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## Case study on stock investment on AMD Inc against the NASDAQ market return and CAPM return model benchmark

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### Abstract

A case study of AMD's stock performance relative to market indices and the capital asset pricing model (CAPM) was the primary focus of this research. Investors' attention has been drawn by AMD's strong stock performance, which has earned the business recognition as a fast-growing leader in the technology sector. The purpose of this research was to compare and contrast the stock return of AMD (AMD) to that of the market benchmark, which was derived from the performance of the NASDAQ market index, and the expected return of the stock of AMD, using the CAPM estimation model. Based on what was learned in the first place, assumptions were made about AMD stock's performance in relation to the NASDAQ market and the expected return from CAPM. The researchers behind the quantitative study recommended a comparative analysis to provide a comparison of the return using the actual investment return for AMD stock against the NASDAQ market index as well as the CAPM computation for the stock. The evidence showed that AMD stock return has a very strong positive association with the NASDAQ market return and CAPM projected return, consistent with the conclusions and findings based on the literature research. AMD's stock return also looks to be above average when compared to the return of the NASDAQ market and the projected return of the capital asset pricing model which suggested that the AMD stock performance had been achieving higher premium return against the market benchmark. The study suggested that the stock of AMD is referred to as a high-risk high-return stock investment.

**Keywords:** AMD, CAPM, NASDAQ market index, Stock return, Comparative analysis

### 1. Introduction

The value of one share of stock in a publicly traded corporation at the current moment is referred to as the stock price. According to Javanmard and Hasani (2017), it is the price at which investors are willing to acquire or sell a share of ownership in a firm through the stock market. The price of a share of stock is susceptible to change due to a wide range of factors, such as the financial performance of the firm, developments in the relevant industry, conditions in the global economy, and the sentiment of investors. According to Gronholdt et al. (2015), the supply and demand pressures in the market, changes in the company's earnings and dividends, and other factors that affect the value of the stock can all have an impact on the stock price. Because the performance of the stock prices through the ups and downs will translate to the return and earnings of the investors in the company's shares (Altig et al., 2020), stock performance has traditionally been the most essential indicator for investors. To put it another way, the price of a stock on the market will provide a reflection on the value of the company's stock as well as the company's overall worth, which in turn will represent the wealth of investors in the stock market. According to Alsabban and Alarfaj (2020), the straightforward game of stock investment will center on the idea of purchasing shares of a company with the goal of profiting through dividend payments and an increase in the value of the stock over time. These factors will contribute to the investors' overall earnings and returns.

The return on stocks is frequently determined by the concept of risk; the relationship between risk and return will give an estimate of the amount of return that investors can expect in exchange for the amount of risk they are willing to take. According to Vinodkumar and AlJasser's research from 2020, this indicates that investors should contribute a greater amount of money in proportion to the level of risk involved. As a result of this, the evaluation of the risk posed by the market will frequently serve as the standard for determining the projected return on the investment. According to Spelta et al.'s research from 2020, "the Beta will become the definitive value to represent the measurement of the market risk," with a reference to a value of 1 being equivalent to the "market risk." The Capital Asset Pricing Model (CAPM) has established itself as the standard model for the calculation of return, and investors frequently turn to it in order to do research and analysis on possible stock investments. According to Bhuva, Mankad and Bhatt (2017), this will also provide

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a close analysis of the comparison towards the present market performance and the ability to take benefit of adjusting the risk tolerance against the return offered by the stock performance.

However, despite the fact that it is possible to compare the success of the market index to the performance of the broader market, the future performance of individual stocks will continue to be determined in a subjective manner. According to Vinodkumar and AlJasser's research from 2020, the contribution of the performance of the market index could be due to the inclusion of some high-performing and some poor-performing individual stocks. However, this would not have a large impact on the market as a whole. In addition, the CAPM provides an estimation of the expected return, which is frequently used as a benchmark by investors when they are deciding whether or not to make a significant investment in a company's stock; nevertheless, despite this, the CAPM does not guarantee such a return for investors (Wibowo & Darmanto, 2020). This resulted in the problem statement where it was necessary to do additional research into the understanding of the market performance and CAPM estimation in order to investigate the possibility of carrying out the evaluation for the study.

