Nanotechnology Divides: Development Indicators and Thai Construction Industry

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Abstract. Nanotechnology and disparity between developed and developing nations could increase the gap of global development while it also affects to construction industry where workers have potentially exposed to nanomaterials application. This research examined the influence of development indicators as demographic, social and economic factors on nanotechnology policy among 250 nations. Results revealed that 68.2% of developed countries have policy on nanotechnology while only 18% of developing countries have such a policy. Fertility and mortality declining with the increasing of literacy, urbanization and energy consumption provide significant positive effect on nanotechnology divides. Furthermore, results pointed out the existing gap of development between developed and developing worlds.

1 Introduction

Majority of world population is still in developing countries where are considered as low quality areas due to the people are facing basic needs scarcity like improper infrastructure and unhealthy condition. The Millennium Development Goals (MDGs), with the agreement of world leaders, would like to promote environmental sustainability (as MDGs 7) while a phenomenon of urbanization booming as well as increasing of urban poverty in many dimensions including the living place becomes the most considerable issue among developed and developing nations. Urbanization also causes the urban poverty increasing due to the poor who can not afford the basic infrastructures and utilities in the city. Not only urban poverty becomes more serious but also high energy consumption is concentrated...
in the place where urbanization spread through and this also creates disparity of energy consumption between the rich and poor in the urban. This gap forces unsustainable city growth and push difficulty for the development goal (MDGs 7) to succeed especially in developing countries where this gap clearly emerged. Urbanization and construction industry clearly relates to each other due to construction industry strongly supports urban process through infrastructure development. According to Salamanca-Buentello et al. (2005) mentions that nanotechnology could help MDGs achievement especially for construction development. However, there is a doubt about the difference of demographic and socio-economic backgrounds of each nation on how nanotechnologies can contribute the development equity especially in construction sector where a gap between technology-based and labor-based intensities is strongly appeared in both developed and developing worlds [1].

A debate between different perspectives of potential risk and benefit from nanotechnology application is seriously discussed, for instance, the Joint Center for Bioethic at University of Toronto mentioned the benefits for socio-economic development while Erosion, Technology and Concentration (ETC group) in Winnipeg, pointed out that it will increase the divide between rich and poor countries [2, 3]. The United Nations Industrial Development Organization (UNIDO) and UNESCO also launch the international conference for this emerging dialogue. For construction industry, an expectation that nanotechnology will help to reduce CO$_2$ emission from cement composing process due to it is considered as a source of GHGs emission as about 3 percent of global generators of GHG (13,500 million ton) comes from the cement industry [4]. Besides new materials are expected to be more durable against coming severe natural disaster such as earthquake, flooding, landslide, or even promote environmental quality through air and water purification in the future.

However, unknown potential risk of small particles could generate health problems if unprotected policy and practice is ignored especially in the place where unskilled worker concentration like Thai construction industry. Thailand has also tried to reduce the cement products in order to combat global warming and it seems like nanomaterials are outstanding materials for this purpose. The European Commission launched a survey on Nanotechnology and Construction Industry 2006 which mentioned that nanomaterials such as Carbon nanotube, TiO$_2$ and Aerogel will arrive in the European construction industry within 10 years and their application will be mostly on building, bridge and road construction. However, for developing nation like Thailand, only new imported construction materials are possibly expected due to there is little R&D support for nanotechnological research beneficial for construction market. While East Asian country like UAE, a major target of Thai exported construction workers, is interested in nanotechnological application for their many construction projects. This changing could bring about new obstacle for construction workers who need to compete at international level if the low awareness of nanotechnology among them has still been.