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# Business Conditions and Cost of Capital: Evidence from the Field

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# Business Conditions and Cost of Capital:

Evidence from the Field

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A Major Qualifying Project Report submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

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# Abstract

The goal of this Major Qualifying Project was to understand how executives in companies estimate and value their cost of capital in investment projects. There is no concrete universal method of valuation that a majority of companies use. The aim was to compare the more traditional methods of the capital asset pricing model and the weighted average cost of capital method with and against newer or more hybrid methods, such as capital expenditure. After gathering survey data from executives in companies across the northeast, we analyzed responses, and discovered a recurrence of themes. Although we expected the capital asset pricing model to be the most widely used method for estimation, it was found that more discounted cash flows and hybrids methods are used to estimate and value the cost of capital.

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# 1. Introduction

In this paper, we conduct a comprehensive survey that describes the current understanding (by executives) of the cost of capital, how executives value projects and how executives integrate risk and how these all affect investment decisions. Most executives learn the basic principle of the Capital Asset Pricing Model (CAPM) from reading textbooks in school, but do they actually use it? Do they all make the same assumptions for their investment decisions? Or do the assumptions used vary from company to company? One of the most influential studies on this topic to this date is Bruner, Eades, Harris, and Higgins' paper titled "Best Practices in Estimating the Cost of Capital: Survey and Synthesis" which was released in 2001<sup>1</sup>. The results of that study are still widely used and referenced and have affected the way that cost of capital research is conducted. After studying the ideas presented in this study, our goal is to show or prove new updates or understandings of CAPM and the cost of capital in the business world today. We hope that executives will use our results to modify existing views and help sharpen their decision making process. We also hope that these executives will learn from our analysis by understanding how other firms of both similar and different nature make decisions regarding the cost of capital and to identify areas of improvement.

The purpose of our study is to see if executives are using the CAPM model when making decisions for their companies. If they are, how far are they taking the use of this model? Do they weigh in outside factors? The gap when using the CAPM model is where executives are making these assumptions. We are trying to gain evidence from the field as to where these gaps lie. And if they aren't using CAPM, what approaches do they use? Are they using other academic ideals or making their own system to make decisions? We also want to examine factors that executives consider when valuing their projects such as, the impact of the last election on the economy and looking at forward expectations of the market. Over 17 years ago a study was held but since then, limited studies and published research have been conducted on this topic. By receiving survey results from numerous investment and financial companies throughout the Northeast, we can compile our data and make conclusions about the industry.

In this survey, not only do we address the academics implications of CAPM, but we also address the outside factors that could affect decision making on the cost of capital. These outside factors include geopolitical and economic. In addition to CAPM, we examine other types of models and approaches used to value investment and R&D projects. We also gauge managements' future expectations regarding the economy and how this will impact investment decisions. Linking these three categories together (academic, geopolitical, economic) allows us to understand where the gaps and variations are when executives make assumptions within their companies.

This paper details how we accomplished our project goal in five chapters. In Section 2 of our report, the literature review, we discuss the necessary background information pertaining to our project. This research includes information from previous reports published on our topic, research on CAPM and other academic approaches used and gaining information about forward

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<sup>1</sup> Bruner, R. F., Eades, K. M., Harris, R. S., & Higgins, R. C. (1998). Best practices in estimating the cost of capital: survey and synthesis. *Financial practice and education*, 8, 13-28.

looking expectations of the market. In Section 3, we discuss the methods used to generate questions, distribute and analyze our survey. In Section 4, we present the important findings that arose from our research. In the final 5th section, we conclude our project.

## 2. Literature Review

In this literature review, we begin by exploring the importance of capital. We then move into the details of the common academic methods of estimating capital; weighted average cost of capital and the capital asset pricing model. Lastly, we discuss common applications of the cost of capital in companies today.

### 2.1 Importance of Capital

Capital generally refers to financial resources. It includes financial assets as well as any machinery or equipment that businesses use to function. Investors use this capital as a means of investing. Capital is strategically used for companies to be able to finance operations. Not to be confused with cash or money that is used to buy goods and services, capital creates wealth through investment. Capital is an important element for the function of investing. Investing capital ultimately creates more capital. Capital generates income, so in the end the investors or companies with the most capital are better off. Because capital is a scarce resource, each unique use of that capital has a corresponding level of risk of loss and/or reward. Capital returns that have a longer timeline of return are considered to have more risk than returns with a shorter timeline of return. Those who are looking to invest capital will look at the expected risk associated with the potential reward when making their decision<sup>2</sup>. With that said, capital cost can be defined as the internal rate that equals all future payments made to all capital sources, with the money that is currently being supplied by these same sources<sup>3</sup>.

#### 2.1.1 Weighted Average Cost of Capital

It is important to understand that capital creates an opportunity cost for investors. Typically, investors have access to information on multiple financial market opportunities. Under these circumstances, corporate uses of capital are compared with and against capital alternatives. If a company or firm can not earn in excess of its cost of capital it will not turn a profit or create value.

A traditional approach some companies use to estimate cost of capital is through the weighted-average cost of capital<sup>4</sup>. The weighted-average cost of capital (WACC) is a measure of a firm's cost of capital where all components are weighed evenly. It is guided by the external market rather than management.

The primary components of the WACC equation include cost of equity and cost of debt. Equity and debt are the two components that form a company's capital funding. Lenders and equity holders expect to receive returns on the capital that they have provided. As the cost of capital serves as the return that shareholders and debt holders expect, the WACC indicates the types of returns that stakeholders will receive on a certain investment. In essence, the WACC

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<sup>2</sup> O'Reilly, I. R. (2014). *Chapter 1: The investment industry: A top-down view* CFA Institute.

<sup>3</sup> Reilly, R. R., & Wecker, W. E. (1973). On the weighted average cost of capital. *Journal of Financial and Quantitative Analysis*, 8(1), 123-126.

