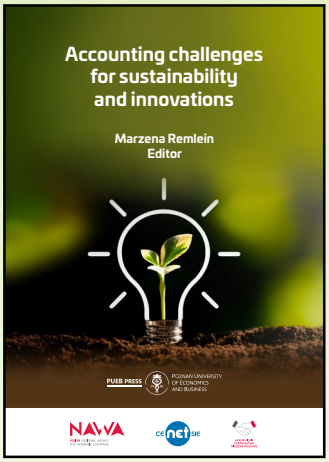

Accounting challenges for sustainability and innovations

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Editor

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9.

COSTS OF RESEARCH AND DEVELOPMENT

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Abstract: Year by year, research and development works constitute an increasingly important element of the functioning of enterprises. Appropriate recording of expenditure and settlement of their effects requires (above all) determination of the actual stage of works. Consequently, there is a distinction between research and development works. Another aspect that determines the principles of recognizing expenditure in the accounting books is to determine whether the developed product/technology belongs to the area economically developed by the unit or to the unrecognized area. The adequate determination will help to place expenses either in the sphere of activity and basic unit or in the sphere of other operating activity. Financial reporting for intangible assets is perhaps one of the most difficult and most controversial topics of financial reporting. In this article it is compared three concepts of financial reporting for R&D costs: IFRS approach, Czech approach for non-profit organizations and Czech approach for profit organizations.

Keywords: costs, costs of development works, cost of research and development, cost of research works, CZ GAAP, financial reporting, IFRS, R&D.

9.1. Reasons for the development of R&D activities

The social and technical changes over the last decades have had an impact on the change of the economic environment. In particular, the progressing globalization process and shortening of the supply chains has caused the necessity to reorganize the work of many business units. In order to remain competitive on the market, enterprises cannot be limited only to the optimization of the production process, but also look for competitive advantages in new products and services. The main sources of activation in terms of R&D activities are presented in Figure 9.1.

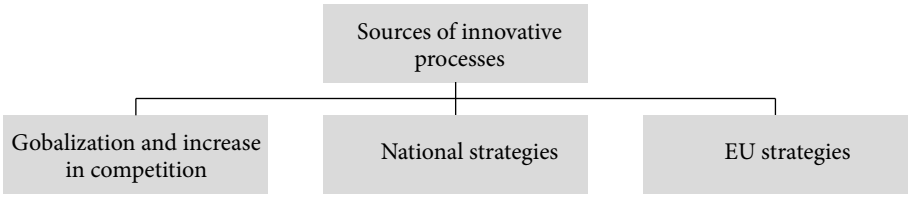

Figure 9.1. Sources of innovative processes in an enterprise.

Source: Own study.

As shown above, stimulating factors can be divided into internal and external factors. The internal stream is the product of the business strategy adopted within the unit (based on the development of new products and technologies). A business entity that wants to increase its competitive advantages looks for either process optimization or new markets. Research and development works, being a response to the internal needs concerning the realization of increases, occur naturally. An individual, who encounters a problem in the real business, looks for new solutions with the use of technological and market knowledge.

Externally stimulated R&D activities may be different. The aforementioned globalization processes cause not only the opening of new sales markets, but also a drain of resources. In particular, European and American companies face the problem in the field of achieving competitive cost levels for their activities in relation to developing countries. Wage pressures and unfavourable demographic trends are connected with the need to look for other answers. This trend was also noticed by legislators. Therefore, many programs have been created in order to support the initiation of research and development initiatives. These activities have national nature (implemented by individual countries), as well as international nature (the aim of the adopted aid system is to stimulate pro-development activities in units). An illustration of the above-mentioned trend may be the change in the value of projects co-financed by the NCBR[1]—i.e. a dedicated entity to support the innovativeness of Polish enterprises.

[1] Narodowe Centrum Badań i Rozwoju—National Centre for Research and Development.

Table 9.1. R&D projects in 2014–2018 years in Poland

Category	2014	2015	2016	2017	2018
Number of programs	46	53	81	64	61
Amount in the NCBR's budget	5318 million PLN	5805 million PLN	3 billion PLN	7.9 billion PLN	6.8 billion PLN
Value of signed contracts	2.6 billion PLN	3.5 billion PLN	5.6 billion PLN	7.67 billion PLN	6.57 billion PLN

Source: (The National Centre for Research and Development, 2015–2019a).

The data in Table 9.1 show a high level of interest in undertaking activities in the research area by Polish enterprises. Therefore, there is a growing interest in recognition of settlements in the field of innovative projects in the accounting system.

9.2. Types of research conducted in the enterprise

Regardless of the source that stimulates the undertaking of innovative works, units can conduct various types of research.[2] Appropriate recognition of their nature is essential due to significant differences in recognition in the accounting system.

Individual types of research have been discussed in detail in various types of regulations in the scope of conducting research and development activities. In the case of Polish enterprises, provisions included in the following tree documents should be presented:

- the Act of 30 April 2010 on the principles for the financing of science,
- IAS 38. Intangible assets,
- NCRD 2020. Levels of technological readiness.

Consequently, two main types of research should be identified:

- research works,
- development works.

When analysing the regulations, it should be noted that research in entities is subject to significant division. This was presented in Figure 9.2.

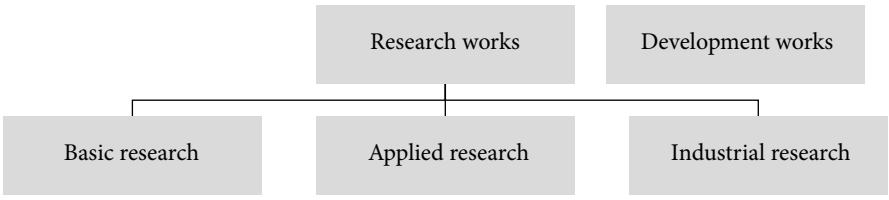

Figure 9.2. Division of research and development works

Source: (Act of 30 April 2010).

