

THE ADJUSTED VALUE CHAIN MODEL FOR THE PUBLIC SCIENCE AND TECHNOLOGY ORGANIZATIONS IN LINE WITH THE CONDITIONS OF VIETNAM

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Abstract:

This research aims to introduce a new mode of operation based on Michael Porter's model of value chain with some adjustments to the operational mode of public science and technology (S&T) organizations in Vietnam. The new mode of operations illustrates the relationships between activities within the research, business and production associated organizations and their approaches to create values. Besides, the model could be a basis for the managers to evaluate and provide decisive considerations to outsource for their partners some of these activities in the value chain.

Keywords: *Value chain; Public S&T organizations.*

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1. Introduction

The nature of the public S&T organizations is of the competent management government-owned agencies' decision for establishment. Regulated by Vietnamese laws, a public S&T organization is either a scientific research institute, a R&D organization or a S&T service unit, which is organized in one of the following forms such as institutes, research centres, laboratories, research stations, monitoring stations, testing stations or any other R&D units; whose authority belongs to either the Government, the Prime Minister, related ministries, ministerial-equivalent agencies, governmental agencies, the People Committee of provinces and cities under the central government, universities, academies, colleges and state corporations.

In terms of legitimate aspects, the public S&T organisations have currently been operated in the shape of regulations guided by governmental administrative agencies. The Circular No. 10/2005/TT-BKHHCN dated on 24th August 2005 provided the guideline on conditions for establishment and operational registration of S&T organizations. This is the legislated

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document on registration and operational activities of S&T organizations, whose ownerships are irrespective of any economic sector types (State, collective or private economic sector). Some of the newest basic points of the Circular include: *Firstly*, in addition to the rights to conduct scientific research activities and S&T services, the public S&T organizations are allowed to be involved in production and business in the related field of activities; *Secondly*, the operational registration issued by the competent administrative state agencies is the only needed requirement for the private S&T organizations, without any decisions granted for operation; *Thirdly*, for the first time, the foreign-owned S&T organizations are allowed for operational registration; *Fourthly*, the S&T organizations are allowed to be linked and jointed venture to other foreign scientific researchers and organizations for operational registering and conducting S&T activities. There are also guidelines from other legitimate documentations, such as: the Joint Circular No. 11/2007/BCA-BKHHCN, dated on 27th July 2007, on guideline for the public S&T organizations to invite foreign experts and scientists into Vietnam and to send Vietnamese officials to abroad on duties that are related to S&T activities; the Circular No. 121/2014/BTC-BKHHCN, dated on 25th August 2014 on guideline on estimation, management, use and fund reimbursement of the regular functional-based tasks of the public S&T organizations; the Joint Circular No. 12/2006/TTLT-BKHHCN-BTC-BNV; the Joint Circular No. 36/2011/TTLT-BKHHCN-BTC-BNV;...

However, in addition to conducting scientific research and S&T services, the S&T organizations are entitled to the production and trading in their field of activities. So, the question is that what the operational mode are suitable for these public S&T organizations in Vietnam. Creatively based on the model of the value chain of Michael Porter, the author of this article has built up new model of value chains with nine types of specified activities of the public S&T organizations in Vietnam. On the basis of putting R&D activities in the centre, the new value chain model will provide a clearer insight on activity operational modes that adapted to the current conditions of Vietnam.

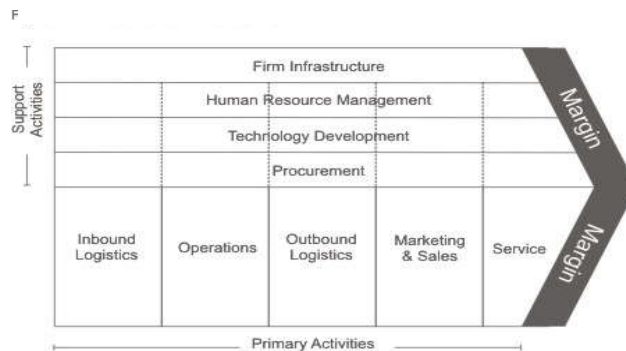
2. Michael Porter's model of value chain

Originally, Michael Porter's value chain (Figure 1) is a model demonstrating a sequence of activities that involved in the product's value creation and the profits gain from these activities. This chain of activities could occur in sequence or in parallel. The model fits for the research, business and production associated units. The model of value chain consists of three components:

First, the group of main activities: includes the activities that occur in sequence. This group of activities is directly involved in the product's value creation. The main activities in this group include: Logistics of the inputs: receiving, transporting, storing of input materials; Manufacturing: product creation; Logistics of the outputs: conducted products, storages in warehouse; Marketing and sales: product introduction, product sales; Services: maintenances, repairing and customer supports;

Second, the group of supporting activities: includes the activities that occur in parallel to the main activities in order to support the product creation. These are the activities that indirect contribute to product's value creation. The activities in this group include: Purchasing: purchasing of machineries, equipments and input materials; Technological development: innovating of products and production processes; Human resource management: recruitment, training, developing and remunerating of human resources; Corporate infrastructure: management, finance, accounting, legal issues,...

