

**Thesis Paper On**  
**A STUDY ON REQUIRED RATE OF RETURN OF IT INDUSTRY IN**  
**BANGLADESH FOR BETTER INVESTMENT DECISION**

**By**

**Ramisa Anjum**

**ID: 18104078**

**A Thesis Paper submitted to the BRAC Business School in partial  
fulfillment of the requirements for the degree of  
Bachelor of Business Administration**

**BRAC Business School**  
**BRAC University**  
**August 2022**

**© 2022. BRAC University**

**All rights reserved.**

## Declaration

It is hereby declared that

1. The Thesis paper submitted is my own original work while completing degree at BRAC University.
2. The article does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The study does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

### **Student's Full Name & Signature:**

---

**Ramisa Anjum  
18104078**

### **Supervisor's Full Name & Signature:**

---

**Riyashad Ahmed**  
**Assistant Professor of Finance & Director of Programs (MBA & EMBA),**  
**BRAC Business School**  
**BRAC University**

**A STUDY ON REQUIRED RATE OF RETURN OF IT INDUSTRY IN  
BANGLADESH FOR BETTER INVESTMENT DECISION**

## Acknowledgement

First and foremost, I want to give thanks and appreciation to Allah, the Almighty, for His bounties that helped me finish my research successfully.

I would like to express my deep and sincere gratitude to my research supervisor, Riyashad Ahmed, Assistant Professor of Finance, BRAC Business School, BRAC University for allowing me to conduct the research, for the essential advices, and for providing me with a wealth of useful trade information. I have been greatly inspired by his dynamism, insight, genuineness, and enthusiasm. He has taught me how to conduct research and deliver the results in the most understandable way. Being able to work and study under his direction was a huge honor and privilege. I am incredibly appreciative of what he has given me. I also want to thank him for his compassion. I am extending my heartfelt thanks to him for patiently clearing and solving all my doubts and confusion during research work and thesis preparation.

I'd want to express my thanks to all of my BRAC University professors for their lectures and teachings. Those lessons were really beneficial when I came to complete the thesis.

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. Also, I express my special thanks to my brother and sister-in-law for their support in terms of writing the paper's front page.

Finally, my thanks go to all the people who have supported me to complete the research work directly or indirectly.

---

**Ramisa Anjum**

**Author**

## Table of Contents

<b>Declaration</b> .....	2
<b>Abstract</b> .....	6
<b>Introduction</b> .....	7
<b>Literature Review</b> .....	8
<b>Overview:</b> .....	8
<b>Plan Stage:</b> .....	8
<b>Conducting Stage:</b> .....	8
<b>Report Stage:</b> .....	8
<b>Search Strategy and Database Selection:</b> .....	9
<b>Outcome of Literature Review:</b> .....	9
<b>Research Methodology</b> .....	11
<b>Data Collection Method:</b> .....	11
<b>Data Analysis Method:</b> .....	11
<b>Analysis &amp; Findings</b> .....	11
<b>Capital Asset Pricing Model:</b> .....	11
<b>Required Rate of Return Calculations:</b> .....	12
<b>Aamra Networks Limited:</b> .....	12
<b>Aamra Technologies Limited:</b> .....	13
<b>ADN Telecom Limited:</b> .....	13
<b>Agni Systems Limited:</b> .....	14
<b>BDCOM Online Limited:</b> .....	15
<b>Daffodil Computers Limited:</b> .....	15
<b>Genex Infosys Limited:</b> .....	16
<b>Intech Limited:</b> .....	17
<b>Information Services Network Limited:</b> .....	17
<b>IT Consultants Limited:</b> .....	18
<b>Discussion</b> .....	19
<b>Conclusion</b> .....	20
<b>Appendices</b> .....	22
<b>References</b> .....	27

## Abstract

The IT business has shown to be the fastest expanding industry in recent years. Every industry was negatively affected by the Covid-19 pandemic. The epidemic, on the other hand, had the opposite effect on the IT industry. Though people are returning to on-site employment following the pandemic. However, there are still a few jobs and tests that are done remotely. Proper local and international investments are required to boost the sector's growth. For this reason, that this study has been undertaken. An introduction is presented at the start of the paper that goes over the thesis's purpose in detail. The next step was to conduct a systematic literature review (SLR). Previous relevant articles have been subjected to a systematic literature review. The SLR approach is used because it gives in-depth understanding of a topic and answers research questions. The following section is methodology. All of the material, articles, and data have been found on the internet. As a result, the study employs a secondary research analysis strategy. The purpose of this article is to use the Capital Asset Pricing Model to compute the required rate of return for each IT company by examining the stock price (CAPM). This in-depth research will aid investors in determining which firm is the best to invest in and which will offer them with a high return on their investment. The study used the stock prices of each IT business over the previous two years to compute monthly returns. The two-year monthly returns of the Dhaka Stock Exchange have also been estimated. Following that, market risk, or Beta, was determined for each IT business using regression analysis. These all are in analysis and findings part. A thorough summary of the paper is given and required recommendations. Last but not least, a list of all preceding publications is presented, which were quite useful in finishing the thesis.

## Introduction

The paper intends to research on the required rate of return that an investor will get if he/she invests in the IT sector of Bangladesh. The required rate of return (RRR) is the lowest amount of money (return) a shareholder must look for or earn in exchange for taking on the uncertainty of investing in an equity or other type of instrument. (PALMER, 2022). There are few reasons for choosing this area as the research topic. An investor must know how much money he or she will make after a particular amount of time before investing in a company's stock. He or she must be aware of the project's level of risk. Because of this, a business owner may consider expanding his or her business in that field.