[2] This will be discussed in the next points.

Elementary activities in research works include basic research, which includes original experimental or theoretical research undertaken (primarily) in order to gain new knowledge about the foundations of phenomena and observable facts without any direct commercial use (Act of 30 April 2010).

The second group includes applied research, undertaken in order to acquire new knowledge. They are primarily oriented on practical use (Act of 30 April 2010).

From the point of view of enterprises, industrial research is important. They are aimed to acquire new knowledge and skills in order to develop new products, processes and services or make significant improvements to existing products, processes and services. The research includes the creation of components of complex systems, the construction of prototypes in a laboratory environment and in an environment that stimulates existing systems, especially to evaluate the suitability of given types of technologies, as well as to build pilot lines (necessary for these tests) and obtain evidence in the case of generic technologies (Act of 30 April 2010).

According to international regulations, examples of research works are (IAS, 2020):

- activities aimed at acquiring new knowledge,
- searching, evaluation and final selection of methods for the use of results from research works or other types of knowledge,
- searching for alternative materials, devices, products, processes, systems or services,
- formulation, design, estimation and final selection of new or improved materials, devices, products, processes, systems or services.

As presented, the second main type of innovative works observed in enterprises includes development works.

Development works are understood as the acquisition, combination, shaping and use of currently available knowledge and skills in the field of science, technology and business, as well as other knowledge and skills for the planning of production, creation and design of new, changed or improved products, processes and services, excluding works involving routine and periodic changes to products, production lines, manufacturing processes, existing services or other operations in progress—even if such changes strive to introduce improvements (Act of 30 April 2010).

In particular, development works include (Act of 30 April 2010):

- preparation of prototypes and pilot projects, as well as demonstrations, testing and validation of new or improved products, processes or services in the environment constituting a model of the conditions of actual functioning, the main goal of which is further technical improvement of products, processes or services, the final shape of which has not been determined;
- preparation of prototypes and pilot projects that can be used for commercial purposes—when the prototype or pilot project is a finished product (ready for commercial use) and its production solely for demonstration and validation purposes is too costly.

Examples of activities undertaken within the framework of development works according to IAS (IAS, 2020):

- design, production and testing of prototypes and experimental models (before their implementation into serial production or use),
- design of tools, processing devices, moulds and dies with the use of a new technology,
- design, production and operation of a pilot line, the size of which does not enable to run an economically reasonable production intended for sale,
- design, production and testing of selected solutions in the field of new or improved materials, devices, products, processes, systems or services.

9.3. Technology advancement phases

The occurrence of two types of works characterized by an innovative nature is caused by the structure of the research and development process. A unit, which wants to develop and implement a new product or technology, should move from the stage of initial concept development to testing of the adopted solutions. Therefore, the types of research presented in the previous section can be entered into the technology advancement phases by dividing them into the following areas (NCRD, 2020):

- research works (levels from I to VI),
- development works (levels from VII to IX).

The characteristics of individual phases are presented in Table 9.2.

Table 9.2. Phases of technology's development

Area of works	Technology readiness phase	Characteristics of a phase
Research works	Level I	Basic principles of a certain phenomenon were observed and described. The lowest level of technology readiness means the commencement of scientific research in order to use the research's results in future application. The research includes (*inter alia*) research on the basic properties of technology.
	Level II	The concept of the technology or its future application was defined. This means the beginning of the process of searching for the potential application of the technology. From the moment of observing the basic principles describing the new technology, its practical application can be postulated (it is based on predictions). There is no evidence or a detailed analysis supporting the assumptions yet.
	Level III	Critical functions or concepts of the technology have been confirmed (analytically and experimentally). This means the performance of analytical and laboratory tests aimed at confirming the predictions of scientific research for selected elements of the technology. The research includes components that are not (yet) fully integrated or not representative for the entire technology.

Area of works	Technology readiness phase	Characteristics of a phase
Research works	Level IV	Components of the technology or its basic subsystems were verified in laboratory conditions. This process means that basic components of the technology have been integrated. They include "ad hoc" models integrated in the laboratory. An overall image of the target system was obtained in laboratory conditions.
	Level V	Components or basic subsystems of the technology were verified in an environment similar to a real one. The basic components of the technology are integrated with real supporting elements. The technology can be tested under simulated operating conditions.
	Level VI	A prototype or a model of the system or technology was demonstrated in conditions similar to real conditions. This means that a representative mode or a prototype of the system, which is much more advanced than the system examined at level V, was tested under conditions similar to real ones. Tests at this level include tests of a prototype in laboratory conditions that reproduce the real conditions with high accuracy or under simulated operating conditions.
Development works	Level VII	The technology's prototype was demonstrated in operational conditions. The prototype is almost at the operating system level. This level represents a significant advance compared to level VI and it requires demonstration that the technology (under development) is applicable under operational conditions. The tests at this level include examinations of prototypes on the so-called research platforms.
	Level VIII	Research and demonstration of the final form of the technology have been completed. This means that it was confirmed that the target level of the technology has been achieved and the technology can be used in the determined conditions. Practically, this level represents the end of the demonstration. Examples include tests and evaluation of systems in order to confirm the fulfilment of design assumptions, including assumptions concerning logistical security and training.
	Level IX	Inspection of the technology in real conditions brought the desired effect. This indicates that the demonstrated technology is already in its final form and it can be implemented in the target system. This concern, among others, the use of the developed systems in real conditions.

Source: Levels of technological readiness (NCRD, 2020).

Example 9.1. Phases of technology

The Alfa unit produces insulations for pipes. The R&D department observed that modification of the foam composition changes its flammable properties. A decision concerning the performance of research and development works was made.

