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A DECISION SUPPORT SYSTEM FOR SELECTION AND IMPLEMENTATION OF ERP IN PROJECT DRIVEN ENTERPRISE

Abstract

The paper presents a concept of decision support system dedicated to selection and implementation of enterprise resource planning system for small and medium manufacturing enterprises that makes engineer-to-order production. The support system enables us to improve the selection process of the ERP solution, as well as to evaluate the productivity of the implementation and calculate Total Cost of Ownership. The concept of the support system is based on both a proposed model of the project, driven enterprise and a determined structure of business processes. The model of the enterprise is closely related to the structure of the ERP system. In this paper the most important performance indices of the system are proposed which decide about the implementation success of ERP. Especially, the evaluations of ERP implementation are taken into consideration based on the proposed indices that enable us to determine the productivity of ERP in a company. The illustrative examples are given.

1. INTRODUCTION

1.1 Enterprise Resource Planning Systems

Enterprise resource planning is a software package that integrates departments, functions and coordinates business processes running through functional areas of a company onto a computer system. Every year companies invest a lot of money in the implementation of enterprise resource planning (ERP) systems. AMR research estimates that the total ERP market will grow to $31.4 billion in 2006. According to different researchers (DiS and IDC) the ERP market in Poland will grow from $109 million in 2004 to $140 million in 2006. Implementation of the ERP system in a company is not only expensive but introduces a lot of disturbances that in worst case can lead to paralysis of the entire firm.

The research in the area of the ERP systems is performed in the following streams: analysis of success factors of ERP system implementation, strategy and methodology of ERP system implementation - motivations and expectations, overview of ERP - selection, modeling and development, proposals on how to analyze the value of ERP systems. Hong and Kim [5] define the concept of organizational fit of ERP and examine its impact of ERP implementation on the

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basis of the surveys from 34 organizations. Motwani et al. [13] use a case study methodology grounded in business process change theory, to understand the factors that lead to the success or failure of ERP projects. The results from comparative case study of 4 firms that implemented an ERP system suggest that a cautious, evolutionary, bureaucratic implementation process backed with careful change management, network relationships, and cultural readiness have a positive impact of several ERP implementations. Al Mashari et al. [1] present a taxonomy of the critical success factors in the ERP implementation process that measurement takes place in a balanced perspective, and for the purpose of providing useful information that can enable the decision making process and which can help deliver the corporate objectives and therefore lead the business competitively forward. Mabert et al. [12] on the basis of a series of case studies and an extensive survey analyses an impact of different sizes of companies on ERP implementations across a range of issues. The same team of scientists [11], empirically investigates and identifies key differences in the approaches used by companies that managed their implementations on time and/or on/under-budget versus the ones that did not use data collected through a survey of US manufacturing companies that have implemented ERP systems. Wie and Wang [14] present a comprehensive framework for combining objective data obtained from external professional reports and subjective data obtained from internal interviews with vendors to select a suitable ERP project. A hierarchical attribute structure is proposed to evaluate ERP projects systematically. They use fuzzy set theory to aggregate the linguistic evaluation descriptions and weights. Gulla and Brasethvik [3] propose the model-driven business management approach. The dynamic and adaptable business models is constructed as part of the ERP implementation project and used to access the system and monitor the real business flows.

The decision about implementation of an ERP system is difficult and managers that take the decision into consideration are often based on experiences of other companies (mostly from different branches). The presentations of ERP products prepared for top management are very general and include mostly the spectacular results (analysis, decision factors,) of the implementation. Each producer of ERP makes sure that his system fulfills all client requirements and that the proposed implementation methodology guarantees full success. The independent research organizations that analyze ERP market generally deal with the ERP systems dedicated to middle and great enterprises. The characteristics of ERP dedicated to small or medium companies are residual. There are no tools on the market which enable the support process of selection and implementation of ERP system and that support evaluation of results of the implementation. The software packages for modeling and analysis of business processes (for example ARIS or iGrafix) are useful for reengineering of the business processes for ERP implementation. The tools should be used for analysis as-is and should-be states before and after ERP implementation respectively. To design the final structure of business processes the ERP system has to be chosen and the business processes should be adapted for possibilities of the ERP (sometimes ERP should be adapted for business processes requirements). The functionality of ERP determines the structure of business processes of the company because implementation of different ERP systems can result in other ways of solving the same problems. To evaluate the performance of ERP system implementation the set of indices has to be defined to reflect the most important enterprise characteristics before and after the implementation of ERP. The impact of implementation of ERP in the project-driven enterprise is investigated in the following functional areas of the enterprise:

- Sale and Distribution,
- Research and Design, Construction and Technology
- Purchasing,

- Production,
- Material Management

For each functional area a structure of typical business processes for project-driven enterprise is proposed. The structure of business processes and allocated resources build a meta-model of project-driven enterprise. To improve selection and implementation of ERP, the reference model of the ERP system dedicated to project driven manufacturing should be created. Both models are basis for a decision support system. The proposed decision support system enables us the best fit of the enterprise resource planning system to the enterprise requirements on the basis of proposed adaptation procedure (see the Fig. 1).

