IMPROVEMENT OF THE SELF-MANAGEMENT MECHANISM OF SCIENCE AND TECHNOLOGY BASED ORGANIZATIONS CASE STUDY OF R&D ORGANIZATIONS OPERATED BY STATE BUDGET[1]

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Abstract:

The self-management in science-technology (S&T) activities has been applied in Vietnam since early time. The practical organization of self-management, however, remains to show many shortages. This study is focused on analysis of successes and shortcomings observed in implementation of self-management of S&T organizations through the case of the ones operated by the State budget and experiences of implementation of the mechanism in some advanced countries. The analysis would be the background to propose a set of solutions for improvement of the institutional self-management of S&T based organizations and R&D organizations in purpose to enhance the effectiveness of activities of these organizations and to contribute to improving the system of legal documents for S&T activities in Vietnam.

1. Some conceptual aspects of the institutional self-management of S&T organizations and R&D organizations operated by the stage budget

When discussing the institutional self-management of S&T organizations, there exist different points of view but almost of them have the identical concept: *"The self-management in S&T activities"* means the status where S&T organizations are proactive to carry out their tasks according to rights and duties assigned by laws and are liable of the completed actions. *"The institutional self-management of S&T organizations"* is the whole set of legal regulations for the rights toward self-management and elements to secure the S&T organizations to implement these rights.

1.1. Requirements of the institutional self-management of S&T organizations

First, the institutional self-management of S&T organizations is an "open" institutional status which is held permanently improved to keep pace with

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the socio-economic development and demands of researchers because of the creative nature of S&T activities.

Second, this institutional status should be defined on set of criteria other than the ones of State administrative management, namely working time, recruitment mechanism, contribution of research results for science and socio-economic development.

Third, the institutional self-management requires elements to secure the realization of research tasks such as mobilization of capitals and S&T human resources, credit loans for research and test, etc.

Fourth, the self-management in S&T activities should be assessed on basis of effectiveness over the full cycle of implementation and global impacts to the socio-economic development.

1.2. Some problems posed toward R&D organizations operated by the State budget during the shift to market economy [16]

By their nature, R&D organizations operated by the State budget are those organizations established and owned by the State. This form is popularized in many countries over the world in order to carry out various tasks according to national development strategies; the tasks which produce economic values and meanings for the community and require large capital resources or have priorities for national defense, security and national secrets... In market driven economy, however, the activities of these organizations make appear some shortages, namely:

First, internal conflict between the State management role and the autonomy status of the State owned R&D organizations. When shifting to the market driven economy, the State does not make direct orders for research tasks, then the organizations have to look themselves for research tasks and to pay the salary for scientific staff and administrative staff. This situation puts down the problem between the "guiding role" of the State and the "autonomy" of these organizations in the new environment.

Second, the links between the owning subject and the using subject in the ownership of research results. According to the Civil Code, the ownership rights include three rights, namely the rights to possess, rights to use and rights to dispose the object. By their nature, these R&D organizations are established by the State then the State has the rights to possess and to dispose, but the organizations themselves keep the rights to use (having the use of State owned human resources and assets). The problem is to which suitable level to allocate the self-management of R&D organizations without causing the conflict with the State ownership rights.

Third, the effectiveness of activities of R&D organizations should be based on other platform of assessment instead of *"completion of assigned tasks"* as it is practiced now in administrative organizations.

1.3. Experiences of self-management in R&D activities in some countries

1.3.1. Germany

The self-management for activities of R&D organizations is implemented through *the organizational reform and financial mechanism reform*. The scientific organizations of large size and S&T associations are fully provided by the State budget upon their research projects. They are free to define their own targets and research themes. S&T associations and research institutes conducting activities in fields of new technologies would provide their financial resources mainly through contracts with business institutions, enterprises and State owned organizations, etc. Subject to scope of activities their level of financial self-management vary (those working specially for defense fields are provided fully from the Federal budget through Ministry of Defense, while others are provided 75% from the State budget and 25% from their own sources) [16]. In addition, in order to encourage R&D development, the German Government issues the Excellent Innovation Program for leading research activities in universities which is supported by a fund of Euro4.6 billion for 2007-2017 periods, promulgates the Law of Modernization of Framework conditions for investment by joint stock scheme or venture funds (2008), incentive taxation policies for R&D activities for 2009-2012 periods, Fund for High Tech-based enterprises for venture investment in technological start-ups with starting capital of Euro272 million (2008) for commercialization of research results, annual investment of Euro17.5 million for service and non-technological innovations [14].

