

ANALYSIS OF SUITABILITY OF STANDARD ERP SOFTWARE PRODUCTS FOR PROJECT-DRIVEN MANUFACTURING

The article deals with analysis of the current ability of the ERP software products and level of their preparation for project management functionality. There are 31 ERP systems analyzed from the 12 aspects in order to get overview about suitability of the current ERP products for project-driven manufacturing. The data about ERP systems were collected via questionnaire in January 2003 from 31 ERP suppliers.

1. INTRODUCTION

The turbulent and permanently changing business environment has the influence on the way how the firms have to manage their business. In case of manufacturing companies that is the way how the manufacturing processes have to be organized and managed.

The traditional production management is based on the material and capacity planning, scheduling integrated with finance and controlling. The most popular methods are MRP II (Manufacturing Resource Planning), JIT (Just in Time) and methods based on the TOC (Theory of Constraints) principles applied recently. These methods put emphasis on the optimal inventory, batch size or capacity utilization of company's resources. The customer order represents the basic element.

The development and flexibility of customer demands tend to the higher variety of products and to lower number of pieces in customer order. Many aspects of management in manufacturing is starting to have the aspects of the traditional projects like. The typical projects in manufacturing companies are:

- development of a new product
- project of a new production system
- asset management
- implementation of ISO norms
- implementation of IS/IT.

The customer order is another important process that has begun to be understood as a project in companies. The typical tasks like delivering customer orders (in many times the customer is internal within a company) on time and in budget, maintaining real-time project visibility; managing changes and monitoring costs and revenues are important part of manufacturing management.

The experience from traditional project confirm that success in project-driven manufacturing depends on many different aspects like:

- production technology
- processes organization

- company culture based on project teams and of course on

- information. Information has to be available to each part in a company in proper quality. It gives you information about project status and costs and you can get early warnings about potential problems in a project.

ICT are therefore key attribute of project-driven manufacturing. The modern ICT also means that the communication is based on the mobile and handheld devices means where you can get access to project information anytime and from anywhere.

There is more and more attributes that show the movement and the big potential of the project driven manufacturing. Potential representatives are not only big companies but there are even many medium and small companies that can get benefit from this modern and not traditional approach.

1.1.1. Traditional methods are applied in ERP packages

The information and communication technology plays the key role in all decision support systems in both traditional and project-driven manufacturing. The ability of information is based on the suitable information system – suitable software packages. The ERP solutions are widely applied today within companies. They always reflect the implemented method that is the basis for algorithm. The graph shows the percentage of traditional above mentioned methods:

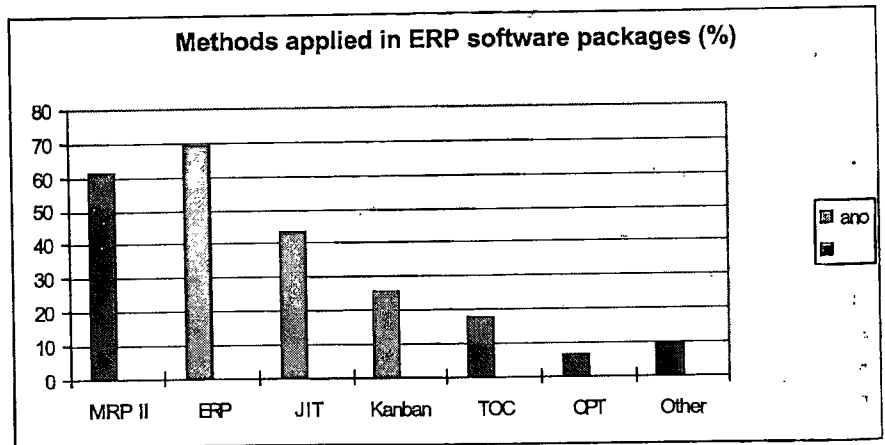


Fig.1 Methods applied in ERP software packages

1.1.2. Special SW solutions for project management

On the other hand there are special software packages that are specialized on the project management. The Microsoft MS Project is well known. The Primavera is the next suitable software.

These special project software solutions allow to project managers to control project structures, schedules, costs, and resources. This includes many activities like network

planning techniques and aggregative tools that support cross-project cost, revenue, margin, schedule, and resource management.

They help project manager in monitoring the project progress using graphs, tables and different kinds of the reports. They are widely used for different types of projects like:

- small and large project
- single and multi project environment
- centralized and decentralized project within real-time

The ability to integrate results with others needed software packages like office information systems family and like ERP packages is also very important

Software packages specially oriented on the project management support the help to handle with task from engineering, budgeting, planning, scheduling and procurement for production, site execution, billing and progress tracking.

1.1.3 Analysis of the ERP market

The main idea leading to this analysis was the question if there is project management functionality in the traditional ERP application software. This analysis was undertaken with cooperation of the Czech Society of Systems Integration and publisher of IT journals the IDG Czech Republic.

