

ENTERPRISE RESOURCE PLANNING: CASE STUDY OF CROATIAN WOOD PROCESSING COMPANIES

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ABSTRACT

Enterprise Resource Planning (ERP) systems are packaged software designed to integrate and optimise the business processes of a company. The ERP systems have been embraced by industry as a de facto solution to integrate their business functions. This paper reports a survey study conducted on Croatian wood processing companies. The study used the elements of survey questionnaires used in previous surveys done on manufacturing firms. Our objective is to determine the extent of adoption of the ERP system in the Croatian wood processing companies, their motivations and benefits obtained.

Key words: Enterprise Resource Planning (ERP); Croatian Wood Processing Companies; Questionnaire survey

1. INTRODUCTION

In recent years, many companies world-wide have been focusing on their core business, downsizing and outsourcing, due to adverse global economic conditions (Loh and Koh, 2004). This global change in business is refers to all areas, especially questioning the company's effectiveness and trying to find optimal solutions for doing business (Hernaus, 2009). According to the European Commission small and medium-sized enterprises (SMEs) and entrepreneurship are key to ensuring economic growth, innovation, job creation, and social integration in the EU. Considering in that part s wood processing industry in Croatia, wood industry is in the same situation like in other European countries, it consists of many SMEs that face difficulties in reaching a good market position and becoming competitive (Perić, 2015). In addition, the important fact is that wood industry is a resource-intensive industry, and as such does not have a high added value (compared to ICT, pharmaceuticals, etc.), but it is important for the Croatian economy (notable share in employment, export and rural development) (Kersan-Škabić, 2014). However, it is not enough to succeed in foreign markets, because the performance depends not just on the availability of resources, but also on subtle factors, such as investment in knowledge, technology, or design on other words to be competitive in the market SMSs have to be innovative in all possible aspects (Belak & Ušljebrka, 2014). Furthermore, in recent years' sustainable development trends have spread over wood products industry and numerous wood industry companies were obliged to implement Chain Custody certification in order to retain their customers (Klarić *et al.* 2017).

To improve their performance and competitiveness companies, in particular SMEs within a supply chain that involves larger companies, must now turn to more outward-looking approaches such as providing higher added value to customers and developing better working relationships and ultimately partnerships, in other words competitive trends are pushing executives to rethink traditional business design configurations (Loh and Koh, 2004). Considering a wood processing industry, where inventory problem is significant, even an improvement in material-flows managements is a one of the way how to extend business results (Grladinović, *et al.*, 2003), this imply the fact that the primary goal of inventory management, is to have adequate quantities of high quality inventory available to serve customer needs, while also minimizing the costs of carrying inventory (Chow *et al.*, 2000). According to the result conducted by study of Pric Barčić *et al.* (2016) related to the innovation activity of furniture manufacturing companies in Croatia, results showed that R/D investments are correlated the most to production process innovation elements. Further, other studies have shown that the effectiveness of an inventory management system depends on the quality of information it takes in and the capacity of the company's information technology (IT) (Dumas, 2008).

Improvements in information systems over recent years mean that feedback can be much more frequent and in some cases, can be almost instant, thus offering real-time control capabilities. With the development of information and communications technology (including computer components and software packages), there has been also an impact on the development of all forms of computer applications and specialization of individual applications intended for business systems, known as ERP systems, which evolved from Materials Requirements Planning (MRP) and Manufacturing Resource Planning (MRP II) systems. All these software's, since their introduction, they all have the main goal - integration of processes across functional areas with improved workflow, standardization of various business practices, improved order management, accurate accounting of inventory, and better supply chain management. Basically, the concern with the demand predictability became more evident from the World War II end. At that time, many companies had competence to carry out its production plans based only on firm orders. To minimize this mismatch between production and demand, were initiated sales forecasts on a quarterly basis (Santin, *et al.*, 2015).

The MRP concept has spread, especially in the United States and Europe, where changes were included in the model, mainly to get information of capacity requirements, and also to do a more reliable cost approach. These developments culminated in the 1980s, with the emergence of MRP II (Manufacturing Resource Planning), replacing the traditional MRP, the production management system that has been deployed by more companies since 1970 (Mabert, Soni, & Venkataramanan, 2003). The Gartner Group coined the term ERP in the early 1990s to describe these systems and stipulated that such software should include integrated modules for accounting, finance, sales and distribution, human resources, materials management and other business functions based on a common architecture that links the enterprise to both customers and suppliers. According to industry reports at least 30,000 companies worldwide have implemented ERP systems (Mabert, *et al.*, 2003). Their planning capability could offer substantial gains in productivity, dramatic increases in customer service, much higher inventory turns and a greater reduction in material costs if they are used efficiently and facilitated by necessary support (Loh & Koh, 2004).

