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# **Financial Reporting of Research and Development costs and its signalling effects on firms market values**

**Chin Bun Tse and Andrew Ekuban**

## **Value Creation and R&D**

Apple and Dyson show us the importance of product innovation in creating values of firms. Such type of value creation happens when the products are actually in the market to generate cash. That is the fundamental value has been changed causes the value change, measured by share prices and dividends level changes. However, before the realisation of cash, the firms needed to spend a great deal on research and development (R&D) of the products. How should we report these R&D expenses in financial statements? How do investors see and react to the spending on R&D? Do they wait until they see the actual realisation of cash after the products are in the markets and then react, or they react straight away when they know a firm has spent a large amount of money on R&D? Would the capital markets react differently to different ways of reporting R&D costs?

These are interesting questions that we attempt to address in this chapter. We first review the R&D accounting reporting requirements where R&D can be, in general, either *written-off* straight away in the Income Statement when it is incurred or *capitalised* as an asset on Statement of financial position. To capitalise it or not is an important question that the directors of companies need to think about. There are a number of conditions stipulated in the Accounting Standards to meet before the directors can decide to capitalise the R&D costs. However, we argue that the subjective nature of the conditions of capitalisation provides a potential opportunity to the directors to communicate to investors whether something good is ahead. This is, of course, a pure hypothesis. We do not know whether the directors really use the capitalisation as a tool to signal or not. We do not know whether

the investors believe the signal or not. To look at this issue more deeply, we review the existing global empirical evidence reported in the literature.

Through the literature review, we are in a better position to understand the *practical* signalling roles of R&D reporting. We also hope to identify some knowledge gaps that are still occurring in the literature as well as the inconsistencies found in the literature. This will in turn meet the major objective of this chapter which is to stimulate further research for both practitioners and academics to have an even better understanding of the value relevance of reporting R&D costs.

### **Financial Reporting Requirements**

On 19 July 2002, the European Parliament and the Council of the European Union passed Regulation (EC) No 1606/2002<sup>1</sup> which had as its primary objective the adoption and use of international accounting standards within the Community. The regulation required publicly traded companies to adopt the use of international accounting standards in preparing their consolidated accounts for financial statements commencing on or after 1 January 2005. Article 2 of the regulation defines “international accounting standards” to include International Accounting Standards (IAS), International Financial Reporting Standards (IFRS) and related interpretations (SIC-IFRS interpretations).<sup>2</sup>

The standard that is directly relevant to the discussion here is IAS 38 *Intangible Assets*<sup>3</sup>. The corresponding standards under UK General Accepted Accounting Principles (GAAP) are the Statement of Standard Accounting Practice (SSAP) 13 *Accounting for Research and Development* and FRS 10 *Goodwill and Intangible Assets*<sup>4</sup>. However, as the discussion is primarily on R&D the focus will be on the requirements and application of SSAP 13. Furthermore, since 2005, the requirements under IAS 38 *Intangible Assets* have largely been followed and applied instead of the requirements of SSAP 13<sup>5</sup>. The Standard, IAS 38 *Intangible Assets*, applies to all intangible assets except in instances where the accounting treatment, either due to the nature of the asset or the transaction underlying the

creation of the asset, is covered within the scope of another standard. An example, which is cited in the Standard would be, intangible assets held by an entity for the purposes of resale in the ordinary course of business should be treated in accordance with IAS 2 *Inventories*<sup>6</sup>.

IAS 38 *Intangible Assets* establishes the general principles and criteria for the recognition and measurement of intangible assets. These principles and criteria are broadly similar to those under UK GAAP; however, there are some significant differences. SSAP 13 *Accounting for Research and Development* was originally issued in 1977 and revised in 1989, to provide guidance and establish the accounting practice to be followed in respect of research and development expenditure<sup>7</sup>. The basic concepts that underlie the determinations of the standard are the ‘accruals’ concept in relation to the matching of revenues and expenditures in the periods to which they were dealt with and the ‘prudence’ concept in relation to the recognition of revenues and profits<sup>8</sup>. The scope and objectives of FRS 10 *Goodwill and Intangible Assets* are to set out the principles of accounting for goodwill and intangible assets<sup>9</sup>. The requirements of the Standard FRS 10 *Goodwill and Intangible Assets* apply to all intangible assets except those covered by SSAP 13 *Accounting for Research and Development* and within the scope of other standards<sup>10</sup>.

