

Management Software Implementing within Ukrainian SMEs: Case Study

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Abstract: By this research we investigate implementation of management software systems within Ukrainian SMEs. We have pointed that implementing of ERP systems in such cases have many disadvantages according to economic crisis in Ukraine. By this case research, we propose alternative approach - the implementation of so-called scalable information systems-designers. Good examples of such systems are Accent 2 and 7.4. These systems are developed by Ukrainian IT-companies and enable complex automation of enterprises of any kind of activity.

Keywords: ERP, manufacturing enterprises, Management Software, Accent 2.

I. INTRODUCTION

As thing stand, SME's (small and medium enterprises) can't go through in a modern competitive environment without electronic gadgets, remote access to corporate resources, automated planning and process management,. This is an obvious trend: companies of different profiles, regardless of the size of the business, switch to automated computer systems that help to conduct business, monitor and plan it. Efficiency from this noticeably wins, especially in terms of saving time and money.

The basis of automaton in commercial organizations is ERP systems (Enterprise resource planning).

ERP systems are implemented with the purpose of uniting all the sectors of the company and all necessary functions in one management system which is to meet the requirements of all these sectors. The development of such a system is not an easy task. ERP possesses the uniform data base of all sectors and tasks which means that the access to the information is much simpler, the basic advantage being the mutual information exchange among the sectors.

The implementation of the management system in many cases enables not so much to increase the profitability as to decrease the expenses. The managers who take the decisions have comprehensive information, may interpret it correctly and undertake the right actions. The financial profit lies very often in the fact that the authorized persons can manage more

effectively the production stock, decrease its quantity to meet the demands and, thus, release the circulating assets. The automation saves more time for the decision-making employees for analytical work as many time-consuming routine processes are being cut down. Besides, the enterprise with the automated management system meeting the requirements of the Western standards has good chances for the Western investments.

There are many researches focusing on advantages of ERP, listed in [1, 2, 3]. Notwithstanding, as stated in [2], despite the great recognition and acceptance of ERP Systems in organizations, some criticisms have been directed to these types of systems [4], pointing inflexibility [5-8] and long implementation period [5, 6, 9] and high cost.

Implementing of ERP systems by Ukrainian enterprises has special value as the tasks of the economic growth, increasing of production quality and competitiveness, becoming a member of the world market are most topical. The solution of these tasks without the increase of the quality management and automation of all spheres of economy (state bodies of management, different enterprises and small businesses) is impossible. But stated above disadvantages of ERP-systems including its high cost and primaries of SME's in Ukraine demand finding other solution.

In this paper we describe alternative approach of Enterprise management system implementation – using so-called scalable information systems-designers at the case of enterprise of wood processing industry.

II. MARKET TRENDS

According to [10] there are top 10 ERP solutions for Ukrainian enterprises: OneBox, 1C: ERP, MS Dynamics ERP, IT-Enterprise, Parus, BAS ERP, DeloPro, HansaWorld, Galaktika, Tend Erp.

The market of ERP-systems is the part of the information and communication industry, which, in turn, brings together the two main sectors: Communications and Information Technology. As we stated in [11] one important factor of increasing ERP system demand is the currently ongoing

process of consolidation inside of several economic branches. Newly groups of companies and holdings need sufficient software and licenses in order to allow them to integrate different information systems into one management control system. According to estimations of the Ukrainian IT consulting enterprise IDC a high potential of growth have such ERP systems in industrial sectors within sales and distribution, banking sector and governmental and public administration. The speed of growth of these sectors will be higher than Ukrainian ERP market growth in general.

Well known investigation of Panorama Consulting and its report "Clash of the Titans 2017" states that Microsoft Dynamics has passed by Oracle to reach the second-from-the-top spot in the ERP market share rankings published by Panorama Consulting [12]. According to Panorama consulting [13] SAP remains leading at the global market with a share of 19% in implementation of management software solutions, it is followed by solutions from Microsoft Dynamics (16% of the market) and Oracle (13%). There are also popular ERP solutions from Epicor and Infor.

