

Evaluation of Science Technology Market Development in the Context of Integration: The Case of Ethnic Minorities and Mountainous Areas in Vietnam

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The main objective of this study was to identify, evaluate, and to measure the attributes of the science technology market development in the context of integration in the ethnic minorities and mountainous areas in Vietnam. Data was collected from survey results in ethnic minority and mountainous areas in Vietnam; respondents are State management agencies, Associations and social organizations, Enterprises, Production and business establishments; Experts, Officials; data collection period was from April 2018 to June 2019. Based on the collected data, we used qualitative and quantitative research methods with calculation and statistical tools to analyze, evaluate, and to measure the current situation of science technology market development in the context of integration in ethnic minority and mountainous areas in Vietnam. The results show that the reality of science technology market development in the context of integration in ethnic minority and mountainous areas in Vietnam include three (03) contents. Based on the findings, some recommendations are given to improve the development of science technology market in ethnic minority and mountainous areas in Vietnam.

Key words: *Science technology market, ethnic minority and mountainous, socio-economic.*

JEL code: O14, J15, O10, F63

Introduction

Science and technology play a role as the foundation and driving force that promotes the industrialization and modernization process of the country. The development of the science and technology market will facilitate the application of achievements in scientific research and technological development to production; to promote the transfer and innovation of technology and equipment and the application of an advanced quality management system. It, therefore, contributes to vigorously promote socio-economic development (Le, 2018). The science technology market is an integral part of the socialist-oriented market economy. It plays a crucial role in creating an environment that promotes technological innovation, improving the science and technology capacity of the nation to serve its socio-economic development. Thanks to that, Vietnam's science technology market has grown in both scale and development speed. The categories of goods on the science technology market are increasingly diversified and plentiful (Nguyen, 2017).

The areas of ethnic minorities and mountainous are often border areas. Where many ethnic groups living in, with different cultural characteristics, languages, beliefs, customs, socio-economic development levels. Ethnic minorities and mountainous areas are gradually getting rid of the "oasis" in the field of science technology application in production. In this area, more and more models of science technology application appertain, thereby increasing income, contributing to changing farming practices of local people (Tung Nguyen, 2018). One of the causes of poverty in rural, mountainous, and ethnic minority areas is the lack of workmanship and knowledge to do business, low literacy levels, outdated customs and practices, inappropriate ways to manage, and organize production activity and life. Also, the people's awareness and capacity to overcome poverty by themselves is still limited. To solve existing problems in rural, mountainous, and ethnic minority areas, it requires the participation of many sectors and fields. One of the most essential solutions is how to promote the application of science technology in production practice and people's lives. Applying science technology into production development is also an important contribution to political and security stability in critical areas of the country. This process requires a certain time to change the way of thinking, backward habits, and awareness of people towards absorbing scientific and technological advances and applying them to improve production and economic life. In the current context of international economic integration, it can be affirmed that the main factor promoting the development of our agricultural and rural production is the synchronous application of scientific and technological advances, the transfer of the latest and most suitable technologies for rural, mountainous, and ethnic minority areas.

Therefore, it can be affirmed that the science technology market in mountainous and ethnic minority regions plays a very important role and becomes increasingly important in the

context of Vietnam's deep integration into the world economy: (i) Increase the capacity of breaking down the restrictions between sectors and localities, the obstacles between urban and rural areas, as well as deltas and mountainous areas; make science technology achievements rapidly expand, thereby developing the level of science technology in the region and creating a driving force for economic growth; (ii) Promoting, encouraging and supporting research activities serving ethnic policy development; (iii) Enhance the science technology potentials of research units and the system of ethnic affairs offices; (iv) Carry out technology transfer and application research for ethnic minority areas, closely coordinate in science technology information activities, propaganda and raise awareness for people; (v) Promote the link between scientific research and production, and promote technology transfer in ethnic minority and mountainous areas; (vi) Develop the science technology market, contributing to social stability, national security and defense in ethnic minority and mountainous areas, thereby giving a helpful hand to the national security and defense; (vii) Promote the application of science technology in life, improve the efficiency of policy communication to the people, contribute to the national unity policy and (viii) the development of the science technology market also create conditions for discovering and using gifted people and talented scientists, at the same time, promoting training activities of high-quality human resource to develop science technology in ethnic minority and mountainous areas.

