Time Series Analysis of Outcomes for Small and Medium Enterprises' Support of Regional Industry

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Abstract

Continued investment in Research and Development (R&D) by the government and corporate support played a major role in the rapid growth of the Republic of Korea. In 2017, the amount of R&D investment by the government accounted for 19.7 trillion Won (KRW), which is 4.7 % of the government's budget. The government's R&D budget is increasing by 2.5 % each year. We analyzed the outcomes of the projects, supported by the Busan regional companies conducted in 2016 to 2017. For a time series analysis, we gathered companies support amount by year, sales after company support, and material for employment. We used IBM's Statistical Package for the Social Sciences (SPSS) 18 for correlation analysis. We confirmed the relationship between employment and the sales of the annual company support program.

1. Introduction

The industrial technology is recognized as an important element of national competitiveness and the Korean government has implemented various policies for corporate support. In particular, it supports the growth of multidimensional companies through R&D and supports SMEs. Prior corporate support policies prioritized securing technology competitiveness of companies based on R&D. However, as a final goal of recent corporate support projects, commercialization support is expanding.

The Republic of Korea started a regional industrial promotion policy in 1999 with the aim of revitalizing the regional economy. To nurture regional strategic industries, the government promoted "policies that intensively support SMEs belonging to regional strategic industries". Recently, it focused on policies that induce cooperation and competition among regions.

The forms of corporate support for regional industry support projects are divided into infrastructure, technology, technology development (R&D), technical support, commercialization support, and human resources development (non-R&D). Results of R&D projects have clear technical development results, but it is difficult to evaluate the outcome of the company support project as employment and sales.

In this paper, we analyzed the business support of Busan area specialized industry in 2015 and 2016, and try to analyze what correlation the enterprise support project has with increasing employment and sales of enterprise.

2. Previous Research

Many researchers present the direction of desirable enterprise support projects through outcome analyses of existing enterprise support projects. [1] conducted an analysis of the efficiency of enterprise support projects for the whole southern

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area's specialized industry development business. [2] conducted an influential factor analysis on the outcome of the support of enterprises by industry of the regional industry promotion policy.

[3] demonstrated that the effectiveness of the corporate support project is being implemented in results at a time lag through efficiency analysis of the government enterprise support project through DEA analysis.

3. Analysis of Correlation

Pearson's correlation analyses were conducted on the results of the enterprise support project of the intelligent machine parts industry, which is a non-R&D business in the region's main industry development project that was conducted in 2015 and 2016. In 2015 support projects, there were multiple programs, such as prototype creation, product luxury, exhibition support, brand, bottleneck technology, and certification for package support. Support program in 2016 consisted of prototype creation, product upgrades, exhibition support, and marketing support.

Using IBM SPSS 18, we analyzed the data of the two years and defined the variables shown in Table 1.

Table 1 Definitions of variables

| Variable	Definition of variable	Unit
Support project costs	Through support projects, the supported amount	Thousand won
New employment	New employment during the support period	People
Domestic sales in commercialization	Domestic sales generated during the support period	Thousand won
Overseas sales in commercialization	Overseas sales generated during the support period	Thousand won
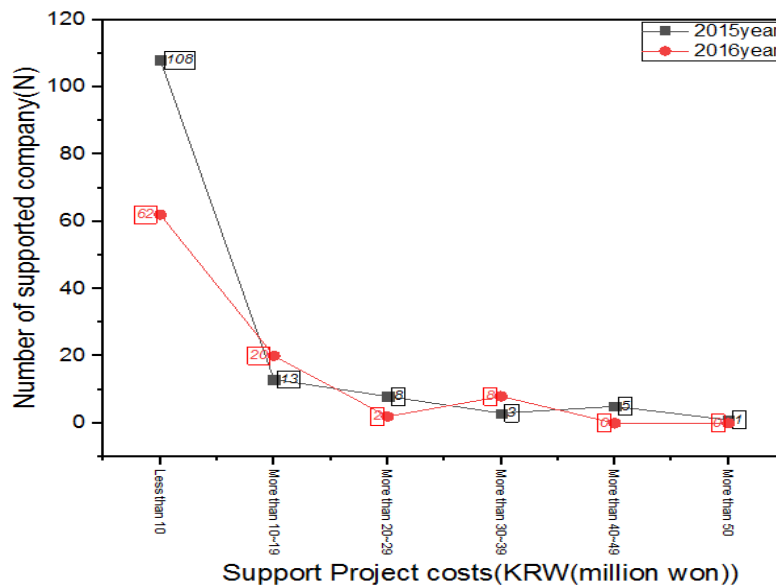
Fig. 1 Frequency analysis of support project costs

Table 2 New Employment

New Employment	2015		2016	
	Frequency	Percent	Frequency	Percent
0	117	84.8	48	53.53
1	9	6.5	22	24.4
2	8	5.8	12	13.3
3	2	1.4	2	2.2
4	1	0.7	2	2.2
5	1	0.7	1	1.1
6	0	0	3	3.3
Total	138	100	90	100

First, we analyzed the frequency of the support project costs in each fiscal year. As a result of the frequency analysis, the support project cost was under 10 million Won because the exhibition and marketing supports were relatively frequent. Table 2 shows the results of frequency analysis of support projects.

