

Tax policy report: Business Tax Review - definition of R&D

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Action sought

	Action Sought	Deadline
Minister of Finance	Agree to recommendations	19 October 2006
Minister of Revenue	Agree to recommendations	19 October 2006

Contact for telephone discussion (if required)

Name	Position	Telephone
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17 October 2006

Minister of Finance
Minister of Revenue

Business Tax Review - definition of R&D

Executive summary

This report proposes a definition of R&D that is broadly in line with the definitions in Australia, Canada, United Kingdom and Ireland. The proposed definition is:

- (i) systematic, investigative and experimental activities that seek to resolve scientific or technological uncertainty and are carried on for the purposes of
 - acquiring new knowledge in a field of science or technology or
 - creating new or improved materials, products, devices, processes or services;
- (ii) other activities that are required for, and integral to, the carrying on of the activities in (i).

The definition is not as tight as the OECD Frascati Manual R&D definition. It is focused not just on scientific endeavour but on development work in creating new products and processes.

The definition requires that the activity seek to resolve scientific or technological uncertainty. If you wish to expand the type of activity eligible for the credit, the definition could include an alternative test so that activities that had an appreciable element of novelty, but did not seek to resolve scientific or technological uncertainty, qualified. This is the approach adopted in Australia.

We propose a list of activities that would be excluded from being “systematic, investigative and experimental activities”. All are excluded in Australia and several (such as the exclusions for research in social sciences, arts and humanities) are standard exclusions in other jurisdictions. Activities are generally excluded to clarify the boundary between innovative and routine activity or development and pre-production activity.

Officials favour either of these definitions over a broader approach because they target the type of activity in which there is likely to be business underinvestment, they are aligned with the international norm and therefore the evidence on effectiveness of tax credits as a policy

instrument is more likely to apply and they are likely to be more sustainable in the longer term.

If you prefer a broader definition of R&D, officials could draw upon the accounting definition of R&D or the definition of innovation in the OECD Oslo Manual to enhance the definition proposed or form the basis for an alternative definition. However, these definitions are imprecise, potentially very broad and likely to be fiscally expensive.

Recommended action

It is recommended that Ministers:

(a) **Agree** that R&D be defined as:

- (i) systematic, investigative and experimental activities that seek to resolve scientific or technological uncertainty and are carried on for the purposes of:
- acquiring new knowledge in a field of science or technology or
 - creating new or improved materials, products, devices, processes or services;
- (ii) other activities that are required for, and integral to, the carrying on of the activities in (i);

Agreed/not agreed

Agreed/not agreed

(b) If you prefer a broader definition that is in essence the same as the Australian definition, **agree** that R&D be defined as:

- (i) systematic, investigative and experimental activities that seek to resolve scientific or technological uncertainty **or that involve an appreciable element of novelty** and that are carried on for the purposes of
- acquiring new knowledge or
 - creating new or improved materials, products, devices, processes or services;
- (ii) other activities that are required for, and integral to, the carrying on of the activities in (i);

Agreed/not agreed

Agreed/not agreed

(c) **Agree** that the following activities be excluded from “systematic, investigative and experimental activities” in either definition above:

- prospecting, exploring or drilling for minerals, petroleum, natural gas or geothermal reserves
- research in social sciences (including economics, business management and behavioural sciences), arts or humanities
- market research, market testing or market development, or sales promotion (including consumer surveys)
- quality control or routine testing of materials, devices, products or processes;
- the making of cosmetic or stylistic changes to products, services, processes or production methods
- routine collection of information
- commercial, legal and administrative aspects of patenting, licensing or other activities
- activities associated with complying with statutory requirements or standards, such as the maintenance of national standards, the calibration of secondary standards and routine testing and analysis of materials, components, products, processes, soils, atmospheres and other things
- management studies or efficiency surveys (e.g. studies relating to inventory control, work practices and industrial relations, and time and motion studies)
- any activity related to the reproduction of a commercial product or process by a physical examination of an existing system or from plans, blueprints, detailed specifications or publicly available information
- pre-production activities, such as demonstration of commercial viability, tooling-up and trial runs.

