## **INNOVATION IN LMT INDUSTRIES: TWO CASES (Chapter 15)**

## **Textiles and Clothing**

As the original "leading sector" of the First Industrial Revolution in Britain, textiles have often been regarded as the quintessential low-tech industry in the modern era.

First, however, most low-tech industries today are not structured like textiles and clothing. Second, textiles themselves have shown a repeated ability to update by bringing in contemporary developments in technology. In the early twentieth century the chemicals technologies at the forefront of the Second Industrial Revolution were recruited to launch "artificial fibers" (rayon etc.); in the middle of the century "synthetic fibers" (nylon etc.) drew upon synchronous advances in plastics.

Both artificial and synthetic fibers remained branches of the chemicals industry in terms of corporate structures as well as technologies and are thus often thought of not as textiles proper, but this hardly seems reasonable. In more recent times computerized technology is making inroads into the still more fragmented clothing sector, while genetics is assisting advances in textiles. "Microfibers" of exceptional fineness have evolved for particular market niches and have begun penetrating standard clothing segments.

It is indeed the case that the recent developments have been slow to diffuse, but this probably has less to do with technological limits than with organizational aspects. The textile–clothing industry is still largely based on a pre-industrial vertical structure that is highly segmented and allows countries with low wage rates to enter through the use of relatively simple technologies, such as sewing machines. To leverage new textile technologies in the way we have described, change in production technologies may have to be linked to product changes, as for instance with microfibers.

The demand side normally offers greater prospects for leverage than the supply (technologies) side in the textiles and clothing sector. As incomes rise, consumers are willing to pay extra for fashionable brand-names. Many of the observed changes in what is fashionable rest on styling rather than technological innovation, though naturally that does not imply any lesser need for creativity. Even here, however, new technology may help bridge the gap between designers, producers, and their markets.

An important innovation by Benetton was the firm's use of ICT to learn quickly about changes in market tastes in order to instruct their suppliers (Belussi 1987).

## Food-processing

A second industry frequently, and often inappropriately, classified as low-tech is food manufacturing. The "industry" is characterized by a huge variety of organizational forms, related principally to the extent to which marketing can be leveraged (Sutton 1991). It has been customary to see the industry as "supplier-dominated" according to Pavitt's taxonomy, resting on a dependence on suppliers of the machinery for production, but this is changing nowadays in some critical ways. As such, the industry is becoming more market-driven, but one cannot reasonably leave technology out of the picture.

Like all industries, the technical efficiency of this industry comes from the knowledge bases it draws upon, but here there exists an unusual amount of variety to go with the variety of organizational structures. The range of expertise from science (e.g. food microbiology) through to engineering has to span not just production conditions but sanitation, quality assurance, environmental acceptability, and so on. The range of new technologies currently being drawn upon in this industry covers almost the whole spectrum. The traditional reliance on suppliers of machinery is being overtaken by needs for technologies from advanced instrumentation (e.g. lasers), electronics and computing (problematic because of the irregular shape of some of the leading products), biotechnology (for both materials and production processes), pharmaceuticals, and smart materials (especially in packaging), supplied by high-tech firms or public laboratories. The seemingly simple packaging of readymade and microwavable foods for sale in supermarkets in fact required very sophisticated analyses of smart materials to combine heat responsiveness, gas release (controlled oxygenation), ease of production, ease in filling during processing, as well as ease of consumer use.

Many of these new techniques remain controversial, particularly in the Weld of biotechnology (genetic modification, GM). At the heart of these controversies lies an issue already noted—is a GM food the same product or a different one? Around such points trade wars rage. As already implied, the nature of the product as a staple of human existence means that safety and quality procedures play a substantial role.

The difficulty with prevailing methods for testing food safety (wet chemistry) is that they involve cutting oV a piece of the product—which may or may not be representative—taking it to the laboratory and waiting about three weeks for the results. By this time the rest of the product could long since have been sold and consumed.

Biotechnological methods and other procedures are therefore being sought to effect testing in "real time," i.e. synchronously with the processing. Again the main motivation for technological innovation is time-saving—reducing downtime and waste and increasing throughput in the interests of systemic efficiency.

Changes on the demand side (from socioeconomic factors like rising wealth, growing female employment, ageing of the population) and the above technological changes on the supply side are channeled in part through a changing vertical structure of the industry, in which growing power is accruing to giant retailers visa`-vis large processors.

At the time of writing, the US food retailer Wal-Mart has become the world's largest company according to the Fortune list, superseding the high-tech and medium-tech companies of the recent past. Similarly in Europe, supermarket chains have been proactively utilizing information technologies for robust expansion of their power base. These developments make the predominance of demand-side influences on innovation here abundantly clear.