An intangible asset is defined by IAS 38 *Intangible Assets* as “an identifiable, non-monetary asset without physical substance”<sup>11</sup>. The main features of this definition are captured within the following components;

- Identifiable (suggesting that it is separable or separately transferable);
- Asset (the definition of which encompasses both the notions of future economic benefit and control)

The significance of the ‘identifiable’ characteristic lies in the fact that the IASB has determined that all assets that are ‘separable’, as per above, are identifiable and thus in a business combination such assets should be recognised separately from goodwill. However, the standard states that the separable

nature of an asset in itself is not the only indication of it being identifiable as this criterion may be met in other ways, such as a legal right, giving rise to future economic benefit although not separable from the underlying business entity. However, it is the second component of the definition (an asset) that gives rise to the controversy surrounding this standard, for the determination of an asset – which is defined, essentially, by the ability to generate future economic benefit to the controlling entity - is rather uncertain and in many cases incorrectly forecasted when dealing with intangible assets.

Intangible assets by their very nature present with a higher level of uncertainty pertaining to their ability to generate a future economic benefit than tangible assets. For example, whereas it is relatively simple to quantify the potential earnings from a physical machine of a certain maximum production capacity which is being built, that is not always the case with the creation, say, of a new technology which is yet to be brought to market. The higher levels of uncertainty as exemplified above, can lead to either significant errors in estimation or may simply be abused or manipulated by managers who may have a biased opinion of the future viability of their intangible creations and its earnings potential. The suggestion is that, managers may use this opportunity not simply to inform investors of developments within the organisations but rather to give an overly optimistic view of the future earnings potential of the entities they manage, effectively using capitalisation as (or not) as a signal to the market about the future earnings potential of a firm. In an attempt to reduce the level of subjectivity in the exercise of determining what costs may be capitalised or not, the standard, introduces and invokes a set of stringent criteria to be applied in ascertaining whether R&D expenditure may be capitalised

The term ‘research and development’ is used to describe a wide range of activities, SSAP 13 *Accounting for Research and Development* defines research and development expenditure under three broad categories of activity, namely pure research, applied research and development. These categories are consistent with the Organisation for Economic Co-operation and Development’s (OECD) definition of the different types of research and development<sup>12</sup>. Pure research is defined as “work undertaken primarily to acquire new scientific or technical knowledge for its own sake...” whereas applied research is defined as “original or critical investigation undertaken in order to gain

new scientific or technical knowledge and directed towards a specific practical aim or objective".<sup>13</sup> However, such a distinction between pure and applied research is not made under IAS 38 *Intangible Assets*, instead the definition refers to research activities as being aimed at obtaining new knowledge and not related directly to any of the company's products or processes<sup>14</sup>. However, both standards define development expenditure in broadly similar terms, with each requiring that a new and recognisable asset should be the outcome of such expenditure. Examples of such output given in the standard include, new materials, products, services or processes<sup>15</sup>. Essentially, R&D activity is identified separately from non-research based activity by the existence or otherwise of a substantial element of innovation or even the breaking of new ground.

The accounting for R&D expenditure tends to fall into two broad treatments, namely; to write-off expenditure that is not directly attributable to the creation of an asset and to capitalise expenditure that does. SSAP 13 *Accounting for Research and Development* requires development expenditure to be written off except where the following stringent recognition criteria are met. This includes, the identification of a clearly defined project; separately identifiable expenditure and that the outcome of the project, in terms of its technical feasibility and commercial viability, can be measured or assessed with reasonable certainty and that sufficient resources exist to complete a profitable project<sup>16</sup>. Similar recognition criteria are provided under IAS 38 *Intangible Assets*, in that, if it is probable that future economic benefit that are attributable to the asset will flow to the entity and the costs of the asset can be measured reliably then it should be recognised in the financial statements<sup>17</sup>. On the other hand, research expenditure should be expensed as it is incurred; this is consistent with SSAP 13.