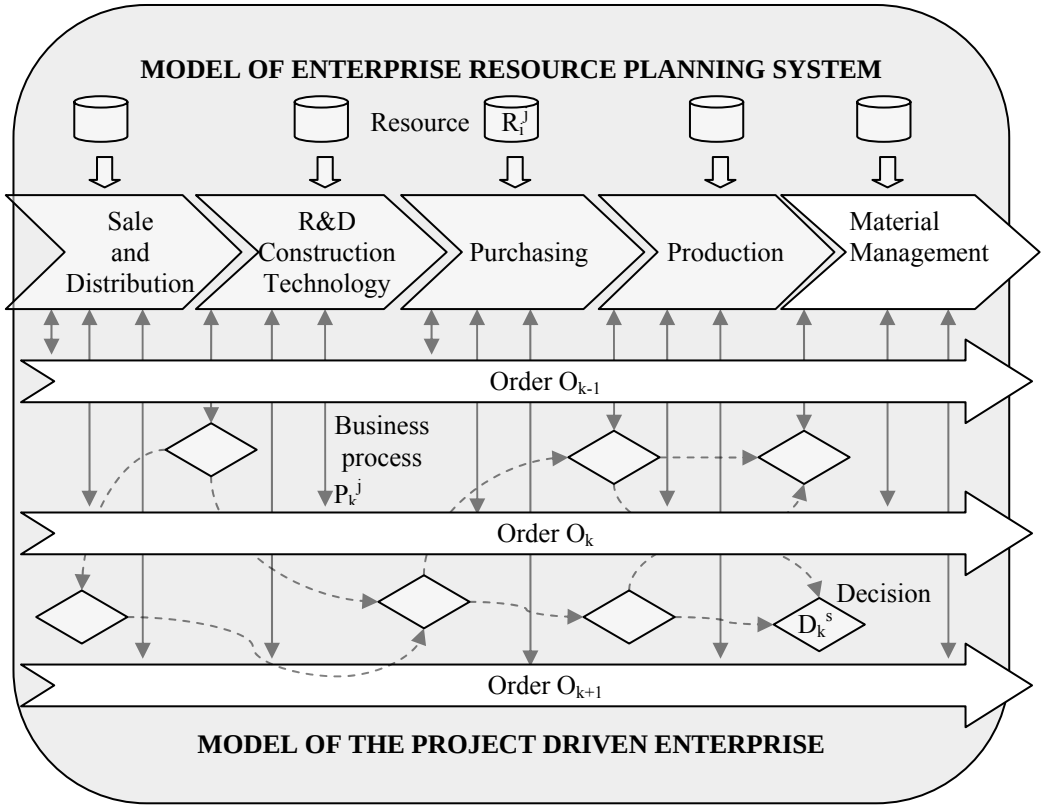

Fig.1. The concept of operation of the decision support system for evaluation of ERP

The set of adaptation procedures is constructed on the basis of selected parameters to achieve business goals of the enterprise that decide to implement of ERP system. In the next chapters the models of enterprise and ERP system will be presented.

2. THE MODEL OF PROJECT DRIVEN ENTERPRISE

2.1 Enterprise modeling

Enterprise Modeling (ELM), is the art of externalizing enterprise knowledge which adds value to the enterprise or needs to be shared. It consists in making models of the structure, behavior and organization of the enterprise [13]. To understand how an enterprise (or part of the enterprise) really works a model of business processes is required. The model is an abstract representation of reality and therefore the modelers have to decide on what and how to model. Enterprise modeling requires both a common modeling language and a methodology. There are some languages for business process modeling. The well-known methods for visual modeling of business processes are Integration Definition Language (IDEF) and Unified Modeling Language (UML). CIMOSA (CIM Open System Architecture) provides guidelines, architecture, and an advanced modeling language for enterprise modeling covering function, information, resource, and organization aspects of the enterprise. CIMOSA work has been the root for two European pre-norms produced by CEN TC 310/WGI: ENV 40003 (Framework for Enterprise Modeling), and ENV 14204 (Constructs for Enterprise Modeling) [3]. Some of the methods are implemented in software tools such as ARIS, FirstSTEP, iGrafx, MS Visio, Rational Rose. The mentioned methods and tools enable to describe graphically the business processes and simulate the flow of business processes. Unfortunately, the quantitative analyze of structure of business processes in view of economical indices of the whole enterprise is not possible.

2.2 Project-driven enterprise

The proposed model of the project driven enterprise is presented as algebraic described structure of resources and business processes. The flow of each business process can be analyzed with regard to productivity, profitability, performance, costs and other performance indices. The model of whole enterprise includes the structure of business processes assigned to the functional areas. There are lot o definitions of business processes in the literature [8], but for this paper the definition formulated by Hammer and Champy [4] is used ‘A business process is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer. A business process has a goal and is affected by events occurring in the external world or in other processes’.

