

STUDIES OF STRATEGIES AND MANAGEMENT

**INTERNATIONAL PRACTICE, NATIONAL CONTEXT
AND ISSUES FOR PUBLIC PRIVATE PARTNERSHIP
IN IMPLEMENTATION OF SCIENCE AND TECHNOLOGY
TASKS IN VIETNAM**

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Abstract:

Public Private Partnership (PPP) in co-financing science and technology (S&T) tasks has been considered by the Party and the State as an important solution to strengthen the linkage between S&T institutions with businesses in the implementation of applied research, technological innovation, human resources development. Research on international practice shows that the concept of PPP has been used in many areas with a very different and confusing meaning. In science, technology and innovation (STI), PPP concept is also used to refer to a diversified public-private interaction. Each specific PPP design depends on the type of issue to be addressed, the context, conditions, cooperative capacity of the parties involved. This article analyzes the international practice of PPP in STI activities, mainly from the US and EU, and based on that, it makes assessment on the context to identify issues of PPP in STI activities appropriate to Vietnam in the next 10-year period.

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1. PPP concept and necessity

1.1. Characteristics and significance

PPP in science, technology and innovation (abbreviated in accordance with international practice as STI), has been interpreted in many different meanings. At one extreme, there is a viewpoint considering that every interaction with the involvement of public and private partners by making, directly or indirectly, their contribution of resources or through market transactions is considered as PPP. At the other extreme, it said that only public-private interactions simultaneously satisfying several different criteria could be considered as PPP.

OECD (1998) argues that “PPP is understood as any relationship based on innovation under which PPP *together involve in contributing, directly or in-kind, financial, human resources, research and infrastructure*”. Features, keywords in identifying the PPP concept, distinguishing it from other types of public-private interaction in STI is *the join contribution of resources by the parties participating in a project or a certain number of projects*. Another feature of PPP, the condition ensuring its sustainability, is the voluntary principle for fundamental interests of the parties involved.

Partnership between organizations in public and private sector can create collective the strength and freshness by combining the knowledge and diversity of different professional competencies. For the government, PPP is expected to improve the “efficiency” of public investment in STI. The commitment of private sector to contribute resources and more importantly, their participation in defining research agenda is considered crucial to increase the practicality and prospects of success of R&D projects implemented under the PPP mechanism.

1.2. State involvement

According to the neo-classical economics approach, the State plays the role of issuing measures to remedy *market failures*. STI activities relate to many types of “markets failures” such as the nature of *public goods* of many kinds of knowledge, technology; the existence of “positive externalities”; the *uncertainty*, many risks, both technical and commercial, involved; the “thin market” makes its size not big enough, as a result, many technical services are not invested and provided.

According to the innovation systems approach, in addition to fixing “markets failures”, the State also plays backstopping role, develops non-market institutions in order for *enhanced learning and interaction among entities*, from which promoting better operation of the system. Here, *system errors* as the obstacles hindering interaction and learning process, preventing the operation of innovation system as expected need policy interventions to move out. Such policies, in many cases, is pertinent to the system where they were born and could not work in other circumstances. When reviewing, learning experiences of other countries this feature should be very carefully considered.

1.3. Classification of public-private interaction in STI

Conceptually, interactions between entities in public and private sectors can be classified according to the following criteria:

Official or unofficial. Official interaction is understood as the engagement of two parties when signing an agreement or contract, while informal interaction, for example, is a long time ties between businesses and research institutions with mutual truth of both sides, not necessarily to sign a contract.

Time frame. Interaction may be short term, for less than a year; or medium term up to 3 years; or long-term partnership when no longer operating in a single project but a series of joint activities under 5 years, 7 years or even longer timeframe.

Ambition. Interactions can target not only to strategic value, core interests of many parties, but also can address daily small problems.

Specialized degree. Interactions can target specific and also more broad objectives, such as working together towards the creation of new knowledge in personnel exchange, capacity building projects between organizations,...

As concerns types of activities, PPP in STI can be realized in association with: (i) research by the order; (ii) common research program/project; (iii) cooperative exploitation of intellectual property; (iv) start-up business from universities, research institutes and joint ventures between research institutions and enterprises; (v) technical advice; (vi) exchange of experts between businesses and research institutions.