In recent years, the Communist Party and State have paid special attention to amending, appending, and strengthening the legal basis to support science technology and the development of the science technology market (Nguyen, 2017). The Communist Party and State have also taken measures to develop the science technology market, promote science technology application activities to ethnic minorities and mountainous areas. However, in addition to the achieved results, the development of the science technology market in ethnic minority and mountainous areas still faces many difficulties, and specific solutions must be laid down to resolve them.

Literature Review

Literature Review of Science Technology Market Development

Pham (2008) emphasizes the crucial role of science technology market in science technology development, economic growth and international economic integration. The author presents a number of solutions to develop the science technology market, including: Training, fostering and employing a contingent of science-technology staff; Applying scientific-technological research to operation in terms of business model; Complete the institutions to support the science technology market; Continue to innovate the economy towards market economy and integration; Develop the knowledge economy as well as shorten industrialization.



On the basis of the Party's views and the state's constitutional principles, the legal and policy environment that governs science technology activities has been strongly amended and reformed. The most pragmatic amendments of the Law on Science and Technology (National Assembly, 2013) focus on three groups of institutions: investment and finance, staff policy, management of science technology research, and application. In addition, the strategies, medium-term plans, programs, projects, and critical national projects on science technology that have been launched and carried out in the past five years have initially created a critical technical and infrastructure premise to step by step improve the potentials and capacity of science and technology, to fulfill the long-term development goals of science technology, which is the industrialization and modernization of the country (Nguyen, 2017).

The formation and development of the science technology market in our country is a long-term process, depends on many factors, and requires the participation of all levels, departments and concerned units to implement synchronous, consistent and practical solutions (Nguyen & Bui, 2017). The authors affirm that, in the process of building and developing the science technology market, it is necessary to focus on the following contents, including: (i) Policy on mobilizing and using investment capital; (ii) provision on tax, fee, salary and other financial service; (iii) policy to protect intellectual property rights, trademarks, copyrights and science and technology information; (iv) policy to exploit and commercialize scientific research results.

Le (2018) affirms, developing the science technology market is identified as one of the key contents with the point of view: Enforce and protect of intellectual property rights; synchronously develop the system of infrastructure, human resources and intermediate institutions of the science technology market; promote the supply-demand relationship for science technology products and services; promoting the central role of enterprises, especially science technology enterprises; actively integrating into the region and the world in terms of science technology.

Literature Review of Science Technology Market Development in Ethnic Minority and Mountainous Areas

The program that supports the application and transfer of scientific technological advances to promote socio-economic development in rural, mountainous and ethnic minority areas in the 2016 - 2025 periods has 3 fundamental differences compared to that in the previous period. These include: (i) Giving more support to regions that face particular difficulties and ethnic minority areas; (ii) Promoting and facilitate projects having links between businesses and farmers that are directly engaged in production; and (iii) Paying more attention to the application of information and communication technology achievements to promote rural agriculture, especially high-tech agriculture. The application and transfer of scientific

technological advances have contributed to expanding production, enhancing commodity competitiveness, alleviating poverty, creating jobs, and improving lives in many rural, mountainous, and ethnic minority areas. However, in order to improve efficiency, it is crucial to select appropriate technologies, subjects, locations, and modes of transfer (Hong Ha, 2020).

Tung Nguyen (2018) adopts several practical examples to analyze the impact of science technology applications in production on the appearance of ethnic minorities and mountainous areas. The author emphasizes the importance of research activities, application, and transfer of science technology in the socio-economic development of ethnic minority and mountainous areas.

Every year, the department of science and technology of Son La province has advised the provincial people's committee to focus on scientific research and transfer results of science technology projects to regions with many ethnic minorities. Coordinate with the provincial ethnicity committee to announce the research mission laid down by the Committee for Ethnic Minority Affairs: the science technology program of the northwestern region and the science technology project of the program for rural mountainous and ethnic minorities areas to provinces, universities, colleges, and business organizations in the province; propose plans to develop scientific tasks that are suitable to the practical situation, serving the socio-economic development of ethnic minority areas (Duy Tung, 2019). The author concludes; (i) In recent years, the province's scientific and technological activities have focused on researching, transferring technology to ethnic minorities, and applying technology in agricultural production, thereby contributing to high yield, quality and value of crops, bringing a comfortable life to people; (ii) The results obtained from accelerating the application and transfer of science and technology into production have gradually helped ethnic minorities eradicate poverty, get sustainable wealth, and contribute to promoting socio-economic development as well as ensuring national security and defense in the whole province.

