

EFFECTIVE TRAINING POLICY TOWARDS PROMOTING ENVIRONMENT FRIENDLY ORIENTED TECHNOLOGICAL INNOVATION AT ENTERPRISES

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Abstract:

Innovation of technological in an environment friendly way is expected to be the solution to the environment related problems caused by negative impacts of the technological itself, thus contributing to boost socio-economic development in a sustainable manner. Training policy is one of the policies that can make positive effects on the improvement of the enterprises' technological innovation capability, in general and their capacity in environmental friendly technological innovation, in particular. This paper tries to clarify the concept of technological innovation in association with training policy in order to encourage enterprises' environmental friendly oriented technological innovation, as well as propose evaluation criteria and solutions to improve training policy to promote environmental friendly innovation technological at businesses. However, the restriction of this paper is the absence of an econometric model for an effective training policy in respect of promoting environmental friendly oriented technological innovation, as well as the limited scale of survey samples (survey conducted at enterprises in Hanoi).

Keywords: *Effective training policy; Technological innovation; Environmental friendly.*

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1. Research overview

1.1. Technological innovation and environmental friendly oriented technological innovation

Currently, there are many different points of view on technological innovation. Specifically, as per the concept of OECD recorded in the Oslo Manual (1996), *technological innovation is understood as the creation of new products or new manufacturing processes or significant technological improvements of product or production process, the technological innovation takes place when new products are introduced into the market (product innovation) or new technologies are used in production processes (process innovation).* More specifically, Schilling (2009) argues that

technological innovation is the introduction of a new device, method, or material aiming at commercial targets or specific production/ business purposes. Thus, the concept of technological innovation has very wide implications, whereby if enterprises only receive technology through technology transfer without follow-on significant improvement or creation of new product/process it cannot be considered as technological innovation. This is not yet appropriate for Vietnam in the current period, due to the enterprises' technological capacity is still limited. In this context, Le Xuan Ba et. al (2008) suggest that in the present condition of Vietnam, *technological innovation is the activity to change the technology as a whole or just to improve the existing technology of enterprises so as to contribute to improve product quality, reduce costs, increase productivity, quality and efficiency of production and business* [5]. In this article, *technological innovation is understood as an active action with the aim to obtain the total change or the change of important parts of the existing technology by using a more advanced technology and meet the production/business targets more effectively.*

With this point of view, *the environmentally friendly oriented technological innovation is understood as those technological innovation activities which can meet environmental requirements, using resources in a saving and sustainable way, generating little or no waste to protect the environment, and at the same time, must be in conformity with the national strategy of socio-economic, technological and environment development.* It includes all necessary support services, with functions to be improved, to minimize the negative impacts of technology on the environment while maintaining business operations, this is not a single technology but rather the entire technological system including know-hows, goods, services, equipment and management processes [1,11].

Technological innovation is a high risk and uncertain activity, therefore technological innovation policies, in general and incentive policies to encourage enterprises to implement environmental friendly technological innovation, in particular play an important role in regulating the market failures and the deficiencies of the system, thereby making the contribution of technological advancement through technological innovation to the economic growth. It is, therefore, needed the State's support by giving direction, creating premises and regulating technological innovation activities, creating physical and institutional infrastructure, as well as enabling environment to promote the development and dissemination of technology, thus enhance the endogenous technological capacity towards environmental friendly development.

1.2. Criteria for evaluating the effectiveness of training policies to encourage enterprises to implement environmental friendly oriented technological innovation

Incentive policies to promote technological innovation are those related to the policy intervention of the State for the purpose of influencing the process of technological innovation, and often referred to the research and development of technology (OECD, 2005). Therefore, training policies to promote enterprises' environmentally friendly technological innovation is understood as the way the State supports businesses to improve quality of their human resources so as that they can achieve desired innovation activities. On that basis, businesses must understand the need of implementing environmentally friendly technological innovation, whereby they shall be more self-discipline, positive, proactive in technological innovation to create products that are accepted by the market and society.

The effectiveness of a policy is expressed through the ability to produce results by using certain inputs. In fact, it is difficult to determine the results and outputs of training policies for encouraging enterprises to implement environment friendly oriented technological innovation due to the spread effect of technological innovation activities. Therefore, in this paper, the effectiveness of training policies for such a purpose was evaluated via feedback of the beneficiaries of policy (i.e., enterprises) and was expressed in two criteria, as follows:

- *First*, the ability of enterprises to recognize and apply the training policies for supporting environment friendly oriented technological innovation activities;
- *Second*, the general evaluation of enterprises on the effectiveness of the training policies to encourage enterprises' environment friendly oriented technological innovation.

