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Sustainable Environmental Development and Technological Innovations

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Abstract: *Sustainable development is a development approach that meets the needs of the current generation without compromising the ability of future generations to meet their needs. Sustainable development means the advancement of human well-being and can be extended by generations instead of only a few years. Innovation and community action are two key factors for sustainable development. Sustainability concepts based on the idea of improving resources or energy efficiency due to technological advances tend to overestimate potential savings because they often ignore the behavioral responses caused by technological improvements. Sustainable development is an organizing principle that maintains the finite resources needed to meet the needs of future generations on Earth.*

Keywords: innovation, technology, sustainable development, environment, future generations

I. INTRODUCTION

Everyone seems to be committed to sustainable development. But not everyone seeks sustainable development in the same way. The transition to sustainability creates various social innovations, as well as innovative technologies (new organizational structures and new tools) of different sizes and sizes. Society needs to adapt to provide wealth to which the world's population is becoming more and more accustomed. We are on the path of ecological collapse and resources if measures are not taken quickly. Technology will have to play an important role in the transformation of the industrial society. But innovation must be integrated into social and organizational innovation. We need a social technological change. The ecological design has been put into practice in engineering design for more than 10 years.

To achieve and sustain good environmental quality in economies that will continue economic growth, environmental pressures per unit of output must be reduced by a factor of 4 to 10 in high income countries during the next fifteen to twenty years. The question is how such ambitious goals can be achieved, or in policy terms, what has to be done to foster sustainable development. In our view, environmental innovation, which aims at reducing environmental pressure per unit of produced value through new technology, is the key to success. In this paper we explore what theory, mainly based on economic disciplines, has to say about the policy to encourage environmental innovation.

Their merits are sometimes considered to be useless because the world has not witnessed a significant contribution to the solution of the larger (global) problem. This technical document describes the stakeholders involved in this type of innovation and who can coordinate the innovation process. This document emphasizes that the level of transition, the most complete level of innovation, has a crucial impact on the achievement of long-term sustainable development. However, conversions are not well managed. This article reviews the literature on the occurrence of technology transfer. When a conversion occurs, a new system is often inefficient. It must increase its benefits in terms of resource consumption or reduction of pollution by including fewer innovation strategies, such as system innovation and product optimization(1).

The transition to sustainable development is often impossible because the new system must compete with a fully developed and optimized system that is optimized for a completely different system and an incremental innovation well ahead of the learning curve. Even if you aim for less sustainability, you can avoid the conversions that are more likely to be sustainable by improving the level of competition (not innovation).

This report provides some examples of these dilemmas and some guidelines for developing government policies and corporate strategies. It is argued that it is particularly important at the policy level to develop a range of markets for new sustainable systems and products and to create a range of experiments that can lead to a transition.

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The speed and direction of technological change are driven by changes in contributions relative to resources and institutional innovations, such as modern research universities and industry research institutes(2). Community activity is a place for innovation activities that are neglected but potentially important.

Eliminating this gap provides a new theoretical approach to the investigation of community behavior for sustainability. Technology will have to play an important role in the transformation of the industrial society. But innovation must be integrated into social and organizational innovation. We need a social technological change. Even if you aim for less sustainability, you can avoid the conversions that are more likely to be sustainable by improving the level of competition (not innovation).

This article covered topics such as competitiveness, the environment, US policy. In science and technology and the transition to sustainable growth globally.

II. TECHNOLOGY FOR SUSTAINABLE DEVELOPMENT

After recognizing the need for innovation for sustainable development, it is not clear what to do. There are several options that contribute to reducing the environmental burden of human activities. New technologies always imply a social change. Therefore, the successful introduction of new technologies is always a matter of social technological change.

The following section discusses the scope of socio-technical solutions for environmental problems. These technologies are classified by the degree of "radicalism", that is, the degree to which they affect the current technological system.

1. Solutions of the industrial industry
2. Classical environmental technology
3. Good management skills
4. End of pipe technology
5. Process adaptation and damage prevention
6. Sustainable technology

It should be noted that technologies that protect human society from natural hazards such as surge barriers and vaccines are not called environmental technologies. In the same way, the techniques used for measurement and analysis are excluded. Very important, but these technologies are not usually limited to environmental problems(3).

However, restoration techniques (such as soil restoration) are included in the definition as the so-called end-of-pipe technology, and this type of environmental technology is under review. Humans have always used technology. Its use has sometimes led to overexploitation of the area by natural resources and local pollution.

These problems were often limited by negative feedback (local fatigue) and very low population densities.

1. Historically, the first environmental problems were local. The easiest way to solve this problem is to use the classic Triple D technology.

- Garbage dump (garbage in the well, etc.)
- Displacement (contamination of sewers, smoke piles, etc.)
- Dilution (gas and liquid waste)

In this category of environmental technology, pollution does not change chemically or biologically.

2. As pollution became a problem, people began to think about pollution prevention. The first initiative in this direction is always the easiest(4).

The options to minimize contamination are carried out under the limitations of conventional production methods. This is usually primary prevention, or what is now called Good Management or Triple M.