### **2. Back of the study**

With this, the research aimed to delve into the case study of AMD, in which the stock of the company would be used to evaluate the stock performance with the comparative analysis against the market performance of NASDAQ, as well as using the five years' Beta value to evaluate the CAPM estimation return for the stock investment. With this, the study had targeted to venture into the case study of AMD. The motivation to understand a rapidly expanding technology company rising in the industry as the benchmark to explore the interest of investors towards the potential appreciation and gain on the company's value against the current assessment of the market performance is the primary factor that drives the preference for the application of AMD. This preference is primarily driven by the motivation to apply AMD.

As a result of this, the research question will be raised with three separate emphasis areas of study. The first research question will cover the topic of "What is the relationship between the market index of NASDAQ against the stock performance?" By doing so, you will be able to investigate the viability of the study in relation to the performance in terms of the correlation and trend of the market as well as the stock assessment within the overall performance. In addition, a second research question was posed, which asked, "How is the CAPM estimation on required return compared against the actual stock performance?" The purpose of this research question is to investigate the viability of testing the CAPM estimation model against the actual return that is derived from the stock performance of AMD Inc. While the third research question will cover the topic of "What is the investment recommendation for the stock of AMD Inc for the investors?" the fourth research question will focus on "What is the future outlook for AMD?" This will provide significant advice for the investors to understand whether or not the stock of AMD Inc. will be viewed as a good stock investment preference with reference to the outcome of the comparability analysis against the performance of the market as well as the risk and return estimation through the CAPM assessment.

### **3. Literature review**

According to Adeyeye, Aluko and Migiro (2018), the behavior of the stock price has brought about a definition on the understanding of the elements that inspire the movement of the stock price, generating the pressure of up and down that leads to fluctuations in the stock price. It is standard practice to classify the stock price as having remained uncertain because there is no certain outcome on the expectation of the stock price due to the presence of a large number of external elements in the environment (Abdullahi, 2020). This will lead to the need to measure the risk and return for the stock price in order to understand the behavior of the stock price, particularly for investors when they are making important investment decisions. According to Adeyeye, Aluko and Migiro (2018), the behavior of stock prices is frequently utilized to translate the stock performance, which is in alignment with the company performance on the business organization. For example, the financial crisis that occurred in 2008 during the Great Depression saw a significant decline in the majority of stock prices as a result of the recession that the economy was experiencing. This put the entire business market at risk because companies were unable to commit further revenues during this time (Ruhani, Ahmad & Islam, 2018).

According to Vintila, Gherghina, and Toader (2019), a market index is a statistical measure that indicates the performance of a certain set of stocks or the overall performance of a stock market. A market index can also be referred to as a stock market index. In most cases, the calculation of a market index will involve taking a weighted average of the prices of the underlying stocks. According to Alsabban and Alarfaj 2020, market indices offer investors and analysts a picture of the performance of the broader market and act as a benchmark for analyzing the performance of individual stocks or investment portfolios. The S&P 500, the Dow Jones Industrial Average, the Nasdaq Composite, and the Russell 2000 are some of the market indices that have gained the most notoriety in recent years. According to Vasileiou (2021), these indexes monitor the performance of a wide variety of corporations operating in a variety of different industries, sectors, and market capitalizations.

However, the previous study did demonstrate that there was some dispute regarding the use of the market index as the reference indicator to predict the stock price performance for individual stocks. The earlier research did find that some of the individual stocks did not share the same direction of correlation with the market index, which resulted in a distinct influence on the stock performance when compared to the performance of the market index (Alsabban & Alarfaj, 2020). According to a recent study, COVID-19 was evidence that the pandemic had significantly affected the majority of businesses, which resulted in a significant reduction in stock prices around the world (Vasileiou, 2021). However, the evidence in the stock performance revealed that some of the businesses from the healthcare industry and the technology

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industry had been triggering the opposite correlation against the direction of the market index performance (Vasileiou, 2021). This was proved by the evidence in the stock performance. This would provide the opposite understanding of predicting the stock performance during the pandemic period, where it had been demonstrated that the reference to the decline in the market index did not represent the overall performance of the individual stock's performance (Al-Awadhi et al., 2020). This would provide an opposing understanding of predicting the stock performance during the pandemic period.

