„Dezvoltarea Capacității Administrative a MCI de implementare a unor acțiuni stabilite în Strategia Națională de Cercetare, Dezvoltare Tehnologică și Inovare 2014-2020„
Cod: SIPOCA 27,
Programului Operațional Capacitate Administrativă, Axa prioritară 1

SESIUNI DE INSTRUIRE EXPERŢI CERTIFICARE/EXPERTIZARE ACTIVITĂŢI CD

Livrabilul R5.3 din cadrul proiectului-*Instruire experți pentru certificare/ expertizare activități cercetare-dezvoltare*

Dalina Dumitrescu, Prof.Dr., ASE
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București, 14 iulie 2017

Bune practici conform Rapoartelor Deloitte (2015,2017)

14 iulie 2017

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Intrebari pentru dezbatere:

1) De ce stimulente fiscale?Care ar fi rolul lor ?
2) Tipuri de stimulente fiscale pe care le cunoasteti
3) La nivelul institutiei la care lucrati ce stimulente fiscale pentru cercetare stiti ca se utilizeaza?

Din perspectiva tehnicii fiscale, stimulentele fiscale pot fi acordate sub o varietate de forme :

- credit fiscal,
- deduceri fiscale,
- amortizarea accelerata a cheltuielilor de capital pentru R&D,
- impozitarea la cote de impozit diferit- favorabile- a veniturilor obținute prin valorificarea sau punerea în practică a drepturilor de proprietate intelectuala (*intellectual property, IP*, engl.) obtinute prin cercetare-dezvoltare (*Innovation, patent boxes* , engl.),
- granturi, etc.

Cele mai des raportate forme de stimulente sunt reducerea, diminuarea impozitului direct datorat, respectiv *credit fiscal* (*tax credit* engl.) și scaderea bazei impozitabile cu cheltuielile legal precizate respectiv *deduceri fiscale* (*deductions*, engl.). (Anon., n.d.)

În general, pentru contribuabil, aplicarea mecanismului creditului fiscal determină economii fiscale mai mari decât utilizarea mecanismului deducerilor fiscale.

Simulare-G1-G3

Parte de simulare- calcul comparativ pentru econoia de impozit

TASK – pe grupe G1-G3

SIPOCA 27 - *Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare*

Economia de impozit in cazul utilizarii deducerilor fiscale (A) față de utilizarea creditelor fiscale (B)și față de deducerile fiscale suplimentare (C)

	A-G1	RON		B-G2	RON		C-G3	RON
1	Rezultat impozabil (inainte de deduceri fiscale)	200000	1	Rezultat impozabil	200000	1	Rezultat impozabil (inainte de deduceri fiscale)	200000
2	Deduceri fiscale	10000	2	Credit fiscal	10000	2	Deduceri fiscale suplimentare (150%)	15000
3	Rezultat - baza de calcul impozit (1-2)	190000	3	Rezultat - baza de calcul impozit (1)	200000	3	Rezultat - baza de calcul impozit (1-2)	185000
4	Cota impozit	16%	4	Cota impozit	16%	4	Cota impozit	16%
5								
6								
7	**Economie de impozit**			**Economie de impozit**			**Economie de impozit**	

Importanta Rapoartelor Deloitte:

2015- *The Global Survey of Research and Developement Incentives*- variety of tax and fiscal policies adopted worldwide -34 de tari
https://www2.deloitte.com/sk/en/pages/tax/articles/global-survey-research-development-tax-incentives.html

2017- *Survey of Global Investment and Innovation Incentives*(actualizat la 1 martie 2017)- system of financial incentives available to fuel R&D, innovation, capital expansion, energy sustainability, employment, and training. -36 de tari
https://www2.deloitte.com/us/en/pages/tax/articles/global-survey-of-investment-and-innovation-incentives.html

- Sistemul de stimulente fiscale folosit in practica internationala pentru sustinerea R&D
- Cum apare Romania in Raport
- Cum ne pozitionam fata de alte tari in utilizarea instrumentelor de stimulare fiscala
- Ajuta o mai buna intelegere a dinamicii globale in finantarea inovarii si strategia de investitii

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Stimulente fiscale utilizate în perioada 2014-2015 în 34 țări OECD

