

The cotton spinning industry

By Marinus van der Sluijs¹ and Stuart Gordon¹

Cotton's share of the world fibre market has been in continuous decline since 1986 and is currently estimated to be 36.2 per cent, with projections that its share will further decline to 34.5 per cent in 2010. Despite this, cotton is still one of the world's most important fibres, at an average consumption of 3.67 kgs per capita, still accounting for more than half of the world fibre consumption per capita.

The cotton fibre sector and its by-products continue to play an important part in the global economy, with cotton production alone directly employing an estimated 350 million people and contributing in excess of \$US25 billion annually to the global economy.

The production and consumption of cotton has been steadily increasing, peaking at 26 mega-tonnes (MT) in 2007. But since 2007, production and consumption has slowed, for a number of reasons (countries such as China utilise carry over stock, global financial crisis, tightening credit limits, increased competition from grains, oilseeds and man-made fibres) and it is projected in 2009 to reach 22 and 24 MT respectively.

The major cotton producing countries are China, India, US, Pakistan, Brazil and Uzbekistan. These countries, with the exception of Uzbekistan, and inclusion of Turkey, are also the major consumers of cotton lint.

Australian cotton production peaked in 2001–02 when it produced nearly 750,000 tonnes or around three per cent of the world's cotton crop. Due to a small and quickly diminishing domestic cotton spinning industry, Australia exports 98 per cent of its cotton.

Despite its small stature as a producer, Australian cotton still makes up over 10 per cent of the medium/high medium grade cotton export volume. It is currently the sixth largest exporter after the US, India, Uzbekistan, Brazil and West Africa. Nearly all of Australia's cotton is exported to high-end use mills in South East Asia, with China, Indonesia, Thailand, South Korea and Japan being the main destinations.

The knowledge contained in Australia

as producer of high quality cotton and major exporter is extensive and well respected internationally. But local knowledge of the cotton yarn and textile processing market is virtually non-existent. The aim of this article is to provide some general information and statistics on the size and make-up of this market.

According to trade figures released by the World ...34▷



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Trade Organisation (WTO) the value of global exports of textile rose in 2008 to \$251 billion and clothing to \$362 billion.

A further survey (conducted between 2004 and 2008 by the International Cotton Advisory Committee (ICAC)) on the value of all related textile trade, revealed that; at 50 per cent, apparel imports make up the largest share of textile world trade, followed by textile fabrics other than apparel at 31 per cent, yarn at 12 per cent, non-wovens (fabric consisting of an assembly of fibres that are bonded together by chemical, mechanical, heat or solvent treatment) at five per cent and technical textiles

TABLE 1: Estimated installed capacity from 2000 to 2007*

Year	Ring spindles	Open end rotors
2000	157	8.3
2001	156	7.9
2002	169	8.1
2003	175	8.1
2004	181	8.0
2005	188	8.1
2006	203	8.0
2007	212	8.1

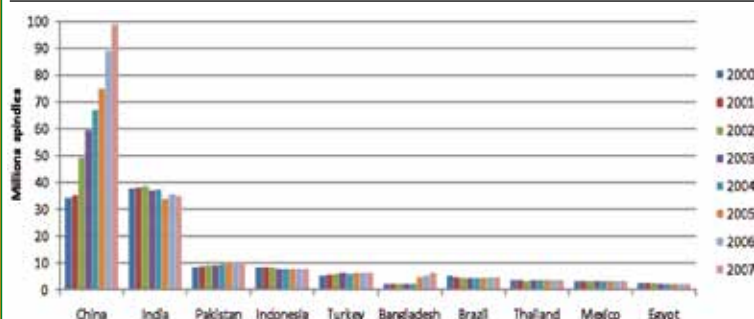
*In millions

TABLE 2: Estimated shipments from 2000 to 2008

Year	Ring spindles ¹	Open end rotors ²
2000	3.9	207
2001	3.7	260
2002	3.6	363
2003	8.2	346
2004	8.2	278
2005	11.2	374
2006	11.7	352
2007	12.8	576
2008	8.6	196

¹In millions. ²In thousands.

FIGURE 1: Top 10 countries with ring spinning installations



(includes textiles for automotive applications, medical textiles, geotextiles, agrotexiles and protective clothing) at two per cent.

MAJOR SPINNING INSTALLATIONS

To explore where this trade originates, it is important to identify where the major spinning installations are in the world. The ITMF has published statistics on textile machinery shipments since 1974 on an annual basis. These statistics are compiled from information provided by manufacturers of spinning, texturing, weaving and knitting machinery.

The most significant change to the survey recently was the inclusion in 2000 of Chinese textile machinery manufacturing and shipment statistics, which had not previously been counted. The numbers since 2000 reflect perhaps the most interesting period in textile trade since the post-war years, with the accession of China to the WTO in late 2001, and the explosion in inexpensive Chinese exports to WTO member countries.