1.3.2. China

In order to address the low effectiveness of activities of R&D organizations, China is conducting a reform of R&D system with the concept: *"Economic development relies on basis of S&T and S&T have to support economic development"*. The reform is conducted in direction: building the Chinese R&D system (which is capable to self-adjust and adapt), renovation of structure and deployment of human resources in R&D system which has 4 main types of research institutes: Government controlled institutes, institutes of enterprises, institutes of universities/colleges and non-profit institutes. Government controlled institutes have to follow the principle that the

Government can establish R&D institutes for S&T problems which can not be solved by market tools or which are required for socio-economic development or S&T development without any existing research institutes capable for. The establishment must be based on consideration of economic conditions and effectiveness of activities. Institutes of enterprises are mainly to conduct R&D activities in fields of commercial products. Institutes of universities/colleges which are intermediate organizations conduct research for non-commercial products with orientation for new and high technologies. Non-profit institutes are set-up by commercial associations, research collectives or local entities for public service purpose. Financial resources for non-profit institutes are provided partially by the Government budget, enterprises, international supports and contracts.

In addition to organizational reform, China issued the long-term S&T Development Plan, up to 2020 with 8 break-through directions[2] [14] with attention focused for intensive investment for R&D, incentive measures and tax reduction for investments in S&T fields to promote applied research and scientific publication. By this way many R&D organizations are transferred to technological enterprises and many of them have R&D activities on global scale.

1.3.3. Korea

Right after the World's Second War, the Government of Korea defined clearly the shift of direction of economic development which would be based on endogenous promotion of S&T and technological transfer. The economic development of Korea passed the process of close links between economic systems and R&D organizations through 10 year long phases suitable for economic capacities. The S&T strategy of Korea is focused mainly on innovations and R&D investments. The 2008-2013 S&T plan focuses on R&D investment for national R&D strategic matters and the one of the world scale, promotion of innovations, issue of regulations and policies for technological renovations, diversification of financial resources for R&D investment, such as Basic Law for S&T, Law for human resources development, funds for technological commercialization, funds for SMEs, enhancement of R&D investment effectiveness and promotion of outputs of R&D research and etc.

[2] They are: Strong investment for R&D; incentive measures and tax reduction for S&T and innovations investment; public purchase for promotion of innovations; innovations based on import advanced technologies; capacity building in field of IP; infrastructure and national background for S&T and innovations; incubation and use of talents.

1.4. Cases of R&D investment of some countries [11,12]

It is possible to see the effective R&D activities through investments of some countries in this field. For example, the US, the world's No. 1 economic power, makes the largest investment for R&D activities. It is the same for Japan and China. In 2009 only, the US investment for R&D was USD383.477 billion (2.8% GDP), Japan was the second ranked country with USD144.576 billion and the third position was China with USD142.494 billion (China keeps the highest annual R&D growth rate of 17%). The allocation of R&D investment of these countries is also different (see Table 1).

Table 1. Structure of domestic R&D expenditures of some countries, 2007

	USD million (PPP*)	Capital allocation by sectors (%)		Implementation rate by sector (%)		
		Business	Gov.t	Business	University	Gov.t
US	368,799.0	62.3	27.7	71.9	13.3	10.7
Japan	138,782.1	77.1	16.2	77.2	12.7	8.3
China	86,758.2	69.1	24.7	71.1	9.2	19.7
Korea	35,885.8	75.4	23.1	77.3	10.0	11.6

Source: OECD, Main Science and Technology Indicators, October 2008.