The requirements for capitalisation under IAS 38 *Intangible Assets* are not dissimilar from those provided under SSAP 13 as noted above. However, the main difference is that under SSAP 13, development expenditure may be capitalised where the recognition criteria are met, whereas IAS 38 requires capitalisation under similar circumstances, thus placing limits on management's discretion<sup>18</sup>. It is the subjective nature of these criteria that has given rise to much debate over their application. Take for example, the identification of a clearly defined project; it is the directors (managers) of a

company who will invariably determine if a project is worth pursuing or not and only they have the full information to determine its technical feasibility and commercial viability. They could generate or compile sufficient accounting information which will enable them to satisfy the criteria for determining what costs are required to completion and prepare forecast of future incomes which confirm the profitability of the project. One could argue that directors' being the holders of the fullest set of information pertaining to the project are best placed to make any judgements concerning the technical and commercial viability as well as the profitability of their projects. However, the very uncertain nature of such projects and the high levels of estimation which are invariably required in forecasting future costs and income will undoubtedly leave much space for subjective judgements. It is this space which is given to subjective judgments that allows for the possible manipulation and abuse of the very criteria set to limit management judgements. But if the directors can, and arguably should, make these judgements about the future viability of their projects, then market participants are equally likely to take a view as to the future earning potential of a firm based on the accounting treatment of its R&D costs. Therefore, by capitalising R&D expenditure, directors are communicating to market participants their judgements concerning the inherent and anticipated value of the current R&D expenditure. Likewise, an immediate write-off of similar expenditure would signal to the market the directors' sentiments that the R&D expenditure to date had no capacity to generate future economic benefit. This effectively captures the signalling nature of the accounting treatment of R&D expenditure.

Another important difference in accounting treatment that exists between UK GAAP and IFRS is in the treatment of internally generated intangible assets. Whereas IAS 38 has a single set of stringent rules to cover the recognition of internally generated assets under both development expenditure and other intangible assets, under UK GAAP, internally generated intangible assets may not normally be capitalised. The impact of this discrepancy in accounting treatment is that some assets which could not be recognised in the statement of financial position under UK GAAP will be capitalised under IAS 38. Interestingly, Tsoligkas and Tsalavoutas<sup>19</sup>, citing Green *et al.*,<sup>20</sup> Stark and Thomas<sup>21</sup> and Oswald<sup>22</sup>, note that under SSAP 13 and prior to 2005 many companies did not capitalise their R&D

expenditure. It would seem that the caution that directors took, even when faced with the potential to capitalise, has been eroded or completely removed by the change in requirement under IAS 38 for directors to capitalise their firms R&D costs once the criteria are met. By contrast, under US GAAP (SFAS No 2) all expenditure on R&D must be expensed in the income statement as the view taken by the US regulator is that ‘a direct relationship between research and development costs and specific future revenue’ has not been demonstrated<sup>23</sup>.

This alternative view highlights a common underlying thread of concern in the minds of regulators as to the objectivity and reliability of estimates of R&D expenditure to be capitalised, and the associated opportunity for managers to manipulate earnings<sup>24</sup>

We observe from the above that the accounting treatment of R&D expenditure is by no means the same across various parts of the world. However, where capitalisation is allowed or even required this tends to be a rather subjective exercise. It is precisely because of the subjective exercise, the ways in which to report R&D expenditure, that has generated some apposite debates in the literature of whether capitalisation signals something positive in the future?

### **Review of global experience**

The last three decades have witnessed the unprecedented growth in R&D expenditure of which Apple and Dyson are recent examples from the US and UK respectively. Several authors (Garcia-Manjon and Romero-Merino<sup>25</sup>; Chan *et al.*<sup>26</sup>; Pyyko<sup>27</sup>) have all observed that R&D expenditure is the driver underlying corporate and even national growth. Pyyko, assesses the international impact of R&D expenditure and finds that it is the underlying driver for mergers and acquisition activity across international borders<sup>28</sup>. Garcia-Manjon and Romero-Merino, on the other hand find that the benefits of signalling applies mainly to high-technology firms and that R&D is only essential for the growth and survival of certain businesses and industry sectors<sup>29</sup>.