Solution:

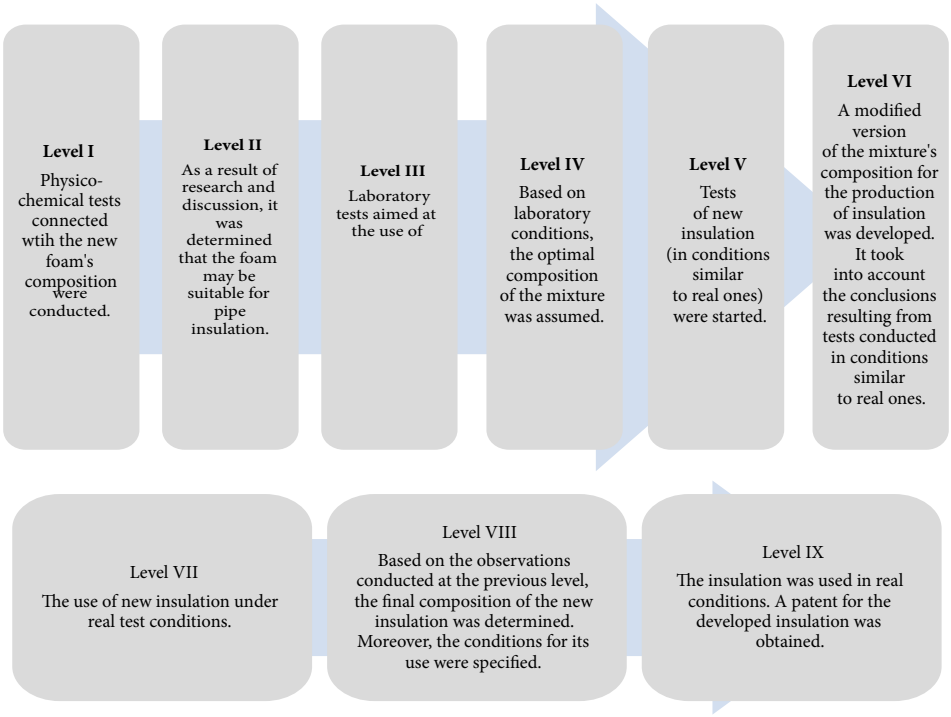

Figure 9.3. Phases of technology—example 9.1

Source: Own study.

9.4. Register of research and development works in the accounting system

The appropriate identification of the current technology readiness phase, and determination of the area of works (research od and development) will have a direct impact on the principles of recording expenditure in the accounting system. Detailed solutions in the field of presenting the effects of the concept of innovative works result from the provisions of the Accounting Act, and especially from the provisions of Article 3 section 1 point 14, Article 33 section 2 and Article 33 section 3.

The final form of the register will depend on two elements:

- the degree of connection of works with the unit's activity (operating activities or other operating activities),

- nature of the final result—success of implementation, creating a component of intangible assets.

Referring to the areas of conducted works and the above-mentioned conditions, it can be stated that research works may be carried out in the area, which is developed or underdeveloped by a unit. Furthermore, the initial nature of research works causes that they do not result in the creation of an intangible assets. Therefore, at the stage of conducting research works, the register of costs[3] will be distinguished according to the sphere of activity related to works. From the point of view of the unit's activity, research works may include:

- developed area,
- underdeveloped area.

In the first case, the unit conducts research works in the sphere of its current economic activity. In practice, these activities are usually connected with the preparation of a new version of the already offered product or a product that replaces the product located in the company's portfolio. Activities in the identified area also include the development of a concept for a product's replacement that was offered for sale, but the unit was not its manufacturer.

In the case of conducting research in the identified area, the register of expenditure should be kept with the use of operating cost accounts, i.e. accounts of "4" generic and "5" functional-calculation groups.

In the case of using the double system of costs, the register is kept as in Table 9.3.

Table 9.3. Register of research expenditure in the identified area

Description	Debit account	Credit account
Incurring of a cost	Cost accounts (group 4)	Accounts of various groups, e.g. 1,2,3
Parallel entry (taking into account double registration)	Cost accounts (group 5)	490 – settlement of costs

Source: Own study.

Example 9.2. Research works (1)

Unit A (in order to expand its current activity) started a research project. Within the framework of conducted activities, it incurred the costs of employee remuneration related to the preparation of the concept of a new technology at the earliest stage of research. The unit has a R&D department.

In which account should the expenditure be recorded?

[3] In the further part of the study, an abbreviation that identifies costs with inputs was used.

Solution:

Due to the fact that the unit conducts research within the developed area, the records should be carried out as presented in the table.

Description	Debit account	Credit account
Calculation of payroll	404 – remuneration	230-1 – settlements for remuneration
Parallel record	505-a-b – RD costs, a: research project No. 1 b: remuneration	490 – settlement of costs by type

The second of the above-mentioned cases is to taken actions in an unrecognized area. If the research activities are conducted in an undeveloped area, it means that the unit has no experience in this part of the market and activities cannot be included in the basic activity. Consequently, the expenditure incurred by the unit should be included in the accounts of other operating costs—i.e. accounts of group "7".

Table 9.4. Records of research expenditure in an unidentified area

Description	Debit account	Credit account
Incurring a cost	Account of other operating costs of group 7	Accounts of various groups, e.g. 1,2,3

Source: Own study.

Example 9.3. Research works (2)

Unit B (in order to diversify its activity) started a research project. Within the framework of conducted activities, it incurred costs of employee remuneration related to the development of the concept of a new technology at the earliest stage of research. The unit does not have an R&D department.

In which accounts should be expenditure be recorded?

Solution:

Due to the fact that the unit conducts research within the undeveloped area, the records should be carried out as presented in the table.

