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## **INVESTIGATION OF REASONS FOR COMMERCIALIZATION OF PROTOTYPES REACHED AS A RESULT OF R&D AND INNOVATION ACTIVITIES AND REASONS FOR SUCCESSFUL AND UNSUCCESSFUL COMMERCIALIZATION IN SMES: IKITELLI SAMPLE**

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### **ABSTRACT**

In economic systems where commercialization of R & D activities is an important problem, it is important for the competitiveness of national economies to determine the extent to which SMEs can commercialize their R & D activities and to determine the reasons for commercialization/non-commercialization and to make proposals for SMEs to achieve successful commercialization. Within the scope of KOSGEB and TUBITAK support, the enterprises that successfully completed an R & D project and reached the prototype were determined. 54 enterprises that carried out the project to commercialize R & D projects within the framework of Industrial Application Support Program have been determined as sample. In the study, which is applied qualitative research design, one of the purposeful sampling methods, extreme and deviant sampling method is used. Companies that have achieved turnover increase, asset increase and employment increase by completing Industrial Application Project have been determined by document examination method. The reasons for commercialization and non-commercialization were researched by structured interview method on enterprises that can and cannot commercialize in these companies. At the end of the R & D and commercialization processes, it was determined that the enterprises did not decrease at least and that the processes they applied in this scope created added value. It has been seen that the technical viewpoint is dominant in R & D activities. From the beginning of the R & D period, it has been determined that market and marketing oriented analyzes are inadequate. After reaching the prototype, it was determined that businesses focused on new R & D projects rather than professional commercialization. It has been determined that the commercialization process has failed due to the lack of adequate market analysis before the R & D project and the projecting of the existing or replacement products in the market.

**Keywords:** Commercialization, R & D, innovation

**JEL Codes:** M19, N25, D20

### **1. INTRODUCTION**

The commercialization of R & D and innovation activities is considered to be extremely important for the competitiveness of countries in new globalized economies. R & D and innovation activities of SMEs, which constitute about 99% of enterprises in national economies, are also important in this respect. In this context, in this research, it was aimed to determine the extent to which SMEs commercialize R & D and innovation activities they have undertaken, to determine the reasons for commercialization / commercialization and to develop proposals for SMEs in order to achieve successful commercialization. KOSGEB and TUBITAK with the support of R & D and Innovation project, KOSGEB supported projects under the scope of Industrial Application Support Program within the scope of KOSGEB support from the companies that reached the prototype and carried out a project to commercialize R & D and Innovation projects. As a result of the increase of turnover, active increase and employment and the enterprises which have not provided an increase in this scope have been determined by document

examination method. Reasons for commercialization / non-commercialization have been searched by structured interview method on two groups that can and cannot realize commercialization in these designated enterprises