Business process is denoted as Pji (k) where k = 1,2,…, Q determines an order (project) realized by the process, i = 1,2, …, N determines a number of functional areas that include the process and j = 1,2,…,M determines the number of business processes defined in the functional area F_i. Some of business processes can respect more then one order. For example the business process of materials purchasing often is referred to a time period that include a set of orders (projects) and not to a particular project (the notions project and order are used in this paper convertibly). But in the case the business process it can be divided into several parallel virtual business processes (see the Fig. 1). A typical example of a business process referred to a time period is generating of list of materials from Material Requirement Planning procedure. Each business processes performed in the functional areas of an enterprise proceeds, partially, orders O_1, O_2, …,O_Q. For example typical business process $P_j^i(k)$ performed in Sale and Distribution area, concerned with preparation an offer for a customer should perform the following tasks:

- Specification of the customer requirements – outcome of the project
- Calculation of the project – project budget.

- Evaluation of the project labour intensity – project schedule.
- Preparation of the draft contract.

To perform the business processes the following resources are required: salesman, designer, material and labour data, computer and office software. The resources are assigned to a functional area F_i and denoted as $R^i_1, R^i_2,...,R^i_P$ where P represents the maximal number of kind of resources in the functional area. The vector $\mathbf{R^i}$ determine the available quantity of each kind of resource in the functional area F_i. Each business process consumes the resources during a project completion. For example; the salesman consume the working hours. A resource utilization vector $\mathbf{U^{ij}(k)}$ determines the quantity of resources necessary to the flow of $P^i_j(k)$ process and service process vector $\mathbf{H^{ij}(k)}$ determines the time of the resources utilization. For non-renewable resources the elements of the vector $\mathbf{H^{ij}(k)}$ are equal to 1.

An order (project) O_k performed in the project driven enterprise is determined as follows:

1. The time of the project $T_k=(t_k^E - t_k^S)$ where, t_k^S – the term of start, and t_k^E- the term of end of the project. Each order O_k is divided into tasks $s_1^k, s_2^k, ..., s_n^k$ proceeded in functional areas for example: $s_i^k=[P^i_1(k), P^i_2(k), P^i_4(k)]$.
2. The total costs of the project C_k.
3. The income of the project I_k (the contract price).
4. The outcomeof the project that determine quantity and kind of resources required for the project completion. The score is determined by a matrix of resource demand $\boldsymbol{S_k}$.

$$\mathbf{S}_k = \begin{bmatrix} S_1^1 & S_2^1 & ... & S_p^1 \\ S_1^2 & S_2^2 & ... & S_p^2 \\ ... & ... & ... & ... \\ S_1^n & S_2^n & ... & S_p^n \end{bmatrix}$$

If any resource is used by completion of the project O_k then $S^i_j = R^i_j$ otherwise $S^i_j = 0$. The costs of the resource utilization are determined by a discrete function of the $F(R^i_j,t)$.

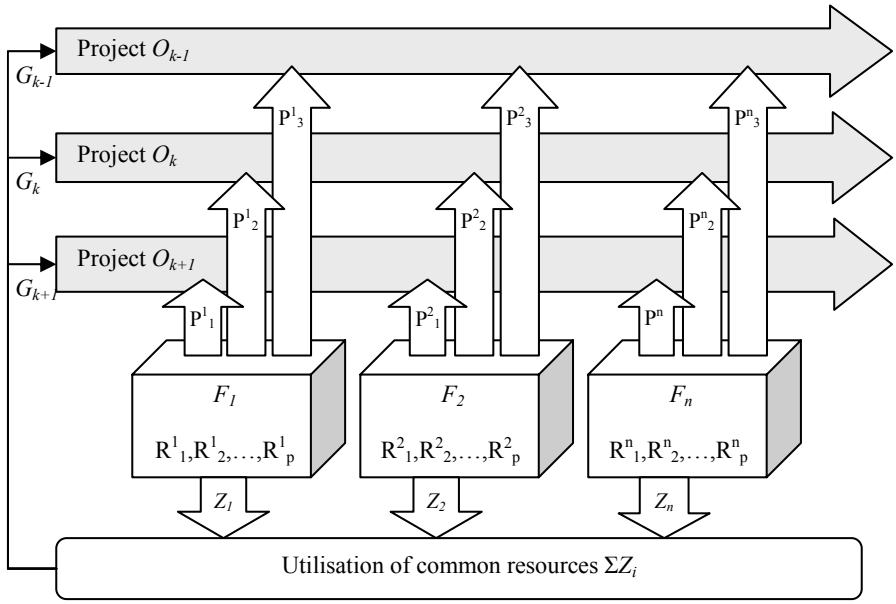

Fig.2. A model of project driven enterprise

In each functional area some resources can be assigned that are used for the whole enterprise requirements $Z_1, Z_2, ...,Z_r$ (for example resources used for marketing, research and development or accounting). The shares of the resources $G_1, G_2, ...,G_N$ should be calculated on the basis of well-known calculation methods such us ABC method - Activity Based Costing. The costs of resource utilization by a business process $P_j^i(k)$ can be calculated as (1):

$$\kappa(P_j^i(k)) = \sum_l U_l^{ij}(k) \cdot H_l^{ij}(k) \cdot F(R_l^j, t) \tag{1}$$