<sup>4</sup> (Bruner et al, 1998)

gives information on the opportunity cost on taking the risk of a certain investment. Using the WACC allows for firms to see how much interest the company will owe for every dollar they finance. The weighted average cost of capital is:

$$WACC = (W_{debt}(1 - t)K_{debt}) + (W_{pref} K_{pref}) + (W_{equity} K_{equity})$$
<sup>5</sup>

Where

K = component cost of capital

W = weight of each component as percent of total capital

t = marginal corporate tax rate

A company or firm's WACC proves to be the minimum acceptable rate of required return. For this reason, WACC is used internally to make various decisions. WACC can also be seen as the discount rate that can be used for cash flows with risk that is similar or equal to that of the overall firm or company. Ultimately, using this equation can help executives see if the projects they want to deploy are worth taking a risk on (assessing the value of investments and when determining which ones to pursue)<sup>6</sup>.

## 2.1.2 Capital Asset Pricing Model

Another method many firms use to estimate the cost of capital is through the capital asset pricing model, known as CAPM. It is used by predicting the risk that can be anticipated from the correlation of expected return and risk. CAPM came about by building upon the model created by Henry Markowitz called the "Markowitz model" or "mean-variance model"<sup>7</sup>. The basis of this model is that an individual selects a portfolio at a certain time that gives a specific stochastic return. The theory assumes that the person selecting the portfolio is risk averse and the only criterion that is of importance of their one period investment return is the mean and variance<sup>8</sup>. Many people were drawn to CAPM since its introduction into the industry due to its simplicity. However, it is this simplicity that causes some individuals to believe it may discredit the data for much of its applications<sup>9</sup>. In CAPM theory, beta is the only relevant criteria when measuring a stock's risk; measuring both the return of the stock and the return on the market form the stock<sup>10</sup>.

By a survey conducted by J.R Graham and C.R. Harvey, it is shown that the CAPM model is the most popular method used when estimating the cost of capital. In the survey, 392 CFOs were asked about which method they used to calculate the cost of capital. The results showed that 73% of participants always or almost always use the CAPM method<sup>11</sup>.

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<sup>5</sup> (Bruner et al, 1998)

<sup>6</sup> (Bruner et al, 1998)

<sup>7</sup> Fama, E. F., & French, K. R. (2004). The capital asset pricing model: Theory and evidence. *Journal of economic perspectives*, 18(3), 25-46.

<sup>8</sup> Fama, E. F., & French, K. R. (2004).

<sup>9</sup> Fama, E. F., & French, K. R. (2004).

<sup>10</sup> Li, X., Zhang, L., & Leng, J. (2015). *Information technology and applications* (1st ed.). London: CRC Press

<sup>11</sup> Graham, J. R., & Harvey, C. R. (2001). The theory and practice of corporate finance: Evidence from the field. *Journal of Financial Economics*, 60(2), 187-243.



The early empirical tests for CAPM are based on three implications on the correlation between expected return and market beta predictions of the model<sup>12</sup> :

1. There is a linear relationship between expected return on all assets and their betas, with all other variables having no power.
2. The return that is expected on the market portfolio is more than the return that is expected from assets that are uncorrelated with market return
3. Assets and markets that are uncorrelated, have the same expected returns of the risk-free interest rate

The capital asset pricing model will remain a classic way to estimate risk and expected return when dealing with capital. It is an academic method used by many firms due to its simplistic application and easy interpretation. Next, the current uses of capital will be discussed from data found in an AFP FP&A survey.

## 2.2 Current Uses of the Cost of Capital

In 2017, over 600 professionals took place in the AFP FP&A survey. This survey was given out as a means to understand how the cost of capital is being used currently by financial practitioners and what types of methods these people are using. This survey asked four main questions about the cost of capital<sup>13</sup>.

1. How many different costs of capital are used in your company?
  - a. None - 30%
  - b. One, we apply the same costs of capital to all investments/projected cash flows - 47%
  - c. Two or more - 23%

Although one-third of respondents do not use a cost of capital, this number is heavily defined by the type of company. Of those who recorded not using a cost of capital, 50% of nonprofits (and governments) and 39% of companies with a revenue under \$1 billion do not use cost of capital. On the other hand publicly-traded companies use the cost of capital more actively. This may be greatly due to the fact that, often times, the cost of capital is used to compare stock and make investment recommendations. This makes it easier to apply the cost of capital internally. Lastly, companies that do use the cost of capital often use one number throughout the entire company. At this point, the opportunity for risk are all assumed to be equal. Then there is an emphasis on the timing of cash flows<sup>14</sup>.

2. How frequently does your company review and if necessary, update its estimates of its weighted average cost of capital?
  - a. Monthly, Quarterly, Semi-annually - 22%
  - b. Annually - 19%
  - c. Other - 59%

Here it is shown that a high percentage of companies review their cost of capital less than annually. This is surprising considering that risk fluctuates over time. The cost of capital can be influenced by interest rates, debt to equity, tax rates, etc. These elements too fluctuate over time.

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<sup>12</sup> Fama, E. F., & French, K. R. (2004).

<sup>13</sup> Lapidus, B. (2017). FR&A survey: How relevant is your cost of capital? *Association for Financial Professionals*

<sup>14</sup> Lapidus, B. (2017)

When paired with question 1 above, it can be seen that the primary value in how companies apply the cost of capital is to analyze the value of money over time<sup>15</sup>.

3. Other than the cost of capital, how do you risk-adjust your budget?
  - a. Probability of success - 39%
  - b. Conservatism factor (reduction to revenue) - 54%
  - c. Cost cushion (build in extra cost or time) - 48%
  - d. Other - 10%

To combat risk, companies are often using risk adjustments to cash flows in addition to or instead of using a discount rate. They are adding these “haircuts” or building in a cash cushion to protect the net returns. These cash cushions serve to as an emergency fund in the event of emergency. If an investment risk does not work in favor of the company, they now have a means of either gaining more time for expected returns or paying back some of the return they would owe to lenders or equity holders<sup>16</sup>.

4. Which types of cost of capital do you use?
  - a. By geography (i.e, country) - 34%
  - b. By business line/ at the business level - 70%
  - c. By product/at the product level- 36%
  - d. Other - 7%

Not every company has the luxury to have multiple geographic locations so it is not surprising that most cost of capital is calculated at the business line level followed by the product level. This means that the ultimate focus is on created investments that would give the highest range of customer engagement and satisfaction<sup>17</sup>.

