



SLIGHT PPC SYSTEMS ADAPTION

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ABSTRACT. Logistics is a crucial issue for small and medium-sized enterprises (SME). Logistics constantly varying demands on a company require adjustments of its production planning and control systems (PPC systems) to the dynamic changes of supply chains under consideration of the company's work organization. The aim of the project 'PPC adaption' is to develop a simple method for adjusting a company's used PPC system to a constantly changing production and market environment. With the help of this system SME's are able easily to adapt their PPC systems to varying external and internal influences. Regardless of the company's type of PPC system, the result is applicable in every SME's.

Key words: production planning and control, production logistics, adaption.

INTRODUCTION

From August 2007 to February 2009, the non-profit research organization IPH - Institute of Integrated Production Hannover gGmbH conducted the research project "PPC-Adaption to Changes in Supply Chains". The aim of this project was to develop a method that enables companies to adjust their PPC systems to internal and external changes. The project was funded by the German Federal Ministry of Work and Economy through the AiF (Arbeitsgemeinschaft industrieller Forschungsvereinigungen Otto von Guericke e.V.), a work group or research cooperation for industrial research associations.

Today, most standardized software tools for production planning and control are the backbone of SME's. Whenever the configuration of production processes or supply chains change, planning parameters need to be adapted as soon as possible. Otherwise the PPC system does not work efficiently and the company cannot achieve a prominent market position in regard to schedule reliability, machine utilization, throughput time and work-in-process-level (figure 1, step 5).

PRACTICAL CHALLENGES

Practical experience has shown that many companies do not sufficiently supervise and adjust the planning parameters on a regular basis. Reasons for this may be lack of knowledge concerning which parameter needs to be adapted when environmental changes happen, or which parameters interact with each other. Sometimes the PPC system does not support a precise adjustment of parameters. Moreover, the required energy and resources to conduct adaption often exceed a company's personnel capacity, and staff is often not adequately qualified.

A SIMPLE METHOD FOR ANYONE

The new adaption method works independent of the particular applied PPC system and can be used without fundamental adjustments or complex implementation routines. Furthermore, using a control loop it guarantees that SME's are able to regularly check their PPC systems. For the company to be able to come to a well-founded decision concerning a possible need of changes, the method helps assess the expected logistic benefit and the resulting organizational requirements and expenses. Figure 1 shows five substantial modules of the method, whose support the PPC system adaption.