Moreover, among Bangladesh's many industries, the IT sector has shown to be a good and profitable investment opportunity. Especially for young and new entrepreneurs. According to Bushra and Hussein, Bangladesh's information technology is currently a topic of great attention. There are over 100 software houses in the nation, and with the expansion of the IT industry in the country, numerous more enterprises are emerging in this area. As a result, the government has declared the IT sector to be a priority area, and numerous computer centers are being established so that the country's people may learn how to use computers and work in the IT industry.

The entire world is currently moving toward digitalization. Furthermore, due to the corona virus outbreak, many tasks were carried out virtually. Working virtually was proven to be highly effective. That is why, in addition to physical activities, virtual activities continue to take place even after the outbreak. Since, world's most of the countries are moving towards digitalization, so Bangladesh's government is gradually digitizing the country in order to keep up with the digitalized world. This sector is able to have a good impact on the economy of the nation because of the government's strong support. It is enabling the nation's economy in growing at a satisfactory rate. According to an article posted by World Economic Forum, it is anticipated to have the 24th-largest economy in the world by the year 2030. The clever application of ICT to promote advancement in all areas has been the key component of this expansion. Having governmental support is one of the most important factors in making a business successful. another factor to make a business successful is, having skilled personnel. Bangladeshis have the necessary skills to work in IT firms. As a result, at this present state, it will be the most profitable sector to invest in. The purpose of this paper is to determine whether the IT sector is profitable enough by calculating its required rate of return.

A profit is regarded a positive rate of return, whereas a loss is considered a negative rate of return. The paper also aims to determine if investing in IT firms will provide a profit or a loss. This indicates whether or not the returns will be favorable or unfavorable.

This study also aims to determine if the shares of the IT sector are undervalued or overvalued during the last two years by comparing the actual returns with the required rate of return. When a company's actual rate of return exceeds its expected or required rate of return, its stock is said to be undervalued. On the other hand, when a company's actual rate of return is less than the required rate of return, it is considered to be an overvalued share. One can predict the future performance of the stocks by determining if the shares of a particular industry were overvalued

or undervalued in prior years. Investing in shares that are undervalued typically yields higher returns than investing in shares that are overvalued. Because the investor has the chance to get a bigger return than what is predicted.

Thus, the thesis paper aims to address three different issues. The first is the required rate of return for all IT companies, the second is whether the shares of this industry are overvalued or undervalued, and last but not least, depending on the comparison, which businesses are currently in a better position to attract investors to invest in and which businesses' shares are better to sell as quickly as possible. These research issues have been framed in relation to the research subject that will have an impact on the study's completion.

## Literature Review

### Overview:

A systematic literature review (SLR) was undertaken in order to reach the targets of this research. This article presents an exhaustive review of the required rate of return of IT sector in Bangladesh. The returns are calculated by using Capital Asset Pricing Model. All of the information and data gathered from prior related research publications have been combined and organized into a theoretical framework, with necessary limitations and guidelines for upcoming research identified. This is done in accordance with the systematic literature review of Chowdhury, Adam, and Skinner (2019). Three steps make up this SLR.

### Plan Stage:

A system for review was designed when a need for SLR on this topic emerged during the first or plan stage. Setting the research questions and creating a research plan were all part of the review methodology.

### Conducting Stage:

The search for articles relating to the issue was began in the second step, known as the conducting stage. Using the inclusion criteria, the results were filtered to choose the best and most relevant ten research papers and a few additional publications that are closely relevant to the subject. After that, the analysis stage was then started.

### Report Stage:

And all the results are organized and presented appropriately during the final, or report, step by composing the report.

The SLR methodology is used because it offers in-depth knowledge on a particular subject and on particular topics. It is possible to collect sufficient data for each study issue by methodically completing a literature review. The majority of the data used for the SLR was gathered from scholarly articles. The Dhaka Stock Exchange website had been exploited for the sake of mathematical calculations.



### **Search Strategy and Database Selection:**

The initial search tool used to locate relevant articles for the research topic was Google Scholar. Research Gate, Taylor & Francis, and Emeralds have also been used. Key terms and a phrase had been taken from the research topic. “Required Rate of Return” AND “IT Industry” AND “Bangladesh” was the search term used to find publications. In order to receive the most relevant search results, it was helpful to use that term to focus the search. The search outcomes were updated after that. Reading the names of each publication was the first thing to do. The second step was to read the abstracts of articles that were highly related to the subject of the investigation. The most relevant papers were selected by reading the abstract, and a comprehensive reading has begun. There aren't enough articles in this field of study, though. Because of this, only a limited number of publications that are relevant to the topic were located after papers were screened.

### **Outcome of Literature Review:**

Bangladesh's IT sector is one of the fastest-growing businesses in the country. This business has shown one of the strongest growth rates internationally, while being substantially smaller industry than India and the Philippines (H Karthik, 2017). The writers also mentioned that, this indicates a large untapped potential and growing investment interest. By 2025, the sector is expected to produce \$4.6–4.8 billion in sales. This is far greater than the total growth prediction for either a mature comparable country like India or a developing country like Vietnam. Since 2010, Bangladesh's IT industry has developed at a rate of 40% per year (Bijon Islam). It is not going to end here. The industry will continue to expand.

