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Working Paper — Digitized Version

Dealing with innovation costs in financial accounting: An international comparison

Manuskripte aus den Instituten für Betriebswirtschaftslehre der Universität Kiel, No. 392

Provided in Cooperation with:

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Suggested Citation: Littkemann, Jörn (1996) : Dealing with innovation costs in financial accounting: An international comparison, Manuskripte aus den Instituten für Betriebswirtschaftslehre der Universität Kiel, No. 392, Universität Kiel, Institut für Betriebswirtschaftslehre, Kiel

This Version is available at:

<https://hdl.handle.net/10419/181068>

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Nr. 392

Jörn Littkemann

**Dealing with Innovation Costs
in Financial Accounting:
*An International Comparison***

Vortragsmanuskript

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Fifth International Conference on

MANAGEMENT OF

TECHNOLOGY

February 27 - March 1, 1996

University of Miami James L. Knight International Center

Miami, Florida USA

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DEALING WITH INNOVATION COSTS IN FINANCIAL ACCOUNTING

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ABSTRACT

A definition of innovation does not exist in the linguistic usage of financial accounting. This is because of the character of an innovation project, which represents a foreign body in the accounting area. Financial accounting is made for the current products, not for innovation projects, which have a high degree of complexity and extend over more than one accounting period. Innovative firms have a great decrease of profit especially in the early years, when they have incurred heavy launching costs and still nothing is sold. The decrease of the operating profits makes it difficult for an innovative firm to show its future business potential. On the other hand it is dangerous to report on the innovation project in the annual report, because the competing firm's attention will be drawn to the innovation. Based on a comparison of the commercial laws in the USA, United Kingdom and Germany, we check how innovation costs can be recorded in an asset account, not in an expense account. Afterwards, we analyze in case studies the possibilities of window dressing, how an innovative firm can prevent the fall of the operating profits in the early innovation years. In this context deferred charges are relevant.

DEALING WITH INNOVATION COSTS IN FINANCIAL ACCOUNTING

AN INTERNATIONAL COMPARISON

THE DIFFERING FOCUSES OF INNOVATION MANAGEMENT AND FINANCIAL ACCOUNTING IN DEALING WITH AN INNOVATION

Studying the German concise dictionaries of business administration, one observes that the keyword "innovation" occurs several times (41) in the concise dictionary of organization (see HWO (1992)), but is not mentioned in the concise dictionary of accounting (see HWR (1993)). This demonstrates that innovation management has great importance in organization theory, but not in accounting theory. Today, innovation management has developed into a self-standing discipline of organization theory without any tradition in accounting theory. Therefore, innovation management and financial accounting maintain differing focuses dealing with innovations.

An innovation is a new product or process that a firm begins to offer for sale or use in its own corporation for the first time (see Hauschildt (1993)). This could be, for example, the development of a new product, the development of market opportunities, a new manufacturing process or a process of computerization. The relevant point defining it as an innovation is the highly complex, non-routine task with which the firm is confronted. The innovation might include the whole corporation or only departments thereof. It is not necessary that R&D takes part, but the innovation usually requires some interdisciplinary cooperation. The firm must therefore use other management methods in dealing with the innovation than those used for routine tasks. Normally, the innovation is organized as a project outside of the formal organization structure.

The focus of innovation management is the innovation project itself. There exists, therefore, a detailed innovation account. Information concerning the innovation is distributed only within the internal corporation, in most cases directly to the top management. It is necessary to organize and to control the whole innovation project in order to make the right decisions, e.g. whether to abandon the project or not. The firm's relevant environment is usually only informed after the project has been finished.

