

# A Balanced Scorecard for Identifying Factors of Strategic Fit of National R&D Program on the Creative Economy Policy

Jieun Kim, Haejin Cho, Yongtae Park, Yoonjo Kim, Jeonghwan Jeon

**Abstract**—As creative economy is important theme for national policy, many countries have been raising investments through national R&D programs. Since not all of programs are aligned with the ultimate vision and R&D investment is one of the most decisive elements, the strategic fit of national R&D programs should be evaluated for effective resource allocation. This study aims at identifying the factors of strategic fit of national R&D program on the creative economy policy. For this purpose, the balanced scorecard (BSC) model for R&D is utilized to translate national strategic objectives into a set of coherent performance factors.

**Keywords**—Balanced scorecard, Creative economy, National R&D program, Strategic fit.

## I. INTRODUCTION

RECENTLY, creative economy has been emphasized in many countries. In general, the creative economy is the new economic paradigm following the industrial age, the information age, and knowledge-based economy [1]. It is a concept that is being discussed active in the field of urban and regional policy in the late 1990s in the United Kingdom and around the UN cultural industries [2]. In Korea, the creative economy policy introduced by President Park Geun-hye government is promoting as a national agenda. The policy's key points included promoting convergent IT and software technologies, scientific discoveries and technology integrating with cultural content for sustainable economic growth.

In attempts to implement the government's economic growth strategy, many countries have been raising R&D investments through various national R&D programs [3]. Since R&D investment is one of the most decisive elements in promoting scientific and technological progress [4], the effective use of the limited R&D resources can be regarded as a prerequisite for benefiting from formulation and implementation of national R&D programs. However, not all of programs are aligned with the ultimate vision even though they are intended to support the government's policy. Thus, evaluations for the strategic fit of national R&D programs need to be made so that the limited

resources are allocated to promising R&D programs and poor R&D programs can be improved or terminated.

Strategic fit is a measure to qualify the degree of project's matching with strategy. In conducting the search for a new investment, sophisticated organizations often establish high-level criteria that need to be met before they move forward. The strategic fit of proposed projects will be assessed whether they meet the organization's strategic objectives.

A number of existing studies have been conducted to measure strategic fit of R&D or performance of R&D at various levels. Also, the literatures used the balanced scorecard (BSC) method to establish strategic criteria for project strategic fit evaluation [5]–[9]. However, few attempts have been made at the national program-level. Moreover, there is lack of the evaluation from creative economy or creativity point of view.

Therefore, the purpose of this paper is to apply BSC framework to translate the national strategic objectives for creative economy policy into a set of coherent strategic fit factors (See Fig. 1). First, the critical success factors for BSC dimensions are investigated from the Korea government's creative economy policy. Also, strategy map of BSC are developed for understanding entire critical success factors. Second, the factors of strategic fit on creative economy are identified by matching critical success factors with the existing creativity performance factors.

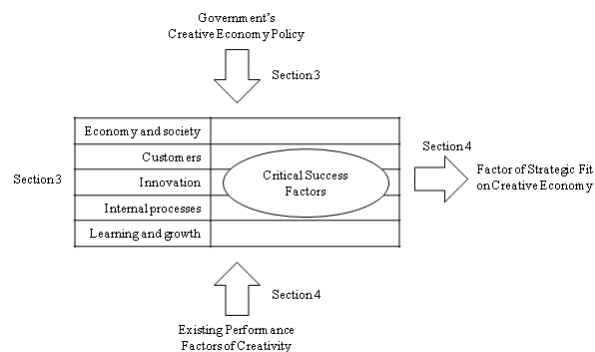


Fig. 1 Research framework

The remainder of this paper is organized as follows. Section II reviews the definition of creative economy and BSC applications to measure strategic fit and BSC models for R&D projects. Sections III and IV details the proposed approach of three steps as shown in Fig. 1 and some conclusion remarks are

J. Kim, H. Lee, and Y. Park are with the Department of Industrial Engineering, Seoul National University, Seoul, Korea (e-mail: hsn1234@snu.ac.kr, insomnia0@snu.ac.kr, parkyt1@snu.ac.kr).