In all, managing and maintaining the cost of capital takes a full effort. It has theoretical components that can be interpreted and used differently varying from company to company. The greatest benefit of calculated the cost of capital is being able to differentiate which risks are necessary for investment projects along with understanding if an investment decision in the short term will still positively affect cash flows and returns in the long term. Not all companies use the cost of capital as a measure for future investments and projects. When the cost of capital is not used, risk is often controlled by built in cushions that are unique to each company and what they are working to accomplish. When the cost of capital is used, the WACC and the CAPM are two widely used methods to try and combat risk and come out with return. After analyzing these two methods along with the results of the latest FP&A survey, we decided to focus on how firms (specifically in the northeast) handle their cost of capital. In the next section, we will discuss the methods that were used in creating our own survey to send to firms and how we analyzed the data.

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<sup>15</sup> Lapidus, B. (2017). FR&A survey: How relevant is your cost of capital? *Association for Financial Professionals*

<sup>16</sup> Lapidus, B. (2017)

<sup>17</sup> Lapidus, B. (2017)

## 2.3 National, Global, and Interdisciplinary Importance

The principles behind the cost of capital can affect many different disciplines on both a national and global scale. From a national perspective, the cost of capital and return on investment can be affected by many types of risk. These risks include, but are not limited to, inflation, economic volatility, political stability, government regulations, investor rights, etc<sup>18</sup>. From an international perspective, the cost of capital calculations are important because they guide foreign direct investment. In other words, when companies expand operations throughout the world, country risk becomes a key element of valuation<sup>19</sup>. For example, when investing in a European firm, it is vital to understand what cost of capital techniques are employed when they value projects. It is important to understand a new culture of business before investing. If there is a lack of understanding, then risk will continue to intensify.

The application of the cost of capital does not just thrive in the business world, but also has a great impact in different fields such as data science and legal. From a data science perspective, it is important to understand that the data from different industries can result in different cost of capital estimations<sup>20</sup>. For example, the pharmaceutical industry values patents and other intangible resources. This is different for finance companies that do not typically secure patents. This can change the valuation for either industry when it comes to estimating their valuation. Lastly, from a legal perspective, a company may have a certain group of shareholders who assume control of the company. These shareholders must act in the best interests of the minority shareholders (this is known as “fiduciary duty”)<sup>21</sup>. The cost of capital measures these shareholders select can affect all of the shareholders of the company (because of what projects the company chooses to invest in).

## 3. Methodology

This paper describes the results of a survey we conducted over the past 7 months. We asked individuals who held corporate, managerial, and leadership positions within their companies to participate in this study. Our survey was used to see which types of models or approaches executives are using to value investment/R&D projects. Followed with questions to gauge managements’ future expectations regarding the economy and how it will impact investment decisions. We surveyed companies within many industries in the New England area using Qualtrics. Qualtrics is a survey software which allows you to easily build surveys and distribute them to your subjects. Then you can analyze your responses right in the software itself.

Our Qualtrics survey was made up of 3 primary sections. These included: academic, market and political. Academic questions were used to see how executives currently value cost of capital, and what is important when evaluating new potential projects. The market section was used to see forward-looking expectations with the stock market as a whole and what industries

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<sup>18</sup> Wachowicz, J. International cost of equity: The science behind the art. *Stout*

<sup>19</sup> Wachowicz, J.

<sup>20</sup> Damodaran, A. (2018). *Cost of capital by sector (US)*.

<sup>21</sup> Fitzpatrick, D. *Fiduciary responsibilities: Corporations*

are expected to excel or decline in the near future. And lastly, the political section was used for executives input on the past election. We wanted to include this section to see if executives feelings on the past election would affect their views on the market and as a result affect their company's investment decisions. Academic allows us to see background knowledge, while the market and political questions allows us to understand how the background knowledge is applied in the field.

In our survey we used both categorical and quantitative type of questions. Including both types helps to paint a bigger picture within a smaller survey. We found if we chose to use just categorical questions the survey became to lengthy and many executives did not have the time to take it. Distributing both types of questions throughout the survey helped us gain more detail on certain questions when we need it but kept the survey length much shorter overall. A of our survey can be seen in Appendix A.

Questions for the survey were chosen in order to see where the variability lied between companies. At which points do companies use traditional techniques/methods for the cost of capital and at which point do they make these traditional techniques/methods unique to their industry or for their specific end goal. This analysis would work to ultimately prove or disprove the hypothesis of this study that CAPM and WACC are the most widely used tools when considering the cost of capital to make investment decisions.

Our Qualtrics survey included 26 total questions. Ranging from multiple choice, short answers and rating scales. It would take approximately 12-15 minutes to do our survey on qualtrics. To distribute our survey, we created an email template with our survey link inside. Once we created a list of companies we thought we could target, we gathered the emails of executives from those companies via LinkedIn and company websites. We then sent out emails and awaited to see if these executives would take our survey. If we do not hear a response back after one month, we sent a final reminder email to those same companies. In the end we had a total of 14 responses from 11 different companies within the New England area. A complete list of companies used in this study can be seen in Appendix B.

## 4. Results

The detailed surveyed results can be found in C. The following are the main findings after careful analysis of the survey.

### 4.1 Lower cost of capital allows for more resources to be available for R&D

One important factor that is critical in order to achieve business growth is R&D. To keep up with technological advances, changing markets, and customer demands, companies need to spend more money on R&D to advance their businesses before their competitors do. A main finding we came across after analyzing our survey responses was that higher cost of capital results in less resources that can be dedicated to R&D as seen in Appendix D. Cost of capital is the amount of money a company needs as a return to make a project worth pursuing. This includes the cost of debt and cost of equity. As seen in Appendix E, our study showed that over 63% of executives are focused on cash flow to capital expenditures. This is a financial ratio used to calculate the amount of operating cash that a company has available to put towards business growth in the future. Most of the time cash flows to capital expenditures often account for new projects or investments which fall under R&D. This shows that executives are putting R&D as a top priority within their companies. If executives wish to be the first in their respected industries with new advances they must put in more money into R&D. Being first to the market with a new technology or product will result in a large sales boost. Having a lower cost of capital is the first step in order to having more resources available for things like more R&D. Lastly, an additional question on our survey that gives evidence to our main finding is the amount of company executives that answered yes to moving towards cloud based services. Moving to cloud based services helps to cut the cost of hardware, and as a result, opening up more cash flow for R&D and new investments. Over 80% of executives stated that their companies have taken steps towards moving to cloud based services. This rating scale for how much companies have moved over to cloud based services can be seen in appendix F.