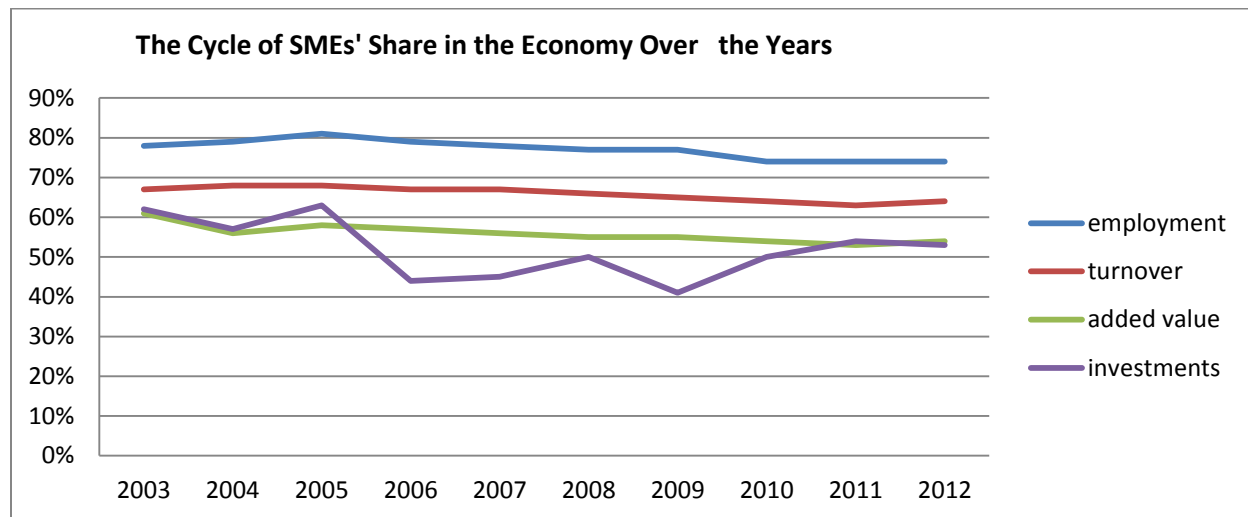
## 2. LITERATURE REVIEW

The place and importance of SMEs in national economies is an indisputable reality. The importance of R & D activities of SMEs in this context and their weight in the economy is also important. However, R & D work that has not resulted in successful commercialization does not give the expected result and may even create a burden on SMEs and the economy. A firm's commercialization orientation plays a central role in the competitive strategy for technology-based firms. Commercialization orientation has a strong direct positive effect on firm performance. Technology based firms not only have to develop their own knowledge assets, but also have to communicate with their customers and to invest in customer relations. (Lin et al, 2006). However, generally technology-focused, R & D and innovation-based businesses neglect market studies. The deepening of information and technical production can distract businesses from customer relationships and social capital. Commercialization and R & D expenditures can be complementary to each other. Both are important sources of a firm's intangible capital and can be seen as long-term investments in intangible assets, which can be reflected in the firm's market value (Chauvin and Hirschey, 1993).The commercialization of a firm's knowledge assets, including knowledge flows and knowledge stocks, is a complex task and there is probably no single best strategy for all firms. Technology categories, knowledge stocks, R & D intensity, and commercialization orientation have different roles to play, and there are significant interaction effects among those variables. In such circumstances, managers have to make trade-offs as well as judgments on the optimum combination of their R & D intensity, sales expense, and patenting strategies. (Lin et al, 2006)

### 2.1. SMEs in TURKEY ECONOMY

The share of SMEs in total goods and services purchases is 65.5% According to the results of TUIK, Annual Industrial and Service Statistics (AISS) 2012. The shares in turnover are 63.3% and the share in value added is 56.2%. In addition, the share of value added at factor cost is 53.9% and the share in gross investment related to property is 53.2%. The share of SMEs in the number of employees is 75.8% (SSAP, SME Strategy and Action Plan), According to the results of Foreign Trade Statistics (GDTİ) 59.2% of exports were realized by SMEs. Turkish Banking Sector Key Indicators According to the March 2015 Report; The share of SME loans in the banking sector total loans is 26%. (SSAP, SME Strategy and Action Plan)

**Figure 1: The Cycle of SMEs' Share in the Economy Over the Years**



REF: TUIK, AISS 2003-2012

The share of SMEs producing total added value is low compared to their share in employment and total turnover in our national economy. SMEs engaged in R & D work and employing about 50% of R & D personnel cannot reach sufficient increase in turnover and generation of added value. In the Turkish economy, SMEs have an important place in terms of number, employment and contributions to the national economy. Developments in the world economy have reduced the importance of geographical boundaries, and have also affected the shape and size of competition. These changes and developments in world

markets are also required to keep pace with the enterprises in Turkey. The fact that the SMEs in Turkey can adapt to these developments will be possible by having innovative ideas, by producing new products and by renewing their structures. The ability of SMEs to have competitive advantage in global markets will be possible by innovating products and processes. (Imamoglu, 2002: 118)

## 2.2. SMEs, AR-GE & innovation and trade

According to the results of R & D Activities Research 2013; the share of SMEs in R & D expenditures is 16.9%. The share of SMEs in the commercial sector R & D expenditures is 35.7%. 85.6% of these expenditures are current expenditures and the remaining 14.4% is investment expenditures. Of the 69,018 R & D personnel that make up the Commercial Sector R & D workforce, 53,2% (36,741) are employed in SMEs. The commercial sector is 28,690 R & D Managers in exact time equals and 49,1% of them are employed in SMEs. Innovation Survey According to 2012 results; 48.5% of entrepreneurs with 10 or more employees in the three-year period covering 2010-2012 were involved in innovation activities. Innovation activities are increasing in proportion to the size of the enterprises. In R & D work, the weight of SMEs in terms of expenditure and R & D personnel employment is clearly seen. However, it is more important that the R & D work that has been done results in successful commercialization. Today, the commercialization of R & D started to be made more important than the share of national income in R & D work in the world is beginning to be discussed. In the context of science and technology syndrome in Europe, the problem of commercialization is expressed as 'European Paradox'. The commercialization of a firm's technology assets, including knowledge flows and knowledge stocks, is a complex task and there is no single best strategy available for all firms. (Lin et al, 2006). Randall Goldsmith's commercialization model is a road map of strategies and actions for the commercialization of advanced technologies. The model breaks down into twelve activities that describe the process to maximize the chances for success. Each sequence has a technical stage, a market stage and a business stage. The model is a framework for measuring progress in the different stages, namely identification of information and technical assistance needs, project development costs and the forecasting of financing requirements. It follows a quite specific, ordered process (see matrix diagram below). Goldsmith has introduced a phased model for effective commercialization of new ideas and products, as described in Table 1.