Y. Kim is with Science and Technology Policy Division, Ministry of Science, ICT and Future Planning, Seoul, Korea (e-mail: kyj@msip.go.kr).

J. Jeon is with Gyeongsang National University, Jinju-si, Gyeongsangnam-do, Korea (corresponding author to provide phone: +82-55-772-1704; fax: +82-55-772-1704; e-mail: jhjeon@gnu.ac.kr).

made in Section V.

## II. LITERATURE REVIEW

### A. Creative Economy

Creativity is defined as ‘the ability to generate something new’, or ‘production by one or more people to ideas and inventions that are personal, original, and meaningful’ [1]. The core of creative economy is creative industries of which economic growth and employment potential increases [10], [11]. Thus, previous literatures in this area focused on the definition and classification of creative industries [1], [2], [11], [12].

Creative economy is emerged as important policy targets for the major countries especially in Europe and U.S. Many governments and policy-makers understand the following normative policy script: to compete in the new creative economy, cities should seek to implement particular initiatives: encourage creative industry clusters, incubate learning and knowledge economies, maximize networks with other successful places and companies, value and reward innovation and aggressively campaign to attract the ‘creative class’ as residents [12].

### B. Balanced Scorecard

The balanced scorecard (BSC), a model for the analysis of strategy performance information for all types of organization, was developed by Kaplan and Norton [13]. It was based on four perspectives: three non-financial topic areas (i.e. customer, internal business process, and learning and growth) as prompts to aid the identification of non-financial measures in addition to one looking at financial.

R&D is a key strategic topic that should be aligned with the corporate strategy and also the implementation of a strategy requires integrated systems of measurement for R&D activities [4]. Thus, several literatures developed BSC in measuring the performance of R&D activities [5], [6]. Specifically, García-Valderrama et al. [14] suggested the BSC frameworks for R&D projects, which consists of five perspectives: learning and growth (training, experience and motivation of personnel), internal process (development of internal process in R&D processes), innovation (degrees of innovation achieved), customers (marketing results from the application of R&D results), and financial (financial results from the application of the R&D results).

The BSC is ultimately about choosing measures and targets. Thus, in order to quantify the strategic fit, existing literatures integrated BSC with multiple criteria decision making approaches such as analytic hierarchy process [7] or analytic network process [8], and data envelopment analysis [9].

## III. CLASSIFICATION OF CRITICAL SUCCESS FACTORS

Park’s vision of a creative economy encompasses more than what other countries designed to articulate the nature and significance of the cultural sector [2]. The Korean president’s basic strategy is to promote innovative start-ups that can develop and discover new technology with simple ideas, emulate the young entrepreneurial spirit commonly seen in the U.S.’ Silicon Valley and in Israel. By overcoming the negative perceptions for high-risk, high-return ventures, the government intends to establish an ecosystem to support sustainable start-ups and small and medium-sized enterprises (SMEs) for technological development. In a creative economy ecosystem, entrepreneurs and young people can take risks, secure investments to finance the launch of innovative start-ups and restart businesses even after failure. The government aims to establish an entrepreneurial cycle in which anyone with innovative and creative ideas can launch start-ups and grow by easily securing investments, and investors can retrieve their capital, which can then be used to finance other tech ventures.

Korea’s creative economy policy includes six strategies and 24 following initiatives. Each of them can be transformed as critical success factor (CSF) by identifying the dimensions of BSC framework. This paper modifies García-Valderrama et al. [14]’s BSC frameworks developed for R&D projects into national R&D program. The dimensions of BSC involve five perspectives:

- Economy and society: “What can we achieve as economical and societal impacts from the application of the national R&D program results?”
- Customer: “How can we provide the results of the application of the national R&D program to stakeholders?”
- Innovation: “What should we implement as innovation performance through the national R&D program?”
- Internal business processes: “What must we excel at for create and increase the value of national R&D program?”
- Learning and growth: “How can we continue to improve, create value, and innovative?”

This work is shown in Table I. The 14 CSFs derived from creative economy policy are constructed as the strategy map (See Fig. 2).