We want to stress that there are no up-to-date data concerning Ukrainian ERP market, but the leaders in 2016, according to IDC research [14], were solutions from SAP (43.4%), IT-Enterprise (15.7%), 1C (13.9%), Oracle (11.7%) and Microsoft Dynamics NAV (6.1%). In recent years, according to a number of experts' investigations, the impact of 1C solutions has significantly decreased at the Ukrainian market as it is under sanctions [15-16].

In the above section we underlined disadvantages of ERP-solutions implementation by Ukrainian SME's accordingly to protracted economic crisis and its high cost. As alternative for this enterprises in Ukraine there are many solutions based on so-called scalable information systems-designers. Good examples of such systems are Accent 2 and 7.4. These systems are developed by Ukrainian IT-companies and enable complex automation of enterprises of any kind of activity. A typical set of functional requirements provides management and financial accounting, but open source framework allows coding modules for complex automation. Implementation of A2 and Accent systems is achievable in stages, progressively covering all areas of a company [17-18].

In this paper we pay our attention to automation of manufacturing enterprises as it is a complex multistage process and the management information system of suchlike enterprise should include a number of modules majoring in certain areas. It is clear that comprehensive and complex automation of production could be provided through implementation of ERP systems.

III. RESULTS

An example of mentioned problem is automation of company providing furniture manufacture. Information flows of the company can be divided into several interconnected modules. Implementation of the system takes place in parallel in all areas of their subsequent integration. Automation modules can be divided into several key blocks in simplified form (Fig. 1).

Each of the blocks has both incoming and outgoing information. The first step of automating is the accounting of

raw materials. The production process starts with the reception of raw materials that is one of the most important components of the manufacturing process. Typically, supplier ships raw materials providing the appropriate enclosed document with a complete list of materials specifying size and its volume.

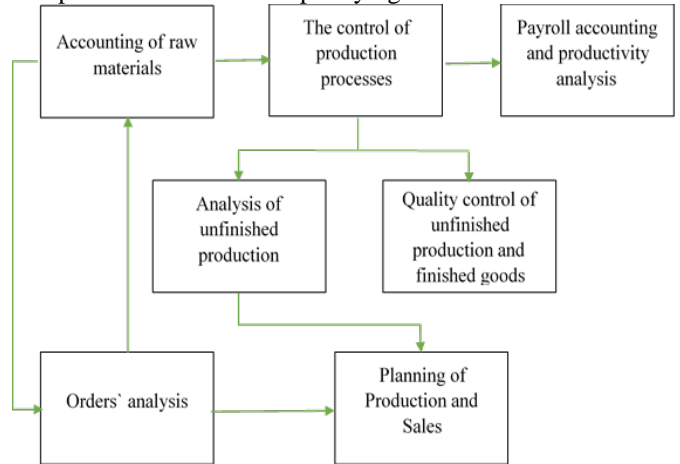


Fig. 1. Modules of information system

Responsible person performs the necessary measurements and marking of the timber party. This data is moving to the production department, which carries out a comparison of the information given in purchase order actual numbers. The next stage of the production process is the primary processing of wood. According to the established production plan, senior master production manager distributes raw materials as needed.

Primary wood processing involves a number of interrelated processes such as drying (if the raw materials come in raw form), longitudinal and transverse cutting (Fig. 2 and Fig. 3).