Raport Deloitte 2015 Anexa 1

	Tara	Tip stimulent utilizat										
		Credit fiscal	Deduceri suplimentare a ch de R&D	Patent Box	Red. Imp.(pe salarii, pe profit, a contributiilor sociale etc)	Amortizare accelerata	Scutire de accize sau TVA la ch. de Capital pt R&D /servicii de R&D	Granturi	Scutiri de impozite	Stimulente pentru investitii	Deduceri de cheltuieli de dezvoltare, de achizitie de tehnologie noua	Total măsuri adoptate
1	Austria	1										1
2	Australia	1										1
3	Africa de Sud		1			1						2
4	Belgia	1	1	1	1	1						5
5	Brazilia		1			1	1					3
6	Canada	1										1
7	China		1				1					2
8	Croatia		1									1
9	Rep Ceha		1					1				2
10	Franta	1		1		1		1				4
11	Germania							1				1
12	Grecia		1	1				1				3
13	Ungaria		1	1					1			3
14	India		1									1
15	Irlanda	1			1			1				3
16	Israel							1				1
17	Italia	1		1	1			1				4
18	Japonia	1										1
19	Koreea de Sud	1		1						1		3
20	Latvia		1									1
21	Lituania		1			1						2
22	Malaezia		1						1	1		3
23	Mexic							1				1
24	Olanda		1	1	1							3
25	Polonia							1			1	2
26	Portugalia	1										1
27	Romania		1			1						2
28	Rusia		1		1		1					3
29	Singapore		1									1
30	Slovacia	1	1					1				3
31	Spania	1										1
32	Turcia		1		1			1				3
33	UK		1	1								2
34	US	1										1
	Total	13	19	8	6	6	3	11	2	2	1	
	Proportie tari	38%	56%					32%				

Varietatea de stimulente pentru R&D folosite de tarile OECD

Nr țări	Nr stimulente utilizate	Ponderea țărilor folosind un anumit numar de stimulente
14	1	41%
7	2	21%
10	3	29%
2	4	6%
1	5	3%

Sursa: Deloitte, *2015 Global Survey of R&D tax incentives*

Restricții pentru eligibilitate la aplicarea stimulentelor pentru anumite industrii

Restricții pentru eligibilitate la aplicarea stimulentelor pentru anumite industrii		
Existența restrictiilor pentru anumite industrii	Număr țări	Pondere
NU	29	85%
DA	5	15%

Sursa: Deloitte, *2015 Global Survey of R&D tax incentives ; prelucrari din Anexa 1*

Restrictii de acces la stimulente legate de industrie

Daca drepturile de proprietate intelectuala (IP) trebuie să rămână în țară		
Existenta cerintei de ramnere a proprietatii intelectuale in tara	Număr țări	Pondere
NU	29	85%
DA	5	15%

Sursa: Deloitte, *2015 Global Survey of R&D tax incentives ; prelucrari din Anexa 1*

Restrictii de localizare geografica pentru a beneficia de stimultentele fiscale

Daca activitatea de R&D trebuie sa se desfasoare in tara pentru a beneficia de stimultentele fiscale		
Daca activitatea de R&D trebuie sa se desfasoare in tara	Număr țări	Pondere
NU	15	44%
DA	17	50%
Partial	2	6%

Sursa: Deloitte, *2015 Global Survey of R&D tax incentives ; prelucrari din Anexa 1*

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Principalele concluzii ale analizei informațiilor din 2015 Global Survey of R&D tax incentives sunt :

- *Cele mai multe dintre țările din studiu își bazează politicile de încurajare a activității de R&D pe* ***mult de două instumente*** *de stimulare fiscală ;*

-Cele mai utilizate instrumente de stimulare fiscală *sunt* ***deducerile suplimentare de cheltuieli*** *de R&D, creditele fiscale și acordarea de granturi, uneori în cash.*

*-**Aproximativ 50% din țările studiate** condiționeaza acordarea de stimulente pentru desfășurarea activității de cercetare **pe teritoriul național sau comunitar**,iar cealaltă jumătate dintre țări acordă aceste stimulente indiferent de teritoriul unde activitatea are loc, existând însă unele cerințe pentru cercetarea realizată în afara teritoriului național de* un aviz în avans din partea guvernelor *pentru aceste cheltuieli, de utilizarea resursei naționale în managementul sau în realizarea proiectelor, de repatrierea dreptului de proprietate intelectuală etc…*