There are varied people who have shown multiple viewpoints regarding a topic of interest that is relevant to the relationship between the performance of the market index and the stock price. Jin (2016) claimed, based on the findings of a different study, that the findings showed a large significant positive correlation between the performance of individual stocks and the performance of the total market index. The results of the research showed that there was a significant positive correlation between stock prices and market index performance; however, different Pearson Correlation Coefficients indicated that the strength of the correlation varied depending on the stock price being compared to the performance of the market index (He et al., 2020). The majority of the results of the research showed that there was a significant positive correlation between stock prices and market index performance. According to Chien et al. (2015), the strength of the positive correlation will define the understanding of the stock price movement. It will show the closeness of the business impact on the current market with high positive correlation strength, and it will show that the stock is not highly affected by changes in the economic condition with low positive correlation strength.

According to the findings of the current research, the CAPM estimate model will become the primary tool for calculating the expected return for individual stocks based on the measurement of the market risk in Beta (Wahyuni & Gunarsih, 2020). This prediction is based on the findings of the study that was carried out by Wahyuni and Gunarsih. The beta had become the most accurate indicator of the market risk, where the value of beta will represent the degree to which an individual stock is representative of the market risk. According to Vergara-Fernández, Heilmann, and Syzmanowska (2023), when the value of Beta is increased, investors will have larger expectations regarding the return on their investment as a result of the increased risk that they are willing to take on. This, in turn, will cause the idea of risk and return in investments to be applied to stock investments. According to prior research, the Capital Asset Pricing Model (CAPM) had provided effective estimation to investors, allowing them to predict the future growth and return for stocks, and it had become the standard analysis for the investment of stock market capital. For example, the CAPM estimation will provide an evaluation of the required risk compensation for the stock, which will serve as a benchmark for the investors to use when determining whether or not they are making an appropriate investment decision (Vinodkumar & AlJasser, 2020).

According to Chia, Liew and Rowland (2020), the unpredictability of the risk has been posing the potential for a different outcome of the return and risk that were obtained from an individual stock. According to Wibowo and Darmanto's 2020 research, previous studies have suggested that individual stocks inherit different exposures in terms of risk and return level. This creates difficulties in providing an accurate estimation of the expected return, which in turn leads to discrepancies in the gap between the expected and actual return on stock investments. It is understood that these differences were the cause of the gap between the expected and actual return on stock investments. In spite of the unpredictability, a previous study suggested that investors will give higher preference for investment purposes to stocks that overperform above the designated expected return derived from the estimation model. This is due to the fact that the higher return is rewarded with the risk-bearing of the stock investment, making it a worthy investment option (Vinodkumar & AlJasser, 2020). However, this could be a very subjective evaluation in which the performance of the stock could be different depending on numerous considerations of factors, leading to difficulty in projecting the performance of the stock in the future despite the guidelines provided by estimating models such as CAPM (Bhuva, Mankad & Bhatt, 2017).

The gap in the literature review had been identified in a few phases, including the initial exploration of the previous study, which revealed the absence of a case study analysis on a specific stock of AMD Inc. This led to the discovery of a new form of knowledge through the current research, which was instrumental in the creation of additional references to the topic of investment field relevance for academics. In addition, the comparative analysis method for the stock performance against the market index performance as well as CAPM estimation analysis had been lacking in the previous research. The current study will appear to provide new insight for the study in order to understand the gap that exists for the academic, allowing the study to provide significant evidence on the performance gap of individual stock studies. This had become the source of inspiration to create the need for the current study to attain the target for the benefit of investors and academic researchers. This triggered the requirement for the current study to be conducted.

## **4. Research method**

The quantitative study approach was the primary emphasis of the research study since the data input for the study will be in the form of numerical data (Sharela, 2016). According to Apuke (2017), the quantitative analysis study will provide a fantastic platform for the research to achieve substantial and objective results of the study depending on the research issue that is addressed. The population that will be the focus of the application of the case study analysis on AMD will concentrate on the study of the stock price of AMD for the past five years of data from 2018 to 2022. According to Vinodkumar and AlJasser 2020, one of the most essential reasons to draw the trend for the previous five years is so that one may do a comparison on the Beta value based on the previous five years' performance of both the stock and the market.