Hong Phuc (2020) affirms, science technology plays a key role in the strategy of developing smart agriculture. However, the practical transfer and application of science technology in rural, mountainous and ethnic minority areas shows that there are still many difficulties and shortcomings. Science technology activities have not met the requirements of being the foundation for improving productivity, quality, added value for agricultural restructuring, especially in the context of disease adaptation, climate change and international integration. The objective reason is that these regions have lower specific characteristics, economic conditions, infrastructure, production levels, and people's awareness than other regions.

It can be seen that these above studies have approached the issue of developing the science technology market in Vietnam in general, in the ethnic minority and mountainous areas

(where the majority of ethnic minorities are concentrated) in particular. Policy for ethnic minorities and mountainous areas are approached at a macro and micro level from the point of view of policy, guidance to different types of policies by region, and market field. Most of the studies have formed a system of scientific basis for the assessment of the science technology market, development of the science technology market, ethnic minority areas, the national policies of the state, bringing critical scientific values. However, the above studies have not thoroughly analyzed and evaluated the contents of developing the science technology market, the achievements and limitations in developing the science technology market in ethnic minority and mountainous regions of Vietnam in the integration period. Furthermore, this study uses a mixed research method to assess the current status of the development of the science technology market in ethnic minority and mountainous regions of Vietnam, thereby giving some recommendations to improve the development of science technology market in ethnic minority and mountainous regions of Vietnam.

Research Methodology

Research sample

The research sample is an important factor that determines the success of a quantitative study. Generally, there are two methods to choose: Random sampling and haphazard sampling. The random sampling is more widely used and brings more objective results. In this paper, we randomly select twelve (12) provinces, Representation of geographical regions in the area of Vietnam. Including: (i) Northern mountainous region: Lang Son, Lao Cai, Quang Ninh, Lai Chau; (ii) North Central region: Nghe An, Quang Binh; (iii) Central Coast region: Quang Ngai, Binh Thuan; (iv) South East region: Binh Phuoc; (v) Central Highlands: DakLak; (vi) Mekong River Delta: An Giang & Soc Trang.

The survey subjects for the science technology market, including: State management agencies, Associations and social organizations, Enterprises, Production and business establishments; Experts, Officials.

Survey Time: From April 2018 to June 2019

Analysis Approach

We collected documents and data on the characteristics and situation of the development of the science technology market in ethnic minority and mountainous areas in Vietnam. We collected documents, data on the implementation and results, the impact of the policy on developing the science technology market in ethnic minority and mountainous areas in Vietnam. We also learned about the awareness, interest, desires and demand for science technology market development of state management agencies, social organizations, business

communities, residents and especially owners who can enter the market. In addition, we learned about the development trend of region ethnic minority and mountainous science technology market in the coming years. Finally, we proceed to tabulate and calculate to get specific data for analysis and comparison.

Attributes

We proposed the contents of developing science technology market in ethnic minorities and mountainous areas in Vietnam (see table 1).

Table 1: The contents of developing science technology market in ethnic minorities and mountainous areas in Vietnam

Code	Scale
DSTM1	Development of science technology market in ethnic minorities and mountainous areas of Vietnam in the period 1986-2017
DSTM2	Enterprises' willingness to purchase technology for application in production and business
DSTM3	Policies to develop the science technology market for ethnic minorities and mountainous areas

Research Results

Development of Science Technology Market in Ethnic Minorities and Mountainous Areas of Vietnam in the Period 1986-2017

Respondents all said that, at present, ethnic minorities and mountainous areas of Vietnam have a science technology market that is incomplete, specifically in Table 2 as follows:

Table 2: Reality of the science technology market in ethnic minorities and mountainous areas of Vietnam today

Assessed objects	Level			
	There is no science technology market	There is a science technology market, but it is incomplete	There is a full science technology market	Total
Enterprises	24.4%	71.3%	4.3%	100%
Production and business establishments	31.0%	65.5%	3.5%	100%
Experts, Officials	25.8%	44.1%	30.1%	100%

Source: Compiled from survey results

The development of the science technology market in ethnic minorities and mountainous areas of Vietnam in the period 1986-2017 is assessed with 5 levels from 'underdeveloped' to very 'rapidly developing' (Table 3).