2. Implementation of self-governing mechanism of state-budgeted S&T/R&D organizations

2.1. Implementation of self-governing mechanism of State-budgeted S&T/R&D organization

2.1.1. Pre-S&T Law period (before 2000)

a) Implementation of self-governing mechanism by Ordinance No. 199-CT dated 25 June 1998 by President of the Council of Ministers (now, Prime Minister). For purpose to re-arrange and to upgrade the network of R&D organizations from central level to local one by classification (the highest level is of the Government controlled institutes and the lowest level is of experimental stations). The classification targets the focused financial allocation. Then research institutes are self-governing when getting bound to production-business units. However, after two years of implementation, the number of the Government controlled institutes was not reduced but

increased. The ones transferred under Unions of Enterprises conducted activities through so-called *mechanically linked structures* (research institutes are self-management in terms of research tasks, finance and staff management aspects, enterprises provide materials for pilot production of research institutes and request the addressing of "technical problems" of their production processes).

b) Resolution No. 35-HDBT dated 28 January 1992 was issued which targeted the liberation and self-governing of resources, clear separation of functions of R&D organizations (including research, production and training); permission for establishment of R&D organizations and registration of activities on basis of "4 self-governings" (finance, free linking, self-managed activities, contractual business). Therefore, Resolution No. 35-HDBT marked an important shift in removal of central control mechanism to market mechanism. However, due to various causes, the implementation of this Resolution was embarrassed, and as result, the organizational system remain bulky, low effective and separated from production-business activities.

c) Decision No. 324-CT dated 11 September 1992 by the Chairman of the Council of Ministers on the re-organization of the network of R&D organizations to link research with training and research with production. For this purpose, all the S&T organizations of any form have duties and rights: self-governing to set up and carry out R&D plans on basis of State assigned tasks and are allowed to sign contracts with other organizations, units and enterprises; to be self-governing in terms of finance, labor force, international corporation and are liable of their own activities. However, after 10 years, there is no any newly set-up fundamental research institutes or any transfer of them under management of universities. It turned out that the number of R&D organizations was not reduced but increased and the linking between science and production was of formal value only.

d) Decision No. 782/QD-TTg dated 24 October 1996 by the Prime Minister regulating the shifting of R&D institutes to self-governing status, merging or dissolving of State-owned R&D institutes. It targeted: 1) to set up some strong S&T organizations of national scale in some ministries, and 2) to transfer S&T organizations specifically in charge of production of concrete commodities under management of enterprises or science-production unions. Implementing this decision, many research institutes were transferred under management of corporations and then conducted effective activities such as Institute of Post Science-Technics (under Academy of Post & Communication Technologies), Oil & Gas Research Institute (under Oil-Gas Corporation). However, due to the lack of integrated financial tools and

some difficulties in implementation organization, Decision No. 782/QD-TTg, globally, did not lead to desired results (4 of 9 institutes to be transferred under so-called 91-typed Corporations requested not to implement this Decision).

Briefly, at this stage, the orientation and definition of self-governed fields of R&D organizations were established. However, due to some problems of nature of awareness, management organization, adaptation capacity of R&D organizations and S&T demands of enterprises, this decision did not meet expected targets.

2.1.2. Post-S&T Law period (since 2000)

a) Summary of implementation of some regulatory documents for self-governing

S&T Law promulgated in 2000 opened an important period for S&T activities. The Law regulated global matters of S&T activities, including the regulations for self-governing rights of S&T organizations and R&D organizations in all the aspects (fixation of S&T tasks, self-governing in terms of finance, labor, international relation, use of research results). After the promulgation of the Law, many implementation guiding documents were issued, namely: Resolution No. 81/2002/ND-CP guiding the implementation of the Law (self-governing and self-liability of activities), Resolution No. 10/2002/ND-CP (financial management for tertiary organizations), Decision No. 171/2004/QD-TTg on approval of the plan for renovation of S&T management mechanism (mechanism of assignment and selection of S&T tasks of S&T organizations), Resolution No. 115/2005-ND-CP regulating self-governing and self-liability mechanism of public S&T organizations. They are considered as documents of break-through value which released public S&T organizations from containment and offered them new opportunities in research and business activities.

b) Some results of implementation of self-governing mechanism of R&D organizations[3]

- *Self-governing in terms of tasks:* Many R&D organizations selected their research tasks and suitable research programs and projects, diversified income sources in addition to allocated State budget. The analysis of completed S&T tasks during recent years shows that the State assigned tasks make 11.42% of total volume, Ministry level tasks make 30.25%, local level tasks make 24.14%, international cooperation projects make 19.96% and

[3] Annex of the MOST Report at the Middle-Term Conference on Implementation of Resolution No. 115/2005/ND-CP and Resolution No. 80/2007/ND-CP, May 2009.

other tasks make 14.22%. From cost point of view, the State tasks make 13.95%, local level tasks make 5,04%, international cooperation projects make 1.04% and Ministry level tasks and other tasks make about 80%. This shows that R&D organizations were proactive in searching S&T tasks in addition to State assigned tasks. This "double" success enhances the self-governing status of R&D organizations and reduces the load of State budget while binding S&T activities and production-business activities.