### 4.2 There may be a shift from the traditional capital asset pricing model when valuing the cost of capital/investments

Our hypothesis suggests that the capital asset pricing model and the weighted average cost of capital are the two most widely known and used methods in assessing the cost of capital. Although there is much academic evidence proving this idea, our survey results suggest that more and more companies may be straying away from or modernizing these methods. Over 50% of respondents reported that they do not use the capital asset pricing model when considering new investments or projects. On the other hand, again over 40% of respondents reported using discounted cash flow (DCF) from investment evaluation. Both of these results are shown in Appendix G and H, respectively. This method incorporates the WACC. DCF is used to

determine the overall attractiveness of an investment opportunity. DCF uses free cash flow projections and discounts them using an annual rate to make present value estimations. This present value estimation is then used to evaluate the potential for an investment. An investment opportunity is deemed as positive or “worth the risk” if the end value through DCF analysis is higher than the current cost of the investment<sup>22</sup>.

DCF can be calculated as:

$$Dcf = \left[ \frac{CF_1}{(1+r)^1} \right] + \left[ \frac{CF_2}{(1+r)^2} \right] + \dots \left[ \frac{CF_n}{(1+r)^n} \right] \quad 23$$

Lastly, when asked the question “how do you value investment projects?”, 25% of respondents replied with capital expenditure. These companies that choose to focus on capital expenditure may be more inclined to follow valuations that come from the cash flow to capital expenditure ratio, or the CF/CapEX ratio. This ratio relates to a company’s ability to acquire long term assets by tapping into free cash flow<sup>24</sup>.

Cash flow to capital expenditure is calculated as<sup>25</sup>:

$$\frac{\text{Cash Flow From Operations}}{\text{Capital Expenditures}}$$

Another way capital expenditure can be calculated in through free cash flow to equity or FCFE<sup>26</sup>.

FCFE is calculated as<sup>27</sup>:

$$\text{Net Income} - \text{Net CapEx} - \text{Change in Net Working Capital} + \text{Net Debt} \\ - \text{Debt Repayment}$$

In both of these equations, the greater the capital expenditure, the lower the free cash flow to equity.

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<sup>22</sup>Damodaran, A. *Basics of discounted cash flows valuation* NYU Stern.

<sup>23</sup> Damodaran, A. *Basics of discounted cash flows valuation* NYU Stern.

<sup>24</sup> Heidari, T. (2016). Experimenting common and adjusted methods of Free Cash Flow calculation Based on Financial Leverage and Capital Expenditure of Listed Companies: Evidences from Tehran Stock Exchange. *International Journal of Humanities and Cultural Studies (IJHCS)* ISSN 2356-5926, 584-591.

<sup>25</sup> Heidari, T. (2016)

<sup>26</sup> Heidari, T. (2016). Experimenting common and adjusted methods of Free Cash Flow calculation Based on Financial Leverage and Capital Expenditure of Listed Companies: Evidences from Tehran Stock Exchange. *International Journal of Humanities and Cultural Studies (IJHCS)* ISSN 2356-5926, 584-591.

<sup>27</sup> Heidari, T. (2016)

Overall, from these results it is shown that companies do not solely use CAPM or WACC when evaluating investments. Instead, they are using methods that are more unique to their company or modified to keep up with their industry, market, or customer demand.

### 4.3 Companies prefer long term investment over short term investment because that ROI is more important for future scalability and growth

In the survey, our respondents were asked what they most value in the long term regarding their projects. All answers for this question are shown in the word cloud in Appendix I, however, over 58% manually input that they are most concerned with return on investment, or ROI. This means that the majority companies compare their investments to each other to see which are outperforming others. To calculate ROI, your net income is divided by the total cost of the investment, multiplied by 100 to give you a final percentage:

$$(\text{Net Income}) / \text{Cost of Investment} \times 100^{28}$$

The higher the ROI percentage the more efficient the investment is at bringing money back into the company. After comparison and analysis of investments, companies are likely to discontinue the lower performing projects and put their focus of the ones that will bring the most back into the business. This information we gained was much different when we asked about projects in the short term. In response to this, over 66% of the respondents were focused on quick wins that led to rapid success in the company by driven members that would be impactful. Seen in appendix J 83% of respondents said long term value creation was more important than short term performance. However, these small, quick investments are the basis of ROI in the long term because they are watched and analyzed over to see which are the outperformers and which do not meet the standards of the company's investments. The growth of a company and their future performance is dependent on their long term value creation from selected projects.

### 4.4 Value creation- more value is weighed on technology, intellectual property, and customer relations is hoped to be gained from investment

The top three factors that lead to higher ROI percentages and higher value of projects are technology/innovation, intellectual property and customer relations, as shown in Appendix K. These three answers received 30%, 23% and 23% of votes respectively in our survey. When valuing projects, 25% of companies use CAPEX regarding their investment projects, shown in Appendix L. Technology allows companies to perform at the most efficient rate by cancelling out human error and automating processes that are redundant and effortless. By using technology, companies can remain at the forefront of their industries by eliminating waste and

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<sup>28</sup>Return on investment (ROI)(2017).

gaining profit. For investment projects, technology can be used to predict future markets, stock prices and supply and demand of products. These useful calculation, along with many others, can be used to invest in the smartest area with the least amount of risk and highest potential for expected return. New technology and innovation is constantly being improved. Intellectual property is how companies are the first entrants into new markets. Being a first mover, with a ground breaking product, can create large long term value creation for companies. When valuing investment projects, 1/3 of our respondents value them by innovation and entering new markets, also shown in Appendix L. This is a huge factor to why so much of a company's capital is put into research & development. Lastly, customer relations is important due to reviews and customer loyalty. Reviews allow for customers to reach more potential buyers and sales. Customer loyalty makes customers want return and continue using their business. Without customers, there can be no return on investment.



