The main process of an engineering enterprise and its integrative relations with applied managerial tools and performance

Ing. Ivor Poprach

1. Introduction

Setting of the main process in an engineering enterprise is an essential issue for every top manager. If integrative relations between managerial tools and main enterprise processes are being looked for, respecting the organization structure at the same time, the way "via" the main process is the most effective one. The way leading to defining enterprise integrative relations connected with evaluation of managerial tools choice appropriateness as well as with engineering enterprise performance will be reached up in this paper.

2. EE performance definition

The system of following indicators defines an EE performance (upgrading the mentioned indicators within a given time interval is thus understood to be increase in performance):

EBITDA
Earnings before Interests, Taxes, Depreciation and Amortization – indicates operating performance of a company and signifies gross operating earnings. This indicator is used in financial analysis to compare performance of different companies and sectors.

EVA
Economy Value Added. Earnings after taxation minus overall capital costs. Added value is either created by a company or the value put in by the investor is destroyed by a company, which is indicated by EVA. The value of capital investments is raised by a company in case the final EVA indicator is positive. On the other hand, if the final EVA indicator is negative the value is debased by the company.

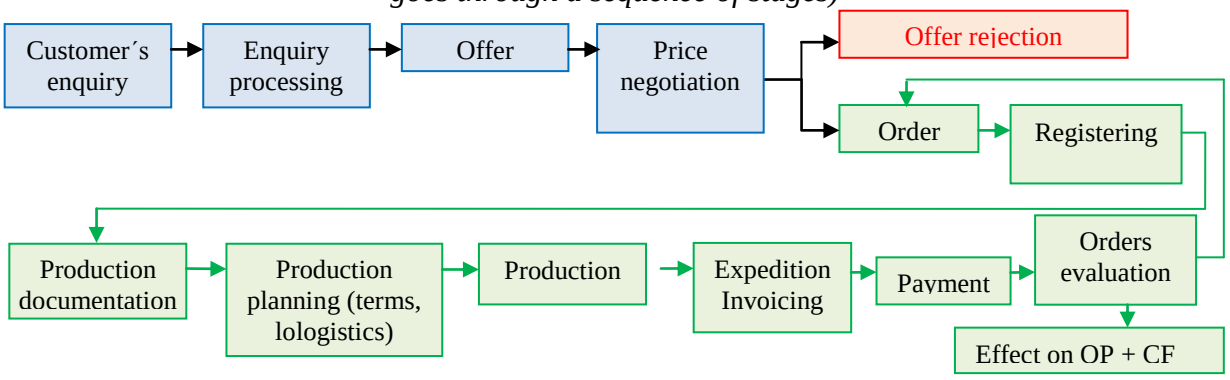
WP
Work productivity- the indicator determines the amount of created added value per a unit (most often it is the amount of work done per a time unit, created added value per an employee, etc.).

Process times reduction
This indicator is connected with WP and is directly connected with increase in work productivity of all employees in an enterprise. It is usually possible to be measured most easily in the production section by the means of a standard system, which often leads to disproportioned pressure put on increase in WP in all the sections – technical departments of an EE are concerned, too.

3. Main process of an enterprise management system

3.1 Main process scheme

Stage process of order control constitutes the main process in an EE
(A stage is constituted by a group of operations carrying out particular output, each order goes through a sequence of stages)



Specification of the determining entities in an enterprise management system :

Entities and enterprise management structure (entity perceived as a complex of particular types of the enterprise elements creating enterprise management that serves for defining the integrative relations):

I. Products, i.e. articles and/or services (material and intangible);
II. Processes (consisted of operations – two points of view of classification : a) process + b) section);
III. Operations (create the processes);
IV. Sections (= divisions);
V. Resources (human, material, intangible, financial);
VI. Functional areas.

I. Products, i.e. articles and/or services (material and intangible):
Mechanical (tube) components made on the basis of customer´s technical requirements.