Agreed/not agreed

Agreed/not agreed

(d) If you do not agree to the approaches in recommendations (a) to (c), **direct** officials to develop an alternative definition drawing on for example:

- (i) the accounting definition in NZ International Accounting Standard 38; or
- (ii) a definition of “innovation” such as that in the OECD Oslo Manual.

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for Secretary to the Treasury

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Definition of R&D

1. In developing a definition of R&D, officials from Inland Revenue, Treasury, the Ministry of Economic Development and the Ministry for Research, Science and Technology have considered tax definitions of R&D in Australia, Canada, the United Kingdom and Ireland. These are set out in Appendix I.

2. The definition proposed reflects “best practice” across those jurisdictions. It incorporates the following common themes (although the formulation differs in each jurisdiction):

- systematic, investigative and/or experimental activities
- resolution of scientific or technological uncertainty
- acquisition of new knowledge (in a field of science or technology) or
- creation of new or improved materials, products, devices, processes or services.

3. The proposed definition of R&D is:

- (a) systematic, investigative and experimental activities that seek to resolve scientific or technological uncertainty and are carried on for the purposes of
 - acquiring new knowledge in a field of science or technology or
 - creating new or improved materials, products, devices, processes or services;
- (b) other activities that are required for, and integral to, the carrying on of the activities in (a).

Scope of definition

4. The definition is not as tight as the Frascati definition, which requires an appreciable element of novelty and the resolution of scientific and/or technological uncertainty. The definition above focuses only on the latter.

5. The definition, consistent with its application in other countries, is adapted to R&D performed in a business setting. It is not focused simply on “white coat” research conducted in laboratories. It recognises that most firms do not do basic research and so includes the development work involved in “creating new or improved materials, products, devices, processes or services”. It would include “shop floor” activities which are part of projects designed to improve production processes as well create new products. Nor does it require that the firm be in a high-tech industry; qualifying activities can occur in any industry.

6. The definition is qualified by the requirement that the activity seeks to resolve scientific or technological uncertainty, which attempts to distinguish innovative development from routine development and purely cosmetic enhancements to products.

7. It is not necessary that the R&D activity be successful to qualify. It is sufficient that the activities seek the resolution of scientific or technological uncertainty and are carried on for the purpose of acquiring new knowledge or creating new or improved products/processes/services.

8. Scientific or technological uncertainty exists when knowledge of whether something is scientifically possible or technologically feasible, or how to achieve it in practice, is not publicly available or deducible by a competent professional working in the field. This is also the test of whether knowledge, products or processes are “new”. So, for example, a product is “new” if the knowledge required for its creation is not publicly available or deducible by a competent professional working in the field. R&D can therefore be done:

- By several firms simultaneously when they are each working at the cutting edge in the same field, and are doing similar work independently
- Where work has already been done but this is not known in general because it is a trade secret, and another firm repeats the work.

9. Supporting activities covered by the second limb of the proposed definition are activities that are part of the R&D project but that are not systematic, investigative and experimental in themselves, such as literature searches and software development.

10. We consider that the proposed definition is wide enough to encompass the development of many innovative products - for example, the development of new food products such as new fruit varieties and milk enriched with anti-oxidants, new cosmetic and pharmaceutical products such as aluminium-free anti-perspirants, and new materials such as more effective fire-, crease- and stain-resistant fabrics and wall coverings with more effective insulating properties.

11. It would not apply to stylistic changes in product design - for example, a new model of washing machine where the only difference to previous models was aesthetic. We also understand from our discussion with a software expert that it is likely to apply to little software development in New Zealand.

Expanded definition

12. If you wish to expand the type of activity eligible for the credit, one way of doing so is to include an alternative innovation test. The definition would then be:

- (a) systematic, investigative and experimental activities that either seek to resolve scientific or technological uncertainty **or involve an appreciable element of novelty** and are carried on for the purposes of
- acquiring new knowledge or
 - creating new or improved materials, products, devices, processes or services;
- (b) other activities that are required for, and integral to, the carrying on of the activities in (a).

