

Full Length Research Paper

An analysis of small and medium-sized forest products enterprises in Turkey based on production, capacity usage, machine park and technology

Derya Sevim Korkut^{1*}, Emel Erdem² and M. Nafiz Duru³

¹Duzce University, Faculty of Forestry, Department of Forest Industrial Engineering, Duzce, 81620, Turkey.

²Forest Industrial Engineer, Duzce-Turkey.

³Istanbul Aydin University, Faculty of Engineering and Architecture, Department of Industrial Engineering, Istanbul-Turkey.

Accepted 1 June, 2010

With this work, it is aimed to put forward the present situation about “production, capacity usage, machine park and technology” and to define the problems of the actuations of the forest products industry which is included in the scope of small and medium-sized enterprises (SME) in Duzce (an important place in terms of actuating the forest products industry in Turkey). For this aim, face-to-face questionnaires were administered to 43 SMEs in the forest products industry in Duzce. Data obtained revealed the problems of the SMEs and it was found that the basis of their problems was insufficient finance.

Key words: Small and medium sized enterprises, SME, forest industry, Turkey.

INTRODUCTION

The small and medium-sized enterprises (SME), which have an undeniable allot for the developed countries coming to their present situations and in providing economical and social stability in developing countries, increased their importance with the changes in the world economy. Particularly, the economic weights of industrialized countries were formed by the SMEs which were determined according to their economies. These kinds of enterprises playing an active role in providing cooperation and collaboration between the enterprises, in maintaining the competition and in applying the policy of income distribution, have an important role in forming a workforce. These enterprises not only show individual success in the developing and growing economical world, but also provide the execution of activities which they cannot realize on their own, except by cooperating within their own sectors or with other related groups (Cindik and Akyuz, 1996).

SMEs, like the world economy, are one of the dynamic

elements of Turkish economy, as well, and have an important place in terms of her socio-economical development.

It is seen that a common SME definition about SMEs accepted in literature does not exist. The main reason for this is the differences of the forms of industry, technological facilities and the development levels of countries or regions within the countries.

The concept of “small and medium-sized enterprises” expresses a proportional size. The size expressed by this concept shows differences among countries according to level of industrialization, size of the market, working line of business and the way of production (Cindik and Akyuz, 1996). This is due to the fact that the qualities defining the concept of small and medium-sized enterprises changes according to the place of the enterprise, the time and the environment. As a result of this change, putting forward an objective definition of SMEs is quite hard.

According to the SME definition of OECD (Organization for Economic Co-operation and Development), the enterprises employing men less than 20 are very small, whereas the ones employing men between 20 – 29 and 100 - 499 are small and medium-sized, respectively, and the ones employing men more than 500 are big enterprises.

*Corresponding author. E-mail: deryasevimkorkut@duzce.edu.tr.
tr. Tel: +90 380 5421137. Fax: +90 380 5421136.

Table 1. The comparison of the SME criteria of Turkey and EU (Anonymous, 2007).

	Definition criteria	Micro enterprise	Small enterprise	Medium-sized enterprise
EU	Number of employees	≤10	≤50	≤250
	Annual clean sales revenue	≤2 Million Euro	≤10 Million Euro	≤50 Million Euro
Turkey	Number of employees	0-9	10-49	50-249
	Annual clean sales revenue	≤1 Million TL (606.000 Euro)	≤5 Million TL (3 Million Euro)	≤25 Million TL (15,15 Million Euro)

According to the definition of European Union (EU), the enterprises who have less than 10 employees are small or micro, the ones having employees between 10 - 50 are small, the ones having between 50 - 520 are medium-sized and the ones having more than 250 employees are large-sized enterprises. In the definition of the SME of EU, it is also stated that, micro-sized enterprises have annual sales volume less than 2 million Euro; small-sized, less than 10 million Euro and medium-sized, less than 50 million Euro (Kucuk, 2005).

However, the "SME definition" stated in 1996 in EU was changed when the definition made in 2003 was enacted forward from 01 January, 2005, and it is required that all member and candidate countries harmonize their SME definitions with the definition of the EU.

The enterprises being in the scope of "The regulations about the definition of small and medium-sized enterprises, their qualities and classifications" are classified according to their size, financial balance sheet and types in Table 1 (Anonymous, 2007).