The two criteria above were the premise for the author to design questionnaires, questions for interview with businesses in Hanoi, state management agencies in charge of technological innovation. Based on the survey results obtained, the paper describes the current picture and evaluates the effectiveness of training policies to encourage enterprises' environmental friendly oriented technological innovation (see details in section 3 - Research results).

2. Research methods

This paper used qualitative and quantitative research methods through the use of primary and secondary data; simultaneously the effectiveness of

training policies to encourage enterprises in implementing environmental friendly oriented technological innovation was assessed on the basis of the level of enterprises' awareness on the general policies issued by the State; from that point, solutions had been proposed to improve the training policies to encourage environmental friendly oriented technological innovation at enterprises relevant to the actual context of Vietnam.

2.1. Data collection methods

For secondary data: the authors had collected, classified, evaluated, selected and used published materials by domestic and international studies related to technological innovation and relevant policies to promote enterprises to implement environmental friendly oriented technological innovation such as projects, research themes, textbooks, reference books, specialized scientific papers. Furthermore, the authors collected and classified relevant prevailing legal documents of the State on science and technology, in general and environmental friendly oriented technological innovation, in particular, such as Law on Environment Protection, Law on Technology Transfer and many under-law documents like decrees, decisions, directives, resolutions and circulars related to environmental friendly oriented technological innovation.

For primary data: the authors conducted a survey by sending questionnaire to enterprises (using liker scale 5) and written interviews (using anket method), and by telephone interviews with staff working in state management agencies on technological innovation, environmental management matters. 150 questionnaires were sent to small and medium enterprises in Hanoi and 119 responses were received (systematic random sampling and convenience sample); simultaneous interview by writing, by telephone were conducted with five selective staff working in state management agencies on technological innovation and environmental management after they had agreed to participate. However, in the survey process, the authors encountered some difficulties such as: (i) difficulty in arranging interview time or completing the questionnaire or answering by phone; (ii) State management agencies on technological innovation and environment protection were not willing to provide sensitive information such as weaknesses in the state management of environmental friendly technological innovation; moreover, businesses were actually not willing to provide information on the environmental negative impacts caused by their existing technologies,...

2.2. Data processing methods

After collecting primary and secondary data, the authors conducted checking and cleaning of data before, during and after the data coding and data entry;

next, the SPSS 16 software was used as a tool for data processing in line with the research objectives. Furthermore, for data processing purpose, the authors also used the descriptive, statistical, comparative, evidential, practical lessons learnt and expert methods; from these conclusions on the real situation of implementing environmental friendly oriented technological innovation by enterprises had been made.

3. Research results

3.1. Current status of promulgating training policies

With a view to improving the quality of human resources for promoting enterprises to realize technological innovation, in general and environmental friendly oriented technological innovation, in particular, the State has promulgated a number of training policies, specifically:

In terms of support for training and fostering of human resources of small and medium enterprises: Resolution No. 22/NQ-CP of the Government, dated 05th May 2010 on the implementation of the Government Decree No. 56/2009/ND-CP dated 30th June 2009 regarding assistance to small and medium enterprises development; Joint Circular No. 05/2011/TTLT-BKHDT-BTC dated 31st March 2011 of the Ministry of Planning and Investment, Ministry of Finance on guiding the assistance for training and retraining of human resources of small and medium enterprises, eligible objects and type of assistance are specified in Article 2 and Article 3 of this Joint Circular. Eligible expenditures and specific cost norms are stipulated under the provisions of Circular No. 87/2001/TT-BTC, Circular No. 120/2007/TT-BTC, Circular No. 51/2008/TT-BTC, Circular No. 97/2010/TT-BTC and Circular No. 79/2003/TT-BTC of the Ministry of Finance. Accordingly, full financial support from central government budget is provided for the development, compilation, update/revision and duplication of basic and specialized training materials for training of human resources of enterprises. Similarly, full financial support of government for survey, training needs assessment, impact and effectiveness assessment on assisted training activities; partial funding support is given for training courses organized for enterprises and implemented by ministries, departments, associations. In addition, 100% funding support by local authorities under local budget plans for survey, training needs assessment of local enterprises; partial local funding support for training courses organized for local businesses under local tasks.

In terms of improving the quality of human resources for enterprises, especially small and medium enterprises development to achieve socio-economic development goals: Decision No. 1231/QD-TTg dated 07th

September 2012 by Prime Minister on the small and medium enterprises development plan in 2011-2015 (group solution No 4: support for human resource development with focus on the improvement of the management capacity of small and medium enterprises); Decision No. 677/QĐ-TTg dated 10th May 2011 by Prime Minister approving the national technological innovation programme up to 2020, in which there will be about 30,000 and 80,000 engineers, technicians, managers of small and medium enterprises trained in technological management, new technological update by 2015 and 2020, respectively.