13. This would be a broader test that would in substance be very similar to that in Australia. Its important difference from the proposed definition is that it would not require the resolution of uncertainty provided that the product or process created had appreciable novelty. Thus it would include a new idea that relied on standard engineering for its production. For example it would include the development of a new software programme which included appreciable novelty, even though it did not involve the resolution of scientific or technical uncertainty.

Advantages of standard definition

14. We favour either of the definitions discussed above over broader approaches because:
- they target the type of activity in which there is likely to be underinvestment by business
 - they are strongly aligned with international norms and therefore the evidence on effectiveness of R&D tax credit as a policy instrument is more likely to apply
 - they are likely to be more sustainable in the longer term.

Exclusions

15. Certain activities are commonly excluded from the tax concession definitions of R&D. Activities are excluded because governments do not wish to incentivise particular types of R&D activity (such as research in the arts, humanities or social sciences that may be considered less likely to lead to economic growth). Other exclusions remove doubt that particular activity is R&D (oil exploration), or clarify the boundary between development and post-development activity, or innovative and routine work.

16. Set out below is a list of activities that we propose be excluded from “systematic, investigative or experimental activities”. The first six activities are excluded in all jurisdictions we have considered and the others are excluded in at least Australia:

- prospecting, exploring or drilling for minerals, petroleum, natural gas or geothermal reserves ¹
- research in social sciences (including economics, business management and behavioural sciences), arts or humanities
- market research, market testing or market development, or sales promotion (including consumer surveys)
- quality control or routine testing of materials, devices, products or processes;
- the making of cosmetic or stylistic changes to products, services, processes or production methods
- routine collection of information
- commercial, legal and administrative aspects of patenting, licensing or other activities
- activities associated with complying with statutory requirements or standards, such as the maintenance of national standards, the calibration of secondary standards and routine testing and analysis of materials, components, products, processes, soils, atmospheres and other things
- management studies or efficiency surveys (e.g. studies relating to inventory control, work practices and industrial relations, and time and motion studies)
- any activity related to the reproduction of a commercial product or process by a physical examination of an existing system or from plans, blueprints, detailed specifications or publicly available information
- pre-production activities, such as demonstration of commercial viability, tooling-up and trial runs.

17. Because we propose these activities be excluded only from being “systematic, investigative and experimental activities”, they can come within the supporting limb (paragraph (b)) of the definition of R&D. This means, for example, that while routine data collection would not be a core R&D activity, it may be eligible as an activity that is required for and integral to a core R&D activity. This is consistent with the Australian approach.

Alternative approaches

18. If Ministers prefer a wider definition of R&D, there are definitions of R&D or innovation that are used for other purposes and that we could draw upon to add to the definitions discussed above or to form the basis for an alternative definition. However, these would need substantial further work.

¹ It is possible to have R&D in these industries but the exclusion makes it clear that exploration in itself is not R&D.

19. An alternative definition could draw on the accounting definitions of “research” and “development” in International Accounting Standard 38 (Intangible assets). These definitions are in Appendix II. The definitions focus on the creation of an intangible asset that is new to the firm and are intended to guide the firm in choosing whether or not to expense expenditure against income or capitalise it and create an asset on the balance sheet.

20. The accounting definition would appear to be broader than the proposed definition in that it would cover the development of a standard product using established production techniques. For example, it would cover the addition of a 4-door utility to the range of cars offered by a vehicle manufacturer. However, this definition is not designed to be a bright-line test for determining eligible activity. As a definition for tax credit purposes, it would be imprecise, potentially very broad and likely to be very fiscally expensive.

21. Conceptually wider, and more fiscally expensive again, is the definition of “innovation” in the OECD Oslo Manual which applies to the implementation of any product, service, process, marketing or organisational method which is new to the firm or a significant improvement to the firm. This encompasses adoption, as well as the creation, of new technology and methods and would include, for example adoption of an off-the-shelf new mail handling system within a firm. It is not clear how to implement this definition in the tax system. The definition is also set out in Appendix II.