*- Cele mai multe țări, explicit, **nu favorizează sau nu exclud anumite industrii la acordarea stimulentelor fiscale**. Cele care fac explicitări au în vedere stimulare pentru industriile creatoare sau promotoare de tehnologii noi sau înalte sau precizeaza excluderea de la acordarea stimulentelor fiscale a industriilor susținute prin alte instrumente fiscale (de obiecei subventii sau ajutoare de stat).*

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Lamuriri conceptuale:

1) În România există o diferență conceptuală între *deducerile fiscale* și *chetuielile deductibile fiscal.* Astfel, » ***deducerile fiscale*** sunt acele elemente care nu sunt cheltuieli, dar se deduc din profit la calculul impozitului de exemplu- rezerva legală este o deducere fiscală, sau pierderea fiscală din anii anteriori, sau dobânda nedeductibilă datorita gradului de îndatorare și care devine deductibilă atunci când acesta se afla sub pragul de 3 (nivelul prevăzut de lege) , iar ***cheltuielile deductibile fiscal*** sunt acele cheltuieli care sunt efectiv efectuate pentru realizarea de venituri în limitele prevazute in Codul fiscal. »

Mircea, D., Jun 6th, 2015. *Deduceri fiscale vs. cheltuieli deductibile fiscal.* [Online]
Available at: http://www.contzilla.ro/deduceri-fiscale-vs-cheltuieli-deductibile-fiscal/
[Accessed 19 January 2017].

2) Cum în Monitorul Oficial din 13.07.2016 Ordinul detaliaza chetuielile eligibile pentru *deducerea suplimentară de 50% aferentă cheltuielilor de cercetare dezvoltare*, în continuare se va folosi pentru acestea in tratamentul fiscal termenul de deduceri fiscale.

2017- *Survey of Global Investment and Innovation Incentives*(actualizat la 1 martie 2017)- system of financial incentives available to fuel R&D, innovation, capital expansion, energy sustainability, employment, and training - ***analiza de grup***

- Prezentare generala

- G1: UK, -5
- G2: Ungaria, -5
- G3: Polonia,-6
- G4:RO-6

Deloitte 2017 Survey of Global Investment and Innovation Incentives, *pp. 132-136 Romania*

"*Romania currently offers a super deduction of 150% of qualified research expenses and, beginning in 2017, a 10-year tax exemption for R&D companies*"

Nature of Incentives

- Romania offers a 150% super deduction for eligible R&D expenditure. In light of the corporate income tax rate of 16%, the incentive provides a tax savings of 8% of qualifying costs.
- Additionally, accelerated depreciation for equipment and machinery used in R&D activities of up to 50% of the fiscal value of the asset may be deducted during the first year of use. The remaining fiscal value may be depreciated over the remaining useful life of the asset.
- As from 1 January 2017, taxpayers that only carry out R&D activities may benefit from a corporate income tax exemption for the first 10 years of activity. The 10-year period will begin on 1 January 2017 for qualifying companies that existed prior to that date.

Deloitte 2017 Survey of Global Investment and Innovation Incentives, *pp. 132-136 Romania (continuare)*

Eligible industries and qualifying activities

The super deduction is granted to any Romanian taxpayer that conducts qualifying R&D activities, i.e., taxpayers in every industry can qualify. This includes taxpayers that participate in collaborative R&D through partnerships or associations, provided they have the right to use the research results in their business, e.g., selling products developed through R&D, selling the results of the R&D, or exploiting the resulting IP in another way.

Deloitte 2017 Survey of Global Investment and Innovation Incentives, *pp. 132-136 Romania (continuare)*

The R&D activities must **be creative activities** that **bring a significant element of novelty** in **resolving scientific or technological uncertainty,** i.e., **the solution should not be obvious for a competent professional in the field.** The following activities are considered qualified research:

- ***Applied research*** undertaken ***to acquire new knowledge*** for ***the development*** **of new products**, **processes**, or s**ervices** or **for the significant improvement of existing** products, processes, or services. This includes the creation of components for existing complex systems and may include the construction of prototypes or pilot lines when this is necessary for the industrial research, and especially for the validation of new processes, products, and services.

- ***Technological development work***, drawing on existing knowledge gained from research and/or practical experience, which is directed to obtaining new materials, products, processes, systems, and services, or to improving substantially those already in existence.