In this section, we review evidence from around the globe to establish if managers are able to use R&D expenditure reporting as a signal to the markets about the future earnings potential of their firms. The review begins with the case of the US, where under SFAS No. 2, firms are not allowed to capitalise R&D expenditure except in limited instances such as software development costs (SFAS No.86)<sup>30</sup>. Aboody and Lev<sup>31</sup>, cited in Eccher<sup>32</sup>, conclude that whereas there is evidence that capitalising software costs, as a proxy for R&D capitalisation in the case of US firms, provides value-relevant information about the future earnings potential of firms the accuracy of such forecasts is questionable. These findings are made all the more significant when one considers the FASB's thinking behind the requirement to write to the income statement all R&D expenditure, that "a direct relationship between research and development costs and specific future revenue generally has not been demonstrated...."<sup>33</sup> However, the fact that value-relevant information is provided, arguably at the expense of accuracy, does reopen the long standing debate on the trade-off between relevance and reliability which is also mentioned by Markarian *et al*<sup>34</sup>. The work by Aboody and Lev was prompted by the Software Publishers Associations (SPA) petition to the FASB in August 1996 to abolish SFAS No.86<sup>35</sup>. They argued that the capitalisation of software did not benefit the investor but rather if all software costs were charged to the income statement then the reliability and consistency of financial reporting and financial statements will be improved. These findings are at variance with conclusions drawn from the works of Sougiannis *et al.*,<sup>36</sup>; Lev and Sougiannis<sup>37</sup> and Chambers *et al.*,<sup>38</sup>. Furthermore, Lev *et al.*, find that the requirement to expense all R&D expenditure, may be costly to both the firms and market participants. The costs are incurred initially by the prevention of management to publish private inside information which would reduce information asymmetry between them and investors. This leads investor and other participants to seek this additional information through alternative and usually costly means. The lack of relevant information may also lead to the mispricing of equity and the associated inefficient allocation of resources<sup>39</sup>.

In Europe, unlike the US, the implementation of IFRS means that firms are able and even required to capitalise their R&D expenditure where certain criteria are met. Following the study of some 754 firms in Europe, Garcia-Manjon and Romero-Merino provide evidence to support a positive relation

between R&D and sales growth and conclude that for firms to increase their sales, grow and ultimately survive they must invest in R&D. They also find that the intensity of this relationship is enhanced in high-growth firms and heightened further in high-technology industries but this relationship is not clearly evidenced in low-technology firms<sup>40</sup>. This is consistent with the findings of Chan *et al*<sup>41</sup> and Zantout and Tsetsekos<sup>42</sup> who also conclude that a strong positive correlation exists between R&D investment in high-technology industry firms and market responses and a negative correlation in the case of low-technology industry firms.

Buckley and Casson<sup>43</sup> and Caves<sup>44</sup> are proponents of the internationalisation theory that suggests that cross-border M&A's are largely driven by the benefits and synergies arising from the R&D activities of both the target and acquirer firms. Pyyko, extends the internationalisation theory using the ten most R&D active European countries and finds that "cross-border M&A's have a positive impact on the value that investors place on acquirer's R&D activity but only if both the acquirer and the target are technology firms"<sup>45</sup>

The evidence from Italy provided by Markarian *et al* posits the notion that management's motivation to capitalise R&D expenditure stems from the opportunity to use it as a tool for manipulating earnings or for earnings-management. Their work has contributed largely to the reliability side of the debate on the trade-off between relevance and reliability by identifying income-smoothing as being the determining factor for managers when considering whether to capitalise their R&D costs or not. They conclude that income-smoothing is an 'effective and efficient way to signal and communicate important information to the market' and so favour the requirement to expense all R&D costs if financial statements are to provide reliable information<sup>46</sup>.

In the UK, the adoption of IFRS has had a positive impact on the value-relevance of reported assets with Tsohligkas and Tsalavoutas<sup>47</sup> finding evidence in support of Barth *et al*<sup>48</sup> and Ball<sup>49</sup> that the implementation of IFRS improves the reporting of companies' fundamentals. Reported R&D expenses though, were only found to be significantly value-relevant in large companies; this is in

contrast to the findings of Shah *et al*<sup>50</sup> but consistent with Zhao<sup>51</sup> Cazavan-Jeny and Jeanjean<sup>52</sup>. In other words, where large firms failed to capitalise their R&D expenditure this was perceived as inefficiency by investors. The assumption here being, that larger firms would be expected to make more efficient use of the R& D expenditure and gain a competitive technological advantage.