## 5. Conclusions

Our research worked to identify the best methods for estimating the cost of capital for investments by surveying executive in corporations of the Northeast. These type of leaders in their respective industries had the best chance of providing the proper information and perspective on this topic.

The survey revealed an overall shift from CAPM to other techniques that are unique to each company. When companies are not specifically using the CAPM they are using variations of DCF which incorporate WACC to help put value on to investment decisions. Capital expenditure is also a great area of concern when it comes to these investment decisions. Cash flow to capital expenditures are highly monitored in order to understand how much can be spent on R&D. More companies are hoping to lower capex and opex to give more cash flow to R&D/investment. This not only benefits the company in areas such as first to market or technological advances, but also keeps the customer happy by being able to keep up demand. There is a higher weight for new technologies, intellectual property, and strengthening customer relation in regards to the different value that investment results can have. (i.e. can basically invest in technology, intellectual property and/or customer relations). When valuing projects, more weight is put on the long-term return on investment. Companies would rather see their investments mature over time and expand in the long run than have several quick wins with smaller returns.

In all, we believe that the following suggestions would put executives and their companies in the best position to succeed when it comes to estimating the cost of capital:

- Companies should not solely use the CAPM or WACC to estimate and value their investments.
- Companies should also explore methods such as the DCF, CF/CapEX ratio, and FCFE.
- After careful comparison and analysis, the company should then use a method or blend of methods that is not only appropriate for their specific company, but one that is appropriate for the goals of its industry.

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## 7. Appendix

Appendix A: Our survey questions in their respective academic, market and political sections

### **MQP Survey**

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Start of Block: Default Question Block

Q1

The purpose of this survey is to elicit responses from internal management of financial service firms in order to ascertain the following:

- a) What types of models/approaches are used to value investment/R&D projects.
- b) To gauge managements' future expectations regarding the economy and how this will impact investment decisions.

**\*\* All responses are strictly anonymous. No identifying information will be included in our research. In addition, if any of the survey takers wish to obtain a copy of this report, this can be provided upon request.**

Which company do you represent?

---

What is your position or job title?

---

Q2 Do you think in the next 12 months it will be easier or more difficult to raise capital for projects?

Not sure (1)

Easier (2)

Same (3)

More difficult (4)

Explain (5) \_\_\_\_\_

Q3 How does cost of capital affect R&D?

---

Q4 What factors do you believe best drive value creation?

- Technology innovation (1)
- Intellectual Property (2)
- Alliances (3)
- Management Capabilities (4)
- Employee Relations (5)
- Customer Relations (6)
- Community Relations (7)
- Brand Value (8)
- Other (9) \_\_\_\_\_

Q5 How do you value investment projects?

- Net Present Value (1)
  - CAPM (2)
  - CAPEX (3)
  - OPEX (4)
  - New products or new markets (5)
  - Replacement project necessary to continue operations as usual (6)
  - Replacement project necessary to reduce business costs (7)
  - Discounted Cash Flows (8)
  - Other (9) \_\_\_\_\_
- .....

Q6 What is valued in the short term when it comes to projects?

\_\_\_\_\_

.....

Q7 What is valued in the long term when it comes to projects?

\_\_\_\_\_

Q8 What is more important to your company, short-term financial performance or long-term value creation?

	1 (0)	2 (1)	3 (2)	4 (3)	5 (4)	6 (5)	
Short-term financial performance (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
							Long-term value creation

.....

Q9 Do you use the capital asset pricing model when considering new projects?

Yes (1)

No (2)

---

Q10 Is Discounted Cash Flow a technique you use for investment evaluation?

Yes (1)

No (2)

---

Q11 What are your main focuses in operating expenditures?

Cost of goods sold (1)

Selling (2)

General and administrative costs (3)

Depreciation and amortization (4)

Interest expenses (5)

Income taxes (6)

Other (7) \_\_\_\_\_

Q12 What are your main focuses on capital expenditure?

- Cash flow to capital expenditure ratio (1)
  - Free cash flow to equity (2)
  - Other (3) \_\_\_\_\_
- .....

Q13 Has your company taken steps to move towards cloud based services?

	1 (0)	2 (1)	3 (2)	4 (3)	5 (4)	6 (5)	
No services are cloud based (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	All services are cloud based



Q14 What are your forward looking expectations on the market on aggregate in the next 12 months?

---

---

Q15 Where do you see the stock market going in the next 12 months?

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---

Q16 What industries do you see excelling in the market?

Healthcare (1)

Technology (2)

Retail (3)

Real Estate (4)

Financial Services (5)

Pharmaceutical (6)

Other (7) \_\_\_\_\_

Q17 Are you surprised that we have not seen a large drop in the market since 2008?

Yes (1)

No (2)

---

Q18 Do you believe there will be a large drop in the stock market in the near future?

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
(1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q19 What is your input of the last election?

---

Q20 Do you think the result of the election has been a factor on the stock market?

	Definitely yes (1)	Probably yes (2)	Might or might not (3)	Probably not (4)	Definitely not (5)
Click to write Statement 1 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21 What do you think would happen to the stock market if President Trump were impeached?

- Go up (1)
- Stay the same (2)
- Go down (3)

Q22 If Hillary Clinton had been elected, do you believe the stock market would be as it is today?

	Definitely yes (1)	Probably yes (2)	Might or might not (3)	Probably not (4)	Definitely not (5)
Click to write Statement 1 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q23 What types of laws which Trump has signed has had the most significant impact on the market?

- Repealing Obama-era rules and regulations? (1)
  - Modifying existing programs (2)
  - Encouraging an agency to try something new (3)
  - Naming something, siting a memorial or encouraging flag flying (4)
  - Personnel related (5)
  - Extending Obama-era policy (6)
  - Omnibus appropriation bill (7)
  - New policy (8)
  - No type of bill has had a significant impact on the market (9)
- 

Q24 Do you think in the next 12 months with the geopolitical and economic condition that it will affect R&D?