Definitii aferente **cercetarii aplicative si dezvoltarii experimentale** si diferentierea fata **de cercetarea fundamentala**, conform Manualului Frascati 2015 (Art. 8 din Ordinul 1056/5.07.2016 MFP si MENCS)

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

OM 1056-4435/05.07.2016 (ref. L 227/2015, Art. 20)
"Norme privind deducerile pentru cheltuielile de cercetare-dezvoltare la calculul rezultatului fiscal"

ART. 1

(1) Contribuabilii plătitori de impozit pe profit beneficiază de stimulentele fiscale prevăzute de art. 20 din Legea nr. 227/2015 privind Codul fiscal, cu modificările și completările ulterioare, pentru **activitățile de cercetare-dezvoltare**, definite prin prezentele norme, desfășurate **prin mijloace proprii sau în colaborare/asociere/acord, *în scopul valorificării***.

(2) Stimulentele fiscale pentru **activitățile de cercetare-dezvoltare** reprezintă reducerea rezultatului fiscal de care pot beneficia contribuabilii, prin deducerea suplimentară, în proporție de 50%, a cheltuielilor efectuate de aceștia în anul fiscal respectiv, pentru activitățile de cercetare-dezvoltare, precum și prin aplicarea metodei de amortizare accelerată în cazul aparaturii și echipamentelor destinate activităților de cercetare-dezvoltare

OM 1056-4435/05.07.2016 (ref. L 227/2015, Art. 20)
"Norme privind deducerile pentru cheltuielile de cercetare-dezvoltare la calculul rezultatului fiscal"

ART. 2

(1) Stimulentele fiscale se acordă pentru activitățile de cercetare-dezvoltare desfășurate atât pe teritoriul național, cât și în statele membre ale Uniunii Europene sau în statele care aparțin Spațiului Economic European.

(2) Valorificarea se poate realiza:

- atât **în folosul propriu**, prin preluarea în activitatea proprie a rezultatelor cercetării, conform cerințelor activității industriale sau comerciale desfășurate de contribuabil,
- cât și prin **vânzarea rezultatelor cercetării** sau
- **utilizarea acestora în prestarea de servicii ori executarea** de lucrări,
- precum și **prin exploatarea drepturilor de proprietate intelectuală rezultate**.

OM 1056-4435/05.07.2016 (ref. L 227/2015, Art. 20)
"Norme privind deducerile pentru cheltuielile de cercetare-dezvoltare la calculul rezultatului fiscal"

ART. 2

(3) În situația în care activitățile de cercetare-dezvoltare sunt desfășurate de mai mulți contribuabili prin colaborare/asociere/acord, stimulentele fiscale se acordă fiecăruia dintre aceștia, pe baza cheltuielilor eligibile efectuate. Cheltuielile eligibile efectuate de un contribuabil nu sunt luate în calcul la stabilirea stimulentelor fiscale acordate celorlalți contribuabili.

(4) În situația în care o parte dintre activitățile de cercetare- dezvoltare efectuate de un contribuabil sunt efectuate de un terț, la comanda sa, stimulentele fiscale se acordă acestuia, dacă sunt îndeplinite condițiile din prezentul ordin, iar contribuabilul beneficiar nu va lua la calculul propriului stimulent fiscal cheltuielile înregistrate din partea acestui terț.

(5) Deducerile nu se recalculează în cazul nerealizării obiectivelor proiectului de cercetare-dezvoltare.

OM 1056-4435/05.07.2016 (ref. L 227/2015, Art. 20)
"Norme privind deducerile pentru cheltuielile de cercetare-dezvoltare la calculul rezultatului fiscal"

ART. 8
În sensul prezentelor norme, expresiile sau termenii folosiți au înțelesul din Ordonanța Guvernului nr. 57/2002 privind cercetarea științifică și dezvoltarea tehnologică, aprobată cu modificări și completări prin Legea nr. 324/2003, **cu modificările și completările ulterioare, din Regulamentul UE nr. 651/2014 al Comisiei din 17 iunie 2014 de declarare a anumitor categorii de ajutoare compatibile cu piața internă în aplicarea articolelor 107 și 108 din tratat, precum și comentariile din ghidul specific emis de Organizația pentru Cooperare și Dezvoltare Economică - Manualul Frascati.**

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Frascati Manual 2015 - Guidelines for Collecting and Reporting Data on Research and Experimental Development
OECD Publishing, Paris, http://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm
DOI: 0.1787/9789264239012-en

The internationally recognized methodology for collecting and using R&D statistics, the OECD's Frascati Manual is an essential tool for statisticians and science and innovation policy makers worldwide.
It includes: definitions of basic concepts,
data collection guidelines, and
classifications for compiling R&D statistics.