II. Processes (Classification of operations: IIA. Process point of view; IIB. Section point of view):

IIA. Process point of view:

a) Production - operations(P):
   - material division;
   - working;
   - bending;
   - forming;
   - welding, soldering;
   - surface treatment;
   - washing;
   - assembling;
   - packing;

b) Technical - operations (T):

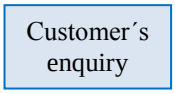
- enquiry/offer processing;
- construction (of an article, instrument);
- technology suggestion;
- sampling;
- technological procedures;
- CNC machines programming;
- quality control;

c) Logistics - operations (L):
- material purchase;
- material storage;
- material distribution;
- product dispatch;

d) Supporting - operations(S):
- marketing;
- gaining customers;
- projects control;
- selecting suppliers;
- purchase of overhead material and services;
- personnel activities;
- quality system (ISO/TS);
- financing;
- accounting;
- supporting SW (reporting, ERP);
- reparations and maintenance;
- administration flow;
- dealing with suppliers;
- dealing with customers (including after sales services, feedback);
- training;
- system of motivation

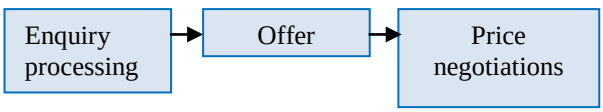
3.2 Assigning operations to individual stages of the main process

Stage 1:



S marketing;
S gaining customers;
S dealing with customers (including after sales services, feedback);

Stage 2 - 3 -4:

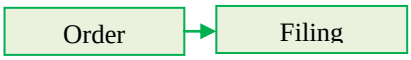


T enquiry/offer processing;
T technology suggestion;
S dealing with customers (including after sales services, feedback);

Stage 5 A:

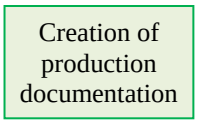
S dealing with customers (including after sales services, feedback);
S supporting SW (reporting, ERP);
S training;

Stage 5 B:



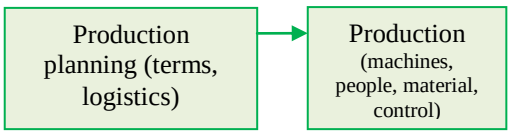
S project control;
S selecting suppliers;
S purchase of overhead material and services;
S administration flow;
S dealing with suppliers;

Stage 6:



T construction (of an article and an instrument);
T technology suggestion;
T technological procedures;
T CNC machines programming;

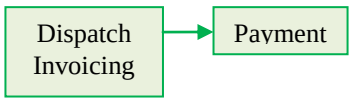
Stage 7:



S supporting SW (reporting, ERP);
T technological procedures;
T CNC machines programming;
L material purchase;
L material storage;
L material distribution;
S financing;
T sampling;
P material division;
P working;
P bending;
P forming;
P welding, soldering;
P surface treatment;
P washing;
P assembling;
P packing;

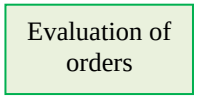
S reparations and maintenance;
T quality control;
L product dispatch;
S selecting of suppliers;
S purchase of overhead material and services;
S personnel activities;
S quality system (ISO/TS);
S financing;
S administration flow;
S dealing with suppliers;
S training;
S system of motivation;

Stage 8:



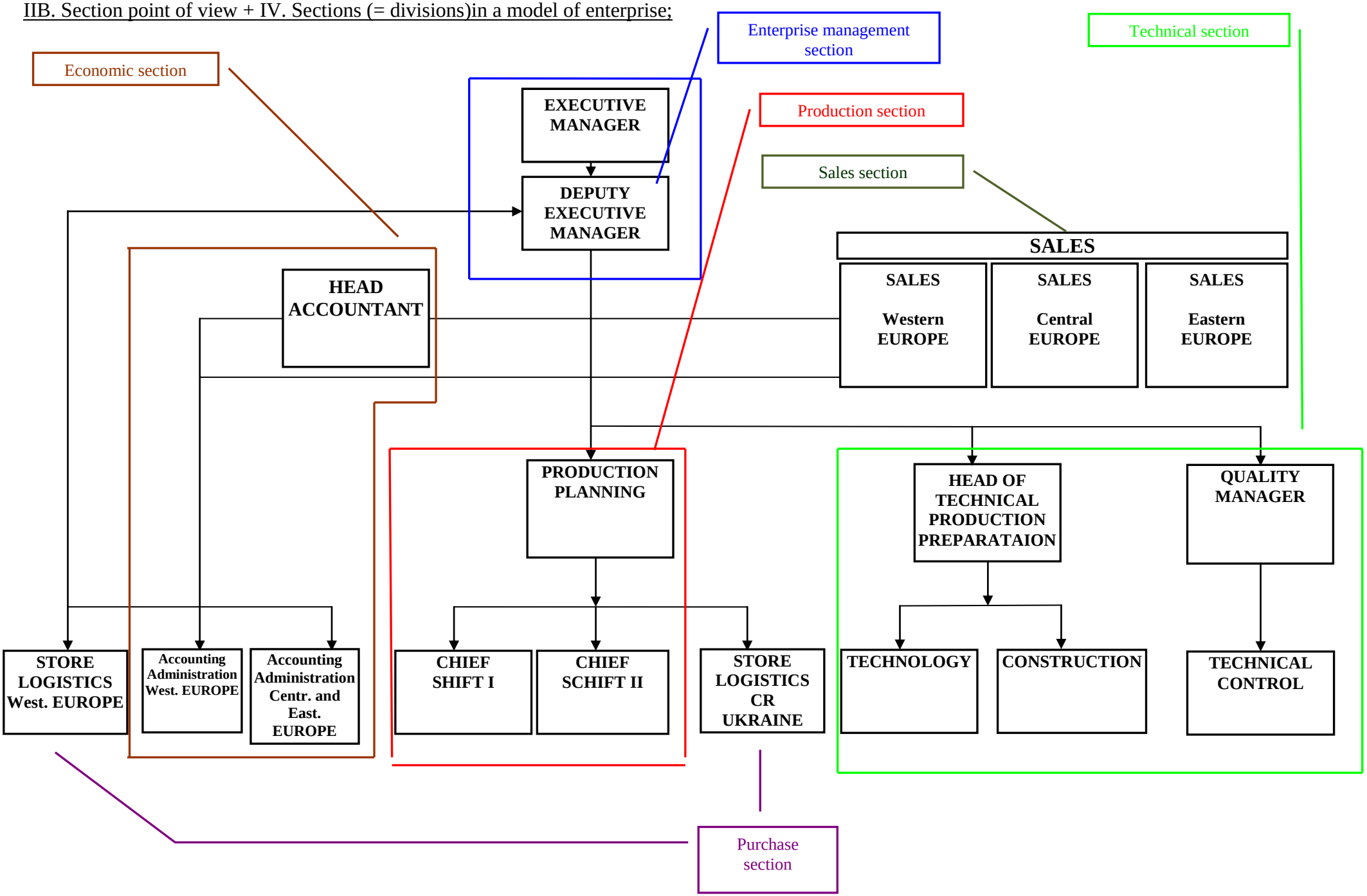
P packing;
T quality control;
S quality system (ISO/TS);
S financing;
S accounting;
S supporting SW (reporting, ERP);
S administration flow;
S dealing with customers (including after sales services, feedback);

Stage 9:



S training;
S system of motivation;
S supporting SW (reporting, ERP);
S quality system (ISO/TS);

IIB. Section point of view + IV. Sections (= divisions)in a model of enterprise;



3.3 Main process analysis summary

(The integrative relations specification – assurance by the means of managerial tools and specification of their role in supporting managerial decision-making along with the feedback).