Implications for the delivery mechanism

22. Regardless of the final scope of the definition of eligible activities, international experience has demonstrated that there will be considerable uncertainty among taxpayers on the application of R&D or similar credits, particularly in the early years of the programme. Unless adequate procedures are established to reduce this uncertainty, it leads to frequent disputes between taxpayers and the tax authorities and erodes the effectiveness of the programme to the extent that taxpayers cannot be certain in advance that their projects will qualify for the credit. These difficulties are exacerbated since tax administrators normally do not have the necessary technical expertise to make the determinations. Resolving these issues has resource implications which need to be built into the planning process for implementing the credits in order to guarantee a successful launch of the programme.

23. The determination of which projects are eligible will involve judgements on a case-by-case basis. Other countries have approached making these determinations in at least four ways:

- a) The tax authority contracts with technical consultants who can be consulted by the ordinary auditors while conducting an audit of a company. (Canada previous approach)
- b) The tax authority hires technical staff as part of a dedicated R&D unit. (Canada currently)
- c) The tax authority is authorised to consult on individual files with technical staff in other departments.
- d) Technical staff in another department make the determinations on behalf of the tax authority. (Australia)

24. We will be reporting to you on these issues as part of a more detailed report on implementation issues.

APPENDIX I

Definitions of R&D in other jurisdictions

Australia

Section 73B Income Tax Assessment Act 1936

“Research and development activities” means

- (a) systematic, investigative and experimental activities that involve innovation or high levels of technical risk and are carried on for the purposes of:
 - (i) acquiring new knowledge (whether or not that knowledge will have specific practical application); or
 - (ii) creating new or improved materials, products, devices, processes or services; or
- (b) other activities that are carried on for a purpose directly related to the carrying on of activities of the kind referred to in paragraph (a).”

The terms “innovation” and “high levels of technical risk” are further defined in section 73B (2B).

“(2B) For the purposes of the definition of research and development activities in subsection (1):

- (a) activities are not taken to involve innovation unless they involve an appreciable element of novelty; and
- (b) activities are not taken to involve high levels of technical risk unless:
 - (i) the probability of obtaining the technical or scientific outcome of the activities cannot be known or determined in advance on the basis of current knowledge or experience; and
 - (ii) the uncertainty of obtaining the outcome can be removed only through a program of systematic, investigative and experimental activities in which scientific method has been applied, in a systematic progression of work (based on principles of physical, biological, chemical, medical, engineering or computer sciences) from hypothesis to experiment, observation and evaluation, followed by logical conclusions.”

“Systematic, investigative and experimental activities” do not include:

- market research, market testing or market development, or sales promotion (including consumer surveys);
- quality control;
- prospecting, exploring or drilling for minerals, petroleum or natural gas for the purpose of discovering deposits, determining more precisely the location of deposits or determining the size or quality of deposits;
- the making of cosmetic modifications or stylistic changes to products, processes or production methods;
- management studies or efficiency surveys;
- research in social sciences, arts or humanities;
- pre-production activities, such as demonstration of commercial viability, tooling-up and trial runs;
- routine collection of information except as part of the research and development process;
- commercial, legal and administrative aspects of patenting, licensing or other activities;
- activities associated with complying with statutory requirements or standards, such as the maintenance of national standards, the calibration of secondary standards and routine testing and analysis of materials, components, products, processes, soils, atmospheres and other things;
- the making of donations;
- preparation for teaching;
- specialised routine medical care;
- any activity related to the reproduction of a commercial product or process by a physical examination of an existing system or from plans, blueprints, detailed specifications or publicly available information.