The SMEs have an important place in Turkish economy because of the total number of enterprises and their big share in employment. Turkish SMEs are different when compared to the SMEs of EU and many OECD, because of their lower annual backings and workforce in terms of their average profiles (Anonymous, 2004a).

SMEs have various positive contributions to rivalry and employment. Among these contributions of SMEs, their contributions to maintaining the rivalry, capital accumulation, birth of new ideas and innovation should be focused on especially.

While the enterprises, included in the definition of SME (1 - 250 employees) among the enterprises active in the manufacturing industry in Turkey, forms 99.6% of total enterprises, they also employ 69.7% of workers, which forms 32.3% of the total value-added. The scarcity of value-added that is created by SMEs compared to their importance in employment and the number of enterprises show the importance of their being developed and supported (Cansiz, 2008).

The SMEs that are being active in the manufacturing sector in Turkey are dispersed according to their sectors: metal goods (26.19%); textiles, clothing and leather goods (25.6%); wood and furniture (24.3%); food and drink (12.7%); paper (3.9%) and others (7.4%). These are generally, very small enterprises. While an average of

48 people are employed in the SMEs that are being active in the manufacturing sector, in 95% of SMEs, this number changes between 1 and 9 people and the average value is 31 (Akgemci, 2001).

As a result of a series of positive qualities, like their ability to adapt quickly to the changing market circumstances, their flexible form of production, their roles in regional development, their contributions to initiation of new work areas, thereby lessening unemployment, SMEs play a very important role in social and economical development of countries. As a result of these contributions, SMEs have become one of the important areas of execution of public policies. For this reason, all countries (that is, primarily developed ones) try to develop the policies in creating appropriate economical environment for SMEs that are being born, growing, developing and protected (Erdem, 2009). Successful entrepreneurs will affect the potential entrepreneurs, thereby making them enter into the economy, and so, in a democratic atmosphere, psychological satisfaction will grow gradually. Therefore, strong SMEs will affect bigger enterprises positively and will provide relief in social terms (Kendirli and Bilginer, 2001).

When the studies done about SMEs are examined, it is seen that these kinds of enterprises have the problems of marketing, finance, raw material, quality, technology, management and personnel. For this reason, with this work, it is aimed to put forward the present situation about "production, capacity usage, machine park and technology" and to define the problems of the actuations of industry of forest productions, which are included in the scope of small and medium-sized enterprises (SME) in Duzce (which has an important place in terms of the actuations of industry of forest products in Turkey).

MATERIALS AND METHODS

Materials

Duzce is a city that experienced the destructive effects of the earthquakes of 1999, and at the end of the same year, gained the status of province. In the earthquakes of 17 August, 1999 in Marmara and 12 November, 1999 in Duzce, big and small 3837 workplace were demolished, 2573 workplace were damaged (medium) and 1606 workplace were damaged (very little); and in total, 8016 workplace were damaged (Anonymous, 2009).

In the forest products industry, which has an important place in

the city industry, 30 workplace employing about 900 workers, ended their actions after the earthquake. In this sector, the total number of workers which was about 8000 before the earthquake lessened to 6000 after the earthquake. Along with the losses of building, machine, equipment, goods and semi-goods stock, the earthquake also caused the losses of production and employment, which resulted in a pause of their manufacturing and the lessening of export in the workplaces working for export (Anonymous, 2004b). Duzce, with the 5084 numbered law shown in the Official Newspaper of 6 February, 2004, stood out with its quality of being the most advantageous city geographically located among the cities in the scope of encouragement and is faced with the intense interest of investors (Anonymous, 2009). When the managership profile of Duzce is looked at, there are 862 management in total, where 850 of them are SME and 12 are large-sized management. SMEs have 98.4% share and creates 64% employment (Er, 2006).

