

RESEARCH ARTICLE

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Implementation of new technologies in wood industry and their effect in wood products quality

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Abstract

There are about 300 companies producing furniture and about 250 small and medium enterprises (SME) producing sawn timber, which operate in the field of wood industry in Albania. This wood industry production is being challenged by the increasing demand in the domestic market, ranging from kitchen furniture to office and schools furniture, bedroom furniture, doors, windows, and saw timber in different dimensions. The production from the wood industry can fulfill about 80% of the domestic market demand. The remaining 20% of domestic market needs in wood furniture are afforded by import. Small entities do not make serious investment in technology. Big enterprises such as Ardeno in Tirana, Biçaku in Durres, Shaga in Tirana, Ital-wood in Elbasan, Dafinori in Shkoder, etc., have made remarkable investments in their technology. They have installed several mechanized lines of production. So, Ital-wood has invested in a mechanized saw timber production line; Bicaku in wood panels coated with PVC lines; Dafinori in a wood handrail production technologic line; Ardeno in wooden chairs production technologic lines, and Shaga in the production of furniture with particle panels. These enterprises are using modern numerical command machines, vacuum presses for gluing PVC, cutting equipment for panels with laser ray, finishing lines with electrostatic field, modern lines of pneumatic transport for wood dust etc. These investments in new technologies have increased the quantity and quality of native wood products.

Keywords: wood, furniture, timber, market, company, technology, investment

1. Introduction

In the last 15 years, Albanian wood industry has been under a complete transformation process, not only in terms of the structure and organization of the enterprises, but also in the type of raw materials used to produce wood objects with a greater range of choice.

Currently, there are about 300 small and medium enterprises and companies operating in the field of wood industry which produce furniture, and about 250 enterprises which deal with timber processing, which process an annual volume of 360,000 m³ of sawn timber. They provide services associated with cutting, extraction and transportation of timber assortments.

The medium enterprises employ hundreds of workers and only 50 wood processing engineers, all of them graduated from the Faculty of Forest Sciences. There are big enterprises with 50-80 workers and with advanced technology, medium enterprises with 10-15 workers and some contemporary wood machines, small entities with 2-4 workers and with 2-3 wood machines. Small entities and the majority of medium and big enterprises use particle panels, fiber panels with medium density MDF, veneer and plywood. The big enterprises also use massive wood, partly from

Albanian forests such as beech, oak, fir and pine and partly from import including tropical wood such as Iroko, Azobe, Mogano, etc recently highly demanded from the trade. [1]

All this production of wood industry is affording the increasing demand of the internal trade ranging from kitchen furniture to office and school furniture, bedroom furniture, doors, windows, and saw timber in different dimensions. The production from the domestic wood industry can afford about 80% of the internal trade demand. Only the 20% of internal needs in wood furniture are afforded by import. Biggest furniture companies in the country are mainly located alongside Tirana-Durres highway and in the area of Fush Kruje. This sector has had a significant increase during 2012-2013. Even the marketing of materials for furniture manufacturing has been an increasing tendency for the sector in general in the recent years.

2. Material and method

The aim of this study is to gain a better understanding of determinants influencing the success of the introduction of new technologies as perceived by wood-processing industry staff themselves.

Data collection was conducted through a primary research; the used method was surveying.

56 companies located in 15 districts of Albania are surveyed through direct (face-to-face) standardized interviews,

A complex questionnaire that includes a variety of topics on the existing conditions of the wood-processing companies was compiled. The study population is a nationally representative research sample of wood processing industry staff (further referred to as the Wood Processing Staff Panel), of whom 185 completed a survey questionnaire about their experiences with recently introduced technologies. Participants were working in the wood processing industry throughout the country.

A series of problems generated on the basis of these data. The main rubrics of this questionnaire included the following sections:

- Company’s innovation strategy;
- Introduction process of the new technology;
- Determinants of the innovation process mentioned by staff as enhancing or impeding;
- Machineries used;
- Working conditions;
- Environmental pollution;
- Technological waste management;

- Technical Problems;
- Quality control methods;
- Future assessment.

We are focused on some of the problems that affect several aspects of production such as processing types realized, mechanization rate of transport operations, mechanical-electrical problems, etc.

