Business Process Modeling in Port Logistics: Towards a Process Reference Model for Container Terminal Operations

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Abstract

It has been over thirty years, since Porter's seminal work on the value chain model was first published, describing common high-level chain processes and establishing core processes, such as inbound/outbound logistics and production operations as those that add value to the products or services delivered by a company. In today's business environment where no longer companies but whole supply chains, involving large numbers of autonomous business entities, compete with each other, the value of processes and business process modeling is already well documented and established. The inter-organizational and complex nature of supply chain processes and the rapidly changing and continuously fluctuating business environment demands methods, tools and practices capable of designing new or adjusting existing processes in an effective, efficient and inexpensive manner. This can be achieved by reusing information and knowledge already captured and offered in existing reference process models. A reference model depicts structures, attributes, relationships and behaviors of objects for a given domain. It is represented in a general, reusable and applicable form, so that specific application models can be created by adaptation and modification. In that sense, reference process models act as generic blueprints for future modeling and design tasks. The elaboration of a generic reference model is based on a set of business process modeling methods and tools providing the necessary functionality to support the desired level of abstraction of the modeling effort and its different perspectives. In this paper, the initial efforts towards the development of a reference process modeling to support standard operations and reengineering efforts of contemporary container terminals is presented. The study includes a literature review of port logistics operations with a special and more detailed focus on container terminal processes, a short study of available reference models for supply chain processes, the presentation of the research methodology, the description of the business process modeling method and tool selected for this study along with the decision's rationale and finally the first results of the selected method's application in a real life case study in the Container Terminal of Piraeus Port Authority S.A. (PPA) - Greece. Specifically, after an extensive literature review, the ARIS Framework (Architecture of Integrated Information Systems) of methods and tools was selected to support the graphical representation of container terminal operations and the future redesign and improvement of business

processes considering their different perspectives. The modeling effort presented in this paper, focuses in eight typical core process of PPA's core terminal, i.e. Preparation for ship's arrival, Vessel Planning, Yard Planning, Containers Yard Inspection, Work scheduling and assignment, Loading & Unloading, Container Moving & Staging, Inbound/Outbound Truck Loading. Finally, a discussion on the suitability of the business process modeling tool for the purpose of developing the Container Terminal Reference Model is taking place, followed by a description of the next steps of our future research.

Keywords: Port Logistics, Container Terminal, Supply Chain, Reference Model, Business Process Modelling, ARIS.