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The data collection for the study concentrates on the secondary data market, and the collection of the data input is based on the historical data of the stock price of AMD. This is because the secondary data market is the primary focus of the study. The data source can be acquired from websites that are accessible to the public online and fall under the category of open data. According to Cooper and Schindler (2014), the advantage of the data collecting procedure for the study will be provided by the secondary data collection approach, which will appear to be more effective and cost less than the primary data gathering method. According to Vinodkumar and AlJasser's 2020 research, the timeline for the study will be based on the historical pattern of the previous five years. These five years will be considered sufficient to offer the analysis of the data in order to derive the Beta value for the company. The comparison of the data input within the timeframe of five years will become more relevant for the study. This will allow for a comparison of the most current data input between the stock performance and the market performance, as well as for the CAPM computation (Apuke, 2017).

The quantitative analysis adopted the application of the comparative analysis, in which the comparative analysis will provide the platform for the quantitative study to perform the analysis between the comparison of the quantitative data input based on the variables introduced by the need of the study (Sekaran & Bougie, 2016). The quantitative analysis adopted the application of the comparative analysis (Cooper & Schindler, 2014). The comparative analysis posed the benefits where the analysis allows the quantitative study to compare the objectivity in the significant differences of the data to draw the conclusion to meet the objective and purpose of the study. The analysis also provided the benefits where the analysis allowed the quantitative study to compare the objectivity in the significant discrepancies of the data.

The comparative analysis that is being conducted through the quantitative technique for this study will concentrate on two primary areas. To begin, the research will investigate how the rise in the stock price of AMD Inc. compares to the performance of the market index for NASDAQ. In addition, the correlation analysis is going to be carried out in order to provide more insight into the analysis of the trend and pattern of the growth of both variables (Sekaran & Bougie, 2016). Moving forward, the research will concentrate on highlighting the estimation model of CAPM in order to draw the return for the expected return for the stock. The expected return will be drawn for the comparative analysis against the actual growth for the stock performance of AMD Inc. over the course of the previous five years (Wahyuni & Gunarsih, 2020). The comparison analysis will, as a result of this, define the outcome of the findings in order to offer a relevant reflection on the research question that was posed at the beginning of the research project.

## 5. Data analysis

**Table 1:** Correlation Analysis Market Return vs. AMD Return)

	<b>NASDAQ</b>	<b>AMD</b>
<b>NASDAQ</b>	1	0.9593
<b>AMD</b>	0.9593	1

Table 1 provides evidence through the statistical output based on the correlation analysis conducted for the AMD return against the NASDAQ market return where the result had been showing agreement with Figure 1 where both the return on the AMD stock and the NASDAQ market index had been sharing significant positive correlation. Table 1 provides this evidence through the statistical output based on the correlation analysis conducted for the AMD return against the NASDAQ market return. The two variables had been closed in sharing a similar direction as there is the presence of a very strong positive correlation between the AMD stock and the NASDAQ market index with the range falling between 0.8 and 1 for the measurement of the Pearson Correlation Coefficient. Based on the Pearson Correlation Coefficient of 0.9593, the two variables had been closed in sharing a similar direction.

**Table 2:** Average 5 Years' Return – AMD Return vs. NASDAQ Market Return

<b>Variables</b>	<b>NASDAQ Market Return</b>	<b>AMD Return</b>
Average 5 Years' Return	1.04%	4.59%

The results on the average return based on the performance of AMD stock over the past five years compared to the performance of the NASDAQ market are presented in Table 2. The findings indicated that in spite of the fact that the market index return of the NASDAQ showed a higher level of volatility with reference to Figure 1, the stock of AMD appears to have a higher level of average return with 4.59% in comparison to the market return of 1.04%. This suggests that the total performance of AMD stock is higher than that of the NASDAQ market, which gives investors positive indications to help them make a decision about whether or not to invest in the stock. The significant discrepancies in the MAD stock return had proven the evidence that the performance of the AMD stock achieved way above the expectations of the industry average. This could be attributed to the fact of the AMD company's improving growth in the business creating a positive impact towards the stock investment return for the AMD stock investors.

