

PROBLEM ANALYSIS OF PROJECT MANAGEMENT INFORMATION SYSTEM CONSTRUCTION AT IRON AND STEEL ENTERPRISES OF UKRAINE

АНАЛІЗ ПРОБЛЕМИ ПОСТРОЄННЯ ІНФОРМАЦІОННОЇ СИСТЕМИ УПРАВЛІННЯ ПРОЕКТАМИ НА МЕТАЛУРГІЧЕСКИХ ПРЄДПРІЯТТЯХ УКРАЇНИ

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Abstract: *The problem of construction of project management information system (PMIS) is analyzed. The factors under investigation define the problem: the presence of ERP-systems (ERP) in metallurgy industry, the ERP inefficiency for the PMIS construction due to the drawbacks of the functional and historical divergences between the kind of management activity and project management software (PM software); the necessity for the PM software application for the PMIS construction and integration of the PMIS and ERP into unified informational system (IS) for management of all kinds of enterprise activities. To solve this problem information is systematized; variants of integration of PM software with ERP applied in metallurgy industry are classified and proposed.*

KEYWORDS: PROJECT MANAGEMENT INFORMATION SYSTEM, PROJECT MANAGEMENT SOFTWARE, ERP, INTEGRATION

1. Prerequisites and means for solving the problem

Project management information system (PMIS) is one of the system components of the enterprise project management (PM), the implementation of which is designed to the increase of effectiveness of the PM processes and controllability of execution of the development strategy in the form of portfolios, programs and projects (PPP).

The problems of effective construction of PMIS at the enterprises include the following components:

- ERP is implemented and operated in metallurgy industry;
- ERP inefficiency for the PMIS construction due to the drawbacks of the functional of their module «PM» ;
- the necessity of software program application in PM for the PMIS construction due to the availability of the most complete functional and its conformance to PM international standards;
- historically, project management software (PM software) and ERP software were developed independently and constitute independent software programs. Provided that, in practice, PM software was applied for the PMIS construction, and «PM» module of ERP was developed later than its basic functional;
- the key difference between PMIS and ERP is a kind of management activity: PMIS is designed for investment management, and ERP – for production and commercial (operating and financing) activities of the enterprise;
- the interconnection of the PMIS managerial information, ERP by their joint exploitation in common enterprise resource planning: the ERP data on resources and finance are needed for project planning in PMIS, the PMIS data are necessary for the cost-benefit calculation with respect to the projects in ERP;
- the necessity for software implementation of data exchange and integration of PMIS and ERP into unified IS for management of all kinds of enterprise activities;
- the long-term absence of software, enabling integration of PMIS and ERP, performance of system integration on the basis of their software «stitching» by virtue of the fields linking the data. The occurrence of the abovementioned software was subject to the market readiness and the enterprises' needs.

Information on solving of the given problem is presented separately in current literature and only certain aspects are introduced. For this reason the problem analysis of the project information management system construction at iron and steel enterprises of Ukraine and the search for its solution is timely and relevant.

Defining the reporting objectives: to carry out the comparative analysis of ERP, PM software; perform the analysis of ERP applied

in metallurgy industry; show major functional disadvantages in the «PM» module of ERP, explain the inefficiency of ERP application for the PMIS construction; systematize information, classify and propose available variants of software of PM integration with ERP of iron and steel enterprises for the PMIS construction.

2. Result and discussion

The managerial standards, focused on the implementation of the common strategy of enterprise development (among them: operating, financing and investment) through realization, optimization, implementation and increase of management efficiency on the basis of respective business processes [1, 2] are taken as the basis of the ERP, PMIS.

The general characterization of systems under examination is the establishment of unified information environment at the enterprise with the purpose of the business processes automation for teamwork support and management of specified kind of activity with the aim of its efficiency increase.

The essential systems' difference is a kind of management activity: ERP (Enterprise Resource Planning) – control the production and commercial operations (PCO), associated with manufacturing [1]; PSIM (Enterprise Project Portfolio Management (EPPM), Enterprise Project Management (EPM) or Project Portfolio Management (PPM)) – manage the investment activity (IA) in the form of PPP [3].