- *Self-governing in terms of human resources:* R&D organizations use their human resources in more effective manner. Many organizations built models of effective use of human resources through reduction of staff volume, contractual recruitment instead of permanent staff status. More accents were focused on the quality of recruited staffs[4].

- *Self-governing in terms of finance:* Many R&D organizations carried out well their self-governing status in financial management, such as Institute of Agriculture Machine and Tools, Institute of Mining and Metallurgy, Institute of Engineering Research and etc. Majority of these institutes, implementing Resolution No. 115/2005/ND-CP, managed to mobilize their potential in activities of research and transfer of results to production-business process.

- *Self-governing in terms of research results:* There are some disputes in S&T management works. Data of the National Center of S&T Information shows that from 2003 to 2009 more than 3000 technologies and equipments, more than 6000 technological products and equipments were offered for sales. The number of MoU and the value of technical transactions increased from 26% (in 2008) to 37% (in 2009); the value of technical transactions increased from VND2400 billion (2001 - 2005 periods) to VND6000 billion (2006-2010 periods) [8]. These figures, even remaining modest to the State supported costs of Techmart (about VND5 billion/year), show well the fact that R&D organizations get more proactive in searching research tasks and promote links between R&D organizations and production-business activities.

2.2. Assessment of implementation of self-governing mechanism by R&D organizations

- Practice of self-governing mechanism produces a large change in the way to define tasks, use of human resources and reform of operation

[4] It can be seen through 17 research institutes of Ministry of Agriculture and Rural Development (MARD) before the transfer (2006), they have the total staff of 8.688 which was reduced to 8.189 persons (reduction of 499), where the number of permanent staff were 5.082 persons, then the extra staff were 648 (Resource: MARD Report on Implementation of self-governing according to Resolution No. 115, 2007).

mechanism of S&T organizations and R&D organizations for higher effectiveness and better links with market. Researchers get a more dynamic mind-set; leaders of S&T organizations get more proactive, creative and responsible. Researchers get higher income and they remain more closely bound to research work quality and opportunity to transfer research result to production-business activities. All of this set up a new mindset in fixation of S&T research tasks and relevant links between *incomes of researchers and values of research results*.

- Implementation of self-governing mechanism creates close links between scientific research and socio-economic development and shortens gaps between research and production processes. Many enterprises set up their S&T organizations which operate on basis of Resolution 115/2005/Nd-CP, such as Hai Phong Paint Joint Stock Company, Institute of Industrial Machines and Tools, Quang Trung Mechanical Enterprise (Ninh Binh Province) and etc. Results of S&T research contribute an important part for their fast growth with the annual rate of income growth of 250%. Products are kept updated, the life level of staffs and labors get increased[5]...

2.3. Limitations and reasons

2.3.1. Limitations

- Many R&D organizations were embarrassed. They could not define the way of shifting and had not enough capacities for shifting to self-governing mechanism [9].
- Environment and conditions for implementation of self-governing mechanism was not favorable, difficulties existed for R&D organizations, R&D organizations face many difficulties with loans from banks and S&T Development funds.
- In some cases, S&T organizations could not recruit high qualified researchers or could not arrange the extra work force when implementation of self-governing.

2.3.2. Reasons

- Limited resources and potential of many R&D organizations in terms of equipment and capacity of staff could not let them make the immediate shifting to self-governing mechanism. Some large S&T organizations (Vietnamese Academy of Sciences, Vietnamese Academy of Social

[5] Report of Ministry of Industry and Trade on Results after 3 years implementation of Resolution 115.

