

# Workflow Methodology for Collaborative Design and Manufacturing

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**Abstract.** During product development processes, collaboration has become a common practice between different departments and companies that are involved in their activities. Product Lifecycle Management (PLM) tools can facilitate collaboration among distributed teams within the context of an extended enterprise, but the efficient use of them is still hard to achieve. In this work, we propose a workflow based approach in order to implement product development collaboration, focusing the discussion on a case study of the integration of design and manufacturing activities, using workflow functionality offered by PLM software.

**Keywords:** Workflow Management, Collaborative Engineering, Extended Enterprise, Product Lifecycle Management.

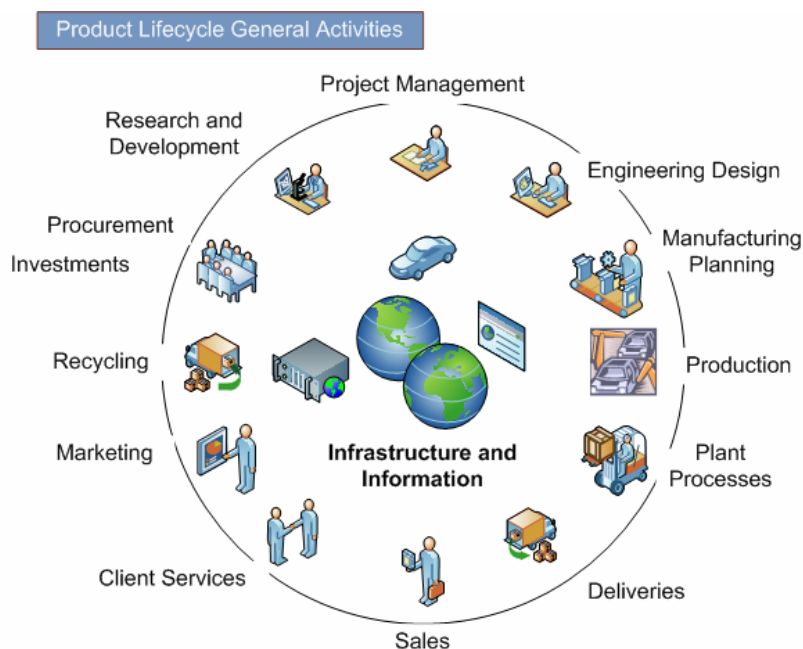
## 1 Introduction

In the age of the extended enterprise, the quick expansion of the Internet provides the infrastructure by which information can be simultaneously available to all those involved in product lifecycle activities from product design to product recycling. Collaboration has become the mainstay of product and processes development but it must not end just with engineering design activities, it should continue with other activities such manufacturing process planning, manufacturing, production and those that concern the product lifecycle [1, 2].

It is obvious that collaboration is needed in all the activities of the product lifecycle (Fig. 1.) and if there is any problem within two activities of the chain it will affect all the others. In this scenario we would like to pay attention to the problems between product design and manufacturing.

Today, computer aided tools enable collaboration among marketing department, product designers and manufacturing engineers to avoid manufacturing problems and decrease lead times in product development. Typically, these tools integrate the product development data within a Web shared database [3]. Nevertheless, real practice is far away from total collaboration [4].

In the framework of the extended enterprise, where companies collaborate and compete, designers need to know the exact capacities of the processes used by the



**Fig. 1.** Collaboration across Product Lifecycle

enterprises responsible for product manufacturing in order to make an efficient process planning which is the bridge activity between design and manufacturing [5].

Although collaborative engineering (CE) depends on the use of modern web based collaboration, the real situation of many CE implementations reminds us that, by simply adopting the required technology, it does not ensure the success. Therefore, it is needed not only a web-based tool for collaboration (Product Lifecycle Management, PLM, or Computer Support for Collaborative Work, CSCW) but also a workflow based methodology that enables the integration and coordination of products life cycle processes and the information exchange between all the people involved [6,7].

Literature reports some research efforts in the direction of collaborative manufacturing and distributed networks [8-10] with applications based on the Information and Communication Technologies (ICT) through the Internet.

With this aim, the research presented in this paper is part of a project conceived for collaborative design and manufacturing within a manufacturing cluster, where workflow models support and coordinate the information sharing and the management of the product development activities. We present a particular case study, in which we propose a framework for the coordination of the design, process planning and manufacturing activities, through a workflow model and its implementation in a commercial product lifecycle management tool (PLM).