**Table 1: Model For Effective Commercialization Of New Ideas And Products**

Concept phase		Development phase	Market entry phase	Market expansion phase
Market	Initial market and opportunity assessment Lead customer identification and engagement	Develop marketing plan including segmentation, channel and customer relationship strategies	Implement promotion plan Perform competitive market intelligence	Target vertical and adjacent markets and increase market penetration Enhance partnership delivery channel and CRM
Business	Identify financial, physical & HR requirements	Secure required financing Establish management team, financial and business plans.Determine break-even point	Manage financing, skills and production needs Adjust strategic and business plans to respond to market opportunities	Diversify internal and outsourced skills required to meet ROI objectives Establish international partnerships
Technical	Determine features and performance requirements Perform competitive technology intelligence – Patent search	Move development into prototyping, testing and production phase Source raw materials and establish Q&A systems	Establish manufacturing facilities and product technical support	Determine incremental product development cycle Continuously assess competitive product functionality and emerging technologies for adoption

Source: Based on Dr. Randy Goldsmith, Oklahoma Technology Commercialization Centre with modifications by Acorn Growth Companies.

The Goldsmith's model was designed to provide a mechanism for commercializing new products and processes (totally new ideas). This framework is not suited to commercialization for technology adoption purposes (incremental innovation). "The Goldsmith framework was designed for new product introduction and new company creation which is most often reflective of emerging and disruptive technologies. These emerging and disruptive technologies account for a very small percentage of total innovation where the majority of innovations involve adopting or adapting technologies." (Rosa and Rose, 2007).

## 3. RESEARCH METHOD

### 3.1. Purpose of the Research

KOSGEB and TÜBİTAK finance R&D projects with their R&D support. KOSGEB finances the investments to commercialize prototypes obtained as a result of these projects with Industrial Application Support Program. In this study, prototypes were successfully financed with the support of TUBITAK and KOSGEB within the scope of R&D projects within the scope of the

problem of commercialization of R&D activities, which are also referred to as 'European Paradox' in the literature and they applied to the Industrial Implementation Support Program, The reasons for successful commercialization and commercialization have been tried to be determined, suggestions have been developed to improve successful commercialization and to prevent failed commercialization.

### 3.2. Sampling, Data Collection and Method

KOSGEB and TUBITAK with the support of an R & D and Innovation project and successfully received the prototypes of the companies that reached KOSGEB Istanbul İkitelli Directorate of Industrial Implementation Project and the project was completed by completing the project information was requested from the Directorate and the scope of this 54 enterprises reached the data. 3 projects were assessed as having no time series to provide an assessment as they were completed by the end of 2016, and 49 project projects completed at the latest in mid-2016 were evaluated. The net sales, total assets, employment numbers and export amounts data of the 49 enterprises of the KOSGEB İkitelli Administration were obtained before and during the Industrial Implementation Project. Within the scope of the excessive and contingency sampling approach within the scope of the qualitative research design, 5 enterprises that have increased at least 150% in net sales data and at least 60% in employment data and have started to export with at least 15% increase in export value or in the absence of exports The reasons for successful commercialization / commercialization were investigated by semi-structured interview method on 4 enterprises where employment and turnover decrease were found to increase despite the increase in assets.

Data were collected from the qualitative research designs using semi-structured interview form consisting of intensive open-ended questions within the scope of phenomenology design. In case studies are the main data collection tool. In order to reveal the experiences and meanings related to the phenomena, it is necessary to use the interaction, flexibility and probing features of the interviewer to investigate. It is important that the researcher can create an interaction environment based on the interviewed individual's trust and empathy. In such an environment, individuals can reveal experiences and meanings that they themselves have never even been aware of or thought about too much before. (Yildirim and Simsek, 2013: 80).

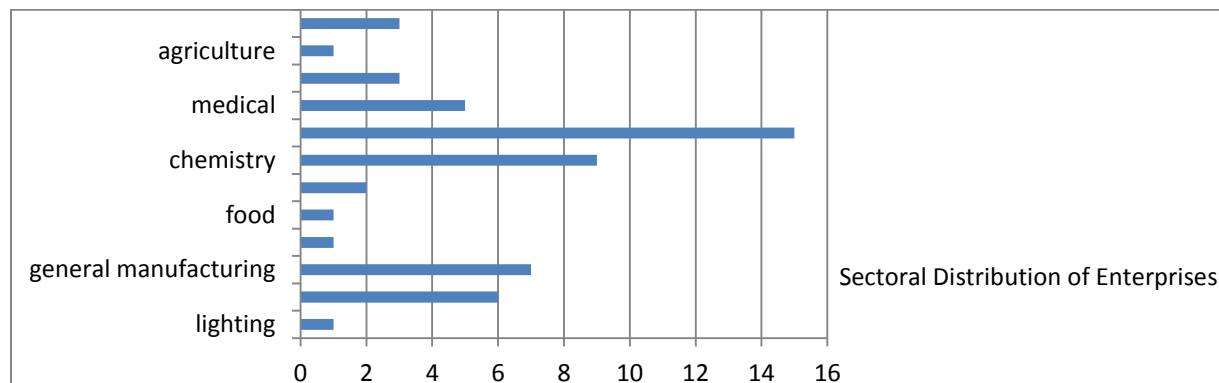
Within the scope of the research, 5 enterprises that are expected to perform successful commercialization from financial and employee data and 4 enterprises and businesses that are predicted to fail have been visited and interviews have been conducted with each of them for at least 60 minutes. It was tried to determine the perspectives and perspectives on the rationales and failures of the enterprises regarding the approaches and commercialization of the R & D and innovation processes and prototypes they experienced. In the survey using the interview form method, the questions given in the table below are used. "The interview form method is designed to get the same kind of information from different people by going to similar topics." (Patron, 1987, p.111, Lightning and Lightning, 2013: 150) During the interview, the interviewer can change the structure and sequence of the questions, They can go into the details of the topics or determine a more chat-style method. (Yildirim and Simsek, 2013: 150) No questions were skipped in the talks and occasionally the order was not taken into consideration. It focuses on reasons for selling in successful businesses and on the grounds of not selling in unsuccessful businesses.