Table 2 shows the frequency analysis of new employment, 40 new employees were hired in 2015, and 83 new employees were hired in 2016. However, more than 50 % were not hired.

Table 3 summarizes the average value of the support costs, new employment, domestic, and overseas sales in commercialization. The average cost of the support projects in 2015 was 8.3 million Won and the average domestic sales in commercialization were confirmed at 13 million Won. The average cost in 2016 was 9.9 million Won, and the average sales of commercialization were confirmed at 28 million Won.

Table 3 Descriptive statistics

	2015			2016		
	Total	Average	N	Total	Average	N
Support project costs (million Won)	1,145	8.3	138	891.3	9.9	90
New Employment	40	0.29	138	83	0.92	90
Domestic sales in commercialization	1,884	13.658	138	2,522	28	90
Overseas sales in commercialization	180	1.305	138	1,139	12.6	90

Tables 4-5 show the results of the correlation analysis. By correlation analysis, we analyzed the correlation between yearly support project cost and new employment, sales of domestic in commercialization, and commercialization of overseas.

Table 4 2015 Correlation analysis

		Support project costs	New employment	Domestic sales in commercialization	Overseas sales in commercialization
Support project costs	Pearson correlation coefficient	1	.416	.066	.016
	Significant probability		.000	.440	.849
	N	138	138	138	138
New employment	Pearson correlation coefficient	.416**	1	.118	-.009
	Significant probability	.000		.168	.915
	N	138	138	138	138
Domestic sales in commercialization	Pearson correlation coefficient	.066	.118	1	.453**
	Significant probability	.440	.168		.000
	N	138	138	138	138
Overseas sales in commercialization	Pearson correlation coefficient	.016	-.009	.453**	1
	Significant probability	.849	9.15	.000	
	N	138	138	138	138

** Please note that the correlation coefficient is 0.01 level (both sides).

Table 5 2016 Correlation analysis

		Support project costs	New employment	Domestic sales in commercialization	Overseas sales in commercialization
Support project costs	Pearson correlation coefficient	1	.303**	.068	-1.26
	Significant probability		0.004	.524	.238
	N	90	90	90	90
New employment	Pearson correlation coefficient	.303**	1	.092	.103
	Significant probability	.004		.389	.333
	N	90	90	90	90
Domestic sales in commercialization	Pearson correlation coefficient	.068	.092	1	-0.56
	Significant probability	.524	.389		.602
	N	90	90	90	90
Overseas sales in commercialization	Pearson correlation coefficient	-.126	.103	-.056	1
	Significant probability	.238	.333	.602	
	N	90	90	90	90

** Please note that the correlation coefficient is 0.01 level (both sides).

In 2015, the support costs seemed to correlate positively (+) with new employment (r = 0.416). In addition, the domestic and overseas sales in commercialization showed a positive (+) correlation with quantity. In 2016, the support costs had a positive correlation (+) with new employment (r = 0.303), but the domestic and overseas sales in commercialization did not have significant correlations.

4. Conclusions

In this paper, we analyzed the correlations between sales and employment of the support amount of the company support business for two years. The analysis of the outcome of the company support business for two years, the support costs of the company and new employment have a high correlation. It was confirmed that the direct and indirect employment of the company is done according to the company support amount. However, the frequency analysis of the overall employment shows that considerably lower employment was being conducted. We confirmed that it was still difficult to increase employment, just only by the supporting project costs.

Generally, it was judged that there was a correlation between the support costs of a company and the domestic sales in commercialization. However, in 2015, it was confirmed that the 2016 data analysis results of the sales in commercialization were not strongly correlated with the support costs of the company. It is difficult for the actual results of the prototype production support to occur in that year.

We analyzed the results of the same support project for two years. The results show that it is necessary to have a performance index that could grasp the substantial influence on the company's ability and productivity, rather than being evaluated on the basis on financial performance indicators, such as employment and sales.

Conflicts of Interest

The authors declare no conflict of interest.

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