Methods

In defining the size of the enterprise, it is accepted that the enterprises stated in the EU's definition having employees between 1 - 9 are micro-sized, whereas the ones having between 10 - 49 are small-sized and the ones having between 50 - 249 are medium-sized. With this fact, totally 141 enterprises active in forest products industry are defined by means of taking into consideration the data of 'Duzce trade and industry office' and by examining other results of researches. For the fact that 36 enterprises out of 141 stopped their activity for various reasons or continued as just sale enterprises, the study evaluated about 105 enterprises. At first, the study was planned with a face-to-face questionnaire and on-site observation. The rate of attendance to the questionnaire was 41%. Twelve of the enterprises attending to the questionnaire were micro-sized, 19 were small-sized and 12 were medium-sized. The results of the questionnaire were transferred to SPSS environment and were evaluated with statistical methods.

This research, of course, has some limits. First of all, because the research was done in Duzce region forest products industry, it is limited that the related sector can be generalized to forest products industry in other regions of Turkey. At the same time, when the voluntaries of the enterprises basis are taken, some problems were found in terms of sample volume. To make it easier for the attendants to answer the questions more easily, mostly nominal type questions were preferred. For this reason, the variety of the analyses to be done was limited.

RESULTS

The general situation of the enterprises

When the judicial situations of the enterprises were examined, it is seen that the companies are mostly cooperatives (41.9%). Cooperatives are followed by limited companies with 27.9%, where 25.6% of the enterprises are personal managements and 4.7% are collective companies.

In SMEs, strategical decisions are taken by the "boss", who is the possessor of the capital, in 31 enterprises (72.9%). The number of the enterprises is 8, where, along with the boss, professional managers also have the right to speak when taking decisions (18.6%).

About 88.4% of the enterprises were established with the owners' own means, while 4.7% of them were bought by the family of the owner and the rest 4.7% were inherited

by the owner.

When the work areas of the enterprises are examined, it is seen that, 39.53% of them work in national scale; 23.25%, international; 16.3%, regional; 11.63% national and inter-national; and 6.98% in regional, national and international scales. Moreover, 31 (72.1%) of the enterprises are manufacturing factories, while 12 of it (27.9%) are manufacturing workshops.

Three (7%) of the enterprises take in-service education from KOSGEB; 2, from public establishments; 8 (18.6%), from private establishments and 9 (20.9%), from the enterprises where their machines are bought. The enterprises do not have in-service education from universities. Fifteen enterprises (34.9%) have their education by own means.

When the enterprises' answers to the problem of education are examined, it is seen that in-service education is carried out within the enterprise itself. In the enterprises of forest productions industry, which have the quality of SME, education is carried out mostly by the manager possessing the capital or the employee having knowledge about the related subject. SMEs do not benefit from the professional educations as they have confidence about management and production, and as a result, they do not want to pay money for education and waste time out of production.

The managers of enterprises, who enable their employees to have in-service education from professional instructors and awareness of the importance of that subject, bid hope for their employees about their being developed in terms of personal and professional areas.

Production

Two (4.7%) of the enterprises produces parquet; 13 (30.2%), lumber; 4 (9.3%), veneer; 8 (18.6%), furniture; 2 (4.7%), multilayered parquet; 1 (2.3%), laminated parquet; 1 (2.3%), press door and 12 (27.9%), kitchen and bathroom furniture. Eight enterprises (18.6%) make serial production; fourteen (32.56%), work upon order and 15 enterprises (34.88%), make serial production for some goods and work upon order for some goods too (Table 2).

When the buying of the enterprises' raw material is looked at, it is seen that 19 of the enterprises (44.2%) buy the raw material which they use in production from the market sales of Forestry General Management, 30 (69.8%) of them from traders and 15 (34.5%) from abroad. It is understood that the enterprises bought their wood raw material from countries like Romania, Ukraine, Georgia, Europe, Africa, America, Gabon, New Zealand, Cameroon, Ivory Coast, Russia, Bulgaria, Finland, Canada, Indonesia, Italy, Brazil, Germany, Kyrgyzstan, Uzbekistan and Iran.

Thirty one of the enterprises (72.1%) are careful about the paying conditions appropriateness, 29 (67.4%) about the low price of raw material and 39 (90.7%) about the

Table 2. The production subjects and ways of the enterprises.