The innovation is categorized as an investment inside the corporation. This is associated with high costs in the early periods, in the expectation of earning money or saving costs in the future (see Hauschildt (1992)). The project manager must consider the total costs and total revenues throughout the life cycle of the innovation, from the birth of the idea for the innovation until the innovation is introduced into market or within the corporation (see an innovation account example by Hauschildt (1994)). The life cycle of an innovation is not easy to estimate. It is long often many years. Innovation accounting deadlines depend upon technologically given milestones of variously lengthy periods. Moreover, innovation is very risky. It is more difficult to prognosticate innovation costs and revenues than those for existing products or processes. Finally, the measurement of innovation success is highly complex (see Hauschildt (1991)). It is not sufficient to evaluate costs and revenues for the project. It is also important in the measurement of innovation success to prove whether the goals of non economic data, e.g. goals of technology or of strategy, have been reached.

The focus of financial accounting is existing products, not unfinished innovation products or processes whose profits are uncertain. Therefore, an innovation account does not exist. Financial accounting is designed for the outside, not as an end in itself. Its reporting depends on accounting principles developed from the economic environment (see Chasteen/Flaherty/O'Connor (1992)). Without any such objective principles, the financial accounting information is not very useful for interested individuals, e.g. investors or creditors. In contrast, the innovation account is not determined by any rules from outside.

The data of an annual report illustrates what has happened in the past. Information pertaining to the future is given only in qualitative form. Profit and loss account is based on the current products, presenting the net income of the corporation. The profits of any individual departments or projects are unknown. One does not read whether a project is, or has been, successful or not. Usually, the accounting period is one year. Financial accounting depends on a calendar deadline supplied from the outside, not on a milestone derived from technological factors. Finally, financial accounting measures the corporation success only with economic methods like profit and loss account. It is not useful to measure the corporation success by means of other dimensions such as effects of technology or of strategy.

In summary, innovation management keeps a very detailed account of innovations, while financial accounting neglects such an account altogether (see table 1).

- insert table 1 here -

In the following chapter, we analyze the consequences of the absence of an innovation account in financial accounting.

	innovation management	financial accounting
object of accounting	innovation project	current products
scope of accounting	project group	divisions
users of accounting	inside the corporation	outside the corporation
dimensions of accounting	technological, strategic, economic	economic
data of accounting	uncertain	certain
deadline of accounting	technological milestone	end of the year
length of accounting period	different	one year

Tab 1: Differing focuses in the way of accounting between innovation management and financial accounting

EFFECTS OF INNOVATION COSTS BEHAVIOR ON ANNUAL REPORT

The fact that an innovation account does not exist in financial accounting causes problems with report on profit and loss in the annual report, especially in the initial accounting years. For our analysis, we examine a product innovation with high costs and revenues for a firm. We first look at cost and revenue behavior during the innovation's life cycle. Figure 1 shows the typical behavior of innovation costs and of revenues from the period of the idea's conception to the period of current utilization.

- insert figure 1 here -

From financial accounting's point of view the following points are relevant. In early periods the majority of the innovation costs must be paid, but no money is earned. In contrast, in the final periods the revenues are higher than the costs. The firm should thus count on a loss in the early periods and on a profit in the final periods.

When the innovation's life cycle is shorter than one year, innovation loss and profit are contained within one accounting period. The innovation success is balanced under the whole net income of the firm. But the innovation's life cycle is usually longer than one year. It often takes many years for an innovation to be developed and sold as a product on the market. In this case, the innovation success is spread over many accounting periods. This means that *ceteris paribus*, in the early accounting periods the net income of the innovative firm is too low, while in the final accounting periods it is too high. The high launching costs of the innovation cause the operating income to decrease in the initial accounting years, and the revenues from the innovation cause the operating income to increase in the last accounting years.