**Table 3:** Correlation Analysis (AMD Return vs. CAPM Return)

	<b>AMD Return</b>	<b>CAPM Return</b>
<b>AMD Return</b>	1	0.6553
<b>CAPM Return</b>	0.6553	1

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Based on Table 3, the correlation analysis was conducted to understand the correlation between the AMD return against the CAPM estimate return based on the Beta of AMD. The Beta value based on five years of historical data showed a computation of 1.89. This directly provided the translation on the market risk for AMD stock appears to be 1.89 times the risk of the market risk in the NASDAQ stock market. The outcome as provided in Table 3 had posed a significant and strong positive correlation between the AMD return and the expected return derived from the CAPM computation for AMD based on the Pearson Coefficient Correlation of 0.6553. This provides evidence that the reference based on the CAPM expected return had been significant where the high positive correlation provides the indication that the estimation of the return of AMD appears to be closely linked to the actual return of the AMD making the CAPM estimation model feasible for the investors to put as reference for investment analysis on the stock performance.

**Table 4:** Average 5 Years' Return – AMD Return vs. CAPM Return

Variables	CAPM Return	AMD Return
Average 5 Years' Return	-1.21%	4.59%

The attention is now being directed onto Table 4, which displays information on the five-year average return for AMD stock as well as the CAPM anticipated return for AMD. The CAPM has obtained a negative average return of -1.21% based on the statistical output, which indicates that the stock is not hopeful for investors as the market predicts a loss in the growth of AMD's stock performance. This is due to the fact that the market is expecting AMD's stock performance to decline. On the other hand, the actual average return for AMD suggests differently, with a positive return of 4.59% indicating that the actual performance of AMD stock had surpassed the prediction made by CAPM on the expected return. This demonstrated that AMD stock had been performing exceptionally well in comparison to the expectations of the market. AMD stock has a tendency to be characterized as a high-risk stock because of the significant differences in its performance. This is reinforced by the high Beta risk, which is in line with the idea that high-risk results in great returns. To put it another way, the performance of the AMD stock had been above the expectations of the market, which resulted in a better return for the investors, thereby compensating for the risk that was borne by the investors.

**Table 5:** Average 5 Years' Return – AMD Return vs. CAPM Return

Variables	NASDAQ Market Return	AMD Return	CAPM Return
Standard Deviation	6.05%	17.29%	11.44%

Table 5 demonstrates the comparison based on the comparative analysis approach to understand the difference between the standard deviation between the NASDAQ market return, AMD stock return as well as the CAPM return for AMD stock. The outcome as provided in Table 5 provides concrete evidence to suggest that the fluctuation based on the five-year trend had suggested that AMD stock price had held the highest standard deviation which translates to the highest risk followed by the CAPM expected return. The NASDAQ return showed the lowest standard deviation implying the stability of the stock market. This showed that AMD stock holds high-risk stock investment characteristics for the investors which are aligned with the Beta measurement for AMD stock

## 6. Findings and discussion

According to the conclusions of the research, the quantitative analysis offered important findings through the comparison analysis that had been carried out for the data input for three factors. These variables included the return on investment for AMD stock, the return on investment for the NASDAQ market index, and the return that was anticipated from CAPM. The early results based on the comparison of the data analysis between the return of AMD and the return of the NASDAQ market had been displaying a similar trend, which is in line with the original understanding that was acquired from the review of the relevant literature. The success of the market index frequently reflects the overall performance of the individual's stock performance, as had been plainly established with the significant strong positive correlation through the correlation study that was exhibited. The fluctuations in the return of the AMD stock had a higher standard deviation above the risk reflected in the stock market which implies that the AMD stock refers to high-risk high return concept for the investors. As a result, the strong actual return from the AMD stock performance had suggested the presence of the reward based on the risk commitment from the stock investment. This had resulted in a greater average return being attained by AMD stock in comparison to the return of the NASDAQ market, which demonstrated that the stock performance of AMD had been encouraging and was giving a better return together with a reduced risk, both of which make it ideal for investment stock consideration.