TABLE I  
IDENTIFYING CRITICAL SUCCESS FACTORS FOR KOREA GOVERNMENT'S CREATIVE ECONOMY POLICY

Government's Creative Economy Policy		Factors of BSC	
Six Strategies	24 Initiatives	Dimension	Critical Success Factor (CSF)
Establishment of ecosystem that compensates creativity fairly and allows easy start-up	Increasing the investment for creative ideas and technologies	Customer	Creation of entrepreneurial environment
	Establishing easy start-up environments	Customer	Creation of entrepreneurial environment
	Promoting the protection and application of the idea and technology by the intellectual property	Customer	Technology transfer and commercialization
	Enabling catalytic function for commercialization of creative assets	Customer	Technology transfer and commercialization
Strengthening global expansion and the leading role of start-ups and SMEs in the creative economy	Establishing entrepreneurial safeguard allowing challenge again	Customer	Creation of entrepreneurial environment
	Arranging growth platform for start-ups and SMEs	Internal processes	Establishment of venture infrastructure
	Supporting the opening of global market for start-ups and SMEs	Customers	Development of the global market
	Promoting symbiosis and cooperation between conglomerates and SMEs	Internal processes	Promotion of technological cooperation
	Resolving the difficulties of venture and SMEs such as a manpower shortage	Internal processes	Establishment of venture infrastructure
Creation of a growth engine for new business and new markets	Creating new industrial growth vitality of existing industries by the convergence of ICT and science and technology	Innovation	Promotion of ICT innovation
	Development of high value-added content industry and new Internet and SW-based industry	Innovation	Promotion of the content industry
	Creating new markets through human-centered technology innovation	Innovation	Development of creative and advanced technology
	Developing new markets through the discovery and development of promising new future industry	Innovation	Development of creative and advanced technology
	Promoting market creation and industrial convergence through the rationalization of regulation	Customers	Technology transfer and commercialization
Cultivating global creative person of dream, talent, and a spirit of challenge	Strengthening the training of convergent creative talent	Learning and growth	Education of creative talent
	Enlarging the education to cultivate a spirit of challenge and entrepreneurship	Learning and growth	Education of creative talent
	Vitalizing the domestic flow and overseas expansion of creative talent	Learning and growth	Education of creative talent
Strengthening of ICT innovation capability and science and technology underlying the creative economy	Improving R&D system to strengthen the commercialization and expansion of potential	Internal processes	Expansion of R&D infrastructure
	Strengthening ICT innovation capability for the acceleration of creative economy	Innovation	Promotion of ICT innovation
	Strengthening industry-university-institute-region cooperation for the job creation	Internal processes	Promotion of technological cooperation
	Enhancing the role of science and technology · ICT to solve the global problem	Innovation	Promotion of ICT innovation
Development of creative economic culture with a nation and government together	Developing creative culture in which creativity and imagination can be expressed	Learning and growth	Development of creative economic culture
	Converging the ideas of the people and public resources through government 3.0	Learning and growth	Development of creative economic culture
	Innovating the way of government for the realization of creative economy	Learning and growth	Development of creative economic culture

