

## **SOME POLICIES TO PROMOTE RESEARCH AND DEVELOPMENT ACTIVITIES OF BUSINESSES**

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### ***Abstract:***

*Research and development (R&D) is considered as a tool bringing benefits for businesses in many aspects such as enabling them to introduce quality products/services into markets, enhance their in-house technological capacity,... Many policies of countries, both developed and developing, have been issued with a view to supporting for business R&D. These policies are often delivered, whether in the form of direct or indirect support, via various fiscal instruments. This article clarifies the nature of the policy formation and some state specific policies in relation to support for business R&D.*

**Keywords:** Science and technology policy; R&D; Science and technology enterprise.

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### **1. Introduction**

To improve competitiveness, businesses develop different action plans. Among the many business activities, R&D is considered beneficial for businesses in many aspects: enabling businesses to enhance innovation; build up in-house technological capacity; help enterprises better absorb and assimilate imported technologies;... Therefore, supporting to Business R&D has always been given attention by governments. Therefore, policies by states are continuously issued to promote enterprises to conduct R&D programs. The following sections clarify the nature of the formulation of state policies in support for R&D of business, reflect actual performance of a number of specific policies and finally summarize some strengths and weaknesses of each specific type of policies.

### **2. Nature of state support for R&D of business**

Governments can encourage R&D in many different ways, but there are two most prominent policies normally used by countries, e.g direct incentive policy measures such as providing subsidies, loans, grants; and indirect policy measures such as tax incentives (tax deduction or tax credit).

Hereunder are some justifications for the need of public support for business R&D.

***First, the imperfection of system***

Innovation is not a linear process from science to market, it is a complex system composing of many different elements. Innovation system is a consortium of integrated organizations with different functions from production, information and special knowledge accumulation required in the innovation process (*Lundvall, 2004*). As the system is formed from various elements and interactions between the elements always exist, defects in the system are unavoidable. A system defect can occur at any time when the access to necessary knowledge is prevented, or the knowledge producing organization or the accessing agency to such knowledge fails, or the link of information between corresponding organizations is lost or ineffective (*Gustafsson & Autio, 2006*). Thus, it makes innovation policy become an issue in the design of an appropriate institutional set up, or social capacity building plan in order to materialize the potential for development. Clearly, business is the key (direct or indirect) player by their dual role as technology users and technology providers in the innovation process, in association with universities, R&D institutes, laboratories, social organizations and consulting firms. In really, in any knowledge-based economy, there exists a network of organizations as stakeholders in the innovation process.

***Second, the imperfection of market***

Many scholars believe that in the creation and dissemination/diffusion of knowledge there appears a series of visual market defects which may weaken the incentive measures in R&D investment and introduction of innovation/invention. Knowledge is a public “commodity”, businesses therefore tend to invest for R&D under the “threshold”, because the profit got from R&D investment for private business tends to be lower than the benefit brought for society. Private investment in R&D is not optimal, from the social point of view, as social benefits often are higher than private interests, therefore, it does not encourage businesses to invest in R&D (*OECD, 2002; Van Pottelsberghe & cs., 2003*).

From studies on innovation and innovation policy, a number of causes of market defect in the creation and use of knowledge has been reflected, as follows: (i) the uncertainty and risks involved in R&D; (ii) the failure in implementation of innovations and use of new knowledge; (iii) misleading information in the economy; (iv) the failure to materialize the value of

knowledge for economic growth; (v) underestimated assessment of technological goods in business strategy of enterprises.

Two main reasons can be clearly observed through the behavior of businesses towards research and deployment. The first may be due to limited resources owned by or low interest of small and medium enterprises in R&D compared to large enterprises. The second, it's due to perception of enterprises about the public property nature of knowledge. Businesses think that knowledge is a public goods that can "disclose" to every business, so they do not need to make investment, as a result, investment in R&D and innovation falls under the necessary "threshold". In addition, the third reason should be mentioned that there is a significant difference in information between inventors and investors. This is quite understandable because efficient market transactions depend on the ownership of the transactions' property. The fourth reason is the uncertainty of benefits and publication of new knowledge of business. When competing on a new technology, businesses often have their strategy to prevent the dissemination of knowledge which has given them an advantage over the others. The last reason, is the cause relating to social perspective/outlooks and the benefits resulting from certain goods and services still unrecognized for further development or only be the signals for markets (*Gustafsson & Autio, 2006*).