Description	Debit account	Credit account
Calculation of payroll	765-a – other operating costs of research projects, a: remuneration	230 – settlements for remuneration

From the point of view of an individual, it becomes more problematic to record expenditure in further phrases of innovative works, covering the area of development works. Like in the case of research works, development works can be conducted in the area developed or underdeveloped by the unit. Furthermore, unlike research works, development works may result in the creation of a new intangible asset. In other words, in this case, the selection of the recording method will depend not only on the sphere of the company's activity, within which the research is carried out, but also on the results of this research.

At this point, the achievable result of the research activities should be defined. Within the framework of the accounting system (Act of 29 April 1994), costs of completed development works may be recognized. They constitute the effect of completed development works carried out by the unit for its own needs (incurred before the beginning of production or applying the technology). These costs can be included in intangible assets if:

- product or manufacturing technology is strictly defined, and development costs relating to them are reliably determined.
- technical suitability of the product or technology has been established and properly documented, and the unit (on this basis) has decided to manufacture these products or use the technology.
- R&D costs will be covered—in relation to expectations—with revenues from the sale of these products or use of the technology.

Due to the assumed effect in the form of an asset, the expenditure incurred as a part of development works cannot be recognized (when incurred) as period costs. Records (corresponding to the accruals principle) are carried out with the use of active accruals, i.e. on the basis of accounts of group 6.

The scheme of incurring expenses within the framework of development works is presented in Table 9.5.

Table 9.5. Records of expenditures related to development works in the identified area

Description	Debit account	Credit account
Incurring the cost of development works	Cost accounts (group 4)	Accounts of various groups, e.g. 1,2,3
Parallel record connected with the suspension of the cost	Group 6 account – prepayments	490 – settlement of costs

Source: Own study.

Example 9.4. Development works

The unit C conducts research related to the new production technology of its products. The anticipated effect is a new technological line. The unit completed the stage

of conceptual and research works, and it started the phase of development works. The enterprise purchased materials, which are necessary to create a prototype.

In which accounts should expenditure be recorded?

Solution:

Due to the fact that the unit conducts research within the developed area, the records should be carried out as presented in the table.

Description	Debit account	Credit account
Purchase and consumption of materials	401 – consumption of materials and energy	202 – settlements with suppliers
Parallel record connected with the suspension of the cost	640 – prepayments	490 – settlement of costs

Example 9.5. Development works

The unit D conducts research related to the new production technology of its products. The unit completed the stages of research and development works. Finally, the conducted research did not allow the achievement of the assumed goals and did not contribute to the creation of the new technology. The unit proceeded to settle the suspended costs. The enterprise has a R&D department.

In which accounts should expenditure be recorded?

Solution:

Due to the fact that the unit conducts research within the underdeveloped area, the records should be carried out as presented in the table.

Description	Debit account	Credit account
Settlement of the completion of works	505-a – costs of the R&D department a: various costs by type	640 – prepayments

Further proceedings of the accounting services depend on the result of the conducted research and (possibly) the sphere of activity, within which the research is conducted.

In the event of a positive realization of the research, i.e. the creation of a new asset, the register is connected with the transferring accumulated outlays from accruals to intangible assets balace sheet category. However, it should be remembered that simple accounting on the accounts of the group 6 (accruals) and group 0 (intangible assets) will disturb the circle of costs in the enterprise. Therefore, the records (related to the acceptance of costs of completed development works) should

be connected with a parallel recognition of internal turnover and costs of internal turnover (accounts of the group 7). Thanks to this accounting, it will be possible to maintain the compliance between the records of costs incurred in a given period and costs connected with a certain period.

Table 9.6. Record concerning the completion of development works

Description	Debit account	Credit account
Completion of works	Account (group 02) – intangible assets	Account (group 6) – prepayments
Parallel entry that enables to close the circle of costs	Costs of internal turnover	Internal turnover

Source: Own study.

In other words, the records of costs regarding development works, taking into account their settlement at the time of completion of these works, may be associated with the occurrence of costs (on the balance sheet date) suspended on the account of prepayments. In such a case, these costs should be differentiated in terms of the estimated time for the completion of development works. Costs related to works, the completion of which is expected in a period longer than 12 months, should be presented in the part of the balance sheet concerning the non-current assets. Other costs are recognized as short-term prepayments.

Example 9.6. Development works

The unit E conducts research connected with the new production technology of its products. The unit completed the stages of research and development works. Finally, the conducted research did not allow the achievement of the assumed goals and did not contribute to the creation of the new technology. The unit proceeded to settle the suspended costs. The works concerned a new area of the enterprise's activity.

In which accounts should the utilization of expenditure be recorded?

Solution:

Description	Debit account	Credit account
Settlement concerning the completion of works	764-a – other operating costs of research projects a: various costs by type	640 – prepayments
Parallel record	791 – costs of internal turnover	790 – internal turnover

Example 9.7. Development works

The unit F conducts research connected with the new production technology of its products. The unit completed the stages of research and development works. Finally, the conducted research did not allow the achievement of the assumed goals and did not contribute to the creation of the new technology. The unit proceeded to settle the suspended costs. The works concerned a new area of the enterprise's activity.

In which accounts should adoption of the technology be recorded?

Solution:

Description	Debit account	Credit account
Settlement concerning the completion of works	764-a – other operating costs of research projects a: various costs by type	640 – prepayments
Parallel record	791 – costs of internal turnover	790 – internal turnover

9.5. International harmonization of financial reporting for R&D

There used to be three major sources of harmonization of financial reporting: accounting standards adopted by the U.S. Securities and Exchange Commission (also known as US GAAP), International Financial Reporting Standards (IFRS, formerly known as International Accounting Standards) and regulations of the European Union. Since the European Union decided to adopt IFRS as its main tool for regulating financial reporting of entities whose securities are traded at the European capital markets, only the first two sources of harmonization remain. In this chapter we focus on International Financial Reporting Standards as these are mandatory for financial reporting of European entities whose securities are listed on any of EU's capital market. Moreover, IFRS are very often used as a paragon for member states such as Poland or the Czech Republic when formulating their national regulation of financial accounting and reporting. The perspective of IFRS is supplemented by the accounting treatment prescribed by Czech accounting regulation.

