3.Naučno-stručni skup sa međunarodnim učešćem
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REENGINEERING OF PRODUCTION SYSTEMS

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SUMMARY

Reengineering is considered to be one of many techniques of production system improvement. In this paper reengineering is presented as a production system improvement method directed to processes. Because of different kinds of processes (strategic, operational, additional), their task division (functions) have been presented. Functions are considered to be crucial point of methodological reengineering analyse. Main ways of present and future reengineering investigations have been also presented in this paper.

1. INTRODUCTION

Production system is an organized setup aimed to manufacture given products. Production system consists of processes and relations between them. Particularly main processes in production system can be divided into:

- Operational processes – their main aim is to manufacture products,
- Supplementary processes – their main aim is to assist operational processes in order to ensure proper realization of operational processes,
- Strategic processes – their main aim is to schedule tasks of production system.

In general, all processes consist of elementary tasks and process is considered to be sum of elementary tasks (Fig.1). Process is completed only when all elementary tasks are performed. However, processes and tasks must be frequently improved in production system to ensure its competitiveness in global market.

This paper presents selective reengineering methodology, which is supposed to be effective way of processes improvement in production system.

2. TECHNIQUES OF PRODUCTION SYSTEM IMPROVEMENT

Production system improvement starts in fact exactly when this system is launched and it is being continued all the time. This has been noticed by Henry Ford, who has said that, „ …*the only one form of stabilization is change*”. Improvement changes in production systems are undertaken as a response on demands of customers and market competition (Fig.2).

At the beginning it is assumed that process is set-up correctly and only small tunes toward task realisation are required. However, after some time small task tune-improvements are not sufficient. It becomes necessary to improve some part of production process. It may be done by application of TQM (Total Quality Management) tools and methods. When discrepancies between demands and real production process processing are too high, reengineering methodology should be applied (Fig.2). In result of reengineering, functionality of production process is boosted what also reflects in better condition of production process in general. Usually radical production processes improvements like reengineering are obtained by redesign, which is achieved by high cost. Hence reengineering is costly and all manufacturing enterprises cannot effort themselves for its application.