	Definitely yes (1)	Probably yes (2)	Might or might not (3)	Probably not (4)	Definitely not (5)
Click to write Statement 1 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

---

Q25 What type of geopolitical risks can affect your company's stock value?

---

Appendix B: Companies that took part in survey

<b>Company List</b>
Access Information Management
Fallon Health
PCC
Putnam Investments
Eaton Vance Corp.
Ernst and Young
Hanover Insurance
Opus Investment Management
Blue Cross Blue Shield
Lexington Wealth Management

## Appendix C: Survey Results

2. Do you think in the next 12 months it will be easier or more difficult to raise capital for projects?

- 64.29% - Same
- 21.43% - Easier
- 7.14% - More difficult
- 7.14% - Other written response: We are a nonprofit, so we do not have investors who could be a source of capital. We would have to borrow. We have a Line of Credit with our bank and are also a member of the Federal Home Loan Bank of Boston. We can borrow from each party, which is essentially our source of any additional capital we might need.

3. How does cost of capital affect R&D?

- It all boils down to effective marketing.
- We are a wealth management firm. So our R&D is research/marketing/etc., so somewhat.
- Capital investments in the financial system leads to proper FP&A along with pipeline investment for M&A.
- It depends. If a company does not have to raise capital to fund its R&D, there is no effect. Otherwise, a higher cost of capital can negatively impact R&D spending
- The type of projects I am raising capital for have no bearing on R&D.
- Unknown
- Limited opportunities
- Not my area
- The higher the cost for capital the less dollars you have to spend on R&D, the lower the cost of capital the more dollars you have to spend.
- Generally not considered but we don't conduct traditional R&D. Our R&D takes the form of seeding new investment products.
- lower cost of capital definitely creates incentives for more R&D
- Lower the cost of capital the more resources available for R&D
- It's one factor used in the decision making process to evaluate new projects and initiatives. In and of itself, companies would invest in projects whose expected returns exceed their cost of capital.

4. What factors do you believe best drive value creation?

- 30.77% - Technology/innovation
- 23.08% - Intellectual property
- 7.69% - Management capabilities
- 7.69% - Employee relations

- 20% - Customer relations
- 7.69% - Other

5. How do you value investment projects?

- 16.67% - Net present value
- 25% - CAPEX
- 33.3% - New products or new markets
- 8.33% - Replacement projects necessary to reduce business costs
- 16.67% - Other

6. What is valued in the short term when it comes to projects?

- Realizing our limitations as a firm of 20 people and under \$10 million in revenue.
- Functionality and efficiency.
- Improving the health of our community. Financial sustainability of the Company.  
Reputation, market share
- Learning process, new equipment or software
- Member driven and impactful
- Quick hits/small wins
- Not my area
- Keeping the right staff members, do we manufacture a product or outsource it, do we make less today for the possibility of more tomorrow.
- Strong investment performance
- Getting to market early/first
- Achieving short term progress and results that reinforce project, initiative and/or company is on sustainable path to long term value creation

7. What is valued in the long term when it comes to projects?

- Return on investments.
- That we commit to it in the long term and not give up too early.
- Scalability in regards to YOY growth via organic and acquisition growth.
- Improving the health of our community. Financial sustainability of the Company.  
Reputation, market share.
- ROI- return on investment
- Innovation and cost effectiveness
- Return on investment and scalability
- Not my area
- Higher profitability, more efficiency.

- Contributing to raising new client assets
- sustained results
- Long term value creation

8. What is more important to your company, short-term financial performance or long-term value creation?

- 83% of respondents value long term value creation

9. Do you use the capital asset pricing model when considering new projects?

- 50% - Yes
- 50% - No

10. Is Discounted Cash Flow a technique you use for investment evaluation?

- 41.67% - Yes
- 58.33% - No

11. What are your main focuses in operating expenditures?

- 8.33% - Cost of Goods Sold
- 58.33% - General and administrative costs
- 16.67% - Depreciation and amortization
- 16.67% - Other

12. What are your main focuses on capital expenditures?

- 63.64% - Cash flow to capital expenditure
- 18.18% - Free cash flow to equity
- 18.18% - Other

13. Has your company taken steps to move towards cloud based services?

- 1-4 scale ~ 16.66%
- 5-7 scale ~ 83.33%

14. What are your forward looking expectations on the market on aggregate in the next 12 months?

- Global markets are in very good condition. Barring a geopolitical event, business should be strong.
- In regards to technology, the top 10 aggregate has hit the trillion mark due to high level of acquisition, those ten will only grow larger.



- Not sure
- First 6 months due to tax reform, second 6 months a bit choppy but overall looking for low double digit returns
- Positive
- Moderate Growth
- Further gains but now more limited than previously based on view that several measures indicate market is near-to-fully valued.

15. Where do you see the stock market going in the next 12 months?

- We have been in a bull market since early 2009. I think the stock market will be up again in 2018 because of the overall strong economic climate - economic growth worldwide, strong Balance Sheets, credit expansion, improved consumer confidence, low unemployment, emerging markets rebounding, earnings up in general.
- Based on the current conditions, wars and President I believe the market will stay volatile
- Not sure
- S&P 7% total return
- Up low double digits
- Modestly up
- Up low double digits.
- Continue to rise
- Continue to rise especially with the current tax reform and the current US economy projecting to have growth in the first two quarters.
- Valuations are very high in most markets. Difficult to predict short term performance. High volatility expected.
- Relatively stable
- Although many feel valuations are stretched, still expected additional appreciation based on forecasts of steady growth in the US and globally, strong corporate earnings, low inflation and although rising, still low interest rates. Additionally, if enacted, Pres. Trump's pro growth policies with respect to tax reform, financial reform and regulatory relief, would support economic growth and corporate profits, and thus be supportive of stock market returns.

