Transactions of the Korean Nuclear Society Spring Meeting
Chuncheon, Korea, May 25-26 2006

Evaluation of the New Growth Engine in the Nuclear Energy R&D Field

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1. Introduction

This paper aimed at looking for the new growth engine in the nuclear R&D field which leads the national prosperity and people's welfare in the 21st Century and evaluating those technologies from the respects of the realization time, the market and the technology development level. Based on the analysis of the technological environment and the preceding research[1], eight innovative technologies were selected as new growth engines.

2. Evaluation of Innovative Technologies

Twenty one technologies which are considered innovative ones in the NuTRM[1] were evaluated by an expert group from the aspect of their business and innovative features to select new growth engines in the nuclear R&D field. The evaluation results are summarized as follows;

2.1 Realization Time of the Innovative Technology

In the aspect of their expected realization time, eight possibilities selected for the new growth engines and categorized into three groups as shown in the figure 1, Long-term development technology(SFR, VHTR), Mid-term development technology(Fuel, Robot, Innovative material), and Short-term development technology (Research Reactor, SMART, Laser).

Figure 1 illustrates the realization time of Korea and the leading country in each technology. Also, one can see in the figure, most of the innovative technologies have five to ten year realization time gaps when compared to the leading nation.

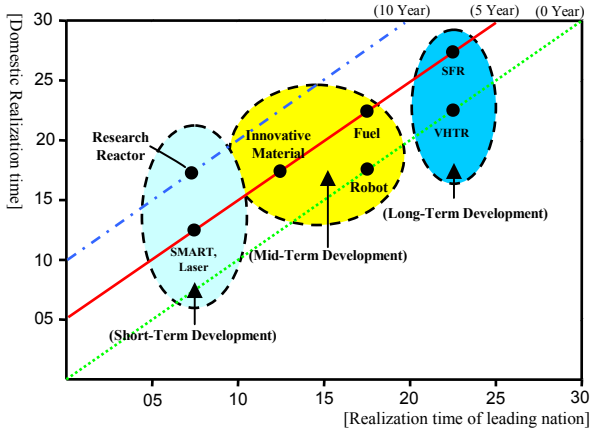

Figure 1. The evaluation result of innovative technologies as the expected realization time.

2.2 World Market Size and Amount of Sales

The innovative technologies selected above were also categorized into three groups in terms of the world market size and the amount of yearly sales as shown figure 2.

A-Group includes two innovative technologies of VHTR and SFR. This group has a large world market of the range of 10 ~ 100 billion $/year. Even if these technologies still have a high uncertainty in business, they also have a high viability to be a new growth engine in a long-term.

Innovative technologies within the B- and C-Groups were estimated to have a smaller world market than those within I-Group. However, these technologies were expected to be cash flows within several years and can be new leading technologies in the near future.

In the figure, the line indicates the ten percent of the world market share, SMART and Research Reactor were estimated to have a share of over ten percent in the world market and the others were in the lower range.

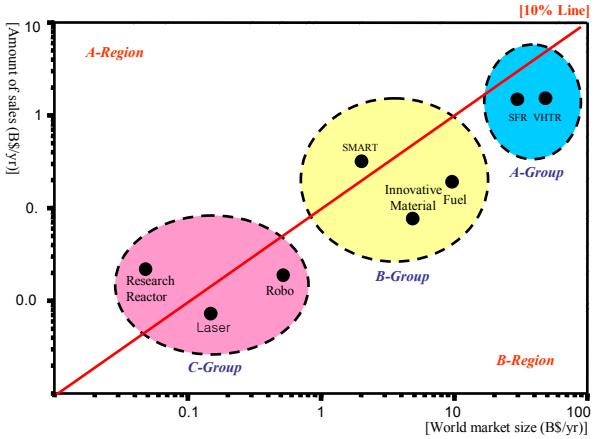

Figure 2. The evaluation result of innovative technologies as the world market size and amount of sales.

2.3 Technology Development Level

Finally, according to the level of technology development, the innovative technologies selected above were divided into four regions as shown figure 3. Table 1 explains the definition of each region in the figure.

Table 1. The definition of each region in figure 3.

Region	Definition of each region
I	Home and abroad technology development level is all high
II	Abroad technology development level is higher than domestic level
III	Home and abroad technology development level is all low
IV	Domestic technology development level is higher than abroad level

Figure 3 shows that most of the innovative technologies were located in region II or III and they had a 20 ~ 40 % gap in the technology development level when compared with the foreign countries.

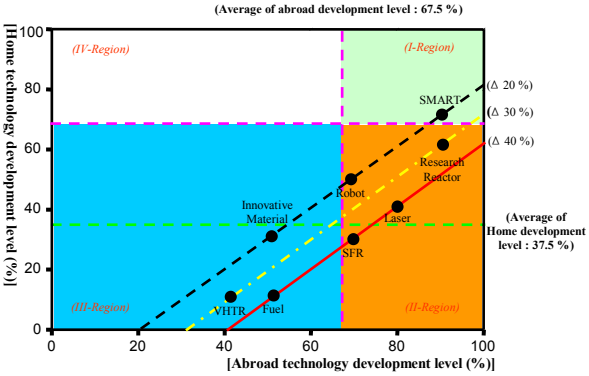

Figure 3. The Evaluation result of innovative technologies as the technology development level.

3. Conclusion

We have discussed throughout this paper the investigation of new growth engines in the nuclear R&D and the evaluation of these technologies by using an expert group's peer review.

The innovative technologies as the new growth engines were categorized into various types in accordance with criteria such as the expected realization time, world market size, amount of yearly sales, and the technology development level.

This paper will contribute to the diffusion of knowledge and will be helpful in the establishment of effective technology development strategies in the nuclear energy R&D field.

REFERENCES

[1] Ministry of Science & Technology, Korea Science & Engineering Foundation and Korean Nuclear Society (2005), *National Nuclear Technology Readmap(NuTRM)*, Korean Nuclear Society, Daejeon.