2. International practice on PPP in STI

2.1. PPP in STI in the United States

2.1.1. State participation in R&D alliances of businesses¹

Coalitions established by US firms to do R&D together have existed for a long time. However, such alliances used to face with the risk of being accused of violating anti-monopoly laws. Not until 1984, when the United States Congress passed the Act on national cooperative research (The National Cooperative Research Act - NCRA), the R&D cooperation between US businesses has officially been promoted.

Also during that period, the issue of state participation in or support for R&D alliance of businesses was discussed. It was believed that many businesses have the power to complement each other, so cooperation was

¹ The content of this section was compiled from many data sources, mainly from the research of US Congress Budget Committee titled "Using R&D Consortia for Commercial Innovation: SEMATECH, X-ray Lithography, and High-Resolution Systems" (CBO, 1990).

necessary; it promoted technology transfer in the industry; forming industry standards, open up a larger potential market. In addition, State participation in R&D alliances initiated by businesses also aims at increasing efficiency of public investment in R&D because when having businesses involved by investing money, the practicality and successful opportunities of R&D is likely to be higher.

The above argument has paved the way for the introduction of SEMATECH², an R&D alliance in the field of semiconductors, a model of joint efforts of the State and business community in collaborative R&D. SEMATECH was established in 1987 to prop up the crafting technology of the US semiconductor industry. This is a R&D alliance with the participation of 14 semiconductor companies in the US, representing 80% of the output of this sector in the United States by that time. The federal government initially approved a budget of \$100 million in fiscal year 1988 corresponding to the similar contribution (\$100 million) of the alliance member companies. Then, the government and businesses reached agreements to use these resources to participate in the 5-year joint R&D project in semiconductor manufacturing technology with an annual budget of about \$200 million, each side contributed half of the budget. In addition to the initial contribution of federal government and semiconductor manufacturers, SEMATECH also attracted later the participation of a coalition of 140 semiconductor equipment manufacturers and further contribution of local authorities. Following SEMATECH, US governments at all levels have involved in many R&D alliances of other high-tech industries.

SEMATECH and alliances have similar nature of PPP. However, at that time, these models were called “Collaborative R&D”. Later on, the concept of PPP in R&D is used in the US to refer to the funding provided by business sector for R&D of universities and public research institutions.

2.1.2. Participation of enterprises in support for R&D of public universities and research institutions

According to Scotchmer³, PPP in R&D in the United States is understood as the private sector involvement in investment for research projects of public universities and research institutions with expectation to get early access of results (if any) or own (wholly or partially) the intellectual property generated from these R&D projects. It could be said that research

² SEMATECH is the abbreviation in English of Semiconductor Manufacturing Technology.

³ Scotchmer, S. (2005), *Innovation and Incentives*. The MIT Press. Cambridge.

activities in US universities increasingly relied on funding from the business sector⁴. This trend is fading the boundaries between non-profit and for-profit sciences, making recently emerged new worries.

US reality shows that PPP in R&D, on the one hand, it helps exploit the advantages as more additional financial resources mobilized for research, practical applicability of research results increased,... but on the other hand, it poses many issues need to address, such as the issue of ownership of intellectual property generated by the two sources of funds, the limitation of scientific openness, scientific research tends to economic profits that sometimes overlook other social, human benefits.

2.1.3. PPP provides STI services for SMEs⁵

Partnership in the STI in the United States is not only limited in large R&D programs, but also is quite popular and successful in the area of STI service provision for SMEs, typically in the Manufacturing Extension Partnership - MEP- program. MEP is actually a network of regional centers operating on the basis of multilateral partnership (both public and private) which provides technical support and business service for the closely need of SMEs in the locality in order to improve their performance and competitiveness. The program was a joint initiative between federal and state governments, with participation of non-profit organizations, scientific institutions, and business groups.

