

## LINKS BETWEEN SCIENCE-TECHNOLOGY OBJECTIVES

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### **Abstract:**

*Actually in Vietnam there exist some signs of lacking consistency and links between the objectives of S&T development between various administrative levels, fields and economic sectors, namely: activities, fields, sectors and areas are not based on the common national objectives. They are lacking important backgrounds to unify objectives of individual S&T activities. They have different reference systems existing in the objectives of S&T development. They do not have compatible links reflected in assessment of achievement of objectives of S&T development in some strategies and master plans. They set up objectives of S&T development which lack the coordination and cooperation between them. These incompatible links between objectives will negatively impact the quality and effectiveness of guiding documents and activity coordination in practice. The settlement of this incompatibility of objectives of S&T development between various administrative levels, fields and economic sectors requires the renovation of contents and methods to set up these objectives.*

### **1. Actual situation of links between objectives of science-technology development**

Actually we have many objectives of S&T development up to 2020 which get officially approved in documents issued by various levels and branches<sup>1</sup>. The S&T objectives are usually attached to S&T management authorities of

<sup>1</sup> Some examples: Decision No. 14/2008/QĐ-TTg dated 22<sup>nd</sup> January 2008 on the approval of “the Global plan for development and application of bio technologies in Vietnam up to 2020”; Decision No. 246/2005/QĐ-TTg dated 06<sup>th</sup> October 2005 by the Prime Minister on the approval of “the Strategy for development of ITC in Vietnam up to 2010 and vision up to 2020”; Decision No. 186/2002/QĐ-TTg dated 26<sup>th</sup> December 2002 by the Prime Minister on the approval of “the Strategy for development of the mechanical sector of Vietnam up to 2010 and vision up to 2020”; Decision No. 159/2008/QĐ-TTg dated 04<sup>th</sup> December 2008 on the approval of “the Project of technological renovation and modernization in mining industry up to 2015 and vision up to 2025”; Decision No. 78/2008/QĐ-BNN dated 01<sup>st</sup> July 2008 by the Ministry of Agriculture and Rural Development on the approval of “the Strategy of sylvicultural studies of Vietnam up to 2020”; Decision No. 53/2008/BCT dated 30<sup>th</sup> December 2008 by the Minister for Industry and Trade on the approval of “the Strategy of development of high tech applying branches up to 2020”; Decision No. 1483/QĐ-TTg dated 17<sup>th</sup> August 2010 by the Prime Minister on the approval of “the National key program for mathematical development, 2010-2020 period”; Decision No. 1486/QĐ-UB dated 19<sup>th</sup> October 2005 by the People’s Committee of Hai Phong City for “the Strategy of S&T development of Hai Phong City up to 2010 and vision to 2020 đến 2010”; Decision No. 4179/2006/QĐ-UBND dated 25<sup>th</sup> December 2006 by the People’s Committee of Quang Ninh Province on the Plan of S&T development of Quang Ninh Province, 2006-2010 period and vision to 2020, Decision No. 58/2006/NQ-HĐND dated 20<sup>th</sup> July 2006 by the People’s Council of Quang Nam Province on the S&T development of Quang Nam Province up to 2015 and vision to 2020, Decision No. 1186/QĐ-UBND dated 16<sup>th</sup> June 2008 by the Chairman of the People’s Committee of An Giang Province on the Plan of development and application of bio technologies of An Giang Province up to 2020, etc.

levels, fields and economic sectors<sup>2</sup>. Here the particular aspects of objectives are required to fit the specific features of areas, scope and fields of S&T activities. These particular aspects are related also to the will and determination of scientists, managers of actual levels, fields and economic sectors.

It is impossible to have identical objectives of development between cities such as Hanoi and Hochiminh City that have a higher developed level and provinces and cities that have a lower level of S&T and economic development. It is impossible also to have the equal level of objectives of development between high tech fields, such as ITC and bio technologies, and other traditional fields. It is impossible to have identical objectives of development between economic sectors that get favors for development and play driving role and other economic sectors.

