gas pipeline	33
34	Azerbaijan-Georgia-Romania Interconnector	33
31	Tauern Gas Pipeline	32
46	Johan Sverdrup Development Project Avaldness field	32
15	Ghedamess basin to Gabes gas pipeline	31
29	Odessa-Brody Project Ukraine Section	31
30	South Stream Southwestern - Onshore Otranto to Brindisi	31

Project number	Project name	Total score
5	Veurne interconnector - Dunkirk to Veurne Gas pipeline	30
53	Israel - Turkey gas pipeline	30
25	Trans Adriatic Pipeline (TAP) - Albania section	29
28	South Caucasus Pipeline Expansion	29
32	TANAP - Trans Anatolian Gas Pipeline - Georgian-Turkish border to Turkish European border	29
36	Trans-Caspian Oil Pipeline - Eskene to Kuryk	29
37	Beyneu-Shymkent - Phase II - Beyneu to Bozoy	29
41	Leviathan field to Turkey gas pipeline - Onshore Portion	29
44	White Stream - Ukraine onshore branch - Feodosia to mainline transit system	29
42	Leviathan field to Turkey gas pipeline - Offshore Portion	29
6	Trans Adriatic Pipeline (Italy section)	28
17	Central asia Turkmenistan-Uzbekistan-Kazakhstan-Russia gas pipeline	27
7	Trans Adriatic Pipeline (TAP) - Offshore - Vlore to Lecce	27
18	Trans-Caspian Gas Pipeline - Türkmenbashi to Baku segment	27
19	Kartaly-Tobol-Kokshetau-Astana gas pipeline	27
9	Trans-Saharan Gas Pipeline (TSGP)	26
20	Power of Siberia GTS - First stage - Chayandinskoye, Khabarovsk, Vladivostok gas trunkline	26
21	Power of Siberia GTS - 2nd stage - Kovyktinskoye to Chayandinskoye	26
22	Russian arctic pipeline- Saint Peterburg to Murmansk phase 1	26
24	Russian arctic pipeline Teriberka - Shtokman platform phase 3	26
38	Kara Sea Oil and Gas Project East Prinovozemelsky	26
10	Galsi pipeline - GK4 and Gk3- Hassi R'Mel to El Kala section	25
11	Galsi gas pipeline -El Kala to Cagliari section	25
16	Ahnet to Hassi Messaoud gas pipeline	25
33	Qatar to Turkey gas pipeline	25
48	LR1 expansion - Haoud El Hamra to Hassi R'Mel	25
49	NK1 - Haoud El Hamra to Skikda condensate pipeline	25
51	Leviathan project - Israeli to Cyprus LNG terminals - Option 1	25
4	Ercis drinking water- New water distribution network	24
26	Karelia Republic gasification project Iodeynoye Polo to Pitkyaranta	24
50	Egypt to Libya gas pipeline	24
23	Russian arctic pipeline - Murmansk to Teriberka phase 2	23
39	Igdir to Nakhchivan, Azerbaijan	22

Appendix C - Initial outlays, costs and revenues

Initial outlays

Preparation costs	Amount	Price per unit	Total amount in €
Set up AUT system			€ 10.000
Procedure and calibration block development			€ 1.000
Calibration block	1 €	3.500 €	3.500
Mobilization AUT equipment	4 €	3.200 €	12.800
Mobilization employees	6 €	500 €	3.000
Validation			€ 25.000
			€ 55.300
Costs to include in day rate			€ 597

Revenues

First team	Amount	Tariff	Total
AUT unit			€ 600
AUT LKW/Pick-up			€ 75
Diesel fuel			€ 100
Allround AUT Operator	1 €	608 €	608
Helper	1 €	473 €	473
Calibration block and setting system			€ 169
Hotel and surcharge abroad	2 €	100 €	200
Saturday surcharge AUT operator(s)	1 €	450 €	90
Hotel and surcharge abroad weekend	1 €	200 €	40
AUT reserve unit			€ 300
Miscellaneous			€ 100
Administration costs			€ 5
Revenues first team per day			€ 2.759

Extra team	Amount	Tariff	Total
AUT unit			€ 600
AUT LKW/Pick-up			€ 75
Diesel fuel			€ 100
Allround AUT Operator	1 €	608 €	608
Helper	1 €	473 €	473
Hotel and surcharge abroad	2 €	100 €	200
Saturday surcharge AUT operator(s)	1 €	608 €	122
Hotel and surcharge abroad weekend AUT operator	1 €	200 €	40
Miscellaneous			€ 100
Administration costs			€ 5
Revenues extra team per day			€ 2.322