Table 3: Development of science technology market in ethnic minorities and mountainous areas of Vietnam during 1986-2017 period

Assessed objects	Level					
	Science Technology Market: Not developed	Slowly developing	Normally developing	Rapidly developing	Very rapidly Developing	Total
Enterprises	10.7%	39.0%	36.5%	13.2%	0.6%	100%
Production and business establishments	0.0%	78.6%	17.8%	3.6%	0.0%	100%
Experts, Officials	25.88%	38.82%	15.29%	14.12%	5.89%	100%

Source: Compiled from survey results

Table 3 shows that: There is a big difference in the results of assessing the development of the science technology market of the 3 surveyed subjects working in enterprises; business establishments and experts, Officials. However, all subjects assessed that the science technology market of ethnic minorities and mountainous areas of Vietnam is developing slowly (accounting for the highest percentage).

Enterprises' Willingness to Purchase Technology for Application in Production and Business

The proportion of enterprises in ethnic minorities and mountainous areas participating in the survey informs that they are willing to buy technology to apply in production and business (72.7% of enterprises). Only 27.3% of enterprises say that they are not ready for this activity. This trend is also quite uniform across all surveyed ethnic minorities and mountainous provinces in Vietnam.

Survey results show that willingness to buy Technology for use in production and business is proportional to the size of the enterprise. Meanwhile, only 59.3% of micro enterprises say they are willing to buy technology, respectively up to 76.9% of small businesses and 91.3% of medium enterprises that are willing to buy technology to apply. In addition, in the main production and business sectors, agricultural material producers and businesses have less willingness to buy technology compared to other areas of production and business (Table 4).

Table 4: Level of willingness to buy technology to apply in production and business of enterprises

Descriptions	Willing	Not willing
The sizes of enterprise		
Micro	56%	44%
Small	75%	25%
Medium	95%	5%
The types of enterprise		
State (Government)	100%	0%
Out of state	73%	27%
With foreign investment capital	86%	14%
Main production and business field		
Producing and trading in agricultural materials	64%	36%
Producing and trading in general	68%	32%
Specialized production and business	78%	22%
Other	70%	30%

Source: Compiled from survey results

Policies to Develop the Science Technology Market for Ethnic Minorities and Mountainous Areas

Mechanisms and policies on science technology market development in ethnic minorities and mountainous areas have not yet attracted many enterprises, there are no specific policies on the application and transfer of science technology to support socio-economic development in ethnic minorities and mountainous areas.

Basically, the system of science technology policies related to ethnic minorities and mountainous areas so far has not revealed illegal, conflicting and overlapping regulations that need to be handled. However, there is no separate document system on science technology activities serving sustainable development for ethnic minorities and mountainous areas, so it has caused difficulties in attracting resources, especially from enterprises to science technology activities to support socio-economic development for this area. For example, Law on Science and Technology No. 29/2013 / QH13 does not have specific regulations on a specific mechanism to encourage and attract science technology activities for ethnic minorities and mountainous areas, so some financial mechanisms still follow the general mechanism, making it is difficult to attract resources, especially from enterprises to science technology activities.

Survey results of subjects working in enterprises, official business establishments and State

management on policy implementation and policy content development of science technology market in ethnic minorities and mountainous areas, reached average level: 3 points (Linker scale 5 points: 1-Very not good; 2-not good; 3-normal; 4-good; 5-very good). With the Linker 5-point scale: 1-Very not good; 2-not good; 3-normal; 4-good; 5-very good; The surveyed subjects also assessed the enforcement of science technology market development policies in ethnic minorities and mountainous areas (table 5) and the content of science technology market development policy in ethnic minorities and mountainous areas (table 6).

Table 5: The enforcement of science technology market development policy in ethnic minorities and mountainous areas

Unit: Average score

Descriptions Objects	Efficiency and economy	Possibility	Specificity	Transparency	Communication efficiency	Efficiency of resource mobilization for policy implementation
Enterprises	3.2	3.2	3.1	3.2	3.2	3.1
Individual enterprises	3.0	3.0	3.0	2.8	3.1	3
Experts, Officials	3.3	3.4	3.3	3.4	3.4	3.2

Source: Compiled from the survey results of the thesis

Table 6: Content of science technology market development policy in ethnic minorities and mountainous areas

Unit: Average score

Descriptions Objects	Completeness and comprehensiveness	Appropriateness and reality	Up-to-date and timeliness	Stability
Enterprises	3.2	3.2	3.2	3.1
Business and production establishments	3.0	3.0	2.9	3.0
Experts, Officials	3.3	3.2	3.3	3.3

Source: Compiled from the survey results of the thesis

Discussion and Implications

Discuss the Development of Science Technology Market in Ethnic Minority and Mountainous Regions of Vietnam in the Period 1986-2017

Developing Components of the Science Technology Market in Ethnic Minority and Mountainous Areas

Developing components of the science technology market include (i) Size and speed of market development; (ii) Quality of market development and (iii) The consistency in the development of the components of the science technology market.