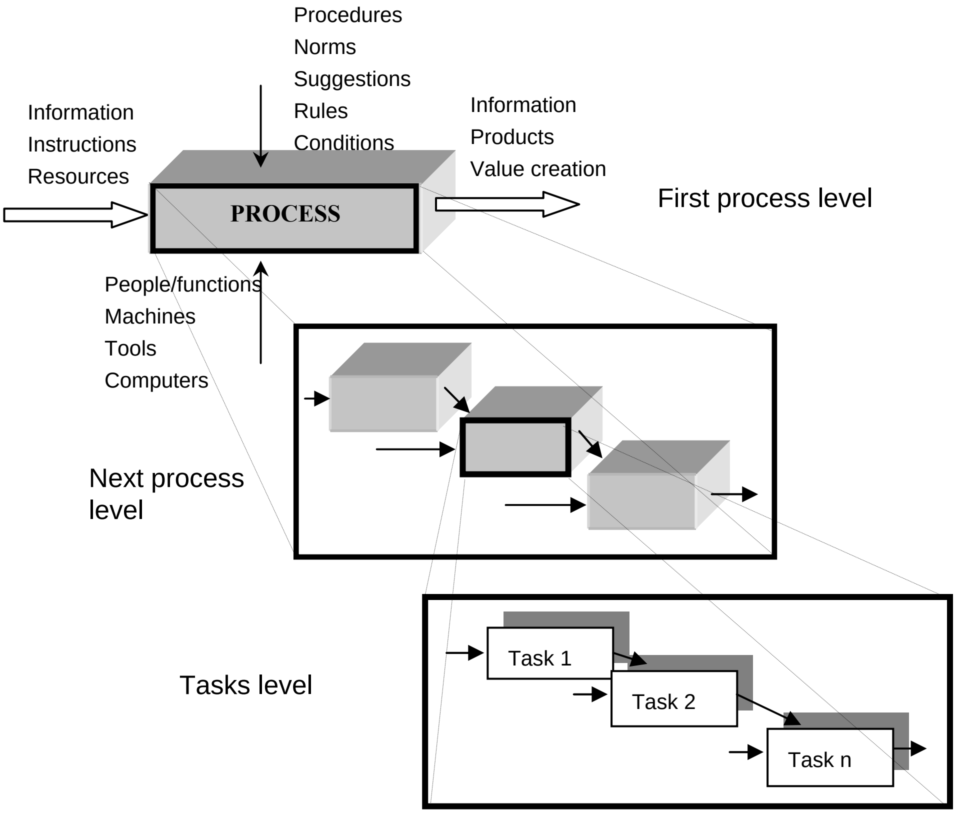

Figure 1. Production process levels and tasks description

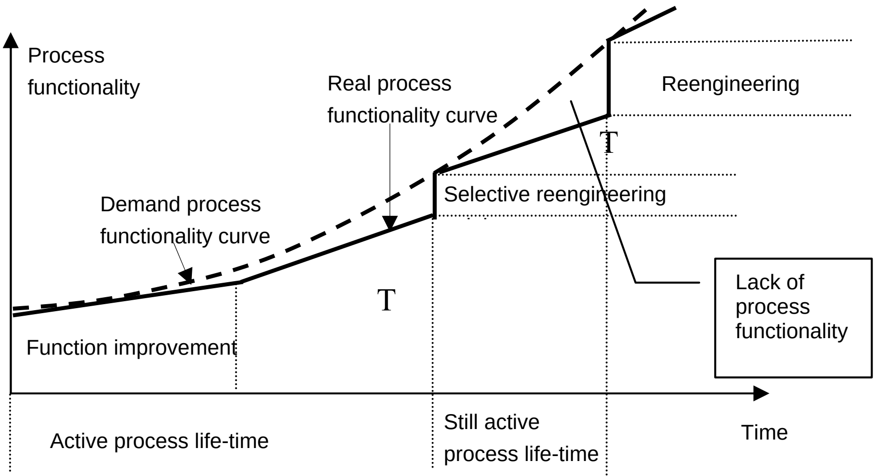

Fig.2. Compare of different techniques of production system improvement

An alternative way for costly reengineering might be a selective-reengineering. The selective-reengineering facilitates many features of conventional reengineering and enables to reduce costs of its implementation in production process. The selective-reengineering aim is to undertake co-ordinated changes in production processes, which are part of production system. The selective-reengineering method is to undertake changes only in one critical production process in production system in order to achieve relatively good output at acceptable cost level.

In result, the selective-reengineering does not provide possibilities to implement any fundamental changes in production system because its budget is limited. In order to undertake complex, fundamental changes in production system "full" reengineering must be implemented with high budget expenditure consequences (Fig.3).

3. SELECTIVE REENGINEERING METHODOLOGY

In the first step implementation of the selective-reengineering, an area of its consideration must be characterised. As it is shown in Figure 3, the selective-reengineering implementation can be minimal and maximal. The minimal range refers only to the only one production process improvement, whereas maximal range refers to many production processes. Taking into consideration these two possible implementation ranges, selective-reengineering methodology has been divided into following levels:

- Identification (recognition),
- Design,
- Implementation.

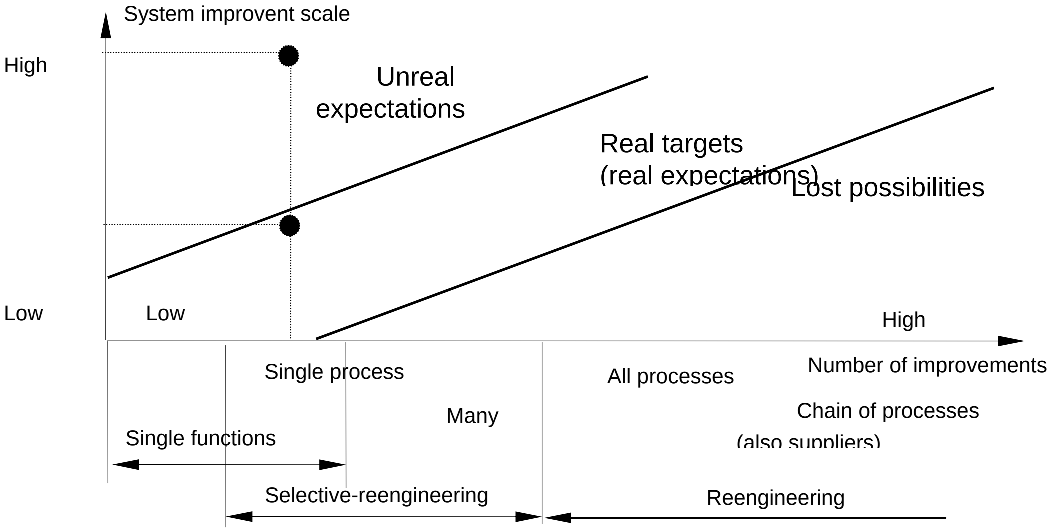

Fig.3. Relations between expected production process improvement and real activities

An identification level characterises processes in the manufacturing enterprises to be subjected by selective-reengineering. A *selective-reengineering sequence* is chosen at identification level. This selective-reengineering sequence ought to indicate activities need to be undertaken necessarily to improve process. The improvement activities refer not only to its aim tasks, but also indirectly to other tasks connected with them. Because of that, the second step of selective-reengineering is characterisation of a *relation map*. The relation map aim is to describe interactions between different tasks and processes.

The identification level is ended with improvement cost simulation of the selective-reengineering. This cost simulation is compared to assumed budget value. Any differences between total improvement cost simulation and budget result in selective-reengineering activities correction. The correction feedback is performed by “scale change” of relation map. The “scale change” is understood as improvement range focusing at given selective-reengineering sequence. If this correction did not cut selective-reengineering costs, the selective-reengineering sequence would demand to be changed. In this case production system improvement is limited and selective-reengineering less effective.