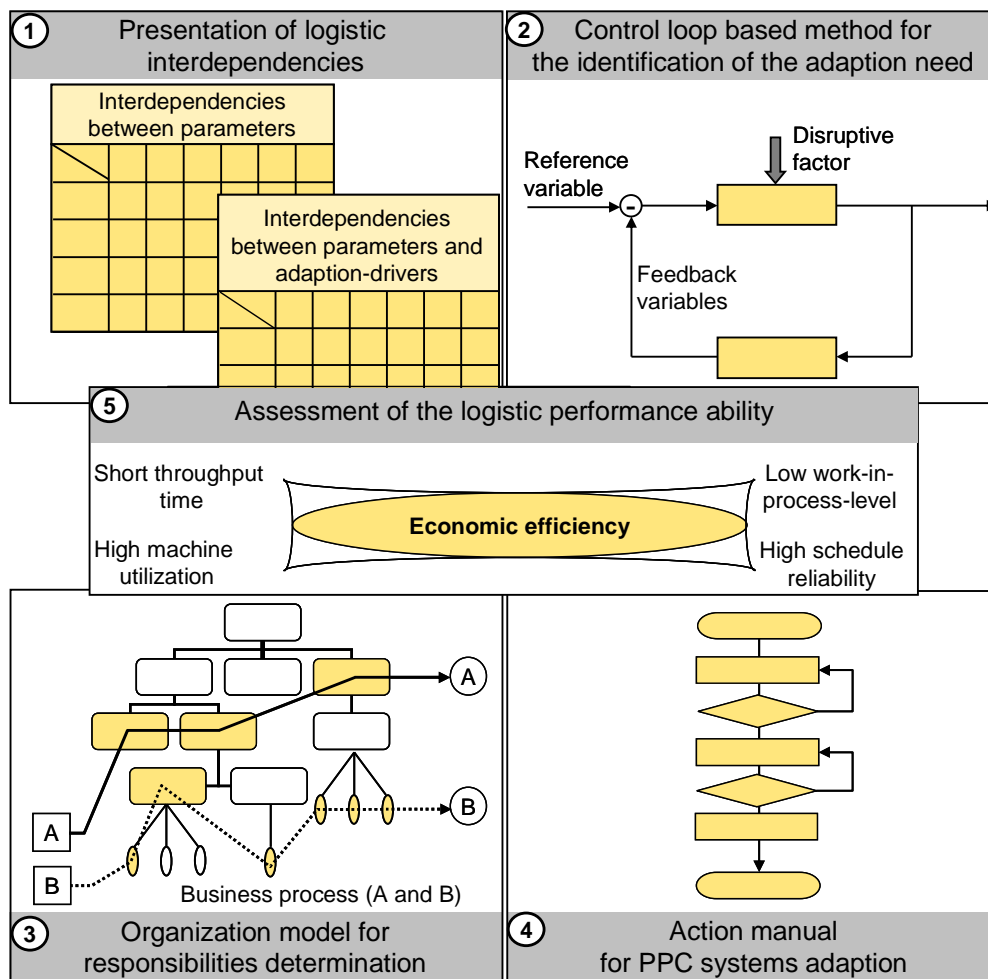


Fig. 1. Moduls of PPC adaption
 Rys. 1. Moduły PPC

At the beginning of a reconfiguration project, well-known adaption-drivers (e. g. a new supplier or new technology) need to be recorded in spreadsheets by the enterprise. In these lists, the SME's determine their individual adaption need. The adaption-drivers and affected planning parameters need to be classified. A possible classification consists of combining the adaption-drivers according to their origin (e.g. supplier or client related) or the reasons for the changes (e.g. technical internal changes or organizational changes).

STEP BY STEP

The existence of interdependencies between the classes of adaption-drivers and affected planning parameters need to be examined. In order to make SME's able to identify these relationships by themselves, appropriate correlation matrixes are made available (figure 1, step 1). A variation of the parameter "demand for products" changes the parameter "production volume" in the PPC system. The correlation matrix allows comfortable finding of specific parameters which have to be adapted among a multitude of possible configurable affected planning parameters. The respective action to be conducted by a SME is regularly determined using a control loop (figure 1, step 2) within the PPC adaption. The control loop is an easily applicable device clarifying the form and frequency of the required adjustment subject to reference variables (e. g. volume ordered by customer), disruptive factors (e. g. changes of volume ordered) and feedback variables (e. g. adaption production volume). Also an organizational model (figure 1, step 3) describes which departments or persons should take over which tasks for the system adjustment. Therefore this organizational model defines the appropriate responsibilities for the adjustment of PPC system. For daily use all required operations are explained in an instruction manual (figure 1, step 4) which suggests production logistics for adjusting the PPC system. A processing which evaluates the effect of a parameter change takes effect on the logistic efficiency of the SME (figure 1, step 5). In case of contrary logistic goals, as for instance aiming for low work-in-process-level of finished products on the one side and a high machine utilization on the other side, parameter adjustment needs to be determined which allows the best fit on the individual objective of SME's.

At the end of the research project, the focus was on validating the developed method. This method was tested by the project partners' enterprises. The test results have shown the practicability for SME's and are a part of validation to ensure the later applicability of the project results with other SME's.

The described modules of the method can be applied individually. For instance, the organizational model alone can be introduced in a company. The entire potential of the innovative method, however, is only achieved by the use of all components.