Despite the fact that the business is rapidly expanding, investors must have a clear understanding of the exact return they will receive after investing in the area. There hasn't been any proper research conducted in this field yet. As a result, the thesis paper aims to determine the needed rate of return for each IT company in Bangladesh, so that investors may understand how much return they can earn from the business.

This return has been calculated by using Capital Asset Pricing Model (CAPM). According to Abhay Raja and et al. it is the area of finance that has received the most attention from researchers and has also been the subject of the most critical analysis. One of the most significant advancements in financial research is the Capital Asset Pricing Model. Sharpe (1964), Lintner (1965), and Mossin (1968) each separately established the CAPM (Md. Zobaer Hasan, 2013). CAPM is a framework used in finance to choose which assets to include in a well-diversified portfolio by estimating the asset's theoretically suitable required rate of return (Hossain).

A positive rate of return is what an investor always hopes for. Taking into account that a good rate of return denotes a successful business. Finding out whether most IT companies have positive or negative returns is one of the goals of this study. It is true that a positive return on investment guarantees investors a healthy return on their investment. However, merely understanding positive and negative required rates of return is insufficient to adequately assist an investor. An investor should also be aware of shares that are overvalued and undervalued.

It facilitates buy-sell decision-making. Making quick and accurate buy-sell selections can result in a respectable profit.

In their article, Abhay Raja and et al. compared the expected returns of three different industries to the actual returns for each. The expected returns were determined using CAPM. In the backdrop of India, the paper was written. The information technology industry was one of the sectors. The gap between the actual return and the expected return fluctuated between the years of 2011 and 2015. With regard to Bangladesh, this article will now compare the actual and expected returns from the IT sector. As was previously written, comparing actual returns to required returns can help to determine whether a company's stock is undervalued or overvalued. With this, investors will be able to figure out how the future performance of IT companies will be.

Shilpa K. S. and et al. conducted extensive testing on the Indian IT industry and contrasted each IT company's intrinsic value with its market value. They conducted an analysis of which firms' shares are undervalued and which are overvalued based on this comparison. They also offered suggestions in addition. For instance, it was advised to buy or retain shares that were undervalued, while it was advised to sell shares that were overvalued. An investor can make much more profit at the time of purchasing or selling shares of a firm when they are aware of which shares are overvalued and which ones are undervalued.

In their research, Jayendra Gokhale and et al. demonstrated that buying undervalued stocks can yield higher returns. A new investment approach known as the composite-error model was presented in their study. They advised investors, using this new method, to repeatedly buy in undervalued equities to generate surplus returns. Daname Kolani and et al. also advised investors to purchase shares that are undervalued. They found that shares that are undervalued can be purchased for a cheaper price. Stock prices are consistently corrected by the stock market. In other words, if an investor purchases a stock at a price below its fair value, the market will soon fix that price and the purchaser will receive their investment back at its fair value. The investor will then be able to make a respectable profit if he decides to sell that share. The situation is the exact reverse in terms of overvalued shares. A share is overvalued if its price is higher than it should be, according to the current market situation. Therefore, it is preferable to sell these kinds of shares as quickly as possible before the equities return to their intrinsic value.

## Research Methodology

### **Data Collection Method:**

The study is conducted in secondary research analysis approach. That means All of the material needed to complete the paper was obtained from the internet. For example, the share price was necessary to determine the monthly rate of return of listed IT firms. The stock prices of these companies were obtained for Dhaka Stock Market. In DSE market there are 11 IT companies. But among them, one company started being listed in the market from March'21. That is why, this company has not considered for the study. 10 listed IT companies that trade on the Dhaka Stock Exchange for the time frame of 1 January 2020 to 31 December 2021 were utilized to perform the thesis. So, the period of research was 22 months.

### **Data Analysis Method:**

For the purpose of analysing the data, it was first determined for each company and for the previous two years the monthly rate of return based on the share price. Following that, the standard deviation and average rate of return for the subsequent two years were computed. For each of the 10 companies, the beta value or market risk was determined separately. For this computation, regression analysis was used. Finally, the required rate of return using CAPM was determined after obtaining the value of risk-free rate of return from Bangladesh Bank's website. The difference between the actual and required rates of return was then used to determine which shares were undervalued and which were overvalued.

The thesis paper is based on a new issue that has received little attention in the literature. Nonetheless, a few publications were discovered throughout the search, although they bear little resemblance to the thesis. The research draws on those previous studies.

## Analysis & Findings

The required rate of return calculations has been shown in this chapter. To begin, the market risk, or Beta, of each firm has been estimated using regression analysis. Then, using the Capital Asset Pricing Model (CAPM), the required rate return was calculated separately.

### **Capital Asset Pricing Model:**

According to a paper of Anirudh YS, The Capital Asset Pricing Model (CAPM) is a model that explains how the expected return and risk of an investment in a security are related to one another. As a result, it can be seen that the expected return on a security is equal to the risk-free return plus a risk premium that is based on the beta of that asset. As a basis of the model, the required rate of return formula is provided below:

$$\mathbf{K_e = R_f + (R_m - R_f) * Beta}$$

Here,

**K<sub>e</sub>** = Required Rate of Return

**Rf** = Risk-free Rate of Return. The risk-free rate of return is fixed for every company. The Rf has been found in the Bangladesh Bank's website. Two year's stock data has been considered in order to conducting the thesis. That is why two years government bond's rate of return has been chosen. So, the rate of return of government bond for two years,

$$R_f = 6.14\%$$

**Rm** = Market return. This value is fixed for every company as well. First, monthly market return for two years has been calculated. From there, average monthly rate of return of DSEX was 1.61% and the annual market rate of return is 0.19% (multiplied by 12). Therefore,

$$R_m = 0.19\%$$

**Beta** = This is referred to as market risk. This is a stand-alone security risk that cannot be eradicated. The market risk of a stock indicates how volatile it is in comparison to the market. Every business has a different value. As a result, each company's market risk or Beta has been calculated independently.