Since 1990s many research have been published studies within the topic "improving the success rate of ERP implementation", and were primarily based on studies at large organizations (Zach, 2012). According to the Snider *et al.* (2009) the absence of SMEs was because of differences between SMEs and large organizations. Further, SMEs top management is usually involved in day-to-day activities, managers may have limited formal training, absence of long term planning is another dominant factor. On the other hand, SMEs have relatively informal structures and culture, which increase cross-functional exchanges, and small management teams, which results in efficient decision-making. For major disadvantage authors pointed out a lack of human and financial resources within the SMEs. However, SMEs often cannot afford extensive training, find it difficult to implement reengineering projects due to limited spare resources. The cost of an ERP implementation may be proportionally higher for SMEs than for large organizations.

According to the literature review, none of the research related to the implementation of ERP systems among wood processing companies in Croatia was carried out, as above mentioned this paper presents a preliminary work. Further, the aim of this study was to find out a level of usage of ERPs, examine factors of ERP implementation within SMEs in Croatian wood processing industry, and to determine their motivations and benefits obtained.

2. RESEARCH METHODOLOGY

The framework of the present study was tested with the use of a newly developed questionnaire on a sample of Croatian wood processing companies. The initial target population was taken from the Register of Business Entities supervised by Croatian Chamber of Commerce. The mailing list included all active companies with more than 10 employees, and according to their core business activities, were

classified in the field as C 16 - wood processing and C 31 - furniture manufacturing, based on *National Classification of Activities (2007)*.

A mailed survey, via www.survs.com, was approaches used in this study. The design of the questionnaire for this research required a variety of measures and items. The items have been collected and adapted from different sources (Dumas, 2008; Loh and Koh, 2004; Mabert, *et al.*, 2003; Maditinos, *et al.*, 2011; Pertoni, 2002; Santin, *et al.*, 2015; Shatat, 2015; Snider, *et al.*, 2009; Zach, 2012). Open questions and five- point Likert scale was used for some of measurement of included variables (1 = “strongly disagree” to 5 = “strongly agree”) or (1 = “very unimportant” to 5 = “very important”). Only 22 usable questionnaires were returned.

3. RESULTS

According to the results obtained, totally 22 companies were identified that have implemented an information business systems, precisely 13 of them furniture manufacturing and 9 wood processing companies. Software’s are mostly applied (86%) for doing both - business and production processes. Regarding type of production processes within the company, 9% of them stated to have single production, 41% small-scale production and 50% large-scale production.

Most of them applying customized software programs (55%). Considering the well know ERP provider, 18% are using the Oracle, per 10% are using QAD and Navision (Microsoft Dynamics NAV) and per five percent of them are using SAP and Mapics. Further, 55% of respondents answered that they apply the above-mentioned software more than 5 years, while rest 45%, applying it for a period of 3 to 5 years.

About half of (45,5%) of questioned companies belongs to group that have between 10 to 50 employees and them 40,9% to have from 51-250 employees (table 1). Analysing the educational structure of the surveyed companies, more than average of all respondents (more precisely 64,2%) reported to employee people with secondary education and 30,6% with no education or primary education (table 1).

Table 4 Qualification structure and number of employees within the word-processing companies (n=22)

<i>Number of employees</i>	<i>(n)</i>	<i>%</i>	<i>Qualification of employees</i>	<i>%</i>
10-50	10	45,5	No education and primary education	30,6
51-250	9	40,9	Secondary education	64,2
251-500	1	4,5	Bachelor’s degree	2,2
501-1000	1	4,5	Master’s degree	2,6
>1001	1	4,5	Postgraduate degree	0,1

Analysing the criteria for selection above mentioned software, shown in table 2, the main factors according to the respondents' answers were ability to customize the specific requirements of companies, ability to upgrade and employee IT competencies and company IT infrastructure (M=4,36; SD±0,91).