To solve the problem of market imperfection, national governments can take various policy measures to promote knowledge based production, enhance economic benefits and social welfare such as: formation of an appropriate intellectual property system to protect knowledge creators, strengthen humanity intellectual treasure; support investment making in R&D through direct grants or indirect financial instruments; forming special types of "R&D organizations" to enhance the access to new knowledge for enterprises; support universities and R&D institutes to discover new scientific knowledge.

### ***Third, innovation and economic growth***

One issue being accepted in economics theory and proved by empirical studies is the important role of Business R&D for economic growth (*Carvalho, 2011*). Simply speaking, the economic growth of a country is most correlated with the country's investments into R&D, particularly business R&D; business R&D is the main driver of innovation, and innovation is the key driver of competitiveness and economic growth.

The focus of policy varies among industries, it shows the evidence of market imperfections in R&D in general and in business R&D, in

particular, with different implications in terms of objectives, results and effectiveness of policies. *Governments encourage private R&D because it is not necessary due to any imbalance between private and social interests in specific industries, but the role of business R&D as a key driver of future knowledge and innovation based economic growth.* Fairly speaking, those policies addressing market imperfection issues or having a lot of innovations and for economic growth, they will enjoy benefits from the public support.

For the case of tax incentives in R&D, “non-discrimination” and enabling environment provided for enterprises with “maximum autonomy” in the selection of research activity, large risky activities (*OECD, 2008; Carvalho, 2011*). Tax incentives are mainly used to encourage enterprises to increase their investment in R&D. It would say that tax incentives, among other indirect measures, have been the policy instrument of highest attention applied in R&D to encourage enterprises to conduct R&D.

### **3. Some policies promoting business R&D**

#### ***3.1. Financial support policies for business R&D***

This support can be considered as one of the important policies affecting business R&D. Support from the Government budget for business R&D is provided through different channels: Central and local support programs for business R&D; science and technology (S&T) programs of priority. In addition, a number of S&T programs, projects and tasks under the cooperation with foreign countries, which is one of the financing sources for business S&T.

*Credit policy for business R&D:* This policy involves preferential terms provided by bank credit and state funds (national S&T development foundation; national innovation fund; enterprise development fund, etc.) for business R&D and innovation.

*Venture capital for business R&D:* Venture capital is a form of share capital investments primarily for new start-up businesses. This is for those with new technological ideas but without collateral. Moreover, the uncertainty of the application of new technology may make those having new technology ideas difficult to borrow from traditional financial institutions like commercial banks to realize their such new technological ideas.

In Vietnam, there has recently formed several “channels” of capital support for enterprises conducting R&D in the form of state S&T themes/projects/programs at different level from the central to local. However, not so many businesses have benefited from state R&D direct support programs; they

often have to satisfy many conditions and procedures; furthermore, many support programs are not suitable for specific type of business and expose a number of restrictions.

### ***3.2. Tax incentive policies for promoting business R&D***

Tax incentives is a policy received high attention among indirect support policies to encourage enterprises to conduct R&D. Tax incentives for business R&D vary in countries around the world under different forms:

- Tax deduction (tax allowances): at a rate greater than 100% for the costs involved in R&D. It allows businesses to make more investment in R&D as this funding is deducted from taxable income of enterprises depending on their actual expenditure for R&D;
- Tax credits: a percentage of costs for R&D, specially cut from the corporate income tax that businesses would have had to pay;
- Other forms are also applied in some countries, namely tax deferrals, tax offset (applicable to unsuccessful businesses with a rate equivalent to the exemption rate, i.e tax deduction per costs for R&D) and progressive encouragement policies.

In Vietnam, there exists various forms of “tax incentive” for enterprise investment in R&D, applicable for (i) import of machinery, equipment, spare parts, supplies and means of transport which can not be produced in the country or it can be produced but could not meet requirements; priority technologies; it is not subject to import duties and value added tax for S&T documents, books, electronic information, high-tech equipment imported for direct use in R&D; (ii) Corporate income tax exemption for following cases: income earned from the performance of R&D contracts, sales of products in trial production period, products made from new technology applied for the first time in Vietnam; high-tech enterprises, agricultural enterprises with high-tech applications and some activities in the field of high technologies; Income from contribution by intellectual property rights, technical know-how, technological processes; S&T services; (iii) Reasonable expenses are reduced in calculation of taxable income, including: expenditures for scientific research, technology development; technical innovations and improvements; cost of out-sourcing services such as technical design, establishment and protection of trademarks, property insurance, payment for the use of technical documents, patents, technology licenses, intangible assets, technical services and other out-sourcing procurements.