For Hanoi City: to overcome the drawback of knowledge and skills at enterprises in the area, the City authority has issued a number of policies to support the empowerment of enterprises' human resources, namely: Decision No. 4635/QĐ-UBND dated 19th November 2007 by the Hanoi People's Committee approving plans and cost estimates for pilot training of executive director of enterprises; Decision No. 5629 /QĐ-UBND dated 12th November 2010 of Hanoi People's Committee approving the plan to support Small and Medium Enterprises period 2011-2015; accordingly, Hanoi has supported training course on start-up business, classes on business administration, classes for executive directors, including training in business technological management; cost norms determination under the guidance of Circular No. 09/2005/TT-BTC of the Ministry of Finance dated 28th January 2005. Moreover, the Hanoi City People's Committee also funded training activities, attracting outstanding experts, leading scientists to participate in capital city development as per Decision No. 48/2007/QĐ-UBND dated 06th May 2007, Decision No. 91/2009/QĐ-UBND of 22nd July 2009; also the City by its Decision No. 22/2008/QĐ-UBND provides 100% financial support for vocational training, career development, raised level of business managers, production facilities owners in traditional production village, 100% grant to support short-term training in order to enhance the business capacity and skills of key industrial products as stipulated in Article 8, Decision No 75/2009/QĐ-UBND dated 29th May 2009 of Hanoi People's Committee.

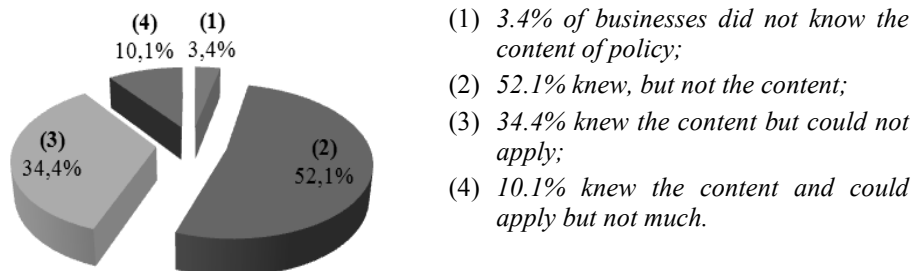
3.2. Evaluation of the effectiveness of training policy by criteria

According to the results of the survey conducted by the authors at enterprises in Hanoi and processed by SPSS 16 software, the effectiveness of training policies to encourage enterprises to realize environmental friendly oriented technological innovation can be generalized as below:

First, the ability of enterprises to acknowledge and apply training policies for environmental friendly oriented technological innovation: although the surveyed enterprises exposed a high awareness of the need to empower human resources for technological innovation activities (average score 4.12),

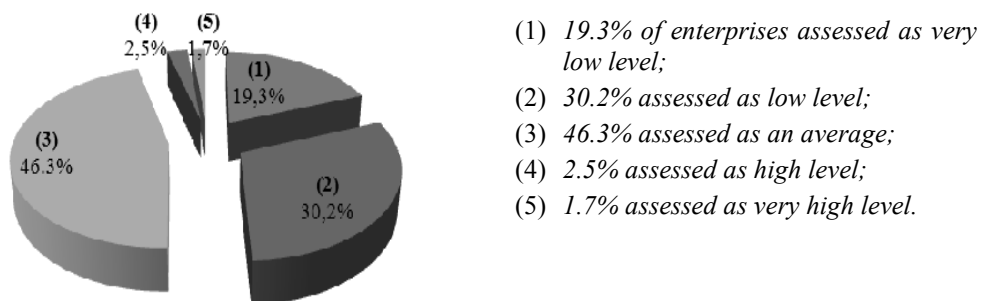
but the ability to recognize and apply training policy was still limited (Figure 1). Specifically, 3.4% of enterprises was not aware of the content, 52.1% heard about the policies, but not their content, 34.4% knew the content but could not apply, 10.1% knew the content, could apply but at low level (average score of 2.51). The level of assessment on incentive regulations to enjoy preferences, receiving training support was of a higher level (average score 2.97), out of which 24.4% of enterprises thought the regulations were favorable, 0.8% very favorable, 49.6% moderate, only 21% said that it was difficult, and 4.2% very difficult to apply.

Second, general assessment of enterprises on the effectiveness of training policies to encourage enterprises in implementing environmental friendly oriented technological innovation (Figure 2): 19.3% of enterprises assessed it at very low level, 30.2% at low level, 46.3% at average level, only 2.5% at a high level and 1.7% at a very high level (an average score of 2.38, standard deviation 0.91).