The analysis was based on the questionnaires sent to the suppliers of the ERP products at the beginning of January 2003. This group consists from 65 suppliers and their products offered on the Czech market. There are 35 respondents who sent back information and that make the basis of this research. The foreign and the domestic products are among them. Products of the following firms were analyzed:

Name of product	supplier	place of origin	on market from	Global number of installations	web pages
Baan	Baan	Holland			www.baan.com
J.D.Edwards	J.D.Edwards & company	USA	1997	6 700	www.jdedwards.com
mySAP.com	SAP AG	Germany			www.sap.com
Oracle E/Business Suite	Oracle Corporation	USA	1987	7 500	www.oracle.com
BPCS	SSA Global Technologies	USA	1981	>10 000	
EFORCE	Atos Origin	France/Netherlands	1995		
Automotive IFS	IFS AB	Sweden	1983	3100	www2.ifsworld.com
Aplikace i/2	Polynom Software AG	Switzerland	1991	90	www.softwareag.com
Microsoft Business Solution – Navision	Microsoft Business Solutions	Denmark	1997	35 000	www.navision.com
Microsoft Business Solution – Axapta	Microsoft Business Solutions	Denmark	1998	6 000	www.microsoft.com
Movex	Intentia AB	Sweden	1985		www.intentia.com
SunSystems	Systems Union	United Kingdom	1982	18 000	www.sunsystems.com
ABRA G3	Aktis	Czech Republic	2000	130	www.abra.cz
ALTEC	Altec	Czech Republic	1991	64	www.altec.cz
Aplikace Bily motyl	BM Servis	Czech Republic	1998	4	www.bm.cz
Diamac	Benefit& Diatryma	Czech Republic	1993	42	
EPASS	EPASS	Czech Republic	1994	18	www.epass.cz
ESO9	SW PRO	Czech Republic	1998	97	www.swpro.cz
FACTORZ	Logis	Czech Republic	1992	17	www.logis.cz
ES	Merlin	Czech Republic	1994	211	www.merlin.cz
FEIS	Merlin	Czech Republic	1994	211	www.merlin.cz
IDEA	IDEA	Czech Republic	1992	21	www.idea.cz
INFORIS	Inforis	Czech Republic	1990	380	www.inforis.cz
Magic	Infos 2001	Czech Republic	1997	13	www.infos2001.cz
INFOS	Infos 2001	Czech Republic	1997	13	www.infos2001.cz
LCS Noris	LCS International	Czech Republic	1996	120	www.lcs.cz
NOTIA	Notia IS	Czech Republic	1995	45	www.notia.cz
System II	Notia IS	Czech Republic	1995	45	www.notia.cz
OR-SYSTEM	OR-CZ	Czech Republic	1990	165	www.or.cz
Orsoft	ORTEX	Czech Republic	1991	667	www.ortex.cz
QI	Melzer	Czech Republic	2000	40	www.melzer.cz
RIS2000	Saul IS	Czech Republic	1997	110	www.saul-is.cz
Twist	Saul IS	Czech Republic	1997	110	www.saul-is.cz
Inspire	Beep	Czech Republic	2000	24	www.beep.cz
WAM S/3	Mikros	Czech Republic	1995	53	www.mikros.cz

Table 2 – The analyzed ERP products

All analyzed data are presented in the transparent aggregate form in table 2. For better understanding of receiving data the following text describe all twelve analyzed areas:

a) Resource management

Each software package in this area has to support the management of resource management. It means not only in the standard way how the MRP II algorithm does but with respect of multi-project environment with tendency to leveling of the resources. It defines project-specific resources, such as project materials or equipment for budgeting, costing, planning and scheduling purposes. These projects can be either limited within a single project or shared by multi projects.

Results of analysis: From the 31 packages 17 ERP products full support this functionality.

b) Finance management

This functionality is crucial for project management. It should cover on the one hand bottom-up budgeting functionality, based on the assignment of resources to project elements and activities (resources include material, people, equipment and subcontracting). On the other hand it is top-down budgeting functionality, based on the definition of top-level budgets, management reserves and allocation of distributed budgets to lower levels of the project breakdown structure. Both top-down and bottom-up budgets can be compared easily to ensure a good match between resource allocation and budget allocation. From this point of view is the current ERP market prepared in the best way.

Results of analysis: From the 31 packages 19 ERP products full support this functionality and 1 product partly.

c) controlling of projects

Definitions of activities, milestones and execution plan for the project are the basis for the controlling task that helps to identify the differences between plan and reality in time. It can be the completion of manufactured project assemblies or subassemblies for example. It supports to coordinate the system properly to follow origin plan.

Results of analysis: From the 31 packages 15 ERP products full support this functionality and 3 products partly.

d) controlling of due dates

Due to import role of time in project management there is one special area of controlling oriented on the time and due dates.

