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A Survey about the Characteristics of Promising Radiation Technologies

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1. Introduction

Korea's nuclear R&D program started in 1992 and was devised as the 3rd plan in 2006 with the time span of 5 years till 2011. This program is more focused on nuclear power technology development than Radiation Technology(RT). So the nuclear power industry in Korea is 6th in the world in terms of nuclear power production. On the other hand RT industry is less advanced than the nuclear power industry.

This paper is aimed at the promotion of RT R&D through surveying and identifying the technological potentials of promising radiation technologies for the future market. Based on the analysis of a preceding research [1] and a questionnaire to an expert group, nine promising technologies were selected. Expert group peer-reviewed and evaluated their economic and technological features.

Table 1 shows the nine selected technologies and their abbreviations.

Table 1. Selected technologies and their abbreviations

Abbreviation	Selected technologies
F & B	Radiation **F**ood **&** **B**iotechnology products
GR	Useful **G**enetic **R**esources Using Nuclear Beams
VC	Radiation Breeding high **V**aluable **C**rop
NM	Radiation Public Health **N**ew-**M**aterial
FP	Development of **F**unctional **P**olymer
IR	**I**ndustrial **R**adioisotope Production
DD	**D**isease **D**iagnosis Using Radioisotope
P & C	Radiation Medical Treatment **P**rediction **& C**ontrol
RD	Advanced Semiconductor **R**adiation **D**etector

2. Characteristics of Promising Radiation Technologies

All of the technologies selected were expected to be commercialized by 2010 in the leading countries as shown in Figure 1. Also, except for the Industrial Radioisotope Production and Disease Diagnosis by Radioisotopes, most of the radiation technologies have a 2.5 to 5 year time gap to be commercialized between the leading nations and Korea.

The distinct character of their commercialization time is that most of the promising radiation technologies have possibilities to be commercialized within a short period.

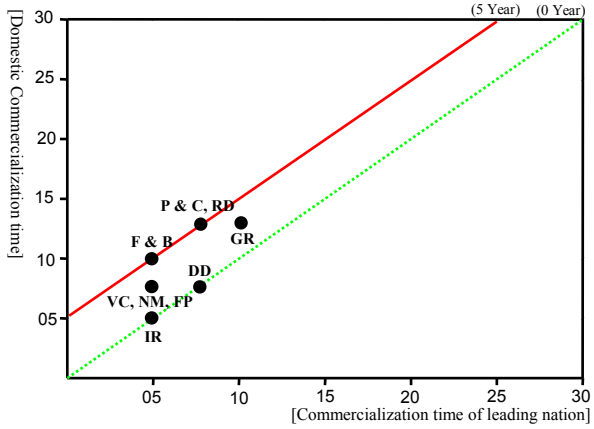

Figure 1. The survey result of radiation technologies as the expected commercialization time.

Furthermore, technologies selected above were also categorized into three groups in terms of their world market size and the amount of yearly sales as shown Figure 2. From a business aspect, it was expected that the promising radiation technologies would have a world market size of the range of $0.1~100 billion/year and sales of $0.01~0.1 billion/year.

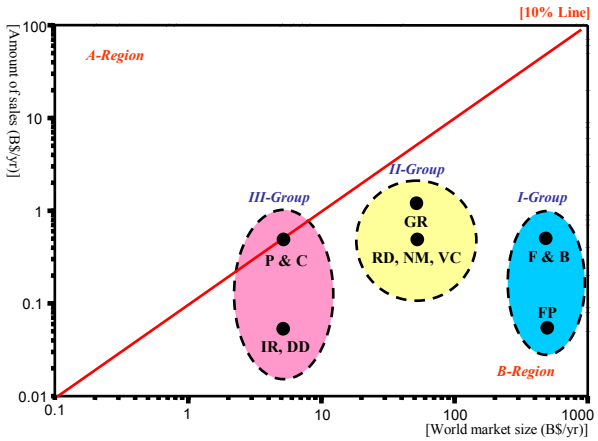

Figure 2. The survey result of radiation technologies as the world market size and amount of sales

Two technologies of Food & Biotechnology and Functional Polymer were included in I-group. This group had a large world market of the range of $10~100 billion/year. Promising technologies in II- and III-groups were estimated to have a smaller world market

than those in I-group. However, these technologies were expected to have an amount of yearly domestic sales ranging from $0.01~0.1 billion/year independently of the world market size.

As shown in Figure 2, except for Medical Treatment Prediction & Control technology, it was found that most of the technologies would not be able to share ten percentage of the world market in the future.

In terms of the level of technology development, selected technologies were divided into four regions as shown in Figure 3. Table 2 defined each region used in Figure 3.

Table 2. The definition of each region used 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

As shown in Figure 3, most of the technologies were located in the II or III regions and had technology gaps of 20~40 percentage from leading countries with the exception of Functional Polymer and Genetic Resources development by a radiation use.

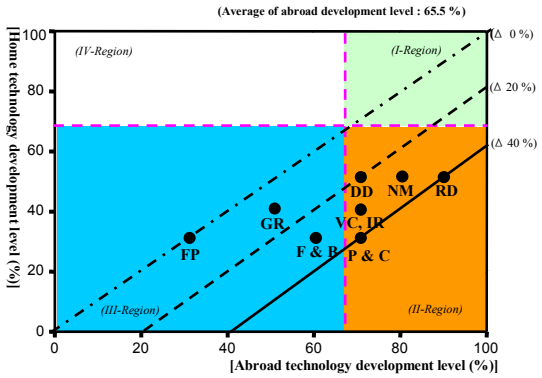

Figure 3. The survey result of radiation technologies as the technology development level.

3. Conclusion

It is expected Radiation Technologies will significantly contribute to enhancing the public welfare and they also have a good chance of being developed and commercialized since they are deeply connected to the national core technologies, 5T. Especially, Radiation Technologies have various applications, so their fusion possibility with other technologies is very high. Therefore, the construction of a cluster centered on Radiation Technologies and collaborative development with a new growth engines development plan are desirable.

Process and product standardization are essential for a effective R&D implementation of promising Radiation Technologies consistence with their commercialization time and technological maturity. Moreover, for growing a world market share of those technologies, improvement of the R&D capability in R&D institutions, appropriate funding, and a well established R&D infra is required.

REFERENCES

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