The differences in specific particularities and determination are reflected also in various indexes of development. For example, the emphasized objective up to 2020 of mathematical sector is “to double the number of international publications in comparison to the one of 2010” [1], and the one of bio technological sector is “to develop strongly bio technologies to meet the requirements to produce key important and essential products of the national economy” [2]; the targeted level of the bio technological field up to 2020 is “the advanced rank in the region and international standards in some essential fields”[2], the one of IT sector is “to build and develop E-Vietnam with E-Citizen, E-Government, E-Businesses, E-Transaction and Trade for Vietnam to have a high position in the ASEAN region [3], the one of construction sector is “to get the advanced technological level in the region and the international level in some aspects such as design and structural computing, special construction works and production of some construction materials” [4], the one of sylviculture sector is “to get the equal position in the region” [5], the one of transport sector is “to get the S&T level equivalent to the one of advanced countries in the region and the level of advanced countries in some aspects” [6], the one of mining sector is “to get the regional level by 2015 and the world’s level by 2025” [7], and the one of mathematics is “to push the actual ranking 50 - 55 of Vietnam up to the ranking 40” [1], etc.

The differences and the absence of links between S&T objectives of sectors are not absolute. There exist certain links between S&T objectives and this factor plays its role. S&T activities of various levels, fields and economic

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<sup>2</sup> The paper does not take scientific and technological objectives of the research institutes, universities and enterprises into the consideration.

sectors have interactions among themselves. In global views they are different sections of the unified S&T system. The compatible links between objectives would impact the quality of guiding documents and the coordination of activities in practice.

Actually in Vietnam there exist some signs of lacking consistency and links between the objectives of S&T development of various levels, fields and economic sectors.

**First**, S&T objectives of S&T fields, economic sectors and regions are set up but many of them have gaps to fit the objectives of national global development<sup>3</sup>. Not being based on the national global objectives the individual objectives of fields, economic sectors and local administrations would not have the important and common background to unify the objectives of individual S&T activities.

**Second**, different reference systems of indexes exist between objectives of S&T development. In fact the index of increasing market shares in mechanical sector [8] is not seen in the bio technological fields [2, 9] and IT field [3].

Even, in bio technological field where the objectives are highly agreed to get the level of the top ASEAN countries and the world's level in some aspects<sup>4</sup> there exist some gaps in the determination of basic indexes to indicate clearly the actual targets up to 2020. Namely, it concerns the fact that the index of "percentage of contribution of bio technologies in the economic growth" noted in Decision 11/2006/QD-TTg dated 12<sup>th</sup> January 2006 by the Prime Minister on the approval of the Key Program of development and application of bio technologies in the field of agriculture and rural development up to 2020 and Decision No. 14/2007/QD-TTg dated 25<sup>th</sup> January 2007 by the Prime Minister on the approval of "the Project of

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<sup>3</sup> When the National strategy of S&T development up to 2020 is not issued yet in Vietnam there appears already the document to fix the orientations of S&T development for the close future as it was said in the Announcement of the Conclusion of the Politburo No. 234-TB/TW dated 1<sup>st</sup> April 2009 on the tasks and solutions for S&T development from now to 2020; here, however, the objectives of S&T development were not presented clearly.

<sup>4</sup> Concretely: "... up to 2020 the bio technologies of Vietnam will get the advanced regional level and the world's advanced level in some aspects" (Article 1 of Decision No. 14/2008/QD-TTg dated 22<sup>nd</sup> January 2008 by the Prime Minister on the approval of "the Global plan for development and application of bio technologies in Vietnam up to 2020"); "Agricultural bio technologies of our country will get the level of the top group of ASEAN countries and the world's advanced level in some aspects" (Article 1, Decision No. 11/2006/QD-TTg dated 12<sup>th</sup> January 2006 on the approval of the Key Program of development and application of bio technologies in the field of agriculture and rural development up to 2020; "By 2020 the bio technologies in the field of aquaculture will get the level of the advanced countries in the South-East Asia region" (Article 1 of Decision No. 97/2007/QD-TTg dated 29<sup>th</sup> June 2007 on the approval of the Project of development and application of bio technologies in the field of aquaculture up to 2020); "Vision up to 2020: Bio technologies in the processing industry of our country will get the level of advanced countries in the region, and the world's level in some aspects" (Article 1 of Decision No. 14/2007/QD-TTg dated 25<sup>th</sup> January 2007 on the approval of "the Project of development and application of bio technologies in processing industry up to 2020").