02. Long grain of board - A2

File

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Leaves

1

date

01 June 2017

From

Gold sawmill

To

Gold sawmill

Long grain №

№	Bunch №	Name	Wood species	Unit	Q-ty, m3	Amount	Size		
							L	W	T
1	389	Board beech 57	Beech	m³	1,79	1.7900	3000	57	25
2	400	Board beech 57	Beech	m³	2	2.0000	3000	57	25
3	396	Board beech 57	Beech	m³	1,93	1.9300	3000	57	25
						0	0	0	0
Total			5.7200	Total	5.7200	Total			
							Beech	5,72	
							Oak	0	

long grain document

CAPS | NUM

Fig. 2. Longitudinal board cutting

The entire production process is displayed in the system by means of relevant documents that allows operational control of the production process. The final stage of primary wood processing is the formation of rough pieces and transfer them to areas of further processing.

02. Cross grain of board - A2

File Edit View Window Help

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Cross grain № date 01 June 2017

From Cold sawmill

To Cold sawmill

Wood species	Size			Beech №	Oak №
	L	W	T		
Beech	3000.00	100.00	32.00	0	7

№	Name	Unit base	Unit der.	Size			Wood species	Series	Q-ty pcs	Q-ty m3
				L	W	T				
1	RSS Beech 1850x100x32	шт	м³	1850	100	32	Beech		242.0000	1.4326
2	RSS Beech 450x100x32	шт	м³	450	100	32	Beech		979.0000	1.4098
3	RSS Beech 800x100x32	шт	м³	800	100	32	Beech		482.0000	1.2339
4	RSS Beech 100x32	шт	м³	100	32	Beech		4(01/06)62	1.1800	1.1800
5	RSS Beech 50x32	шт	м³	50	32	Beech		4(01/06)63	0.8400	0.8400
Total									6,0963	
Beech									6,0963	
Oak									0	

cross grain document

Fig. 3. Transverse board cutting

The conversion process of transforming of rough-sawn stock into finished products is shown in Fig. 4.

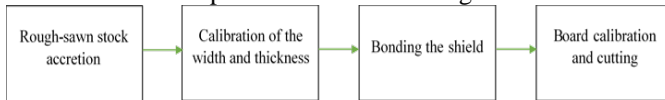


Fig. 4. Assembling of the finished product

Rough-sawn stock hits the seam line after initial treatment, where they to be formed as slats. The main feature of this process is the transition from one unit of measurement (for rough-sawn stocks there is only volume) to two - pieces and volume (for each lamella there is fixed length, width and thickness). Accretion operations are recorded in the journal and entered into the system in the form of relevant document (Fig. 5).

03. Act processing - A2

File Edit View Window Help

New Save Print Details Close

Act processing RSS (lengthening) № date 03 June 2017

№	RSS			Size	Wood species	Q-ty pcs	Q-ty m3	DIF	% lost
	Name	Series	W						
1	RSS Beech 45x27	01/06/17001	45	27	Oak	0.30			28.18
2	RSS Beech 43x23	01/06/17001	43	23	Beech	0.36			18.00
3	RSS Beech 47x23	01/06/17002	47	23	Beech	0.40			5.98
4	RSS Beech 50x24	01/06/17004	50	24	Beech	0.30			19.05
5	RSS Beech 45x31	29/05/17008	45	31	Beech	0.39			17.09

Act processing

Fig. 5. Accretion accounting

To eliminate irregularities and defects which were formed during the seam, especially in the field of bonding, each adherent lamella is calibrated on the four-sided machines. Action of the machine is recorded in the journal and entered into the system (Fig. 6).