The Scale and Speed of Development of the Science Technology Market

This is the content that evaluates the development of the market in terms of quantity, which is shown in the following contents: Quantity and value of goods to be traded; Number of subjects participating in the market; Restructure of the science technology market. This transformation is reflected in the restructuring of goods, market participants structure, and resource allocation structure in the science technology market.

Quality of Science Technology Market Development

Development quality is that the speed of development needs to be maintained in the long term and ensures development quality. These contents are explicitly shown as follows: Ensuring efficiency in using resources of subjects in the science technology market. For example, the effective use of investment capital sources, such as the state's investment capital in enhancing national science technology capacity, enterprise's investment capital in technological innovation.

Building capacity of subjects participating in the science technology market: The capacity building for market participants plays an extremely important role because it shows the qualitative development of subjects on the science technology market;

Ensuring a healthily and equally competitive environment for participants of the science technology market. The subjects will be equal in accessing to resources, business and development opportunities.

Synchronization in the Development of Factors Constituting the Science Technology Market

Among factors making up the science technology market, there is a correlation and mutual impact which forms a unified whole. Therefore, the science technology market development

is reflected in the consistency of constituent factors development. This consistency can be seen in the correlation between development levels of elements contributing to the science technology market. If there is any factor that does not develop, or develops at a low level compared to other factors, it will affect the development and function of other factors, will distort and impair market functions which might lead to an undeveloped science technology market.

Developing the Science Technology Market in Ethnic Minority and Mountainous Areas by Levels

Develop Science Technology Market in Ethnic Minority and Mountainous Areas in Width Scope

In the wide - growth development model, with the fundamental characteristics of quantity development such as increasing the number of science technology goods on the market or increasing the number of market participants (enterprises, science technology organizations and intermediaries).

Develop Science Technology Market in Ethnic Minority and Mountainous Areas in Depth Scope

The in-depth development model has the fundamental characteristics of developing quality and improving efficiency such as improving the quality of science technology goods and services on the market, improving demand on technology use and enterprises ability to absorb technology in the market; improving the quality of science technology human resources and the quality as well as efficiency of science technology organizations; improving the efficiency of intermediaries.

It is important to form a specific link chain model in a deep perspective to maximize the role of factors in the science technology market such as institutions / intermediaries / science technology enterprises / Corporations / Enterprises / Business associations in ethnic minority and northern areas.

Develop in both Width and Depth

During the process of economic development, it is difficult to make a clear distinction between growth in width and growth in depth, which is often alternating and combining in a certain extent. This combined development model focuses on both quantity and quality growth, improving growth quality and competitiveness; effectively combining two types of growth on the basis of applying scientific and technological advances, improving the quality of human resources, promoting comparative advantages, proactively integrating into the



world, not only improving quality economic efficiency but also economic sustainability which associates with protecting the ecological environment, improving social welfare.

***Develop Science Technology Market in Ethnic Minority and Mountainous Areas in Timing Perspective
In the Short - Term***

Developing the science technology market in ethnic minority and mountainous areas in the short term, associating with short-term goals and programs on science technology and socio-economic development of the region and the country.

In the Long – Term

Developing the science technology market in ethnic minorities and mountainous areas in the long term, associating with long-term orientations, strategies, medium-term programs on the development of science, technology and socio-economy of the country.

Developing the science technology market in ethnic minority and mountainous areas in the long term which takes into account sustainable development goals, contributing to the sustainable development of the local, regional and national economies.

Developing the Science Technology Market in a Sustainable Direction in Ethnic Minority and Mountainous Areas

The sustainable development of ethnic minorities and mountainous areas is also a sustainable development of the whole country. Ethnic minorities and mountainous regions occupy a large area and spread across regions of the country, which is great potentials for development, but at the same time is the region where practical development is posing many complicated problems. It is the phenomenon of degradation and depletion of natural resources, environmental pollution due to inefficient natural resources exploitation and use, especially minerals exploitation. The poverty rate in these areas is still the highest of the country; the quality of human resources remains low; whereas social evils and crimes such as drug trafficking, women and children trafficking, cross-border smuggling, etc. have increased rapidly. The areas also always contain dangers that lead to stigma, division and conflict for hostile forces to take advantage of to destroy the regime and national security, etc.