Options		Number of enterprise	Percent (%)
Production subject	Parquet	2	4.7
	Lumber	13	30.2
	Veneer	4	9.3
	Furniture	8	18.6
	Multilayered parquet	2	4.7
	Laminated parquet	1	2.3
	Press door	1	2.3
	Kitchen-bathroom furniture	12	27.9
Production way	Serial	8	18.6
	Order	14	32.56
	Order and party type	2	4.65
	Serial for some goods and order for some goods	15	34.88
	Serial, order and party type	4	9.3

Table 3. The problems faced by the enterprises while buying raw material.

Problems faced	N	Average	Standard deviation
The insufficiency of demand in native raw material	36	2.61	1.38
The time loss caused by transportation in importing raw material	28	2.68	1.49
Failure in finding the required raw material	38	2.71	1.51
The high prices of raw material	38	3.7632	1.03
The problems faced in the customs	28	2.71	1.63
The loss of quality in raw materials as a result of the fact that regional forestry managements do not sell the material at the right time.	32	3.22	1.83

relevance of the raw material for the aim of production. Twenty three (53.3%) enterprises face hardships in finding employees having the qualities required by the job and 17 enterprises (39.5%) face problems while buying raw material.

Primarily, the high prices of raw material and the fact that regional administrations of forestry do not sell the raw material just after the production, thus leading to quality loss, are the main problems faced by the enterprises while buying raw material (Table 3).

With the trunk import, in 25 (58.1%) of the enterprises, there happens to be a quality increase in production and in 8 of them (18.6%), there happens to be a decrease in production expense. In 2 (4.7%) enterprises, with the import, there happens to be no change in quality and production expenses. Among these enterprises, 20 of them stated that, there happened to be an increase only in quality, whereas 3 of them stated that, while they experienced quality increase due to import, at the same time they saw a decrease in production expense, and 14 enterprises did not answered the question.

It is seen that 16 of the enterprises (37.2%) have an office or agency in other cities or countries, while 4 enterprises (9.3%) out of the region and 3 enterprises (7%) have a production point in other countries.

A number of 14 enterprises (32.6%) make production at the same quality, while 29 of them (67.4%) make upon-demand of different quality production. It is also seen that 21 enterprises make (48.8%) contract manufacturing and 24 enterprises (55.8%) make a different type of contract manufacturing.

The enterprises have always complained about the high prices of energy cost, especially the insufficiency of demand as a result of global economic crisis and the insufficiency of native raw material, which are the primary problems faced in production. Along with these problems of the enterprises, other problems are seen in production because of finance insufficiency and scarcity of qualified employee (Table 4).

Capacity usage

The capacity usage proportions of the 40 enterprises that gave answers to the question about the proportions of capacity usage of the enterprises changes between 10 and 100% (average 58%).

As the reasons for not working with full capacity, 5 enterprises of 43 (11.6%) state the insufficiency of raw material; 5 of them (11.6%), the lack of buying force; 35, the insufficiency of demand (81.4%) and 3 (7%), the

Table 4. The problems faced by enterprises in the production.

Options	N	Average	Standard deviation
The blanks in laws and regulations	38	2.90	1.54
The insufficiency of native raw material	41	3.24	1.59
The hardships in supplying imported raw material	41	2.59	1.45
The scarcity of qualified employees and worker problems	42	3.07	1.54
The high cost of energy	42	3.76	1.25
The insufficiency of finance	42	3.14	1.5
The insufficiency of technology	39	1.95	1.15
The insufficiency of demand	42	3.45	1.47
The problems faced in production planning	37	1.97	1.067

Table 5. The reasons of enterprises not working with full capacity.

Options	N	Number of enterprises	Percent (%)
The insufficiency of raw material	43	5	11.6
Lack of buying force	43	5	11.6
Lack of energy	43	-	-
Lack of demand	43	35	81.4
Personnel problems	43	3	7
Lack of technology	43	-	-

problems of workers. Among these reasons, it is clear that, the lack of energy and technology does not exist (Table 5).

Machine park

When the ages of the machines used by the enterprises are looked at, 3 - 5 years old machines are mostly used and 6 - 9 years old ones are used very much, as well. Along with this, it is seen that the machines used by these enterprises are mostly imported machines (Table 6).

Lumber and veneer producers use mostly the machines that are beyond 10 years old. Not even one of the enterprises being negotiated did complain about the machines they use on the production line. They stated that the technology they use is suitable and sufficient for their own production.