A design level characterises and verifies concrete and detailed improvement activities. This stage ends with acceptation of planned improvement activities. The next stage is implementation (Fig.4).

4. CONCLUSIONS

Selective-reengineering methodology enables to improve production system performance at acceptable level of its implementation. The cost evaluation and control at identification and design levels facilitates possibly the best improvement output at assumed budget value.

Selective-reengineering algorithm presented in this paper provides such methodology tools as *selective-reengineering sequence* and *relation map*. The selective-reengineering sequence characterises main area and aims of improvement activities. The relation map gives suggestions which other tasks or processes also need improvement. Hence this algorithm provides information for cost prediction and budget preparation. Furthermore database of acceptable solutions (verified in technical and economical aspect) can be elaborated. In the end, chosen solution is implemented in production system.

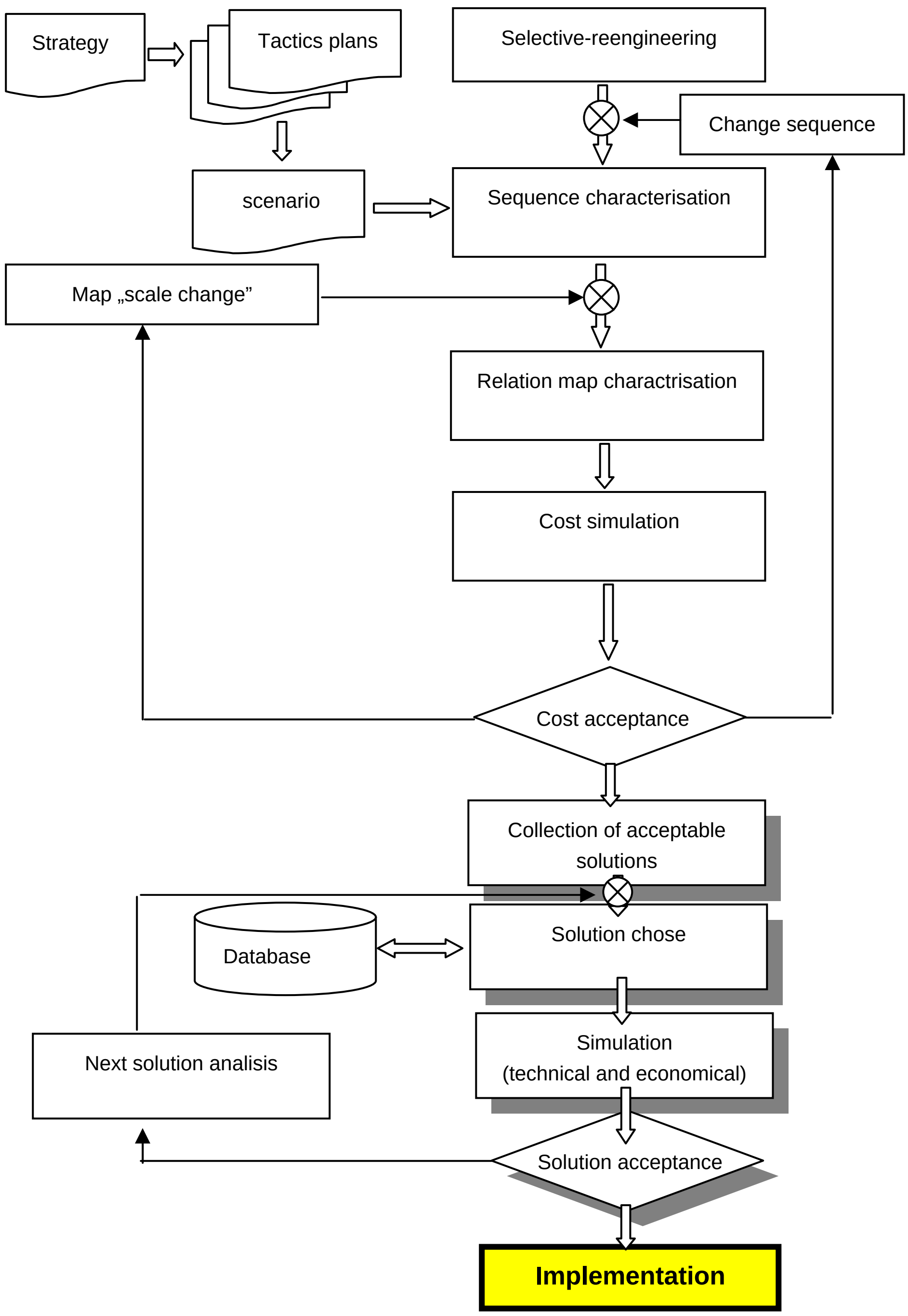

Fig.4 Selective-reengineering algorithm

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