## 4. FINDINGS AND DISCUSSIONS

### 4.1. Findings and Discussion in the Scope of the Research Universe

The sectoral distribution of the 54 enterprises reached to the data within the scope of the research is given in Table 2.

**Table 2 : Sectoral Distribution of Enterprises**



It has been determined that the machinery sector is dominant among the enterprises applying R & D and Industrial Application Project. The chemical sector has been ranked second, followed by general manufacturing, electronics and medical sector. It was evaluated that it is important to shape the sectoral distribution in favor of the sectors in which Turkey is an importer. Since post-project data cannot be obtained from 7 of these enterprises, it has been excluded from the scope. A business has been determined to be closed. Since 3 enterprises completed the project in 2017, it was excluded from the analysis because there was not enough time series for evaluation. The data of 42 companies were evaluated. The pre-project employment, turnover, exports and assets data and the rates of change according to the year 2015 are given in table 2. The employment, turnover and export data at the beginning of the project and the year 2015 data were analyzed. It is observed that 32 of the 42 enterprises provide employment increase and 27 of the enterprises provide employment increase of over 10%. Employment decline was detected in 9 enterprises. It is determined that 35% of the enterprises provide a turnover increase of over 10%. 30 of the enterprises increased their turnover by more than 30% and the turnover of 6 enterprises decreased. 36 of the businesses have shown asset growth and 30 of these businesses have provided an asset increase of over 30%. Decrease in assets was determined at four firms. It was determined that 18 enterprises increased their exports and that the growth of exports of 14 enterprises was over 90%. It was determined that 5 companies did not have pre-project exports and that they started to export during the project period and afterwards. A decrease was found in the exports of 8 companies. It is observed that 10 companies did not export. The highest increase in employment was found to be 327%. The highest turnover was determined as 1734%. It has been determined that 14 of the enterprises have a turnover of 10 to 50 million, 11 of them have 4 to 9 million, 12 of them have 1 to 3 million, and 4 of them have earned 1 million or less. In the sample, it was seen that the enterprises in different sizes were included in terms of business scale.