3. Results and their discussion

A growing number of new technologies are becoming available within wood-processing industry that can improve the quality of wood products, reduce costs, and enhance working conditions. [5] Since competition is very high in this sector, the new technological innovative production lines will further enhance the quality of furniture production. However, such effects can only be achieved if technologies are used as intended. [7]

Half of the respondents were confronted with the introduction of a new technology in the last five years. Only half of these rated the introduction of the technology as positive. The factors most frequently mentioned as impeding actual use were related to the (kind of) technology itself, such as malfunctioning, ease of use, relevance for patients, and risks to patients. Furthermore staff stress the importance of an adequate innovation strategy. [4]

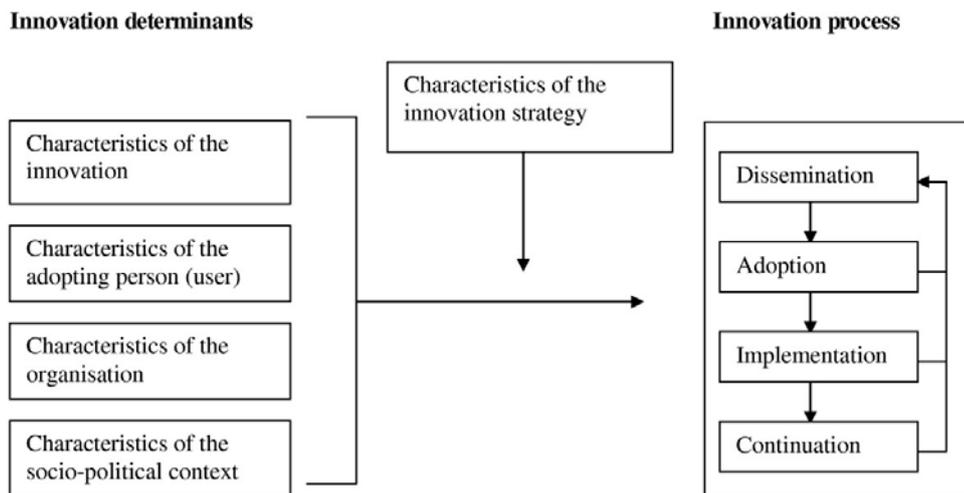


Figure 1. Framework representing the innovation process and related categories of determinants derived from Fleuren et al. [2]

In Albania wood industry is very dynamic. Most of SMEs work with raw materials originating mainly from Europe respecting European quality standards. Generally SMEs that operate in the field of wood processing are distinguished for their quality and creativity, and have enjoyed a continuous and constant growth with a successful track record in business.

Some of them have managed to maintain a positive trend of 15% on an annual basis.

Big enterprises such as Ardeno in Tirana, Biçaku in Durres, Shaga in Tirana, Ital wood in Elbasan, Dafinori in Shkoder, etc., have made remarkable investment in technology, whereas small ones do not make investment in technology (Fig 2.). They have

installed different mechanized lines of production. So, Ital-wood has invested in mechanized line of saw timber production; Bicaku has invested in lines of wood panels coating with PVC; Dafinori has invested in technologic line of wood handrail production; Ardeno has invested in technologic line of wooden chairs production; Shaga has invested in the production of furniture with particle panels.

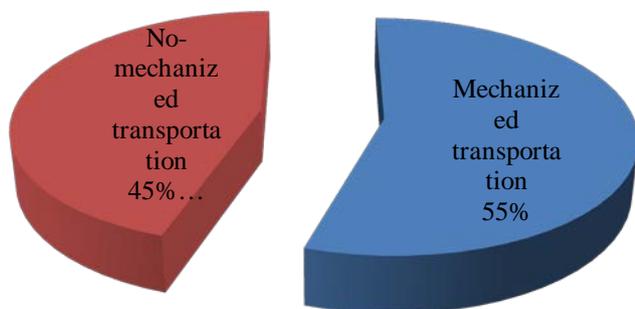


Figure 2. Internal transportation in wood-processing industrial enterprises.