03. 2 Act processing 4-sided № date 01 June 2017

№	RSS length			Size	Wood species	Q-ty pcs	Q-ty m3	DIF	% lost
	Name	Series	L						
1	RSS length Beech 1850x100x32	01/06/17001	1850	30	Beech	477	0.4028	0.2063	1101
2	RSS length Beech 450x100x32	01/06/17001	450	30	Beech	524	0.2719	0.0002	1731
3	RSS length Beech 800x100x32	01/06/17001	800	27	Beech	24	0.0042	0.0022	1101
4	RSS length Beech 100x32	01/06/17001	100	27	Beech	226	0.0001	0.0001	2000
5	RSS length Beech 50x32	01/06/17001	50	27	Beech	14	0.0001	0.0001	2000
6	RSS length Beech 1850x100x32	01/06/17001	1850	27	Beech	477	0.4028	0.2063	1101
7	RSS length Beech 450x100x32	01/06/17001	450	27	Beech	524	0.2719	0.0002	1731
8	RSS length Beech 800x100x32	01/06/17001	800	27	Beech	24	0.0042	0.0022	1101
9	RSS length Beech 100x32	01/06/17001	100	27	Beech	226	0.0001	0.0001	2000
10	RSS length Beech 50x32	01/06/17001	50	27	Beech	14	0.0001	0.0001	2000
11	RSS length Beech 1850x100x32	01/06/17001	1850	27	Beech	477	0.4028	0.2063	1101
12	RSS length Beech 450x100x32	01/06/17001	450	27	Beech	524	0.2719	0.0002	1731
13	RSS length Beech 800x100x32	01/06/17001	800	27	Beech	24	0.0042	0.0022	1101
14	RSS length Beech 100x32	01/06/17001	100	27	Beech	226	0.0001	0.0001	2000
15	RSS length Beech 50x32	01/06/17001	50	27	Beech	14	0.0001	0.0001	2000
16	RSS length Beech 1850x100x32	01/06/17001	1850	27	Beech	477	0.4028	0.2063	1101
17	RSS length Beech 450x100x32	01/06/17001	450	27	Beech	524	0.2719	0.0002	1731
18	RSS length Beech 800x100x32	01/06/17001	800	27	Beech	24	0.0042	0.0022	1101
19	RSS length Beech 100x32	01/06/17001	100	27	Beech	226	0.0001	0.0001	2000
20	RSS length Beech 50x32	01/06/17001	50	27	Beech	14	0.0001	0.0001	2000
21	RSS length Beech 1850x100x32	01/06/17001	1850	27	Beech	477	0.4028	0.2063	1101

Act processing

Fig. 6. Accounting of four-sided machine actions

This document allows you to bring data about size and number of lamellas before and after machine processing. The account of these units is very important, since the passage of the described operations occurs most technological material loss after roughing. Both documents contain field "difference", which has information about the material loss in m³ at each position. This specification allows providing clear operational supervision of the units, identifying and eliminating variations in the equipment or workers. Incorrect settings of machines or failures of the results occur significant excess of process loss that causes the increase of the finished product cost.

The norms of technological losses of raw materials are established for the data processing sections. The norm for accretion line is up to 10% by volume of rough-sawn stocks in overhauls and for four-sided machine - up to 20%. Monitoring of compliance with these rules can be carried out either immediately, right when entering data of nodes to systems, or aggregated over time using appropriate information reporting system (Fig. 7).