Putting in operation in 1988 with 3 centers, to date MEP has expanded to all the states, with about 60 centers and more than 440 field stations. MEP was organized in decentralized and highly flexible manner. Federal funding was used to support for the establishment and operation of regional centers on the principle of competition, counterpart contribution and actual capacity of local partners. Regional centres did not provide direct financial support for businesses, but only technical and management support. In addition to mobilizing their own resources, MEP centers also had collaboration with thousands of both public and private organizations throughout the States so as for other resources exploited, duplication of services avoided, professional skills attracted, raising awareness and promoting flexibility in the provision of services.

⁴ Li and Gross (2003) showed that there was 23% to 28% of researchers in the field of biomedicine had received funding from Enterprises; 43% received gifts related to research activities; and about one third had personal financial ties with corporate sponsors. In 1980, 46% of biotechnology companies provided support for research of universities.

⁵ Contents of this section was summarized based on documents of Schacht (2011) and Posts of Shapira & Youtie published in OECD (1998).

Success and sustainability a long the time of MEP was due to a combination of both public and private financial sources. On average, the cooperation was guaranteed of 35% from federal budget, 35% from state budget, and 30% from private funds. Businesses receiving support had to pay maximum 40% of total cost. An independent study noted that the firms receiving assistance from the program had productivity growth higher than 5.2% compared with those of same type of business not receiving the assistance (*Schactt, 2011*).

A noteworthy point of the MEP was a change in content of the program during its implementation. The initial intention when formulating the program was to provide cutting - edge technology developed by the National Institute of Standards and Technology (NIST) and other federal labs for SMEs in manufacturing sector. However, an assessment report of the US Government then concluded that advanced technologies from labs were not practical for large number of small manufacturing enterprises for the fact that these technologies were generally expensive, not had been tested and too complicated. The MEP had changed direction to provide simpler, basic technologies but allowing SMEs to improve their competitive position.

From the viewpoint of mechanism design, MEP was a partnership of multilateral mechanism, at many different levels, including different types of entities, both public and private, and operating in pursuance to market signals. In terms of financing for the establishment and operation of regional centers, MEP relied on partnership of donors. In respect of operation of individual center, on the other hand, MEP relied on partnership among the centers with a number of other service providers, both public and private. Services of centers were not provided free, as the operation realized under market signals to meet the real needs of local SMEs.

2.2. PPP in the EU frame programs on S&T

2.2.1. Joint technology initiatives

PPP in STI operation has already existed for a long time in EU member states under various forms, at different scale, and in different fields of technology. However, not until the period 2005 - 2007, PPP in STI at the EU level in the form of Joint Technology Initiatives (JTIs) was started discussion and then introduced in the content of the 7th EU Frame Programme for research, technological development and demonstration for 2007-2013.

JTI was seen as a new way of implementing PPP in STI at European level. JTI was proposed as a result of operation of the European Technology Platforms (ETPs), which were established by decision of the EU in capacity of a “state” in order to legalize the capital contribution of EU with partners of private sector. The contribution rate common in JTIs was 50:50, except otherwise agreed upon.

With regard to organization, each JTIs normally included a management board, CEO and an Executive office. In some cases, in structure of JTIs there was also a scientific council and some units representing the voice of other related stakeholders. The EU (represented by the EC) was a founder of the JTIs and a participant in decision making process.

Proposals for establishment of JTIs were reviewed, selected on the basis of the assessment results in pursuant to various criteria, as follows:

- The strategic importance of the proposed themes and clear indication of the results;
- Convinced explanation on the existence of the market failures;
- Convinced explanation on added values for the EU;
- Commitment of the business sector;
- Existing policy tools are not enough to address the issue posed.

2.2.2. Legal structure and public finance in JTIs

JTIs is established in the form of “Joint undertakings” under Article 171 of the Agreement on the European Union’s operation, this term allows this organization, along with other partners, to establish collaborative entities to carry out the EU mission. To be consistent with financial rules, EU funding support for JTIs was not eligible as a grant, but *a contribution*, thereby it can enjoy financial regulations in more flexible manner. Financial contributions are not subject to some specific provisions for grant identified in financial regulations. In addition, to ensure adequate transparency, two separate budget lines were established: one line for Joint undertaking running costs and the other for Research costs.

