

**Title: Share Buyback and Innovation:
A Case Study Analysis of Apple and Alphabet**



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Abstract

Stock buybacks is a controversial topic and continues to attract interest from the academics and practitioners alike. The divergent viewpoint on the impact of buybacks on innovation is a reason that motivated this research. The aim of this research was to analyse the effect of share buyback on innovation at Apple and Alphabet and to establish whether engaging in buyback means there is a trade-off with innovation. The study included a combination of relevant theories (signalling hypothesis, managerial incentive and flexibility hypothesis, Schumpeterian innovation) and empirical analysis using the financial data on Apple and Alphabet from 2010 onwards. Both the companies started their share buyback programs from 2012 and 2013 respectively. Regression and Pearson correlation techniques were employed to assess the existence of a relationship between share buyback and investment in R&D.

When it comes to Apple, share buyback and R&D have a moderate and positive correlation (+0.2495). It means that an increase in share buyback has coincided with the increase in R&D spending by Apple to enhance its innovation. However, the correlation between share buyback and R&D as a proportion of sales is -0.82, which signifies a strong and negative correlation between share buyback and R&D as a proportion of revenue at Apple. It clearly indicates that as the share buyback has accelerated at Apple over time (especially since 2017), the period has coincided with a reduction in R&D spending as a proportion of revenue. For Alphabet, the correlation between R&D spending and share buyback is strong and positive (0.871). This is unsurprising, as the trend in R&D spending and share buyback at Google is upwards. The correlation between R&D as a % of sales and share buyback is positive but moderate (0.311). It shows that an increase in share buyback has not deterred Alphabet from spending more on R&D as a proportion of the company's sales. The positive relationship between share buyback and R&D spending at Alphabet is also supported through the regression analysis.

The study offers several recommendations. Firstly, consistent with the signalling hypothesis and as seen in case of Apple, management of a business should only engage in share buyback if they are highly confident that the share price is below the intrinsic value. As management tend to understand the business better than the external stakeholders, they are able to better value the business and know when the market is undervaluing the business.

Secondly, share buyback should not be at the expense of giving up R&D spending. As noted through the analysis of Alphabet, a company can engage in buyback while pursuing an increase in R&D spending. This is because although share buyback can help to boost the share price in the short-term, a lack of R&D spending would reduce the long-term competitiveness of the business.

Finally, share buyback can be a preferred option over dividend payout for high growth businesses. This is because share buyback provides flexibility to the management in terms of the extent to which they want to buy back the company's shares from the open market and whether they want to continue to engage in buyback in the future. The above argument is in contrast to the dividend policy, which is expected to be ongoing once companies commit to paying the dividend, as cancelling the dividend serves as a signal to the investors that the company is possibly experiencing cash flow difficulties.

Key words: Share buyback, innovation, R&D spending, Apple, Alphabet, Schumpeter, signalling, flexibility and managerial incentive hypothesis

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1. Introduction

1.1 Research background

Stock buybacks is a controversial topic and continues to attract interest from the academics and practitioners alike (Burnett et al., 2012). Larry Fink, the Head of Blackrock stated that although buybacks are a source of immediate return to the shareholders (through increasing the earnings per share and share price), the buybacks imply that management is not focused on innovation, underinvesting in research and development (R&D), innovation, skills and training of its workforce and necessary capital expenditure to improve the innovation capabilities and new product development (Fink, 2015).

Another critic of buybacks is Hillary Clinton, who stated that buybacks from American corporations negatively impact the American economy, reduce the much needed corporate investment that would drive aggregate demand, all of it at the expense of providing greater return to the shareholders (Evgeniou, 2016). The argument regarding criticism of buybacks is supported by Wu et al. (2014), who state that buybacks turn historically well run businesses into poor corporations because they sacrifice their future in order to satisfy the needs and interests of the shareholders most of whom tend to be activist short-term investors rather than long-term institutional investors.

Despite the criticism of buybacks, there are others who argue that buybacks cannot necessarily be blamed for reducing innovation or corporate investment in the economy. Roe (2016) stated that the argument regarding the negative impact of buybacks on the innovation, productive capacity of the company and economic growth is untrue. Roe (2016) cited the example of 1970s and 1980s corporate America whereby companies possessed excess cash back then but did not engage in share buyback.

Instead, the companies engaged in mergers and acquisitions, either using the capital available (in the form of retained earnings and cash), or issuing new funding through debt or equity. The result was a reduction in industry concentration, as few firms came to dominate the industries (akin to oligopoly or monopoly structure), restricting the competition through enacting legal and regulatory among other barriers to entry.

A lack of competition meant the larger organisations had a little incentive to improve their operational efficiency or innovate. Roe (2016) argued that acquisitions undertaken in 1970s and 1980s were neither good for the consumers, shareholders or the wider American economy due to the value destruction and as a result, ending the share buybacks in the current environment is likely to imply that companies would concentrate on using the excess cash to acquire other businesses.

The argument that buybacks limit the innovation may not necessarily be true, as the cash returned to the shareholders through the buyback (by reducing the number of ordinary shares outstanding, increasing the earnings per share and the share price) means the large shareholders (mainly institutional investors such as pension funds or mutual funds) can use part of the funding to invest in innovative and entrepreneurial new businesses, thus channelling the funds to the most deserving companies to promote innovation and entrepreneurship (Thakor, 2014).

There are arguments regarding the potential positive and negative impacts of buybacks on innovation, which will be further explored in this study. When it comes to innovation, it is important to assess the key arguments put forward by Schumpeter on innovation including the concept of creative destruction. The assertions of Schumpeter are compared to the existing theoretical and empirical evidence on share buybacks and the extent to which senior managers of corporations in the contemporary environment are neglecting the investment in research and development to prioritise share buyback as a means to boost the earnings per share, return on capital employed, share price and their own remuneration, as supported by the principal agent conflict.

1.2 Research problem and rationale

The research problem I am interested in exploring is to understand whether share buybacks influence innovation at the firm level or not. The conflicting evidence suggests that on one hand, share buybacks reduce the corporate investment including spending on R&D to improve innovation within organisations (e.g. Wu et al., 2014; Evgeniou, 2016), this is in contrast to the other researchers such as Thakor (2014) and Roe (2016) who have argued that buybacks do not constrain innovation. This is because the cash returned to the shareholders through the

buyback can use part of the funding to invest in innovative and entrepreneurial new businesses, thus channelling the funds to the most deserving companies to promote innovation and entrepreneurship.

The conflicting and divergent viewpoint on the impact of buybacks on corporate innovation has motivated me to focus on this subject area as part of my dissertation. Moreover, review of the literature showed there is no recent research conducted to investigate how does the corporate buyback influence innovation within organisations. This is surprising, given the increased popularity of buybacks within the corporate environment. It presents a gap in the literature, which is to be addressed through this dissertation.

Finally, my personal interest in exploring the impact of buybacks on motivation is also relevant in encouraging me to pursue the research on this topic. As part of my studies this year, I have taken a deep interest in the subjects such as Accounting CPT, Economy ECO, Finance FIN, Strategy STR, Taxation TAX. The combination of knowledge gained in these subjects coupled with my reading on prevalence of share buybacks has motivated me to investigate the impact that buybacks have (if any) on the corporate innovation.

1.3 Aim and research objectives

The aim of this research is to analyse the effect of share buyback on innovation at Apple and Alphabet and to establish whether engaging in buyback means there is a trade-off with innovation. To fulfil this aim, the research focuses on the following research objectives.

- To analyse the relevant theories that help to explain why corporations engage in share buyback
- To draw upon the work and arguments of Schumpeter to understand the importance of innovation for the company and the wider economy
- To investigate the effect of share buyback on innovation at Apple and Alphabet

The research question that this study aims to answer is the following:

“How does share buyback influence corporate innovation at Apple and Alphabet? Does engaging in buyback means there is a trade-off with innovation?”

1.4 Research contribution

There are two important contributions of this study. The first relates to addressing the gap in the literature. The review of the extant literature showed there is no recent research conducted to investigate how does the corporate buyback influence innovation within organisations. This study overcomes the literature gap and is useful for researchers that want to further understand and explore the topic of buybacks and their effectiveness or drawbacks. This research is particularly useful, as it draws upon the relevant theories (e.g. Schumpeter’s arguments on innovation and creative destruction, agency theory) as well as empirical evidence to establish the relationship between buybacks and innovation.

The second contribution of this study is practical. It helps the corporations and their shareholders to better understand the potential impacts of buybacks on creation of shareholder wealth both in the short-term and long-term, including the implications for innovation, productive capacity and competitiveness of the business.

1.5 Structure of the research

The rest of the dissertation is structured as follows. The second chapter explains the research methodology adopted to analyse the effect of share buyback on corporate innovation and to establish whether engaging in buyback means there is a trade-off with innovation.

The third chapter explains some of the reasons that companies engage in share buyback. This is followed by review of the relevant theories namely signalling hypothesis, flexibility hypothesis and managerial incentive hypothesis. Finally, the relationship between share buyback and company performance is explored.

The fourth chapter begins by providing an overview of key arguments put forward by Schumpeter on innovation including the concept of creative destruction. The assertions of

Schumpeter are compared to the existing theoretical and empirical evidence on share buybacks and the extent to which senior managers of corporations in the contemporary environment are neglecting the investment in research and development to prioritise share buyback as a means to boost the earnings per share, return on capital employed, share price and their own remuneration, as supported by the principal agent conflict. The chapter will argue that managerial emphasis on short-termism and their tendency to look after their own interests (through share buyback) means they are less likely to allocate resources to research and development, especially as research and development to improve innovation generates results only in the long-term, whereas most managers and board of directors are under pressure to produce results (i.e. boost earnings per share, return on capital employed and the share price) in the short-term future.

The fifth chapter analyses how the share buyback has influenced investment in R&D and impacted the innovation prospects of companies. The chapter focuses on a case study analysis of two companies namely Apple and Alphabet. The rationale for selecting these two companies is two fold: firstly, both operate in the technology industry where innovation is a vital component in improving the competitiveness of the operations of the business. Secondly, both companies are market leaders with sizable share buyback programs in since 2012, making the choice of Apple and Alphabet suitable to analyse the potential impact of share buyback on influenced investment in R&D and innovation prospects.

The final chapter concludes on each of the research objectives, clearly addressing the effect of share buyback on corporate innovation and to establish whether engaging in buyback means there is a trade-off with innovation. It also provides recommendations, highlights the limitations of this study and the recommendations for future research.

2. Methodology

The methodology chapter details the research methodology adopted to analyse the effect of share buyback on innovation at Apple and Alphabet and to establish whether engaging in buyback means there is a trade-off with innovation. The relevant aspects of methodology discussed in this chapter include the research philosophy and approach, research strategy, data collection and analysis techniques, reliability and validity.

2.1 Research philosophy and approach

A research philosophy refers to a belief held by a researcher concerning the way in which data about a phenomenon (under investigation) should be collected and analysed (Saunders et al., 2016). As a philosophy, positivism is based on the viewpoint that factual knowledge based on objective and observable data can be relied upon. Positivist philosophy states that the research should be conducted in a value-free manner and judged based on logic (Bell et al., 2018).

This study has used positivist philosophy and deductive research approach whereby review of the extant literature on share buyback including the relevant theories (e.g. signalling hypothesis, managerial incentive and flexibility hypothesis) along with the Schumpeter's viewpoint on innovation are used as a basis to evaluate the impact of share buyback on innovation in companies. The findings of literature help to investigate the secondary data on the share buyback and research and development (R&D) spending undertaken by Apple and Alphabet to establish whether engaging in buyback means there is a trade-off with innovation.

2.2 Research strategy

Case study as a research strategy has been used in this study. The rationale for selecting these two companies is two-fold: firstly, both operate in the technology industry where innovation is a vital component in improving the competitiveness of the operations of the business. Secondly, both companies are market leaders with sizable share buyback programs in since 2012, making the choice of Apple and Alphabet suitable to analyse the potential impact of share buyback on influenced investment in R&D and innovation prospects.

Case study research strategy is suitable in this context because it provides an opportunity to apply the relevant theories and findings from the literature to the two major corporations that have engaged in share buyback programs in the past decade.

2.3 Data collection

The data collection is relevant in addressing the effect of share buyback on innovation at Apple and Alphabet. As Apple and Alphabet both started the share buyback from 2012 and 2013 respectively, the financial data on both the companies from 2010 onwards has been collected. The data collected included revenue, gross profit margin, operating profit margin, earnings per share, dividend per share and dividend payout ratio, spending on research and development, R&D as a proportion of revenue and the amount spent on share buyback on an annual basis. The data collected is illustrated in appendix 1 (Apple) and appendix 2 (Alphabet).

The data on profit measures was collected because it helps to establish the extent to which companies are profitable and how their profitability has changed, allowing to assess the potential impact of profitability changes on share buyback, dividend payout and R&D spending. Similarly, growth in revenue and EPS is also relevant to better understand and establish a potential link with the share buyback, dividend payout and R&D spending.

2.4 Data analysis

The analysis of data on Apple and Alphabet involves the use of ratio analysis (financial statement analysis), Pearson correlation and regression analysis. The ratio analysis helps to establish the trends in revenue growth, profitability, earnings per share, spending on R&D, R&D as a percentage of revenue and the spending on share buyback.

The time-series data has been relevant in using the Pearson correlation and regression analysis. Pearson correlation as a technique helps to investigate the potential linear association between the variables. In this study, correlation between R&D spending, R&D spending as a percentage of revenue and spending on share buyback is undertaken. A potential positive correlation would indicate that despite increasing the share buyback, the companies have continued to spend on R&D (in absolute terms and as a percentage of revenue), helping to conclude that engaging in buyback does not mean there is a trade-off with innovation. Conversely, a negative correlation

would indicate that with an increase in share buyback, the companies have not continued to spend on R&D (in absolute terms and as a percentage of revenue), helping to conclude that engaging in buyback means there is a trade-off with innovation.