In contrast to innovation revenues behavior, innovation costs behavior leads to problems with reporting on the innovation in the annual report. Especially in those first accounting years, just

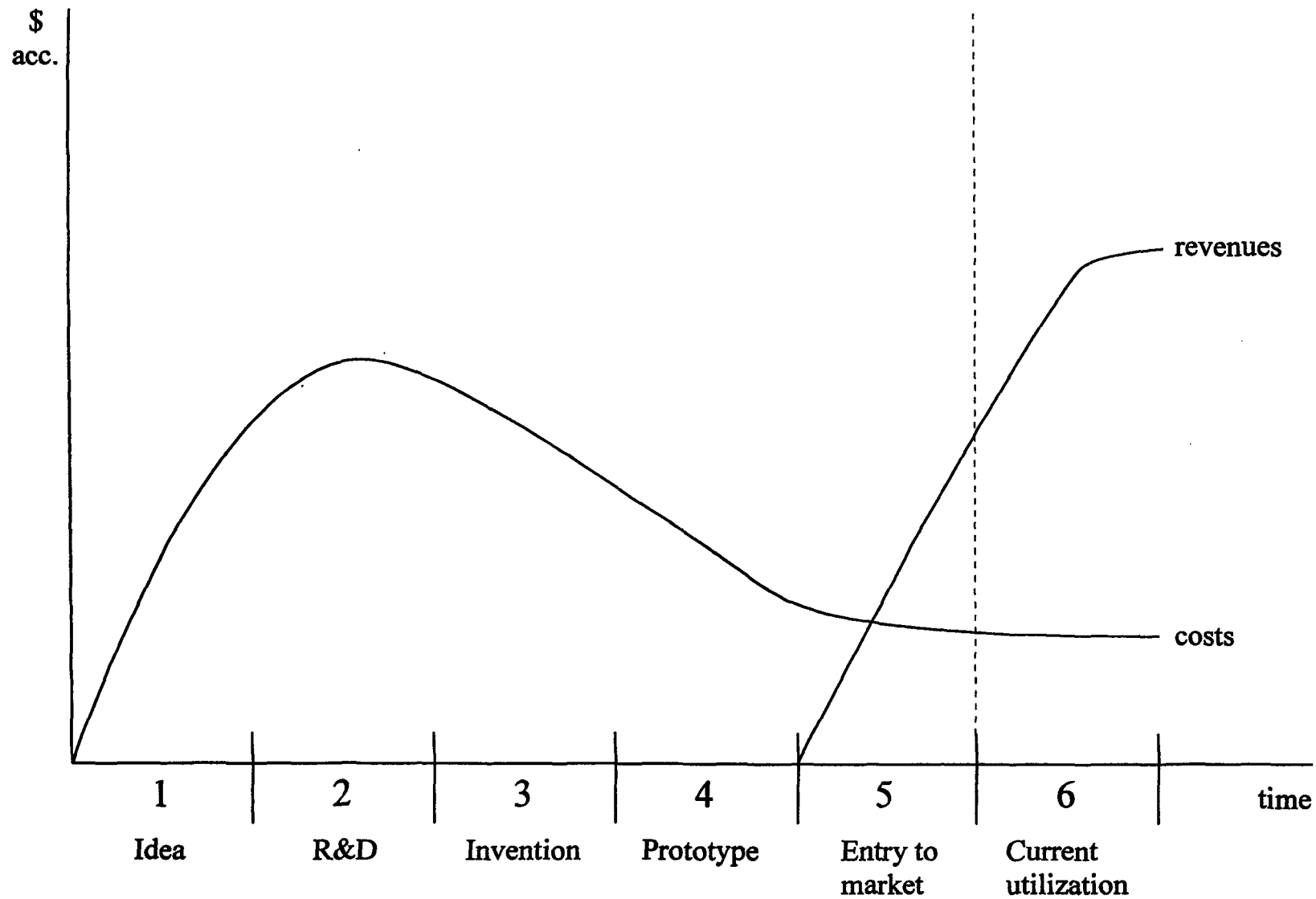


Fig. 1: Cost and revenue behavior of a product innovation during the innovation's life cycle, see Commes/Lienert (1983)

when the firm wants to show the future business potential of the innovation, operating profits will decrease. This situation could be disastrous for the firm, as an external analyst would evaluate the innovative firm as being less successful than the years before. Studying the income statement or the balance sheet, he would still remain unaware of the innovation's existence. The consequences might be that no creditors would be found or that the share price of the firm would decrease. In a worst case scenario, the firm would be forced to abandon the innovation project.