2.2.3. Results and direction of JTIs development

In the framework of the Seventh Program Frame (2007 - 2013), there were five JTIs established and put into operation, with an EU contribution up to EUR 3.12 billion, corresponding to the counterpart contribution from private sector of EUR 4.66 billion. JTIs had confirmed their success in attracting the participation of private sector (including SMEs with 28% of

the partners involved). Practical activities of JTIs also pointed out some weaknesses requiring some policy adjustments, amendments to be more relevant for PPP.

Following the 7th Program Frame, the next program for period 2014 - 2020 called “Horizon 2020” continued to regard JTIs as a tool for PPP implementation in research and innovation at European level. Some adjustments were made in the direction of simplification of administrative procedures relating to the establishment and operation of JTIs; simultaneously, specific regulations on finance for JTIs activities were applied.

Besides JTIs, “Horizon 2020” added new form “PPP based on contracts”. In this way, the PPP was implemented without a new legal entity established, but a partnership contract signed instead between EU representatives and the private sector’s. Modality of PPP by contracts was considered appropriate for the task which could be relatively clearly defined from the outset and was directly related to business. This modality did not create complicated financial and organizational issues like JTIs, however, limitation of this modality was the loose commitment in participation of stakeholders involved.

3. Background and issues raised for PPP to perform S&T tasks in Vietnam

3.1. Limitation in identification and implementation of S&T tasks

3.1.1. S&T tasks

S&T tasks was defined in Law on S&T 2013 in a fairly open sense, i.e: *“subject matters of S&T need to be addressed to meet the practical requirements of socio-economic development, ensure national defense and security, S&T development”*.

However, in practice S&T task is often understood in a narrow sense within the range of R&D and experimental production activities organized in the form of research programs, projects, tasks in line with research functions of S&T organizations. S&T tasks using State budget were then classified into national, ministerial, provincial and local level S&T tasks. For the tasks at national, ministry, provincial level they must be implemented by order. This provision made uncomfortable in the application of the concept of S&T task for non R&D or experimental production activities that use the resources not from state budget.

3.1.2. Identification of S&T tasks

The identification of S&T tasks should be funded from the State budget is really a hard work. Because the state represents the interests of community, therefore, in principle, S&T tasks should bring expected larger benefits to community compared to the costs involved. However, in fact, there were many different communities and interest of this community may not be necessarily beneficial to other communities. In addition, too many uncertain factors, lack of market signals, major delays made us have no effective mechanism to predict the real value of the proposed S&T tasks.

The problem becomes more complicated when many results of S&T tasks using the state budget had not been applied yet in life, not brought about clear benefits. In response to criticisms on this regard, State S&T management agency often proposed “rapid solutions” at risk of “splashing water pot with the baby in it”. The recently issued mechanism of funding S&T tasks by order in Vietnam was as an example.

Responding to complaints about many research results are left in “drawers”, managers proposed the “mechanism of funding S&T tasks by order” with the expectation to address the problem of pending application of R&D results. However, in reality, it is still far from expected.

Law on S&T stipulated that S&T tasks at national, ministerial or provincial level must comply with the order mechanism. In order to implement these provisions, Ministry of Science and Technology (MOST) issued Circular 07/2014/TT-BKHHCN dated 26th May 2014, prescribing guidelines, procedures for determining national S&T tasks using the state budget. The procedures for the above purpose are as follows:

- Proposals by different agencies, organizations and individuals are submitted to MOST;
- MOST conducts reviews, evaluation, selection of satisfactory proposals;
- MOST organizes tasks identification panel and in case of necessity, collects more opinions from independent consultants;
- MOST approves the list of S&T tasks to order, whether by selection or by direct assignment.

In the spirit of the Law on S&T “*The State shall encourage, create favorable conditions for all organizations and individuals to propose ideas for S&T tasks*”, Circular 07/2014/TT-BKHHCN prescribed “*organizations and individuals have the right to propose ideas for S&T tasks*”, however, these ideas, proposals must be “sent to the authorities concerned for consideration and synthesis” and submitted to the MOST for further

consideration and selection before giving to the tasks identification panel to select S&T tasks.