9.5.1. The difference between research and development

Before we delve into the issue of reporting cost for research and development, let us take a closer look at what research and development is, what is the difference

between those two categories and what is their outcome. Understanding the differences is crucial for correct financial reporting and in some instances for financing R&D as well.

IFRS define the research as follows: "Research is original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding" (IASB, 2004, p. 1447). Goldense recognizes two levels of research: a basic research and an applied research: "In Basic Research, discovery targets are very broad. Scientists and researchers look for capabilities that have 'some efficacy' with an articulated broad market or targeted need. Some Basic Research is truly blue sky, but that has decreased over the past few decades as few can afford it. Basic Research often just rules out things that won't work and inventories what might work" (Goldense, 2016, p. 80). This kind of research is often carried out at universities and some research institutions, often financed by the government or its agencies. The applied research on the other hand is much more concentrated on given subject and may follow up on the findings of the basic research. "There is some known problem, opportunity, or application area where an economic gain or social improvements is possible. Applied Research picks up by taking things that might work and attempts to narrow down the feasible solutions" (Goldense, 2016, p. 80).

Development is different to research. IFRS define the development as follows: "Development is the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems or services before the start of commercial production or use" (IASB, 2004, p. 1447). Goldense recognizes two levels of development: an advanced development and a product development: "Advanced Development takes the feasible solutions and culls out the best alternative(s) to achieve a target capability or feature to incorporate into products" (Goldense, 2016, p. 80). Although advanced development is considered as development stage it is sometimes viewed as a transition between (general and applied) research and development of a product. Advanced development takes over the findings of the applied research and focuses on narrowing-down feasible (and marketable) solutions. The outcome of the advanced development is usually a prototype of a product together with a list of other possible variations which were rejected during the development. Following advanced development is product development which deals with issues of how to adjust the prototype to make it easier and less costly to produce, how to make its production and its use more safe, how to pack and deliver the product to the customers and so on. "Product Development packages feasible and risk reduced features and capabilities in both form and function into products planned for release to the marketplace" (Goldense, 2016, p. 80).

9.5.2. The regulation for R&D cost reporting under the IFRS

The costs of research and development activities from the accounting point of view are just that: costs, i.e. the decrease in economic resources of an entity. The question is, when (in which accounting period) should these costs be expensed (i.e. charged to profit or loss)? To expense a cost means to recognize it as a decrease of profit or an increase of loss. In principle there are two options for an initial cost recognition: either as an expense or as an asset. If an entity decides to recognize the cost as an asset, then it needs to depreciate (amortize) the asset in the following periods and/or to perform an impairment test to allocate the cost to the P&L eventually. The depreciation (amortization) method should faithfully represent the manner of using the asset—it should represent how the entity consumes the benefits embodied in the asset and how the asset contributes to earning revenues.

How does the entity decide whether the R&D costs should be expensed or capitalized (i.e. brought to the balance sheet as an asset)? The guidelines for this decision-making process are formulated in the Conceptual Framework for Financial Reporting and in the IAS 38 Intangible Assets. The Conceptual Framework for Financial Reporting defines what is an asset. Should the R&D cost fail this definition they must be expensed. "An asset is a present economic resource controlled by the entity as a result of past events. An economic resource is a right that has the potential to produce economic benefits" (IASB, 2018, p. 34). The Conceptual Framework then explains what is considered "a right" and what is considered "a potential to produce economic benefits". We can simplify this and say that for an entity to recognize cost as an asset, it must be able to show that this asset will probably (not certainly) bring the entity revenues in the future and that the entity controls the asset. This definition is very general, and, in many cases, it is quite difficult to apply this definition to intangible item as R&D cost. That is why IAS 38 includes number of additional defining characteristics of R&D cost eligible for recognition as an intangible asset.

While the two basic criteria for intangible asset recognition included in IAS 38 are the same as stipulated by the Conceptual Framework (i.e. existence of future benefits and control over the resource of those economic benefits), there are additional criteria set out by IAS 38. These are: identifiability, ability to measure the asset reliably and the probability that the economic benefits expressed by (concentrated in) the asset will flow to the entity.

Identifiability criterion does not pose an issue when dealing with tangible assets be it property, plant, equipment, or inventory. It does however pose an issue when dealing with intangible assets, especially when these assets are developed internally as it might be quite difficult to distinguish them from internally generated goodwill. Therefore IAS 38 sets out a rule that intangible assets must be identifiable in

order to be recognized in entity's balance sheet. According to IAS 38 "an asset is identifiable if it either:

- is separable, i.e. is capable of being separated or divided from the entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, identifiable asset or liability,
- arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations" (IASB, 2004, p. 1448).

The requirement to measure the asset reliably ties to the principle that both acquired intangible assets as well as internally developed intangible assets are to be recognized at their costs, which presumes that the entity is able to measure these costs reliably. This is a bare necessity and an effective barrier for management to "discover" (usually at the end of the reporting period, when the profit for the period is lower than expected) internally developed intangible assets for which they somehow "forgot" to document the development process and did not track the development costs properly. Let us keep in mind that costs of R&D are often quite high and without the strict rules of IAS 38 might be used for "creative accounting" or even an intentional misstatement. With all these additional recognition criteria, IAS 38 only sets ground for fair and reliable presentation of internally developed intangible assets while making sure that it does not provide management with tools to manipulate the profit or loss.