Sciences and etc.) needed more time for ranking and then re-arranging their dependent units and appraising shifting plans. R&D investments remained low then could not implementing real production process after pilot and test stages and even products could not come to market. Researchers, globally, were not really dynamic in searching research jobs; they still keep the old practice of State-budgeted research tasks. Incomes of researchers remained still limited due to application of old administrative-nature payroll then the system could not mobilize them for research activities and bind them to S&T organizations.

- Legal environment for implementation of self-governing mechanism was not completed, technological marker remained in initial stage, financial tools for technological transaction were limited (credits and investment capitals from enterprises), IP rights and rights of researchers were not respected adequately, some regulations remained overlapped which blocked the implementation of self-governing mechanism[6], guiding documents were not integrated, proposed solutions could not cover the whole range of organizational capacities of S&T management work[7] then impacted the implementation process. More than that there was no clear indication of ranking criteria for shifting to self-governing mechanism which caused "negative psychological effects" for researchers.
- R&D activities were not really bound to production-business activities then could not bring in added values to products then research results were not "attractive products" for investment by enterprises[8].

In short, self-governing mechanism of S&T organizations in general and State-budgeted R&D organizations is a right policy and bring practical effect for R&D organizations which have high-applicant products, strengthen competitiveness of commodities, bind production and research, raise the research's income.

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[6] E.g., not concrete enough for matters of pricing of assets, credit policies for S&T organizations shifted to self-governing mechanism, ownership rights, benefit sharing of transferred State-budgeted research outcomes and etc.

[7] E.g., 8 months after issue of Resolution No. 35-HDBT, the Government issued Guideline No. 08/CT dated 18 October 1992 which did not allow research institutes/universities to set up businesses under any form. It means that Resolution No. 08/CT invalidated the self-governing regulated by Resolution No. 35-HDBT.

[8] It is possible to see clearly R&D investments in some corporations of Vietnam, namely Post-Telecommunication Corporation allocates only 0.08% of turn-over for R&D investment, while Microsoft Corp. (USA) made R&D investment of USD7.01 billion in 2007 (18%), or SIEMENS AG (Germany) made R&D investment of USD6.35 billion (6% of turn-over).

3. Some solutions for improvement of self-governing mechanism of state-budgeted S&T/R&D organizations

3.1. Macro scale

- Issue of integrated solutions for implementation of S&T Strategies from now to 2020 as measures to actualize Resolutions of the Party. They would be guiding directives for definition of long-term research tasks and research human resource training activities.
- Early set-up and implementation of *the National Innovation System (NIS)* which is considered as an integrated solution for closely binding R&D research and production-business activities. Many nations pay the great importance role to the set-up of NIS for national development strategies and to the effective operation of this system (the US, China, Korea and etc.)
- Policies to set-up the technological market; construction of industrial clusters and development of commodities of strategic values for socio-economic development and they will serve to orient the definition of research works and research products.
- Improvement of integrated legal and regulatory systems capable to secure the self-governing rights of S&T organizations for effective implementation.

3.2. Some actual solutions

- Set-up of systems of criteria to define capacities of R&D organizations and suitable road-maps for self-governing implementation (criteria for qualification of researchers, annual volume of research works, applicability of research results and etc.); criteria for evaluation of effective activities of State-budgeted R&D organizations (budgets for contractual research works, capacity of financial and human mobilization, income of researchers), R&D level of research works and obtained results (relevant level and regional and international level), potential capacities of R&D organizations.
- Implementation of periodical evaluation of State-budgeted R&D organizations according to international relevant standards for better quality and effectiveness of research results which would serve as criteria for definition of self-governing mechanism eligible organizations. It is necessary to define the status of independent S&T evaluating organizations to provide objective evaluation of activities of State-

budgeted R&D organizations (actually, the Draft of S&T Law prepares 3/83 articles for this content in Point 2, Part 2 of the Draft).

- Completion of regulations and rules for feasible implementation of self-governing rights of R&D organizations. For example, R&D organizations which have multiple tasks should separately define the ones to be completed fully on basis of self-governing mechanism, for self-governing in terms of finance and assets (the State provides the budget for completion of State-assigned tasks and daily operation).
- Enhancement of awareness by researchers about market economy. They need to have economic knowledge and integrate them into their research works. Besides, in order to create new capacities to meet actual market requirements, S&T organization leaders should define the orientations for training, use and mobilization of research human resources and for right selection of research projects according to market demands and proper organization of research activities.
- Improvement and renovation of S&T management mechanism: Implementation of administrative reforms to separate functions and duties, renovation of financial management mechanism in S&T activities, encouragement of investment by enterprises for technological innovations which would facilitate the access by enterprises to self-governing mechanism.