### Required Rate of Return Calculations:

#### Aamra Networks Limited:

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.532							
R Square	0.283							
Adjusted R Square	0.247							
Standard Error	0.090							
Observations	22.000							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.064	0.064	7.886	0.011			
Residual	20	0.163	0.008					
Total	21	0.228						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.020	0.020	-1.017	0.321	-0.062	0.022	-0.062	0.022
X Variable 1	1.019	0.363	2.808	0.011	0.262	1.776	0.262	1.776

Here, Aamra Networks Stock's market risk or Beta is 1.019%. Therefore, 1% change in market rate of return will lead to 1.019% change in Aamra Network's stock return.

So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * 1.019$   
 $= 0.1936\%$

**Aamra Technologies Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.455							
R Square	0.207							
Adjusted R Square	0.167							
Standard Error	0.077							
Observations	22.000							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.031	0.031	5.215	0.033			
Residual	20	0.119	0.006					
Total	21	0.150						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.014	0.017	-0.828	0.417	-0.050	0.022	-0.050	0.022
X Variable 1	0.708	0.310	2.284	0.033	0.061	1.354	0.061	1.354

Here, Aamra Technologies Stock’s market risk or Beta is 0.708%. Therefore, 1% change in market rate of return will lead to 0.708% change in Aamra Technologies’ stock return.

So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * 0.708$   
 $= 0.1344\%$

**ADN Telecom Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.360							
R Square	0.129							
Adjusted R Square	0.086							
Standard Error	0.154							
Observations	22							

ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.070	0.070	2.969	0.100			
Residual	20	0.475	0.024					
Total	21	0.545						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.002	0.034	-0.053	0.958	-0.073	0.070	-0.073	0.070
X Variable 1	1.066	0.619	1.723	0.100	-0.224	2.357	-0.224	2.357

Here, ADN Telecom Stock's market risk or Beta is 1.066%. Therefore, 1% change in market rate of return will lead to 1.066% change in ADN Telecom's stock return.

$$\text{So, Required Rate of Return, } K_e = 6.14 + (0.19 - 6.14) * 1.066$$

$$= 0.2025\%$$

### **Agni Systems Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.535							
R Square	0.286							
Adjusted R Square	0.251							
Standard Error	0.107							
Observations	22							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.091	0.091	8.030	0.010			
Residual	20	0.228	0.011					
Total	21	0.319						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.015	0.024	-0.632	0.534	-0.065	0.035	-0.065	0.035
X Variable 1	1.214	0.428	2.834	0.010	0.320	2.107	0.320	2.107

Here, Agni Systems Stock's market risk or Beta is 1.214%. Therefore, 1% change in market rate of return will lead to 1.214% change in Agni Systems' stock return.

So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * 1.214$

$$= 0.2305\%$$

**BDCOM Online Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.577							
R Square	0.333							
Adjusted R Square	0.300							
Standard Error	0.072							
Observations	22.000							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.052	0.052	10.000	0.005			
Residual	20	0.104	0.005					
Total	21	0.156						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.029	0.016	-1.817	0.084	-0.063	0.004	-0.063	0.004
X Variable 1	0.914	0.289	3.162	0.005	0.311	1.518	0.311	1.518

Here, BDCOM Online Stock’s market risk or Beta is 0.914%. Therefore, 1% change in market rate of return will lead to 0.914% change in stock return of BDCOM Online.

So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * 0.914$

$$= 0.1737\%$$

**Daffodil Computers Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.621							
R Square	0.385							
Adjusted R Square	0.355							
Standard Error	0.106							
Observations	22.000							

ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.142	0.142	12.542	0.002			
Residual	20	0.227	0.011					
Total	21	0.369						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.013	0.024	-0.533	0.600	-0.062	0.037	-0.062	0.037
X Variable 1	1.514	0.427	3.542	0.002	0.622	2.405	0.622	2.405

Here, Daffodil Computers Stock's market risk or Beta is 1.514%. Therefore, 1% change in market rate of return will lead to 1.514% change in stock return of Daffodil Computers.

$$\text{So, Required Rate of Return, } K_e = 6.14 + (0.19 - 6.14) * 1.514$$

$$= 0.2876\%$$

### Genex Infosys Limited:

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.280							
R Square	0.078							
Adjusted R Square	0.032							
Standard Error	0.149							
Observations	22							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.038	0.038	1.704	0.207			
Residual	20	0.443	0.022					
Total	21	0.480						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.023	0.033	0.701	0.491	-0.046	0.092	-0.046	0.092
X Variable 1	0.780	0.597	1.305	0.207	-0.466	2.026	-0.466	2.026

Here, Genex Infosys Stock's market risk or Beta is 0.780%. Therefore, 1% change in market rate of return will lead to 0.780% change in stock return of Genex Infosys.



