

Aspects of Selected Process Management Approaches and their Implementation in Enterprises of the Slovak Republic

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Abstract—The aim of this paper is to present the theoretical basis of domestic and foreign sources focusing on process management and use of selected concepts and approaches of process management. On the theoretical knowledge of the field of follow-up analysis of the results of research that illustrate the use of selected concepts and approaches of process management in all enterprises in manufacturing enterprises and enterprises in wood processing industry (WPI). We focus on the relationship between the use of selected concepts and methods for process improvement in all companies surveyed and ROE indicator height. Classical methods of research work such as analysis, synthesis, comparison, descriptive statistics, graphical representation, and pivot table were used during processing.

Keywords—process, process management, approaches, return on equity

I. INTRODUCTION

At present, the business environment is influenced by factors such as globalization, individualization, digitization, which brings big changes to business management. Enterprises and their management are under constant pressure to find new ways and means to manage processes, looking for new concepts and approaches in the management processes. A prerequisite for appropriate implementation and application of new process management concepts is to increase their performance and consequently the performance of the enterprise as a whole. Choosing the right concepts and methods, as well as their proper use, gives enterprises the opportunity to react quickly to changes in the market environment and a stable position in a competitive battle. The success of the company expresses its functionality, performance and process stability, which have a direct impact on fulfilment of customer requirements. Management processes through new concepts, approaches and methods leads to the fastest or most accurate delivery date of goods or services, to the lowest possible price, to the required quality, to reliable warranty and post-warranty service, to responsive behaviour and problem solving. The article is focused on theoretical aspects of selected production management approaches that are used in various categories of enterprises in Slovakia and their impact on the performance indicator return on equity ROE.

II. MATERIALS AND METHODS

The subject of the paper is the analysis of secondary data from available domestic and foreign literature related to process management issues as well as methods and concepts of process management. The object of the survey was a representative sample of 524 all enterprises in selected industrial sectors operating in Slovakia, 189 manufacturing enterprises and 82 enterprises of wood processing industry. The aim of the questionnaire survey was to find out, among other things, the use of modern concepts and methods used to manage processes in enterprises of different industries. Primary data were obtained through a standardized questionnaire by the implementation of qualitative research through interviews of managers of enterprises. The survey was conducted between 2016 and 2017. Data obtained from the questionnaire was processed into tables and graphs using Microsoft Excel and STATISTICA 12 CZ - Stat Soft. Inc.2013 [1]. Primary data was used through the PivotTables for statistical analysis. The PivotTable is a method of organizing and analyzing data by groups, categories, or classes that allows you to compare them. It connects the distribution of the variables of two variables and represents the extension of the simple frequency table [2].

A. Process, Process Management and Process Life Cycle

Instead of introducing numerous process definitions by various authors, it is possible to summarize the basic characteristics of the process to which the overall consensus applies and to which the authors agree in the following points: the process has a beginning, it is defined in a section, the process has inputs that transform into outputs, that is, something that consumes and produces something, and the process generates a value for the customer, which is manifested by the fact that the sum of outputs has a higher value than the sum of inputs. Based on the content of the above definition, we can conclude that some authors do not distinguish the concepts of the manufacturing process and the process and their definitions are similar [3]-[6].

The term process is closely related to the process approach and process management, the characteristics provided by the following authors and their work.

According to [7], the application of the system of processes within the organization together with process identification and their interaction, as well as their management, can be understood as a procedural approach.

Authors [8], [6], [9] agree that process management is defined as a methodology for evaluating, analysing and improving key business processes, based on the needs and requirements of external and internal customers. They further state that process management can analyse and measure bottlenecks and improve the performance of processes and employees for the benefit of all stakeholders. They consider it a methodology for evaluating, analysing and improving key business processes that is based on customer needs and requirements. Process management is very important because you cannot manage what you do not know. The process organization attempts to organize the work as a coherent process, which is further decomposed into individual inter-logically linked sub processes. There are groups of processes at the highest level, followed by processes that fall into sub processes and then to activities and details of activities. Authors [10], [11] describe Business process management (BPM) as a discipline in operations management in which people use various methods to discover, model, analyse, measure, improve, optimize, and automate business processes. BPM focuses on improving corporate performance by managing business processes.

The authors agree that process-driven organizations are customer-cantered, create higher value for the customer, focus on process management through analyses and metrics, use concepts, methods and approaches to both process improvement and optimization and modelling with the aim of radically changing them and increasing the performance of processes. Author [12] characterize BPM within the historical context and gradually unveil the individual phases of the BPM process (process identification, process modelling, process discovery, quantitative and qualitative analysis, process redesign and process intelligence). The BPM life cycle helps understand the importance of technology in process management. The lifecycle of the process through which BPM is applied provides the ideal approach to solving production management problems. The first step in the lifecycle is applied only when a new process is introduced or re-engineered [13]. Other steps are continuous and are applied when a particular process is needed. Processes should be monitored at least once every two years [14]. The BPM life cycle are shown in Figure 1.