This situation can be the reflection of the enterprises working with low capacity. The enterprises working with low capacity cannot be aware of other negative things because of the heavy negative effect of the insufficiency of demand on the enterprises. The owners of enterprises who state that they are contented with their technology will no longer find their machines' capacity and quality of production sufficient. The dilemma here is that; the technology used on the production line has to be renewed because of growing demand or for the fact that the enterprises try to affect their customers by producing more qualified goods to increase the demand.

For the fact that the owners or managers of the enterprise should adapt to directing of new technologies,

due to its importance, the problem of insufficient finance should not be ignored.

It is seen that in 2 of the enterprises (4.7%), the machines used are produced in Turkey with license, and 21 of them (48.8%) are produced in Turkey by native technology.

Technology

The technology used in enterprises, standards and equipment are shown in Table 7. A number of 23 enterprises (53.5%) benefit from computer-aided design and production technology, while 39 of them (90.7%) benefit from the internet. It is seen that 14 (32.6%) of the enterprises execute total quality policy and 8 (18.6%) makes production with TSE (Turkish Standards Institution) and ISO (International Organization for Standardization) quality assurance system.

Nine of the enterprises (20.9%) have 'research and development' service from the spot in the 'research and development' core of the enterprise, and 7 of them (16.3%) have it from private associations. About this subject, 1 enterprise had service about research and development from the university and 1 from the professional agency which it belonged to.

The data about the innovation studies done by the enterprises from 1999 - 2009 are shown in Table 8. By the data, it can be said that, the enterprises mostly developed their goods according to customer demands and expectations, thereby making the quality better. The enterprises also stated that, they did not imitate other firm's goods and multiplied their goods variations.

Table 6. The ages of the machines used in the enterprises and their state of being native or imported.

Options	N	Average	Standard deviation
0 - 2 years	17	54.41	33.11
3 - 5 years	24	61.00	35.45
6 - 9 years	15	56.40	24.80
10 years and beyond	15	59.00	36.75
Total	42	.00	.00
Import	25	77.52	28.52
Native	33	68.55	38.37
Total	42	100.00	.00

Table 7. Technology-used standards and equipments.

Options	Number of enterprises	Percent (%)
Computer-aided design and production	23	53.5
Total quality management	14	32.6
TSE labeled production	8	18.6
ISO quality assurance system sealed	8	18.6
Internet	39	90.7

Relationships between variables

When the relationship between the production and the proportion of capacity use is looked at, the lowest capacity usage is seen in lumber industry. However, the proportion of capacity use is higher in the kitchen and bath furniture producing factories and veneer industry (Table 9).

In the study's research field, it is obvious that the proportion of capacity usage in forest products industry is approximately 58.43%. This low proportion of capacity usage which creates the weakest point of the small and medium enterprises shows that the investment capital is a big problem in these establishments in Turkey which are already in shortage of investment capital.

CONCLUSIONS, DISCUSSION AND SUGGESTIONS

Most of the small and medium enterprises are founded by their own means. However, they continue their relationships both in national and international degree. These enterprises mostly make mass production and work according to ordering. Consequently, their production that is being directed to the market is very low. In small and medium enterprises, important decisions like finance and production are taken by their founders or one of the family members. The shortage of demand prevents these establishments from working in full capacity.

The shortage of demand that comes with late global crisis also supported this negative condition. One of the reasons for not working in full capacity is the inadequacy of money. Moreover, technological inadequacy and high prices of energy should not be underestimated. The high

prices of energy raise seriously the cost of production. The proportion of establishments' capacity use varies according to the fields in which they work. The proportion of capacity use is very low in lumber production. In both cover and kitchen-bath furniture production, the proportion of capacity uses is high.

Most of the small and medium enterprises evaluate the quality of production according to demand. Sub-contracting contracting and making subcontraction are also common between these establishments. According to this, the shortage of qualified workers prevents production.

A lot of the enterprises buy most of the goods that they use in production from merchandisers. Beside this, raw materials are also taken from the sales of General Forestry Ministry's market and from abroad as well. Establishments pay attention firstly, to whether the material is appropriate for the aims of production and to the appropriation of paying conditions.