This updated edition contains improved guidelines reflecting recent changes in the way R&D takes place and is funded and the wider use of R&D statistics and definitions.
It provides new chapters dedicated to the practical aspects of collecting R&D data in different sectors, as well as new guidance on capturing different aspects of public support for R&D such as tax incentives.

new Chapter 13 – Measurement of government tax relief for R&D DOI: http://dx.doi.org/10.1787/9789264239012-15-en

NOTĂ: Manualul Frascati este disponibil în limbile Engleză, Franceză, Coreană. Nu există o traducere oficială în limba Română.

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

Frascati Manual 2015 - Guidelines for Collecting and Reporting Data on Research and Experimental Development OECD Publishing, Paris, http://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm

§2.2 Definition of research and experimental development (R&D)

2.5 **Research and experimental development (R&D)** comprise **creative and systematic work** undertaken in order to increase **the stock of knowledge** – including knowledge of humankind, culture and society – and **to devise new applications of available knowledge.**

pt. cresterea fondului de cunoastere(cunostiinte)

creativa

R&D= Munca si

(actiune, activitate, slujba etc..)

sistematica

(Care se efectuează după un plan, după o metodă dinainte gândită; metodic, organizat)

elaborarea(crea, concepe,inventa, imagina,planui, testa) de noi aplicatii ale cunoast. disponibile

Frascati Manual 2015 - Guidelines for Collecting and Reporting Data on Research and Experimental Development OECD Publishing, Paris, http://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm

§2.2 Definition of research and experimental development (R&D)

2.7 For an **activity to be an R&D activity**, **it must satisfy** five core criteria: Task

- **Novel**
- **Creative**
- **Uncertain**
- **Systematic**
- **Transferable and/or reproducible**

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

- Novel- to be based on original , not obvious (evident, clar limpede vadit), concepts and hypothesis
- Creative- to be aimed at new findings(descoperiri, concluzii, constatari)
- Uncertain- uncertain about its final outcome(or at least about the quantity of time and resources needed to achieve it)
- Systematic- to be planed and budgeted
- Transferable and/or reproducible- to lead to results that could be possibly reproduced
- 2.8 **All five criteria are to be met, at least in principle**, **every time an R&D activity is undertaken** whether on a continuous or occasional basis.

Novel- to be based on original , not obvious (evident, clar limpede vadit), concepts and hypothesis

2.14 New knowledge is an expected objective of an R&D project, but it has to be adapted to different contexts. Research projects in universities *are expected to pursue entirely new advancements in knowledge*, and the same for projects designed and managed by research institutes.

2.15 In the Business enterprise sector (defined in Chapter 3), the potential novelty of R&D projects has to be assessed **by comparison with the existing stock of knowledge in the industry**. The R&D activity within the project must result **in findings that are new to the business and not already in use in the industry**. Excluded from R&D are activities undertaken to copy, imitate or reverse engineer as a means of gaining knowledge, as this knowledge is not novel.

- Creative- to be aimed at new findings(descoperiri, concluzii, constatari)

2.17 An R&D project must have **as an objective new concepts or ideas that improve on existing knowledge.** This **excludes from R&D any routine change to products or processes** and, therefore, a human input is inherent to creativity in R&D.
While routine activity is excluded from R&D, new methods developed to perform common tasks are included.
As an example, data processing is not an R&D activity unless it is part of a project to develop new methods for data processing.
Vocational training is excluded from R&D, but new methods to deliver training could be R&D.
A new method to fix a problem, developed as part of a project, could be R&D if the outcome is original and the other criteria are met.

Uncertain- uncertain about its final outcome(or at least about the quantity of time and resources needed to achieve it)

2.18 R &D involves uncertainty, which has multiple dimensions. At the outset of an R&D project, the kind **of outcome and the cost (including time allocation**) cannot be precisely determined relative to the goals.

In the case of basic research, which is aimed at extending the boundaries of formal knowledge, there is a broad recognition of the possibility of not achieving the intended results.

For example, a research project may succeed in eliminating a number of competing hypotheses, but not all of them.