The evaluation of the ERP system for the enterprise requirements the productivity index of the whole enterprise (2) is proposed:

$$P = \frac{\sum_{k=1}^{N} I_k}{\sum_{k=1}^{N}\left[\sum_{j=1}^{p}\sum_{i=1}^{n} S_j^i(k) \cdot F(R_j^i, T_k) + G_k\right]} \tag{2}$$

Another index that should be taken into account is productivity of an order (3):

$$P_k = \frac{I_k}{\sum_{j=1}^{p}\sum_{i=1}^{n} S_j^i(k) \cdot F(R_j^i, T_k) + G_k} \tag{3}$$

The productivity of the implemented ERP system (4) can be derived from the following formula:

$$P_I = \frac{\sum_{k=1}^{N} I_k}{K_I} \tag{4}$$

where:

$K_I = K_I = K_H + K_L + K_S + K_P + K_U$ is the Total Cost of Ownership of the system.

K_H – hardware amortization costs,

K_L – licenses costs,

K_S – training and consulting costs

K_P – IT personal costs,

K_U – update costs and costs of software adaptation,

The total productivity of the functional area F_i can be calculated as follows (5):

$$P_{Fi} = \frac{\sum_{k=1}^{N} V_k^i}{\sum_{j=1}^{p} S_j^i(k) \cdot F(R_j^i, T_k)} \tag{5}$$

where V_k^i determines the value added generated in each functional area F_i of enterprise for the order O_k.. In this paper operating decisions, that are performed in functional areas of the company, are taken into account. The decisions assigned to functional areas are determined by a vector of decision:

$\mathbf{D^i} = [D^i_1, D^i_2, \ldots, D^i_K]$

where K is the dimension of the vector of functional area F_i.

Each decision requires on the input a set of data and on the output a set of business processes that are changed by the decision. Despite of this to the each decision a weight is assigned that determines the importance of the decision. It means that a decision can be defined as (6)

$$D^i_j = (\mathbf{Y}^i_j, \mathbf{X}^i_j, \mathbf{P}^i_j, W^i_j) \quad (6)$$

where $\mathbf{Y}^i_j$ – is a set of data required for decision making, $\mathbf{X}^i_j$ - limitations, $\mathbf{P}^i_j$ is a set of business processes related with the decision making and W^i_j is weight of the decision. Let us consider the functional area of purchasing where the operational decisions about buying of a material by a supplier are made. To make the decision the following data should be available:

- the supplier list – y_{j+1},
- the material list – y_{j+2},
- delivery times of the material offered by the suppliers – y_{j+3},
- costs of the material offered by the suppliers – y_{j+4},
- quality level of the materials offered by each supplier – y_{j+5},
- materials requirements – y_{j+6},
- materials in stock – y_{j+7},
- materials in transit – y_{j+8},
- minimal stock of material – y_{j+9},
- production schedule – y_{j+10},

As a result of the decision the supplier and the delivery date should be determined. The decision affects the business process of a supplier selection that can be performed several times in a day. The proper selection of a supplier results in lower material costs, timely/punctual/on-time material delivery and higher quality of the materials. But to make the proper decision, limitations (selection criteria) for each decision should be determined. For example:

- $y_{j+3} \leq 14$ days,
- $\min(y_{j+4})$,
- $\max(y_{j+5})$,
- $y_{j+7} + y_{j+8} - y_{j+9} \leq 1\,500$ kg.

The weight of a decision determines the consequences of the decision on the activity of the whole enterprise and performance of particular projects. The Fig. 2.2 presents the dependence between data, decisions and business process performed in a functional area F_i.

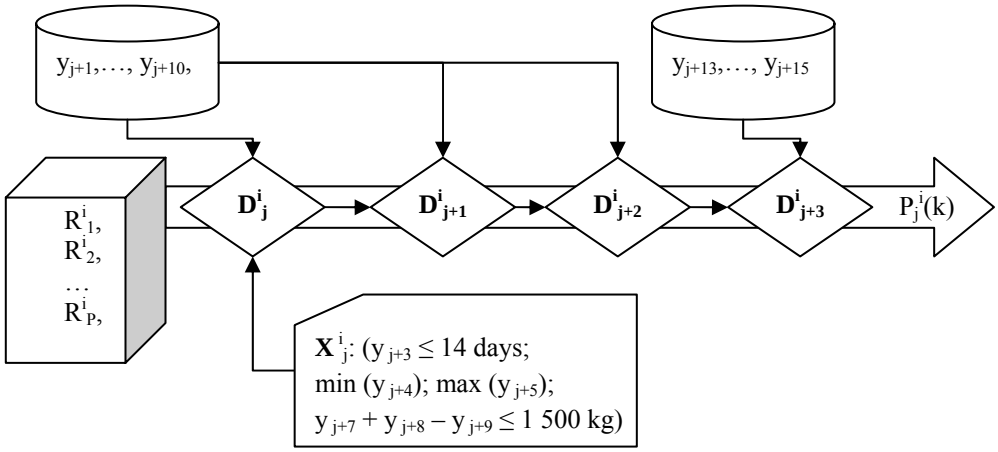

Fig.3. The dependence between data, decision and business process

From the Fig. 2.2 results we can conclude that in order to realize the business process $P^i_j(k)$ the data $y_{j+1},\ldots, y_{j+10}, y_{j+13},\ldots, y_{j+15}$, are required and the decisions $\mathbf{D^i_j}$, $\mathbf{D^i_{j+1}}$,… $\mathbf{D^i_{j+3}}$, should be made. If any business process should be repeated many times to complete a project O_k the repetition factor $f^i_j(k)$ of the process has to be determined. The sum of the weight of the decision multiplied by the repetition factor enables us to evaluate the importance of the process. Hence the evaluation of business processes and important data can be performed. An adjustment of decisions weight in each functional area should be performed empirically and should be dependent on the business strategy of the whole enterprise. The business strategy of the company is appointed by the business goals which should decide about the ERP functionality.