With such organization such as described above, the identification of S&T tasks was still due to the state agency responsibility in playing a decisive role. The research ideas, proposals were basically oriented by the State. The involvement of private sector, especially businesses remains limited and unequal. Mechanism of financing S&T tasks by order as current practice is still difficult to bring about real changes in the way to define S&T tasks. On the other hand, it might eliminate important S&T tasks only for not relevant to order mechanism. In fact, there is a risk of “pouring a water pot with the baby in it”.

3.1.3. Investments for implementation of S&T tasks

In the period 2006-2012, the total expenditure of state budget for S&T (excluding funds for environmental protection, national security, defense) increased over the years, but the rate of that expenditure compared with total expenditure of the State budget tended to decrease, from 1.85%/year (2006) to 1.44% (2013). In 2013, investment from state budget for S&T development reached VND 6,136 billion, accounting for 43%, and for scientific public sector reached VND 8,008 billion, accounting for 57%, there was an increase compared to previous years.

Table 1. Investments from the State budget for S&T

(Excluding the funds allocated for environmental protection, national security, defense and increased salary in 2012)

Year	Total State budget expenditure (in VND billion)	Total expenditure for S&T from the State budget (in VND billion)	Proportion of S&T expenditure compared to total State budget expenditure (%)
2006	292.700	5.429	1,85
2007	348.000	6.310	1,81
2008	390.000	6.585	1,69
2009	486.000	7.867	1,62
2010	575.000	9.178	1,60
2011	725.600	11.499	1,58
2012	903.100	13.168	1,46
2013	978.000	14.144	1,44

Source: MOST S&T (2014).

In terms of budget management, the investment in S&T from State budget is divided into two sources: (i) investment for S&T development, and (ii) investment for MOST sector, in general. The organization, formulation of plans, allocation of funds for the source (i) above was entrusted to the Ministry of Planning and Investment while the implementation of respective parts under the sources (ii) was assigned to the MOST. In line ministries, sectors and localities, the management of funds for S&T was decentralized vertically to the corresponding authorities. It could be seen that state budget spending for S&T was very modest, furthermore it had to spread out to many ministries, localities and was used for many different goals.

Investment by the private sector for R&D was considered limited, it mainly concentrated in large enterprises having big financial potential. There has been a number of businesses, large corporations established S&T development funds, however, the management and use of funds was not so effective to produce clear expected results. Overall, the state still needs effective measures to mobilize extra-budgets from non-state sources for S&T.

3.2. The question for PPP in implementation of S&T tasks

3.2.1. Supplemented new policy instruments to mobilize social resources for STI activities

Data showed that investment from the state budget for S&T tasks was very modest, widespread for many sector while the investment from the private sector for S&T is of great potential and had not been properly mobilized. In order to encourage business sector to increase their spending on S&T, the State has issued a number of policy instruments in the Investment Law, Law on S&T, Government Decree No 119/1999/ND-CP (Article 32 - established links to identify and implement S&T tasks; established the national technological innovation funds, issuing guidelines and regulations for establishment of funds for S&T at enterprises. However, the actual results of the above policies have so far still been modest. The currently applicable policy tools are largely subsidized, individual project/enterprise oriented, towards encouraging enterprises to adopt the outcome of state funded S&T carried out by public S&T organizations.

Relationship between business and state within the framework of the above policy instruments still remains a “asking-giving” mechanism, not existing policy tools allow to joint, open discussion between State and business community *to identify, contribute resources and realize S&T tasks* for mutual benefits. There have not been appropriate mechanisms for

implementation of large S&T program with a decisive contribution to improved sector competitiveness; development of sector priorities; addressing major socio-economic issues which require the cooperation of many parties, including the State.

Party Resolution No. 20-NQ/TW also highlighted that one of the limitations of our country's S&T was “*inefficient mobilization of social resources for S&T activities; low level and effectiveness of investment for S&T*”, simultaneously, it indicated oriented solutions “*to strengthen links between S&T institutions and enterprises in the implementation of applied research, technological innovation, personnel training tasks. Conduct pilot implementation of a mechanism of PPP in co-financing the implementation of S&T tasks*”.