Canada

Section 248(1) Income Tax Act

“scientific research and experimental development” means systematic investigation or research that is carried out in a field of science or technology by means of experiment or analysis and that is

- (a) basic research, namely, work undertaken for the advancement of scientific knowledge without a specific practical application in view,
- (b) applied research, namely, work undertaken for the advancement of scientific knowledge with a specific practical application in view, or
- (c) experimental development, namely, work undertaken for the purpose of achieving technological advancement for the purpose of creating new, or improving existing, materials, devices, products or processes, including incremental improvements thereto,

and, in applying this definition in respect of a taxpayer, includes

- (d) work undertaken by or on behalf of the taxpayer with respect to engineering, design, operations research, mathematical analysis, computer programming, data collection, testing or psychological research, where the work is commensurate with the needs, and directly in support, of work described in paragraph (a), (b) or (c) that is undertaken in Canada by or on behalf of the taxpayer,

but does not include work with respect to

- (e) market research or sales promotion
- (f) quality control or routine testing of materials, devices, products or processes
- (g) research in the social sciences or the humanities
- (h) prospecting, exploring or drilling for, or producing, minerals, petroleum or natural gas
- (i) the commercial production of a new or improved material, device or product or the commercial use of a new or improved process
- (j) style changes or
- (k) routine data collection.

United Kingdom

The definition of R&D for tax purposes follows generally accepted accounting practice as modified for tax purposes by Guidelines which are given legal force by Parliamentary Regulations.

The fundamental test in the Guidelines is that that R&D takes place when a project seeks to achieve an advance in science or technology. The activities which directly contribute to achieving this advance in science or technology through the resolution of scientific or technological uncertainty are R&D. Certain qualifying indirect activities (such as information services) related to the project are also R&D.

Exclusions are generally embedded in the Guidelines and include

- oil exploration
- social sciences (including economics) arts and humanities
- work to improve the cosmetic or aesthetic appeal of a product/process
- market research to identify market niches

Ireland

Section 766 Taxes Consolidation Act 1997

‘research and development activities’ means systematic, investigative or experimental activities in a field of science or technology, being one or more of the following –

- 1) Basic research, namely, experimental or theoretical work undertaken primarily to acquire new scientific or technical knowledge without a specific practical application in view.
- 2) Applied research, namely, work undertaken in order to gain scientific or technical knowledge and directed towards a specific practical application or
- 3) Experimental development, namely work undertaken which draws in scientific or technical knowledge or practical experience for the purpose of achieving technological advancement and which is directed at producing new, or improving existing, materials, products, devices, processes, systems or services including incremental improvements thereto: but activities will not be research and development activities unless they –
 - (a) Seek to achieve scientific or technological advancements, and
 - (b) Involve the resolution of scientific or technological uncertainty:

Exclusions (Regulation 4 Taxes Consolidation Act 1997 (Prescribed Research and Development Activities) Regulations 2004

- (a) research in the social sciences (including economics, business management and behavioural sciences), arts or humanities,
- (b) routine testing and analysis for the purposes of quality or quantity control,
- (c) alterations of a cosmetic or stylistic nature to existing products, services or processes whether or not these alterations represent some improvement,
- (d) operational research such as management studies or efficiency surveys which are not wholly and exclusively undertaken for the purposes of a specific research and development activity,
- (e) corrective action in connection with break-downs during commercial production of a product,
- (f) legal and administrative work in connection with patent applications, records and litigation and the sale or licensing of patents,
- (g) activity, including design and construction engineering, relating to the construction, relocation, rearrangement or start-up of facilities or equipment other than facilities or equipment which is or are to be used wholly and exclusively for the purposes of carrying on by the company concerned of research and development activities,
- (h) market research, market testing, market development, sales promotion or consumer surveys,

- (i) prospecting, exploring or drilling for, or producing, minerals, petroleum or natural gas,
- (j) the commercial and financial steps necessary for the marketing or the commercial production or distribution of a new or improved material, product, device, process, system or service,
- (k) administration and general support services (including transportation, storage, cleaning, repair, maintenance and security) which are not wholly and exclusively undertaken in connection with a research and development activity.

APPENDIX II

Definition of Research and Development in NZ International Accounting Standard 38 (Intangible assets)

Research is “original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding”

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”

Oslo Manual: Guidelines For Collection And Interpreting Innovation Data

An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.

The minimum requirement for an innovation is that the product process, marketing method or organisational method must be new (or significantly improved) to the firm.

Innovation activities are all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations.