Information on ERP implementation at iron and steel enterprises of Ukraine is shown at Table 1. Data presented in Table 1 demonstrate that ERP-system of German company SAP obtains a wide circulation. Other ERP are also applied herein.

The construction of PPM on the basis of the «PM» module in ERP is inefficient via limited capacities of the following PM functions: project portfolio management; detailed project planning; team work; risk management; change management; report preparation [4, 5, 6, 7].

That is why PPM is based on the PM software.

The implementation of PPM on the basis of the PM software at enterprises, listed in the Table 1, is absent at the moment. For detailed planning and project management the software is applied at the level of some organization units without integration with ERP for the execution of individual projects.

Microsoft EPM 2003, implemented at PJSC «Khartsyzsk Pipe Plant», is the example of PPM in Ukrainian metal industry [8]. The introduction has a 3-tier client-server architecture, which is shown at Figure 1 [9].

The basis of the architecture is presented by the following PM software:

Table 1. Information on ERP implementation at iron and steel enterprises of Ukraine

| Ser. No. | Iron and steel enterprise | Information on ERP implementations | Electronic resource |
|----------|--|--|---|
| 1 | PJSC «Azovstal Iron & Steel Works» | SAP | http://www.kommersant.ru/doc/625372 |
| 2 | PJSC «Ilyich Iron & Steel Works» | Preparing for SAP introduction | http://www.komtender.ru/tender/385605 |
| 3 | PJSC «Zaporizhzhya Iron & Steel Works «Zaporizhstal»» | Preparing for Oracle E-Business Suite introduction | it.sitronics.com/about/projects/view.php?ID=549 |
| 4 | PJSC «ArcelorMittal Kryvyi Rih» | SAP | http://ukraine.arcelormittal.com/newspaper/pdf/№45.pdf |
| 5 | PJSC «Dniprovsky Integrated Iron & Steel Works named after F.E. Dzerzhinsky» | It was decided to implement SAP in 2015 | http://www.dmkd.dp.ua/2481 |
| 6 | PJSC «Alchevsk Iron & Steel Works» | Introduced ERP of in-house design | http://ko.com.ua/best_cio_2009_proizvodstvo_bole_500_kompyuterov_46821 |
| 7 | OJSC «Makiivka Integrated Iron & Steel Works named after S.M. Kirov» | IT-Enterprise | http://mescenter.ru/mesaconf/presentations/ mesa2010_MikhailovIntro.pdf |
| 8 | LLC «Metallurgical plant «Interpipe Steel»» | | http://www.it.ua/products.php?cat=61 |
| 9 | PJSC «Yenakiieve Iron and Steel Works» | | |
| 10 | PJSC «Donetsk metallurgical plant» | SAP | http://www.pcweek.ua/themes/detail.php?ID=119484 |
| 11 | CJSC «Mini Steel Mill ISTIL (Ukraine)» | SAP | |
| 12 | PJSC «Electrometallurgical Works "Dniprospeksstal" named after A.M. Kuzmin» | SAP | http://www.pcweek.ua/themes/detail.php?ID=121105 |



Fig. 1. The architecture of Microsoft EPM 2003, implemented at PJSC «Khartsyzsk Pipe Plant»

1. Client Tier, Web Client Tier: Microsoft Project Professional 2003 (function: detailed planning and project management); Project Web Access (function: access to project data).

2. Application Tier: Microsoft Project Server 2003 (function: enterprise project portfolio management); Windows Share Point Services 2003 (function: performance of collaborative work during the project).

3. Database Tier: SQL Server 2000 (function: data analysis, creating reports, holding projects data).

Besides Microsoft EPM 2003, ERP Oracle E-Business Suite is also introduced at the plant. In this case the information on performance of work on integration of two systems is absent [8].

All the above systems (ERP, PPM) of the iron and steel enterprises in Ukraine are implemented on the ground of the traditional model «Software-as-a-Product» (SaaS), which provides the purchase of licensed software with its installation on the technical basis of the enterprise.

For the purposes of the joint operation of two systems at the enterprises their integration into unified information system for management of all kinds of enterprise activities is required.

To solve the problem of PPM construction in metallurgy industry information was systematized, Table 2 shows the Classification and existing variants of integration of PPM with ERP of iron and steel enterprises are provided.