List of the managerial tools		*Application in particular sections*	← *Sections*	*Connection with processes (operations)*
(T1)	**Process control**	Eco Man Pur Sal Tech Pro	***(organization diagram p.9)***	**P T L S**
(T2)	Activity Based Costing (ABC)	Eco Man	Eco- Econom.	**P T L S**
(T3)	Operational costing	Eco Man Pur Sal Tech Pro	Pur- Purchase	**P T L S**
(T4)	Investment costing	Eco Man Pur Sal Tech Pro		**P T L S**
(T5)	HOTM (Hour Overhead Tariff Method)	Eco Man Pur Tech Pro	Sal- Sale Pro- Production	**P T L S**
(T6)	EVA	Eco Man	Tech- Technic.	**P T L S**
(T7)	Customer Relationship Management (CRM)	Man Pur Sal	***Processes*** →	**S**
(T8)	Human Capital Management (HCM)	Man Pro	**P**- Production	**P S**
(T9)	SW (accounting, planning ERP, reporting)	Eco Man Pur Sal Tech Pro	**T**- Technical **L**- Logistics	**P T L S**
(T10)	Registration and evaluation	Eco Man Pur Sal Tech Pro	**S**- Supporting	**P T L S**

4. Selection of managerial tools

List of managerial tools		Frequency of application	Note
(T1)	Process control		
(T2)	Activity Based Costing (ABC)		
(T3)	Operational costing		
(T4)	Investment costing		
(T5)	HOTM (Hour Overhead Tariffs Method)		
(T6)	EVA		
(T7)	Customer Relationship Management (CRM)		
(T8)	Human Capital Management (HCM)		
(T9)	SW (accounting, reporting, planning ERP)		
(T10)	Consecutive registration and evaluation(EBITDA/EVA/PP/Process times)		

(T1) Process control

Process control within the meaning of the main production process determination, its subsequent analytical disintegration to set of operations and determination of relations for supporting operations.

(T2) Activity Based Costing (ABC)
Accounting method facilitating direct assignment of costs to individual company operations as well as to products and services.

(T3)+(T4) Operational and investment costing
Costing is usually a financial management plan of a plant usually worked out for one year or for an investment time duration. The company management propose and approve the budget. It includes revenues estimation and expenses allocation. Revenues and expenses are very often centralized in a monetary fund.

T5) HOTM (Hour Overhead Tariff Method)
The Hour Overhead Tariff Method is one of the in-house controlling tools. The basic function of the method is to provide relevant information about the hour costs for particular operation per section, department, process, profession or any other management unit of an organization. This management unit is further designated as an entity. Both planned and real rate values are being worked with, they are being compared and evaluated. It is strictly confidential internal information which is a result of a processes control and which can become a significant competing advantage. That is why no exclusive HOTM is practically applied but usually certain structure of the methods is applied. However, each of them is employed differently at the control of processes and product costs as well as at their relation to the sales policy. The planned and the real HOTM value of a particular entity are essential but there exist another values, depending on the situation in the company, that supplement and possibly particularize them and also relate more tightly to the hour price tariff.

(T7) Customer relationship management (CRM)
Customer relationship management – CRM is usually a process of collecting, processing and application of information about the company´s customers. This process is usually supported by database technology. It enables to identify, understand and forecast customers´ needs, desires and purchase customs and it also enables communication with the customers. The company software, hardware and the personnel of the company, executing these functions, are also called CRM.
Some suppliers also use these definitions of the CRM

- systems supporting the control of the whole customer contact cycle
- systems supporting effective coordination of the customer relations
- systems supporting customer service

(T8) Human Capital Management (HCM)
The basis of this managerial tool is the fact that employees represent the most important investment of a company. If correctly controlled the investment can become a source of innovation and growth, competition advantage and gain the leading position on the market. The company with a functioning HCM can optimize the whole personnel process starting with recruitment up to retiring, including recruiting and keeping qualified employees. Secure pooling of important information about employees, adaptation of relating enterprise processes on the basis of growth and changes in the enterprise as well as providing employees and managers with self-service functions and facilitating effective decision-making as for the employees, creates a part of HCM.

(T9) Software (SW) (accounting, reporting, ERP)

Software (SW) is to be understood as a set of enterprise computer programmes that collect, process and evaluate the acquired data in compliance with the given rules.

Making overview reports about the process and state of particular activities or operations stands for reporting.