On 29th March 2013, the Government issued Resolution No. 46/NQ-CP to start the action program of the Party Resolution No. 20-NQ/TW; concretizing measures indicated in the Party Resolution, including the task of developing a project on “PPP mechanism, co-financing the implementation of S&T tasks”. This was expected to be one of the solutions to enhance the mobilization of social resources and attract domestic and foreign investment for S&T, avoid the situation of fragmented investment from the state budget, reduce costs, risks and create a high competitive environment in the S&T operation.

3.2.2. Improve the practicality of S&T operation

Although there existed a number of mechanisms and policies to encourage the participation of private sector in the identification and implementation of S&T tasks, there is currently no effective dialogue mechanism by which it allows the State, enterprises and organizations and individuals to come together to identify, implement and use the results of S&T tasks of common concern, improve the efficiency of using state funds for S&T. PPP is expected to be a new modality towards such a desire, thereby enhancing the practicality of S&T activities, in general and S&T tasks, in particular. In addition to contribute more investment funds for S&T tasks, the private sector with advantages of R&D, management capability, market development, association, networking,..., shall become an important partner that the State can cooperate with to improve the efficiency of investment and implementation of S&T tasks. Attracting and encouraging private sector to get involved in S&T tasks also meets the requirements of socialized S&T activities, facilitating the sector to participate in an active, proactive manner.

4. Leading ideology in PPP design for implementation of S&T tasks in the next 10 years

4.1. Lessons learnt from international practice

International practice shows that the understanding of PPP in STI is very diverse. A specific PPP design is dominated by many factors, in which it should be mentioned those problems that PPP focused to address, i.e legal environment and custom that influence the behavior and attempts by the parties involved; desire, capacity and opportunity of the partners in cooperation. International practice also shows that achieving consensus among different parties with different core interests to establish and then implement the PPP is not so simple and it requires a lot of effort. Experience also shows that PPP requires time for the parties to better understand each other, therefore, on top of the objective of obtaining specific results, successful interactive process between the parties should also be considered an objective of PPP.

International experience also indicates that for the PPP to gain good results, it will need testing, adjustments of policies and related legislative instruments. There is no general formula for such items. It should clarify the causes, context and issues to address for the PPP, then we can touch upon the specific design option.

4.2. Types of S&T tasks and appropriate format for PPP

Basically, S&T tasks implemented under the PPP should come from the mission, the interest of the state, the community and profit goals of private partners. On the government side, that is the mission to adjust market and system failure, supply public goods/services and/or fix under threshold investment of private sector. On the private sector side, S&T tasks should be initiated for their benefits, it can be profitable, but it may be beneficial in terms of reduced risk, networking, being accessible to store of knowledge, human resources, research infrastructure of the public sector. Obtaining political guarantee in some cases is also an important benefit that private partners target to.

As analyzed in previous sections, S&T tasks that both public and private sectors benefit from when working together can be of the following types:

- Technology development in the pre-competition phase: technology at this stage having the character of public goods, with high risk, so businesses need to share the risk and the state has also the mission to participate in the implementation;

- Technology in commercialization phase: typically, technology at this stage brings direct benefits to the enterprise, however, the state may still have reason to participate in PPP as success of one technology, especially platform technology, can open up the development of a new industry, bringing huge benefits to the entire society.

The determination of the appropriate type of S&T tasks to comply with PPP as above indicated is just something in principle. In fact, which S&T tasks are appropriate with the PPP depends on specific circumstances. Practice in many countries and in many international organizations also reflects the diversity of approaches to PPP in R&D and innovation.

In the context of Vietnam, the PPP is expected to be complementary policies to address those problems that the prevailing policy tools have not yet solved. Specifically, there is the issue of synergy to tackle the strategic, large scale S&T tasks of individual sector or the whole economy that each separate enterprise, sector or locality cannot solve effectively. The PPP carries out S&T tasks not only to address the issue of PPP but also the question of public-public and PPP. The ideology of partnership towards joint proprietary, joint effort while maintaining the relative independence of the parties is considered to be mainstream ideology in design of PPP mechanism to realize S&T tasks in Vietnam in the next 10 years period./.

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