16. What industries do you see excelling in the market?

- 30.77% - Healthcare
- 23.08% - Technology
- 30.77% - Financial Services
- 15.38% - Other

17. Are you surprised that we have not seen a large drop in the market since 2008?

- 23.08% - Yes
- 76.92% - No

18. Do you believe there will be a large drop in the stock market in the near future?

- 0% - Strongly Agree
- 23.08% - Agree
- 7.69% - Somewhat Agree
- 15.38% - Neither Agree or Disagree
- 38.46% - Somewhat disagree
- 15.38% - Disagree
- 0% - Strongly Disagree

19. What is your input of the last election?

- Circus
- I believe the republican did themselves a huge disservice by having so many candidates running. There was no way for the candidate to state their case over the reality star. I believe the wrong person won the election.
- It does not matter what body is put in office, economic trends built to recover from recession are what has made our country stronger economically.
- Not Sure
- People are fed up with status quo
- People wanted change, our President may not be the most politically correct but he struck a nerve with the average american.
- Unhappy with the outcome
- Very Scary
- Wall Street called for a big drop if Trump were elected. They were wrong. Trump is pro business as evidenced by less regulation and the recent Tax act. I worry about his policy relative to trade. On your next question I say go down as markets tend to dislike uncertainty.

20. Do you think the result of the election has been a factor on the stock market?

- 23.08% - Definitely yes
- 46.15% - Probably yes
- 7.69% - Might or might not
- 23.08% - Probably not
- 0% - Definitely not

21. What do you think would have to the stock market if President Trump were impeached?

- 50% - Stay the same
- 50% - Go Down

22. If Hillary Clinton were elected, do you believe the stock market would be as it is today?

- 23.08% - Probably yes
- 23.08% - Might or Might not
- 46.15% - probably not
- 7.69% - definitely not

23. Which types of laws which President Trump has signed has had the most significant impact on the market?

- 41.67% - Repealing Obama-era rules and regulations
- 8.33% - Modifying existing policy
- 25% - New policy
- 25% - No type of bill has had a significant impact on the market

24. Do you think in the next 12 months with the geopolitical and economic condition that it will affect R&D?

- 7.69% - Definitely yes
- 53.85% - Probably yes
- 15.38% - Might or might not
- 23.08% - Probably not

25. What type of geopolitical risks can affect your company's stock value?

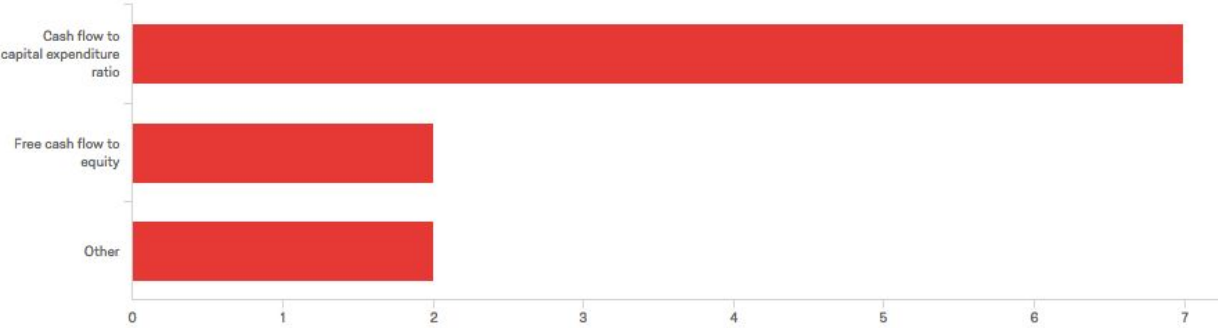
- My Co is privately held. That said, our value is roughly 7.5 X EBIDA. Markets dropping directly affects our fees. Short term geopolitical risk most likely not a big deal from a business perspective. War with No. Keora for example would be a big deal from a market perspective thus affect our revenue /EBIDA etc.
- We are privately held, but in the management of information, the scrutiny will continue to grow and so to will the market we are in, which is why I started working at AIM.
- N/A as we are a nonprofit and do not have stockholders. But, I do think goings on in North Korea and Russia could negatively impact US stocks. Also, we are experiencing worldwide growth, if that slows down it could impact. Also, China looms huge. A slowdown in that economy will have worldwide impact
- Wars
- We aren't publicly traded. Repeal of the ACA has an impact on us.
- Foreign Policy
- North Korea, Terrorism, China

- Any action that impacts the value of the financial markets
- ability to bring in talent/labor from overseas
- Unfavorable tax legislation and unfavorable state regulatory changes
- Tax laws, state and federal insurance regulations, and environmental (catastrophic weather).

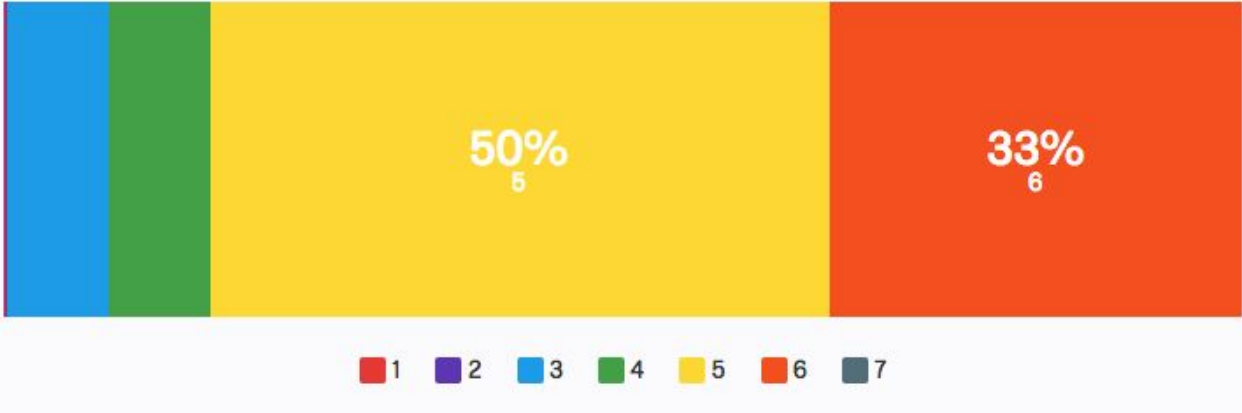
Appendix D: Word Cloud for Q3. How does cost of capital affect R&D?