ITMF textile machinery shipment statistics

Although cotton and other short staple fibres (less than 60 mm) are spun on a number of spinning systems, the ITMF surveys cover only the two major spinning systems namely ring spinning and open-end (or rotor) spinning. Of the other spinning systems, air-jet spinning, which includes Murata Vortex spinning, is the most popular. A rough estimate puts the number of air-jet positions at around 500,000.

As can be seen from Table 1, ring spinning continues to dominate the short staple spinning sector. Although open-end spinning has greater productivity (four to eight times higher than ring spinning), ring spinning is more versatile, producing a wider range of yarn counts and superior quality yarns. The steep rise in the installed capacity of ring spindles reflects the increased textile production from China.

It must be borne in mind that ITMF statistics refer only to the installation of new spindles and rotors and relies heavily on updated information from industry bodies. It does not take into account the large second-hand textile machinery market.

The International Cotton Advisory Committee (ICAC) estimates that world wide, 80 per cent of short staple yarns are spun on the ring spinning system with the remaining 20 per cent spun on the open-end spinning system. The majority of Australian cotton is spun on the ring spinning system. Table 2 gives a breakdown of ring spindle and open-end rotor shipments between 2000 and 2008.

Again, the sharp increase in shipments from 2003 is due to the increase in the installation of ring spindles in China (mainland). This resulted in China (mainland) becoming the country with the largest number of ring spindles world wide, displacing India in the process. The number of installations world wide continued to increase to 2007, with a sharp decline of 33 per cent from the

2007 level in 2008, mainly due to the global financial crisis. The growth in open-end installations until 2007 was also large, with a large decrease also in 2008 to its lowest since 1999.

Ring spinning installations

In 2008, 85 per cent of ring spinning installations were found in 10 countries. At 99 million spindles (46.7 per cent) China (mainland) has the largest installation of ring spindles, followed by India with 16.4 per cent, Pakistan with 5.0 per cent, Indonesia with 3.7 per cent, Turkey with 3.1 per cent, Bangladesh with 3 per cent, Brazil with 2.3 per cent, Thailand with 1.8 per cent, Mexico 1.7 per cent and Egypt with 1.2 per cent. Other sizeable but relatively small installations compared with China and India occur in Iran, Vietnam, Argentina, Taiwan, Uzbekistan, Japan, Russia, Italy, South Korea and the US.

Figure 1 gives a further breakdown of the Top 10 countries with ring spinning installations. Note that with the exception of China (mainland) and Bangladesh, all the other countries did not increase the number of spindles during this period although they may have upgraded or replaced obsolete spindles. In 2008, 96 per cent of all new ring spindles were installed in Asia. The ITMF shipment statistics also show that over the past four years there have been large investments in the installation of ring spindles in Vietnam and Uzbekistan.

Textile Intelligence have stated that developing countries with low labour costs often favour the installation

of ring spinning over the more capital intensive technology of open-end spinning. The countries that have the lowest hourly labour costs are Bangladesh, Pakistan, Vietnam, India, Egypt and China where the majority of ring spindles are installed and where future installations are expected.

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FIGURE 2: Top 10 countries with open end spinning installations