3.3. Recommendations

Actual studies and analysis of self-governing activities of State-budgeted S&T/R&D organizations of Vietnam and some S&T activities of advanced countries show there exist different approaches and road-maps for implementation of self-governing mechanism in S&T activities. For further improvement of self-governing mechanism of S&T/R&D organizations the following recommendations are proposed:

3.3.1. Concept of management approach: multi-directional approach for self-governing mechanism by S&T/R&D organizations

- From point of "S&T organizations rights": the actual practice of self-governing mechanism shows that there exist some unclear interpretations which lead to "mass shifting of R&D organizations to self-governing mechanism". Therefore, it is necessary to define the self-governing as rights of R&D organizations and to issue integrated policies and solution for implementation of these rights, such as financial policies, ownership of research results, use of human resources, outputs of research results

and etc. At the same time, it is necessary to confine the scope and eligibility of these rights.

- From point of "quantitative measurement of activities of S&T organizations", it is necessary to introduce the ranking system, evaluation criteria for definition of their eligibility, particularly for financial self-governing.
- From point of S&T activities orientation: it is necessary to define that the self-governing is to mobilize the creative capacities and efficiency of S&T labor of individual researchers and organizations. It is necessary to have a proper interpretation between "self-governing" and "self-control" then S&T/R&D organizations should select the suitable organizational modes for effective implementation.

3.3.2. Elements to secure the implementation of self-governing status

It is necessary to facilitate the close links between three elements: State management (to create suitable environment), R&D organizations (to carry out research) and businesses (to use research results).

3.3.3. Driving forces for promotion of self-governing implementation by S&T/R&D organizations: The driving forces for promotion of self-governing implementation have two basic components: effectiveness of activities (on basis of quantity and quality of research works and the income of researchers and etc.) and recognized evaluation of activities (acceptance of research results by society, intellectual capacities of researchers, infrastructure and equipment for research and etc.). Therefore, it is necessary to issue suitable policies in these directions. Only then the self-governing implementation of S&T activities will be really meaningful and effective./.

REFERENCES

1. Resolution No. 20-NQ/TW on S&T development for objectives of industrialization and modernization in context of socialism oriented market economy and international integration.
2. Decision No. 418/QD-TTg dated 11 April 2012 by the Prime Minister approving the S&T Development Strategies, 2011-2020 Period.
3. S&T Law, IP Law, Technological Transfer Law and implementation guiding documents.
4. OECD. (2008) *Main Science and Technology Indicators*.

5. Monitoring Report No. 752 /BC-UBKH&CNMT12 on organization and activities of S&T organizations and national key laboratories.

6. MOST. (2008) *Report on implementation of Resolution No. 115/2005/ND-CP on self-governing of research institutes and economic corporations*.

7. MOST. (2009) *Middle-term Report on implementation of Resolution No. 115/2005/ND-CP and Resolution No. 80/2007/ND-CP*, May 2009.

8. MOST. (2010) *Final Report on S&T activities, 2001-2010 Period,* October 2010.

9. Reports by MARD and MIT on self-governing implementation according to Resolution No. 115, 2007.

10. General Department of Statistics. (2009) *Statistic Annual 2009*.

11. Vietnam S&T Summary, May 2006.

12. Vietnam S&T Summary, July 2008.

13. World's Science-Technology, 2007.

14. World's Science-Technology, 2011.

15. Tran Chi Duc. (2002) *Methodology for evaluation of activities of R&D organizations of Vietnam in transition economy.* Ministry research project.

16. Hoang Xuan Long. (2002) *Studies of scientific arguments for building mechanisms and policies for self-governing and self-liability of R&D organizations.* Ministry research project..

17. Mai Ha. (2007) *Vietnam Science and Technology: Challenges for integration*. Scientific Activities Magazine. No. 1, 2007.

18. Nguyen Quan. (2008) *Investment for Science and Technology*, Scientific Activities Magazine. No. 8, 2008.