The biggest challenge for an entity when dealing with recognition of internally developed intangible assets is to show the probability that the economic benefits expressed by (concentrated in) the asset will flow to the entity. To help entities comply with this requirement, IAS 38 lists five aspects which must be fulfilled:

- "the technical feasibility of completing the intangible asset to the technical feasibility of completing the intangible asset so that it will be available for use or sale,
- its intention to complete the intangible asset and use or sell it,
- its ability to use or sell the intangible asset,
- how the intangible asset will generate probable future economic benefits. Among other things, the entity can demonstrate the existence of a market for the output of the intangible asset or the intangible asset itself or, if it is to be used internally, the usefulness of the intangible asset,
- the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset" (IASB, 2004, p. 1456).

To make the recognition process easier, IAS 38 includes a rule that all cost incurred during the research phase of the project must be always expensed. That means that no costs of the research phase of any project are eligible for recognition as an asset. The reason for this rule is that it is an inherent trait of research that its outcome is very uncertain and the probability that it will bring any economic benefits is not high enough. This is different from the development phase. The

development phase deals with design, construction and testing prototypes, models or various pilot project for which their market potential is much easier to demonstrate. To demonstrate the marketability of the development output an entity may use for example market studies which confirms that there is a demand for product under development and support it with business plan which shows there is enough resources to finish the development and start the production.

9.5.3. Measuring the development costs in compliance with the IFRS

At this point it should be obvious that while all the costs incurred during the research phase of the R&D project should be expensed, some of the costs incurred during the development phase of the R&D project should not be expensed, instead they should be recognized as an intangible asset. Measuring the Development costs to be recognized as an intangible asset should rely on development plan (which should include projection of costs) and reliable book-keeping. The difficult task is to determine at which point in time the R&D project had entered the development phase and more importantly at which point during the development phase the project reached the criteria set out by IAS 38 for recognition of the intangible assets. It may happen that even though the project successfully finished the research phase and entered the development phase, not all requirements of IAS 38 for recognition of internally developed intangible assets were met. According to IAS 38 only those costs incurred at the point in time when all requirements were met or later shall be recognized as intangible asset. In other words, progressing with the project from the research phase to the development phase is a required but it is not sufficient. R&D projects are usually long-term projects and sometimes the market conditions change during the project. It may be that the entity started the R&D project when the demand for the newly developed product was strong but later on the demand decreased significantly because a substitute was introduced to the market. Such change in the market conditions might cause that the entity fails the requirement of IAS 38 to show that it can use or sell the intangible asset once its development is finished, therefore all the costs for this project would be expensed.

IAS 38 also lists some common examples of expenditures which management tend to perceive as cost of development projects but according to IAS 38 must always be expensed. These expenditures include:

- "selling, administrative and other general overhead expenditure unless this expenditure can be directly attributed to preparing the asset for use expenditure on training staff to operate the asset;
- identified inefficiencies and initial operating losses incurred before the asset achieves planned performance; and

- expenditure on training staff to operate the asset" (IASB, 2004, p. 1458).

Moreover, costs incurred for developing brands, mastheads, publishing titles, customer lists and items similar in substance, plus expenditures on advertising and promotional activities or start-up costs shall not be recognized as intangible assets according to IAS 38 because these items are viewed as integral part of internally generated goodwill of the entity.

Finally, IAS 38 does not allow to recognize costs as an intangible asset if these costs were initially recognized as expenses. With this rule IAS 38 prohibits to take expenses out of the P&L account and reclassify them as part of the costs of intangible asset.

9.6. National regulation—the case of the Czech Republic

The accounting and financial reporting in the Czech Republic is regulated by the law, more specifically by the Act No. 563/1991 Sb. and the regulations of the Czech Ministry of Finance. However, while the Act No. 563/1991 Sb. is applicable to all entities, there are different regulations of Czech Ministry of Finance for different types of entities. The regulation No. 500/2002 Sb. is applicable to business entities, while for example the regulation No. 504/2002 Sb. is applicable to non-profit organizations (e.g. non-profit research institutions). A comparison of these two regulations is in order as it is quite common for businesses to cooperate on their development projects with universities, research government agencies or other research non-profit organizations which usually carry-out the research phase while the businesses continue with the development phase. Unfortunately, these two regulations of the Czech Ministry of Finance approach the issue of internally developed intangible asset slightly differently, which introduces discrepancies in financial reporting of R&D costs.

Let us concentrate on the criteria set out by Czech accounting regulation for recognition of internally developed intangible assets:

- the useful life of the asset must exceed one year;
- the cost exceeds the amount set by the entity in its accounting policy for long-term intangible assets;
- the asset was developed in order to sell it or license it.

The regulation No. 500/2002 Sb. (applicable to business entities) lists one additional criterion—only costs incurred during the development phase shall be recognized as internally developed intangible asset. Thus, it is prohibited for business entities to recognize any research cost as an intangible asset. This is where the regulation for business entities differs from the regulation for non-profit organization (e.g. universities) which does not exclude the research cost to be recognized as part of the internally developed asset.

There is another source of financial accounting regulation in the Czech Republic. The Czech Accounting Standards were issued by Czech Ministry of Finance but unlike the Act No. 563/1991 Sb. or the accompanying regulations, the Czech Accounting Standards are not legally binding. Rather it is a set of generally accepted and recommended rules for financial accounting. Like the regulations of Czech Ministry of Finance, there are different sets of Czech Accounting Standards for different types of entities. Czech Accounting Standard for business entities provide another option for reporting R&D costs—instead of recognizing those costs as long-term intangible asset or as an expense it is possible to recognize them as a special accrual item: complex deferred expenditures. This item allows to "capture" different types of expenditures related to research and development and recognize them as an asset. This asset should be amortized over the period of four years or sooner. This create another dissimilarity when compared to applicable regulation for non-profit organizations for which no such item as complex deferred expenditures is allowed.

