

**RAPID PROTOTYPING IN THE TEXTILE & APPAREL INDUSTRY:
A PILOT PROJECT**

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ABSTRACT

Technological advances during the past decade have opened many new doors for the Textile and Apparel industries, especially in the area of rapid prototyping and related activities. We need to have a better understanding of how some of this technology may benefit the textiles industry, how these developing systems can be most successfully implemented, and how we can use these systems to the greatest advantage to serve our customers, today and in the future. A project was developed to explore integration of 3-D body scanning, CAD/CAM, and digital printing technologies to support prototyping and mass customization activities. Patterns altered to fit each specific customer were cut from their digitally printed designs, sewn into the desired garments, and tested for fit. This project allowed us to test the developing rapid prototyping and mass customization paradigms and look for the bugs that are inherent in new technologies. While the process was ultimately successful, several areas were uncovered where the implementation of these processes might be problematic for industry.

1 INTRODUCTION

During the past decade, the textile and apparel complex has been scrambling to adjust to a rapidly changing business environment. With increasing imports and rising labor rates, the industry has seen a drastic change in its appearance. Businesses have closed and employment within the industry has decreased, as production of textile products moved to other countries. Industry leaders have been forced to evaluate this business shift and the ultimate effect on the consumer to determine ways in which the industry might maintain, if not regain, market share. These evaluations have led to the development of quick response, rapid prototyping, and mass customization strategies.

Quick response (QR) strategies were developed during the 80s, with the expected benefits to the industry of reduced overhead, handling costs, product inventories, financial investments, and markdowns [1,2,3]. Theoretically, the adoption of these strategies would allow businesses to respond to consumer demand more quickly than mass production strategies, because product

decisions and commitments would be made closer to product entry in the marketplace—weeks rather than months before introduction. In order to implement QR strategies most effectively, a significant amount of trust and communication between members of the supply chain was imperative. The Demand Activated Manufacturing Architecture (DAMA) project was created in 1993 to help the Integrated Textile Complex (ITC) manage supply chain partnerships that would support quick response strategies (DAMA, 2000) [1].

Unfortunately, the industry as a whole has had difficulty implementing these strategies, for a number of reasons. First, the development time required for a new textile product was especially lengthy. New print designs took weeks or months to produce the first strike off for sample fabrics. The design and development process was not only lengthy, it was also extremely costly—costing almost \$30,000 to set up each design, whether the design was actually put into production or not [1]. Second, businesses in the ITC were not normally powerful enough to be able to trust that their industry partners would