The alternative - reporting on the innovation in the text of the annual report - is a dangerous practice (see Brockhoff (1982)). The competing firm's attention will be drawn to the innovation. They might move to develop the innovation product more swiftly and be the first to introduce it onto the market. The innovative firm would then be unable to earn the substantial monopoly profits otherwise won during the initial period after entry to market.

In summary, we conclude that financial accounting is a barrier to innovative firms regarding the demonstration of an innovation's future business potential in the first accounting years. *Ceteris paribus*, the high launching costs cause the operating profits to decrease. External analysts would evaluate the firm as being less successful.

In the following chapter, we analyze regulations of the USA, the United Kingdom and Germany as to how an innovative firm must account for innovation costs.

THE ACCOUNTING OF INNOVATION COSTS: AN INTERNATIONAL COMPARISON

We must first explain what kinds of costs are to belong to innovation costs. All costs which depend on the innovation are defined as innovation costs. This may be anything from factories or plants purchased especially for the innovation to a pencil used by an engineer. Moreover, a certain amount of the normal fixed costs of the corporation is allocated to innovation costs.

With respect to an innovation's life cycle, only the costs incurred up to the beginning of the period of current utilization, as figure 1 shows, are defined as innovation costs. If the product or process innovation belongs to the period of current utilization, the innovation's life cycle is then finished. The product or process is established on the market or in the company. The innovation status has been lost. Costs and revenues are no longer treated as innovative. In individual case, a well constructed accounting system is necessary which can separate the innovative costs from routine task costs (see Veit (1994)).

In financial accounting two kinds of accounts are present in the annual reports of US and West European firms: the income statement and the balance sheet.

For our analysis, it is important to know in which account type the innovation costs are to be found. The innovation costs are either to be treated as assets in the balance sheet or as operating expenses in the income statement.

The advantage of dealing with the innovation costs in an asset account is that the profit of the innovative firm is decreased less than if they were treated as operating expenses in the initial accounting period of innovation. It is therefore reasonable that all tangible, noncurrent assets (with the exception of land) and numerous intangible, noncurrent assets must be depreciated over their useful lives (see Chasteen/Flaherty/O'Connor (1992)). The costs are spread over many accounting years. If assets are not depreciated or not written down, costs will not decrease the net income in any periods at all until these assets belong to the corporation. This means that the loss resulting from innovation costs is not only accounted for in the first accounting period but in

many following accounting periods. In contrast, dealing with the innovation costs in an expense account means that the costs cannot be depreciated, and the loss is accounted for in the initial accounting period of innovation. Consequently, we conclude that an innovative firm will prefer to handle innovation costs in an asset account.

The problem with these effects of innovation costs on financial accounting is that an innovative firm cannot always freely choose the way in which innovation costs are to be accounted for. In the USA and in West European countries, there exist many regulations to this end. The conditions under which a firm is to use the asset account, the expense account or can choose between the asset account and the expense account. For our analysis we consider the regulations of the USA (principles of FASB), the United Kingdom (principles of SSAP) and Germany (principles of HGB).

As mentioned in the first chapter, the keyword "innovation" does not exist in any regulations. Therefore, we examine the accounting of all costs which might be connected with an innovation. Table 2 explains the different regulations of our countries we analyzed, with respect to accounting for innovation costs. Column 1 presents the different kinds of innovation costs, columns 2 through 4 present information regarding whether the firm must use the asset account, the expense account or can choose between both for different kinds of innovation costs.

