

KJHS FORUM: TECHNOLOGY GAP

Rethinking the Technology Gap

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Today, Korean companies often make headline news with their impressive performance in the global market. Samsung has emerged as the number two producer of smart phones, beating seemingly invincible giants like Nokia. Automobiles made by Hyundai, until recently known better for their affordable prices than for their high quality, have made their inroad into the market of both high-end and low-end classes. In the field of nuclear power plant construction, the Korea Electric Power Corporation has led an international consortium to win a 40 billion dollar contract with the United Arab Emirates, sending a wake-up call to its big-name rivals, such as General Electric and Westinghouse of America, Areva of France, and Toshiba, Hitachi and Mitsubishi Heavy Industries of Japan. The list of Korean companies rising up to top places would be much longer should we consider cases beyond these headline makers. For Korean CEOs, there is little time for rejoice as they are already concerned about adapting to post catch-up modes of thinking, moving from the status of first-followers to that of first-inventors. For many policymakers in developing countries, Korea stands out as an attractive model of economic growth, transforming itself from a war-stricken, poor recipient of international aid into a world-leading seller of high-tech products. The technology gap seems to have disappeared in some areas, as one reader of *The Economist* magazine quipped after the nuclear deal between Korea and UAE was signed off: “Simple, G.E. Just join the Koreans. Their model works best and is the most efficient.”¹

What made it possible for Korea to have such a turn-around? A body of literature seeks to answer this question by examining cultural aspects (e.g., Asian values), innovation systems (e.g., government agencies and policies), geopolitical situations (e.g., the Cold War context), or charismatic leadership in business and policymaking areas (e.g., the founder of Hyundai). Yet no one has taken a serious look into the nature of the technology gap *per se*. What is the technology gap? What exactly do we mean by “bridging” this gap? Is there a universal yardstick to measure and

¹ Comments on “The Nuclear Industry: Unexpected Reaction,” *The Economist* (Feb. 4, 2010), <http://www.economist.com/node/15457220/comments> (accessed Apr. 12, 2010).

rank the national capacity for technological productivity? I think that the term ‘gap’ is a useful yet problematic metaphor, for a gap connotes a space or distance between two objects. Is the technology gap something that can be filled with more stuff or be connected with a bridge?

To better understand the meaning of the technology gap, we need to pay more attention to the ways in which technology is developed and used, namely the *historicity of technology*. Technology can be *decontextualized* from one place and be *recontextualized* in another, but the process is very complicated and is not easily accomplished. For example, building a factory for high-tech materials in India or China does not necessarily mean that technology is fully transferred and contextualized there. This is merely a change in the site of production. Andrew Feenberg, a philosopher of technology, maintains that the part can only be understood within the whole environment. A picture of an engine in a manufacture’s catalog, with its sharp-edged surfaces in cold, shiny steel, is like an image of a fish out of water, giving no sense of the engine’s noisy and hot working environment. Likewise, a study of the community or society is needed in order to understand how imported or transferred technology really works in the new environment.²

Nevertheless we tend to forget the contextualized or historicized meaning of technology. A good example is the inward-outward opening door, which is commonly seen in any movie theater. The invention of this type of swirling door is in fact an outcome of severe fire accidents that took place in theaters, including the famous Iroquois Theater fire in Chicago in 1903. Some 600 people died, and many of the victims were found near the exit door. Installation of inward-outward doors in theaters, then, became a construction standard, not an option. But very few people these days would be aware of this historical context behind door technology. Feenberg calls this “the paradox of origins,” which means that “behind everything rational there lies a forgotten history.”

As a historian, I embrace Feenberg’s emphasis on the historicity of technology. But I wonder how contextualized understanding of technology might help tackle the issue of the technology gap. Who cares about all the forgotten history when we are busy with catching-up? Do we have to learn all the trials and errors and study successes and failures before adopting and using technology? Technology can be liberated from its origin as much as it is constrained in the past. Let us take an example of the computer motherboard. One may find that the components of a motherboard are made in several different countries, assembled yet in another country, and sold all over the world. The motherboard is then an ensemble of patents protected, technologies transferred, labors purchased, and contracts signed. The same can be said of smart phones, automobiles, and nuclear power plants. The nationality of a technology becomes fuzzy, and the technology gap gets complicated, as it can be an issue of original inventions, manufacturing know-hows,

² Andrew Feenberg, “Ten Paradoxes of Technology,” *Technē* 14 (2010), 3-15. I am much inspired by Feenberg’s critical view of technology, on which he gave a presentation at KAIST in 2010. See also Feenberg, *Between Reason and Experience: Essays in Technology and Modernity* (Cambridge, MA: The MIT Press, 2010).

management skills, or even business practices.

It should be noted, therefore, that the technology gap is not solely about technology itself. It is about the *historical process* by which technology moves beyond its birthplace, crosses national boundaries and business lines, and is put into a new use. This process often involves changes in government policies, corporate strategies, research directions, university teachings, and the way people live in society in general. The technology gap, I think, is essentially a *rhetoric* that sustains this historical process by constructing hopes and aspirations for progressive changes in developing countries.

These days, the new term *technology divide* gains much currency in dealing with the problem of inequality between technology-haves and technology-have-nots in society. There is a subtle difference between the two terms: whereas ‘technology gap’ is usually employed to address the issue of a nation’s economic development through technology, ‘technology divide’ is primarily concerned with the social implications of the accessibility of specific technologies like computers and mobile phones. This difference in focus should not conceal the fact that the economic and social consequences of technological inventions and uses are closely intertwined, perhaps as inseparable parts of the historical process. The combined study of technology gap and divide is an untapped research area that can be profitably exploited.

The essays in this section examine three historical actors working to advance Korea through technology: the government, corporations, and researchers. Historian Moon Manyong traces the evolution of the first Korean government-funded research institute, the Korea Institute of Science and Technology (KIST, 한국과학기술연구소), from its inception in 1966 to its development as a model for other government-funded research institutions created in the 1970s and 80s. Moon shows that the history of KIST is more than just another story of institutional growth. It encapsulates science and technology policies developed and implemented by the Korea government during a period of rapid industrialization. Another historian Song Sungsoo takes us to see the changing corporate strategies in steel industry during a similar time span. The Pohang Iron and Steel Company (POSCO), established in 1968 as a public enterprise and completely privatized in 2000, exemplifies technology transfer as a historical process that involves overseas training, efforts to become the first follower of advanced technologies, and strengthening of R&D function. The third essay is an excerpt from Kim Byung-Koo’s memoir, *Nuclear Silk Road: The “Koreanization” of Nuclear Power Technology* (forthcoming in 2011). Trained as a mechanical engineer at Caltech (Ph.D. 1972), Kim was scouted back to Korea as part of the reverse brain drain policy and spearheaded the task of developing nuclear fuel at Korea Atomic Energy Research Institute (KAERI). He later became the project manager for designing the power reactor system, a technology central to a nuclear power plant. Before his retirement in 2008, he also worked as the director of the Technical Cooperation Department at IAEA. Kim’s essay gives a vivid illustration of collective aspirations and individual ordeals involved in technology transfer—in a sense, the process of decontextualization and recontextualization of technology. There is no doubt we need more case studies to

fully grasp the meaning of the technology gap in Korea, i.e., how it functioned as a rhetorical tool to move people's minds, shape government policies, and change social relations. Collectively, I believe, the three essays presented here will serve as an invaluable starting point for further study.