Third, Profits are the difference between revenues and costs. The production and business unit will gain profits if the total revenues from sales are greater than the total costs. In the model of value chain, the revenues are the values of goods sold and the values are created through the activities shown on the model of value chain. The costs are the amount spent to carry out these activities.



Source: Porter, 1985, pp. 37

Figure 1: Michael Porter's model of value chain with nine types of activities.

3. The approach of value chain in the case of the public S&T organizations

The following ways of approaches could be used for the public S&T organizations to recognize their advantages in Michael Porter's value chain:

First, for the use of a simple analysis of value chain, including the identification of different main and supporting activities, that significantly contributes to reduce the cost or create the uniqueness.

Second, for the identification of competitive advantages which include the analysis of new possibilities on linkages of these activities in the value chain. As long as the S&T organizations are able to manage these linkages, they could:

- Identify different processes and select the optimal solutions. For example, a S&T organization could choose to meet the just demand of individual/organization partners or choose to control the quality of the entire conducted products;
- Reduce costs; for example, the operating costs could be reduced by improving operational coordination in logistics activities;
- Reduce time for processing orders as to provide faster services for the costumers;
- Improve the quality of products/services and lower the rates of defect products.

The S&T organization, which aims to introduce strategic products, would need to redesign the linkages between the activities so that both inside and outside collaborations are enhanced to well address S&T tasks.

Third, for being found within the linkages between the S&T organizations and the suppliers and traders' own value chains, the Porter's idea was not about the cost savings over the planned expenditure of the suppliers or traders. These two partners could both gain benefits, because it is not a game with a total sum of zero. For example, a confectioner decided to choose liquid chocolate as input ingredients instead of condensed chocolate provided by the trader. This decision helped to save costs of smelting process for the confectioner, as well as to reduce the unnecessary stages of pouring chocolate into molds and condensing them into chocolate bars for the chocolate trader (*Michael Porter, 1985*).

Fourth, the last way of approach to the value chain is related to the integration of the value chain of the S&T organization to the value chain of the users which are either another S&T organization or a local household, depending on the related products or services. In the case that the costumer is a S&T organization, it could be as a direct integration into the value chain as in the case of a supplier and a trader. In the case that the costumer is a local consumer, the point is to understand the costumer's value chain and to meet his demand by a suitable kind of products and services. For

example, for one manufacturer in the field of climbing gears and mountainous traveling, the key point is to be knowledgeable on the types of terrains and weather conditions that his products would be used for. The more suitable that the products are met the needed demands and actual practice, perhaps including the extremely tough and dangerous situations, the greater the commercial success would be achieved (*Michael Porter, 1985*).

All of these above approaches own their own advantages; and suitable adjustments in majority of these activities in the original Porter's value chain are needed to the public S&T organizations.

4. The development of the types of activity in the value chain that is suitable to the public S&T organizations in Vietnam

As shown in Figure 2, the nine types of activities in the original Porter's model of value chain was adjusted to suitable to the operational mode of the public S&T organizations.