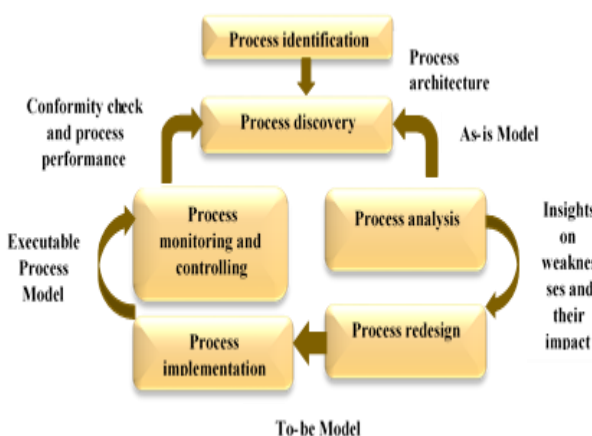


Fig. 1. BPM life cycle (source: personal processing according to [12])

B. Theoretical Background of Process Management Approaches

Kanban plays an important role in the JIT production system, as it is the tool that communicates the needs of each workstation [15]. The Japanese term *Kanban* means “visual record” [16]. On the other hand authors [17] assure that *Kanban* became the hallmark of JIT as a pull system, which contains information on the production characteristics of a product and the transport route within the organization. In the pull production system, the flow of material is replaced in the process at the same rate that it is consumed [18].

Just-In-Time operations are widely implemented in manufacturing business with the main objectives to control the timeliness of the production and delivery of products while maintaining or improving the quality of products [19]. JIT requires manufacturers to handle tasks within very small time spans and it has big impact on production scheduling. The developed sensors and wireless network technologies have raised the possibility of incorporating Internet of Things technologies into manufacturing process. Internet of Things can link physical elements in manufacturing process, such as materials, work in progress (WIP), finished products, labour, machine, tooling etc., and capture their status and performance so as to support production scheduling [20].

Optimized Production Technology - OPT is the method for the implementation of the theory into practice. It highlights the possibilities that a company has to distinguish narrow spots from the others. OPT takes into account machine setup times, batch sizes and priorities for each phenomenon. Recognizes resources that limit the amount of produced products from the others and tries to make full use of them [21]. If a bottleneck did not exist, the business would have unlimited opportunities and could produce an infinite number of products or services. Initial consideration of OPT is that the identification and optimal occupancy, use of tight capacity may be secured improve the average utilization of all production facilities, reduce average times, as well as a reduction in the workforce [22], [23].

The inception of *Lean production* marked a shift from principles of mass production created on the propositions of Frederic Taylor and manufacturing innovations of Henry Ford. The objective of lean production systems is to enable high variety of goods and services at comparable low price. Lean production is associated with post-Fordistic tendencies shifting an emphasis from mass production to mass customization in industrial relations [24]. Authors [25] - [28] agree, if a Lean Manufacturing company uses some alternatives as an approach that seeks to better organize and manage a company's relationships with its customers, supply chain, product development, and production operations, then it is possible to increase productivity by efficiently utilizing the resources.

Method 5S is a simple, practical and versatile method that brings many benefits and benefits, the essence of which is to eliminate waste and visualize the environment by organizing the workplace. Its simplicity lies in the fact that it does not require any special knowledge or techniques, technology, but for its successful implementation, common sense and healthy thinking are sufficient. If an employee spends 10% of his working time searching, it means that 48

minutes of his 480-minute working time are unproductive. In some organizations it is much more than 10%. The objectives of the 5S implementation in the organization are as follows: optimization of space utilization, workplace organization, waste reduction, time and cost, improvement of quality, efficiency and effectiveness of the 5S in the organization productivity and health improvement [29]-[31]. The authors [32], [33] are completing the 5S goals of safety standards, user satisfaction, higher employee morale, increasing team interaction and team spirit creation, creating a sense of belonging among employees.

Authors [34]-[36] characterize *Computer integrated manufacturing - CIM* as a production approach to integrating all production functions with the help of computers to control the entire production organization. CIM relies on closed loop control processes based on real-time sensor input. Through computer integration, product production can be improved, faster and less erroneous. The main advantage of CIM is the ability to create automated manufacturing processes. It is also known as flexible design and production. In possible terms, CIM is a function of three elements, hardware, software, and human knowledge representation.