CONCLUSIONS

The method developed by IPH supports SME's with constant updating of PPC systems. Charts with adaption-drivers as well as appropriate planning parameters, an action manual, a control loop, an organizational model and the possibility for the economic evaluation of the changes are at the company's disposal. The examined topic concerns a large number of producing companies, since almost everywhere PPC systems are widespread and have to be adapted to the requirements of the enterprises and their supply chains regularly. In future, internal and external influences on the PPC systems of the enterprises can be evaluated in regard to the logistic effects.

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ADAPTACJA SYSTEMÓW PLANOWANIA I STEROWANIA PRODUKCJA

STRESZCZENIE. Konsekwencją niewystarczającego dostosowania systemów planowania i sterowania produkcją (PSP) do dynamiki zmian zachodzących w obrębie łańcuchów dostaw oraz wydziałów produkcyjnych przedsiębiorstw są niestety nie w pełni efektywne systemy sterowania w/w funkcjami. Przyczyną tego stanu rzeczy jest z jednej strony nieznanostwo związków przyczynowo-skutkowych, zachodzącymi pomiędzy istotnymi, zewnetrznymi czynnikami zmian i wewnetrznymi parametrami przedsiębiorstwa oraz z drugiej strony zbyt pózne wdrażanie rozwiązań dostosowawczych, jak również niezbyt jasno dookreślone kompetencje dla ich wdrażania. Z tego tez wzgledu najwazniejszym wyzwaniem w tym zakresie stalo sie opracowanie metody dla adaptacji systemow PSP do dynamiki zmian, wystepujacych w obrębie łańcuchów dostaw. Dla pokazania relacji pomiędzy sprawczymi czynnikami takiej adaptacji a istniejącymi parametrami wyjściowymi oraz dla identyfikacji możliwych i adekwatnych do potrzeb rozwiązań opracowano standardowy model adaptacyjny. Model ten zawiera metode oceny potencjalnej mozliwosci wdrozenia okreslonych zmian pod wzgledem nakladów i osiaganych korzyści. Schemat organizacyjny funkcjonowania modelu oraz instrukcja postepowania operacyjnego wspieraja funkcje optymalnego ksztaltowania przedsiwzień organizacyjnych w celu efektywnego dostosowania systemow PSP do relacji zachodzących zarówno w ramach wydziałów przedsiębiorstwa oraz w kontekście przebiegu okreslonych procesow wewnatrzakładowych, jak i w obrębie całego łańcucha dostaw.

Słowa kluczowe: system planowania i sterowania produkcją, dostosowanie, łańcuch dostaw, logistyka, parametry, model adaptacyjny.

ADAPTION VON PPS- SYSTEMEN

ZUSAMMENFASSUNG. Die mangelnde Anpassung von PPS-Systemen als Reaktion auf das dynamische Änderungsverhalten von Lieferketten und der eigenen Produktion haben ineffiziente Systeme zur Folge. Gründe hierfür sind zum einen die Unkenntnis über Kausalzusammenhänge zwischen relevanten externen Veränderungen und internen Stellgrößen und zum anderen die verspätete Maßnahmeneinleitung und unklare Zuständigkeiten für die Anpassung. Daher stand die Entwicklung einer Methode zur Adaption von PPS-Systemen an das Lieferkettenverhalten im Vordergrund. Um die Zusammenhänge zwischen den Adaptionauslösern und den vorhandenen Parametern aufzuzeigen sowie entsprechende Maßnahmen abzuleiten, wurde ein Regelkreis entwickelt. Dieser Regelkreis beinhaltet eine Bewertungsmethode, welche das aufgezeigte Änderungspotenzial nach Aufwand und Nutzen abschätzt. Ein Organisationsmodell und ein Handlungsleitfaden unterstützen die Gestaltung der Aufbau- und Ablauforganisation zur effizienten Anpassung von PPS-Systemen sowohl über alle innerbetrieblichen Geschäftsprozesse und Unternehmensbereiche als auch über die gesamte Lieferkette hinweg..

Codewörter: Produktionsplanungs- und Steuerungssystem, Anpassung, Lieferkette, Logistik, Parameter, Regelkreis.

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