- (1) 3.4% of businesses did not know the content of policy;
- (2) 52.1% knew, but not the content;
- (3) 34.4% knew the content but could not apply;
- (4) 10.1% knew the content and could apply but not much.

Figure 1. The ability of enterprises to acknowledge and apply training policies



- (1) 19.3% of enterprises assessed as very low level;
- (2) 30.2% assessed as low level;
- (3) 46.3% assessed as an average;
- (4) 2.5% assessed as high level;
- (5) 1.7% assessed as very high level.

Figure 2. Evaluation by enterprises on the training policy effectiveness to promote enterprises realize environmental friendly technological innovation

As we can see, training policies to promote enterprises to implement technological innovation, in general and environmental friendly oriented technological innovation, in particular have in recent years contributed to the prevention of negative impacts caused by the use of technology on the

environment and the common benefit of society, limited import of outdated/backward, environmental unfriendly technologies into Vietnam; these policies also take steps to create a harmonized legal basis for environmental friendly technological innovation. However, in view of enterprises and experts of state management agencies responsible for technological innovation, environmental management, the performance of such policies is still far from expected, specifically as follows:

- Enterprises had not been so clear of the content of training policies and not fully accessed to the support provided by the state. This is one of the factors hindering enterprises to implement technological innovation activities. Possible causes may include: the enterprise has no investment plan for technological change, especially for environmental friendly technological innovation, as the result, it has no need to learn the content of prevailing training support policies. Though the enterprise itself had relatively high awareness of environment friendly technological innovation, there still lacked of specific, proactive and long-term plan of action. On the other hand, policy advocacy activity of the State had not really been effective in improving the policy beneficiaries' knowledge and awareness on the benefits of environment friendly technological innovation for business and the society as a whole;
- Results of the survey showed that increasing number of enterprises tended to increase the level of investment in environment friendly technological innovation, but the level of technology and the ratio of investment/corporate revenue are low compared with those of other countries in the region and the world. Reasons for this backward may include: limited capacity in terms of information, finance, manpower to realize environment friendly technological innovation, that is why the process of technological acquisition, evaluation, selection and capital mobilization for environment friendly technological innovation has not been effective as expected. On the other hand, the pressure of relevant state policies is not strong enough to enforce enterprises using outdated technologies to make investment in environment friendly technological innovation.

4. Conclusions and recommendations

By using primary and secondary data, and qualitative and quantitative research methods, the article clarified the concept of environmental friendly oriented technological innovation, actual situation of training policies to promote enterprises to implement environment friendly technological innovation. At the same time, it proposed and assessed the criteria for an effective training policy to support enterprises in environment friendly

technological innovation. To do that, it would recommend that in coming years the State should:

- Continue to provide training support to improve the quality of technological manpower so as that enterprises can be able to acquire, master the equipment/machinery, technological lines received via technological transfer, and then provide support for enterprises themselves to conduct R&D activities in line with environment friendly oriented technological innovation; at the same time there should be close coordination between the central and local authorities in the policy advocacy activities in respect of environment protection, environmental friendly technological innovation, and financial sanctions should be strong enough to deal with cases using outdated technological making negative impacts to the environment;
- Review the Vietnam national standards system relating to environment in comparison with regional/international standards, then amend those standards which are no longer appropriate and add-on those standards still missing; Parallel, enhance the check of the enterprise's output to ensure it fully meets the quality criteria and standards as stipulated in the Law on Product/Goods Quality. On the other hand, every year the state agencies responsible for technological innovation and environment should conduct environmental impact assessment in the use of technology by enterprises, in combination with the assessment of the enterprise's existing technological level with a view to give warning to the enterprise and promote, even force them to implement technological innovation if they want to survive. The State should make Environment Tax Law as a legal document to enforce enterprises to implement environmental friendly technological innovation, otherwise they shall be taxed at higher tariff;
- For policies to be more effective, during the policy development and enforcement, the State should have a certain dialogue with enterprises as they are beneficiaries of the policy. This is the basis for technological innovation policy making in general and training policies to encourage enterprises in technological innovation in particular, so as to focus all necessary resources to the creation of products and services that meet the market requirements and will be accepted by the market and society.

Thus, in order to limit the negative impacts of technological on the environment, and on the other hand, make training policies be more effective to promote enterprises to implement environment friendly technological innovation, it is proposed that the next research directions be concentrated on the following subjects:

- *First*, studies to build an econometric model to evaluate the effectiveness of incentive policies to encourage enterprises to realize environment friendly technological innovation;
- *Second*, studies on training policies to encourage enterprises to implement environmental friendly technological innovation nation-wide or in a particular industry or using other different research approach./.

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