Table 3 : Pre and Post Project Data Analysis Chart

	Project completion date	PRE-PROJECT FISCAL YEAR				2015 FISCAL YEAR							
		Days worked	Turnover	Assets	Export	Days worked	Rate of Change	Turnover	Rate of Change	Assets	Rate of Change	Export	Rate of Change
1	April 4, 2013	2,214.00	148,556.00	750,362.00	No	4,232.00	0.91	2,724,752.00	17.34	2,629,964.00	2.50	106.00	Started after the project
2	March 6, 2012	29,541.00	7,251,243.58	7,453,679.71	2,340,884.98	31,370.00	0.06	11,477,117.72	0.58	15,995,418.81	1.15	1,994,489.09	-0.15
3	November 20, 2013	19,001.00	3,520,912.00	16,296,672.00	1,317,375.00	81,184.00	3.27	21,842,308.00	5.20		-1.00	1,505,000.00	0.14
4	January 28, 2016	23,565.60	8,413,623.91	6,609,499.83	2,064,462.69	26,521.20	0.13	19,116,812.78	1.27	9,253,279.98	0.40	1,903,831.62	-0.08
5	January 27, 2016	2,887.00	258,122.62	942,765.53	No	2,035.00	-0.30	215,699.39	-0.16	1,483,532.17	0.57	No	No
6	January 28, 2016	16,315.00	17,001,641.44	10,606,026.86	1,531,442.15	26,295.00	0.61	22,392,710.21	0.32	13,567,026.61	0.28	0.00	-1.00
7	June 22, 2015	9,201.00	25,740,779.31	24,719,664.07	2,534,159.00	9,377.00	0.02	45,169,910.89	0.75	41,435,886.63	0.68	29,466,698.77	10.63
8	April 19, 2016	1,326.00	749,117.09	2,175,956.33	No	1,582.00	0.19	832,285.24	0.11	4,195,238.65	0.93	No	No
9	July 22, 2016	14,289.00	4,552,842.56	4,923,054.82	272,363.57	12,136.00	-0.15	5,712,016.39	0.25	5,776,994.97	0.17	518,435.03	0.90
10	January 28, 2016	4,800.00	2,143,049.00	2,145,643.19	333,704.00	7,800.00	0.63	5,787,722.97	1.70	6,733,220.53	2.14	2,715,630.64	7.14
11	October 1, 2012	16,809.00	9,792,629.99	8,707,054.83	No	18,309.00	0.09	14,044,121.53	0.43	24,575,394.90	1.82	3,382,463.64	Started after the project
12	September 30, 2013	2,637.00	401,000.00	587,000.00	2,389.76	2,246.00	-0.15	368,004.57	-0.08	1,238,402.42	1.11	0.00	-1.00
13	November 20, 2013	22,326.00	9,657,896.39	7,690,253.80	2,443,770.00	38,633.00	0.73	54,971,602.37	4.69	21,856,262.86	1.84	4,628,273.97	0.89
14	May 20, 2014	9,283.00	4,799,721.35	4,483,058.90	No	10,388.00	0.12	5,722,577.08	0.19	6,416,809.93	0.43	No	No
15	January 20, 2016	4,299.00	14,302,859.14	18,551,918.82	62,376.39	10,209.00	1.37	17,802,910.99	0.24	24,037,817.97	0.30	No	No
16	May 20, 2014	1,350.00	1,666,259.09	2,033,544.42	No	1,740.00	0.29	1,993,317.87	0.20	3,899,818.54	0.92	0.00	No
17	January 7, 2014	2,750.00	1,238,130.19	946,353.51	184,853.18	3,123.00	0.14	1,967,784.00	0.59	1,272,168.37	0.34	412,815.25	1.23
18	January 28, 2015	16,236.00	18,315,351.16	12,434,782.66	No	22,542.00	0.39	43,127,921.31	1.35	32,785,950.07	1.64	No	No
19	June 26, 2014	1,804.00	224,961.00	1,311,070.00	20,840.00	2,236.00	0.24	408,729.58	0.82	2,150,582.35	0.64	143,607.56	5.89
20	September 8, 2015	966.00	74,235.00	470,345.00	No	1,092.00	0.13	408,729.58	4.51	461,142.00	-0.02	143,607.00	Started after the project
21	January 27, 2016	4,650.00	1,916,556.39	1,916,556.39	258,500.00	4,002.00	-0.14	3,454,134.87	0.80	1,996,635.32	0.04	1,114,544.19	3.31
22	February 15, 2013	19,043.00	4,615,201.97	4,763,640.49	No	38,930.00	1.04	13,995,676.64	2.03	10,860,788.09	1.28	1,772,717.94	Started after the project
23	April 18, 2016	8,583.00	3,705,903.40	826,414.79	755,044.00	9,394.00	0.09	2,502,461.00	-0.32	1,728,128.88	1.09	154,080.00	-0.80
24	September 19, 2014	7,348.00	10,093,395.12	5,993,397.53	1,675,025.21	8,357.00	0.14	15,958,498.69	0.58	11,654,875.15	0.94	3,617,455.78	1.16
25	July 22, 2016	2,675.00	2,999,153.65	3,155,580.25	No	3,446.00	0.29	4,119,697.26	0.37	6,763,360.97	1.14	25,520.14	Started after the project
26	June 30, 2014	57,360.00	8,151,095.19	15,934,420.44	92,420.92	34,766.00	-0.39	6,316,471.29	-0.23	19,403,729.17	0.22	1,408,146.86	14.24
27	February 14, 2012	10,977.00	1,997,482.86	2,040,517.61	119,848.00	11,969.00	0.09	3,814,967.53	0.91	3,955,154.76	0.94	261,968.00	1.19
28	January 28, 2016	16,140.00	6,290,059.95	2,480,495.16	2,115,387.98	16,027.00	-0.01	8,408,388.41	0.34	4,744,637.06	0.91	4,167,818.23	No
29	January 28, 2016	6,333.00	1,465,986.77	1,681,700.40	No	10,450.00	0.65	3,222,066.92	1.20	2,919,895.64	0.74	No	No
30	May 20, 2014	13,767.00	5,645,001.97	4,405,598.08	1,030,577.05	18,035.00	0.31	10,012,226.20	0.77	5,959,979.00	0.35	668,807.00	-0.35
31	January 28, 2016	37,639.00	22,495,230.73	29,383,320.53	3,235,879.99	57,463.00	0.53	30,538,099.93	0.36	40,206,523.60	0.37	4,632,776.90	0.43
32	December 1, 2014	16,277.00	11,997,332.45	8,454,426.91	841,504.00	29,054.00	0.78	20,408,924.52	0.70	22,858,526.99	1.70	1,632,713.00	0.94
33	January 28, 2016	28,506.00	10,734,911.13	8,626,444.61	2,840,791.18	9,618.00	-0.66	5,885,439.44	-0.45	8,034,024.05	-0.07	3,398,671.19	0.20
34	June 20, 2014	7,362.00	3,508,429.00	3,234,279.54	182,217.63	9,120.00	0.24	7,520,565.31	1.14	6,391,098.56	0.98	523,119.35	1.87
35	November 1, 2016	14,604.00	4,610,128.81	2,465,891.28	1,247,564.46	14,604.00	0.00	4,610,128.81	0.00	2,465,891.28	0.00	1,247,564.46	0.00
36	April 10, 2015	5,570.00	1,306,305.00	1,498,293.00	53,690.60	7,343.00	0.32	2,505,267.81	0.92	2,394,578.75	0.60	10657.60	-0.80
37	September 8, 2015	2,996.00	1,159,645.30	1,012,128.26	2,914.00	4,015.00	0.34	3,776,008.10	2.26	2,065,266.80	1.04	51,157.05	16.56
38	January 25, 2012	3,791.00	514,183.00	1,253,062.00	No	2,902.00	-0.23	1,075,867.00	1.09	1,578,205.00	0.26	645,520.00	No
39	July 8, 2013	2,737.00	1,444,582.73	1,373,243.78	No	4,250.00	0.55	2,777,793.48	0.92	6,888,252.92	4.02	No	No
40	January 7, 2014	8,416.00	3,616,638.24	6,063,322.56	2,115,071.92	7,377.00	-0.12	7,851,390.00	1.17	5,813,056.47	-0.04	4,566,551.46	1.16
41	January 27, 2016	5,180.00	1,850,201.15	1,359,185.50	410,211.23	6,995.00	0.35	4,531,049.45	1.45	2,734,086.37	1.01	171,377.37	-0.58
42	May 27, 2016	2,725.00	2,037,663.90	1,118,036.36	No	3,113.00	0.14	1,855,850.28	-0.09	1,440,184.85	0.29	No	No