Integrated software is developed for ERP of SAP, Oracle and Microsoft. In this case the ERP integration is mostly designed with PPM market leaders: Oracle Primavera EPPM; Microsoft EPM.

The main variants of integration are the following: the application of canned integrated software from the developers of ERP (PPM); the application of canned integrated software from the development partners of ERP (PPM); the application of integrated software for the software «stitching» of ERP and PPM from other integrators.

The distinctive features of ERP and PPM integration are the need to define: the master system wherein the project initiation takes place; project activities performed in each of the systems;

data directions (in one or two directions); fields of linking information (data) on projects; the way of data synchronization (manual, automatic) [10, 11].

It is indicated in electronic resources that both PPM and ERP can serve in a capacity of a master system.

Wherein each system usually has a role: ERP – providing of project information on desired service life, equipment; the role of projects recording and budgeting (financial control); PPM – supporting of project portfolio management according to business strategy, including the following functions: evaluation and selection of projects for implementation, planning and optimization analysis and evaluation of project progress, teamwork, change management, risk management, execution control and management of the portfolio value management,

reporting on the portfolio and projects, other functions [4, 7, 10-14].

The basic fields of linking information during the systems' integration are the following data: the list of enterprise projects, the work breakdown structure of projects (WBS); project activities; enterprise project members; resources and their cost; resource allocation; time of delivery of equipment and materials, budget; actual data on projects implementation; forecast on terms and value of projects completion.

For instance Figure 2 depicts the fields of linking information, which are accomplished by a canned integrated software Oracle Primavera Gateway from Oracle by its using for the purpose of OraclePrimavera EPPM and ERP SAP integration [15, 16].

Table 2. The classification of available variants of PPM integration with ERP of iron and steel enterprises

| The variant of integration | Integrated software | | | The name of the software that integrates | Electronic resource | |
|---|-------------------------------------|---|--|---|---|---|
| | developer | name | application | | | |
| 1. Canned integrated software from the developers of ERP (PPM) | SAP | SAP Enterprise project connection (EPC) | ERP integration with PPM | SAP ERP | Microsoft EPM OraclePrimavera EPPM | http://www.eventureevents.com/download_login/sap-centric-eam_2011/presentations/Monday_Track_4/315-Rex.pdf |
| | | | | Oracle ERP (E-Business Suite, JD Edwards EnterpriseOne) | | |
| | Oracle | Process Integration Pack (PIP) | ERP integration with PPM | SAP ERP | OraclePrimavera EPPM | http://www.oracle.com/us/products/applications/primavera/primavera-gateway-data-sheet-1927706.pdf |
| 2. Canned integrated software from the development partners of ERP (PPM) | trinovis GmbH | Impress for EPM | PPM integration with ERP | SAP ERP | Microsoft EPM OraclePrimavera EPPM | http://hannover.inecos.de/hannoverit/de/profile/UNT-23885 |
| | Pipeline Group, Inc. | Maxavera iPack | PPM integration with ERP | SAP ERP, Oracle ERP | OraclePrimavera EPPM | http://www.gopipeline.com/news/47/83/ |
| | | | | SAP ERP | Microsoft EPM | http://www.maxavera.com/microsoft-project/ |
| | The Project Group | TPG PSLink | PPM integration with ERP | SAP ERP Microsoft ERP (Dynamics AX), Oracle ERP | Microsoft EPM | http://www.theprojectgroup.com/en/ppm-products-produkte/integration-ppm-business-systems.html |
| | Campana & Schott | CS Connect | PPM integration with ERP | SAP ERP Microsoft ERP, Oracle ERP | Microsoft EPM | http://www.campana-schott.com/de/en/cs-connect/ |
| Dassian Inc. | Schedule Integration with SAP (SIS) | Integration of software for detailed planning and project management with ERP | SAP ERP | Microsoft Project Desktop | http://www.dassian.com/products/programManagement/detail.php?Schedule%20Integration%20with%20SAP%20(SIS)-8 | |
| 3. Integrated software for the software «stitching» of ERP and PPM from other integrators | Integrator should be chosen | - | It is developed subject to PM requirements and peculiarities at the enterprise | - | - | - |

In this case the following data directions are specified by Oracle Primavera Gateway:

- only in one direction (from ERP SAP to OraclePrimavera EPPM) the transfer of financial data (budget, value) and data on the projects resources are carried out;

- in two directions (from OraclePrimavera EPPM to ERP SAP or from ERP SAP to OraclePrimavera EPPM) the transfer of other data on projects, showed in Figure 2, is carried out. Thus these data are synchronized, displayed and can be used

simultaneously in two systems. Therefore, the projects initiation can be carried out in any system.