2.3 Preparing the implementation project of ERP for project-driven enterprise

The project-driven enterprise completes individual orders (projects) engineered for a customer requirements. The examples of the project-driven enterprises are companies that manufacture machine tools or production lines, dedicated software, furniture and equipment for kitchens, furniture for hotels, etc. The unique production is often characterized by complicated business processes and requires high qualifications of workers. The decision about implementation of ERP is often made when the company is under constraint because of rapid development and great number of projects. The resources are not efficiently utilized, the deadlines are missed and it is not possible to exactly calculate the profitability of closed projects. The same data are introduced several times in different functional areas. The management needs information to analyze cash flow, utilization of renewable and non-renewable resources, self-cost of each project, etc., but there is no objective information source in the company. To proper implement the ERP system in the project-driven enterprise the following assumption should be fulfilled:

- the business goals have to be distinctly specified,
- the project of ERP system implementation has to be well defined (budget, scope, schedule)

- the top management has to be determined to implement the ERP system,
- the development of the company and the important changes for next three years should be determined,
- the functional areas of the company should be specified (also the planned functional area as controlling department or department for research and development),
- the resources accessible in each functional area should be specified,
- the business processes should be described,
- the important data required for the decision making should be given.

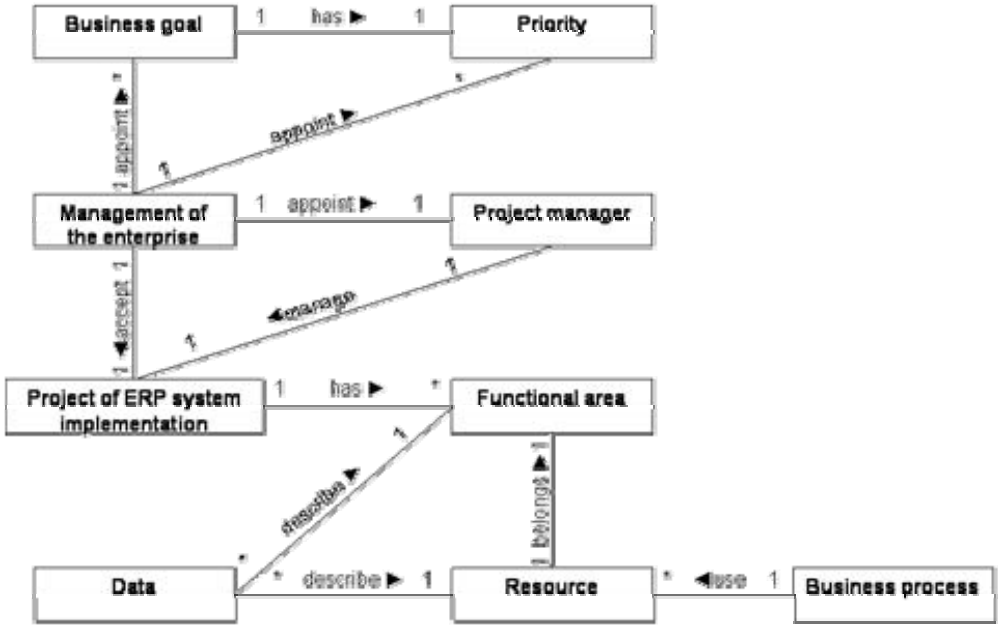

Fig.4. Connections between the elements of the ERP project and project - driven enterprise

The company that intends to implement an ERP system should specify the set of business goals that have to be reached. The business goals should be ordered and prioritized. The list of business goals should be analyzed in view of contradictions. For example reduction of the material stock and increase of products variety belongs to typical conflicting aims. The project of ERP system implementation should be well organized and the top management of the company should be strongly determined to complete it. The project manager responsible for the implementation of ERP should occupy significant position in the in the enterprise (management representative). For the implementation of the ERP in each functional area, a key user should be assigned. The key users are responsible for implementation of ERP in the functional areas and know inside out the individual modules of the system. On one hand the ERP system should not limit the flexibility of the company, on the other hand, with the enterprise development the management should take into consideration the change of all the business processes in the company. For example; it will be a great mistake to implement an ERP system and override the high storage warehouse that will be built in next two years. A lot of managers require

functionality from the ERP, which can not be used because the required data are not collected. The typical example is the decision about the production planning. A production manager require from the ERP system graphical presentation of the main production schedule that can be modified according to drag-and-drop methodology but the job cycles are not measured and the technology is not specified. The proper labeling of material indices require a lot of work from the company but the work should be performed independent from any ERP system before implementation stage.