Some experts consider the option for business entities to recognize the R&D cost as complex deferred expenditures an unnecessary or detrimental as it allows to by-pass the principles set out in the regulation No. 500/2002 Sb. for internally developed intangible assets, which is (compared to IAS 38) quite permissive but compared to the option of complex deferred expenditures still prescriptive and limiting to some extent. To address this issue the National Board for Financial reporting issued an interpretation dealing with R&D costs. In its interpretation the Board aimed to implement the core principals of IAS 38 to the extent that is compatible with the Czech legal regulation of financial reporting and thus imposed set of additional requirements for recognizing R&D costs as an asset. Interpretations issued by the Board are not legally binding, instead they serve as a recommendation and additional guidance.

9.7. Case study

In this final chapter we will discuss a case study describing the decision-making process related to presentation of the incurred costs and adopted solutions of entities undertaking research and development activities.

9.7.1. The case of mobile mini-power plant

Czech limited liability company ENERGY together with one of the Czech technical universities launch a joint project of mobile mini power plant development which should be able to produce heat and electricity from several sources simultaneously. The considered sources of energy are burning of vegetable oil or ethanol, solar

power, and wind power. To goal of the project is to combine all three resources to a mobile power plant and achieve the highest possible efficiency. In the R&D project two goals are set: first to develop a fully functional prototype of such mobile power plant and second, to develop highly effective processes for heating plants and use them in the form of a handbook dealing with optimalization process in heating plants and power plants. The project is divided into three phases:

- Concept development.
- Implementation.
- Testing and finalization.

The goal for the first phase is to find a functional solution for each part of the power plant and to find a way to integrate them in the most efficient way. There is no similar solution available at this time, so this phase of the project is expected to yield new technical procedures in burning the renewable fuel such as vegetable oil and ethanol as well as new knowledge on combining different sources of energies, creating synergies and/or minimizing losses during the process. According to the project most of the work during the first phase of the project shall be carried out by the university.

The second phase of the project shall utilize the findings of the first phase and use it to construct a prototype of mini power plant and then perform series of tests to verify its functionality while searching for ways to increase its overall efficiency. Both parties of the project shall participate at this stage equally.

During the third phase of the project the prototype will be tested for safety measures and compliance with all applicable legal requirements. Moreover, researchers will engage potential manufacturers and suppliers of components to improve the prototype in way that makes it easier to produce and decrease its production cost. Finally, the researchers will gather all their findings and forge them into a handbook / manual for process control and increasing efficiency in the common heat plants and powers plants. According to the project most of the work during the third phase of the project shall be carried out by ENERGY.

The parties expect that several patents will be registered during the R&D project. These patents will mostly likely be bound to the prototype itself, not to the processes described in the handbook. It is expected that the prototype will be licensed to a manufacturer who will start its production. The handbook can be used by both partners of the project in providing consulting services to various heat plants and power plants.

According to the project there will be a period of approximately five years after the project ends referred to as "sustainability period" during which both parties are required to assist each other in providing technical support, dealing with various technical issues that might occur during the production process, even to perform some minor improvements. It is expected that the total expenditures for the activities in the "sustainability period" will not exceed 10 % of the total project cost.

The management of ENERGY as well as the university need to find the appropriate accounting treatment for all the expenditures that will arise during the R&D project. They seek to find the correct way to report those expenditures in their financial statements to comply with IFRS as they both prepare their annual financial statements according to IFRS. They also need to find the correct accounting treatment under the Czech national regulation in order to determine the correct taxable income for Czech income tax.

9.7.2. The deliberations and solution—IFRS approach

Let us start with the IFRS point of view—we need to test whether the outcomes of the R&D project meet the characteristics of an asset. We need to determine whether the prototype of the mini power plant and the handbook for process optimalization (each individually):

- are results of past events,
- their costs can be measured reliably,
- present economic resource,
- are controlled by the entity,
- are identifiable.

Both the prototype and the handbook are results of past transactions—they are the result of the research project for which ENERGY and the university incurred expenditures. Since there was a budget for the project and both partners keep a very thorough record of the project costs, we can conclude that the second criterion is also fulfilled. The third criterion is difficult to evaluate and is closely tied to the fourth and fifth criterion. Let us evaluate these last three criteria together. To show an ability to control the asset means that the entity is able to use it in its business activities and at the same time prevent others from using it. It is rather easy to do when dealing with tangible asset, because you have the physical possession of that particular asset. But how does one prevent others from using ideas or technical solutions? One can either keep those ideas and solutions a secret (think of Coca-Cola recipe) or to have his idea protected by a patent (or similar legal instrument). There is a limited scope of intangible assets that can be protected by a patent. Patents are intended to protect inventions, and technical solutions, not general ideas, artwork, recipe, working-procedures and so on. This means that the researchers can apply for patent to protect their findings and technical solutions concerning the construction of the mini power plant, however they cannot apply for patent to protect their knowledge and experience described in the handbook. The only way to protect what they learned during the R&D project about heat and power optimalization processes is to keep them a secret, but that would make it

impossible to provide consultancy services to heat and powerplants as they intent to do. At his point we can conclude that while the R&D outcomes connected to the prototype of the mini power plant fulfil the requirement of identifiability and control, the R&D outcomes connected to the handbook do not. Thus, all the cost incurred in the handbook development must be expensed right away.

Now, we continue our analysis only for the R&D costs which were incurred as a result of the development of the prototype of the mini power plant. We need to evaluate whether the R&D costs for the prototype present an economic resource. For this IAS 38 provides a guidance: costs incurred during the research phase must be expensed (because at that stage the probability of gaining economic benefits in the future is too low), costs incurred during the development phase shall be recognized as an intangible asset only if all the additional criteria are met (see IASB, 2004, p. 1456 or the subchapter 9.5. above).

The characteristics of the first phase of the project (Concept development) meet the characteristics of the applied research as defined above because in this phase the researchers are supposed to look for a solution, which is not yet existent. It is not certain that they will find one. They might even conclude that there is no viable solutions which would satisfy the aim of the project. The level of uncertainty about finding the solution and being able to sell or license the outcome is too high at this stage of the project. Therefore, all the costs incurred during the first phase of the project shall be expensed. Please bear in mind that at this point of our analysis we are dealing with the R&D costs related to the prototype of the mini power plant only.

