I. ABSTRACT

Industrial Product-Service Systems (IPS²) are a new way to deliver customer value in contrast to just offering a product and providing services. The delivery of IPS² is performed with a network that includes suppliers as well as the IPS² provider and the IPS² customers. To support the IPS² provider in the management of this network and the planning of the required resources for the IPS² delivery, a software tool is required. The development of such a system is the aim of the research project. Therefore, an IPS² Execution System is introduced and designed.

For the implementation of the IPS² ES requirements for the IPS² delivery have to be collected. Based on that, a system architecture can be developed and a prototype of an IPS² can be implemented. Due to the complexity of the automatic planning and control of the IPS²-ES, the output of the system can be manually controlled. Hence, an automated method to measure and rate the resulting IPS² focused on the planning algorithm and IPS² network has to be developed.

II. INDUSTRIAL PRODUCT-SERVICE SYSTEMS (IPS²)

In the manufacturing industry competitors are continuously struggling to differentiate from other companies in the market. Industrial Product-Services (IPS²) offer this differentiation by representing a paradigm shift from traditional product selling and service offering to providing customer value, as presented by (1). (1) also presents the following definition of IPS² based on (2):

> “An Industrial Product-Service System is characterized by the integrated and mutually determined planning, development, provision and use of product and service shares including its renewable components in business-to-business applications and represents a knowledge-intensive socio-technical system.”

According to (3), the IPS² Lifecycle is divided into five phases: planning, development, implementation, delivery and use as well as closure. The research presented in this paper is focused on the delivery phase of IPS². To support the IPS² provider during this phase an IPS² Execution System (IPS²-ES) is needed for planning, scheduling and organization of the required delivery processes and the partner network.

III. IPS² ORGANIZATION AND PLANNING

The operation phase includes the use of the IPS² as well as the delivery of (service) processes. For the execution of the delivery processes, several different resources are needed. Especially an IPS² provider cannot necessarily provide the capacity of all resources for the delivery of multiple IPS². To support the IPS² provider during this phase an IPS² Execution System (IPS²-ES) is needed for planning, scheduling and organization of the required delivery processes and the partner network.

IV. IPS²-EXECUTION SYSTEM (IPS²-ES) FOR PLANNING AND SCHEDULING THE SERVICE DELIVERY

To enable the delivery of processes that are needed to cover unplaned demands that arise on short notice. Strategic capacity planning influences which partners are compared to which IPS² network and defines the planned IPS² delivery network, operational resource planning changes the IPS² delivery networks to cover all demands with a use generic algorithms to generate delivery plans. (5)

V. PERFORMANCE MEASUREMENT (Morlock)

Elements of the IPS²-Execution System like planning and IPS²-organisation are automatically executed. Thus it is difficult to measure and evaluate these elements manually. To measure and evaluate organizational and planning issues a Performance Measurement Method (PMM) to support the IPS² provider network have to be handled efficiently, the IPS²-Execution System (IPS²-ES) is developed. It serves as an automated tool and information system to coordinate the resources and suppliers for the delivery of all IPS² provided by an IPS² provider.

Existing software solutions do not handle the extreme complexity of the dynamically changing partner networks and focus either on service provision planning or on production planning. However, an integrated approach is needed for IPS². This information management of the different software systems are used by the IPS²-ES to fulfill its purpose (see Fig. 3).

The required high availability as well as need for a real-time execution of the planning algorithms postulate the use of a high performance system that can be provided by cloud solutions. A plugin system allows for the integration of new services and partners as well as the connection to external systems (see Fig. 4).

REFERENCES


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