- insert table 2 here -

The list of innovation costs in table 2 does not claim to be complete, but we believe that the majority of the typical innovation costs are named. In our results, we find that the regulations of the countries analyzed do not differ greatly from one another. Property, plants, equipment and capital investments must all be accounted as assets. The same goes for intangible innovation costs such as patents, copyrights, trademarks and franchises, as well as can possibly be judged.

innovation costs	United States	United Kingdom	Germany
land	○	○	○
buildings	○	○	○
machinery	○	○	○
equipment	○	○	○
inventories	○	○	○
capital investment	○	○	○
patents			
- aquired	○	○	○
- created	●	○	●
copyrights			
- aquired	○	○	○
- created	●	○	●
trademarks			
- aquired	○	○	○
- created	●	○	●
franchises			
- aquired	○	○	○
- created	●	○	●
good will			
- aquired	○	●	●
- created	●	●	●
preliminary costs	●	●	●
organization costs	●	●	●
research costs	●	●	●
development costs	●	●	●
capital lease	○	○	○
operating lease	●	●	●
publicity costs	●	●	●

- Asset account
 ● Expense account
 ● Asset account or expense account

Table 2: Innovation costs accounting in the United States, the United Kingdom and Germany, see Küting/Weber (1994)

For those costs which are self-created by the corporation it is allowed, in the USA, to use the expense account, while in Germany it is forbidden to use the asset account. The expense account is prescribed for many of the innovation costs mentioned at the end of table 2.

At first it might seem that financial accounting would not be a barrier to innovation. But, keeping figure 1 in mind, remember that the majority of innovation costs are incurred in the period of research and development. Typical R&D costs include materials, labor, contract services etc. For these costs, the asset account is off limits: they must be expensed, as they are incurred as R&D costs. An exception in the account development costs area is found in the United Kingdom's regulations. There, development costs may be handled in an asset account under specific circumstances, e.g. when they are incurred by a clearly defined project and are separately identifiable (see Coopers & Lybrand (1993)). But this advantage in the United Kingdom is reduced by the further regulation that, in contrast to the other countries analyzed, organization costs must be expensed (see Samuels/Brayshaw/Craner (1995)).

In summary, the regulations of the United States, the United Kingdom and Germany regarding the handling of innovations costs in financial accounting are similar. Many types of costs can, in fact, be capitalized, but the relevant costs with a high share of the total innovation costs, such as R&D costs, must be expensed. A corporation which initiates an innovation must reckon with losses in the first accounting period. The losses depend on the kind of innovation costs. A product innovation incurs different sorts of costs than a process innovation.

In the following chapter, we demonstrate the effects of the accounting of the various innovation costs on the corporation's whole net income decrease.

EFFECTS OF THE ACCOUNTING OF INNOVATION COSTS ON NET INCOME DECREASE

The effect that innovation costs have on net income decrease depends on how the costs are dealt with, in an asset account or in an expense account. It is clear that use of expense account means that total innovation costs cause the net income decrease by precisely that amount. In an asset account the effects are significantly more difficult to describe. Whether the innovation asset is noncurrent or current, whether it has a limited or an unlimited useful life, and whether it belongs under capital investments or not: all of these issues must be settled. Moreover, the possibilities for depreciation or write down have an influence on net income decrease. The asset account spreads the innovation costs over more than one accounting period.

Figure 2 shows a model under the conditions of which innovation costs are channeled to an asset account or an expense account. This model can be used by corporations in the United States, the United Kingdom and Germany. Various differing regulations in these countries, e.g. the use of depreciation methods or the estimation of the useful life have no influence on the model sequences and its results.

- insert figure 2 here -

This model presents one option as an expense account but five options as asset accounts. The effect on net income decrease is read in the options. Asset account no. 1 does not expense innovation costs, nos. 2, 3 and 4 expense certain shares of innovation costs as depreciation or write down. Asset account no. 5 chooses between write down and no costs being expensed.