1	Порода	Дата	ИД документа	ЧМЗ	Об'єм ЧМЗ	Ламель	К-ть ламелей	Об'єм ламелей	Об'єм тех. втрат	% втрат
2	Всього				64,28			58,46	5,87	9,13%
3	Бук	01.06.2017	11006	ЧМЗ Бук 47x25	0,54	Ламель 3-х сторонний Бук 2070x47x25	189	0,4596	0,0804	
4	Бук	01.06.2017	11006	ЧМЗ Бук 47x25	0,37	Ламель 3-х сторонний Бук 2070x47x25	127	0,3126	0,1504	
5	Бук	01.06.2017	11006	ЧМЗ Бук 50x27	0,37	Ламель 3-х сторонний Бук 1900x50x27	127	0,3258	0,0442	
6	Бук	01.06.2017	11006	ЧМЗ Бук 50x27	0,68	Ламель 3-х сторонний Бук 1900x50x27	232	0,5951	0,0849	
7	Бук	02.06.2017	11029	ЧМЗ Бук 50x27	1,00	Ламель 3-х сторонний Бук 2000x50x27	294	0,8335	0,1665	
8	Бук	02.06.2017	11029	ЧМЗ Бук 47x26	0,38	Ламель 3-х сторонний Бук 1900x47x26	176	0,3226	0,0574	
9	Бук	02.06.2017	11029	ЧМЗ Бук 50x27	0,77	Ламель 3-х сторонний Бук 1900x50x27	344	0,8960	0,0734	
10	Бук	02.06.2017	11029	ЧМЗ Бук 50x27	0,28	Ламель 3-х сторонний Бук 1900x50x27	99	0,2539	0,0261	
11	Бук	02.06.2017	11029	ЧМЗ Бук 48x22	0,29	Ламель 3-х сторонний Бук 1370x48x22	190	0,2749	0,0151	
12	Бук	03.06.2017	11030	ЧМЗ Бук 47x26	0,15	Ламель 3-х сторонний Бук 1900x47x26	40	0,1191	0,0309	
13	Бук	03.06.2017	11030	ЧМЗ Бук 48x22	0,02	Ламель 3-х сторонний Бук 1370x48x22	40	0,0518	-0,0318	
14	Бук	04.06.2017	11061	ЧМЗ Бук 40x20	0,12	Ламель 3-х сторонний Бук 1700x40x20	112	0,1228	-0,0028	
15	Бук	07.06.2017	11121	ЧМЗ Бук 52x25	0,61	Ламель 3-х сторонний Бук 2070x52x25	175	0,4709	0,1791	
16	Бук	07.06.2017	11122	ЧМЗ Бук 57x24	0,37	Ламель 3-х сторонний Бук 2070x57x24	117	0,3111	0,0187	
17	Бук	07.06.2017	11122	ЧМЗ Бук 47x25	0,29	Ламель 3-х сторонний Бук 2070x47x25	94	0,2286	0,0614	

Fig. 7. Analysis of technological losses in lamella accretion

The system allows you to export reports to MS Excel for more detailed analysis and graphical display of results. Consolidated total analysis provides a more objective result, since the features of the process cause some uncertainty analysis for each position.