development and application of bio technologies in processing industry up to 2020”, was not seen in Decision No. 14/2008/QD-TTg dated 22<sup>nd</sup> January 2008 by the Prime Minister on the approval of “the Global plan of development and application of bio technologies in Vietnam up to 2020” and Decision No. 97/2007/QD-TTg dated 29<sup>th</sup> June 2007 by the Prime Minister on the approval of the Project of development and application of bio technologies in aquaculture up to 2020; the index of “percentage of growth of production based on development and application of bio technologies” was used in Decision No. 97/2007/QD-TTg dated 29<sup>th</sup> June 2007 on the approval of the Project of development and application of bio technologies in aquaculture up to 2020 was not seen in Decision No. 11/2006/QD-TTg dated 12<sup>th</sup> January 2006 by the Prime Minister on the approval of the Key Program of development and application of bio technologies in the field of agriculture and rural development up to 2020; the indexes of “S&T human source training activities”, “set up of S&T centers” noted in Decision No. 14/2008/QD-TTg dated 22<sup>nd</sup> January 2008 on the approval of “the Global plan of development and application of bio technologies in Vietnam up to 2020” was not seen in Decision No. 11/2006/QD-TTg dated 12 January 2006 on the approval of the Key Program of development and application of bio technologies in the field of agriculture and rural development up to 2020”, Decision No. 97/2007/QD-TTg dated 29<sup>th</sup> June 2007 by the Prime Minister on the approval of the Project of development and application of bio technologies in aquaculture up to 2020, Decision No. 14/2007/QD-TTg dated 25<sup>th</sup> April 2007 on the approval of “the Project of development and application of bio technologies in processing industry up to 2020”; etc.

Regarding economic sectors, while the main index of objectives noted in “the Vision of S&T development of transport up to 2020” issued by the Ministry of Transport targets the advanced level of technologies to be transferred, applied and mastered, Decision No. 78/2008/QD-BNN dated 01<sup>st</sup> July 2008 by the Ministry of Agriculture and Rural Development on the approval the Strategy of silvicultural studies of Vietnam up to 2020” notes the contribution of science to development of the sector, and the Strategy of S&T development of the field of construction up to 2010 and vision to 2020 issued by the Ministry of Construction notes that the S&T ensures the upgrading of the economic-technical level of the activities in the field (surveys, construction works).

In local levels it is possible to note individual indexes present in the objectives of development of one province but absent in the ones of other provinces, namely: “To put down efforts to have the S&T content in Quang Ninh trade mark products up to 40% of GDP by 2015 and 42% of GDP by 2020” [10], “At least 60% of programs, projects of science research and

technology development of the provincial level will have the direct service for production-business activities” [11], “More than 90% of transferred technologies in Nghe An Province will fit the regulations in conformity to the Law on Technology Transfer; more than 90% of appraised technologies and equipment will meet the requirements of quality, time and regulations and bring back socio-economic effects” [12].

From one side, the main indexes would be taken as basic lines to fix the models for the future. The global picture of the national S&T would, in fact, gather the puzzles from different configurations. Then the use of different indexes would lead to different concepts of development. From another side, the main indexes would be taken as concretized objectives to meet. Then the non-unified use of indexes would create different directions of concerns. They would hinder the coordination activities in implementation of strategies and master plans for S&T development.

*Third*, the compatible links are not reflected well to indicate the required level of objectives of S&T development in some strategies and master plans.