Compared to the actual tax incentive policy for R&D of business of some countries around the world, tax policy of Vietnam has almost no encouraging effect on business R&D. There still exists many limitations and shortcomings in taxation legal documents in Vietnam in relation to support for R&D, in general and R&D of business, in particular, for example, no through consideration of R&D specific characteristics, inconsistency in many legal taxation documents, difficult enforcement in practice and so on and so forth.

### ***3.3. Policies in respect of facilities, machinery and equipment for R&D of business***

*Use of machineries and equipment for R&D:* This is particularly true for SMEs, because many types of machinery and equipment used for R&D are very expensive and high rate of intangible depreciation. Besides, there should be preferential policies for imported equipment and machinery for business R&D (*Dahlman, 2010*); and for common use, shared facilities with other state S&T organizations.

*Depreciation of machinery and equipment for business R&D:* As just mentioned, machinery and equipment specialized in scientific research is mostly subject to intangible depreciation, therefore, there should be appropriate method to estimate the depreciation, reflecting the true actual state of equipment in research process.

### ***3.4. Human resource development policy for R&D business***

S&T human resources in general, and for business R&D, in particular play an important role for sustainable development of businesses. Therefore, policies in S&T human resource development in general place a great influence on business R&D. It may include policies in S&T manpower training, recruitment, utilization, mobility, salary, remuneration,...

### ***3.5. Policies on intellectual property and management of business intangible assets***

In knowledge economy, R&D and innovation for increased business competitiveness and profitability becomes crucial. This requires an effective and strict system of intellectual property protection to prevent unfair competition, dishonest, while stimulating parallelly the development of endogenous technological capacity. Particularly, the intellectual property issue is even more important for S&T enterprises. This type of enterprises is newly established businesses for the purpose of commercialization of new technologies or provision of new services creating from their research

results. These enterprises have limited capital and tangible assets but intangible property, innovation capacity and good human resources for further success in the market. Innovative ideas are often the property of enterprises, especially in the early stages and form the basis for looking for investors. Some high-tech industries such as electronics technology, semiconductors, biotechnology, new materials technology need special attention to the intellectual property issue, because in addition to attracting investors on the one hand, it also has the purpose to attract cooperative partners in R&D, on the other.

Here, also it needs to pay attention to the sharing of benefits when enterprises exploit the research results not produced by their in-house R&D, but by the R&D collaboration between enterprises and other S&T organizations. Besides, there is the issue of intellectual property for R&D results which have been granted with certificates of patent or utility solution, keeping secrets of scientists from rivals who would likely be competitor enterprises.

### ***3.6. Policy in providing information, consulting service for business R&D***

When businesses require to invest for themselves to conduct in-house R&D or realize research cooperation with other institutions/agencies, they need to find out multiple sources of information, make comparative assessment, analysis to select the most appropriate options. This may include: identification of subject matter, partners for R&D cooperation (strengths of each partner institution as well as each individual scientist), research equipment, even funding sources and other related issues. In addition, information on funding policy, state support for business R&D is also needed. Thus it can be said that information and counseling service for R&D is very useful, indispensable to promote R&D and innovation of businesses.

### ***3.7. Development of enabling “environment” to build up the academy-industry linkage***

Institutional development to create “corridor” for linking academia (R&D institutes, universities, research laboratories) and industrial sector (business), in the end, is one of the factors affecting the operation of R&D of enterprises, this is reflected through: increased the autonomy of S&T institutions, strengthened the cooperation between the state S&T organization and enterprises; restructured the system of public S&T organizations, changed the governance of S&T institutions,...

### 3.8. Several other government incentives for business R&D

In addition to the incentive policies on financing, taxation and credit given to develop S&T manpower, a number of other state preferential policies in land-use to build R&D facilities of businesses, customs incentives, rewards,... has also been launched to promote business R&D and innovation.

### 3.9. Policy institutional environment

Policy institutions in a set of *innovation policy* such as research policy, trade and investment policy, industrial policy,... put together in an unified, harmonious environment where policies complement each other, not overlapping, to create the best conditions for business, provide a certain impact on R&D of business.