Table 2. Determinants of the innovation process as enhancing and impeding in each category of determinants

Characteristics of the...	enhancing number	%	impeding number	%	total number	%
Technology	96	56.1	200	57.6	296	57.1
(Potential) user	30	17.5	67	19.3	97	18.7
Organisational context	45	26.3	80	23.1	125	24.1
Total	171	100	347	100	518	100

These enterprises are using modern numerical command machines, vacuum presses for gluing PVC, cutting equipment for panels with laser ray, finishing lines with electrostatic field, modern lines of pneumatic transport for wood dust etc. [3],

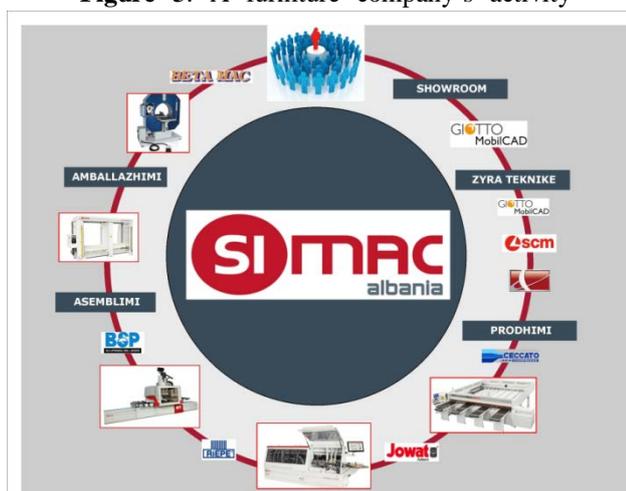
During the preparation of this paper, the Wood Processing Staff Panel interviewed, evaluated the introduction process of the technology as follows:

Table 1. Staff's evaluation of the introduction process of the technology

Evaluation	%
very good	6.6
moderate	34.2
very bad	4.9
good	42.6
bad	11.6
Total	100

When it came to their assessment of the innovation process, the Wood Processing Staff Panel interviewed responded as follows:

Figure 3. A furniture company's activity cycle



cycle

Currently, RTA furniture is another fastest growing segment of the furniture market. At the same time, following the trends of bio-energy, many wood processing factories, have introduced briquetting machines in their production chain. However, only a few companies in the country have a clean profile for

the production of briquettes, mainly producing for the domestic market.

Cooperation of wood processing enterprises with wood industry department

Today, the consumers' demands for high quality furniture lead on technological improvements. This new situation brings on the necessity of collaboration between the wood industry and the Wood Industry Department in the Faculty of Forest Sciences.

The Faculty of Forest Sciences curricula has created room for the insertion of new and contemporary knowledge; has harmonized the ratio between theory and practice; has increased the flexibility of subjects from year to year; has increased the economic knowledge responding to the demands of the labor market, etc. The part time system education is a great opportunity for current wood industry workers to get specialized education in the field of wood processing.

The department of the wood industry is taking in consideration the wide range of actual and future challenges that the wood industry is facing. Significant results in the scientific research field as well as in the commitment in sustaining the development of wood industry have been achieved.

5. Conclusions

In Albania the potential and importance of the SME sector in wood processing industry as well as the implementation of new technologies is not yet recognized in any strategic national planning documents. The implementation of a new technology system is a delicate interplay of various organizational factors. To foster successful organizational change, the analyst must first identify the technologies most advantageous to his organization. [4]

Employees are much more likely to accept and adapt to the new process when made a part of planning and implementation procedures. Even the best technology system is useless if the end users will not adapt their work processes to include it.

The introduction of new machinery has brought a 20% income increase per year. The furniture cost about 8% less, whereas the new machineries create less expected losses, and have a greater production efficiency.

SMEs in Albania report for difficult access to capital for investment in improving technology and information technology, or the lack of operational capital. The most serious problems of wood industry enterprises and entrepreneurs are partially of a technical nature associated with outdated equipment and machinery, but what is more disturbing is the unfavorable financial situation with expensive commercial loans and the lack of incentives for the modernization and development of SME poor infrastructure.

Overall weaknesses and problems of these SMEs include: a) lack of business opportunities for self-financing as a result of the low level of operational capital available, b) limited investment activities of the financial sector, c) lack of information on existing financial possibilities. Wood processing SMEs need to

be seen as a great potential to help the recovery of the national economy.

The main objectives for the development of SMEs can be supported by an increased contribution of the forestry and wood processing industry in economic and social development at the national level. Regarding direct measures for promoting SME business in the forest industry, the main strategic directions can be the following:

Supporting small and medium enterprises in the primary sector,

Supporting institutions related to the interests of companies to resolve legal restrictions,

Financial measures, education and training, as export promotion, sector analysis and technical support measures.

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