In some cases, the balanced links should be existing between strategies and master plans. It is, however, difficult to see these links in the whole things we have seen above.

One example of it is the gap between the objective to “ensure, by 2020, the rate of more than 70% of mathematical teachers in big universities to have the doctor grade” as noted in Decision 1483/QD-TTg dated 17<sup>th</sup> August 2010 by the Prime Minister on the approval of “the Key National program of mathematical development, 2010-2020 period” and “by 2020 more than 75% of university teachers to have the doctor grade” as noted in Decision No. 121/2007/QD-TTg dated 27<sup>th</sup> July 2007 on the approval of “the Master Plan of the system of universities and colleges, 2006-2020 period”.

The compatibility of efforts is reflected also in the mutual impacts of objectives. In fact, with the limited sources, the focused efforts for strong development of some fields would lead to refuse the development opportunities in some other fields. It would cause negative impacts to the achievement of high objectives in many fields, sectors and regions.

The absence of compatibility of efforts would lead to the misbalance in S&T development in the whole country. The absence of compatibility of efforts would also put obstacles to the coordination of investments for S&T development between levels, fields and sectors. The common objectives, therefore, would be difficult to be achieved without links and supports from other concrete objectives.

For example, the national objectives such as “Agricultural bio technologies would have the contribution of more than 50% of the total S&T contribution to the agricultural growth” noted in Decision No. 11/2006/QD-TTg dated 12<sup>th</sup> January 2006 by the Prime Minister on the approval of the Key Programs of development and application of bio technologies in agriculture and rural development up to 2020”, “Bio technologies in processing industry will have the contribution of more than 40% of the total contribution of S&T to the growth of processing industry” noted in Decision No. 14/2007/QD-TTg dated 25<sup>th</sup> January 2007 by the Prime Minister on the approval of “the Project of development and application of bio technologies in processing industry up to 2020”, “30% increase of key aqua-products based on development and application of bio technologies in aqua cultural field” noted in Decision No. 97/2007/QD-TTg dated 29<sup>th</sup> June 2007 by the Prime Minister on the approval of the Project of development and application of biotechnology in aqua cultural field up to 2020, would be difficult to be achieved if they are missed in programs and plans of development of bio technologies in many provinces, such as the Plan of development and application of bio technologies in An Giang Province up to 2020 (issued together with Decision No. 1186/QD-UBND dated 16<sup>th</sup> June 2008 by the Chairman of the People’s Committee of An Giang Province), the Action Program to push up the development and application of bio technologies to serve the national industrialization-modernization of Tay Ninh Province, 2005 - 2010 period and vision to 2020, Decision No. 1100/QD-UBND dated 21<sup>st</sup> April 2006 on the approval of the Project of development of bio technologies of Thanh Hoa Province, 2006 - 2020 period, etc.

**Fourth**, the absence of links and coordination is reflected in the set up of objectives of S&T development.

In practice, many large activities are conducted to collect comments and recommendations during the preparation of documents related to S&T development. The contribution and assessment of comments and recommendations, however, remain a kind of formal and one-direction jobs.

The process of construction of objectives has also the purpose to get the consensus through compromises and commitments of stakeholders. Therefore, the absence of coordination during the stage of set up of objectives would not only lead to their incompatibility but also make miss the background for cooperation and coordination in the implementation stage of strategies and master plans.

## **2. Recommendations**

The set up of strategic objectives have a very important role for S&T development. The above noted incompatibility causes the considerable impacts to strategies and master plans which would lead to some heavy consequences. Namely, the S&T objectives are not convincing then difficult to be implemented. It makes also difficult to coordinate resources for S&T development between fields, branches and regions because of their different orientations. It is also difficult to coordinate effectively their implementation which leads to high costs for amendments of the independently set up objectives.