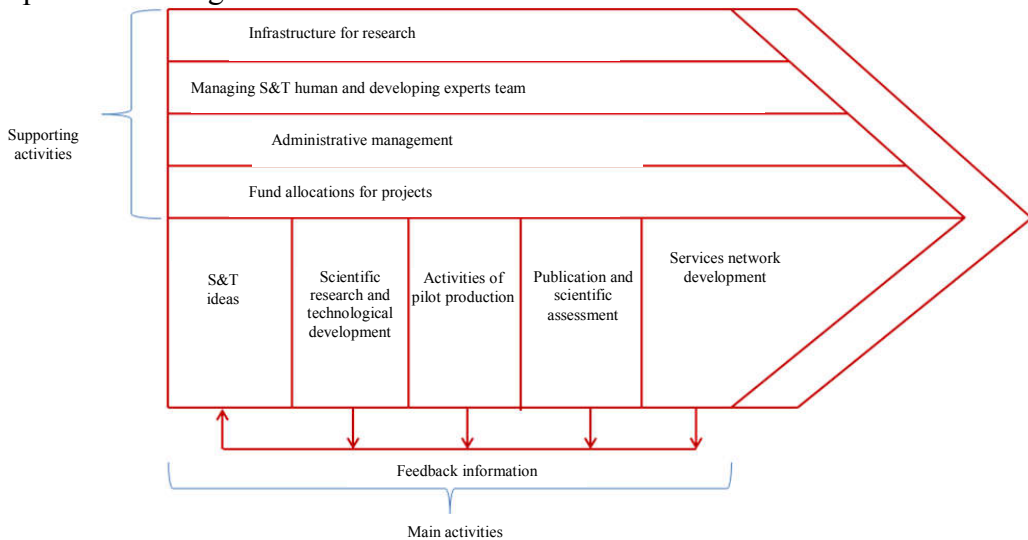


Figure 2: The model of value chain for the public S&T organizations

4.1. Adjusted group of supporting activities

a) The supporting activities on developing R&D infrastructure

The development of specified infrastructure for R&D is extremely important and represents the level and position ranking of the S&T organizations. It is the reason why the type of supporting activities on developing R&D infrastructure is more suitable for this type of organizations. Equipments, machineries and specified tools that are related

to technical processes are necessary in research and development. The most obvious feature of this type of activity is capital intensive for developing and purchasing all of these various kinds of equipments as well as maintenances of lab equipments and other related activities.

b) The supporting activities on S&T human resource management and expert team development

The development of qualified S&T human resource and ranked expert team in the related field of activities could be considered as a crucial factor. Many unique, new and specified techniques are developed during practical research, which could not be borrowed, lend or mimicked in the short term period. This would be one of the most important advantages for public S&T organizations in Vietnam. An unique feature of S&T organizations is that the quantity and quality of research outputs are counted on the excellent individual researchers' performance.

On the other hand, managers should be aware that it would be an extremely tough and huge challenge to manage S&T in the way that encourages researchers' creativity. An unsuitable management mode and improper managers might result in a properly complete collapse of a strong S&T organization with a number of top professionals and modern and adequate facilities.

c) The supporting activity on administrative governance

In order to achieve the targets planned in the government-oriented research environment, financial management, legal consulting activities related to intellectual property, contracts and other non-technical operational supports are under the management of the organizational agencies. The S&T organization needs to maintain an administrative division that is refined and flexible. Besides, the public S&T organizations should avoid recruiting any so-called "superfluous" at work or "childish" in perception (*Decree No. 115/2005*).

d) The supporting activity on budget allocation for projects

The budget allocation activity is not limited within the organization itself; in other words, the public S&T organizations might receive many other various sources of funding (such as being sponsored by government, individuals or organizations,...). In Vietnam, the S&T contracts for S&T tasks are a bit delayed and lasted in a quite short-term duration (often up to three years); therefore, if project managers look forward to continuously developing their projects, they might need to be very proactive, diverse and agile, instead of "waiting" of funding. Otherwise, the projects might probably face difficulties in a shortage of time, lack of funding, breach of

contracts and inability to retain good professionals. In order to survive and maintain the continuity of operation, the S&T organizations need to possess a quite large amount of variable capitals (which are not easy to be estimated) in order to allocate and maintain the operation in the short and medium term. In all cases, the public S&T organizations in Vietnam are not strong enough to cover all of their needs.

4.2. Adjusted group of main activities

a) The main activities start with the idea creation and development

Ideas for scientific research and technological development come not only from the researchers, but also arise mainly from the practical production and business. It is known from the experts that the outputs of S&T activities do not count merely on the number of refereed articles, international conference papers or the number of graduated masters or PhDs. However, S&T organization's function such as services for production and business is over demanded by the society. This is not simply done. Moreover, new research topics are often collided in ideas with partners, who want to check the suitability of the research on their actual production.

b) The main activities of scientific research and technological development

Typically, the research would be carried out by itself as planned. Meanwhile, the role of the researcher is merely to promote the research activities and to ensure that the research could be carried out with modern equipments. However, there has been a disparity in the current management mode. The results of research in public S&T organizations are publicly disseminated; and intellectual property belongs to the management representatives of the state agencies. Meanwhile, the results of S&T activities funded by individuals and non-state organizations or private investment are not necessarily published; and the issue of intellectual property ownership could be negotiated.

c) The contracts on research and trial production

When R&D activities end up with promising results, manufacturers and traders would like to involve in with a certain amount of investment in the forms of contracts. Under the scope of this paper, the discussion on the forms of these contracts will not be discussed because this depends much on the S&T organizations and their selected partners.