So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * 0.780$

$$= 0.1481\%$$

**Intech Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.022							
R Square	0.000							
Adjusted R Square	-0.049							
Standard Error	0.158							
Observations	22							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.0002	0.0002	0.0096	0.9231			
Residual	20	0.4964	0.0248					
Total	21	0.4967						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.033	0.035	0.948	0.355	-0.040	0.106	-0.040	0.106
X Variable 1	-0.062	0.633	-0.098	0.923	-1.381	1.258	-1.381	1.258

Here, Intech Stock’s market risk or Beta is 0.062%. Therefore, 1% change in market rate of return will lead to 0.062% change in Intech’s stock return.

So, Required Rate of Return,  $K_e = 6.14 + (0.19-6.14) * (-0.062)$

$$= -0.0118\%$$

**Information Services Network Limited:**

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.506							
R Square	0.256							
Adjusted R Square	0.219							
Standard Error	0.111							
Observations	22							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			

Regression	1	0.085	0.085	6.873	0.016			
Residual	20	0.248	0.012					
Total	21	0.333						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.021	0.025	-0.833	0.415	-0.072	0.031	-0.072	0.031
X Variable 1	1.172	0.447	2.622	0.016	0.240	2.105	0.240	2.105

Here, Information Services Network Stock's market risk or Beta is 1.172%. Therefore, 1% change in market rate of return will lead to 1.172% change in Information Services Network's stock return.

$$\begin{aligned} \text{So, Required Rate of Return, } K_e &= 6.14 + (0.19-6.14) * 1.172 \\ &= 0.2227\% \end{aligned}$$

### IT Consultants Limited:

SUMMARY OUTPUT								
<i>Regression Statistics</i>								
Multiple R	0.521							
R Square	0.271							
Adjusted R Square	0.235							
Standard Error	0.082							
Observations	22							
<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.050	0.050	7.437	0.013			
Residual	20	0.133	0.007					
Total	21	0.183						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.021	0.018	-1.157	0.261	-0.059	0.017	-0.059	0.017
X Variable 1	0.894	0.328	2.727	0.013	0.210	1.579	0.210	1.579

Here, IT Consultants Stock's market risk or Beta is 0.894%. Therefore, 1% change in market rate of return will lead to 0.894% change in IT Consultants' stock return.

$$\text{So, Required Rate of Return, } K_e = 6.14 + (0.19-6.14) * 0.894$$

$$= 0.1699\%$$

## Discussion

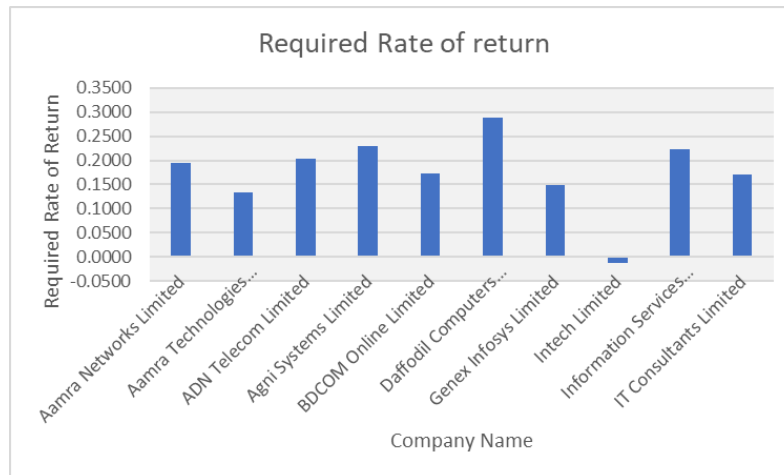


Figure 1: Graphical Representation of Required Rate of Return

We can see from the figure above that, every IT company, with the exception of Intech Limited, is demonstrating a positive required rate of return. We are aware of that; investors always look for positive rate of return. If investors want to invest in this sector, they will have the best chance of seeing a positive required rate of return. Investors can now predict which IT firm will generate the highest return. They will be drawn to businesses that provide bigger returns. For instance, 9 of the aforementioned 10 corporations are exhibiting a positive figure. Even so, if we look at the required rates of return for ADN Telecom, Agni Systems, Daffodil Computers, and Information Services Network Limited, we can see that they have had fairly good returns over the past two years. The rate of return for these companies is higher than other IT companies. From there, it follows that they can clearly choose the best company out of those with positive returns. Finding out what the required rate of returns are for all IT companies is the paper's initial goal.

Table 1: Comparison Between Actual & Required Rate of Return

Company Names	Actual Rate of Return	Required Rate of Return	Analysis
Aamra Networks Limited	-0.0493	0.1937	Overvalued
Aamra Technologies Limited	-0.0344	0.1344	Overvalued
ADN Telecom Limited	0.1836	0.2025	Overvalued
Agni Systems Limited	0.0537	0.2306	Overvalued
BDCOM Online Limited	-0.1735	0.1737	Overvalued
Daffodil Computers Limited	0.1401	0.2876	Overvalued
Genex Infosys Limited	0.4290	0.1481	Undervalued
Intech Limited	0.3872	-0.0118	Undervalued
Information Services Networks Limited	-0.0219	0.2227	Overvalued
IT Consultants Limited	-0.0803	0.1699	Overvalued

The second objective of the paper is to find out the companies those are overvalued and undervalued. From the table, we can see that, for the last two years, the stocks of Genex Infosys and Intech Limited are undervalued. And the rest of the companies' stocks are overvalued.

The final goal was to offer advice on which stocks of firms should be liquidated and which stocks should be acquired. Genex and Intech have the potentials to provide satisfactory returns to both its domestic and international investors. So, investors should sell the overvalued shares now and buy the undervalued ones before the market makes necessary corrections. Though, Intech Limited is showing a negative required rate of return. Apparently, this might look as a loss project. But after comparing the actual return with the required rate of return, it is visible that, investing in Intech Ltd. might be profitable.