Tab.1. Business processes

Functional area	Business process	Decision variables	Data
Sales and Distribution **F_1**	Offer preparation - P_1^1	price, time, customer, product,	products, variants, prices, self costs, customers, competition, dealers, offers, discounts, sale orders, delivery times, guarantee conditions
	Serve a complaint – P_2^1	guarantee, time, contract,	
	Acceptance of an order – P_3^1	price, deadline, profit margin, penalty	
	Project preparation – P_4^1	budget, schedule, score,	
	Elaboration of sales plan – P_5^1	products, customers, price, area, dealers, profit margin,	
	Evaluation of dealers provision – P_6^1	sales level, price, profit margin	
Research and design **F_2**	Construction design – P_1^2	kind of material, bill of material, optional construction, quality requirements	materials, semi-finished products, services, products, component quantities, machines, technological operations, tools, job cycle, drawings, cards of change, purchase price, time-rates, costs ratios, units of measure,
	Technology design – P_2^2	grade of material, bill of material, quality requirements, available machines	
	Documentation outline – P_3^2	bill of material, CAD system, technology description	
	Product changes – P_4^2	bill of material, technology, kind of changes,	
	Bill of material preparation – P_5^2	number of indices, component quantity,	
	New index introduction – P_6^2	index labeling, kind of index,	
	Calculation of self cost – P_7^2	material cost, labor cost, indirect costs	

Purchasing **F_3**	Supplier selection - P_1^3	material price, delivery time, material quality,	number of storages stock-in-trade, delivery time, ordered materials, transportation costs, replacement parts, storage area, storage periods, material prices,
	Date of delivery statement – P_2^3	materials requirement, production plan, quantity discount,	
	Delivery frequency statement – P_3^3	material price, transportation costs, storage area,	
	Cooperation selection – P_4^3	price, technology, quality, distance,	
	Material reservation – P_5^3	material requirements for production order, replacement parts,	
Production **F_4**	Production schedule preparation – P_1^4	number of production orders, deadlines, labor intensity, number of available resources,	production orders, completion times, resources, amortization periods, business calendar, job periods, operation costs, resource performance, costs of resource utilization, production routes, guarantee times, work instructions, material grades, wage rates,
	Maintenance process – P_2^4	inspections period, repair parts, guarantees, resource utilization,	
	Production investment – P_3^4	amortization periods, wear level, costs of resources, operation costs, productivity, performance,	
	Bottle-neck analysis – P_4^4	number of production orders, schedule, number of available resources, performance	
	Waste material reduction – P_5^4	bill of material, quantity of components, quantity of production lack, technology	
	Production workers payment – P_6^4	working time, budget of orders, quality requirements, time requirements	
Material management **F_5**	Minimum level of materials - P_1^5	kind of material, material price, material requirements	material prices, kind of materials, number of storages, material
	Material movement performance – P_2^5	material release, material introduction, material displacement, return of material, natural material waste	

	Material rotation analysis – P_3^5	quantity of material release, quality of material introduction	requirements, number of indices, stock-taking period, batch size, storage area,
	Material control – P_4^5	kind of material, material quality, material quantity, purchase specification	
	Stock-taking process – P_5^5	Stock-taking period, number of indices, kind of material, measurement units	

Before implementation of an ERP system in a project driven enterprise a map of business processes should be prepared. The map should describe the flow of business processes after implementation of ERP. The most important paper and electronic documents that will be generated in the company should be defined (also the documents layout). The examples of typical business processes realized in the different business areas of the project-driven enterprise are described in the Table 1.

In the next chapter the concept of the decision support system dedicated to selection and implementation of an ERP system for project driven enterprise will be presented. The business processes described in the Table 1 enable us to describe the activity of the system.

3. THE CONCEPT OF DECISION SUPPORT SYSTEM

3.1 The structure of the decision support system

The proposed decision support system is consisting of three integrated modules:

1. Module of project-driven enterprise modelling.
2. Module of ERP system modelling and selection process support.
3. Module of ERP implementation process support.

First a user should introduce the most important information about the project driven enterprise: description of functional areas, resources ordered to the functional areas, annual number of orders, annual turnover, etc. The information is introduced in the first module in a form of an interactive dialog. It means that the user selects the available variants offered by the decision support system and so builds a model of project driven enterprise. The dialog is based on implemented structure of business rules that should guide the user by the building of the model. An example of the dialog is presented on the Fig. 5. The structure of rules should be flexible and guarantee possibility of the system development. The system requires from the user a selection of the functional area from the closed set presented in the Table 1 but the closed set of functional area can be extended. For example the ERP can be developed, a new functional area (such as F_6 – Human Resource) can be added or Purchasing department can be exchanged on the Logistics department.