- Monitoring
- Management
- Maintenance

3. Waste residual reduction can be achieved through end-of-pipe technology, especially including:

Incineration

- Pyrolysis
- Separation

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- Fermentation
- Chemical transformation
- Catalytic reduction
- Shielding (copy, noise)

Recycling and re-use technologies that feed waste (product) back into production processes can be termed end-of-pipe if the waste in question is from a different process loop, as in the case of waste being used as a fuel, for example. If waste is re-used in the same production loop without requiring much additional energy or generating much pollution, however, recycling may be sustainable (as in the case of reprocessed metals).

4. Restoration technology is a specific kind of end-of-pipe technology. There is an obligation, at the very least, to clear up the worst pollution of the past and insulate polluted sites from their unpolluted environment. Areas where restoration is required include the following:

- Polluted soils
- Polluted lake and river bottoms
- Space debris
- Plastic wastes in the oceans
- Nuclear waste
- Nonindigenous species introduced into ecosystems

5. In many cases, however, the preferred option is to reduce the environmental burden by creating a clean production process. In this way, further reduction of pollution and resource consumption can be achieved. Complete redesign of production processes can lead to both environmental gains and cost reduction. Various tools are available for this purpose:

- Industrial ecology: integral design of industrial systems to minimize resource consumption and waste production by intelligent combinations of facilities(5).
- Life-cycle assessment: analyzing the overall production chain and identifying the main target areas for environmental and resource improvement.
- Pinch technology: minimizing resource consumption in production processes by minimizing process redundancies.

6. Ultimately, technologies must be developed for sustainable production and consumption, for none of the above technologies will suffice to solve the environmental problems being faced. Sustainable technologies go beyond environmental technologies. Whereas the latter are concerned with producing goods and services with minimal pollution, sustainable technologies have a far broader aim: to enable the needs of the whole of humanity to be fulfilled without:

- Exhausting the earth's nonrenewable resources
- Exceeding its ecological recovery capacity
- Consolidating or promoting inequity

These technologies must enable humanity to survive in the longer term, that is to say, sustainable technologies are a necessary condition for the continuity of human civilization.

III. INNOVATION FOR SUSTAINABLE DEVELOPMENT

Not all technical updates of the system, architectural innovations or conversions can lead to sustainable development. In the first place, sustainable technology means more than simply producing products without pollution or ecological destruction. Sustainable technology means meeting the needs of people so as not to exceed the capacity of the earth to recover, as well as the capacity to recover the earth's ecosystem. The goal is to bring the use of the world's natural resources within the limits set by the Earth's ability to recover. The need for sustainable development what are the prerequisites for this innovation?

Satisfy your needs

The first step to develop technology for sustainable development is to analyze the needs of the product. Consumers should be aware that they have a "hidden" need (not an articulation).

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A company or government may have hidden needs, such as a reputation of official or national reputation. Certain products often pose problems of legality (you must allow cigarettes if a Formula 1 race is allowed).
However, these products reflect the need (of emotions, comfort) as if they were legitimate. The challenge is to develop more sustainable alternatives to meet these needs. When you think about satisfying your needs, you often have to cross the line of discipline. The best solution to the problem may be outside the trained field. Disciplinary training can sometimes prevent a jump. Limit the range of alternatives you should consider.

Example:
The fusion of a metal always requires a minimum amount of energy, no matter how efficiently the process is designed. When additional improvements are required, an efficient recycling plan will help reduce mineral demand and energy consumption. For some uses of metals such as zinc, it is impossible to recycle because zinc is consumed during use. For example, in the case of galvanized steel, the zinc layer dissipates into the environment. So it seems that progress through technological innovation is not possible until you realize that users do not necessarily want galvanized steel products! What you want is a durable product that renders a specific service(6).

Think globally
Satisfying a demand in a much more efficient way does not necessarily lead to a sustainable solution. Very environmentally friendly technologies can have a variety of negative side effects, have a long-term impact, or can be applied only on a small scale.
Monsanto's rodeo technology (genetically modified maize resistant to herbicides and herbicides sold as a combination) allows farmers to reduce the use of herbicides, reduce costs and achieve higher yields. But will genetically modified corn affect the ecosystem?
Farmers will have to buy seeds every year from Monsanto. How does this affect the ability of farmers to produce agricultural products?
Food aid in areas with high malnutrition can reduce food prices. This may be important to prevent hunger, but in the long run it will contribute to the deterioration of local agriculture.
High efficiency technology may depend too much on the resources that may be missing in the future.
For example, a wide variety of precious metals and rare earth metals are used to catalyze the decomposition of toxic substances, and the relatively small additional demand in the market may be insufficient.
For example, antibiotics are very important in health care, but when they are widely used, bacteria are produced that are immune to antibiotics. In the long term, this can generate enormous health risks.

IV. CONCLUSION

Therefore, innovation for sustainable development demands a wide view on innovation.
Acting locally is necessary, but so is evaluating technologies globally and with a long-term view. Moreover, technology assessment is crucial also for technologies that are aimed at contributing to the common good.

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