## Conclusion

Bangladesh's IT industry is regarded as one of the country's most important industries. It contributes significantly to the country's GDP. The advent of the Corona virus influenced the country's digitalization. Many domestic and international investors are interested in investing in the business. However, no comprehensive research into the amount of return necessary from this business has been undertaken. As a result, the motive of this paper is to present a comprehensive picture of the required rate of return for each firm in that industry.

The article then determined the undervalued and overvalued shares by comparing the actual rate of return (monthly return) with the required rate of return. Investors can make better decisions if they are aware of overvalued and undervalued stock. They can clearly understand which shares are best suited for investment or purchase right now and which shares need to be sold right away before share prices return to their fair market value. These details are all contained in the report very clearly. Investors will be able to get a good notion of how profitable the industry is by reading this paper.

A systematic review of the literature has been attempted in this study. A summary of relevant prior articles' ideas was provided in the literature review section. However, in the context of Bangladesh, the paper's topic is quite fresh. The search for relevant prior articles was therefore rather challenging. The paper used secondary research and analysis as its research methodology. That indicates that all the information required for conducting the study was obtained from the internet, the websites of the Bangladesh Bank and the Dhaka Stock Exchange (DSE). The data used in this study included the years 2020 and 2021. Each IT company's required rate of return has been determined once the data has been collected using the Capital Asset Pricing Model (CAPM). The actual return was calculated by averaging monthly returns prior to determining the required rate of return.

After the estimation of the required rate of returns, a discussion of the conclusions drawn by the article from its findings and analysis is provided in the following section. Two of the ten IT businesses have shares that are cheap, while the other eight have shares that are overvalued. It was advised to purchase undervalued shares and to dispose of overvalued shares.

It would have been great if our nation had more shares that were undervalued. Because shares that are undervalued promise profit. The majority of the companies' share prices have fallen since the Corona Virus outbreak. However, the IT or ICT sector has the potential to regain its prior standing and return to its former levels of profitability. But for it to happen, our government must assist this industry. Barriers related to money and regulations need to be eliminated. Government should concentrate on increasing the nation's manpower's level of expertise because IT-based businesses always want qualified workers. Launching numerous IT training programs can help with this. The cost advantage is with our nation. Promoting these benefits can in fact attract investors' attention.

## Appendices

### Appendix 1:

$$\text{Monthly Return} = \frac{\text{Month Closing} - \text{Month Opening}}{\text{Month Opening}} * 100$$

Aamra Networks Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	39.4	36.8	-6.60%
	February	36.4	40.1	10.16%
	March	38.5	33.2	-13.77%
	June	33.2	33.2	0.00%
	July	33.2	37.6	13.25%
	August	38.5	40.2	4.42%
	September	41.9	41.8	-0.24%
	October	42.9	37.9	-11.66%
	November	39.4	42.1	6.85%
	December	46.2	45.2	-2.16%
2021	January	45.6	38	-16.67%
	February	37.8	38.3	1.32%
	March	38.4	36.9	-3.91%
	April	37.3	38.7	3.75%
	May	39.5	38.7	-2.03%
	June	39.2	40.6	3.57%
	July	41.7	47	12.71%
	August	47	51.2	8.94%
	September	54.1	62.2	14.97%
	October	62	45	-27.42%
	November	44.2	42.2	-4.52%
	December	43.2	43.2	0.00%
Average Monthly Return		-0.41%		
Annual Return		-0.05		
Risk(SD)		0.10		

### Appendix 2:

Aamra Technologies Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	24	25.7	7.08%
	February	25.8	25.6	-0.78%
	March	25.9	23	-11.20%
	June	23	23	0.00%
	July	23	25.4	10.43%
	August	25.3	25.2	-0.40%
	September	26.2	26.3	0.38%
	October	26.5	25.9	-2.26%
	November	27.8	25.7	-7.55%
	December	27.5	26.4	-4.00%
2021	January	26.9	25.2	-6.32%
	February	25.3	25.1	-0.79%
	March	24.6	24.7	0.41%
	April	24.3	24.2	-0.41%
	May	24.3	25.5	4.94%
	June	25.8	26.2	1.55%
	July	27	29.9	10.74%
	August	30.8	29.6	-3.90%
	September	30.3	37	22.11%
	October	36.6	29	-20.77%
	November	28.8	27.5	-4.51%
	December	28.4	28.1	-1.06%
Average Monthly Return		-0.29%		
Annual Return		-0.03		
Risk(SD)		0.08		

### Appendix 3:

ADN Telecom Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	40.5	45.1	11.36%
	February	43.7	42.8	-2.06%
	March	41.3	32.1	-22.28%
	June	32.1	32.1	0.00%
	July	32.1	37.7	17.45%
	August	40.1	37.3	-6.98%
	September	38.4	37.6	-2.08%
	October	38.4	38.9	1.30%
	November	38.9	59.2	52.19%
	December	60.7	64.3	5.93%
2021	January	64.7	50.2	-22.41%
	February	50	47.6	-4.80%
	March	46.9	42.7	-8.96%
	April	42.5	47.4	11.53%
	May	49.3	50.5	2.43%
	June	50.9	49.6	-2.55%
	July	50.9	54.5	7.07%
	August	54.4	61.3	12.68%
	September	63.2	74.1	17.25%
	October	73.5	58.6	-20.27%
	November	59.6	55.9	-6.21%
	December	56.3	52.4	-6.93%
Average Monthly Return		1.53%		
Annual Return		0.18		
Risk(SD)		0.16		