Cazavan-Jeny and Jeanjean<sup>53</sup>, examine the value-relevance of R&D accounting treatment using a sample of companies listed in France. They conclude that capitalised R&D expenditure has a signalling effect evidenced by significant positive correlation with market prices for commercially successful firms and negatively correlated to the stock market returns or prices when R&D costs are expensed. However, Cazavan-Jeny and Jeanjean<sup>54</sup> and Cazavan-Jeny *et al*<sup>55</sup>, find that capitalising R&D on the whole has a neutral or negative impact on future performance. ‘When firms both capitalise and expense R&D costs, the expensed portion exhibits a stronger (and negative) relationship with future earnings’. These findings are in stark contrast to the evidence reviewed previously which was largely in favour of capitalising R&D costs.

### **Value relevance of R&D reporting -gaps in knowledge**

Cazavan-Jeny *et al*, suggest possible reasons for the difference in their findings to previous evidence which was in support of capitalising R&D expenditure. One of the main reasons proffered for this difference is the fact that the research carried out by Cazavan-Jeny *et al*. was based on real data as opposed to simulated data which had been used previously<sup>56</sup>.

Ahmed and Falk, make a similar point when reviewing their findings in the light of previous studies. This is particularly true of research based on US data where under FASB accounting rules companies must expense all their R&D costs. Therefore, researchers are required to make a judgement in placing all R&D expenditure into appropriate ‘capitalised’ and ‘expensed’ categories. The argument here is that manager’s, given the choice, may not capitalise the same expenditure, thus making these categorisations highly subjective and questionable exercises<sup>57</sup>.

In countries where IFRS has been introduced, the adoption of IFRS has amplified companies' fundamentals but continued to confirm the value relevance of R&D expenditure. This is particularly evident in countries like the UK where the accounting treatment has not changed significantly from pre-2005. What is not clear is what the impact would have been if the accounting treatment had changed significantly from pre-2005<sup>58</sup>.

The studies by Garcia-Manjon and Romero-Merino, Chan *et al* and Zantout and Tsetsekos suggest that the type of industry (high-technology or low technology) and Ehie and Olibie the type of sector (manufacturing or service) will have a bearing on outcomes. Firms in the high-technology industry are more likely to benefit disproportionately from the effects of R&D expenditure as compared to low technology firms<sup>59</sup>.

Chambers<sup>60</sup> citing Ciftci *et al*<sup>61</sup>, suggests that given the uncertain nature of the future earnings from R&D expenditure, firms involved in an innovative R&D strategy may find their stock mis-priced (generally under-priced) due to the anticipated and associated inherent risk in the R&D projects and a conservative estimate of expected future earnings.

## **5. Summary and Conclusion**

The two main accounting treatments are to either expense the R&D costs to the income statement or to capitalise R&D expenditure in the statement of financial position. In certain contexts, such as in the US, the accounting treatment is quite prescriptive with little or no room for management judgement. The required accounting treatment under US GAAP is to expense all R&D costs, as the standard-setter's claim there is no demonstrable relationship between R&D costs and specific future revenue. A considerable amount of research has been performed across the globe to provide evidence that a relationship does exist between R&D costs and specific future revenue. It is in the face of this mounting evidence that other standard-setters in the UK, Italy and France (pre-2005) and now

throughout Europe, under IFRS, not only allow for the capitalisation of R&D expenditure but also require it where the conditions for capitalisation are met. It is these conditions for capitalisation that have been the subject of much debate as they are largely of a subjective nature and require a certain amount of management discretion. Much of the debate has centred on the value-relevance of the amounts recognised in the financial statements as either an expense or an asset and whether or not management are inclined to use R&D expenditure as a tool to signal to the capital markets the future earnings potential of their companies.