Regression is another suitable econometric technique employed in this study. For each of the two companies namely Apple and Alphabet, two different regression analyses are conducted. The first regression includes share buyback as an independent variable and R&D spending as a dependent variable. This will help to establish whether engaging in share buyback leads to a continuation of R&D spending or not.

The second regression includes share buyback as an independent variable and R&D spending as a percentage of revenue as a dependent variable. This will also help to establish whether engaging in share buyback leads to a continuation of R&D spending or not. However, a better indicator of the impact of share buybacks on innovation is the correlation between share buyback and R&D as a proportion of sales. This is because the emphasis of a firm on innovation and entrepreneurship measured through R&D spending is signified through the analysis of the extent to which the firm continues to maintain its R&D spending as it experiences growth (Thakor, 2014). For instance, an increase in revenue should translate into higher R&D spending if a firm is keen to maintain and enhance its R&D capabilities.

2.5 Limitations of methodology

As with the effectiveness of the methodology used in this study including the reliance on relevant literature as a basis to conduct the data analysis and use of recognised econometric techniques, the study suffers from several limitations. Firstly, regression and correlation analysis are conducted based on the limited observations. As the two companies in this analysis (Apple and Alphabet) only began to engage in share buyback from 2012 and 2013 respectively, the econometric analysis (using regression and correlation methods) is based on limited observations. This limits the reliability of the findings, as also signified by the low R-square and potentially high p-value implying that the findings may not be statistically significant.

Secondly, an important shortcoming of the case study research strategy as acknowledged by Saunders et al. (2016) is that the findings cannot be applied to other studies. The data analysis

conducted in this thesis is focused only on Apple and Alphabet, which implies that findings of this study with regards to the effect of share buyback on innovation is limited only to these two companies. The result is that findings cannot be generalised and applied to other companies.

3. Theoretical overview of share buybacks

3.1 Overview of the chapter

Share buyback refers to the practice whereby organisations choose to buy back their own stock (Blundell-Wignall and Roulet, 2013). Increased popularity of share buybacks in the current corporate environment has contributed to a polarisation in responses: one argument being that share buybacks constrain the creation of value and the second argument being that buybacks is a method used by corporations to reward their existing shareholders in the form of an increase in share price. The researchers that argue against the share buybacks assert that excessive use of share buybacks can be likened to market manipulation that leads to a short-term gain for senior management (who possess share options) and the shareholders at the expense of a reduction in innovation, limited wage growth and a lack of corporate investment, which has implications for only for the company itself but for the wider economy too (Lazonick, 2014).

In contrast, other researchers have argued that buyback provides flexibility to the management to create greater shareholder wealth (Chen et al., 2015). The ongoing debate on the usefulness of share buyback is increasing relevant in the contemporary environment, as rising corporate profits have raised a question regarding the extent to which the share buyback policy is justified, especially if it comes at the expense of a reduction in future growth prospects through a lack of investment in R&D, innovation and reduced employee headcount.

The rest of this chapter is structured as follows. Section 3.2 briefly explains some of the reasons that companies engage in share buyback. This is followed by review of the relevant theories namely signalling hypothesis in section 3.3, flexibility hypothesis in section 3.4 and managerial incentive hypothesis in section 3.5. Finally, the relationship between share buyback and company performance is explored in section 3.6.

3.2 Reasons for share buyback

When it comes to the reasons that companies engage in share buyback, several reasons have been cited in the literature that justify the decision of companies to buy back their own stock.

Firstly, share buyback is considered a tax-efficient way to reward the shareholders in the form of a higher share price, as the tax involved when engaging in a share buyback is lower compared to the tax implications of paying out a dividend to the shareholders (Brown and Norman, 2010). This reasoning is particularly attractive for high net worth individuals with higher income, as dividend attracts income tax whereas share buyback attracts capital gains tax instead of income tax, with the possibility to use tax-efficient methods to minimise the capital gains tax payment (Andriosopoulos and Lasfer, 2015).

Secondly, share buybacks provide flexibility to the management in terms of the extent to which they want to buy back the company's shares from the open market and whether they want to continue to engage in buyback in the future. This is in contrast to the dividend policy, which is expected to be ongoing once companies commit to paying the dividend, as cancelling the dividend serves as a signal to the investors that the company is possibly experiencing cash flow difficulties (Comment and Jarrell, 1991). Such a signal is not necessarily the case when it comes to share buybacks, as explained through the flexibility hypothesis later in this chapter.

Thirdly, signalling hypothesis explains that buybacks serve as a signal of confidence in the company's future prospects including the growth in revenue and profitability, in addition to increasing the earnings per share through the financial mechanism (e.g. buying back some of the outstanding ordinary shares to lower the number of shares in the market) if the company does not find growth opportunities from an operational perspective to generate more earnings.

The share buyback is also justified as a way to reward the shareholders if the company does not identify any future growth opportunities and investment projects with the positive net present value, as undertaking the projects with a negative net present value would destroy shareholder wealth (Balachandran et al., 2008).

Even though the above-mentioned reason that the company should not undertake negative net present value projects and instead reward its shareholders in the form of a share buyback is justified, this reasoning can also be criticised because inability of the firm to identify sufficient positive net present value projects and growth prospects for the future arguably illustrate that the company is not undertaking sufficient innovation.

A lack of emphasis on innovation and new product development can have detrimental consequences on the share price and shareholder wealth in the long-term especially if the company loses market share, which is along with the damaging impact on the wider economy (Mitchell et al., 2001). Thus, share buyback as a policy may not be justified, especially if it contributes to short-term focus of the management in terms of maximising the payout to shareholders and themselves at the expense of long-term competitiveness of the business and the economy due to a lack of focus on innovation. This point is also elaborated by referring to the argument of Guéant et al. (2020) that buybacks create a moral hazard problem: company management are assured of a higher payout as their remuneration is linked to the financial targets such as return on capital employed, share price and earnings per share whereas the long-term performance and innovation of the company is negatively impacted.

The reasoning for share buyback as discussed in this section is elaborated through referring to the relevant literature in the rest of this chapter.

3.3 Signalling Hypothesis

It is important to analyse the signalling hypothesis because theoretical arguments and empirical evidence on signalling is vital in formulating the relationship between share buybacks and R&D, especially given the time lag associated with the investment in R&D and the returns it generates because it takes time to translate the R&D spending into development of successful new products/ services.

A number of academics have investigated the argument that buyback of ordinary shares is a signalling mechanism. Vermaelen (1981) conducted an empirical study on common stock repurchases and argued that stock buyback serves as a signal from the management to the external stakeholders (e.g. current and potential shareholders) that management believes the share price in the market to be below the inherent intrinsic value of the firm.

If the intrinsic value is indeed below the current market capitalisation (based on the share price in the market times the number of ordinary shares of the firm outstanding), then stock buyback is an effective mechanism through which management can serve the best interests of the

shareholders by reducing the number of ordinary shares, boosting the earnings per share and the share price (assuming the price to earnings multiple remains constant) (Vermaelen, 1981).

However, the argument of Vermaelen (1981) can be criticised in that he failed to consider the longer term impact of share buyback on innovation and creativity credentials of the company, especially if the excess cash is being used to boost the share price in the short-term, without any regard to the effects it can have on innovation capabilities of the organisation in the long-term.

The decision between opting for share buyback to boost the share price in the short-term versus the investment in R&D to enhance the long-term growth prospects of the firm poses a paradox. If the existing mispricing in the marketplace motivates the management to engage in a share buyback in the short-term, assuming the financial markets are efficient (based on the efficient market hypothesis) whereby share buyback would result in an increase in share price, the continued buyback of shares in the long-term is not justified (Lasfer and Andriosopoulos, 2015). This is because buyback in the short-term should enhance the share price, consistent with the signalling mechanism that stock buyback serves as a signal from the management to the external stakeholders (e.g. current and potential shareholders) that management believes the share price in the market to be below the inherent intrinsic value of the firm. Thus, assuming the markets are efficient, the share buyback in the short-term should help the share price to reach the inherent intrinsic value.

The continued buyback of ordinary stock in the long-term means excess cash is not being used to boost the future growth prospects of the business, while lowering the available cash balance for potential difficult period in the future (Coulton and Ruddock, 2011). It could contribute to a capital structure problem for the company in future especially if it needs funding, as a lack of available cash during the systemic crisis (e.g. financial crisis) would mean the company will need to either issue new shares (thereby diluting the existing shareholders and lowering the share price) or issue new debt, raising the gearing and risk for shareholders (Evgeniou and Vermaelen, 2017).

Chan et al. (2004) investigated the three economic motivations used by management to conduct share buybacks: disgorgement of free cash flow, mispricing and increased leverage, analysing the impact of share buybacks on initial market reaction and the longer term performance of the

companies. The cross-sectional differences in market reactions and the long-term share price performance after the share buyback was used by Chan et al. (2004) based on the data collected using open market buybacks between 1980 and 1990 along with the supplementary data from the Securities Data Corporation (SDC) between the period 1980 to 1996.

Chan et al. (2004) concluded that firms with a higher free cash flow stood to benefit the most from engaging in share buyback i.e. as these firms continue to generate a positive free cash flow year-on-year, they can use the surplus free cash flow to buy back some of the ordinary shares outstanding, using the free cash flow effectively as a means to return the profit to the shareholders in a tax efficient manner.

The finding of Chan et al. (2004) is consistent with the conclusion reached by Ikenberry et al. (2000) who investigated the impact of stock repurchases in Canada and concluded that firms with a high positive free cash flow use the share buyback as a way to disgorge their free cash flow.

The empirical evidence on signalling hypothesis (e.g. Chan et al., 2004; Lasfer and Andriosopoulos, 2015) suggests a strong and positive statistically significant relationship between share buyback and the abnormal share price returns in the short-term. This clearly suggests that signalling hypothesis can be accepted in the short-term, as share buyback does send a signal to the investors of the that management believes the share price in the market to be below the inherent intrinsic value of the firm.

If the intrinsic value is indeed below the current market capitalisation (based on the share price in the market times the number of ordinary shares of the firm outstanding), then stock buyback is an effective mechanism through which management can serve the best interests of the shareholders by reducing the number of ordinary shares, boosting the earnings per share and the share price (assuming the price to earnings multiple remains constant) (Vermaelen, 1981).

However, Henning (2019) criticised and questioned the validity of signalling hypothesis by arguing that if management really believe their share price as undervalued, they would focus on promoting the long-term growth prospects through investment in R&D so that the market participants (existing and potential shareholders) realise the growth potential of the business, instead of engaging in share buyback.

The argument of Henning (2019) is justified, as there is a lack of statistically significant evidence on the long-term share price performance as a result of engaging in share buyback. This explains why Henning (2019) concluded based on the review of the literature on buybacks that buybacks are not indicative of the long-term performance and returns of the company from R&D expenditure, suggesting that share buyback is a substitute investment that prompts companies to spend less on R&D, thereby negatively impacting the innovation and product development capabilities of the business.

3.4 Flexibility Hypothesis

The flexibility hypothesis states that the flexibility associated with the share buyback compared to dividend payout as a method of rewarding the shareholders is an important reason that companies may prefer to focus on share buyback (Kragt et al., 2020). As argued by Comment and Jarrell (1991), share buybacks provide flexibility to the management in terms of the extent to which they want to buy back the company's shares from the open market and whether they want to continue to engage in buyback in the future.

The above argument is in contrast to the dividend policy, which is expected to be ongoing once companies commit to paying the dividend, as cancelling the dividend serves as a signal to the investors that the company is possibly experiencing cash flow difficulties. Such a signal is not necessarily the case when it comes to share buybacks.

Baker and Wurgler (2004) concluded that once a company begins to pay a dividend, its dividend policy becomes an important part of the investors' expectation about the future dividend payout. The result is that corporate management is likely to cater to the needs of investors by paying out the dividend, as investors place a premium on the dividend paying stocks compared to the non-dividend paying stocks.

The finding of Baker and Wurgler (2004) is supported by Smith et al. (2019), who concluded that as the interest rate is at record low in the current macroeconomic environment and the return generated by investors from the fixed income instruments has been reduced, dividend-paying stocks provide a regular income stream and are considered attractive. It indicates that

as dividend becomes part of the investors' expectation (i.e. the firm will continue to pay a dividend), this imposes a constraint on the firm because cutting down a dividend during the period of economic downturn (when the corporate profitability and free cash flow might be lower) is likely to become unpopular. This is not the case with the share buybacks, as they are a flexible way for management to return cash to the shareholders, without the development of expectation amongst the investors/ shareholders that the company will continue to engage in share buyback.

Firth and Yeung (2005) conducted an empirical investigation of share buybacks undertaken by corporations in Hong Kong. The investigation was based on share buybacks from 172 companies listed on Hong Kong Stock Exchange that engaged in 4,670 share buybacks between the period 1990 and 2002. Firth and Yeung (2005) concluded that companies that engaged in share buybacks considered themselves undervalued (consistent with the signalling hypothesis that management is sending a signal that the company's share price is below the inherent intrinsic value).

Another noteworthy finding of Firth and Yeung (2005) was that only those firms that possessed surplus cash engaged in the share buyback i.e. the firms with positive and healthy free cash flow were able to use part of the surplus free cash flow to buyback the ordinary shares outstanding. The findings led Firth and Yeung (2005) to accept the hypothesis that management engaging in the share buyback do so to return surplus cash to the shareholders, in addition to signalling the undervaluation of the company and correcting this undervaluation.

Linking these findings to the potential impact that share buyback can have on the emphasis on innovation and the wider economy, it is inferred that when the companies are focused on share buyback (even in the short-term), they are less likely to prioritise the investment in R&D and improvement in innovation capabilities of the firm, which tend to generate benefits in the long-term. The neglect of innovation in the form of a lack of spending on R&D reduces the effective development of superior new products and services, employment creation and the resultant negative impact on economic growth (Clarke and Liu, 2019).

Iyer and Rao (2017) also investigated the flexibility hypothesis associated with the share buyback. They supported the findings of Baker and Wurgler (2004) by concluding that management considers dividend as a method of shareholder payout to be a rigid way of

rewarding shareholders, whereas share buyback is a more flexible approach. This conclusion was supported by Iyer and Rao (2017) through the empirical analysis using the data collected between the 2008 and 2012 period, when the global financial crisis of 2008-09 had led to a significant undervaluation of a number of companies, permitting the management to engage in share buyback as a basis to signal the undervaluation and reward shareholders.

3.5 Managerial Incentive Hypothesis

The managerial incentive hypothesis argues that a key reason that managers have an incentive to engage in share buyback is so that they can enrich the company insiders such as the board of directors and other members of the senior management team that hold shares and share options expiring in the foreseeable future (Henning, 2019).

It is important to differentiate between the signalling hypothesis and managerial incentive hypothesis: whereas signalling hypothesis asserts that managers genuinely believe that the company's inherent intrinsic worth is more than what the company is valued currently in the market, managerial incentive hypothesis on the other hand states that management does not legitimately use buyback as a basis to send a signal to the investors (existing and potential) about their belief about the company being undervalued.

Instead, the sole reason they conduct the share buyback is so they can successfully increase the share price and their own remuneration, which is linked to the financial measures such as the return on capital employed, earnings per share and the share price (Yallapragada, 2014).

Lamba and Miranda (2010) explored the role of executive stock options in influencing the willingness of management to undertake share buybacks. Through collecting the data on 50 firms listed on the Australian Stock Exchange between 1997 and 2006, Lamba and Miranda (2010) explored whether managers of firms with high levels of stock options have an incentive to engage in share buybacks more than the managers of companies that have a lower level of stock options.

The hypothesis tested by Lamba and Miranda (2010) was that corporate management has an incentive to engage in share buybacks to neutralise the dilution in earnings per share as a result

of exercising the stock options. This can be explained as follows: when managers exercise the stock options, it increases the number of ordinary shares outstanding, as new shares have been crystallised which did not exist before, directly due to the share options being in the money.

The increase in number of ordinary shares outstanding leads to dilution of the shareholding of existing shareholders, reducing the earnings per share. Lamba and Miranda (2010) concluded that to offset the impact of dilution of shareholding of the existing shareholders and the resultant reduction in earnings per share, management that holds more share options are more likely to engage in share buyback.

However, Lamba and Miranda (2010) also found that the existing share options owned by the managers is not the only reason considered by the management when it comes to deciding whether to pursue the share buyback policy or not. There are several other reasons too as explained earlier in this chapter, such as the company being undervalued by the market (signalling hypothesis) and flexibility associated with the share buybacks compared to the alternative means of rewarding shareholders such as dividend (as explained through the flexibility hypothesis).

3.6 Share buyback and company performance

It is important to understand the impact that buybacks have on company's value. In contrast to the common wisdom, share buybacks do not create value through increasing the earnings per share. The reason being that although earnings per share increases because there are lesser number of shares outstanding while the net income is expected to remain the same, as the retained earnings reduce by the amount spent on buying back the shares, this explains why the share buyback has no impact on value (Pettit, 2001). However, this is only true in theory, as Pettit (2001) asserted that buybacks effect the company's value through the signalling effect and leverage.

The signalling effect has been the focus of academic research in the past few decades, as also explained in section 3.3. Analysts and investors (existing and prospective shareholders) make use of the financial decisions undertaken by the business to ascertain the growth prospects of the business and use this information to arrive at the expected value of the business and

consequently its share price. On one hand, the signalling effect states that management is so confident in their prospects and feel the existing share price is undervalued that the best investment the company can make is in its own shares (Lazonick, 2011).

However, investors take into consideration the past experience and policy of the company regarding share buyback and the context within which the share buyback is being conducted to better understand the rationale for buyback, which subsequently informs investor decision-making whether the company is currently undervalued, fair valued or overvalued (Pettit, 2001). For example, Merck is a leading pharmaceutical company that unveiled a \$10 billion share buyback in February 2000, the biggest ever share buyback at the time.

Although it could have served as a signal that that management is so confident in the future prospects of Merck and feel the existing share price is undervalued that the best investment the company can make is in buying its own shares, investors did not interpret the buyback news in that way. The nature of pharmaceutical industry is such that pharmaceutical firms are greatly reliant on the future new product development and potential drug pipeline as a basis to secure their future revenue stream and growth prospects (Milberg and Winkler, 2010). Merck's buyback decision was interpreted by investors as a weakness: as a variety of company's patents approached expiration, a lack of investment in research and development by Merck management in such an environment and prioritisation of share buyback as an attempt to boost the share price failed to boost the share price and instead resulting in a fall in the share price (Lazonick, 2011).

The experience of Merck demonstrates that the information that management intends to communicate through the buyback is not always the way investors interpret the information. Stunda (2017) reported two different ways in which buyback announcement can contradict the intended buyback signal expressed by the management. If the buyback announcement is accompanied with the other managerial decisions that will slow down the company's growth (e.g. reduced investment in research and development, a lack of merger/ acquisition as a basis to achieve further growth and a falling financial performance), the share buyback is unlikely to be considered as a credible way for management to generate value for the shareholders.

An example of Hewlett Packard's share buyback between 1998 and 2000 demonstrates this: the company's decision to spend \$8.2 billion on buying back 128 million shares as a signal that

the share price is undervalued was inconsistent with the management's other decisions such as continued delays in business restructuring, a cancelled acquisition and lost market share in the key markets served by the company. The result was a 15% reduction in the share price in the subsequent 12-month period post buyback (Stunda, 2017).

Secondly, share buybacks are also unlikely to be perceived favourably by investors where the companies operate in high growth industries. For instance, if a business operates in the industry such as technology which is a dynamic and rapidly changing industry, the buyback is likely to be perceived as a signal that management accepts they do not have any interesting growth opportunities to invest the funds and as a result, they have decided to return the money to shareholders in the form of the share buyback.

Pettit (2001) asserted that long-term shareholders are unlikely to continue to hold the shares of a company where share buyback is prioritised over the long-term growth prospects, as the company is not positioned to benefit from the growth prospects offered by the dynamic and rapidly changing industry.

The argument of Pettit (2001) is supported by Rappaport (2005), who stated that a company should only repurchase its shares when they are trading below the management's estimate of intrinsic value and when the company does not have suitable investment opportunities available to it. If the companies decide to engage in share buyback with the knowledge that shares are not necessarily undervalued, this suggests that the managerial intention is to provide an instantaneous boost to the earnings per share rather than attempting to create value. If this is the case, the wealth is transferred from the continuing shareholders to the shareholders that decide to sell their shareholding (Rappaport, 2005).

Keasler and Byerly (2015) investigated the extent to which corporate share buybacks are a source of value creation. By collecting the data on 91 companies across various industries, Keasler and Byerly (2015) employed the descriptive statistics, correlation and regression techniques and concluded that companies engaging in share buybacks reported an underperformance of their share price over the three and five-year time horizon.

The findings indicated the negative impact (as measured through the correlation and ordinary least square regression) of share buyback on the metrics such as future revenue growth, market

capitalisation (measured through the multiplication of share price and the number of ordinary shares outstanding) and profitability (as measured through the return on capital employed).

3.7 Summary of the chapter

The theoretical overview of share buybacks has been undertaken in this chapter using a number of relevant theories. Signalling hypothesis, flexibility hypothesis and managerial incentive hypothesis help to explain the potential reasoning as to why companies may decide to conduct share buybacks. Buyback of ordinary shares is a signalling mechanism. Stock buyback serves as a signal from the management to the external stakeholders (e.g. current and potential shareholders) that management believes the share price in the market to be below the inherent intrinsic value of the firm.

If the intrinsic value is indeed below the current market capitalisation (based on the share price in the market times the number of ordinary shares of the firm outstanding), then stock buyback is an effective mechanism through which management can serve the best interests of the shareholders by reducing the number of ordinary shares, boosting the earnings per share and the share price.

However, the information that management intends to communicate through the buyback is not always the way investors interpret the information. If the buyback announcement is accompanied with the other managerial decisions that will slow down the company's growth (e.g. reduced investment in research and development, a lack of merger/ acquisition as a basis to achieve further growth and a falling financial performance), the share buyback is unlikely to be considered as a credible way for management to generate value for the shareholders. Share buybacks are also unlikely to be perceived favourably by investors where the companies operate in high growth industries.

For instance, if a business operates in the industry such as technology which is a dynamic and rapidly changing industry, the buyback is likely to be perceived as a signal that management accepts they do not have any interesting growth opportunities to invest the funds and as a result, they have decided to return the money to shareholders in the form of the share buyback.

If the companies decide to engage in share buyback with the knowledge that shares are not necessarily undervalued, this suggests that the managerial intention is to provide an instantaneous boost to the earnings per share rather than attempting to create value. If this is the case, the wealth is transferred from the continuing shareholders to the shareholders that decide to sell their shareholding. This is supported by managerial incentive hypothesis, which argues that a key reason that managers have an incentive to engage in share buyback is so that they can enrich the company insiders such as the board of directors and other members of the senior management team that hold shares and share options expiring in the foreseeable future. Finally, the flexibility hypothesis states that the flexibility associated with the share buyback compared to dividend payout as a method of rewarding the shareholders is an important reason that companies may prefer to focus on share buyback.

4. Buyback and innovation

4.1 Overview of the chapter

The previous chapter provided an in-depth analysis of the relevant theories (i.e. signalling hypothesis, flexibility hypothesis and managerial incentive hypothesis) in explaining the reasoning as to why companies undertake share buyback. The buyback process is directly linked to innovation, as the decision of companies to buy back their own shares usually is attributed to the fact that they either cannot find the investment opportunities or are not interested in pursuing research and development as a basis to promote innovation. This highlights the relevance of innovation as a concept within the context of share buyback.

This chapter begins by providing an overview of key arguments put forward by Schumpeter on innovation including the concept of creative destruction. The assertions of Schumpeter are compared to the existing theoretical and empirical evidence on share buybacks and the extent to which senior managers of corporations in the contemporary environment are neglecting the investment in research and development to prioritise share buyback as a means to boost the earnings per share, return on capital employed, share price and their own remuneration, as supported by the principal agent conflict.

The chapter will argue that managerial emphasis on short-termism and their tendency to look after their own interests (through share buyback) means they are less likely to allocate resources to research and development, especially as research and development to improve innovation generates results only in the long-term, whereas most managers and board of directors are under pressure to produce results (i.e. boost earnings per share, return on capital employed and the share price) in the short-term future.

4.2 Schumpeter's arguments on innovation

Schumpeter's arguments on innovation can be explained through (1) the traditional economic theory and (2) through the innovation as a basis of economic growth and development. Firstly, the circular flow of income as an economic theory concentrates on the determination of price

and quantity, which help to facilitate the flow of factors of production (inputs) and the output. Schumpeter (1934) asserted that firms are able to earn an abnormal profit by virtue of the market power they possess (i.e. market imperfections) as the level of profit in a perfectly competitive market would be zero (break-even).

However, Schumpeter (1943) was also aware that perfect competition as a theory of market structure is highly theoretical and lacks relevance in practice, as he argued that perfectly competitive markets do not exist, which makes it unhelpful to compare the firm's behaviour in the context of innovation and profit with respect to a condition that is hypothetical.

The second argument of Schumpeter on innovation includes reference to innovation as a basis of economic growth and development. Schumpeter (1943) referred to growth driven by innovation as a disruptive instead of a smooth process, referring to this concept as 'creative destruction'. He stated that it is the ability of firms to devise new products, processes or services that contribute to an increase in productive capacity and generate new fields where productive activity can be undertaken, allowing a firm to charge a higher price for the unique and novel new products eventually translating into an increase in profits.

Schumpeter (1934) linked economic growth and development to the process of innovation, dividing innovation into five different types namely: (1) ability of an organisation to successfully launch a new product or a new feature within the products that already exist, (2) successful application of new methods of production that have not yet been extensively employed in the industry, (3) ability of an entrepreneur/ organisation to successfully open a new market for which there was limited demand previously, (4) acquisition of new sources of supply including the finished goods to develop novel new products/ services and (5) changes in the existing industry structure that lead to either the creation or elimination of monopoly structure.

Schumpeter asserted that any organisation aiming to successfully grow its market share, revenue and profit must innovate as without engaging in innovation, an organisation cannot continue to differentiate itself from the competition to capture more market share (including retention of existing customers and the acquisition of new customers). This argument led him to argue how innovation contributes to the process of creative destruction, whereby innovation helps to revolutionise the economic structure through destroying the existing processes and

products, which are replaced by new products, processes and services (Schumpeter, 1991). Schumpeter explained innovation process in four distinct dimensions namely innovation, invention, diffusion and imitation. It is the activities of the entrepreneur and entrepreneurial organisation that not only create opportunities for the firm to gain market share but also create new possibilities for the firm to contribute to the economic growth and development by creating employment, increasing the disposable income, consumption and investment in the economy (Schumpeter, 2000).

The diffusion and imitation are the two vital dimensions of innovation that contribute to a significant impact on the economic environment and growth. The reason being that although initial innovation in the form of creating a new product or a service is important, it is the diffusion of this information and knowledge in the wider economy and its adoption by other companies (imitation) that the wider economy begins to take advantage of the opportunities presented by innovation (Gilbert, 2006).

Schumpeter (1942) stated that creative destruction is the pre-requisite for capitalism to exist and the novel idea is not sufficient to contribute to the creation of successful new product. Instead, the persistence and strong character of the entrepreneur along with the organisational support (in the form of technical resources, human and financial resources to facilitate the process of creativity and innovation) are essential for an organisation to successfully innovate. Schumpeter acknowledged that technological advances meant that the society was becoming more dynamic, which means the capitalism facilitates change, encouraging organisations to engage in creative destruction. Thus, entrepreneur is the driver of change and innovation in the economy, which has an impact not only on the company itself but also the wider economy.

The arguments and writing of Schumpeter clearly illustrates that if the organisation does not focus on research and development, innovation and creativity, it is less likely that the firm would be able to successfully innovate and develop new products, services and processes. This has two drawbacks: firstly, it reduces the competitiveness of the firm itself because the organisation cannot benefit from innovation to improve its product/ service offering provided to its customers (Hospers, 2005).

Secondly, as the company becomes less competitive and loses market share to the domestic or international competitors, it will reduce the level of investment in the domestic economy,

potentially make people redundant or hire less workers in the future. The end result is a reduction in employment (or an increase in unemployment), lower investment, disposable income and consumption (Kurz, 2008). It helps to establish that if the firms are not focused on creativity and innovation (e.g. through management's tendency to prioritise share buyback as a means to reward shareholders in the short-term or to improve own remuneration by boosting the earnings per share), they would lose their competitive advantage, market share, revenue and profitability.

Based on the arguments of Schumpeter (1934; 1942), organisational support in the form of promoting innovation and creativity within organisations is essential to improving the competitiveness of the firm itself and to have a positive impact on the wider environment and the economy within which the firm operates. It is the activities of the entrepreneur and entrepreneurial organisation that not only create opportunities for the firm to gain market share but also create new possibilities for the firm to contribute to the economic growth and development by creating employment, increasing the disposable income, consumption and investment in the economy (Schumpeter, 2000).

4.3 Impact of buybacks on innovation

Researchers have explored the impact of share buyback on corporate innovation. Although the key function of the stock market is to raise cash that can be used by corporations to invest in improving their innovative capabilities and enhancing their productive capacity (Dawid et al., 2019), Nelson (2020) criticised this role of the stock market by showing that in contrast to other sources of funding, stock markets have been an insignificant supplier of funding to the corporations. Lazonick (2017) detailed an analysis of the changing role of the capital markets (and especially the stock market) in the global economy in the last 100 years. He questioned the way in which the changing function and role of the capital markets has effected the way in which corporations create value as well as extract and distribute value among the various stakeholders.

Lazonick (2017) argued that an innovative organisation comprises of three important social conditions: increased organisational integration, financial commitment and strategic control. These factors subsequently influence the ability of the business to produce the products and

services at a lower cost and higher value compared to those currently available in the marketplace. Investment in research and development as part of promoting innovation is an important component of the innovative and creative organisations. An organisation that focuses on value creation via innovation is able to successfully create value not only for itself but the wider economy that it is part of. This is through the help to create employment opportunities, improve disposable income and contribute to taxes, among other ways in which innovative organisations have a positive contribution to the economy.

The three key social conditions that form part of an innovative organisation all have an important role in promoting innovation. Organisational integration is associated with the ability of the people to work closely together, providing an incentive for people to engage in collective learning, transfer of information and knowledge, eventually contributing to creation of value (Brav et al., 2018). A creative and innovative organisation through emphasis on integration of the various organisational functions helps to promote sharing of ideas and knowledge, positively impacting the innovation capabilities (Swift, 2018).

Lin and Sanders (2017) studied the link between organisational integration and innovation in corporations. Drawing upon the feed-forward and feedback learning theories of organisational integration and knowledge transfer, Lin and Sanders (2017) concluded that organisational learning (including the learning achieved by individuals, teams and the entire divisions) is a function of the ability of the organisation to retain and reinvest its resources. If the company is able to retain its human and financial resources and reinvest in these vital resources, the reinvestment promotes innovation and the ability of the organisation to successfully develop new products and services, enhance productive capacity and improve the growth prospects of the company and the wider economy.

The finding of Lin and Sanders (2017) signifies that if the organisation focuses on retaining its key resources and reinvesting the proceeds in expanding the market share and productive capacity of the business, increased organisational integration and the availability of relevant resources will help the organisation to benefit from improved innovation and product development. However, as concluded by Lazonick (2017), if the management does not allocate corporate resources to the research and development, investment in staff training to improve organisational integration and instead the managerial focus remains on using the available financial resources to engage in share buyback to reward shareholders and themselves, this

negatively impacts the innovation potential of the company in the short-term as well as the long-term.

The conclusion of Lazonick (2017) is supported by Faraglia et al. (2019), who concluded that managerial emphasis on short-termism and serving their own interests (through share buyback) means they are less likely to allocate resources to research and development, especially as research and development to improve innovation generates results only in the long-term, whereas most managers and board of directors are under pressure to produce results (i.e. boost earnings per share, return on capital employed and the share price) in the short-term future.

The above argument can be compared to the assertion of Schumpeter (1934; 1942), who stated that any organisation aiming to successfully grow its market share, revenue and profit must innovate. Without engaging in innovation, an organisation cannot continue to differentiate itself from the competition to capture more market share (including retention of existing customers and the acquisition of new customers). This argument led Schumpeter (1991) to argue how innovation contributes to the process of creative destruction, whereby innovation helps to revolutionise the economic structure through destroying the existing processes and products, which are replaced by new products, processes and services.

The short-term focus and orientation of management in the contemporary environment, driven by the analyst expectations and the principal agent conflict encouraging management to look after their own interests has meant that innovation has suffered to an extent (Sakinc, 2017). If the companies do not focus on research and development to innovate, they are not appropriately positioned to differentiate themselves from the competitors. Ultimately, the companies that prioritise share buyback and divert resources from R&D to buying back shares are likely to fall behind, as creative destruction process would make their activities redundant and less attractive in terms of the value proposition they provide to the customers.

Financial commitment is another important area, which involves the ability of the organisation to secure funding (either through debt or equity as external sources of funding) at a competitive rate/ terms to promote and sustain the process of innovation and cumulative learning. This is sustained through the ability of the firm to secure funding and use it to invest in expansion of productive capacity until the innovative new products begin to generate income and higher profitability for the business (Lazonick, 2017).

Strategic control is another important social condition required for innovation to prevail within corporations. Strategic control involves the ability of the decision-making authority in the companies (usually senior management) to enjoy the ability to allocate resources (including human, technological, physical and financial resources) to effectively utilise the available factors of production to maximise their innovation credentials, helping to access new markets and creation of low-cost high quality products (Dawid et al., 2019).

Lazonick and Mazzucato (2013) investigated the relationship between risk and reward when it comes to management's decision to engage in share buyback instead of focusing on innovation. They stated that senior managers that misallocate a large amount of financial resources to buyback of the company's own stock are largely motivated by their self-interest. Developing on the agency theory and principal agent conflict (Vaubel, 2006), Lazonick and Mazzucato (2013) stated that managers who do not prioritise spending on research and development as a basis to improve the innovation capabilities within the company lose credibility with the employees, shareholders and suppliers as important stakeholders.

As the managerial focus is on pursuing the self-interest, the management does not pay attention to the technological and organisational investment required to maintain and enhance their innovation. The existing remuneration structure whereby managers are largely paid in the form of share options that are vested for three to five year period creates incentives for senior management and board of directors to take corporate decisions in terms of resource allocation such that they boost the company's share price in the given time period to maximise their own take-home pay.

A quick way for management to achieve an increase in earnings per share is engaging in share buyback, which if achieved at the expense of giving up research and development spending reduces the ability of the organisation to successfully innovate. The end result is the negative impact of share buyback on innovation of companies, as share buyback is driven by the underlying attempt from management to concentrate on increasing the earnings per share and share price to boost their own take-home pay (Lazonick and Mazzucato, 2013).

Despite the criticism of buybacks, there are others who argue that buybacks cannot necessarily be blamed for reducing innovation or corporate investment in the economy. Roe (2016) stated

that the argument regarding the negative impact of buybacks on the innovation, productive capacity of the company and economic growth is untrue. Roe (2016) cited the example of 1970s and 1980s corporate America whereby companies possessed excess cash back then but did not engage in share buyback.

Instead, the companies engaged in mergers and acquisitions, either using the capital available (in the form of retained earnings and cash), or issuing new funding through debt or equity. The result was a reduction in industry concentration, as few firms came to dominate the industries (akin to oligopoly or monopoly structure), restricting the competition through enacting legal and regulatory among other barriers to entry.

A lack of competition meant the larger organisations had a little incentive to improve their operational efficiency or innovate. Roe (2016) argued that acquisitions undertaken in 1970s and 1980s were neither good for the consumers, shareholders or the wider American economy due to the value destruction and as a result, ending the share buybacks in the current environment is likely to imply that companies would concentrate on using the excess cash to acquire other businesses.

The argument that buybacks limit the innovation may not necessarily be true, as the cash returned to the shareholders through the buyback (by reducing the number of ordinary shares outstanding, increasing the earnings per share and the share price) means the large shareholders (mainly institutional investors such as pension funds or mutual funds) can use part of the funding to invest in innovative and entrepreneurial new businesses, thus channelling the funds to the most deserving companies to promote innovation and entrepreneurship (Thakor, 2014).

4.4 Summary of the chapter

This chapter reviewed the theoretical and empirical evidence on the relationship between buybacks and innovation. The key theoretical arguments included the reference to the work of Schumpeter on innovation and creative destruction, as well as the managerial incentive to maximise their own remuneration in line with the principal agent conflict.

The chapter concludes that managerial emphasis on short-termism and their tendency to look after their own interests (through share buyback) means they are less likely to allocate resources to research and development, especially as research and development to improve innovation generates results only in the long-term, whereas most managers and board of directors are under pressure to produce results (i.e. boost earnings per share, return on capital employed and the share price) in the short-term future.

Comparing this to the arguments of Schumpeter, any organisation aiming to successfully grow its market share, revenue and profit must innovate. Without engaging in innovation, an organisation cannot continue to differentiate itself from the competition to capture more market share (including retention of existing customers and the acquisition of new customers). Innovation contributes to the process of creative destruction, whereby innovation helps to revolutionise the economic structure through destroying the existing processes and products, which are replaced by new products, processes and services. The short-term attention span and focus of management in the contemporary environment, driven by the analyst expectations and the principal agent conflict encouraging management to look after their own interests has meant that innovation has suffered to an extent. If the companies do not focus on research and development to innovate, they are not appropriately positioned to differentiate themselves from the competitors.

Ultimately, the companies that prioritise share buyback and divert resources from R&D to buying back shares are likely to fall behind, as creative destruction process would make their activities redundant and less attractive in terms of the value proposition they provide to the customers.

5. Impact of share buybacks on innovation: Case study analysis

5.1 Overview of the chapter

The purpose of this chapter is to investigate how share buyback has influenced investment in R&D and impacted the innovation prospects of companies. The chapter focuses on a case study analysis of two companies namely Apple and Alphabet. The rationale for selecting these two companies is two fold: firstly, both operate in the technology industry where innovation is a vital component in improving the competitiveness of the operations of the business. Secondly, both companies are market leaders with sizable share buyback programs in since 2012, making the choice of Apple and Alphabet suitable to analyse the potential impact of share buyback on influenced investment in R&D and innovation prospects.

The next section conducts the case study analysis of Apple, followed by the assessment of Alphabet in section 5.3. The analysis of each of the two companies focuses on financial performance assessment through the use of relevant ratios (e.g. revenue growth, profitability ratios, share buyback and payout). Besides ratios, correlation analysis and regression are also conducted to better understand if there is any relationship between share buyback and investment in R&D by Apple and Alphabet. Finally, section 5.4 involves the analysis of the findings of the quantitative analysis including the comparison to the findings from the literature, as analysed in the 3rd and 4th chapters.

5.2 Apple

Since 2012, Apple has focused on returning cash to its shareholders not only in the form of a dividend but also the share buyback. To investigate the potential impact of share buyback on innovation at Apple, it is important to review the financial performance of Apple over the period 2012-2019 by undertaking ratio analysis. Figure 1 shows the changes in revenue of Apple since 2010. The revenue has increased significantly since 2010, confirming the successful global expansion and an increase in market share enjoyed by Apple over time.

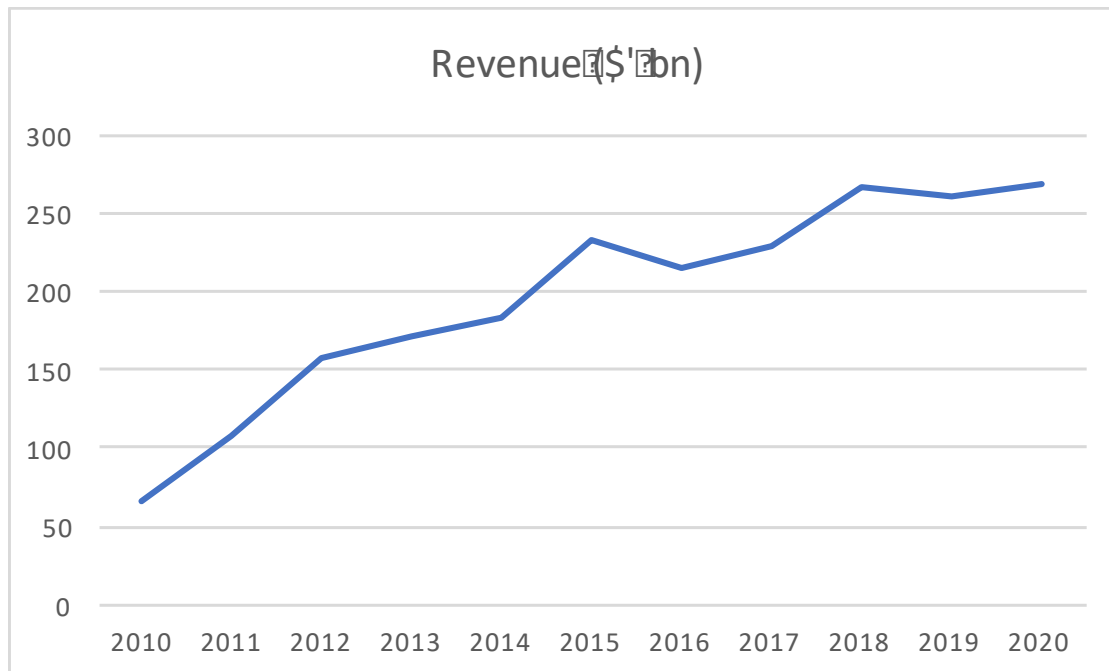


Figure 1: Revenue of Apple (in \$' billion)

Source: Author, using data collected from Apple's annual reports

Despite the increase in revenue, a slightly worrying trend is a reduction in gross and operating profit margin since 2012. As shown in figure 2, Apple's gross margin was 45% and operating margin 35% in 2012. Although the profit margins increased slightly between 2013-15 period, they have continued to fall since 2015. Strong brand name of Apple (driven by spending on marketing) coupled with the ability to benefit from economies of scale through global expansion (e.g. bulk buying discount from suppliers on buying large volume of inputs, managerial economies of scale through recruiting expert and technically competent management and financial economies of scale through lower cost of borrowing) have not necessarily translated into an improvement in operating profit margin over time, even though the revenue has increased.

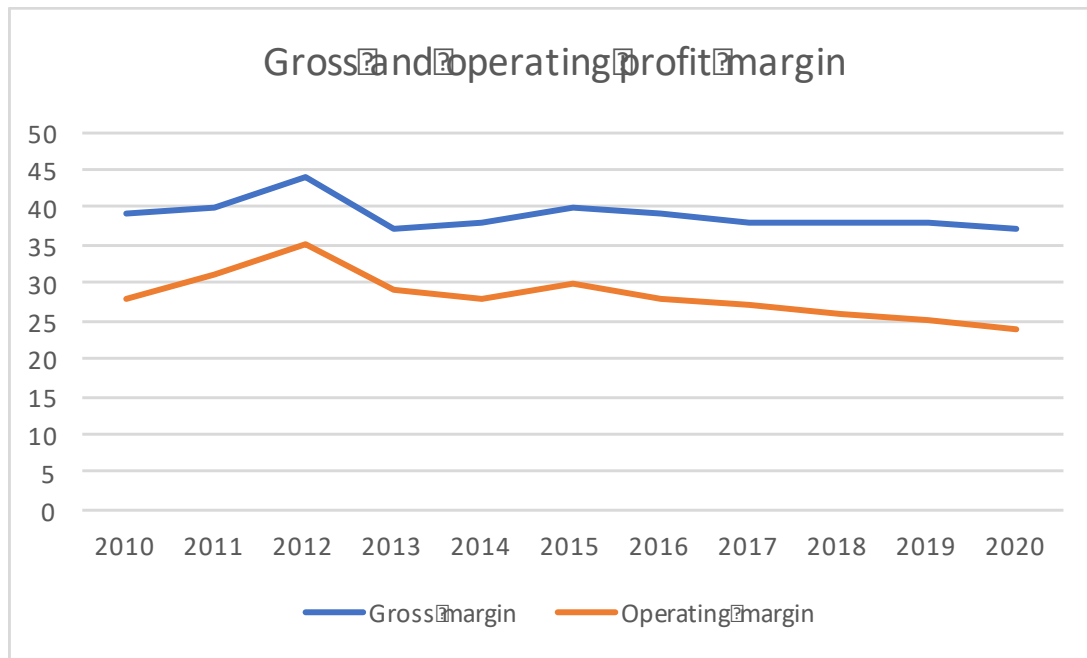


Figure 2: Gross and operating profit margin of Apple (in %)

Source: Author, using data collected from Apple's annual reports

The impact of share buyback on financial performance is evident from figure 3. Buying back the ordinary shares outstanding since 2012 has reduced the number of ordinary shares in issue, translating into a significant increase in earnings per share. Share buyback is only one factor that has contributed to a rapid increase in Apple's EPS, with the other factor being an increase in profitability. Apple started to pay out a dividend to its shareholders from 2012 onwards and has graduated increased the dividend payment per share, as illustrated in figure 3.

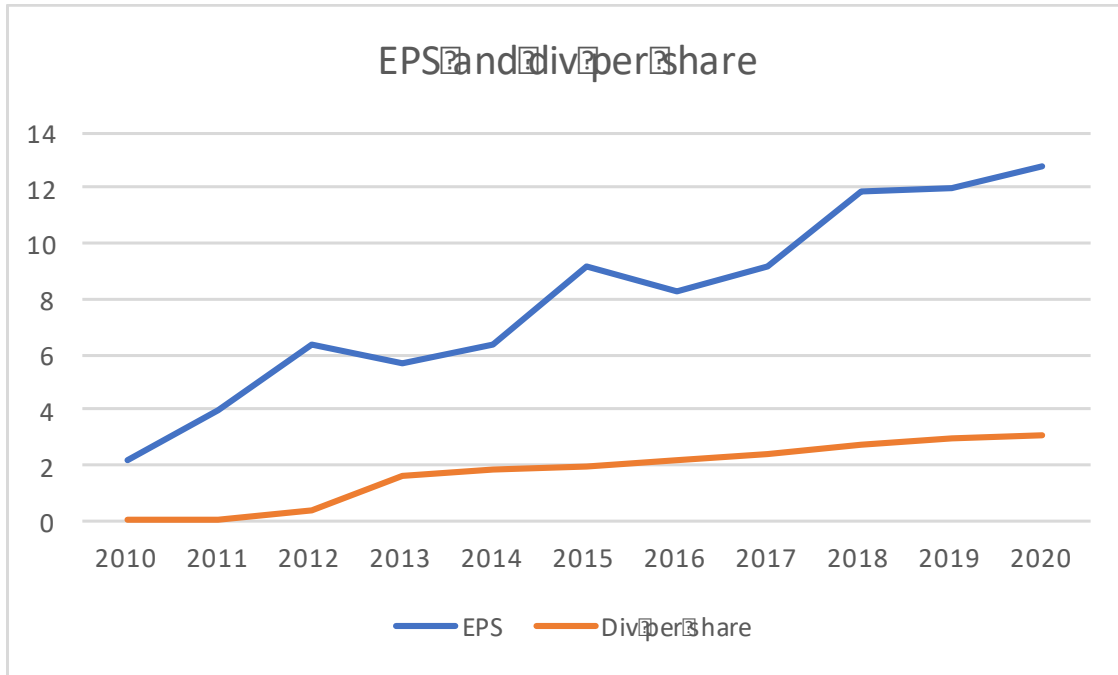


Figure 3: Earnings per share and dividend per share of Apple (in \$)

Source: Author, using data collected from Apple’s annual reports

The dividend policy of Apple can also be analysed by reviewing the company’s payout ratio (percentage of profit paid as dividend compared to what is retained in the retained earnings). As Apple began to pay a dividend in 2012, the payout ratio reached 27.5% in 2013. The payout ratio has been maintained between 20% and 30% since 2013 (figure 4).

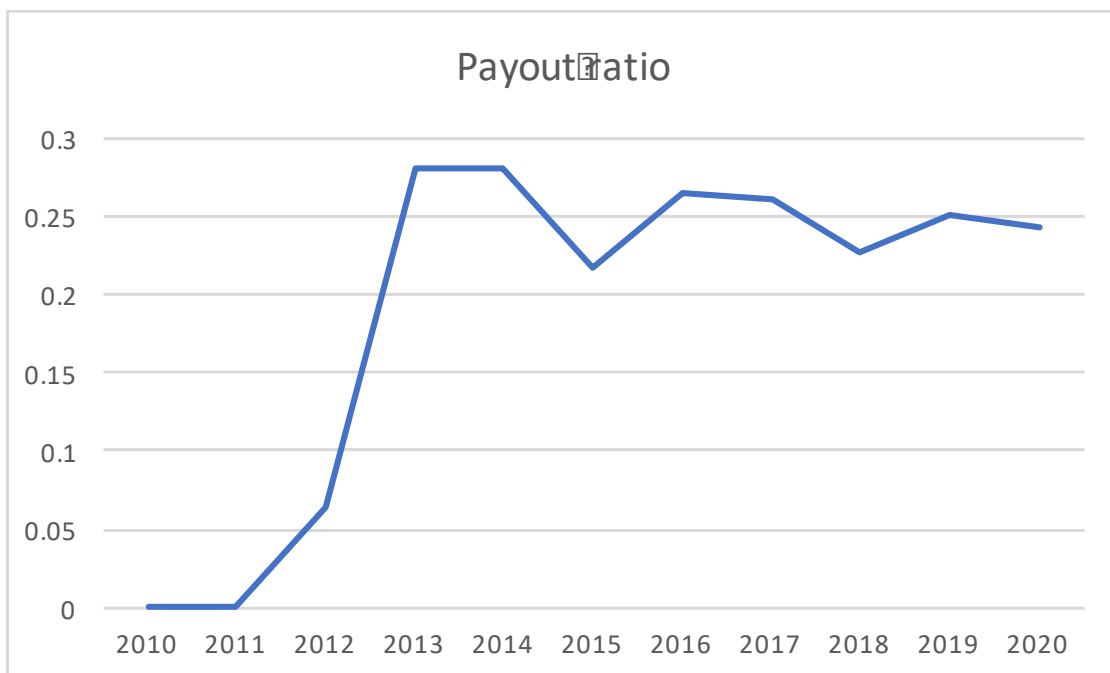


Figure 4: Dividend payout ratio of Apple (in %)

Source: Author, using data collected from Apple's annual reports

The share buyback programme of Apple since 2012 is highlighted in figure 5. It shows that although the amount spent on buyback reduced between 2014 and 2017, the buyback has increased significantly since 2017. The rapid increase in share buyback during the 2017-2019 period partly helps to explain a significant increase in EPS during the same period, as reduction in number of ordinary shares outstanding (due to the buyback) translated into an increase in EPS.

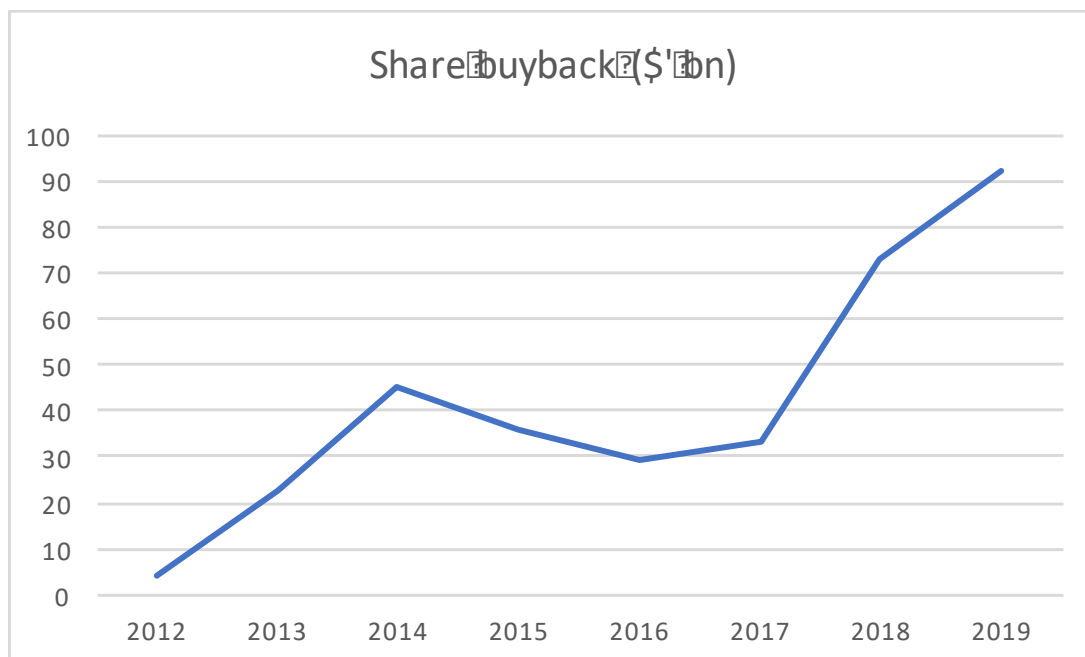


Figure 5: Share buyback of Apple (in \$' billion)

Source: Author, using data collected from Apple's annual reports

To investigate the impact of share buyback on innovation at Apple, it is important to assess whether there is any relationship between share buyback and spending on R&D. The changes in R&D spending undertaken by Apple since 2010 are highlighted in figure 6. It shows that although R&D spending was on the upward trend between 2010 and 2017, it has reduced since 2017.

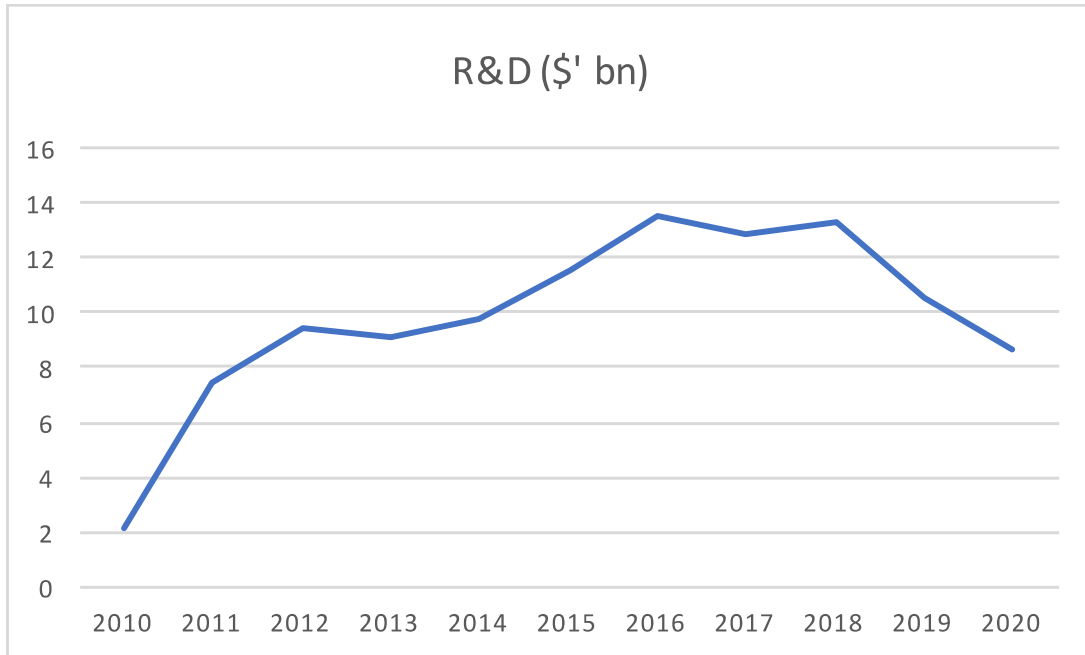


Figure 6: R&D spending of Apple (in \$' billion)

Source: Author, using data collected from Apple's annual reports

R&D as a proportion of sales is illustrated in figure 7, which indicates a general downward trend since 2011 (apart from 2015-16 period), highlighting that despite an increase in revenue, R&D spending as a proportion of revenue at Apple has not continued at the same pace. R&D spending as a percentage of sales has halved from 7% in 2011 to 3.5% in 2019, as illustrated in figure 7.

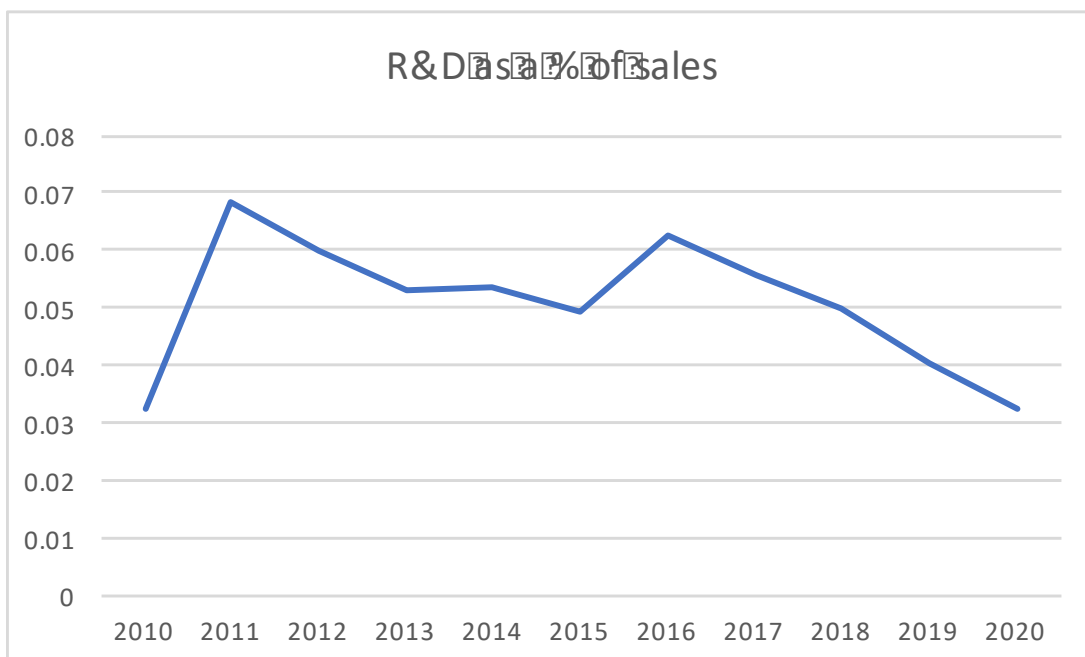


Figure 7: R&D spending of Apple as a % of sales (in %)

Source: Author, using data collected from Apple’s annual reports

Correlation analysis

The correlation matrix is provided in table 1, which shows the Pearson correlation between share buyback (in \$ billion), research and development spending undertaken by Apple (in \$ billion) and R&D spending as a proportion of sales.

	Share buyback (\$' bn)	R&D (\$' bn)	R&D as a % of sales
Share buyback (\$' bn)	1		
R&D (\$' bn)	0.249511077	1	
R&D as a % of sales	-0.821976757	0.172930704	1

Table 1: Correlation matrix (demonstrating Pearson correlation coefficient) between share buyback and R&D spending of Apple

Source: Author, using data collected from Apple’s annual reports

Share buyback and R&D have a moderate and positive correlation (+0.2495). It means that an increase in share buyback has coincided with the increase in R&D spending by Apple to enhance its innovation. However, a better indicator of the impact of share buybacks on innovation is the correlation between share buyback and R&D as a proportion of sales. This is because the emphasis of a firm on innovation and entrepreneurship measured through R&D spending is signified through the analysis of the extent to which the firm continues to maintain its R&D spending as it experiences growth (Thakor, 2014). For instance, an increase in revenue should translate into higher R&D spending if a firm is keen to maintain and enhance its R&D capabilities.

The correlation is -0.82, which signifies a strong and negative correlation between share buyback and R&D as a proportion of revenue at Apple. It clearly indicates that as the share buyback has accelerated at Apple over time (especially since 2017), the period has coincided with a reduction in R&D spending as a proportion of revenue. The revenue and profitability of

Apple has increased during this period whereas R&D spending has reduced, translating into a significant reduction in R&D as a proportion of sales.

Regression analysis

Two different regression have been conducted. The first one with share buyback as an independent variable and R&D spending (in \$ billion) as a dependent variable (table 2) whereas the second regression includes share buyback as an independent variable and R&D spending as a % of revenue as a dependent variable (table 2.1). The results of the regression support the linear relationship between share buyback and R&D spending signified by the Pearson correlation.

Share buyback as an independent variable has a positive impact on R&D spending as a dependent variable. However, the finding is not statistically significant at 5% significance level, as p-value is 0.055 (T-critical = 1.86). It illustrates that it cannot be concluded with 95% confidence that share buyback at Apple has contributed to an increase in R&D spending. Limited number of observations (as share buyback only initiated from 2012 onwards) also contributes to a relatively low R-square and insignificant results at 5% significance level.

<i>Regression Statistics</i>					
Multiple R	0.24951108				
R Square	0.16225578				
Adjusted R Square	0.09403493				
Standard Error	1.87269005				
ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.396941831	1.39694183	0.39833321	0.055122097
Residual	6	21.04180817	3.50696803		
Total	7	22.43875			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>
Intercept	10.5737991	1.242669034	8.50894228	0.00014428	7.5330975
Share Buyback (\$'bn)	0.01584957	0.012511275	1.86311364	0.0551221	-0.045599121

Table 2: Regression analysis, independent variable = share buyback (in \$ billion), dependent variable = R&D spending (in \$ billion)

Source: Author, using data collected from Apple's annual reports

The results of the second regression are statistically significant. R-square of 67.5% shows that share buyback as an independent variable explains 67.5% variation in R&D spending as a % of revenue as a dependent variable. The inverse relationship between share buyback and R&D spending as a % of revenue is confirmed through the regression, a finding which is highly statistically significant (p-value = 0.012).

<i>Regression Statistics</i>					
Multiple R	0.82197676				
R Square	0.67564579				
Adjusted R Square	0.62158675				
Standard Error	0.00424352				
ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	0.000225062	0.00022506	12.4982954	0.012288706
Residual	6	0.000108045	1.8007E-05		
Total	7	0.000333107			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>
Intercept	0.06155777	0.002815888	21.8608706	5.9851E-07	0.054667536
Share Buyback (\$ Bn)	-0.0002012	5.69055E-05	-3.5352928	0.01228871	-0.00034042

Table 2.1: Regression analysis, independent variable = share buyback (in \$ billion), dependent variable = R&D spending as a % of revenue

Source: Author, using data collected from Apple's annual reports

5.3 Alphabet (Google)

Since 2013, Alphabet has focused on returning cash to its shareholders in the form of share buyback (note: Alphabet does not pay any dividend). To investigate the potential impact of share buyback on innovation at Alphabet, it is important to review the financial performance of the company over the period 2012-2019 by undertaking the ratio analysis. Figure 8 shows the changes in revenue of Alphabet since 2010. The revenue has increased significantly since 2010, confirming the successful global expansion and an increase in market share enjoyed by Alphabet over time. The rate of increase in revenue was particularly steep between 2014 and 2019, as illustrated in figure 8.

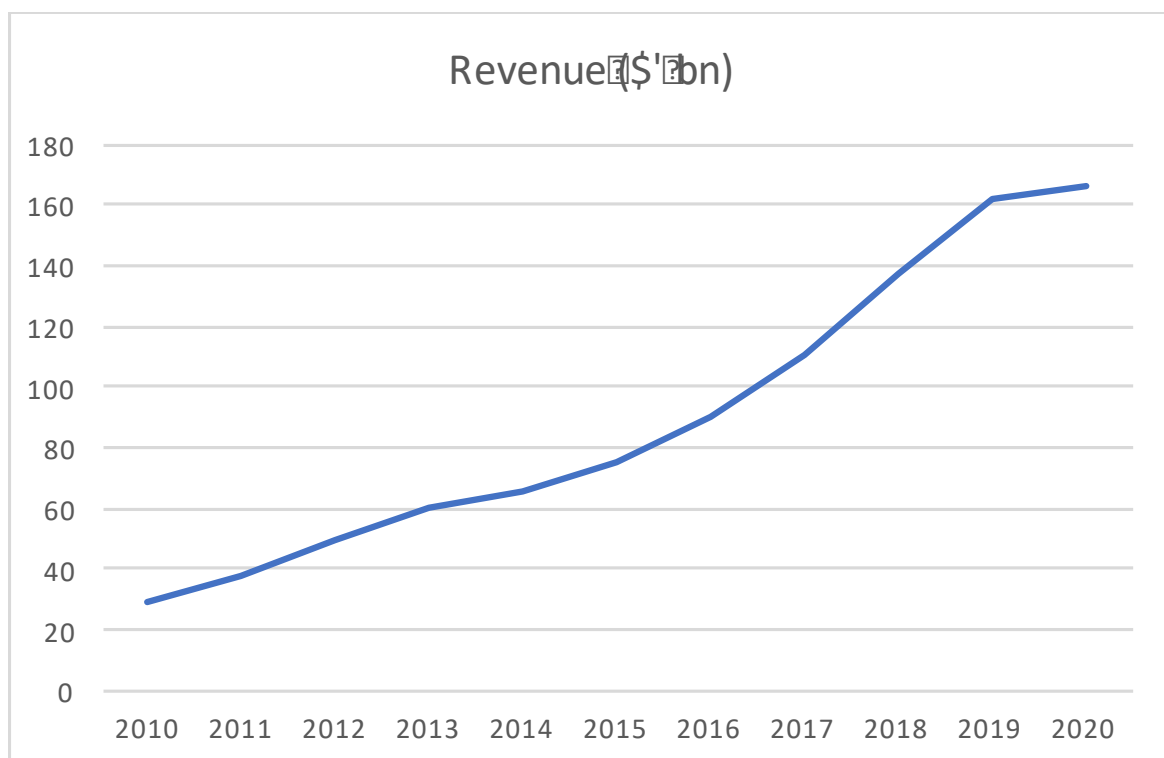


Figure 8: Revenue of Google (in \$' billion)

Source: Author, using data collected from Google's annual reports

Despite the increase in revenue, a reduction in gross and operating profit margin of Alphabet is noticed since 2012. As shown in figure 2, Alphabet's gross margin was a healthy 65% and operating margin 25% in 2012. Although the profit margins increased slightly between 2013-15 period, they have continued to fall since 2015. Strong brand name of Alphabet (driven by spending on marketing) coupled with the ability to benefit from economies of scale through

global expansion (e.g. bulk buying discount from suppliers on buying large volume of inputs, managerial economies of scale through recruiting expert and technically competent management and financial economies of scale through lower cost of borrowing) have not translated into an improvement in operating profit margin over time, even though the revenue has increased.

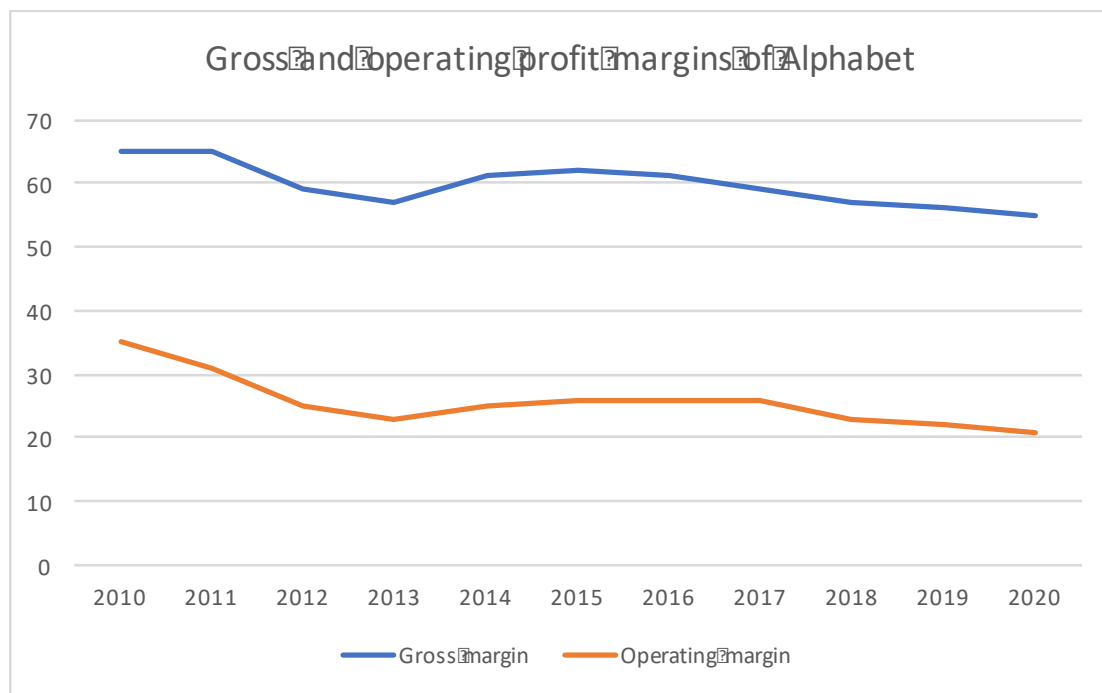


Figure 9: Gross and operating margin of Google (%)

Source: Author, using data collected from Google's annual reports

Alphabet's R&D spending illustrates an upward trend between 2010 and 2020. Although spending on R&D reduced between 2012 and 2013, it has steadily increased since 2012 (apart from 2014-16 period), as shown in figure 10.

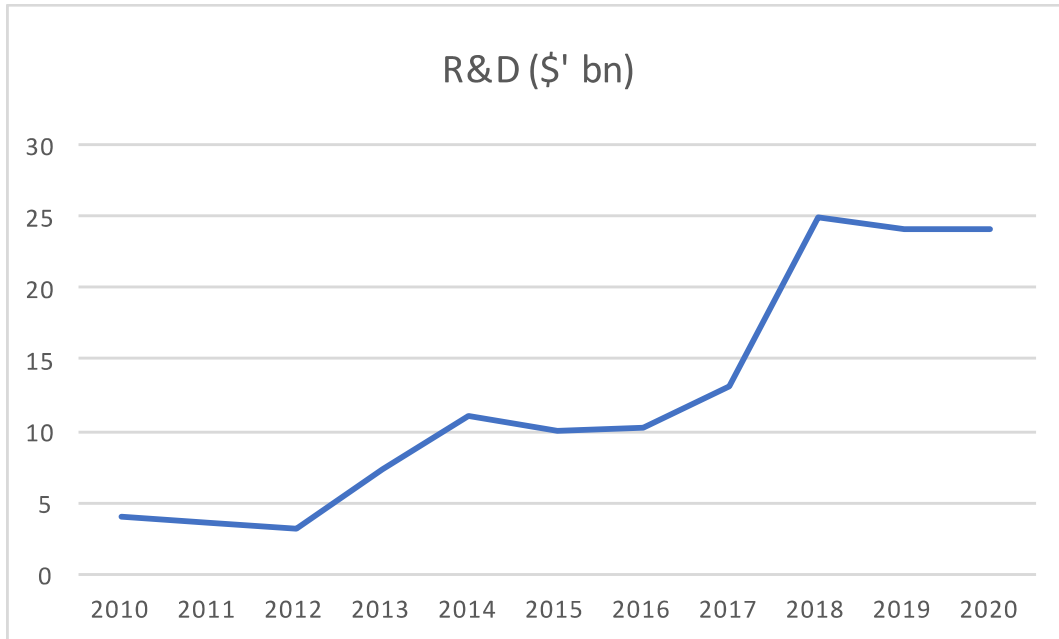


Figure 10: R&D spending of Google (in \$' billion)

Source: Author, using data collected from Google's annual reports

It is important to translate R&D spending into R&D as a percentage of sales. As shown in figure 11, R&D as a proportion of sales reduced from 14% in 2010 to 6% in 2012, followed by an increase to 16.5% in 2014. The period 2014-2016 saw a reduction in R&D spending as a proportion of sales and an increase in 2017-18 period. Finally, R&D spending as a proportion of sales has fallen since 2018 indicating that R&D has not continued to increase at the same pace as the increase in revenue earned by Alphabet.

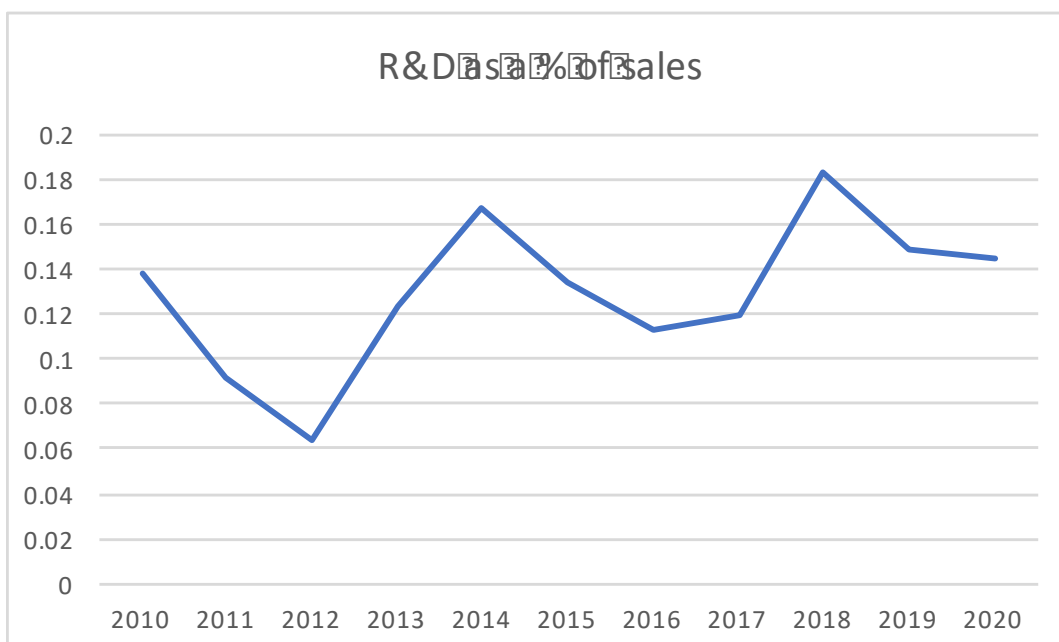


Figure 11: R&D spending of Google as a % of sales (in %)

Source: Author, using data collected from Google’s annual reports

Figure 12 shows the share buyback details of Alphabet. The upward trend in share buyback is noticed since 2013 when the buyback was initiated. Between 2013 and 2017, the increase in buyback was not as rapid. However, the buyback accelerated from 2017 onwards, as illustrated in figure 12.

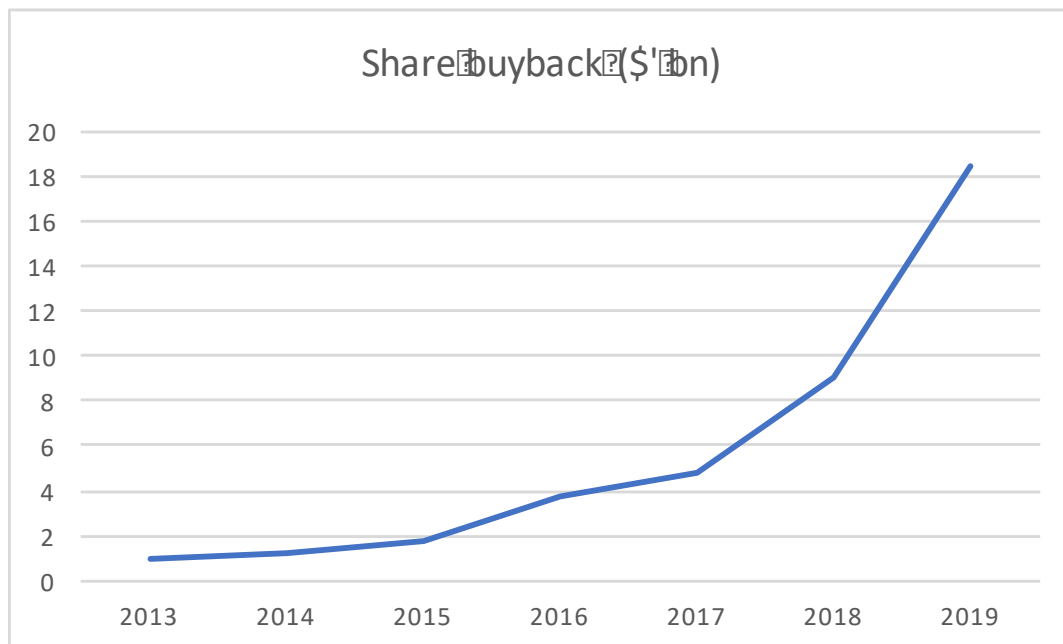


Figure 12: Share buyback of Google (in \$' billion)

Source: Author, using data collected from Google’s annual reports

Correlation

The correlation matrix is provided in table 3, which shows the Pearson correlation between share buyback (in \$ billion), research and development spending undertaken by Alphabet (in \$ billion) and R&D spending as a proportion of sales.

	R&D (\$' bn)	R&D as a % of sales	Share buyback (\$' bn)
R&D (\$' bn)	1		
R&D as a % of sales	0.65008893	1	

Share buyback (\$' bn)	0.871290035	0.311783758	1
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Table 3: Correlation matrix (demonstrating Pearson correlation coefficient) between share buyback and R&D spending of Google

Source: Author, using data collected from Google's annual reports

The correlation between R&D spending (in \$ billion) and share buyback (in \$ billion) is strong and positive (0.871). This is unsurprising, as the trend in R&D spending and share buyback at Google is upwards, as illustrated in figures 10 and 12 respectively. However, as argued earlier, R&D as a proportion of sales is a better measure of the assessment of whether the company continues to remain focused on innovation. This is because the emphasis of a firm on innovation and entrepreneurship measured through R&D spending is signified through the analysis of the extent to which the firm continues to maintain its R&D spending as it experiences growth. For instance, an increase in revenue should translate into higher R&D spending if a firm is keen to maintain and enhance its R&D capabilities.

The correlation between R&D as a % of sales and share buyback is positive but moderate (0.311). It shows that an increase in share buyback has not deterred Alphabet from spending more on R&D as a proportion of the company's sales. Thus, the results of correlation demonstrate that even though the amount of share buyback has increased, it has coincided with higher spending on R&D as a proportion of sales.

Regression

Two different regression have been conducted. The first one with share buyback as an independent variable and R&D spending (in \$ billion) as a dependent variable (table 4) whereas the second regression includes share buyback as an independent variable and R&D spending as a % of revenue as a dependent variable (table 4.1). The results of the regression support the linear relationship between share buyback and R&D spending signified by the Pearson correlation.

Share buyback as an independent variable at Alphabet has a positive impact on R&D spending as a dependent variable. The finding is statistically significant at 5% significance level, as p-

value is 0.01 (T-critical = 3.97). It illustrates that it can be concluded with 95% confidence that share buyback at Alphabet has contributed to an increase in R&D spending.

Regression Statistics					
Multiple R	0.871290035				
R Square	0.759146325				
Adjusted R Square	0.710975591				
Standard Error	3.823713046				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	230.4160927	230.416093	15.7594923	0.010638058
Residual	5	73.10390729	14.6207815		
Total	6	303.52			
	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	8.744229438	2.029390901	4.30879503	0.00765136	3.52751405
Share Buyback (\$ Bn)	0.989759848	0.24932092	3.9698227	0.01063806	0.34886002

Table 4: Regression analysis, independent variable = share buyback (in \$ billion), dependent variable = R&D spending (in \$ billion)

Source: Author, using data collected from Google's annual reports

Regression Statistics					
Multiple R	0.311783758				
R Square	0.097209111				
Adjusted R Square	0.083349066				
Standard Error	0.027056613				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.000394127	0.00039413	0.53838111	0.049604628
Residual	5	0.003660302	0.00073206		
Total	6	0.004054429			
	Coefficients	Standard Error	t Stat	P-value	Lower 95%
Intercept	0.133490959	0.014359981	9.29604036	0.00024234	0.096577454
Share Buyback (\$ Bn)	0.001294469	0.001764196	1.95337446	0.04960463	-0.00324054

Table 4.1: Regression analysis, independent variable = share buyback (in \$ billion), dependent variable = R&D spending as a percentage of sales (%)

Source: Author, using data collected from Google's annual reports

The results of the second regression with share buyback (in \$ billion) as an independent variable and R&D spending as a percentage of sales as a dependent variable are illustrated in table 4.1. The low R-square (9.7%) indicates that 9.7% of variability in R&D spending as a percentage of sales as a dependent variable is explained by share buyback as an independent variable. Limited number of observations (as share buyback only initiated from 2013 onwards) also contributes to a relatively low R-square. Consistent with the findings of Pearson correlation, the relationship between share buyback and R&D spending as a percentage of sales is positive and significant at 5% significance level (p-value = 0.049).

5.4 Discussion of share buyback and impact on innovation at Apple and Alphabet

Apple

Share buyback and R&D have a moderate and positive correlation (+0.2495). It means that an increase in share buyback has coincided with the increase in R&D spending by Apple to enhance its innovation. However, the correlation between share buyback and R&D as a proportion of sales is -0.82, which signifies a strong and negative correlation between share buyback and R&D as a proportion of revenue at Apple. It clearly indicates that as the share buyback has accelerated at Apple over time (especially since 2017), the period has coincided with a reduction in R&D spending as a proportion of revenue. The revenue and profitability of Apple has increased during this period whereas R&D spending has reduced, translating into a significant reduction in R&D as a proportion of sales. The inverse relationship between share buyback and R&D spending as a % of revenue is confirmed through the regression, a finding which is highly statistically significant (p-value = 0.012).

The inverse relationship between share buyback and R&D spending as a % of revenue can be explained through the signalling hypothesis. The management of Apple may believe the share price to be below the intrinsic value. If the intrinsic value is indeed below the current market capitalisation, then stock buyback is an effective mechanism through which management can serve the best interests of the shareholders by reducing the number of ordinary shares, boosting the earnings per share and the share price (Vermaelen, 1981).

The decision between opting for share buyback to boost the share price in the short-term versus the investment in R&D to enhance the long-term growth prospects of the firm poses a paradox. If the existing mispricing in the marketplace motivates the management to engage in a share buyback in the short-term, assuming the financial markets are efficient (based on the efficient market hypothesis) whereby share buyback would result in an increase in share price, the continued buyback of shares in the long-term is not justified (Lasfer and Andriosopoulos, 2015). This is because buyback in the short-term should enhance the share price, consistent with the signalling mechanism that stock buyback serves as a signal from the management to the external stakeholders (e.g. current and potential shareholders) that management believes the share price in the market to be below the inherent intrinsic value of the firm.

Thus, assuming the markets are efficient, the share buyback in the short-term should help the share price to reach the inherent intrinsic value. The continued buyback of ordinary stock in the long-term means excess cash is not being used to boost the future growth prospects of the business, while lowering the available cash balance for potential difficult period in the future (Coulton and Ruddock, 2011).

Alphabet

The correlation between R&D spending (in \$ billion) and share buyback (in \$ billion) is strong and positive (0.871). This is unsurprising, as the trend in R&D spending and share buyback at Google is upwards, as illustrated in figures 10 and 12 respectively. However, as argued earlier, R&D as a proportion of sales is a better measure of the assessment of whether the company continues to remain focused on innovation. This is because the emphasis of a firm on innovation and entrepreneurship measured through R&D spending is signified through the analysis of the extent to which the firm continues to maintain its R&D spending as it experiences growth. For instance, an increase in revenue should translate into higher R&D spending if a firm is keen to maintain and enhance its R&D capabilities. The correlation between R&D as a % of sales and share buyback is positive but moderate (0.311). It shows that an increase in share buyback has not deterred Alphabet from spending more on R&D as a proportion of the company's sales. The positive relationship between share buyback and R&D spending at Alphabet is also supported through the regression analysis.

Flexibility hypothesis is one theory that helps to explain Alphabet's decision to focus on share buyback instead of paying dividend. As argued by Comment and Jarrell (1991), share buybacks provide flexibility to the management in terms of the extent to which they want to buy back the company's shares from the open market and whether they want to continue to engage in buyback in the future. The above argument is in contrast to the dividend policy, which is expected to be ongoing once companies commit to paying the dividend, as cancelling the dividend serves as a signal to the investors that the company is possibly experiencing cash flow difficulties. Such a signal is not necessarily the case when it comes to share buybacks. Baker and Wurgler (2004) concluded that once a company begins to pay a dividend, its dividend policy becomes an important part of the investors' expectation about the future dividend payout.

Managerial incentive is another theory that helps to explain Alphabet's decision to engage in share buyback while also maintaining focus on R&D spending. that corporate management has an incentive to engage in share buybacks to neutralise the dilution in earnings per share as a result of exercising the stock options. This can be explained as follows: when managers exercise the stock options, it increases the number of ordinary shares outstanding, as new shares have been crystallised which did not exist before, directly due to the share options being in the money. The increase in number of ordinary shares outstanding leads to dilution of the shareholding of existing shareholders, reducing the earnings per share. Lamba and Miranda (2010) concluded that to offset the impact of dilution of shareholding of the existing shareholders and the resultant reduction in earnings per share, management that holds more share options are more likely to engage in share buyback. Although share buyback increases the likelihood that Alphabet management is better off in terms of exercising their options in the money, investment in R&D continues to improve the innovation and growth potential of Alphabet too.

The actions of Alphabet in terms of continued emphasis on R&D and not compromising R&D spending to undertake share buyback can be explained by referring to Schumpeter. Schumpeter (1942) stated that creative destruction is the pre-requisite for capitalism to exist and the novel idea is not sufficient to contribute to the creation of successful new product. Instead, the persistence and strong character of the entrepreneur along with the organisational support (in the form of technical resources, human and financial resources to facilitate the process of creativity and innovation) are essential for an organisation to successfully innovate.

Schumpeter acknowledged that technological advances meant that the society was becoming more dynamic, which means the capitalism facilitates change, encouraging organisations to engage in creative destruction. Thus, entrepreneur is the driver of change and innovation in the economy, which has an impact not only on the company itself but also the wider economy.

5.5 Summary of the chapter

The chapter analysed the share buyback and the impact of buyback on innovation by referring to the two companies: Apple and Alphabet. Apple has undertaken share buyback while compromising its emphasis on innovation (as measured through R&D spending in absolute terms and R&D as a proportion of revenue). In contrast, an increase in share buyback of Alphabet has coincided with the upward trend in R&D spending as a proportion of revenue. The inverse relationship between share buyback and R&D spending as a % of revenue can be explained through the signalling hypothesis. The management of Apple may believe the share price to be below the intrinsic value. If the intrinsic value is indeed below the current market capitalisation, then stock buyback is an effective mechanism through which management can serve the best interests of the shareholders by reducing the number of ordinary shares, boosting the earnings per share and the share price.

Flexibility hypothesis and managerial incentive theories help to explain Alphabet's decision to engage in share buyback while also maintaining focus on R&D spending. Schumpeter (1942) stated that creative destruction is the pre-requisite for capitalism to exist and the novel idea is not sufficient to contribute to the creation of successful new product. Instead, the persistence and strong character of the entrepreneur along with the organisational support (in the form of technical resources, human and financial resources to facilitate the process of creativity and innovation) are essential for an organisation to successfully innovate.

6. Conclusion and recommendations

6.1 Conclusions

The aim of this research was to analyse the effect of share buyback on innovation at Apple and Alphabet and to establish whether engaging in buyback means there is a trade-off with innovation. The research question that this study aimed to answer was the following: “How does share buyback influence corporate innovation at Apple and Alphabet? Does engaging in buyback means there is a trade-off with innovation?” The aim and research question have been addressed through answering three research objectives.

The first objective was to analyse the relevant theories that help to explain why corporations engage in share buyback. The research has clarified that signalling hypothesis, flexibility hypothesis and managerial incentive theories help to explain the reasons as to why companies undertake share buyback. If management decides to engage in share buyback with the knowledge that shares are not necessarily undervalued, this suggests that the managerial intention is to provide an instantaneous boost to the earnings per share rather than attempting to create value. If this is the case, the wealth is transferred from the continuing shareholders to the shareholders that decide to sell their shareholding. This is supported by managerial incentive hypothesis, which argues that a key reason that managers have an incentive to engage in share buyback is so that they can enrich the company insiders such as the board of directors and other members of the senior management team that hold shares and share options expiring in the foreseeable future. The flexibility hypothesis states that the flexibility associated with the share buyback compared to dividend payout as a method of rewarding the shareholders is an important reason that companies may prefer to focus on share buyback.

The second objective was to draw upon the work and arguments of Schumpeter to understand the importance of innovation for the company and the wider economy. As argued by Schumpeter (1942), any organisation aiming to successfully grow its market share, revenue and profit must innovate. Without engaging in innovation, an organisation cannot continue to differentiate itself from the competition to capture more market share (including retention of existing customers and the acquisition of new customers). Innovation contributes to the process of creative destruction, whereby innovation helps to revolutionise the economic structure

through destroying the existing processes and products, which are replaced by new products, processes and services.

The short-term attention span and focus of management in the contemporary environment, driven by the analyst expectations and the principal agent conflict encouraging management to look after their own interests has meant that innovation has suffered to an extent. If the companies do not focus on research and development to innovate, they are not appropriately positioned to differentiate themselves from the competitors. Ultimately, the companies that prioritise share buyback and divert resources from R&D to buying back shares are likely to fall behind, as creative destruction process would make their activities redundant and less attractive in terms of the value proposition they provide to the customers.

The third objective was to investigate the effect of share buyback on innovation at Apple and Alphabet. When it comes to Apple, share buyback and R&D have a moderate and positive correlation (+0.2495). It means that an increase in share buyback has coincided with the increase in R&D spending by Apple to enhance its innovation. However, the correlation between share buyback and R&D as a proportion of sales is -0.82, which signifies a strong and negative correlation between share buyback and R&D as a proportion of revenue at Apple. It clearly indicates that as the share buyback has accelerated at Apple over time (especially since 2017), the period has coincided with a reduction in R&D spending as a proportion of revenue. The revenue and profitability of Apple has increased during this period whereas R&D spending has reduced, translating into a significant reduction in R&D as a proportion of sales. The inverse relationship between share buyback and R&D spending as a % of revenue is confirmed through the regression, a finding which is highly statistically significant (p-value = 0.012).

For Alphabet, the correlation between R&D spending and share buyback is strong and positive (0.871). This is unsurprising, as the trend in R&D spending and share buyback at Google is upwards. The correlation between R&D as a % of sales and share buyback is positive but moderate (0.311). It shows that an increase in share buyback has not deterred Alphabet from spending more on R&D as a proportion of the company's sales. The positive relationship between share buyback and R&D spending at Alphabet is also supported through the regression analysis.

6.2 Recommendations

The analysis of the effect of share buyback on innovation at Apple and Alphabet based on the literature review and statistical analysis helps to provide the following recommendations. Firstly, consistent with the signalling hypothesis and as seen in case of Apple, management of a business should only engage in share buyback if they are highly confident that the share price is below the intrinsic value. As management tend to understand the business better than the external stakeholders, they are able to better value the business and know when the market is undervaluing the business. By engaging in share buyback when the market undervalues the business based on its share price, the share buyback program will add to the shareholder wealth.

Secondly, share buyback should not be at the expense of giving up R&D spending. As noted through the analysis of Alphabet, a company can engage in buyback while pursuing an increase in R&D spending. This is because although share buyback can help to boost the share price in the short-term, a lack of R&D spending would reduce the long-term competitiveness of the business. The persistence and strong character of the entrepreneur along with the organisational support (in the form of technical resources, human and financial resources to facilitate the process of creativity and innovation) are essential for an organisation to successfully innovate.

Finally, share buyback can be a preferred option over dividend payout for high growth businesses. This is because share buyback provides flexibility to the management in terms of the extent to which they want to buy back the company's shares from the open market and whether they want to continue to engage in buyback in the future. The above argument is in contrast to the dividend policy, which is expected to be ongoing once companies commit to paying the dividend, as cancelling the dividend serves as a signal to the investors that the company is possibly experiencing cash flow difficulties. However, not paying a dividend means a company may not be attractive to a number of institutional investors who prefer to invest in dividend-paying stocks and are attractive as shareholders because they tend to invest for the long-term.

6.3 Limitations and future research

As with the effectiveness of the methodology used in this study including the reliance on relevant literature as a basis to conduct the data analysis and use of recognised econometric techniques, the study suffers from several limitations. Firstly, regression and correlation analysis are conducted based on the limited observations. As the two companies in this analysis (Apple and Alphabet) only began to engage in share buyback from 2012 and 2013 respectively, the econometric analysis (using regression and correlation methods) is based on limited observations. This limits the reliability of the findings, as also signified by the low R-square and potentially high p-value implying that the findings may not be statistically significant.

Secondly, an important shortcoming of the case study research strategy as acknowledged by Saunders et al. (2016) is that the findings cannot be applied to other studies. The data analysis conducted in this thesis is focused only on Apple and Alphabet, which implies that findings of this study with regards to the effect of share buyback on innovation is limited only to these two companies. The result is that findings cannot be generalised and applied to other companies.

The future research can broaden the sample size whereby data on more than two companies should be collected to analyse the effect of share buyback on innovation. Preferably, those companies should be selected that have engaged in the share buyback for a considerable time period. This would help to increase the number of observations, improving the quality of the statistical analysis conducted using the correlation and regression analysis.

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Appendix 1: Apple financial data

	Revenue (\$'bn)	Gross margin	Operating margin	EPS	Div per share	Payout ratio	R&D (\$'bn)	R&D as % of sales	Share buyback (\$'bn)
2010	65.2	39	28	2.2	0	0%	2.1	3.2%	
2011	108	40	31	4	0	0%	7.4	6.9%	
2012	157	44	35	6.3	0.4	6%	9.4	6.0%	4
2013	171	37	29	5.7	1.6	28%	9.1	5.3%	23
2014	183	38	28	6.4	1.8	28%	9.8	5.4%	45
2015	233	40	30	9.2	2	22%	11.5	4.9%	36
2016	215	39	28	8.3	2.2	27%	13.5	6.3%	29
2017	229	38	27	9.2	2.4	26%	12.8	5.6%	33
2018	266	38	26	11.9	2.7	23%	13.3	5.0%	73
2019	260	37.8	25	12	3	25%	10.5	4.0%	92
2020	268	37	24	12.8	3.1	24%	8.7	3.2%	

Appendix 2: Alphabet financial data

	Revenue (\$ bn)	Gross margin	Operating margin	EPS	Div per share	Payout ratio	R&D (\$ bn)	R&D as % of sales	Share buyback (\$ bn)
2010	29	65	35	13.2	0	0	4	14%	
2011	38	65	31	14.9	0	0	3.5	9%	
2012	50	59	25	16.2	0	0	3.2	6%	
2013	60	57	23	18.8	0	0	7.4	12%	1
2014	66	61	25	20.6	0	0	11	17%	1.2
2015	75	62	26	22.8	0	0	10	13%	1.8
2016	90	61	26	28	0	0	10.2	11%	3.7
2017	111	59	26	18	0	0	13.2	12%	4.8
2018	137	57	23	44	0	0	25	18%	9.1
2019	162	56	22	49	0	0	24	15%	18.4
2020	166	55	21	50	0	0	24	14%	