To illustrate the model's sequences we give an example. A German corporation wants to develop a new product. At the first accounting deadline after starting the innovation process the following

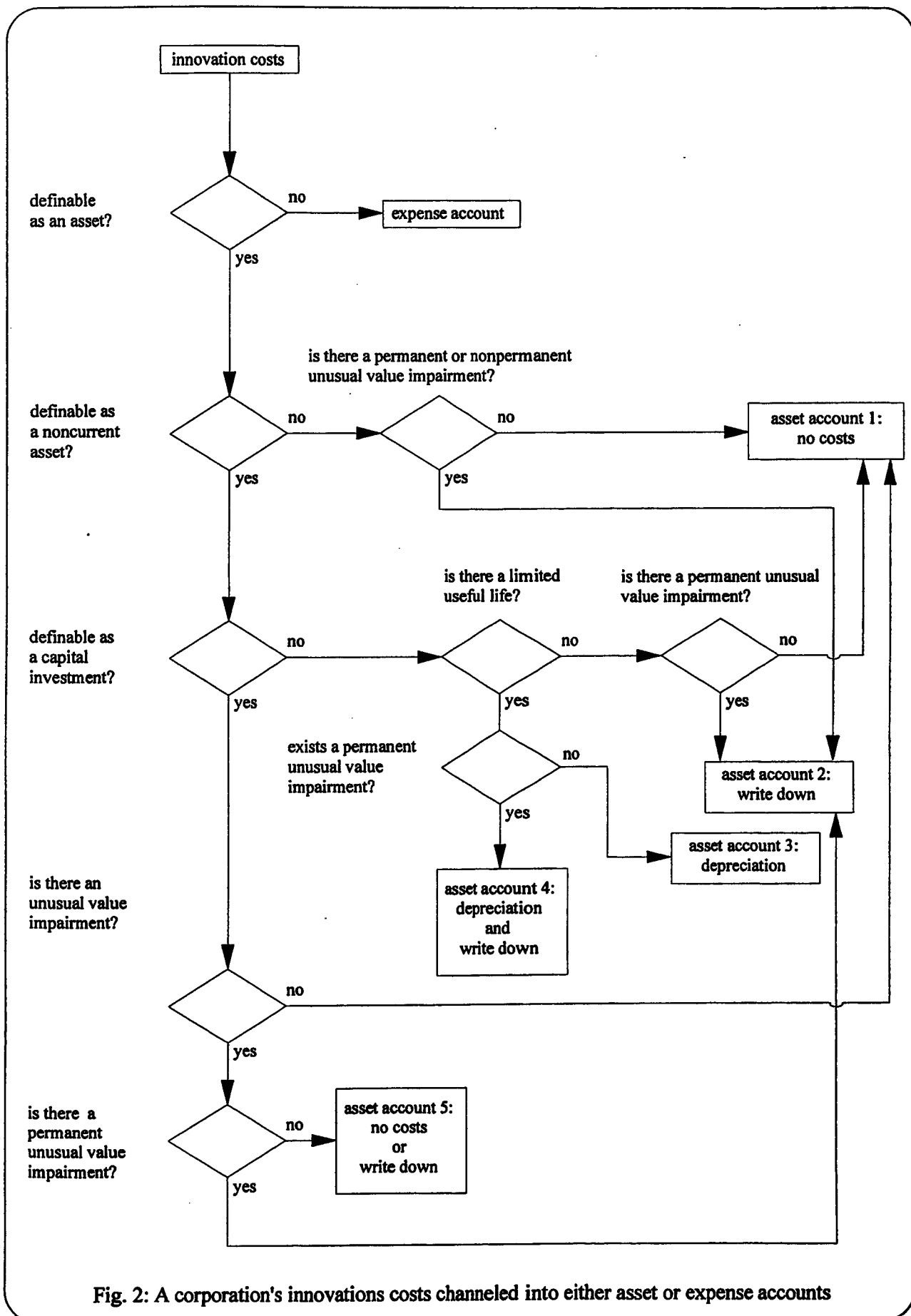


Fig. 2: A corporation's innovations costs channeled into either asset or expense accounts

costs have been incurred: acquisition of new machinery, purchase of unused raw materials, a self-created patent, purchase of a security from another firm and development costs.