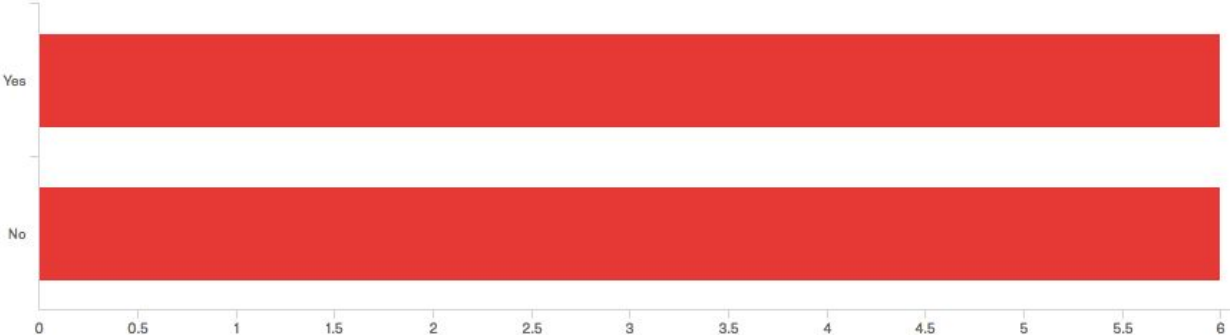
Appendix E: Graph for Q12. What are your main focuses on capital expenditures?



Appendix F: Q13 - Rating scale for how much your company has moved to cloud based services

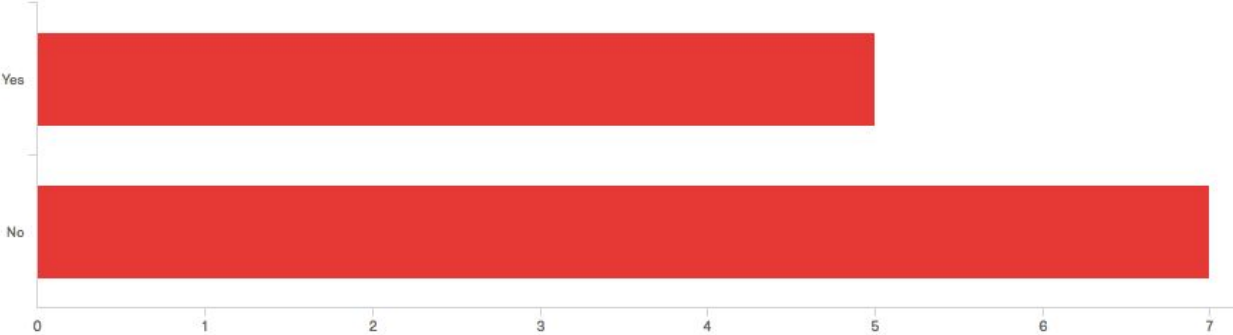


Appendix G: Graph for Q9. Do you use the capital asset pricing model when considering new projects?





Appendix H: Graph for Q10. Is Discounted Cash Flow a technique you use for investment evaluation?





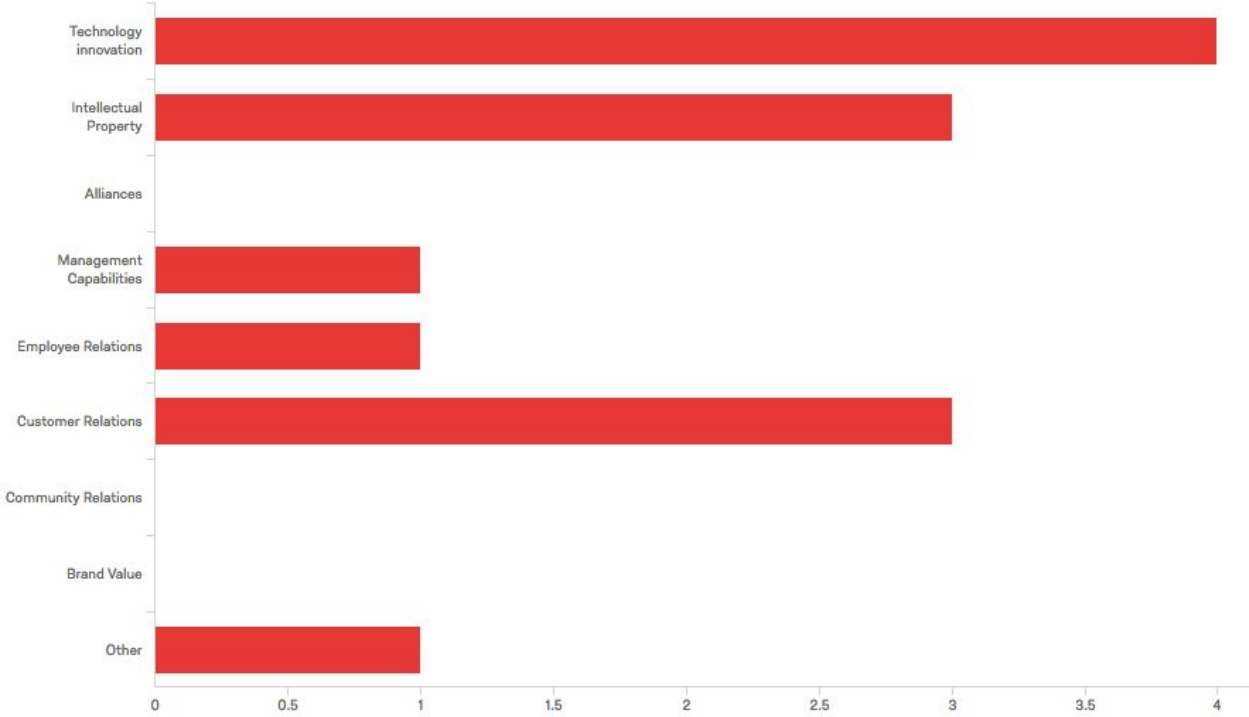
Appendix J: 1-7 Rating scale for Q8. What is more important to your company, short-term financial performance or long-term value creation?



Short term financial performance

Long term financial performance

Appendix K: Graph for Q4. What factors do you believe best drive value creation?



Appendix L: Graph for Q5. How do you value investment projects?