Previously for OraclePrimavera EPPM and ERP SAP integration, as being canned integrated software, Oracle was offered Oracle Primavera Inspire for SAP 8.0, but Oracle Primavera Gateway is more advanced software and in comparison with Oracle Primavera Inspire for SAP 8.0 has a number of advantages, which are listed in [16].

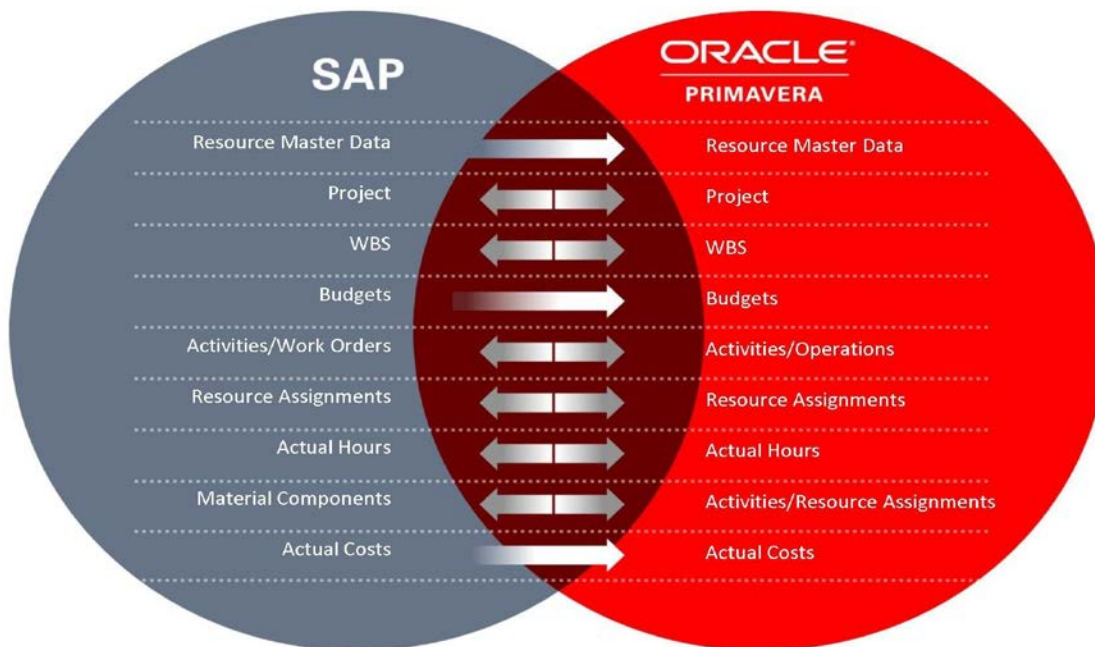


Fig.2. Oracle Primavera Gateway: the fields of linking information for OraclePrimavera EPPM and ERP SAP integration

3. Conclusion

1. The problem of the PMIS construction in metallurgy industry is of complex systemic nature and deals with the necessity of software application and integration of PM with ERP, operating at the enterprises.

2. Historically, PM software was applied for the PMIS construction and IA management. With regard to the above mentioned, ERP was developed independently from the PM software and applied for the PCO management of the enterprise; the «PM» module was developed later for extending its functionality.

3. The PMIS construction on the basis of the «PM» module of ERP is inefficient via limited capacities of the module of the basic PM functions.

4. On the basis of the analysis and information systematization from different sources, the classification of three main variants of integration of PM software with ERP is proposed. Whereby the basic fields of linking information, which are applied in the majority of disclosed in this report variants of integration of PM software with ERP of iron and steel enterprises, are shown.

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