Table 2 Criteria for selection of software (n=22)

Variables	M	SD
The ability to customize the specific requirements of companies	4,36	0,77
IT infrastructure of company	4,10	0,81
Software price	3,82	1,03
Cost of maintenance	3,95	0,82
Employees IT competencies	4,32	0,76
Implementation costs	3,68	0,92
The ability to upgrade	4,32	0,76

On the question regarding to the decision of implementation software's used within the companies, it was measured with the 11 factors competencies (M=3,98; SD±0,91), the main factors were: reducing production costs, improving product quality, better inventory control, standardization of working procedures. But, on the other hand, the lowest rating was obtained for factors such as: new production line (2,05), then quality control, and reducing delivery lead time (table 3).

Table 3 Decision criteria for software implementation (n=22)

Variables	M	SD
The ability to customize the specific requirements of companies	3,45	1,72
Reducing production costs	4,23	0,85
Better meeting of delivery promises	4,00	1,09
Reducing delivery lead time	3,88	1,13
Quality control	3,87	0,90
Improving product quality	4,38	1,08
Better inventory control	4,32	0,82
Standardization of working procedures	4,14	0,87
Greater responsibility of employees	4,00	1,04
Providing "real-time" support for customers	4,00	1,04
New production line	2,05	0,90

The survey contained thirty-four open question, grouped into seven modules, regarding the activities of software usage within the surveyed companies. The following modules were offered, as follows: *financial module*, *human resources*, *management and production processes*, *inventory management*, *purchase management*, *quality management* and *sales management*. Obtained results have shown that the *financial module* is the most commonly used module, for activities such as: input accounts, open accounts, financial reporting and ledger (more than 80 percent of responses). Observing the *human resource* module, activities like managing employee's salary calculation, health and pension insurance were most commonly used within the respondents. Considering a *management and production process* module, production planning (81,8%), material management (63,6%) and work order control (68,2) showed as most common tools. When analysing an *inventory management module*, activities like material requirements, reservation and inventory adjustment, respondent companies apply the most. For *purchasing management* module, there were activities like managing orders and procurement reports. Further, the *quality management* module, 22,73% respondents were not using it, those who did use it for activities such as control of incoming material, quality control in production and for complainants. In sales management module results have shown usage for activates: pricing (90,9% respondents) and sales report (63,6%).

Question related to the benefits obtained considering post-implementation ERP phase, measured with five point Likert scale. Results have shown that factors such as *sales efficiency* (M=3,70; SD±1,69), measured with 6 variables, and *inventory planning and management*, measured with 5 variables (M=3,71; SD±1,66) been high score evaluated. On the other hand, factors *employee skill and competences*, variable measured with 4 variables (M=3,52; SD±1,01), then organizational effectiveness (M=3,59; SD±1,60), 4 variables, *overall productivity* (M=3,53; SD±1,63), 9 variables, showed a slightly lower rating.

4. DISCUSSION AND CONCLUSION

Considering the number of employees within the surveyed companies, they belong to classification of small and medium sized enterprises. The study shows that conducted companies mainly have implemented customized ERP system for doing both-business and production processes. Main criteria selection of ERP software was ability to customize the specific requirements of companies, ability to upgrade, employee IT competencies and company IT infrastructure. Well know ERP providers are using mainly by large companies with more than 250 employees. This results and above mentioned results are correlated with previous research done by Dumas (2008), Loh and Koh, (2004), Snider, *et al.* (2009) and Zach (2012), where authors pointed out factors which may influence ERP implementation success in SMEs, such as: lack of human and financial resources, needed extensive trainings, reengineering of overall business processes, complex implementation process, high resource requirements etc. The main reasons for ERP software implementation, according to respondents' ratings were: improving product quality, better inventory control and reducing production costs. This lead to conclusion to be competitive, to leverage business performance, to improve organizational effectiveness, companies have to be innovative in all areas of business. That ERP system brings some improvements, can be seen from the obtained results, when assessing the factors: sales efficiency, inventory planning and management. According to the Shatat (2015), practice have shown that companies are only used between 50 and 75% of the ERP system functionalities or modules, comparing that with our case study, results are similar. Information business software's, within the surveyed companies are mainly used for following modules: financial module, human resources, management and production processes, purchasing and sales management.

Based on all the data that have been raised, it can be seen the importance of an ERP system usage within Croatian wood processing companies, as a useful management tool. A limitation of the present study is the relatively small size of the sample. This may be attributed to the nature of the population of the study which is rather small and difficult to be defined due to lack of available data. Another limitation can be prescribed to the timeframe of gathering the data.

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