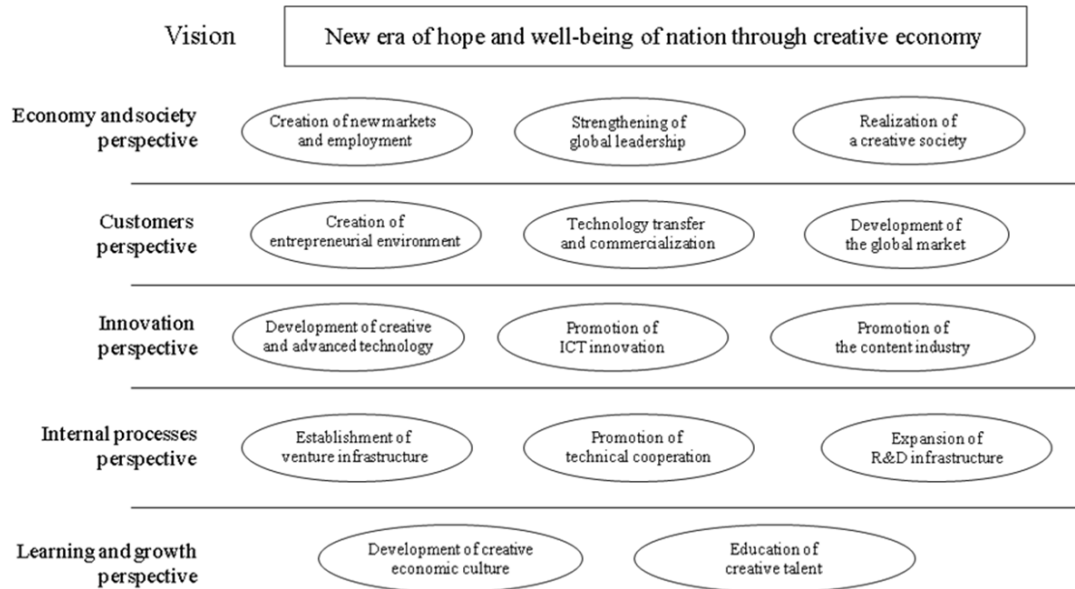


Fig. 2 Strategy map of creative economy policy

#### IV. IDENTIFICATION OF FACTORS OF STRATEGIC FIT

There are many attempts to evaluate creativity or propose creativity index at various levels, either macro-level (i.e. national capital for creativity economy) [10], [11], [15] or micro-level (i.e. creative capability of organization or individual) [16]–[19]. We incorporate the factors suggested in these studies and link with the CSFs of previous process to

identify the strategic fit factors of creative economy.

As shown in Table II, 20 factors of strategic fit of national R&D program on creative economy are investigated. Using strategic fit factors future research can develop criteria for evaluation of national R&D programs, implement assessment with qualitative and quantitative indexes, and allocate and manage R&D budgets by monitoring R&D programs.

TABLE II  
IDENTIFYING FACTORS OF STRATEGIC FIT OF NATIONAL R&D PROGRAM ON CREATIVE ECONOMY

Dimension	CSF	Factor of strategic fit on creative economy	Reference
Customers	Creation of entrepreneurial environment	Entrepreneurial orientation: innovativeness, risk-taking, proactiveness	[20]
	Technology transfer and commercialization	Technology partnership: licensing, connect and develop, joint application of patent	[11]
	Development of the global market	Technology commercialization: start-up, merge and acquisition Global marketability: global network integration, market orientation, global human resource	[21]
Innovation	Development of creative and advanced technology	Creativity of product: novelty-originality, usefulness-adaptiveness, Innovation management: strategic thinking, change management Methodical advance: creative methodology, scientific approach	[19], [22]
	Promotion of ICT innovation	Information use environment: information accessibility, information exchange ICT competitiveness	[18], [19]
	Promotion of the content industry	Cultural consumption: added value of culture and content industries	[11]
Internal processes	Establishment of venture infrastructure	Financial infrastructure: venture capital Entrepreneurship: Share of SMEs, labor productivity	[11]
	Promotion of technological cooperation	Technology collaboration: industry-university-institute-region cooperation	[23]
	Expansion of R&D infrastructure	R&D investment: R&D expenditure Technological talent: number of research scientists and engineers per working people	[11], [15]
Learning and growth	Development of creative economic culture	Learning culture: beliefs and attitudes that support the use of information Cultural tolerance: multi-cross media, inter-cultural consideration	[18], [19]
	Education of creative talent	Knowledge: intellectual orientation, technical talent, cognitive talent Motivation: interest, satisfaction, challenge	[11]
		Creative class: number of employees in creative industries compared to all employees	

#### ACKNOWLEDGMENT

This work was supported by the Science and Technology

Coordination Program grant funded by Ministry of Science, ICT and Future Planning, Korea.