Costs

First team	Amount	Tariff	Total
AUT unit			
AUT LKW/Pick-up			
Diesel fuel		€	100
Allround AUT Operator	1 €	450 €	450
Helper	1 €	350 €	350
Hotel and surcharge abroad	2 €	100 €	200
Saturday surcharge AUT operator(s)	1 €	450 €	90
Hotel and surcharge abroad weekend	1 €	200 €	40
AUT reserve unit			
Miscellaneous		€	100
Administration costs		€	5
Total costs first team		€	1.335

Extra team	Amount	Tariff	Total
AUT unit			
AUT LKW/Pick-up			
Diesel fuel		€	100
Allround AUT Operator	1 €	450 €	450
Helper	1 €	350 €	350
Hotel and surcharge abroad	2 €	100 €	200
Saturday surcharge AUT operator(s)	1 €	450 €	90
Hotel and surcharge abroad weekend AUT operator	1 €	200 €	40
Miscellaneous		€	100
Administration costs		€	5
Total costs extra team		€	1.335

Costs of end project	Amount	Price	Total
Mobilization AUT equipment	2 €	3.200 €	6.400
Mobilization employees	2 €	500 €	1.000
Total costs end project		€	7.400

All the costs, except of the administration costs , validation costs, mobilization costs, and miscellaneous are from an offer for an German project. Via personal communication with Dutch director of UT Quality Rene Bezemer about other costs related to projects. He gave me an excel file of project that has been done in the past for Naumex (Mexico pipeline). He informed me to include administration costs at €5 per working day. The costs for validation costs are approximately €25.000. Without a validation a company cannot execute a project. Mobilization costs budgeted for €3.200 per AUT unit transported to the destination, and approximately €500 per employees. Miscellaneous costs are costs related to the use of mobile phones, scribe tips, DVD's, paper, shipment of calibration blocks etc. These miscellaneous costs will be covered and surcharged to the client for €100 per day.

Appendix D - Variables per project

Variables	Project A	Project B	Project C	Project D	Project E
Total length pipeline project (km)	257	900	300	125	1150
Number of extra teams	2	2	1	0	4
Number of helpers per team	1	1	1	1	1
Day rate revenue (first team)	€ 2.822	€ 2.656	€ 2.713	€ 2.725	€ 2.690
Day rate revenue (extra teams)	€ 4.643	€ 4.643	€ 2.322	€ -	€ 9.286
Day rate costs	€ 4.005	€ 4.005	€ 2.670	€ 1.335	€ 6.674

Variables	Project F	Project G	Project H	Project I	Project J
Total length pipeline project (km)	960	1400	90	186	100
Number of extra teams	3	4	0	0	0
Number of helpers per team	1	1	1	1	1
Day rate revenue (first team)	€ 2.679	€ 2.672	€ 2.778	€ 2.681	€ 2.759
Day rate revenue (extra teams)	€ 6.965	€ 9.286	€ -	€ -	€ -
Day rate costs	€ 5.339	€ 6.674	€ 1.335	€ 1.335	€ 1.335

Appendix E -Risk-free rate, Market risk premium and Country risk premium

Project name	Country of project	(Financial Times , 2014)	(Damodaran, A., 2014)	(Damodaran, A., 2014)
		Risk-free rate	Market premium	Country risk premium
Project A	Poland	1,94%	6,23%	1,23%
Project B	Netherlands	1,94%	5,42%	0,42%
	Germany	1,94%	5,15%	0,15%
Average		1,94%	5,29%	0,29%
Project C	Italy	1,94%	7,48%	2,48%
Project D	France	1,94%	5,90%	0,90%
Project E	Israel	1,94%	6,61%	1,61%
	Greece*	1,94%	20,00%	15,00%
	Cyprus ^{12*}	1,94%	20,00%	15,00%
Average		1,94%	15,54%	10,54%
Project F	Bulgaria	1,94%	7,15%	2,15%
	Serbia ^{13 *}	1,94%	11,75%	6,75%
Average		1,94%	9,45%	4,45%
Project G	Slovakia ¹⁴	1,94%	6,26%	1,26%
	Belarus ^{15 *}	1,94%	14,75%	9,75%
	Hungary	1,94%	8,93%	3,93%
	Poland	1,94%	6,23%	1,23%
Average		1,94%	9,04%	4,04%
Project H	France	1,94%	5,90%	0,90%
Project I	Greece*	1,94%	20,00%	15,00%
Project J	France	1,94%	5,90%	0,90%
Global	Risk free	1,94%	5,00%	4,39%

* country risk premium and market premium based on credit rating

¹² Source: Long term government bond yield Cyprus (Eurostat, 2014)

¹³ Source: International long term bonds Serbia (Cbonds, 2013)

¹⁴ Source: Trading economics 10 year government bond Slovakia (Economics, 2014)

¹⁵ Source: International long term bonds Belarus (Cbonds, 2011)

Appendix F - Scenario analysis

Scenarios per project. Y-axis = cumulative present value, X-axis = duration in months