According to [37] *system ERP* provides an integrated and continuously updated view of core business processes using common databases maintained by a database management system. ERP systems track business resources cash, raw materials, production capacity and the status of business commitments: orders, purchase orders, and payroll. The applications that make up the system share data across various departments (manufacturing, purchasing, sales, accounting, etc.) that provide the data. ERP facilitates information flow between all business functions and manages connections to outside stakeholders [37].

III. RESULTS AND DISCUSSION

A. Analysis of the Approach Implemented in Production Management

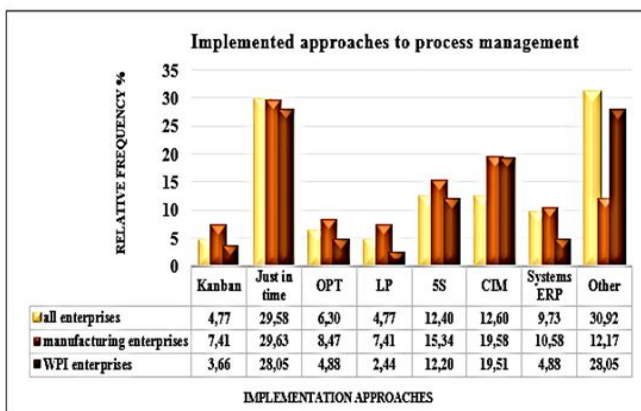


Fig. 2. Analysis of implemented approaches to production management. (source: author)

In the research question regarding the implementation of production management approaches, in the Just-Time response, all the monitored categories of enterprises participated in approximately equal percentages from 28.05% to 29.63%. In the range of 12.20% to 19.58%, all

enterprise categories responded to the implementation of production management approaches such as the 5S or CIM method – Computer Integrated Manufacturing. The response to ERP systems exceeded 10% only for manufacturing enterprises, all enterprises responded by using ERP systems at 9.73% and WPIs by 4.88%. The response to the use of ERP systems exceeded 10% only for manufacturing enterprises, all enterprises responded at 9.73% and WPI enterprises 4.88%. Kanban, Optimized Production Technology – OPT, and Lean Production (LP) approaches were implemented in all monitored enterprises ranging from 2.44% to 8.47%. In production management, other methods use 30.92% of all enterprises, 28.05% of WPI are 12.17% of manufacturing enterprises. The results of the questionnaire survey on implemented approaches are shown in Figure 2.

Table 1 describes and analyses the relationship between the average numbers of responses to the question of implementation of approaches to managing production and achieved the value of Return on Equity - ROE.

TABLE I. THE CONTINGENCY OF IMPLEMENTATION APPROACHES TO MANAGING PRODUCTION AND RETURN ON EQUITY ROE

Average number of responses per group	ROE VALUE					
	< 0%	0-2%	2-4%	4-7%	7-10%	> 10%
All enterprises	1.31	1.04	1.02	1.16	1.24	1.05
Manufacturing enterprises	1.00	1.07	1.02	1.19	1.30	1.94
WPI enterprises	1.00	0.95	1.00	1.00	1.08	1.33

Source: personal processing according to results of projects No 1/0286/16

Enterprises had multiple responses to the implementation of selected approaches. From the analysed research results, it was found that they most implemented selected approaches in enterprises with a positive ROE of 7% to 10% or more. On the other hand, at least the selected approaches have been implemented by enterprises that have achieved a ROE of between 0% and 4%. Manufacturing enterprises with a ROE of more than 10% have an average of about 2 options on this issue, with only one answer given to companies with a negative ROE. The highest average response rate of 1.33 in WPIs was achieved by a group of enterprises with a ROE of more than 10%, which means that on average each third enterprise implemented two production management approaches. The WPI enterprises, some enterprises have experienced answers to who said they do not use any selected approach or another approach offered in response options.

IV. CONCLUSION

Implementation and application of selected process management concepts and approaches lead enterprises to management excellence, enabling businesses to increase their potential, enabling them to better cope with other competing enterprises. For this reason, enterprises are better able to react more quickly to changes and are more easily adapted to market requirements. Business development predetermines a global strategy that at the same time puts high demands on its adaptive abilities. An enterprise can achieve and maintain high performance only through the proper implementation and application of appropriate

approaches and production management concepts. Although at present the use of new methods and approaches at a relatively low level in enterprises in the Slovak Republic, we can conclude from the research results that enterprises using these approaches and concepts of production management achieve higher ROE performance ratios from 7% or more. Efforts enterprises by improving efficiency, increasing productivity and improving quality can be based on research directed to the use of appropriate methods and approaches in the management process. In the longer term, businesses will prove to be able to achieve planned results and goals.

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