#### 4.2. Findings and Discussion in the Context of Sample

Of the 42 enterprises, 5 enterprises were identified as having an increase of at least 130% in turnover, at least 38% in employment data and at least 90% in export data within the scope of extreme and deviant sampling method. Again, under the same approach, four enterprises were found to have a decrease in employment and turnover despite their increased assets, and the reasons for successful commercialization and non-commercialization were investigated by structured interview method on this sample. It has been determined that the visited businesses are applying the commercialization project under the prototypes indicated in the table below. Profit rates noted in the interview process and fiscal year changed rate are tabled.

Table 4: Prototypes, profit ratios and firm fiscal year change rates

Prototypes	Prototype profit ratios	Employment Increase Rate	Turnover Increase Rate	Assets Increase Rate	Export Increase Rate
Fruit yoghurt filling machine (food filling machine)	%40	%91	%1734	%250	No Export Before Project Started after the project
Demountable hanger (general production)	%100	-%29	-%16	%57	No Exports in Both Term
High performance noisy low axial fan (general production)	It varies between 7-15%.	-%15	%25	%17	%90
Multi-line stick machine (food filling machine)	50% for Europe, 30% for the domestic market	%62	%170	%213	%713
Twin sound system (wireless prototype of 2nd speaker in wireless speakers) (electronic)	unsold	-%14	-%08	%110	Current Period No Exports
Multi-user interactive presentation system (educational sector smart writing board) (electronic)	The first products were sold at 300%. With the development of LED technology, it has decreased by 50%.	%73	%469	%184	%89
Solar panel junction box (electronic)	%5-10	%38	%135	%163	No Exports in Both Term
Crane ropes - (technical textile)	Export 100%, domestic market 30%	%104	%203	%127	No Export Before Project Started after the project
Combed cotton machine (machine)	%34	%9	-%32	%109	-%79

Machine and electronics industry seems to be predominant. Prototype products seem to have been sold with higher profits in exports.

#### 4.2.1. Interview form open-ended questions and discussion

"Can you sell the prototype?" and "do you think you sold the prototype enough?" questions were asked together.

**Prototype of solar panel junction box company official;** *"We think we've sold enough. The public support we received under the project has returned to the public as tax. It is now slowing down, but it can be said that it is also beneficial for reducing the prices of imported goods and for causing imported goods to enter the national economy at a lower price and for causing less foreign exchange. In other words, there is also contribution beyond selling the product."*

**Multi-user interactive presentation system company official;** *"The project itself and the company have amortized comfortably. She's still selling it, but it's getting smaller. We have certainly reached enough sales. We stopped importing, we lowered the price of imported goods. Then it was the right job. With the cheapening of the LED technology, profits have now fallen and this technology will be up soon, but we have gained good money at that time. "*

**Combed cotton machine company official;** *"We sell 35-40 per year. 1500 machines are imported every year. The R & D project came out so I could get support or I would not. We did not have a R & D team, we could not do it professionally. So we cannot say that we did not compete in quality with Europe."*

**Crane ropes prototype company official;** *"We sell too many countries such as the UK, Australia and Croatia. This year the sales figures weakened when the maritime sector stopped. Every year TL 1,000,000 is sold. Every year we are participating in the fairs for the maritime industry in Amsterdam."*

**Multi-line stick machine prototype company official;** *"We are now producing the fifth machine on the order. It sells very well. We have no sales problem. "*

**Fruit yoghurt filling machine prototype company official,** "Today we did not come out to sell the machine to the market. The customers always found us on recommendation. We have no sales problems."