Now let us skip the second phase for now and let us evaluate the third phase of the project (Testing and finalization) first. This is clearly the final phase of the development when the researchers have their fully functional prototype, and their goal is to find the best way to start the production—they perform some final testing and trimming and get ready to launch their product. This is the product development phase. At this stage, the researchers have found the viable solution and since there is a demand for their product (otherwise they would probably not proceed with this stage at all) they are getting their product ready for the launch. Costs incurred during the third phase of the project should be recognized as part of the initial valuation of an intangible asset (i.e. cost of the asset).

Evaluation of the second phase of the R&D project (Implementation) is not so straightforward. Although the characteristics of the second phase are in line with the characteristics of the development phase as described by IAS 38, until all recognition requirements of IAS 38 are met, even the costs of the development phase must be expensed; put in other words: an entity must gather evidence that it has got the resources (be it technical, financial or other) to finish the project, it must show that there is a demand for the asset being developed and that it has the means

to distribute the asset to the customers. All the requirements of IAS 38 (see IASB, 2004, p. 1456 or the subchapter 9.5. above) must be met to start accumulating the development costs as a cost of internally developed intangible asset. Unfortunately, the deliberations on meeting the criteria do not end here. Development projects are long-term project, should the circumstances change, and the project would stop meeting the requirements for recognition set out by IAS 38, all subsequent cost must be expensed (i.e. accounted to P&L). Moreover, any expenditures previously recognized as cost of internally developed intangible asset must undertake impairment testing under IAS 36 Impairment of Assets which might cause some or all of the cost recognized as intangible asset (to this date) be written off to P&L.

At last, we need to evaluate the treatment of the subsequent expenditures during the five-year "sustainability period". These are expenditures which occurred after the R&D project ends and the intangible asset (if any) was recognized. The entity started to use that asset and probably even to amortize the asset. Should these subsequent expenditures be recognized as an increase of the value of the intangible asset or should they be expensed? Firstly, we need to distinguish between the subsequent expenditures on prototype and handbook. All subsequent expenditures on handbook must be expensed for the same reasons it was unacceptable to recognize the cost for development of the handbook itself. What about the subsequent expenditures on technical support and minor improvements of the prototype? IAS 38 states that it is highly unlikely that any of the subsequent expenditure would enhance the internally developed asset significantly and fulfil the requirements of the IAS 38. Therefore, it is recommended to charge all the subsequent expenditures directly do P&L (i.e. to expense them).

9.7.3. The deliberations and solution—Czech approach

The solution will differ for ENERGY and for the university because the applicable regulations of the Czech Ministry of Finance are different. While the university (non-profit entity) will recognize all of the R&D costs as its intangible asset, ENERGY (business entity) must distinguish costs incurred during the research phase of the project from those incurred during the development phase. ENERGY will expense all costs incurred during the research phase, but the cost incurred during the development phase will be recognized as an intangible asset. This is because all three criteria for internally developed intangible assets (see the second paragraph of subchapter 9.6.) are met.

As you can see the criteria for recognition of an internally developed intangible asset are rather vague in the accounting regulation of the Czech Republic.

Unfortunately, this lack of thoroughness or strictness in the national regulation provides a leeway for "creative accounting" or even (intentional) misstatement. This increases the pressure especially on auditors to uphold the general principals of financial accounting and prudency and to implore the management to follow principles described in IAS 38 or interpretations of the National Board for Financial reporting even though these are not enforceable and can be used as a "best-practice" approach only.

To complete the depiction, it is a fact that many of the R&D project are subsidized by government or its agencies. Once the subsidy is awarded to the project, the structure of costs that the agency is willing to refund is "set in stone" in the application for the subsidy and no changes are allowed. The refundable expenditures are usually defined by their nature (e.g. salary, rent, electricity, travel expenses) and the measurement of the expenditures eligible for refund is based on audited financial statements. It can happen that most of these expenditures incurred during the R&D project will be recognized as an intangible asset. That means that these costs will not be expensed directly, instead they will be charged to the P&L through amortization once the project is completed. This can pose a very serious obstacle for refunding the R&D costs by the government through a subsidy, because the researchers never reported salary expenses or travel expense in their income statement, instead they reported amortization charges for which they did not apply in their subsidy request. That is another case when the auditors face immense pressure to accept "alternative" accounting treatments which are not in line with Czech national regulation.

Finally, let us deal with the subsequent expenditures according to Czech regulation. Unfortunately, all the relevant regulations are silent on this topic. Hence, only the general principles of financial accounting remain. The treatment should be as follows: if the subsequent expenditures add some new functionality or significantly improve the usefulness of the previously recognized intangible asset, such subsequent expenditure should be recognized as an increase in the gross and net value of the intangible asset. Otherwise, the subsequent expenditure should be expensed.

Questions / tasks

1. Explain the difference between research and development.
2. What effects can be achieved as a result of research works and which as a result of development works?
3. In what area are the costs of discontinued research and development recognized?

4. Which of the three outlined concepts for reporting R&D costs (i.e. IFRS approach, Czech approach for non-profit organizations and Czech approach for profit organizations) is the most informative in your opinion?
5. What might be the benefits of reporting research costs as an asset and what might be the risks?
6. Do you see any reason why there should be different concepts of R&D costs reporting between profit and non-profit organizations (as it is currently in Czechia)?
7. Think about the following scenario: as a financial manager of ENERGY, you are participating in a meeting with other managers. The goal of the meeting is to set the internal procedures and policies for the upcoming joint R&D project described above. What would be your major concerns? What would be the procedures which you would wish to implement for this project?

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