The problems that enterprises face during the supplying of raw materials is firstly, the high prices of raw materials and losses of quality as a result of the General Ministry of Forest not selling timbers shortly after than the production. Enterprises taking the timber from abroad cause rise in the quality of production.

Enterprises use mostly 3 - 5 year machines. Enterprises that use 6 - 9 year machines are mostly timber and cover producers, who imply specifically that this technology is enough for them. Imported machines are mostly used in enterprises.

Between the years 1999 - 2009, enterprises enhanced their products properties and raised the quality of their products in accordance with demand and need of the customers. They also increased the sort of products in the developing rivalry condition and in the changing

Table 8. The innovation studies done by the enterprises from 1999 - 2009.

Options	N	Average	Standard deviation
Developing and improving goods quality increasing	41	4.17	1.05
Varying goods	41	3.98	1.06
Imitating goods	27	2.30	1.35
Adaptation of foreign products	30	3.00	1.31
New goods design	30	3.53	1.59
Adapting other firms' production technology	26	2.88	1.37
Developing peculiar and new technology	22	2.95	1.62

Table 9. The relationship between the production and the proportion of capacity use.

Production subject	Use of capacity (Average)	N
Parquet	75	2
Lumber	35.15	13
Veneer	78.75	4
Furniture	65.71	7
Multilayered parquet	55	2
Laminated parquet	85	1
Press door	70	1
Kitchen-bathroom furniture	69	10
Average	58.43	40

customer favors. More than the imitation of products, the foreign enterprises make their products suitable for the conditions of Turkey and make new product designs. Also, there are some that develop unique and new technologies.

The basic of the problems for the small and medium enterprises is laid on financial inadequacy. In the global economic crisis, because of the increasing inadequacy of demand, they have to work in low capacity and postpone their debts, and as a result, cannot take their claim. Although in Duzce, there are problems of enterprises that work in forestry industry. The production ability of small and medium enterprises' holding qualification as occupational schools play important role in regional development and the blocking of migrations. Their being effected in a minimal level by the temporary, periodical and seasonal crisis contributes to social peace and in overcoming the social chaos. For this reason, the social part of the small and medium enterprises should be given importance and in this respect, their contribution to the country should be supported.

ACKNOWLEDGMENT

This study is a part of Master Science Thesis prepared by Emel Erdem, Institute of Sciences, Duzce University, Duzce, Turkey.

REFERENCES

- Akgemci T (2001). Fundamental Problems of Small and Medium Size Companies and Providing Supports; Small and Medium Industry Development Organization Publications, Ankara, Turkey.
- Anonymous (2004a). Small and Medium-Sized Enterprises in Turkey Status and Policies, <http://www.oecd.org/dataoecd/37/37/33705673.pdf>
- Anonymous (2004b). Duzce Provincial Development Plan, Duzce, Turkey. http://www.duzce.gov.tr/dosyalar/digp/digep_ana.pdf
- Anonymous (2007). Turkey Statistical Institute Official Site, <http://www.tuik.gov.tr>
- Anonymous (2009). Duzce Chamber of Commerce and Industry official website, http://www.duzcetso.org.tr/dh_ekonomi.php
- Cansiz M (2008). SMEs and KOSGEB in Turkey, State Planning Organization (SPO) Publications, Publication No: SPO: 2782, Ankara, Turkey.
- Cindik H, Akyuz KC (1998). The Structure and Suggestions to Solve Problems of Small and Middle-Sized Forest Products Industry Establishments in Trabzon, Tr. J. Agric. Forest. 22: 7-11.
- Er F (2006). Problems and Solutions for SMEs in Duzce, Duzce Chamber of Commerce and Industry, October 2006, Turkey.
- Erdem E (2009). Problems of Small and Medium Sized Enterprises, an Example of The Forest Products Industry in Duzce, M.Sc. Thesis (in Turkish), Duzce University, Institute of Science, Duzce, Turkey.
- Kendirli S, Bilginer M (2001). Alternative Proposals for SMEs, J. Standard, 472: 42-61.
- Kucuk O (2005). Entrepreneurship and Small Business Administration, Seckin Publication, Sozkesen Typography, 975 347 935 2, Ankara, Turkey.