**High performance noisy low axial ventilator prototype company official;** "It sells seriously, and we continue to invest in production. We export to Holland. A total of 50 units a month and 30-35 units are sold to the UK."

Twin sound system and demountable hanger firm officials stated that they could not sell prototypes in sufficient quantity.

All but two of the 9 enterprises interviewed stated that they sold their prototypes. 6 enterprises expressed satisfactory product sales and stated that their investments in R & D and Innovation applications gave meaningful results. They expressed added value in terms of cutting imports or lowering the prices of imported products even though sales were diminishing. A company emphasizes that it cannot achieve satisfactory commercialization because it cannot reach sufficient quality in the prototype.

It has been seen that in the assets of all of the interviewed enterprises, there is an increase in the context of production investment realized by being financed under KOSGEB Industrial Application Support Program. The investment of 3 firms did not affect the turnover. The investment of 6 firms ensured turnover increase, export increase and export starting. It is seen that the increase in the assets of the two companies, which is the subject of decrease in turnover, contributes to the general operation of the company even if the project of the company is not successful. The twin sound system company official stated that they have been standing by doing business to the market thanks to the electronic card type production process they have taken within KOSGEB support program.

In this context, it can be stated that a successful result has been obtained in terms of the effect of support applications. 66% of enterprises achieved satisfactory turnover within the scope of prototype production. Company projects did not have dramatic effects on the growth of enterprises but gave meaningful results in terms of macroeconomic contribution.

It can be said that the output of the projects of fruit yogurt filling machine, multi-line stick machine and multi-user interactive presentation system have a dramatic positive effect in terms of changes in the financial indicators of the enterprises, the data obtained within the interview and the researcher's impressions.

**Within the scope of the question "What are the reasons for not selling the prototype?", The twin sound system prototype, the most unsuccessful project in the sample, company official;**

- a) "We do not have the ability to sell directly."
- b) "The company that bought the product from us could not sell the product."
- c) "The cost of the second speaker was as high as the first speaker because of the initial speaker accessories put into the cost."
- d) "Customer opted for wired speaker."
- e) "China has severely reduced prices on cable speakers. China sells for 60 US dollars and I can only produce the speaker's case for 40 US dollars.."
- f) "There are 90% imports in the industry. Customer is also brand enthusiast."
- g) "The marketers cheated on us (Offered products from competitors to customers.)"
- h) "We have seen that the reverse engineering approach is more correct than dealing with R & D."

expressions compiled from interview notes. It is seen that the firm has made this project on the order but the customer has not been able to sell the product even though it is a big wholesaler in the sector. It has been understood that there is no marketing team in its own right, but a team has been formed afterwards, but this team has been compromised to sell the products of other players in the market instead of focusing on the products of the business. In the context of answers c, d and e, it can be stated that adequate market research has not been done before the project.

**The prototype of the solar panel junction box company official's;**

- a) "Some brands prefer indigenous, some do not."
- b) "In case the panels are indigenous, the Republic of Turkey guarantees higher price. We lost our price advantage when this incentive was removed from practice. The customers started to buy from China."
- c) "In China, the state repays 8% of the product price to the firm. Even if the company sells the product at a cost, it can survive with support."

expressions compiled from interview notes. It has been seen that the effect of brand perception is emphasized and the effect of public regulations on the commercialization of the prototype is underlined.

**Multi-user interactive presentation system prototype company officials;**



- a) "LED technology is cheaper. That's why there has been a decrease in our sales.
- b) "The second TÜBİTAK R & D project was not commercialized. The project was based on customer requests, but the enterprise left the training sector. Our other customers were not ready for that product either."

expressions compiled from interview notes. It can be said that prototype sales have fallen because prototype replacement LED products have become cheaper and there has not been enough work on the analysis of replacement product before project in this context. It can be stated that project planning cannot be left to the client's forecast and that the company needs to conduct market analysis by itself.

**Fruit yogurt filling machine prototype company official's;**

- a) "We could not create a sales and marketing team."
- b) "Overseas customer: are you producing here? How will you stand behind the product ten years? they say.
- c) "We are having trouble selling big machines."
- d) "We sell for a large firm at a cost price. It's advertising from those companies. Ulker has done all the tests on the smart machine, so my R & D process is also contributing. 60 days they have made tests under the promise of bacteria reproductive.

expressions compiled from interview notes. It has been determined that the prototype does not have a problem with sales because it is innovatively strong. It is underlined that they are inadequate at the point of institutionalization and have difficulties financing.

**Combed cotton machine prototype company official's;**

- a) "We cannot compete with China in scale."
- b) "We started to support the R & D project."
- c) "We did not have a R & D team. We could not do it professionally. So we cannot compete with Europe"
- d) "We have 4 companies in the domestic market. We are destroying each other by lowering prices."
- e) "We compete with China. If we compete with Europe, we cannot trust ourselves, will our investment go to waste?"

expressions compiled from interview notes. It is understood that the prototype is subject to scale competition because of the lack of innovative character. It can be said that the cost leadership in the market is intensified and misapplied in the framework of the price reduction approach.