(1) Acquisition of new machinery

The new machinery is defined as a tangible, noncurrent asset with a limited useful life. These assets must be depreciated over their useful lives. The depreciation depends on calculation of the historical costs, estimation of the useful life and use of a depreciation method. Moreover, one must determine whether a permanent unusual value impairment exists not recorded by the regular depreciation like an extraordinary damage. If there is a permanent impairment of value, the firm must write down the machinery over and above this usual depreciation to its recoverable value (asset account no. 4). When there is no permanent impairment of value, the machinery depreciates in the regular way (asset account no. 3).

(2) Purchase of unused raw materials

Raw materials that are not used during the accounting period are current assets. For current assets the normal depreciation is not allowed. If there is a permanent unusual value impairment, the firm must write down. In contrast to the regulations concerning noncurrent assets, the firm must even write down if an unusual nonpermanent value impairment exists. The write down will decrease the net income by the same amount (asset account no. 2). If there is no impairment of value, no costs are incurred (asset account no. 1).

(3) Self-created patent

In Germany, self-created patents that will be used over more than one accounting period are not definable as assets. These costs must be expensed.

(4) Purchase of a security from another firm

One must first determine whether a capital investment is a current or a noncurrent asset. In this case, the purchase of a security from another firm is applied to strategic goals. The German corporation takes part in the firm because this firm is involved in the process of developing the new product. This means that the purchased security should belong to the German corporation longer than one year or the operating cycle. The security is therefore a noncurrent capital asset that may not be depreciated. In contrast to the other noncurrent assets, if an unusual nonpermanent value impairment exists (asset account no. 5) it may be written down. If a value impairment is permanent, it must write down as in the cases of the other assets (asset account no. 2).

(5) Development costs

Development costs may not be capitalized. They must be expensed.

In keeping with our assumption that a firm wishes to proclaim its future business potential, it would be better to use the asset account without any depreciation or write down. This depends, however, on the types of innovation costs and the firm's regulations in financial accounting principles.

Nevertheless, with the help of the model seen in figure 2, an innovative firm can check the consequences that accounting innovation costs will have for the net income.

To choose between alternatives that exert influence on the amount of net income is known as window dressing.

In the following chapter, we discuss the use of window dressing and its effects on the income statement and on the balance sheet. This will be demonstrated with incurred organization costs.

ORGANIZATION COSTS IN AN ASSET ACCOUNT

Organization costs are all costs connected with start-up or expansion activities (see Commandeur (1990)). If these activities are being carried out in the corporation for the first time, it is treated as an innovation. In Germany, many regulations create possibilities for window dressing (see Littkemann (1994)):

- For organization costs, a firm can choose between the asset account or the expense account.
- For the same type of organization costs spanning all accounting periods, a firm can choose between the asset account and the expense account. In this case, there is no principle of continuity.
- In the consolidated annual accounts, a firm can use another means of accounting organization costs than in the individual annual accounts of the consolidated corporations.
- The types of costs that belong under organization costs is not defined. In some cases a firm has a wide range in which to determine what costs should be treated as organization costs.
- With respect to identical types of organization costs, a firm may handle one part of costs in an asset account and the other part of costs in an expense account.
- If organization costs are handled in an asset account, they must be depreciated. In each of the subsequent accounting periods the depreciation must be at least 25% of total costs.

We now offer an example of how an innovative firm can prevent the decrease in net income in the initial accounting period by treating organization costs as part of innovation costs in an asset account.

A German corporation develops market opportunities. Many of the innovation costs incurred are organization costs. The total organization costs able to be separately identified by the accounting system amounted to 8 million DM (8 MDM) in the first accounting period. The corporation wishes to proclaim a maximum of net income in the annual report. It must therefore use the asset

account for the total organization costs. To measure the effect on net income, tables 3 and 4 show the difference between asset accounting and expense accounting for organization costs in the income statement and the balance sheet.