## 4. Conclusions

Governments can support business R&D in many different ways. Incentive measures include financial support for business R&D activities, tax incentives, accelerated depreciation for R&D equipment, tax exemption for imported R&D equipment and inputs for R&D,... Two most important policy measures are direct funding and tax incentives. Recently, governments of developed countries have redirected from policy of providing direct grants to tax incentive policy, largely because these countries want to provide the support in a neutral and objective way rather than targeted interventions. However, developing countries with limited resources, the tax system not yet developed, the R&D in businesses are still weak, so it should carefully consider a harmonic balance between neutral and targeted support policy. Table 1 below summarizes strengths and weaknesses of each type of policy.

**Table 1.** Measures to support business R&D

Measures	Strong points	Weak point
<i>Tax incentives for R&amp;D</i>	<ul style="list-style-type: none"> <li>- State functional, objective and less biased intervention.</li> <li>- Reduced operational bureaucracy, reduced administrative costs in planning, budget allocation and management.</li> <li>- Encouraged R&amp;D for multiple business objects (but can be used for specific target groups of enterprises).</li> <li>- Businesses decide by themselves on how to invest in R&amp;D project in most effective way.</li> </ul>	<ul style="list-style-type: none"> <li>- Difficult to increase support for R&amp;D (e.g additional funding).</li> <li>- Not suitable for businesses implementing large R&amp;D projects which need direct financial support.</li> <li>- Not really suitable for start-up businesses not having taxable income.</li> <li>- Impossible to target specific businesses, though it can aim at</li> </ul>



Measures	Strong points	Weak point
	<ul style="list-style-type: none"> <li>- No discrimination on topic of research, technology or industry areas.</li> <li>- Less risky in selecting R&amp;D projects.</li> <li>- Encouraged more accurate report by businesses on their revenue and profit.</li> <li>- Avoided group benefits and special benefits taken by state employees.</li> <li>- Avoided up-front budget allocations through the tax instrument itself.</li> <li>- The most effective tool to increase business R&amp;D</li> </ul>	<ul style="list-style-type: none"> <li>specific sectors.</li> <li>- Limited control over national budgets.</li> <li>- Risky funding for R&amp;D projects which have been done in the past.</li> <li>- Risky support for non R&amp;D activities (based on the perception of enterprises to classify the activity).</li> <li>- Reduced spill-over effect of R&amp;D results.</li> </ul>
<i>Funding for R&amp;D projects</i>	<ul style="list-style-type: none"> <li>- It allows to address special targets in specific cases.</li> <li>- Possible control of the funding provided for R&amp;D projects</li> <li>- Possible funding in stages based on the objectives identified.</li> <li>- Relevant in promoting high-risk projects with specific policy objectives.</li> <li>- Suitable for R&amp;D activities with major differences between social and private benefits.</li> <li>- Created competition among businesses to ensure public resources directed best towards R&amp;D projects.</li> <li>- Appropriate to address specific technologies</li> <li>- Promoted cooperation and technology transfer.</li> <li>- Better budget control.</li> </ul>	<ul style="list-style-type: none"> <li>- Resulting in management bureaucracy at high level.</li> <li>- Cannot select the best R&amp;D projects.</li> <li>- High administrative management costs</li> <li>- Difficult for administrative processing of a large number of project files.</li> <li>- Businesses can stop performing R&amp;D projects that has not been supported by state.</li> <li>- Possible groups' interests occurred.</li> </ul>
<i>Accelerated depreciation for equipment research &amp; deployment</i>	<ul style="list-style-type: none"> <li>- Reduced costs of R&amp;D project equipment, creating conditions for enterprises to invest new equipment for R&amp;D.</li> </ul>	<ul style="list-style-type: none"> <li>- Difficult in calculating the depreciation rate of equipment</li> </ul>
<i>Import tax exemption for imported machinery, equipment and facilities for R&amp;D</i>	<ul style="list-style-type: none"> <li>- Reduced costs when importing machinery, equipment and modern means for R&amp;D.</li> </ul>	<ul style="list-style-type: none"> <li>- Difficult to distinguish the function of equipment which for R&amp;D, which for production purposes</li> </ul>

Source: Data compiled by the author from Dahlman (2010) and Carvalho (2011).

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