**Multi-line stick machine prototype company official;** "We have wrong start-ups. We dive into the issues we are inadequate" It has been stated that the companies have entered the commercial products they have seen worthwhile, without regard to their background and knowhow capacities.

**Demountable hanger prototype company official;** "We need to attend foreign fairs. We can not export directly. We always work with intermediaries. We continue to be a freight forwarder." emphasizes the importance of marketing orientation and marketing investment.

**High performance noisy low axial ventilator company official;** "I do not go home when I'm bored, I do R & D. Customer demands are also decisive." It has been observed that the company is a solution partner for many different sectors and produces innovative solutions. It has been determined that there is no focused work on the marketing of prototypes to other players in the sector or to different sectors. It has been seen that the motivation of prototyping in R & D entrepreneurs is dominated by the application of a new project in order to renew this motivation at the end of the project rather than focusing on marketing.

**What are the reasons for selling the prototype?**

Fruit yoghurt filling machine prototype company official;

- a) "we have not made any ads till today."
- b) "The Customers always found us on recommendation"
- c) "We formed a cooperative with 15 R & D companies."

expressing that they do not need marketing investment based on the innovative power of the product and the marketing of the ear to the ear based on the characteristics of the product. In terms of marketing, union with companies operating in complementary sectors has been seen as an important initiative. It is seen that this is the most successful establishment of the sample.

**Solar panel junction box prototype company official;**

- a) "We focus on different, know-how high products."
- b) "We are a member of Sahalstanbul project"
- c) "We are working on the train pantograph now"
- d) "We set targets for the ratio of turnover to the R & D team"

expressions were compiled from interview points. Under the expression A, it is underlined that the innovative power in products results in commercialization. B emphasized the importance of participating in cluster applications in different sectors in the determination of innovative power. Sahalstanbul application is a cluster work for the aviation sector and it brings the power of commercialization to the cluster players by choosing the right project theme and gaining the power to reach the sector. Within the scope of D statement, it is seen that they gain marketing perspective by targeting the R & D team in increasing commercialization power.

**Multi-user interactive presentation system prototype firm official;** "We were the only firm in the sector. There were Canadian and British companies. But their prices were high. We have lowered the price of imported products." in the context of expressions, emphasizes the importance of being unrivaled, at least in the national sense. Innovations that have been made by the enterprise in its own way are also considered as innovations within the scope of the European Union Oslo guideline. This approach seems to be inadequate in terms of commercialization, although it is thought that it is important for the enterprise to acquire an innovation culture.

**Crane ropes prototype firm official;**

- a) "Today's value added products are becoming standard products tomorrow. That's why we constantly innovate."
- b) "The customer can also request. In general, we are actively working on small items with customer requests. But we follow big projects by ourselves and start the project."

In the context of expression, It has been seen that continuous innovation is emphasized because of the shortening of product life span of innovative products due to globalization.

**Multi-line stick machine prototype firm official;**

- a) "We are the only company in Turkey. We have a price advantage over foreign firms."
- b) "Being quality, being a brand."
- c) "We have six basic working topics. We focus on them. We do not go into different topics."
- d) "The customer is usually reach with reference. We do not go."

expressions were compiled from interview points. It is seen that the importance of being the only one in the sector is emphasized It has been noted that the importance of focusing on the field of specialization and the importance of protecting this discipline in the face of different demands. When focused on the field of expertise and innovative products are produced, the customer has come to the reference and said that they do not need to marketing.

**5. CONCLUSION**

Companies that invested in the Industrial Application project have a positive tendency in terms of employment increase, turnover increase, asset increase and export development and at the end of the R & D and commercialization processes, it has been determined that at least the enterprises do not shrink to a great extent and the processes they apply in this context create added value. Even the study conducted on the sample through the interview method supported these results. Within this scope, it has been understood that R & D, Innovation and Commercialization oriented support applications are beneficial and effective.

It has been seen that the technical viewpoint is dominant in R & D activities. From the beginning of the R & D period, it has been determined that market and marketing oriented analyzes are inadequate. After reaching the prototype, it was determined that businesses focused on new R & D projects rather than professional commercialization. It has been determined that the commercialization process has failed due to the lack of adequate market analysis before the R & D project and the projecting of the existing or replacement products in the market. Successful commercialized projects have been determined to be supported by such topics as high product innovation power, know-how capacity-based focus, participation in sectoral cluster studies, and creation of commercialization associations. It has also been observed that the marketing orientations of successful businesses are not sufficient at the point of commercialization. It has been determined that the success of businesses is mostly based on the innovative power of the product. It has been evaluated that providing investment culture related to marketing and

customer perception management to R & D and Innovation businesses will contribute positively to the commercialization process of national R & D and Innovation projects.

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