CAD SYSTEMS IN KOSOVO MANUFACTURING INDUSTRIES: THE CASE OF KOSOVO FURNITURE INDUSTRY

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Abstract: *In Kosovo enterprises, the usage of CAD systems are limited, in the beginning as a result of higher prices of hardware and software equipment and afterwards as a result of the war events that Kosovo and their economy passed. This paper reports the results and conclusions drawn from a questionnaire survey concerning the use and implementation of computer-aided design (CAD) in the Kosovo furniture industry.*

It was regarded as important to find out what impacts implementation has on the usage of CAD and whether companies in the furniture industry think the use of CAD could improve their product development. Less than half of all product-developing companies in the Kosovo furniture industry are using CAD today. The study found that the following factors are involved in successful implementation: management support, realistic budgeting, selection of system and effective, company-specific training. Most CAD users are satisfied with their system and think that it fulfills their needs. Many of the difficulties referred to by respondents can be related to the implementation phase, and they could be avoided. In general, the furniture industry considers that CAD improves their product development work.

Keywords: CAD SYSTEMS, KOSOVO INDUSTRIES, MANUFACTURING, FURNITURE INDUSTRY, 2D AND 3D CAD.

1. Introduction

The Kosovo furniture industry, like other industries, has become exposed to greater competition, and market size has increased especially after the war in 1999. During the war years (1998-1999), production in Kosovo was to high scale destroyed and was almost non-existing. Monitoring of major world technological developments that occurred during this time has been difficult in these conditions or nearly impossible. In the years after the war in the market of Kosovo were noticed efforts towards the development of small and middle business. Large businesses have been developed in a very small measure.

"New technological developments and market demands have major impacts on manufacturing" [Osita, 2002, p.19]. Process of manufacturing is a complex that includes some phases, starting with evaluating the market and investigating the demands of customers for a product, and ends with delivery of the actual product. Successful enterprise should take into account the factors that affect current and future demands for a product. It provides management with appropriate inputs for decision making and directing resources of a company toward production of a part that is needed in the market. [2, 2002]

Customers have raised demands for short delivery time, improved quality, and low prices. Thus, the furniture industry has to improve its way of developing products and services. In the view of Hoff et al. (1997), companies (wood-products manufacturers) must respond, and advanced technologies might be one way of responding to changing conditions and requirements for competitiveness. This implies that computer-aided design (CAD) can make a contribution to the way in which products are developed.

This paper presents the results of a questionnaire survey on the implementation and use of CAD in the Kosovo furniture industry. Its goals were to investigate how far the Kosovo furniture industry has progressed in the use of CAD in product development and how implementation has been performed. It also investigated what impacts implementation has on the usage of CAD, and whether companies in the furniture industry think that the use of CAD could improve their product development. The purpose with the investigations was to build knowledge on a branch level on how to increase the competitiveness within the furniture industry.

2. Statement of the problem

Production is directly related to the market, and an advanced production enables other businesses dealing with industry. To meet the demands of the customer it is required to produce high quality products, and this is achieved by applying modern production technologies and processes that accompany it. [3, 2008]

In many industries CAD usage is concentrated on product engineering and for programming computer numerical control (CNC) machinery. In many companies, the use of CAD within product engineering is restricted to its function as a drafting tool. Yet CAD, and solid modeling in particular, has a potential that far exceeds simply automating the drafting process. "The transition from the use of CAD as a drafting tool for producing parts sketches for route sheets to a tool for creating virtual models of complete furniture pieces means a rethinking of how CAD is integrated into product engineering" (Wiebe and Summey 1997).

Another aspect of the implementation and use of CAD is that the technique does not make a company more efficient if its organization and product development are not changed at the same time. Applying a new technology is not just a matter of changing equipment or systems. How advanced the technique needs to be is also related to the company's needs, organization, and work methods (Forslin 1988). Also, Schaffitzel and Kersten (1985) write that the potential of CAD and its integrative effects demand new organizational rules, and that the overall procedural system within the company must be considered.

3. Objectives and purpose of the study

This paper presents the results of a questionnaire survey on the implementation and use of CAD in the Kosovo furniture industry. Its goals were to investigate how far the Kosovo furniture industry has progressed in the use of CAD in product development and how implementation has been performed. It also investigated what impacts implementation has on the usage of CAD, and whether companies in the furniture industry think that the use of CAD could improve their product development. The purpose with the investigations was to build knowledge on a branch level on how to increase the competitiveness within the furniture industry. The assumption that new technology in product development is a competitive factor bases

the investigations. Also implied is that knowledge on how to efficiently implement new technology is needed.

The overall objective and purpose of this study are: to determine the scale of application of CAD systems in Kosovo furniture industry, and also to try to identify challenges that influence the implementation of CAD systems.

The purpose is to possess knowledge about CAD systems, their usage and influence in industry especially in furniture industry, so that managers and engineers and others have an easier access to integrate these systems in industry.

4. Methodology

To obtain data about the application of CAD systems in Kosovo furniture industry we have chosen questionnaires and interviews with the staff of enterprises.

The questionnaire was designed to provide a description of usage and implementation of CAD systems in Kosovo industry. Questionnaire administration offers a suitable method for posing an equivalent set of questions to some number of people.

The questionnaire comprised 13 items, subdivided into 4 sets that cover one part of the goals and purpose of the study:

1. * Company description;
2. * CAD systems usage in the furniture industry;
3. * Implementation of CAD;
4. * CAD systems in use, actual and future needs.

The questions were grouped in order to make it easier for the respondents to work through the questionnaire. Items for each topic were also divided into three categories: questions of fact, questions about opinions and beliefs, and questions about behavior (Gillham 2000). Most of the items were questions of fact, and appeared first in every topic group. The reason for placing them first in each category was that they are normally easy to answer. A majority of the questions were multiple-choice and closed-types, while a few were scale questions, both answered by checking tick-boxes. There were also a few open-ended questions.