d) The main activity on research publications and evaluations, which replaces the function of marketing and sales in the Porter's model, due to the fact that these terms are unfamiliar in the public S&T organizations in Vietnam

To be R&D units, the public S&T organizations always highly acknowledge S&T activities and their outputs. Thus, the function of marketing and sales is not a common term in the public S&T organizations in Vietnam. The term of “research publications and evaluations” is very popular and familiar to them; even though there would be a number of issues to be discussed on these terms.

e) The scientific achievements and the value added to the production

In the Figure 2, the outputs of the value chain were not the profits as shown in the original Porter’s model, which were replaced by new research outputs and value added to the production. The change in terms would be better suited for the S&T organizations since the nature of these organizations eventually aims to create value added to the manufacturing and service sectors. However, the profits that the S&T organizations possibly obtain could come from a part of new products’ value chain or from technological transferring activities.

g) The main activity on information feedbacks

Additionally, Figure 2 has the information feedback connections, which show the linkages between various activities within the S&T organizations. These are also a form of quality control. By this way, it is easy to observe any improvements in performance of the entire process by learning from mistakes and practicing for the changes.

5. Some remarks on the development of brand building for the S&T organizations and measures to increase the products’ value added

In order to increase the values of the products, the public S&T organizations could choose either of these following options:

Option 1, by increasing the products’ values: the benefits of the products/services and the reputation/position of the S&T organizations are required to be increased/improved.

Option 2, by decreasing the total investment costs: these costs are required to be declined through a reduction in prices, simple procedures of purchasing, creating favorable conditions for the purchase and use of goods,...

Both of these two options require the coordination in all activities of the S&T organizations. However, it should be noted that, although costumers are put at the centre and measures to pursuit the high level of satisfaction of the costumers are considered as a focus of the S&T organizations, it does not mean they need to increase their level of satisfaction by any means.

This increase must be tied to business objectives, associated with the organizations' available resources and within some certain competitive conditions. The S&T organizations should follow the philosophy that said: to strive for ensuring a high level of satisfaction for the partners on the basis of ensuring the satisfaction level of other various subjects that are related to the organization (*Prajogo et al. 2008*).

Basically, the value chain include nine operational activities, which are corresponding to the strategy to create greater product value, including five main activities and four supporting activities. Figure 2 illustrates the generalization of the (adjusted) value chain for the public S&T. From these above diagrams, it can be seen that there are a number of issues should be taken into consideration for the S&T organizations in order to create greater values for customers as the basis for building a strong brand:

First, the four main activities should be well carried out because these activities play major roles in creating product values. The main activities include: the idea formed from the organizations; scientific research and technological development; the contracts for the development of applications; scientific publications and evaluations, provision of service networks. It is a chain of work, from the introduction of the inputs to the organizations, then processing them to the production of finished products, sales and other operational activities to serve the users.

Second, the supporting activities would also need to be invested by the S&T organizations. Even though these activities are neither directly nor play major roles in creating product values, they are still very meaningful to assist all of above main activities; without these supporting activities, it is impossible to carry out the main activities. For example, infrastructure of the S&T organization has significant influences to all main activities; human resource management also involves in all types of activities.

Third, the task given to the S&T organizations is to regularly check the costs and the results while implementing each of the activities that create values, and to continuously improve these activities so that they could be better operated than what their competitors could do. There are the only ways to achieve competitive advantages.

Fourth, in order to achieve the highest values, it does require not only the efforts to achieve good results in individual operational activities separately, but also good coordination of all various activities within the organizations. In other words, there must avoid the circumstances that

single departments in the organization merely aim to maximize their concerned benefits without taking into considerations of the common interests of the organization and their partners.

Conclusion

The classic model of Michael Porter's value chain with nine activities is sufficient for the public S&T organizations in Vietnam to experience what the production and business activities for the purpose of profits look like. Therefore, the development of activities in the value chain model (which can be seen as a strange concept) can be useful for the current S&T organizations. Because it can be considered as a tool in the strategic planning and management to keep the activities of the organizations more focused, active and flexible. In this value chain, the supporting activities associated with information feedbacks could be helpful to remark comprehensively to the inner activities of the S&T organizations. The outputs of this value chain are remarkable because it could be measured by the outputs (which are the S&T achievements) and the values added of the new products on the market.

The model represented above is only in the form of principal models. To put this model in the reality, further studies on implementation are needed with trial applications on a number of S&T organizations, especially in Hanoi and Ho Chi Minh City (if these S&T organizations agreed to cooperate)./.

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