## REFERENCES

- [1] J. Howkins, *Creative Economy: How People Make Money from Ideas*. Penguin Books, 2001.
- [2] A. Markusen, G. H. Wassall, D. DeNatale, and R. Cohen, "Defining the creative economy: Industry and occupational approaches," *Economic Development Quarterly*, vol. 22, pp. 24–45, 2008.
- [3] M. Lee, B. Son, and K. Om, "Evaluation of national R&D projects in Korea," *Research Policy*, vol. 25, pp. 805–818, 1996.
- [4] E. C. Wang, and W. Huang, "Relative efficiency of R&D activities: A cross-country study accounting for environmental factors in the DEA approach," *Research Policy*, vol. 36, pp. 260–273, 2007.
- [5] G. A. Neufeld, P. A. Simeoni, and M. A. Taylor, "High-performance research organizations," *Research Technology Management*, vol. 44, pp. 42–52, 2001.
- [6] W. G. Bremser, and N. P. Barsky, "Utilizing the balanced scorecard for R&D performance measurement," *R&D Management*, vol. 34, pp. 229–238, 2004.
- [7] H. Reisinger, K. S. Cravens, and N. Tell, "Prioritizing performance measures within the balanced scorecard framework," *Management International Review*, vol. 43, pp. 429–437, 2003.
- [8] R. Poveda-Bautista, D. C. Baptista, and M. Garcí'a-Melo' n, "Setting competitiveness indicators using BSC and ANP," *International Journal of Production Research*, vol. 50, pp. 4738–4752, September 2012.
- [9] H. Eilat, B. Golany, and A. Shtub, "R&D project evaluation: An integrated DEA and balanced scorecard approach," *Omega*, vol. 36, pp. 895–912, 2008.
- [10] R. Florida, *The Rise of Creative Class...and How It's Transforming Work, Leisure, Community and Everyday Life*. New York: Basic Books, 2002.
- [11] Home Affairs Bureau, the Hong Kong Special Administrative Region Government, *A Study on Creativity Index*. 2005.
- [12] L. Kong, C. Gibson, L. M. Khoo, and A. L. Semple, "Knowledges of the creative economy: towards a relational geography of diffusion and adaptation in Asia," *Asia Pacific Viewpoint*, vol. 47, pp. 173–194, August 2006.
- [13] R. S. Kaplan, and D. P. Norton, "The balanced scorecard measures that drive performance," *Harvard Business Review*, vol. January–February, pp. 71–79, 1992.
- [14] T. García-Valderrama, E. Mulero-Mendigorrí, and D. Revuelta-Bordoy, "A Balanced Scorecard framework for R&D," *European Journal of Innovation Management*, vol. 11, pp. 241–281, 2008.
- [15] R. Florida, and I. Tinagli, *Europe in the Creative Age*. 2004.
- [16] T. M. Amabile, "The social psychology of creativity: a componential conceptualization," *Journal of Personality and Social Psychology*, vol. 45, pp. 357–376, 2005.
- [17] M. Csikszentmihalyi, "Society, culture, and person: a systems view of creativity," in *The Nature of Creativity*, R. J. Sternberg, Ed. New York: Cambridge University Press, 1988.
- [18] M. Sundgren, E. Dimena, J. Gustafsson, and M. Selart, "Drivers of organizational creativity: a path model of creative climate in pharmaceutical R&D," *R&D Management*, vol. 35, pp. 359–374, 2005.
- [19] D. Mietzner, and M. Kamprath, "A competence portfolio for professionals in the creative industries," *Creativity and Innovation Management*, to be published.
- [20] D. Miller, "The correlates of entrepreneurship in three types of firms," *Management Science*, vol. 29, pp. 770–791, 1983.
- [21] M. von Zedtwitz, O. Gassmann, and R. Boutellier, "Organizing global R&D: challenges and dilemmas," *Journal of International Management*, vol. 10, pp. 21–49, 2004.
- [22] R. J. Sternberg, and T. I. Lubart, "The concept of creativity: prospects and paradigms. In R. J. Sternberg (Ed.), *Creativity research handbook*, New York, NY: Cambridge University Press.
- [23] D. M. West, "Improving university technology transfer and commercialization," Washington: Brookings Institution, 2012.