Results of analysis: From the 31 packages 17 ERP products full support this functionality and 2 products partly.

e) optimization of project

Monitoring of the performance (cost, time, quality) of each project is very important and is the standard function set of project management software packages. It helps for better decision making support role of manager. The next step is the ability of optimization procedures integrated in the software.

Results of analysis: From the 31 packages 8 ERP products full support this functionality and 5 products partly.

f) simulation of project

In case there is no optimized algorithm available there is another possibility how to improve decision of factory plan or strategy. Execution plan for the project with alternative scenarios can be used to simulate alternative execution strategies. It can be analysis of the time-phased financial performance of active or simulated projects. Results of the simulation can be in form of tables or graphs.

Results of analysis: From the 31 packages 8 ERP products full support this functionality and 3 products partly.

g) change management

More version of project plan can be created during the planning and also during the execution stage. The changes can be generated externally by customer, suppliers or legislative rules or internally by designers. The opportunity of their archives and comparison is crucial.

Results of analysis: From the 31 packages 13 ERP products full support this functionality and 4 products partly.

h) quality management

Quality management has become complex and multifaceted. Proactive quality management can help to improve equipment and plant performance. This solution is ideal for any industry in which maintenance costs and equipment reliability directly affect profitability.

All employees should have an access to most current quality manuals at any time.

Results of analysis: From the 31 packages 8 ERP products full support this functionality and 7 products partly.

i) document management

Collaborative environment in the project team need good information to be able to manage, track, and control all product and project information over the complete customer order, product and asset life cycle. Important is ability quickly and easily communicate the customer order, product and asset information. So you maintain a close link among engineering, production, and maintenance operations.

Results of analysis: From the 31 packages 14 ERP products full support this functionality and 3 products partly.

j) workflow

IT naturally offer information support for all project participant. The second role of workflow is to control status of project progress to identify possible delay or bottlenecks.

Results of analysis: From the 31 packages 12 ERP products full support this functionality and 4 products partly.

Name of product	Resource management	Financial management	Controlling	Controlling of due dates	Optimization of project	Simulation of project	Change management	Quality management	Document management	Workflow	Version management	SW integration
iBaan												
J.D.Edwards	*	*	*	*			*	*	*	*	*	*
mySAP.com	*	*	*	*	*	*	*	*	*	*	*	*
Oracle E/Business Suite	*	*	*	*	*	*	*	*	*	*	*	*

BPCS												
eFORCE Automotive												
IFS Aplikace	*	*	o	*	*	*	*	o	*	*	*	*
I/2	*	*	*	*	o			*	*	*		*
Microsoft Business Solution - Navision	*	*	*	o	o	*	o	o		o		*
Microsoft Business Solution - Axapta	*	*	*	o	o	*	o	o	*	o	*	*
Movex	*	*	*	*		*	*	o	o	*	*	*

SunSystems												
ABRA G3		*		*			*		*	o	*	
ALTEC Aplikace												
Bily motyl	*	*	*	*	*	*	*	*	*	*	*	*
Diamat												
EPASS	*	*	*	*	*	*	*	*	*	*	*	*
ESO9	*	*	*	*	o	o	*	o	*	*	*	*
FACTORY ES	*	*	o	*	*	*	*	*	*	*	*	*
FEIS												
IDEA												
INFORIS Magic												
INFOS	*	*	*	*	*	*	*	*	*	*	*	*
LCS Noris	*	*	*	*	*	*	*	*	*	*	*	*
NOTIA System II	*	*	o	*					*	*	*	*
OR-SYSTEM	*	*	*	*					*	*	*	*
Orsoft									*	o		
QI	*	*	*	*	o	o	o	o	o	o	o	o
RIS2000												
Twist Inspire		o										
WAM S/3	*	*	*				o	*		*		

* - yes

o - partly yes

Table 3 Project management functionality in ERP products

k) version management

This functionality feature helps to keep order among all valid version of project documentation (plan, budget, etc.)

Results of analysis: From the 31 packages 13 ERP products full support this functionality and 2 products partly.

l) integration with other SW packages

Managers and project team members need integrated data. It offers them the ability to complete time phase budget analysis, determine order dates for financial planning and time phase revenues for installment invoicing – providing the user with more detailed information and saving time of operations. It helps them to write reports with tables and graphs.

The integration with standard software like Microsoft Project and office IS can be very useful feature.

Results of analysis: From the 31 packages 13 ERP products full support this functionality and 1 product partly.

1.1.3. Generally conclusion

The undertaken analysis of the ERP software products in the Czech Republic and their suitability for project managed manufacturing confirms relatively good preparation of this software category for project-driven manufacturing. It has significant meaning because of integrated database and functionality included in ERP. This category is the most applied software solution in manufacturing company with the tendency to penetrate the sector of small and medium enterprise as well.

The results of analysis characterize relatively same preparation of the foreign imported ERP products in comparison with domestic ERP products.

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