The evidence suggests that, investors' perceive firms that expense their R&D costs negatively whereas those firms that capitalise their R&D expenditure tend to see a positive reaction to their stock prices. This positive correlation between the capitalisation of R&D expenditure and market responses is further enhanced in high-growth and high-technology firms. Larger firms also tended to benefit relatively more due to the perceived efficiencies and synergies. However, a fundamental problem that pervaded the findings was that although there was a positive correlation between the capitalisation of R&D costs and market responses, the estimation of the perceived benefits or forecast of future earnings fell short of the reality.

However, a recent study by Cazavan-Jeny *et al*, based on a sample of French listed companies, found evidence that capitalising R&D on the whole has a neutral or negative impact on future performance. These findings are in stark contrast to the evidence reviewed earlier which was in favour of assertion that capitalising R&D costs invariably leads to increases in market values.

These conflicting empirical findings mean that it is difficult to conclude the value relevance of accounting treatment to R&D expenditure despite in theory that capitalisation of the expenditure has signalling value of a good future. It is safe to say that more research is required to work out where the missing links are in both theory and practice.



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## Notes

<sup>1</sup> EU regulation is readily accessible from the following website

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002R1606:EN:NOT>

<sup>2</sup> The issue and publication of International Accounting Standards are the responsibility of the International Accounting Standards Board (IASB). The IASB is the independent standard-setting body of the International Financial Reporting Standards (IFRS) Foundation.

<sup>3</sup> International Accounting Standards Board (IASB), *IAS 38 (Revised) Intangible Assets*, (London, England: IFRS Foundation, 2004) <http://eifrs.ifrs.org/eifrs/bnstandards/en/2012/ias38.pdf>

<sup>4</sup> Statements of Standard Accounting Practice (SSAP's) were originally issued by the Accounting Standards Committee (ASC). These standards were later adopted by the Accounting Standards Board (ASB) who took over the responsibility of standard-setting in the UK in 1990 and issued Financial Reporting Standards (FRS's). Since July 2012, the Financial Reporting Council (FRC) has assumed responsibility for all accounting standards in issue in the UK. <http://www.frc.org.uk/Our-Work/Codes-Standards/Accounting-and-Reporting-Policy/Standards-in-Issue.aspx>

<sup>5</sup> F. Tsoligkas and I. Tsalavoutas, 'Value relevance of R&D in the UK after IFRS mandatory Implementation', *Applied Financial Economics*, 21, 2011, 957–967

<sup>6</sup> IASB, op. cit., p. A1035

<sup>7</sup> Institute of Chartered Accountants in England and Wales (ICAEW), *SSAP 13 (Revised) Accounting for Research and Development*, (England: Stephen Austin and Sons Limited, 1989).

<http://frc.org.uk/Our-Work/Publications/ASB/SSAP-13-Accounting-for-research-and-development/SSAP-13-Accounting-for-research-and-development.aspx>.

<sup>8</sup> *ibid.*, p. 2.

<sup>9</sup> Accounting Standards Board (ASB), *FRS 10 Goodwill and Intangible Assets*, (Milton Keynes, England: ASB Publications, 1997)

<sup>10</sup> *ibid.*, p. 12

<sup>11</sup> IASB, op. cit., p. A1036.

<sup>12</sup> ICAEW, op. cit., p. 2

<sup>13</sup> ICAEW, op. cit., p. 5

<sup>14</sup> B. Elliot and J. Elliot, *Financial Accounting and Reporting*, 15<sup>th</sup> ed., (Harlow, England: Pearson Education Ltd, 2012) p.493-497

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- <sup>15</sup> *ibid.*, p. 494
- <sup>16</sup> ICAEW, *op. cit.*, p. 6
- <sup>17</sup> IASB, *op. cit.*, p. A1039-40.
- <sup>18</sup> Tsoligkas and Tsalavoutas, *op. cit.*, p. 959
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- <sup>32</sup> E. Eccher, ‘Discussion of the value relevance of intangibles: The case of software capitalisation’ *Journal of Accounting Research* 36 (supplement): 193–198 (1998).
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- <sup>34</sup> G. Markarian, A. Prencipe and L. Pozza, ‘Earnings management in family firms: evidence from R&D cost capitalization in Italy’ *Family Business Review*, 21 (1): 71–8 (2008)
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