### Appendix 4:

Agni Systems Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	15.9	14.5	-8.81%
	February	14.9	16.2	8.72%
	March	15.6	13.4	-14.10%
	June	13.4	13.4	0.00%
	July	13.4	17.6	31.34%
	August	19.3	20.8	7.77%
	September	21.1	20.9	-0.95%
	October	21.2	18.2	-14.15%
	November	19.5	17.3	-11.28%
	December	19	18.9	-0.53%
2021	January	19.2	18.9	-1.56%
	February	18.8	17.8	-5.32%
	March	18	15.9	-11.67%
	April	15.8	17.6	11.39%
	May	17.2	18.7	8.72%
	June	18.7	19.9	6.42%
	July	20.7	25	20.77%
	August	25.7	23.6	-8.17%
	September	23.8	25.5	7.14%
	October	25.1	19.7	-21.51%
	November	19.8	21.1	6.57%
	December	21.3	21.1	-0.94%
Average Monthly Return		0.45%		
Annual Return		0.05		
Risk(SD)		0.12		

### Appendix 5:

BDCOM Online Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	22.8	20.7	-9.21%
	February	19.6	21.1	7.65%
	March	20.5	17	-17.07%
	June	17	17	0.00%
	July	17	20.6	21.18%
	August	21.5	21.8	1.40%
	September	23.7	24.4	2.95%
	October	25.8	24	-6.98%
	November	26.4	23.7	-10.23%
	December	24.8	24	-3.23%
2021	January	24.6	22.2	-9.76%
	February	22.1	21.1	-4.52%
	March	21.1	19.8	-6.16%
	April	20.3	20.9	2.96%
	May	21.2	22.8	7.55%
	June	22.6	24	6.19%
	July	24.6	26	5.69%
	August	26.9	26.2	-2.60%
	September	26.4	27.9	5.68%
	October	27.8	26.8	-3.60%
	November	26.9	23.7	-11.90%
	December	24.4	22.5	-7.79%
Average Monthly Return		-1.45%		
Annual Return		-0.1735		
Risk(SD)		0.09		

### Appendix 6:

Daffodil Computers Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	63.5	55.6	-12.44%
	February	54	57.8	7.04%
	March	60.7	55	-9.39%
	June	54.9	53.4	-2.73%
	July	53.4	53.9	0.94%
	August	53.8	72	33.83%
	September	71.4	71.3	-0.14%
	October	75.5	64.7	-14.30%
	November	69.1	63.3	-8.39%
	December	66.1	73.8	11.65%
2021	January	69	54.5	-21.01%
	February	54.3	53.4	-1.66%
	March	53.7	53.4	-0.56%
	April	53.4	53.4	0.00%
	May	53.4	53.4	0.00%
	June	53.4	62.7	17.42%
	July	60.2	58.2	-3.32%
	August	57.7	71.5	23.92%
	September	69.6	72.8	4.60%
	October	69.5	58.6	-15.68%
	November	60.4	60.2	-0.33%
	December	61	70.9	16.23%
Average Monthly Return		1.17%		
Annual Return		0.1401		
Risk(SD)		0.13		



## Appendix 7:

Genex Infosys Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	68.30	62.30	-8.78%
	February	60.9	60.7	-0.33%
	March	61	54.7	-10.33%
	June	54.7	54.7	0.00%
	July	54.7	58.2	6.40%
	August	61.2	58.9	-3.76%
	September	59.7	62.3	4.36%
	October	64.1	62.8	-2.03%
	November	62.4	60.1	-3.69%
December	60.6	55	-9.24%	
2021	January	56.5	54.7	-3.19%
	February	54.7	54.7	0.00%
	March	54.7	54.7	0.00%
	April	54.7	54.7	0.00%
	May	54.7	88	60.88%
	June	92.5	88.9	-3.89%
	July	95.8	93.9	-1.98%
	August	91.8	116.1	26.47%
	September	115.6	122.7	6.14%
	October	132.3	136.4	3.10%
	November	136.1	156.7	15.14%
	December	160	165.4	3.38%
Average Monthly Return		3.58%		
Annual Return		0.4290		
Risk(SD)		0.15		

## Appendix 8:

Intech Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	13.80	13.00	-5.80%
	February	12.7	15.7	23.62%
	March	14.9	19.6	31.54%
	June	19.6	19.6	0.00%
	July	19.6	19.6	0.00%
	August	21.5	22.4	4.19%
	September	22.8	31.3	37.28%
	October	31.9	38.7	21.32%
	November	40	34	-15.00%
	December	34.6	36.6	5.78%
2021	January	37.5	32.8	-12.53%
	February	36	33	-8.33%
	March	32.8	34.1	3.96%
	April	34.5	40.6	17.68%
	May	41.3	37.8	-8.47%
	June	37.2	33.7	-9.41%
	July	34.7	36.2	4.32%
	August	36	38.6	7.22%
	September	38.3	40.6	6.01%
	October	39.8	32.3	-18.84%
	November	32.4	26.8	-17.28%
December	26.9	27.9	3.72%	
Average Monthly Return		3.23%		
Annual Return		0.3872		
Risk(SD)		0.15		

