

Concurrent engineering and virtual reality for human resource planning

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Abstract

New tools, such as the Internet virtual reality, used in support of new global industrial initiatives, can only be implemented effectively with knowledge and consideration of the context in which they are to be used. The following paper provides some background of effective concurrent engineering and its relevance in implementing these new tools and initiatives in the services industry. Considering the current trend toward globalization and the need for geographically distributed product development, manufacturing, marketing and training, it is important to develop domain knowledge regarding technologies, such as the Internet virtual reality, while giving special consideration for the previously developed understanding in concurrent engineering in manufacturing. This paper addresses some research questions recently studied regarding some of the human and organizational aspects of global product development and virtual training in the manufacturing and service industries, while considering some of the current practical limitations. The summary of work presented in this paper together provides a connection between the lessons learned in concurrent engineering in manufacturing industries with applications to risk management training in the service industries. The suggestions for future work are intended to provide some insights for an effective utilization of new technologies, such as the Internet virtual reality, in support of global software product development projects and human resource planning in the service industry. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Internet-based virtual reality tools; Global industrial initiatives; Geographically distributed work; Concurrent engineering; Risk management; Training; Services industry

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¹ Parts of the manuscript were prepared while serving as a Visiting Assistant Professor in the Department of Industrial Engineering, University of Wisconsin-Madison.

1. Introduction

New tools, such as the Internet virtual reality, used in support of new global industrial initiatives can only be implemented effectively with knowledge and consideration of the context in which they are to be used. In the face of new global initiatives, such as geographically distributed product development,

manufacturing, marketing and training, manufacturing companies will reach out, as in the past, toward new technologies like the Internet virtual reality that offers the promise of better productivity and improved performance at a distance. In addition, service-oriented companies could possibly adopt these technologies for similar purposes. In the 1980s and early 1990s, the United States allowed for a great deal of focus on research that would enable manufacturing to be more globally competitive and successful. However, as in the past, it is important to consider how organizations facing technological change today can have the best chance of success. Some lessons learned in the manufacturing may help give insights for some cases in the service industry.

1.1. Objective 1

One objective of this work is to provide some background regarding the effectiveness of concurrent engineering and its relevance in implementing these new tools and initiatives in the service industry.

1.2. Objective 2

A case study is emphasized that illustrates global product development and global marketing in the service industry. The similarities with the previous concurrent engineering studies are emphasized. An example is shown to illustrate that although the service and manufacturing industries may typically be thought of as having different agendas, the lessons learned in manufacturing should not be ignored.

1.3. Objective 3

In addition, it is important to develop domain knowledge regarding technologies such as the Internet virtual reality. Our current understanding of the benefits of such tool is limited and our understanding for the impact of such tool on perception and decision making is also limited. Development of such tool is an interdisciplinary effort and when done in support of an interdisciplinary work, it is again important to give special consideration to the previously developed understanding in concurrent engineering in manufacturing.

1.4. Objective 4

Some research questions regarding some of the human and organizational aspects of virtual reality tools were recently studied. These are examples related to the training of procedural tasks and the effect of different training conditions on decision making in a manufacturing setting. Consideration is given to the applicability of these experimental results to a special case in the service industry. Some of the current practical limitations are considered.

The summary of the work presented in this paper, along with the suggestions for a specific application in the service industry, is intended to provide some insights for the effective utilization of new technologies, such as the Internet virtual reality. It is believed that such tools, if understood in the context of a successful concurrent engineering in manufacturing, can be used successfully in support of the global industrial initiatives in product development and training in the service industries.

2. Literature review

The following sections describe the background to effective concurrent engineering and its relevance in implementing these new tools and initiatives.

2.1. Concurrent engineering

Manufacturers in the 1980s faced a growing need for reducing time to market, and with the introduction of more interdisciplinary endeavors, such as concurrent engineering, required a great deal of interdisciplinary communication. Concurrent engineering is typically considered to be a (technological) process by which products are developed in parallel with the manufacturing processes and those products are developed in teams typically represented by design, manufacturing and marketing with some guidance from the management [1].

2.2. Technological change

For the purposes of this work, the adoption of concurrent engineering would be considered a 'tech-

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