Moving on, the second comparison analysis was carried out between the return on investment in AMD stock and the expected return generated from CAPM. The expected return was calculated by applying the five-year Beta value of AMD stock to the CAPM model based on the period of time from 2018 to 2022. The data do actually provide significant insight, as it can be shown that the average return on AMD stock appears to be larger than the average predicted return that was calculated from the CAPM estimation model. In spite of the fact that there is a strong positive correlation between the return on AMD stock and the projected return derived from CAPM, the performance of AMD stock has been shown to exceed the prediction of the market risk and return. To put it another way, the performance of the AMD stock has been achieving premium returns for the investors, providing higher returns than the projected return based on the market risk

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that was borne by the investors. In other words, AMD stock appears to be attractive stock for investment as the stock tends to consistently provide higher returns over the expected return derived from CAPM. This will provide a higher return per risk rate for the AMD stock which showed a major positive return from the stock investment over the five years trend.

### **7. Contribution of the study**

The contribution of the study had been significant from the outcome of the research where the findings of the research had been relevant to provide the new exposure and knowledge that will close down the gap within the academic study within the scope of interest. The new findings have been crucial to addressing the new concept, especially using the CAPM computation to test against the actual return of an investment. The study of the CAPM had remained a myth from the theory demonstrated where the current study will serve as strong and solid evidence for the topic of interest.

Besides, the outcome of the current study posed significant information to the investors who are interested in investing in AMD stock where the findings from the study explored the market risk for the AMD stock to identify the alignment from the perspective of the risk and return for the stock investment. The measurement of the CAPM has become the reference benchmark that allows the investors to further understand the potential worthiness in addressing the return per risk measurement that will relate back to the investment decision for the investors.

### **8. Implications of the study**

The research arrived at the conclusion that the study had achieved its purpose based on the research questions as addressed from the problem statement of the study based on the outcome of the research study. This conclusion was based on the findings of the research study. First and foremost, the purpose of the study was to analyse the relationship between the market index of NASDAQ and the performance of the stock. The findings confirmed the existence of a robust positive correlation between the two variables, which is in line with the findings of other previous research that have focused on the same aspects of direction and trend in performance. The graph that was built for the return of AMD stock and the return of the NASDAQ market showed a pattern that was similar to one another, with the exception that the return of AMD stock fell within the borders of the return of the NASDAQ market. This indicates that there is a close connectivity and association between the NASDAQ market index and AMD stock.

Moving on to the next part of the research plan, the second objective is to analyse the CAPM estimation on required return in comparison to the actual performance of the stock market. The comparative analysis had been showing strong evidence on the outcome of the data analysis study, where the CAPM had been showing a strong positive correlation between the CAPM expected return and the AMD stock return, which indicated that the CAPM reference had been feasible to reflect the actual performance of the individual stock. The CAPM had been showing a strong positive correlation between the CAPM expected return and the CAPM stock return. In terms of the comparison between expected and actual performance, it would appear that AMD stock has outperformed the forecast of the expected return from the CAPM estimate model by obtaining a higher average return in its actual return. This is demonstrated by the fact that the actual return on AMD stock has been greater. As a result of this, it became clear that AMD stock is obtaining a larger premium return in comparison to the expectation of the risk and return as described by the CAPM. This led to the realization that AMD stock is performing better than expected.

The third and final purpose of this research was to investigate the investment advice for the stock of AMD for investors. This was not the least important of the research objectives. According to the findings of the comparative study, there is no question that the performance of the AMD stock appears to be high accomplishing and going above and beyond what the market had anticipated it would do. The performance of the market index as well as the predicted return from CAPM had combined to construct the benchmark performance, which shows that the return on the AMD stock appears to be compelling and promising despite having a similar correlation with both factors. This suggests quite strongly that the performance of the AMD stock had been closely matched with the economic condition as well as the logical notion of risk and return. The favourable performance of the actual AMD stock return made the stock desirable since it demonstrated the possibility for the growth of the stock, so producing additional value for investors. The superior performance of the actual AMD stock return made the stock desirable. It is advised to investors that they purchase AMD stock because the performance of the stock has demonstrated a good impact on the growth of the stock value over the past five years, and the performance of the stock has shown that it has exceeded the market benchmark for returns on investments in stocks.

### **9. Conclusion**

With this, the outcome of the study had been concluding the achievement of the objective of the research as highlighted at the beginning of the study. This had been crucial address to ensure the achievement of the aim and purpose of the research towards the relevant parties through the contribution of the study as well as demonstrating strong academic findings that will become the future reference for the researchers. Therefore, the current study will draw the relevance potential to address the extension of the future study within the scope of the study.

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