For R&D in general, there is **uncertainty** about **the costs, or time, needed to achieve the expected results**, as well as about whether its objectives can be achieved to any degree at all.

For example, uncertainty is a key criterion when making a **distinction between R&D prototyping** (models used to test technical concepts and technologies with a high risk of failure, in terms of applicability) **and non-R&D prototyping (**preproduction units used to obtain technical or legal certifications).

- Systematic- to be planed and budgeted

  2.19 R &D is a formal activity that is performed systematically. In this context "systematic" means that the R&D **is conducted in a planned way**, **with records kept of both the process followed and the outcome**. To *verify this*, ***the purpose of the R&D*** *project and the sources of funding for the R&D performed should be identified*.

  The availability of such records is consistent **with an R&D project** that is aimed at **addressing specific needs** and has **its own human and financial resources**.

  While the management and reporting structure just described is more likely to be found in large projects, **it can also apply to small scale activities where** it would be sufficient to have one or more employees or consultants (providing that a researcher was included) charged with producing a specific solution to a practical problem.

- Transferable and/or reproducible- to lead to results that could be possibly reproduced

2.20 An R&D project should result in the potential for the transfer of the new knowledge, ensuring its use and allowing other researchers to reproduce the results as part of their own R&D activities. **This includes R&D that has negative results, in the case that an initial hypothesis fails to be confirmed or a product cannot be developed as originally intended.**

As the purpose of R&D is **to increase of the existing stock of knowledge**, **the results cannot remain tacit** (i.e. remain solely in the minds of the researchers), as they, and the associated knowledge, would be at risk of being lost.

The codification of knowledge and its dissemination is part of the usual practice in universities and research institutes, although there may be restrictions for knowledge arising through contract work or as part of a collaborative undertaking.

In a business environment, the results will be protected by secrecy or other means of intellectual property protection, but it is expected that the process and the results will be recorded for use by other researchers in the business.

How to identify its R&D content and the institutional context in which R&D is performed? Manual Frascatti 2015 pag 48

In the field of medicine,

- **a routine autopsy** to determine the causes of death is the practice of medical care and is not R&D;
- **a special investigation** of a particular mortality to establish the side effects of certain cancer treatments is R&D (in fact, novelty and uncertainty about the final results of the study, as well as the transferability of the results for broader use, apply here).

- **routine tests** such as blood and bacteriological tests carried out for medical checks are not R&D, **a special programme of blood tests** for patients taking a new drug is R&D.

How to identify its R&D content and the institutional context in which R&D is performed? Manual Frascatti 2015 pag 49

- Keeping daily records of temperatures or of atmospheric pressure is not R&D, but a standard procedure.

- The investigation of new methods of measuring temperature is R&D, as is the study and development of new models for weather prediction.

How to identify its R&D content and the institutional context in which R&D is performed? Manual Frascatti 2015 pag 49

R&D activities in the mechanical engineering industry often have a close connection with design.

- **If calculations, designs, working drawings and operating instructions are needed for setting up and operating pilot plants or prototypes, they should be included in R&D**.

- If they are carried out **for the preparation, execution and maintenance of production standardisation** (e.g. jigs, machine tools) or **to promote the sale of products** (e.g. offers, leaflets, catalogues of spare parts), they should be excluded from R&D.

Frascati Manual 2015 - Guidelines for Collecting and Reporting Data on Research and Experimental Development OECD Publishing, Paris, http://www.oecd.org/publications/frascati-manual-2015-9789264239012-en.htm

§2.2 Definition of research and experimental development (R&D)

2.9 The term R&D covers **three types of activity**: basic research, applied research and experimental development.

- **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable facts, without any particular application or use in view (details 2.26, 2.27, 2.28, pure/oriented basic research).
- **Applied research** is original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific, practical aim or objective (details 2.30, 2.31).
- **Experimental development** is systematic work, drawing on knowledge gained from research and practical experience and producing additional knowledge, which is directed to producing new products or processes or to improving existing products or processes.(2.32)

Task in dividual

- Task; Pentru fiecare dintre definitiile tipurilor de cercetare subliniati cuvintele cheie care sunt utile pentru identificarea si diferentierea tipului activitatii de cercetare

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2.26 **Basic research** analyses
properties,
- structures and
- relationships

with a view to formulating and testing hypotheses, theories or laws.