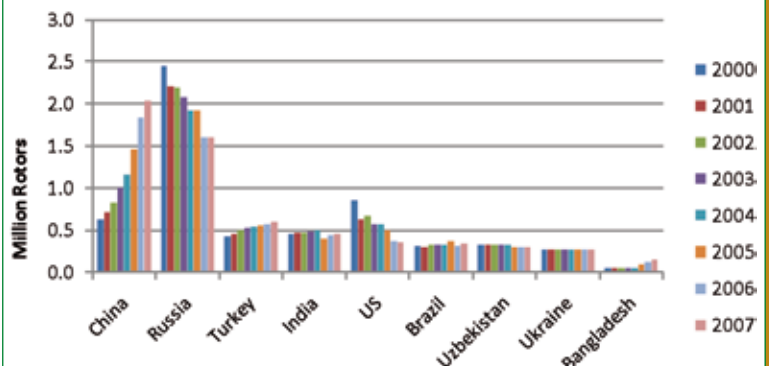


FIGURE 3: Production of cotton yarn

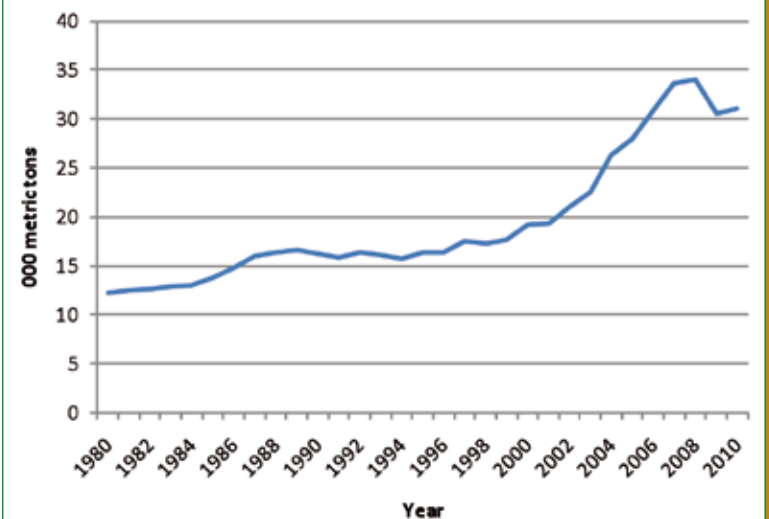
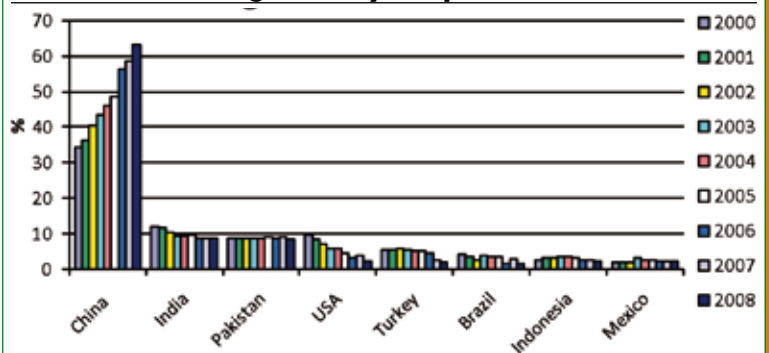


FIGURE 4: Leading cotton yarn producers



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Rotor installations

In 2008, 78 per cent of rotor installations can be found in 10 countries. At two million rotors (or 25.1 per cent of all open-end positions) China (mainland) has the largest installation of rotors, followed by Russia with 19.8 per cent, Turkey with 7.4 per cent, India with 5.6 per cent, US with 4.5 per cent, Brazil with 4.2 per cent, Uzbekistan with 3.7 per cent, Ukraine with 3.4 per cent, Bangladesh 2.0 per cent and Pakistan with 1.8 per cent. Other significant installations occurred in Indonesia, Mexico and Iran.

Figure 2 gives a further breakdown of the Top 10 countries with open end spinning installations. With the exception of China (mainland), Turkey and Bangladesh all the other countries have not increased the number of rotors although they have upgraded or replaced rotors. In 2008, 73 per cent of all new rotors were installed in Asia, with the largest installations of new rotors in China (mainland), followed by Brazil and India.

The statistics show that in 2008, there were 14,500 rotors installed in Australia, with the last installation of new equipment occurring in 1999, with only 21 per cent operational. Interestingly, until 2003, one of the longest running open-end mills in the world operated at Bradmill Textiles in Australia.

Despite the massive investments over the past nine years in new ring spindles and rotors, it is estimated that the median age world-wide of ring spindles is 21 years and for rotors 13 years.

The yarn market

As can be seen in Figure 3, cotton yarn production has steadily increased since 1980, with the majority of yarn produced world wide being in the 30-60Ne count range. As expected, the drop in cotton mill consumption

in 2008 was reflected as a drop in yarn production. Yarn production dropped to 28.3 MT in 2009 and is forecast to increase to 42.5 MT in 2010.

Similarly the production of yarns (spun and filament yarn created by twisting long filament strands together to create a smooth, lustrous yarn) from man made fibres has also been increasing since 1980 and is estimated to reach 31.1 MT in 2010. At around 60 per cent, cotton dominates the spun staple fibre yarn market followed by polyester at around 30 per cent.

Cotton yarn trade (imports and exports) steadily increased from 1990 and reached a peak in 2006. As production dropped in 2008, yarn imports and exports also dropped significantly and were estimated to be around 3.4 and 3.5 MT respectively.

The leading cotton yarn producing countries are listed in Figure 4. It is clear that the production of cotton yarns in China (mainland) has almost doubled between 2000 and 2008.

In 2008, China (mainland) produced in excess of 63 per cent of all cotton yarns, followed by India at 8.6 per cent, Pakistan at 8.5 per cent, Indonesia at 2.4 per cent, US at 2.5 per cent, Mexico at 2.2, Turkey at 1.8 per cent and Brazil at 1.5 per cent. Other significant producing countries were Thailand, Vietnam, South Korea, Russia, Uzbekistan and Bangladesh.

Similarly in 2008, the leading man-made fibre producing countries were China (mainland) followed by Taiwan, South Korea, India, US, Indonesia and Japan

CONCLUSION

China (mainland) has become the focus of the world's cotton textile trade both in terms of fibre consumption and textile production. Since its accession to the WTO, China (mainland) has become the world's largest textile economy – displacing the US.

¹CSIRO Materials Science and Engineering.



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