Pict.: ERP paket

Enterprise Resource Planning (ERP) is an information system integrating and automating a big number of processes relating to the enterprise production activities. The processes and activities typically concerned are production, logistics, distribution, assets management, sales, invoicing and accounting.

ERP advantages:

- making economic processes more effective and faster
- data centralization and reduction of mistakes
- long term economies in information systems and hardware investments
- safety uplifting
- quicker outputs for the company management (employees don´t have to prepare background information)
- support for keeping accounts in compliance with international standards

ERP increases flexibility and thereby competitive strength. Reports constitute the essential output.

(T10) Consecutive registration and evaluation (EBITDA/EVA/PP/Process times)
As it has been stated, following indicators will be applied for monitoring the company performance.

EBITDA
Earnings Before Interest, Taxes, Depreciation and Amortization is the indicator reflecting the company operational performance. EBITD represents gross operational earnings and it is used at financial analysis to compare performance of different companies or sectors.

(T6) *EVA*
EVA indicator, the acronym for Economy Value Added, represents earnings after taxation from which total capital costs are deduced. This indicator stands for the fact whether the

company creates the added value or destroys the value added by the investor. In case the final EVA indicator is positive the company increase the investment value. If the indicator is negative the value is debased.

Work productivity – the indicator specifying the amount of added value per a given unit (most often the amount of work put in per a time unit, created added value per an employee, etc.).

Process times reduction
This indicator is connected with WP and is directly connected with increase in work productivity of all employees in an enterprise. It is usually possible to be measured most easily in the production section through the medium of a standard system, which often leads to disproportioned pressure put on increase in WP in all the sections – technical departments of an EE are concerned, too.

5. Summary

The aim of this paper was to describe the importance of an engineering enterprise main process determination. Definition of integrative relations among managerial tools, main enterprise processes and organization structure constitutes a part of the paper. The description of all the redundant enterprise processes and operations that need to be eliminated or completely cut out would logically follow. At restructuring operations it is necessary to define exactly the processes and operations relations with the main process – a mistake made within this definition can cause serious effects for an enterprise.

6. References:

[1] POPRACH, I.: Co je klíčové pro řízení středního výrobního podniku [*The Process Control Key Factors in Medium-Sized Enterprice*] In: Proceedings from International Engineering Fair Brno 2008 - Conference on "Integrated Engineering in Enterprise Management", Brno 2008, pp. 62-65.

[2] POPRACH, I.: Ekonomika ve výrobě [*Economy in Production*] In: Publication "Effective Production", Verlag Dashofer, Praha 2008.

[3] POPRACH, I.: Specification of Model Enterprise by Key Factors In: WORKSHOP ČVUT 2008, Praha 2008.

[4] Zralý, M.: Hour Overhead Tariffs Method - Effective Tool for Time Oriented Activity Based Management, In: Proceedings from Conference "8th EIASM Manufacturing Accounting Research Conference", Trento, 6/2007.

[5] Zralý, M.: Integration Concept of Management Control and its Contribution to Performance Management, In: Proceedings from Conference "4th EIASM Conference on Performance Measurement and management Control", Nice, 9/2007.

[6] Zralý, M.: Manažerské využití hodinové nákladové sazby, Controlling, 3/2008, ISSN 1801-6251, vydává Společnost pro controlling a podnikové řízení, v tisku.

[7] Zralý, M.: Současné controllingové řízení podniku, 38 stran, Pro Intellego Olomouc,

Praha, 11/2007.

[8] Cokins, G.: Performance management: finding the missing pieces (to close the intelligence gap), ISBN: 0-471-57690-5, John Wiley & Sons, Hoboken, New Jersey, 2004.

[9] Kaplan, R.S., Anderson, S.R..: Time-Driven Activity-Based Costing: a simpler and more powerful path to higher profits, Harvard Business School Publishing, 60 Harvard Way, Boston, Massachusetts 02163, 2007.

[10] Drucker, P.F.: To nejlepší z Druckera v jednom svazku, Management Press, Praha, 2004.

Internet resources:

[11] http://cs.wikipedia.org