- insert table 3 here -

- insert table 4 here -

The accounting of organization costs as assets is thus recorded at the end of the accounting period:

Deferred charges	MDM 8
Other gains	MDM 8

If organization costs are handled in an asset account, accrued liabilities for income taxes must undergo the accounting process (for the prevailing opinion see ADS § 269 HGB (1987); for a differing opinion see Veit (1986)). In the case of our example, accrued long-term liability for income taxes amounted to 4 MDM, and must be thus recorded at the end of the accounting period:

Income taxes	MDM 4
Long-term liability	MDM 4

Studying the two tables we find that the net income when organization costs are handled in an asset account (column B) amounts to 4 MDM more than when organization costs are handled in an expense account (column A). It is thus reasonable to say that the other gains in the income statement amount to 8 MDM higher. This advantage is lessened to the point where income taxes

INCOME STATEMENT
(in millions of DM)

	A	B
Revenues and gains		
Net sales	366	366
Interest	2	2
Gain on sale of equipment	5	5
Other gains	<u>8</u>	<u>16</u>
Total revenues and gains	381	389
Expenses and losses		
Costs of goods sold	206	206
Sales and administration	96	96
Depreciation	5	5
Other operative losses	36	36
Interest	4	4
Income taxes	<u>17</u>	<u>21</u>
Total expenses and losses	<u>(364)</u>	<u>(368)</u>
Net income	<u>17</u>	<u>21</u>

A: Organization costs in an expense account

B: Organization costs in an asset account

Table 3: Income statement with organisatoin costs accounts

BALANCE SHEET
(in millions of DM)

<u>Assets</u>	A	B
Current assets		
Cash	58	58
Accounts receivable	77	77
Inventories	61	61
Prepaid expenses	<u>1</u>	<u>1</u>
Total current assets	197	197
Noncurrent assets		
Investments	7	7
Property, plants and equipment	50	50
Intangible assets	1	1
Deferred charges	<u>-</u>	<u>8</u>
Total assets	<u>255</u>	<u>263</u>
<u>Liabilities and owners' equity</u>		
Current liabilities	42	42
Long-term liabilities	<u>52</u>	<u>56</u>
Total liabilities	94	98
Owners' equity		
Contributed capital	144	144
Retained earnings	<u>17</u>	<u>21</u>
Total liabilities and owners' equity	<u>255</u>	<u>263</u>

A: Organization costs in an expense account

B: Organization costs in an asset account

Table 4: Balance sheet with organisation costs accounts

get 4 MDM higher. In the balance sheet the deferred charges and the long-term liabilities increase to equivalent sums.

This example illustrates the way in which net income may be influenced by means of window dressing. Using the asset account here for organization costs increases the net income 24%. This is very significant because the amount of organization costs has only a 3% share in the total assets.

We conclude that handling organization costs in an asset account prevents a discernable decrease in the net income of a firm: an innovation exists, but external users of accounting information are unable to detect this innovation. But this has an disadvantage. This method of window dressing - handling organization costs in an asset account - is often used by firms that are experiencing problems with business (see Littkemann (1994)). By means of window dressing they hope conceal losses in the net income. In such a case, an external analyst might well view the innovative firm as a crisis firm.

CONCLUSIONS

An innovative firm must become aware of the fact that financial accounting has a different focus in dealing with an innovation. Because of this, innovation costs are applied to the net income in the early accounting periods, since the innovation is not yet earning money. *Ceteris paribus*, the net income presented in the annual report will decrease. An external analyst would evaluate the innovative firm as being less successful than in the previous years. To report on the innovation in the text of the annual report is dangerous, as the competing firm's attention is then drawn to the innovation. The innovative firm must therefore study the principles of financial accounting very precisely in order to find possibilities for window dressing. An international comparison between principles in the United States, the United Kingdom and Germany shows that regulations for the accounting of innovation costs do not differ much from each other. To prevent net income decrease in the first accounting years the firm should handle the innovation costs in an asset account, not in an expense account.

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