Therefore, developing the science technology market in a sustainable direction should contribute to the establishment and adjustment of strategies, reasonable and logical plans for sustainable human resources, for economic and social development in the direction of

protecting the environment and natural resources, ensuring security and national defense, taking into account the economic growth accompanied by responsibility for the environment and society as well as the interests of workers. Social sustainability is to ensure the social consensus. Environmental sustainability is to ensure that the next generation will continue to grow. Researching, proposing and transferring scientific technological solutions for economic development, transport infrastructure, public relation and information, culture, society, rational use of natural resources and environmental protection, natural disasters prevention and mitigation; researching to identify the needs for training program of human resources and proposing appropriate training solutions for human resource development in ethnic minority and mountainous areas.

Discussion on Enterprises' Willingness to Purchase Technology for Application in Production and Business

Science and technology are a special kind of goods and services that are also traded, exchanged and circulated on the market like other goods or services. The science technology market is the place where transactions and purchases take place in science and technology products. Currently, the science technology market in Vietnam has just opened with poor and monotonous transactions. Technology transfer activities between domestic science and technology organizations and enterprises were still very limited. In contrast, the transfer of technology from the outside through the import of machinery, technology and foreign investment took place relatively excitingly with the rate of about 90% of the foreign-invested enterprises (Luong, 2017).

Producers in general and farmers in particular have certain difficulties in approaching scientific technological advances: they have not updated the process new technology, new and good varieties having a higher economic value; do not know where to buy? Cooperate with whom? Who guarantees the quality and even consumes their products, etc. When implementing these models, people find it difficult to change old production habits with the adoption of new technological processes. Therefore, the application of science technology in ethnic minorities areas requires careful study to find advanced and suitable technologies; building highly feasible models, aiming to solve socio-economic issues of importance to the locality, such as improving productivity, quality and diversification of agricultural products. This would promote the market potential and the agricultural advantages of each region (Hong Phuc, 2020).

Enterprises in ethnic minorities and mountainous areas also face the same difficulties as above. They also face difficulties in technology innovation (in terms of human resources, machinery and equipment skills of enterprises). Survey results show that the human resource level of the majority of enterprises in ethnic minorities and mountainous areas is not high,



mainly unskilled and intermediate or low-qualified workers. In addition, the origin of equipment and machinery used in production and business of enterprises is mainly from Vietnam and China. A few machines come from countries with more developed science technology such as Japan, Korea, Germany. In addition, another important reason is that the awareness of enterprises in ethnic minorities and mountainous areas about the need for technological innovation or research and development cooperation in production and business is still low.

Discussion on Science Technology Market Development Policies for Ethnic Minorities and Mountainous Regions

Policies to develop the science technology market for ethnic minorities and mountainous areas in Vietnam during the period 1986 to 2017 were divided into 3 phases: Period 1986 - 1995; Period 1995 - 2007 and Period 2007 - 2017.

1986 – 1995 Period

The view of the Communist Party and State of Vietnam on science technology development in this period created the foundation for the development of science technology, the science technology market and the science technology market in ethnic minorities and mountainous areas in the following periods. In the period 1986-1995, Communist Party had a number of important resolutions on science technology such as: Resolution 26 of the Politburo (term VI), Resolution 01 of the Politburo (Session VII), ect.

Policies to develop the science technology market in the 1986-1995 period included four basic policies: Policies on science technology management, policies on intellectual property, policies on technology transfer, policies on competition.

1995 – 2007 Period

The view of the Communist Party and State on science technology development in this period was the strategic direction for science technology development in the period of industrialization and modernization and tasks until 2020, which said that by the year 2020 Vietnam will basically become an industrial country; Science and technology become the foundation and driving force for national industrialization and modernization.

Science technology market development policy for the period 1995 - 2007:

Along with the introduction of the Law on Science Technology in 2000, the state management of science technology has undergone radical innovations towards the application of the principles of openness, fairness, democracy and objectivity in the implementation of



science technology tasks. In the period 1995 - 2007, there were a number of specific policies as followed: Policy on the transformation of the management mechanism of science technology public institutions to an autonomous and self-responsible mechanism; Policy on Intellectual Property; Policy on Technology transfer; Policy on Competition.