Questionnaires were sent through the companies personally and at the same time are held interviews with staff of organizations, including different categories of personnel who are associated with the production process and management of enterprises in order to gather as much information about CAD systems to fulfill the objectives and purpose of the study. From 125 distributed questionnaires, 105 were filled out and returned.

5. Results and discussion

In this research are included 15 companies.

Based on the analyses of answers to questions of the questionnaire shows that, from 15 inspected companies, four of them are using CAD systems or 26.6%, 6 are partially using CAD systems, or 40.00% and 5 others have not yet introduced this technology in their organization or 33.33%. In figure 5.1 is shown a graphically scale of application of CAD systems in organizations involved in this research. This research is done during the year 2014.

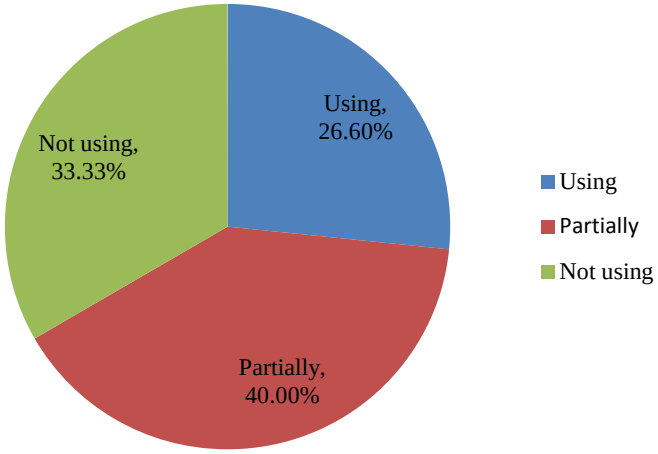

Figure 5.1 *Scale of application of CAD systems in organizations involved in this research.*

The results of this paper will be compared with the results of research of Riinvest Institute that has done in 2009 about the application of new technology in the industry of wood as well as results of research that we have done during the years 2010-2011 about the application of CAD/CAM systems in Kosovo enterprises, the research which is presented at The International Program Committee of the 9th International Congress "MACHINES, TECHNOLOGIES, MATERIALS'12" (Mr.sc. Dipl.-Ing. Fatmir AZEMI, Mr.sc. Dipl.-Ing. Gani Pllana: "SCALE OF APPLICATION OF CAD/CAM SYSTEMS IN KOSOVO ENTERPRISES" 19-21th September 2012 Varna-Bulgaria, ISSN: 1313-5031.

In figure 5.2 and 5.3 graphically are presented research as mentioned above

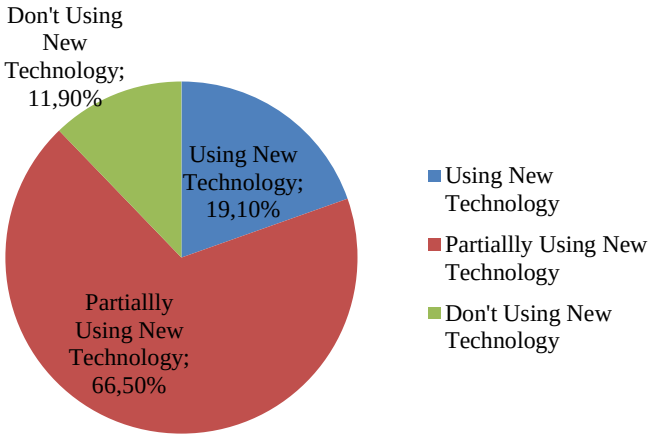

Figure 5.2 *Scale of application of new technology in Kosovo wood industry – Institute Riinvest 2009.*

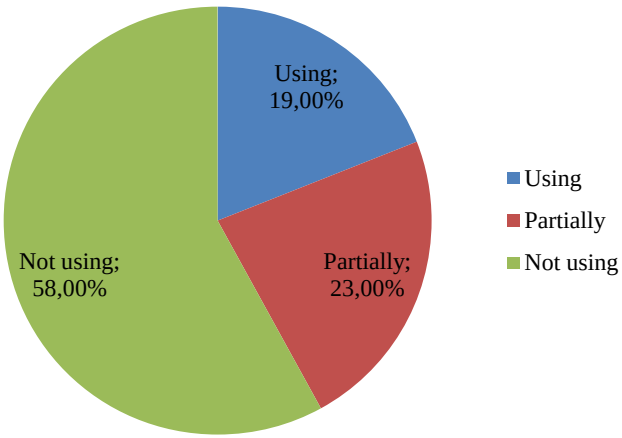

Figure 5.3 *Scale of application of CAD /CAM systems in Kosovo enterprises.*

6. Conclusion

Based on the analyses of answers taken from the questionnaire we could conclude that less than half of all product-developing companies in the Kosovo furniture industry are using CAD systems today. Based on the interviews with mangers of companies, engineers and staff like that, the study found that the following factors are involved in successful implementation: management support, realistic budgeting, selection of system and effective, company-specific training.

From 15 inspected companies, four of them are using CAD systems or 26.60%, six partially are using CAD systems, or 40.00% and five others have not yet introduced this technology in their organization or 33.33%. Compared to the results that have been done in the years 2009-2011 we can see a considerable increase in the application of CAD systems in Kosovo furniture industry.

Most of the responding companies in the Kosovo furniture industry that use CAD are satisfied with their system and think that it fulfills their needs. Many of the difficulties referred to by our respondents are related to the implementation phase, and can be avoided. Nevertheless, the furniture industry as a whole considers that CAD improves their product development work

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