

Application of Resource Portfolio Concept in Nuclear Regulatory Infrastructure Support

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1. Introduction

As the new entrants in the global nuclear construction market are increasing and the establishment of an effective and sustainable regulatory infrastructure becomes more important, they have requested international assistance from the international nuclear communities with mature nuclear regulatory programmes. It needs to optimize the use of limited resources from regulatory organization providing support to regulatory infrastructure of new comers.

This paper suggests the resource portfolio concept like a GE/Mckinsey Matrix used in business management and tries to apply it to the current needs considered in the regulatory support program in Korea as the case study.

2. Methodology

There are many countries, so called new comers, which have expressed interests in developing their nuclear power program. It has been recognized by international community that every country considering embarking on a nuclear power program should establish the nuclear safety infrastructure to provide a sound foundation for ensuring a sustainable high level of nuclear safety [1]. The new comers have requested considerable assistance from IAEA and already they have bilateral cooperation program with the advanced countries with mature nuclear regulatory program.

At this point, regulatory bodies to provide support are confronted with two challenges as follows; the primary objective of the regulatory body is to protect public health, and the environment from possible adverse effects arising from nuclear facilities and management of radioactive waste [2]. At the same time, regulatory body of export country of nuclear power plants should take a reliable role in supporting nuclear safety of country launching the first NPP as the exporter and also contribute to global nuclear safety as IAEA member state. The difficulties in supporting capacity building of new comers as well as regulating safety in domestic NPP are that the regulatory body of providing country has restricted manpower. Therefore, it has to improve effectiveness, efficiency and harmonization of regulatory approaches and needs to optimize and allocate the very limited human resources.

The effective approach suggested in the business field is to shape demand by considering production, inventory and distribution strategies across customers with varying demand characteristics and service-level

requirements. Then it is to help allocate existing inventory and resources to the most profitable customers maximizing margins and realigning demand and supply.

One of tools for business strategy is a GE/Mckinsey Matrix which comes from consulting engagements with General Electric, Mckinsey developed a portfolio matrix as a tool for screening company's portfolio of strategic business units (SBU) [3]. The result can be expressed quantitatively as a circle size and the location in the matrix. Attractiveness and strength are calculated by first identifying criteria, determining the value of each parameter in the criteria and multiplying that value by weighting factor as shown Table 1. Each criterion can be given a different weighting in calculating the overall attractiveness of a particular industry.

Typically:

Attractiveness = Attractiveness Criterion 1 Value by Criterion 1 Weighting + Attractiveness Criterion 2 Value by Criterion 2 Weighting, etc.

Strength = Strength Criterion 1 Value by Criterion 1 Weighting + Strength Criterion 2 Value by Criterion 2 Weighting, etc.

Table 1 : Typical GE/Mckinsey Matrix Criteria

Factor	Criteria
Market Attractiveness	Market Size
	Market Growth
	Market Profitability
	Company Investments
	Overall of Risk of Return
	Entry Barriers
Competitive Strength	Market Share
	Strength of Assets
	Production Capacity
	Core Competencies

3. Results of Case Study

Direct application of this business concept to nuclear regulatory infrastructure support is not easy because the latter is not a business aiming profitability but an international cooperation for global nuclear safety. This paper suggests some modified portfolio criteria. The main objective proposed for the portfolio is (i) to identify and segment the needs for regulatory support, (ii) to discuss 'what and where' of regulatory assistance to be provided, and (iii) to go over how to arrange and

allocate the limited resources for the most effective regulatory assistance.

Before plotting matrix, it needs to rethink the concept of the word generally used in the business. The market in the typical business portfolio can be understood as the needs or requirements of new comers and the profitability can be regarded as the contribution to the global nuclear safety as well as the support to the nuclear industry as national key export firm. Some problems can be issued in terms of regulatory independence when the regulatory body takes part in promoting the nuclear industry. It needs to be considered as the improvement of national stability and prosperity by making the country take a leading role in global nuclear safety.

To make a modified matrix, first, different needs of regulatory assistance are categorized as the country which has already established its regulatory body and decided the import of Korean NPP like UAE, the country which are requesting international aid due to the weak financial condition like Jordan, and others which are still considering launching the first NPP or expansion of nuclear program etc.

Second, specific criteria of market attractiveness and competitive strength could be replaced as Table 2.

Table 2 : Factor and Criteria of Modified Portfolio Matrix for Nuclear Regulatory Support

Criteria for Attractiveness Factor	Condition that have priority to support
Experience in NPP operation	The country with no experience in NPP operation before
Status of Regulatory Organization	The country with no regulatory body currently.
Status of Nuclear Energy Policy	The country with launching or expansion of nuclear power program in detail
Expectation of Growth of Nuclear Program	The country with increasing demand on nuclear application (electricity, desalination, research and so on)
Criteria for Effectiveness Factor	Condition that have priority to support
Assistance of International Communities	The country not supported by bilaterally from the member states of IAEA or international cooperation program such as ODA* or IAEA's EBP**
Reliance or Urgency on Korea's Support	The country highly and urgently relaying on Korea's support
Interests in Korean NPP	The country with high interests in Korean NPP and contributing to national prosperity in the enlarging nuclear market
Usefulness of Resources	The country easily applied to using the regulatory support such as IRISS***

- ODA* : Official Development Program
- EBP ** : Extra Budgetary Program

- IRISS*** : Integrated Regulatory Infrastructure Support Service

Third, the strategy variation and the more preferable options are discussed from the case study. In this paper, specific country names are expressed as A thru E and the weightings and values of criteria in each factor are arbitrarily defined. Fig. 1 with nine cells shows three types of strategy. The three cells in the upper right corner means 'green light' to support actively. The three diagonal cells from the lower right to the upper left are suggested to allocate resources on a selective basis. The three cells in the lower left corner may be divested from a portfolio.

Finally the size of circle means the investment size to be expected for the regulatory assistance in terms of the time and human resources.

As a result, country E, C, and A have higher priority while country B with a large circle is hardly to receive any resources because it has low both of attractiveness and effectiveness and even it needs more time and work loads.

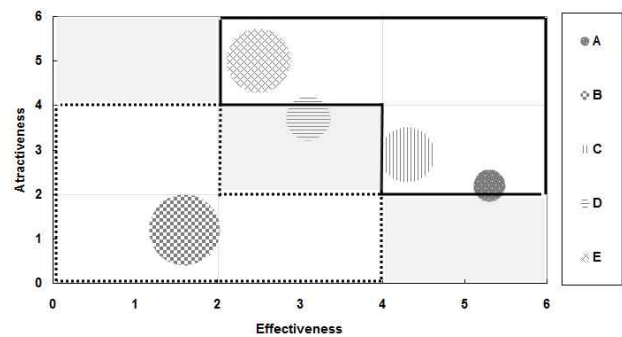


Fig. 1: Portfolio Matrix for Nuclear Regulatory Support

4. Conclusions

It is not possible to fully support and response at any time and at any demands on new comer's regulatory assistances because the resources scarcity should not affect the safe operation in domestic NPPs. This paper suggests the procedure how to identify the effectiveness of arranging the regulatory assistances under the limited resources and attempts to apply it to some countries currently considered in Korea. However, this approach should be improved through further studies including the selection of criteria and quantification of value of each criterion through the expert peer review.

REFERENCES

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