1	Порода	Дата	Ламель до обработки	Об'єм до обраб.	К-ть до обраб.	Ламель после обработки	К-ть после обраб.	Об'єм после обраб.	Об'єм тех. втрат	% втрат
2	Всього			34,799				40,023	1,6486	35,90%
3	Бук	03.06.2017	Ламель 3-х сторонний Бук 2110x47x25	0,0035	345	Ламель 3-х сторонний Бук 2110x47x25	345	0,7615	0,1322	
4	Бук	03.06.2017	Ламель 3-х сторонний Бук 1000x50x50	0,0030	230	Ламель 3-х сторонний Бук 1000x50x50	226	0,4625	0,1179	
5	Бук	03.06.2017	Ламель 3-х сторонний Бук 1900x50x50	0,0030	213	Ламель 3-х сторонний Бук 1900x50x50	212	0,5221	0,1719	
6	Бук	03.06.2017	Ламель 3-х сторонний Бук 800x45x30	0,0011	116	Ламель 3-х сторонний Бук 800x45x30	114	0,2397	0,0789	
7	Бук	03.06.2017	Ламель 3-х сторонний Бук 800x45x30	0,0011	344	Ламель 3-х сторонний Бук 800x45x30	344	0,5291	0,0880	
8	Бук	04.06.2017	Ламель 3-х сторонний Бук 1870x50x25	0,0038	183	Ламель 3-х сторонний Бук 1870x50x25	181	0,3481	0,0489	
9	Бук	04.06.2017	Ламель 3-х сторонний Бук 1870x50x25	0,0027	118	Ламель 3-х сторонний Бук 1870x50x25	105	0,2518	0,0489	
10	Бук	04.06.2017	Ламель 3-х сторонний Бук 1870x50x25	0,0036	110	Ламель 3-х сторонний Бук 1870x50x25	101	0,224	0,0388	
11	Бук	04.06.2017	Ламель 3-х сторонний Бук 1870x50x25	0,0047	59	Ламель 3-х сторонний Бук 1870x50x25	51	0,2133	0,0421	
12	Бук	04.06.2017	Ламель 3-х сторонний Бук 1900x50x27	0,0031	81	Ламель 3-х сторонний Бук 1900x50x27	81	0,1921	0,0572	
13	Бук	04.06.2017	Ламель 3-х сторонний Бук 1900x50x27	0,0036	114	Ламель 3-х сторонний Бук 1900x50x27	114	0,3481	0,1190	
14	Бук	04.06.2017	Ламель 3-х сторонний Бук 1900x50x27	0,0015	272	Ламель 3-х сторонний Бук 1900x50x27	272	0,5299	0,1414	
15	Бук	04.06.2017	Ламель 3-х сторонний Бук 1900x50x27	0,0023	71	Ламель 3-х сторонний Бук 1900x50x27	71	0,1248	0,0381	
16	Бук	05.06.2017	Ламель 3-х сторонний Бук 1500x45x28	0,0019	489	Ламель 3-х сторонний Бук 1500x45x28	481	0,7334	0,2088	
17	Бук	05.06.2017	Ламель 3-х сторонний Бук 1700x50x24	0,0015	105	Ламель 3-х сторонний Бук 1700x50x24	105	0,2614	0,0523	
18	Бук	05.06.2017	Ламель 3-х сторонний Бук 1700x50x24	0,0015	296	Ламель 3-х сторонний Бук 1700x50x24	296	0,3099	0,0713	
19	Бук	05.06.2017	Ламель 3-х сторонний Бук 1420x50x22	0,0028	39	Ламель 3-х сторонний Бук 1420x50x22	36	0,1429	0,0389	
20	Бук	05.06.2017	Ламель 3-х сторонний Бук 1420x50x22	0,0027	36	Ламель 3-х сторонний Бук 1420x50x22	36	0,0787	0,0171	
21	Бук	05.06.2017	Ламель 3-х сторонний Бук 1420x50x22	0,0027	15	Ламель 3-х сторонний Бук 1420x50x22	15	0,0237	0,0020	

Fig. 8. Analysis of technology losses in four-sided machine

A similar analysis can be performed on the action of four-sided machine (Fig. 8).

Derived final assemblies have fair size and can be used for manufacturing furniture panels.

Manufacturing furniture panels is a starting point of production of the finished product. The rough piece must pass a certain number of manufacturing operations to get finish product.

IV. CONCLUSION

Companies of different profiles, regardless of the size of the business, switch to automated computer systems that help to conduct business, monitor and plan it. Efficiency from this noticeably wins, especially in terms of saving time and money. The basis of automaton in commercial organizations is ERP systems.

ERP systems are implemented with the purpose of uniting all the sectors of the company and all necessary functions in one management system which is to meet the requirements of all these sectors. The development of such a system is not an easy task.

Implementing of ERP systems by Ukrainian enterprises has special value as the tasks of the economic growth, increasing of production quality and competitiveness, becoming a member of the world market are most topical. But there are significant disadvantages of ERP implementation by Ukrainian SMEs including its high cost that in special issue in crisis period.

We have described automation of manufacturing enterprises as it is a complex multistage process and the management information system of suchlike enterprise should include a number of modules majoring in certain areas.

We have provided alternative approach of above described automation the implementation of so-called scalable information systems-designers. Good examples of such systems are Accent 2 and 7.4. These systems are developed by Ukrainian IT-companies and enable complex automation of enterprises of any kind of activity. A typical set of functional requirements provides management and financial accounting, but open source framework allows coding modules for complex automation. Implementation of A2 and Accent systems is achievable in stages, progressively covering all areas of a company. In addition, implementation of such systems at the enterprise of wood processing industry may decrease its pollutions and have good influence on ecology in the region.

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