

Enhancing Value Stream Agility: The UK Speciality Chemical Industry

THOMAS BURGESS, *Leeds University Business School*

BRIAN HWARNG, *National University of Singapore*

NICKY SHAW, *Leeds University Business School*

CLAUDIO DE MATTOS, *Leeds University Business School*

As part of a shift in chemical production occurring across the globe, the UK chemicals industry is increasingly moving from commodity to speciality production. In the UK the industry's batch production methods are little changed from previous decades and the speciality chemicals industry faces mounting challenges that argue for an increase in agility throughout the industry value stream. Individual companies and managers have responded in a variety of ways to these challenges. The Britest research project is a concerted industry response that seeks to improve the three key value streams of the industry by introducing new philosophies and methods into plant and process design. This article outlines the Britest approach to introducing agile manufacturing concepts in the speciality chemicals industry and then extends the approach to a more holistic focus on supply networks rather than concentrating on individual production units. © 2002 Elsevier Science Ltd. All rights reserved.

Keywords: Speciality chemicals, Value streams, Process improvement, Supply chain management

Introduction

Global chemical production is increasingly differentiated according to the stage of a country's economic development. Corporations are focusing manufacturing located in developed economies on speciality chemicals to counter the comparative advantages in

commodity chemical production enjoyed by newly emerging economies. However, corporations are doing more than simply concentrating on speciality as a strategic response; they are pushing to improve competitiveness in the crucial value streams that deliver speciality chemicals. Here we look at speciality manufacturing in the UK, and at actions taken to make manufacturing at the plant level more agile and then we extend this thinking throughout the whole value stream.

The UK chemicals industry is traditionally a key contributor to the national economy, with total production value of approximately £33 bn in 1999, and an important player on a global basis since £22.4 bn of this was exported from the UK (Howitt, 2000). This tradition, although under threat, e.g. ICI losing its role as "bellwether" company, is still in place today. The primary segment of the industry produces active ingredients for the pharmaceutical industry while the next largest segment produces organic chemicals for use as basic building blocks in the manufacture of consumer and industrial goods. Other segments lying within the industry include plastics, perfumes, surface coatings, dyes and pigments, and fertilizers. In the past the UK has been home to a number of large trans-national corporations such as ICI, Zeneca and Glaxo Wellcome. However, significant changes are reshaping the (global) industry, such as the recent mergers of the last two mentioned companies with other partners to form AstraZeneca and Glaxo SmithKline. These mergers are part of a response to the increasingly fierce global competition and to the

changing nature of the chemicals industry. The high level of competition is evident in that although UK chemical exports are substantial, imports have captured 63% of the UK market (Howitt, 2000). Recently the industry has come under increasing pressure, particularly in commodities, from competition from lower cost economies, e.g. China and India. The UK based industry is continuing to evolve away from commodity products and moving more towards producing low volume, high value added speciality chemicals with the intention of leaving high volume, low value added to more emergent manufacturing countries.

The speciality chemical industry is fundamentally important to modern economies with its products used by every consumer industry and in every industry application (Howitt, 2000). However, the increased competition in the industry and other significant factors such as customer requirements for faster response than hitherto means that companies, and the value streams that they are positioned within, need to be more agile to respond to the challenges of this new regime. Surprisingly, despite the present and growing importance of the speciality market, UK industry relies substantially on methods of batch production that have little changed over the last half century. Major industry players believe that if the UK industry is to survive then companies need to move on from this traditional approach to manufacturing and thus imbue the industry value streams with increased agility. In this paper we illustrate via case studies this fundamental challenge to the industry and explore some of the ways that this challenge can be grasped. In particular we highlight the results of a particular industry and academia response to render more agile the key manufacturing elements of the industry's value streams.

This paper starts by taking a brief look at the concept of agility. Next the characteristics of the industry are examined and a value stream view articulated. The driving forces that are moving the industry towards this more agile regime are highlighted and illustrated by industry "snapshots". Some ways of enhancing agility are then investigated and in particular an approach developed within a 3-year multi-disciplinary research project, **Britest**, is presented. The approach is then extended in scope to apply to supply networks before concluding the paper.

Agility

The important manufacturing philosophy of leanness (Womack *et al.*, 1990) has impacted significantly on Western manufacturing in recent decades. However, more recently the philosophy of agility (Goldman *et al.*, 1995) has been advocated to address what is seen as a gap in the capabilities of lean thinking (Christopher, 2000). However the nature and content

of both philosophies are subject to debate, perhaps more so in the case of agility given its more recent appearance (Burgess, 1994). In their previously cited key contribution Goldman, Nagel and Preiss (1995, p. 42) describe agility, in very general terms, as follows: "Agility entails a continual readiness to change, sometimes to change radically". Agility can also be seen as the ability to use market knowledge and to exploit profitable opportunities in a volatile market place (Naylor *et al.*, 1999).

In some respects agility can be interpreted as a return to emphasizing flexibility, but in a more dynamic sense than hitherto, by privileging new product or new supply capability introduction. While leanness is seen to focus on resource frugality, i.e. keeping costs to a minimum, agility is seen as more clearly addressing the need to respond speedily to changes in customer requirements (Christopher, 2000). In the context of the chemical industry it can be argued that lean thinking is ideal for commodity production, where price is often the order winner, while agility is more suited to speciality production where delivery times can be the key order-winning criterion. Unfortunately such a renewed emphasis on flexibility, if agility is interpreted in this way, does not augur well for UK industry given its past poor record on improving flexibility (Ackroyd and Procter, 1998).

The UK Industry

Arora, Landau and Rosenberg (1998) give three reasons why the chemical industry is important:

1. chemicals were the first science-based high-technology industry whose inception can be traced back to the dyestuffs industry of the 1850s;
2. the sheer size of the industry;
3. its role in providing products and technologies that support other industrial sectors.

In the 1830s through to the 1870s Britain dominated the world's chemical industry, but advantages slipped away and Germany became pre-eminent. The First World War shattered Germany's industry, led to the expropriation of its technology and resulted in Britain catching up while the industry in the USA grew in strength. In the mid-1920s both Germany and Britain sought to re-affirm their positions by establishing companies that would be national standard bearers; in Britain's case Imperial Chemical Industries was formed in 1926 by merging a number of smaller companies. Similar industrial consolidation took place in the USA but the two areas, America and Europe, differed to the extent that America relied on cheap petroleum as the feedstock while Europe relied on coal. The Second World War once again devastated the German chemical industry but this was rebuilt in the succeeding decades. However, the war led to USA gaining the dominant global position

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات