

Examining major contrasting risks for Knowledge-driven R&D-intensive companies

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Received 10 January 2013; received in revised form 14 May 2013; approved 02 September 2013

ABSTRACT Evidence from the literature suggests that research and development is very important to high technology companies and that the very existence and survival of these knowledge companies depend on continuing investment in research and development. Yet research and development intensive companies face a number of contrasting risks. One of them is the risk of undervaluation of stocks by investors due to lack of quantitative and qualitative information about the long-term benefits of R&D investment. Another is the risk of underinvestment in R&D and the likelihood of being punished by the same market. Using literature evidence, our aim in this paper is to examine major contrasting risks that R&D intensive companies are face with. In this brief paper, we argue that given the nature of R&D investment, a significant form of intangible asset and a major contributor to free cash flow, a reduction in the level of R&D investment will have significant implications for long-term business growth and profitability.

Keywords: Research and development, Investment, Risk, Knowledge companies

Introduction—Importance of R&D

R&D comprise of basic research, applied research and experiential development. It is defined in this context as comprising ‘creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (OECD, para 63, 2002). This definition offered by the OECD [Organisation for Economic Cooperation and Development] can be stretched a little further. For example, the process of increasing the stock of knowledge will necessarily include the discovery and application of knowledge not only to create a new product, process or service but also to improve an existing product, process or service profitably. Continuing investment in R&D is therefore critical to maintain innovation, market performance and leadership and competitive advantage particularly in research and development-intensive knowledge companies. The rapidity of continuous change in information technology

is an added reason for continuous investment in R&D. Several empirical studies into the importance of R&D to knowledge companies have all underlined the criticality of R&D in not only facilitating knowledge exploitation and stimulating new product development (Stam and Wennberg, 2008), but also in maintaining efficiency, innovation and market performance (Kumbhakar et al, 2010; Wu et al, 2011; Kumbhakar et al, 2010).

Risks of underinvestment in R&D

Continuous and long-term business growth and profitability are a priority consideration for well established R&D intensive companies, especially high technology companies. These two characteristics – profitability and long-term growth – have to be demonstrated most especially when accessing or raising external finance. A study by Jeon and Chonnam (2011) into firm's IPO and R&D has shown that high technology companies demonstrate higher financial indices of business growth and profitability than low-technology companies. The study also found that compared to low-technology companies, high tech firms generate high 'information effects' in accounting for firm values. In other words, investors positively perceived IPO firm's R&D expenses on firm's valuation and price earning ratio. Similarly, Morikawa (2004) and Fosfuri and Tribó (2008) have shown a linear relationship between R&D activity and a company's performance. Thus, a knowledge company that under invests or fails to maintain investment in R&D will experience a decline in products or services—and, ultimately market performance—over time (Tubbs, 2007).

Research has also shown that investment in R&D is linked to higher productivity. Ortega-Argilés et al's (2011) evaluation of the impact of R&D spending on the productivity of European and US firms found significant positive correlation between R&D and productivity. What is equally significant about the latter finding is that the productivity impact of research in high technology firms was not only greater than comparable low tech companies, but high technology firms also obtained more returns of R&D investments in productivity than comparable low-tech firms. An empirical analysis of 2020 firms covering 2006 and 2009 by D'Artis and Siliverstovs (2011) equally support literature evidence that high tech companies maintain 'a generally increasing response of productivity growth with the level of R&D intensity'. Also, Kumbhakar, et al (2010) study into the effects of inputs such as R&D stocks on firms productivity and technical efficiency in Europe found that R&D activity is not only key to performance, but it is also a major driver of company efficiency.

Knowledge companies invest heavily to sustain intangible assets and R&D investment is a significant form of intangible assets. Intangible assets are long-term assets – for example brand name, goodwill and patents; they are not physically in existence. Unlike stocks and capital, they are not financial instruments. A recent seminal work by the United Kingdom Commission for Employment and Skills (UKCES, 2011) *Intangible Assets and Performance*, found a significant positive association between intangible assets and productivity. The study also found that firms with a higher proportion of intangible assets are highly productive compared with firms with a lower proportion of intangible assets. What research evidence shows, therefore, is that falling investment in intangible assets is perceived by the market as almost as a default on a company's debts. A company that finds itself in such a situation risks being punished by investors (since intangibles contribute to a company's market value).

Evidently, stock prices reflect a portion of current investment in R&D. A reduction in current investment will necessarily signal to the market lack of investment opportunities in R&D. Since the value of firm that is reflected in stock appreciation rises by the net present value of those investment opportunities, we can therefore think of the value of a firm as value

of assets in place, plus the net present value of future investments. Yan et al (2008) demonstrated this link between a downward and an upward movement in research and development expenditure and stock returns. An increase in R&D expenditure therefore has a positive association with market returns and vice versa.

Contrasting risks in R&D investment

Despite the criticality and necessity of R&D investment to knowledge companies, they still face a number of major contrasting risks. These include:

- the risk of inadequate or insufficient or even absence of internal equity (cash flow) to finance R&D; this means that companies will be vulnerable to 'erratic' capital market behaviour. In some cases, external financing might not even be available.
- the risk of relying on yet-to-be-developed products; or the risk that a product might be withdrawn or recalled from the market on health and safety grounds or because of product malfunctioning.
- the risk of undervaluation of R&D companies by investors; due possibly to lack of or insufficient quantitative and qualitative information about the long-term benefits R&D investment. Undervalued companies find it difficult to raise/attract new capital from investors – funds that could be used to fund new investment in R&D.
- the risk of misapplication of resources by the management; ill informed management decision might see resources moved away from basic research in favour of improvement in current product/technology. This might cause the market to undervalue the company – because investors often think that investment in basic research would generate higher future returns on investment compare to incremental improvement in existing products (or technology).
- greater risk of financial distress or solvency problem; R&D intensive companies might unintentionally hide the likelihood of financial distress or solvency classification. R&D spending is recorded in accounting as investments rather costs, if the R&D intensive company ever gets into a financial difficulty or distressed, it will be difficult to accurately classify the company as such (because of high volume of R&D activity).
- the risk of heavy reliance on intangible assets; if a company relies too heavily on intangible assets; it follows that the value of those intangible assets must necessarily depend on the ability of the company to fund them.

Concluding remarks

This short paper is part of a large seminal work on high technology firms, risks and R&D investment. What is clear from the highlights in the preceding paragraphs is that despite the afore-mentioned contrasting risks and given the nature of R&D investment, a significant form of intangible asset and major contributor to free cash flow, a reduction in the level of R&D investment will have significant implications for long-term business growth and profitability.

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