The reference to **no "particular application in view"** in the definition of basic research **is crucial**, as the performer may not know about potential applications when doing the research or responding to survey questionnaires.
The results of basic research are **not generally sold but are usually published in scientific journals** or circulated to interested colleagues.
Occasionally, the publication of **basic research may be restricted for reasons of national security**.

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2.27 **In basic research**, the researcher is expected to have **some freedom to set goals**.

Such research is usually performed in the Higher education sector but also to some extent in the Government sector.

Basic research **can be oriented or directed towards some broad fields of general interest**, with the explicit goal of a range of future applications.

Business enterprises in the private sector may also undertake basic research even though there may be no specific commercial applications anticipated in the short term. Research on some kinds of energy saving technologies may be described as basic according to the above definition if it does not have a specific use in view. However, it does have a specific direction: improved energy savings. Such research in this manual **is referred to as "oriented basic research".- other examples**

2.28 Oriented **basic research** may be distinguished from **"pure basic research"** as follows:

- **Pure basic research** is carried **out for the advancement of knowledge**, **without seeking economic or social benefits or making an active effort to apply the results to practical problems** or to **transfer the results to sectors responsible for their application**
- **Oriented basic research** is carried out with the expectation that **it will produce a broad base of knowledge** likely to form the **basis of the solution to recognized or expected current or future problems or possibilities**.

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2.30 **Applied research** is undertaken either to determine **possible uses for the findings of basic research** or to **determine new methods or ways of achieving specific and predetermined objectives**.

It involves **considering the available knowledge and its extension in order to solve actual problems**.

In the Business enterprise sector, **the distinction between basic and applied research** is often marked by **the creation of a new project to explore promising results of a basic research programme** (moving from a long-term to a medium-short term perspective in the exploitation of the results of intramural [see Glossary] R&D).

2.31 The results of applied research **are intended primarily to be valid for possible applications to products**, operations, methods or systems.
Applied research **gives operational form to ideas**. The **applications of the knowledge** derived can **be protected by intellectual property instruments**, including secrecy

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experimental development

2.33 **The development of new products or processes** qualifies as experimental development if it meets the criteria for identifying R&D activity. An example **is uncertainty about the resources needed to achieve the goal of the R&D project** in which the development activity is taking place. In this manual the "D" in R&D refers to experimental development.

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experimental development

Experimental development ***Not "product development"***

2.34 **The concept of experimental development should not be confused with "product development", which is the overall process – from the formulation of ideas and concepts to commercialisation – aimed at bringing a new product (good or service) to the market.**

Experimental development is just one possible stage in the product development process: that stage when generic knowledge is actually tested for the specific applications needed to bring such a process to a successful end. During the experimental development stage new knowledge is generated, and that stage comes to an end when the R&D criteria (novel, uncertain, creative, systematic, and transferable and/or reproducible) no longer apply.(rac)

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

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experimental development

Experimental development ***Not "pre-production development"***

2.35 The concept of experimental development should not be confused with "pre-production development", which is the term used to describe nonexperimental work on a defence or aerospace product or system before it goes into production.
Similar cases apply in other industries. It is difficult to define precisely the cut-off point between experimental development and preproduction development; the distinction between these two categories requires "engineering judgement" as to when the element of novelty ceases and the work changes to routine development of an integrated system.

Studiu de caz

Frascati Manual 2015 – How types of R&D can be differentiated

A key criterion guides the classification of R&D activities by type: the expected use of the results. In addition, two questions can help identify the type of an R&D project:

- how far ahead in time is the project likely to lead to results that can be applied
- how broad is the range of potential fields of application for the results of the R&D project (the more fundamental the research, the broader the potential field of application)

It is recommended to undertake an evaluation of the type of R&D at the project level, by classifying the project's expected results according to the two "indicators" described above.

Example:

- ✓ A study about how the properties of carbon fibres could change according to their relative position and orientation within a structure is *basic research*.
- ✓ The conceptualisation of a method to allow for processing carbon fibres at industrial level with a degree of precision at the nano-scale could be the outcome of some *applied research*.
- ✓ Testing the use of new composite materials for different purposes is *experimental development*.

Frascati Manual 2015 – How types of R&D can be differentiated

Example in nanotechnology:

- ✓ *Basic research*: Researchers study the electrical properties of graphene by using a scanning tunnelling microscope to investigate how electrons move in the material in response to voltage changes.
- ✓ *Applied research*: Researchers study microwaves and thermal coupling with nanoparticles to properly align and sort carbon nanotubes.
- ✓ *Experimental development*: Researchers use research in micromanufacturing to develop a portable and modular micro-factory system with components that are each a key part of an assembly line.