### Appendix 9:

Information Services Network Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	41.70	40.90	-1.92%
	February	39.7	42.8	7.81%
	March	43.6	33.9	-22.25%
	June	33.8	33.8	0.00%
	July	33.8	39.2	15.98%
	August	39.8	45.5	14.32%
	September	48.9	53.5	9.41%
	October	54.1	39.9	-26.25%
	November	42	39.9	-5.00%
	December	42.1	39.9	-5.23%
2021	January	39.4	35	-11.17%
	February	35.7	36.6	2.52%
	March	36.8	36.7	-0.27%
	April	36.3	35.5	-2.20%
	May	35.5	36	1.41%
	June	35.6	37.9	6.46%
	July	38.6	43.2	11.92%
	August	44	46.2	5.00%
	September	46.2	46.7	1.08%
	October	45.6	33.3	-26.97%
	November	34.2	34.6	1.17%
	December	34.7	41.7	20.17%
Average Monthly Return		-0.18%		
Annual Return		-0.0219		
Risk(SD)		0.13		

### Appendix 10:

IT Consultants Limited				
Year	Month	Month Opening	Month Closing	Return
2020	January	34.10	34.70	1.76%
	February	33.6	36.2	7.74%
	March	34	29.4	-13.53%
	June	29.4	29.4	0.00%
	July	29.4	34.2	16.33%
	August	35.5	35.2	-0.85%
	September	35.7	32.8	-8.12%
	October	33.8	29.5	-12.72%
	November	31.5	30.4	-3.49%
	December	31.7	32.1	1.26%
2021	January	32.3	31.6	-2.17%
	February	31.9	31.5	-1.25%
	March	31.6	29.9	-5.38%
	April	30.2	30.9	2.32%
	May	31	32.6	5.16%
	June	32.3	36.1	11.76%
	July	37	43.7	18.11%
	August	43.5	42.8	-1.61%
	September	42.2	42.1	-0.24%
	October	41.9	34.1	-18.62%
	November	36.5	31.4	-13.97%
	December	32.3	33.2	2.79%
Average Monthly Return		-0.67%		
Annual Return		-0.0803		
Risk(SD)		0.09		

## References

- Raja, A., Chocha, P., & Lalakiya, N. (2017). Testing Capital Assets Pricing Model as a Tool for Predicting Stock Returns: An Empirical Study in the Indian Context. *NMIMS Journal of Economics and Public Policy*, II (1), 10-16.
- Bijon Islam, M. u. (n.d.). *BANGLADESH HI-TECH INDUSTRIES*. LightCastle Partners. Retrieved from <https://www.lightcastlebd.com/wp-content/uploads/2020/10/Lightcastle-Partners-Bangladesh-Hi-Tech-Industries-Vision-2030.pdf>
- Bashar, B., & H Alsohagy, M. (2017). The Determinants of Capital Structure of IT Sector: Empirical Study on the Listed Companies in Bangladesh. *The Determinants of Capital Structure of IT Sector: Empirical Study on the Listed Companies in Bangladesh* (July 1, 2017).
- By 2030, Bangladesh will be the 24th largest economy. Here's how ICT is driving that growth. (2019, October 2). Retrieved from World Economic Forum: <https://www.weforum.org/agenda/2019/10/bangladesh-ict-development-economic-growth/>
- H Karthik, P. K. (2017). *Betting on the Future- The Bangladesh IT-ITeS Industry in Poised for Growth*. Everest Group.
- Hossain, M. I. (n.d.). *Application of CAPM Model for calculation of*. University of Dhaka, Department of Accounting & Information Systems. Academia.
- Hasan, M. Z., Kamil, A. A., Mustafa, A., & Baten, M. A. (2013). An empirical analysis of higher moment capital asset pricing model for Bangladesh stock market. *Modern Applied Science*, 7(5), 11-21.
- PALMER, B. (2022, March 3). *Calculating Required Rate of Return (RRR)*. Investopedia. Retrieved from [https://www.investopedia.com/articles/fundamental-analysis/11/calculating-required-rate-of-return.asp#:~:text=Return%20\(RRR\)%3F-The%20required%20rate%20of%20return%20\(RRR\)%20is%20the%20minimum%20amount,cost%20of%20funding%20that%20project.](https://www.investopedia.com/articles/fundamental-analysis/11/calculating-required-rate-of-return.asp#:~:text=Return%20(RRR)%3F-The%20required%20rate%20of%20return%20(RRR)%20is%20the%20minimum%20amount,cost%20of%20funding%20that%20project.)
- Silpa, K. S., ARYA, M., & AS, A. (2017). A study on Fundamental Analysis of Selected IT companies Listed at NSE. *Journal of Advanced Research in Dynamical and Control Systems*, 9(5), 1-10.
- Chowdhury, N. H., Adam, M. T. P., Skinner, G. (2019). The impact of time pressure on cybersecurity behaviour: A systematic literature review. *Behaviour & Information Technology*. doi:10.1080/0144929X.2019.1583769.

Gokhale, J., Schroeder, E., & Tremblay, V. J. (2014). Valuation Bias and Profit Opportunities in Financial Markets. *International Journal of Economics and Finance*, 6(4). Retrieved from <https://commons.erau.edu/db-accounting/4>

YS, A. (2021). A STUDY ON APPLYING CAPM ON SELETED STOCKS ACROSS FMCG, IT AND BANKING SECTORS USING CAPM.

KOLANI, D., & BENBACHIR, S. (2022). Portfolio selection based on predictive approach. *African Scientific Journal*, 3(11), 326-326.