Development of science technology and the market of science technology in ethnic minorities and northern Vietnam in this period began to be shown in a number of socio-economic development programs, including: Socio-economic development program of communes having difficulties in ethnic minorities and mountainous areas (Program 135); and The program “Supporting the application and transfer of scientific technological advances to promote socio-economic development in rural, mountainous and ethnic minorities areas (the Rural-Mountainous Program) was launched and implemented for 62 provinces across the country.

2007 -2017 Period

The Party and State's views on science technology development and the science technology market in the 2007-2017 period: The Party and State always considered science and technology as the top national policy, the driving force for socio-economic development, the foundation and the winning decisive factor for the country's industrialization, modernization and international integration. Science and technology played a key role in the country's socio-economic development. In order to effectively take advantage of opportunities as well as cope with challenges brought about by integration, in the 2007-2017 period, the Party and State have paid special attention to amending, supplementing and consolidating legal basis to support science technology and development of the science technology market.

Science technology market development policy for the 2007-2017 period: During this period, many specialized laws in the field of science technology were issued by the National Assembly, creating an important legal foundation for the development of the science technology market such as the Science Law and Technology 2013 (replacing the Law on Science Technology in 2000), Law on Intellectual Property (2005), amended in 2009; Law on High Technology (2008); Law on Atomic Energy (2008); Law on Measurement (2011); Besides, Law on Competition (2005) has been replaced by Law on Competition 2018, from 1 July 2019. In addition, the policies included: Policies on science technology enterprises; Policy on science technology market intermediaries; Policies on science technology transfer, policies on supplying development; demand for scientific technological products; Policy on importing technology; Policy on research - application - transfer of science technology, etc. was also issued.



Evaluation of the Effectiveness and Impact of Science Technology Market Development Policies in Ethnic Minorities and Mountainous Areas of Vietnam in the Period from 1986 To 2017

Economic Efficiency and Impact

The science technology market has really contributed to positive changes of ethnic minorities and mountainous areas, contributing to changing production and living practices and improving the material and spiritual life of the people. Through transferred technology advances, in the last 10 years, there has been a drastic change in farming models. More and more individual businesses, enterprises investing in agriculture have emerged. Up to now, most ethnic minorities know how to use new varieties and advanced cultivation techniques, contributing to increasing crop productivity 2 to 3 times compared to before; thereby, bringing the growth rate of many regions to over 10%/ year; reducing 4-5% of poor households/ year; creating focused commodity production areas such as coffee, tea, sugarcane, rice, fruit trees, etc. with high quality.

Social Efficiency and Impact

The market of science technology in ethnic minorities and mountainous areas has contributed to improving the lives of people in ethnic minorities and mountainous areas, creating jobs, actively serving the socio-economic development of ethnic minorities and mountainous areas; at the same time, it acts as a premise for other local socio-economic development programs, enhancing people's confidence and awareness in the application of technical advances in production and life.

Science technology activities have had special priorities to this area, through the implementation of programs and tasks of separate science technology, thereby proposing solutions to solve related social problems of ethnic minorities such as poverty, the increasing gap in living standards; the issue of backward customs and superstitions tending to spread; Religion, political issues, lawsuits, etc. causing disorder and social security were promptly mentioned and proposals were immediately transferred to responsible organizations and individuals for handling.

Environmental Efficiency and Impact

Ethnic minorities and mountainous areas have problems directly related to the environment. More than 70% of the forest is covered by ethnic minorities and mountainous people. Therefore, this is not only the living environment of the people but also the practical environment for the application of science technology.



The development of the science technology market in ethnic minorities and mountainous areas has a direct and indirect impact, in both positive and negative directions on the environment. Developing the science technology market reduces the labor force of people, improves living standards, contributes to opening opportunities to access jobs in enterprises; however, it also pollutes the environment, forming technology landfills due to the process of importing obsolete and used equipment for many years.

The results of research and technological solutions in the field of environment and climate change have directly supported ethnic minorities and mountainous areas in mitigating environmental impacts such as making zoning maps and warning high-resolution flood for some Northwestern provinces in order to enhance the community's ability to cope with natural disasters.

Equity Efficiency and Impact

Equity is shown through the fact that all people in need are supported in applying scientific technological results in production and husbandry. Even so, there is still an inequity in the process of technology transfer, access to machines for each type of worker, manager or trainer.

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