The well balanced links are the background for coordination. There are two types of coordination works, namely interior and exterior. The interior coordination means the balance inside the same levels, fields and sectors. The exterior coordination requires the balance between levels, fields and sectors. Unlike the self-adjusted balance which results from market mechanism, the balance of strategic objectives is set up through a “conscious” mechanism. Therefore the actual links should be described clearly. The coordination of strategic objectives is based on the commitments of related sides. The commitments, once not respected, will cause the misbalance and then the failure. Therefore the links should be based on the possibly highest level of consensus of targets or the common background of interests.

Some recommendations, as results, are proposed to increase the close links between the strategic objectives for S&T development in our country.

1. The objectives, being focused on the individual scopes of levels, fields and sectors, should reflect clearly the links with other levels, fields and sectors, namely:

- Using other objectives as background for determination of “inputs” and “outputs” of the objectives of the actual levels, fields and sectors. It is necessary to take to account other objectives for consideration of exterior resources which can be used and coordinated to achieve the objectives. It is also necessary to use the objectives of higher level and larger vision as background to set up the objectives of specific fields, sectors and regions;
- Determining, being based on these “inputs” and “outputs”, clearly the compatible objectives of S&T development of related levels, fields and sectors;
- Getting agreed on the concepts and methods to set up the indexes of S&T development of levels, fields and sectors.

2. The special attention should be focused on the causal relations concluded in the systematic links while the objectives are set up. The global objectives of the nation, in fact, are the starting points of the system of objectives and, therefore, they should get the conceptual priority.

The world experiences show that the assessment to set up the objectives of S&T development should take great efforts, require great expenses and mobilize the large human resources. At the national level we have resources to select the appropriate methods and determine the fundamental orientations. The other lower levels would get benefits from the national level standard methods and backgrounds (basic information, "input - output" information, etc.) to set up their own specific objectives. In addition, the national objectives transfer also the strong willing and determination for S&T development from the highest level authorities to the ones of fields, sectors and regions.

The establishment of quality objectives for the national S&T development assists also to reduce the number of objectives of development of fields, sectors and regions. In practice there are cases where some fields, sectors and regions have to set up their individual objectives to cover the lacks in the national objectives.

International experiences show some particular indexes, namely: the rate of total R&D investment/GDP, rate of dependence from exterior technologies, number of cited international scientific papers, number of national granted patents, rate of contribution of S&T advances to the economic growth, rate of added value of manufacturing industry/added value of high techs/new technologies, total number of S&T human resources, rate of enterprises conducting renovation activities. They are necessary not only to describe clearly the picture of the national S&T future for purpose of international comparison but also to have the purpose to orient strategies and master plans for S&T development.

Actually the S&T objectives of some fields, sectors and regions appear before the national S&T objectives do. Therefore it is necessary to revise and adjust the objectives of fields, sectors and regions when the national ones are issued officially afterward.

The determination of some objectives of S&T development depends on certain conditions which play the role of background. The unclear determination of an objective is due not only to methods of assessment but also to the lack of exterior factors which are backgrounds for assessment. The absence of these factors would lead to the set up of formal indexes.



In certain contexts it is required to accept the situation of S&T objectives not fully determined in some fields, sectors and regions. It means to accept the reality of facts when “the possible” is more restricted than “the necessary” in our mind./.

## REFENRENCE

1. Decision No.1483/QD-TTg dated 17 August 2010 by the Prime Minister on the approval of “The Key National program of mathematical development, 2010 - 2020 periods”.
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3. Decision No.158/2001/QD-TTg dated 18 October 2001 by the Prime Minister on the approval of the Strategy of Development of Information Technologies and Communication of Vietnam up to 2010 and vision to 2020.
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5. Decision No.78/2008/QD-BNN dated 01 July 2008 by the Ministry of Agriculture and Rural Development on the approval the Strategy of sylvicultural studies of Vietnam up to 2020”.
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11. Decision No.58/2006/NQ-HDND dated 20 July 2006 by the People’s Council of Quang Nam Province on the S&T development of Quang Nam Province up to 2015 and vision to 2020,
12. Decision No.99/2009/QD-UBND dated 27 October 2009 on the approval of the Master Plan of S&T development of Nghe An Province up to 2020.