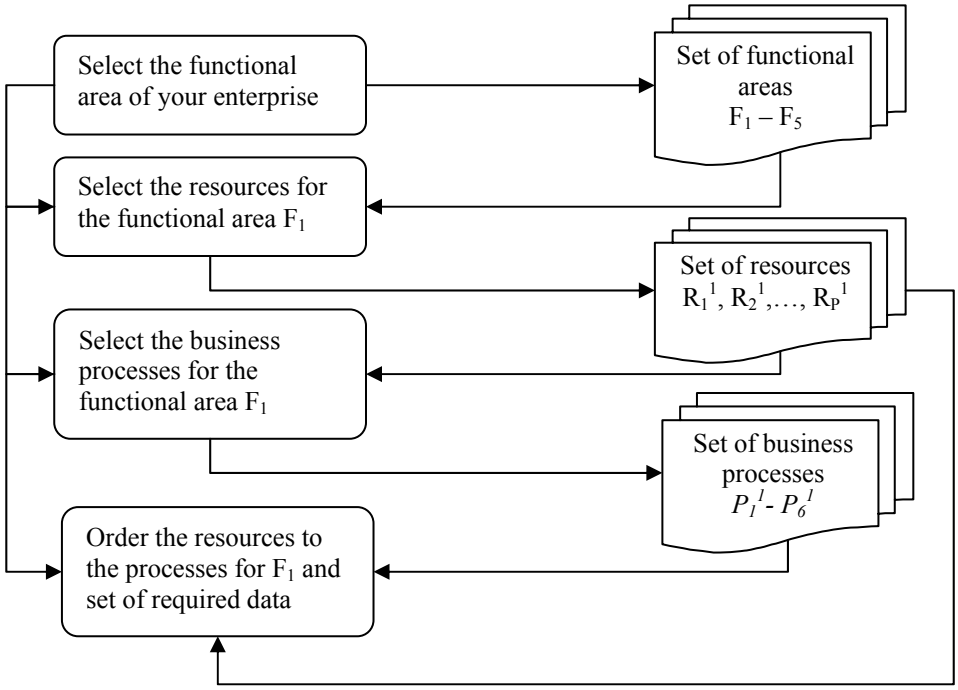

Fig.5. An example of the user-system dialog performed in the module of project-driven enterprise modelling

In the next module the requirements for the ERP system should be determined. On the basis of information about functionality of different ERP system the dialog with user is realized. The database of the ERP systems should encompass the detailed characteristics of ERP systems offered by different suppliers. The characteristics should be prepared for the functional areas of the enterprise. The examples of functions of ERP systems are presented in the Table 2.

The user of the decision support system selects interactively the functions of ERP and determines the level of essentiality of the selected ERP for the project driven enterprise. The essentiality is graded follows: required function, recommended function, useful and discarded. The level of essentiality determines the number of ERP systems that will be taken into account by the selection procedure of the decision support system. The required functionality of the system is the most important criterion that determines the set of acceptable ERP systems. Despite of the level of essentiality the user should select the number of licences (target number of ERP users). On the basis of licences prices of different ERP systems the costs of licences can be calculated. The selection procedure ranks the systems according to different criteria (costs of licences, ERP market position, etc.). The decision support system requires the selection of business goals. The business goals should be graded similar to ERP functions. The module of ERP system modelling and selection process support requires permanent update of information about ERP systems such as changing of licence price, functionality development, etc. The module enables a preliminary selection of several ERP suppliers that potentially deliver the best ERP solution.

Tab.2. Functions of ERP

Functional area	Examples of functions of ERP system
Sales and Distribution	Multicurrency accounting
	Customer relationship management
	Mobile sales
	Complaint service
	Shipping advice with electronic data interchange
Research and design	Integration with CAD systems
	Classifier of indices
	Variants management of bill of material (BOM)
	Definition of alternative technologies
	Current calculation of self costs
	Product Life Cycle
Purchasing	Aggregation of material commissions
	Trade credits monitoring
	Multilingual commissions
	Qualitative and quantitative supplier ranking
Production	Group technology
	Registration of operation time
	Registration of working time
	Capacity requirement planning
	Master production schedule
Material Management	Batch of material deliveries
	Support of barcodes and material identification
	Logical and physical storages
	Material location
	Material reservation for production order

The last module focuses on planning and control of implementation project of ERP system. On the basis of business goals and business processes, number of target users, resources, etc., the score of the ERP implementation project is determined. On the basis of defined business goals and business processes the most important decisions making in the individual business areas should be determined. The decisions, business processes and business goals determine the structure of data that should be introduced into the ERP system. The module of ERP implementation process support should suggest the schedule of implementation of the selected ERP based on the implementation methodology. On the basis of information about number of indices (material, semi-finished products, services and ready products), structure of bill of materials, number of business partners, and another required data the expenditure of labour of data preparing can be evaluated. That enables to determine the internal costs of the ERP system implementation. The costs of external consultants can be evaluated directly by the contract negotiations with the software supplier. Also the hardware costs can be evaluated after the selection of ERP system. However the decision support system can encompass the important information about the average consulting costs dependent from the size of project. The structure of the decision support system and the description of the modules are presented in the Fig. 6.