Frascati Manual 2015 – How types of R&D can be differentiated- task

Example Chemistry: **identificati tipul de activitate de cercetare**

Study of a given class of polymerization reactions under various conditions

Optimization of a reaction with respect to the production of polymers with given physical or mechanical properties

Scalling up the process that has been optimized at the laboratory level and investigating and evaluating possible methods of producing the polymer as well as products to be made from it.

Frascati Manual 2015 – How types of R&D can be differentiated =>Task

Example Physics

1) Modelling of a crystal's absorption of electromagnetic radiations
2) Study of the absorption of the electromagnetic radiation by this material under varying conditions of temperature , impurities, concentration, in order to obtain different properties (sensitivity, rapidity) of radiation detection
3) Testing a new device using this material in order to obtain a better detector of radiation than those already existing

Frascati Manual 2015 – How types of R&D can be differentiated- task

Example in agricultural sciences and forestry:

- ✓ ?: Researchers investigate genome changes and mutagenic factors in plants to understand their effects on the phenome. Researchers investigate the genetics of the species of plants in a forest in an attempt to understand natural controls for disease or pest resist.
- ✓ ?: Researchers investigate wild potato genomes to locate the genes responsible for resistance to potato blight in an effort to improve the disease resistance in domestic/crop potatoes. Researchers plant experimental forests where they alter the spacing and alignment of the trees to reduce the spread of disease while ensuring the optimum arrangement for maximum yield.
- ✓ ?: Researchers create a tool for gene editing by using knowledge of how enzymes edit DNA. Researchers use existing research on a specific plant species to create a plan for improving how a company plants its forests to achieve a specific goal.

Frascati Manual 2015 – How types of R&D can be differentiated

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Frascati Manual 2015 – How types of R&D can be differentiated TASK- sunt corect incadrate?

Example in computer and information sciences:
Basic research: A start-up company takes code developed by researchers and develops the business case for the resulting software product for improved on-line marketing.
Applied research: Research on the properties of general algorithms for handling large amounts of real-time data.
Experimental development: Research to find ways to reduce the amount of spam by understanding the whole structure or business model of spam, what spammers do, and their motivations in spamming

Frascati Manual 2015 – How types of R&D can be differentiated

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Grup work G1-G3

- 1)Task de grup: precizati pentru activitatile selectate tipul de cercetare la care se incadreaza

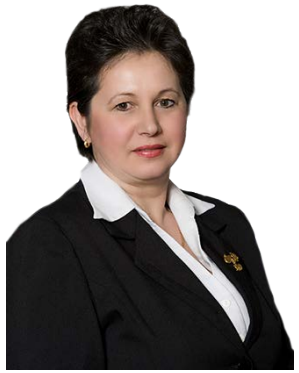
- 2) Comentarii individule la tabelul privind identificarea proiectelor de cercetare (Manual Frascatti pag 49)

Table 2.3. **Borderline between R&D, innovation and other business activities**

Item	Treatment	Remarks
Prototypes	Include in R&D	As long as the primary objective is to make further improvements.
Pilot plant	Include in R&D	As long as the primary purpose is R&D.
Industrial design	Split	Include design required during R&D. Exclude design for production process.
Industrial engineering and tooling up	Split	Include "feedback" R&D and tooling up industrial engineering in innovation processes. Exclude for production processes.
Trial production	Split	Include if production implies full-scale testing and subsequent further design and engineering. Exclude all other associated activities.
Pre-production development	Exclude	
After-sales service and trouble-shooting	Exclude	Except "feedback" R&D (to be included).
Patent and licence work	Exclude	All administrative and legal work needed to apply for patents and licences (delivering documentation as an outcome of R&D projects is R&D). However, patent work connected directly with R&D projects is R&D.
Routine tests	Exclude	Even if undertaken by R&D personnel.
Data collection	Exclude	Except when an integral part of R&D.
Routine compliance with public inspection control, enforcement of standards, regulations	Exclude	

SIPOCA 27 - ***Instruirea a 20 experți pentru certificare/ expertizare activități cercetare-dezvoltare***

MULȚUMIM PENTRU ATENȚIE



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