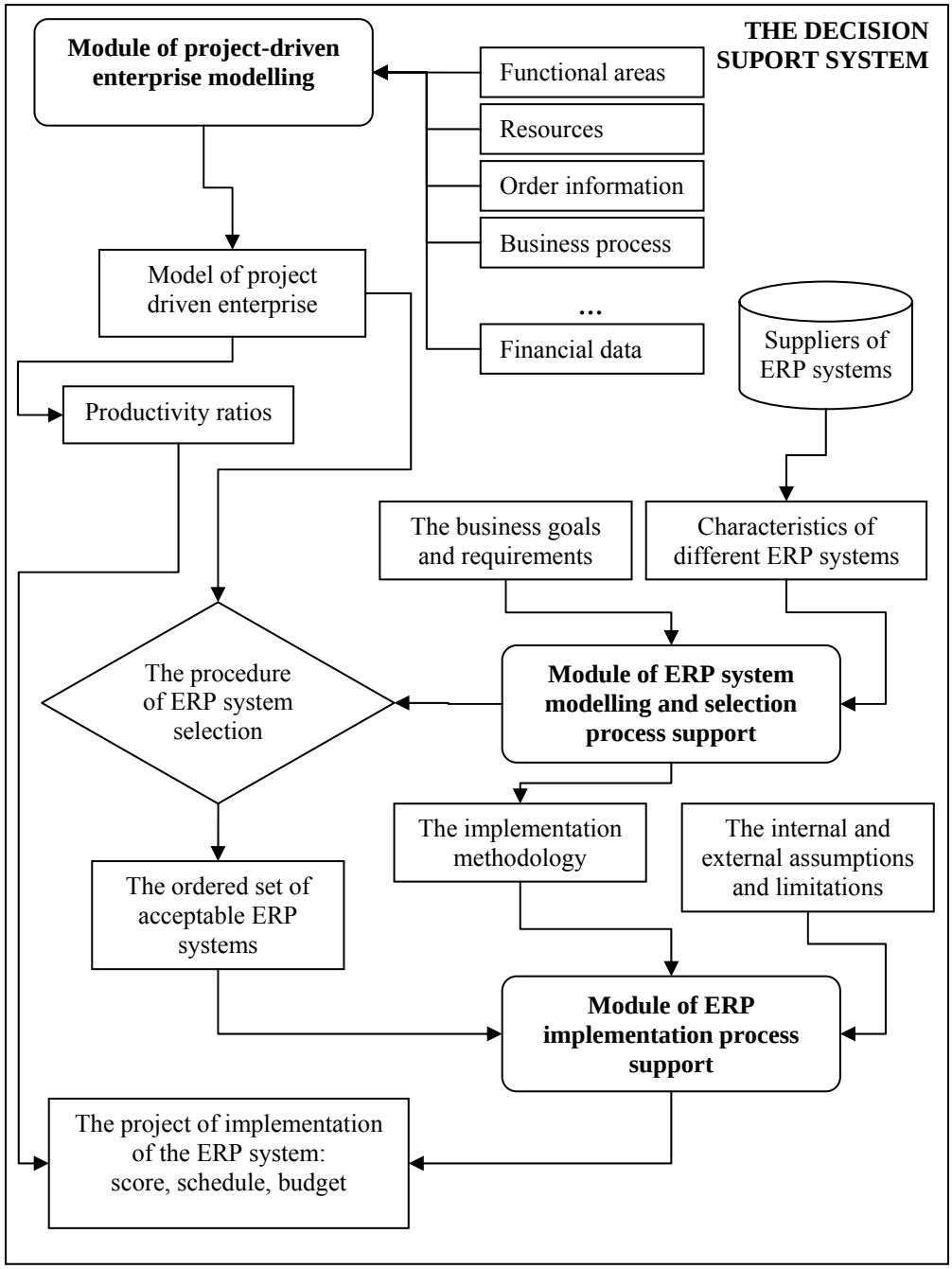

Fig.6. The concept of decision support system dedicated for selection and implementation support of ERP system in project-driven enterprise

4. SUMMARY

In the paper the concept of decision support system dedicated to selection and implementation support of ERP system in project driven enterprise is presented. The concept includes the creation of the project-driven enterprise model based on structure of resources, business processes and orders (projects). As evaluation parameters, the productivity indices to the project-driven enterprise, order, ERP system and functional area are defined. The methodology of preparing of project of implementation of an ERP system is proposed. The concept of the support system assumes that the system includes three modules:

1. Module of project-driven enterprise modelling.
2. Module of ERP system modelling and selection process support.
3. Module of ERP implementation process support.

The first module is responsible for the data acquisition required for creation of the model of project-driven enterprise. The second module encompasses the data about the ERP systems and suppliers of the systems. It will be more effective if the ERP vendors can update the information about their ERP systems on-line in electronic form (for example defined an XML format). The second module support the selection process of the ERP system and make the ranging of the ERP acceptable for the project-driven enterprise. The procedure of selection of the ERP system will be based on the decision trees and Constrained Logic Programming. The last module of the decision support system generates the draft project of implementation of the ERP system in the project-driven enterprise. The project includes outcome, schedule and budget of the ERP system implementation.

The further work require survey of the ERP market and data collection for objective characteristics of the ERP systems available on the market and elaboration on the ERP.

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