Partnership for Sustainable Textiles

Innovation in the textile value chain

Focus on chemicals- and environmental management

The textile sector is undergoing significant technological transformation, especially as multinational retailers and apparel brands aggressively innovate and pilot disruptive technologies such as 3D printing, body scanning technology, computer-aided design (CAD), wearable technology, nanotechnology, environmentally friendly manufacturing techniques, robotics and automation which bring production to move closer to market. Trends in reshoring are already emerging and will soon occur for the clothing sector upon introduction of automated sewing machines that enable automation of the most difficult part of apparel manufacturing. Combined, body scanning sensors and CAD not only provide the perfect fit to the consumer, but also permit extremely fast delivery.

Successfully prototyped smart clothes, or apparel enhanced with electronic and digital capabilities (e.g., smart shoes that provide health metrics and measure distances travelled). Moreover, advancements in nanoparticle research have introduced nanoparticle-infused clothes that are waterproof, stain-proof, UV protecting and/or odourless. In addition, larger brands are implementing more environmentally friendly manufacturing techniques to reduce the amount of water consumed, chemicals used and material waste produced. When the price point becomes favourable, an increasing number of consumers will demand these improved and sustainably manufactured goods en masse. Automated cutting machines are now becoming a widely available technology, and robots capable of sewing – called "sewbots" – will soon change the calculus of textile production. Sewbots are unlikely to displace current workers in ASEAN garment factories, but more likely to be deployed in destination markets such as China, Europe and the United States. The disruptive impact on the sector in ASEAN could be very substantial, as robotic automation poses a significant threat of job displacement. The producers will encounter both a displacement of lower skilled workers and an increase in the demand for higher skilled technicians and engineers to serve niche apparel producers.

Innovation:
The process of translating an idea or invention into a good or service that creates value or for which customers will pay.

Disruptive innovation:
The process of developing new products or services to replace existing technologies and gain a competitive advantage. For example, in a typical innovative high technology business, disruptive innovation tends to shake up a market when it is introduced externally, and it typically requires a more creative internal attitude toward the product development and promotion process.

Read more:
http://www.businessdictionary.com/definition/disruptive-innovation.html

Lean manufacturing is being achieved through technological improvements to assist manufacturers offset labour cost increases with cost savings in other segments such as reduced defects and usage of excess raw material, reduced manufacturing lead times and production cycle time and minimized inventory levels. Consumers nowadays are not only fashion conscious, but also increasingly looking for the perfect fit. They seek textiles that support their individual biomechanics through customization.
The lack of qualified garment and textile industry engineers and the fact that the producing countries does not have sufficient qualified tertiary engineering institution is a challenge for the export-region.

Modern technology such as automated cutting and CAD will increase the demand for skilled workers knowledgeable in operating new machines and computer software. To produce higher value products that meet heightened consumer demands from export markets, producers will need to work more closely with other sectors such as electronics, material science and medical science.
Manufacturers are deskilling operations through automation, achieving the same production with less workers. Deskilling manufacturing is also critical to achieve better quality and to reduce a learning curve that takes up to several weeks, even months, to achieve expected levels. Suppliers mentioned that modern technology is in particular replacing medium-skilled or high-skilled workers who may require six to nine months of training. To summarize, deskilling reduces manual labour, training time and worker turnover and increases overall product quality.

References:

ILO, ASEAN in transformation: Textiles, clothing and footwear-Refashioning the future, July 2016 Jae-Hee Chang, Gary Rynhart and Phu Huynh
http://www.businessdictionary.com/definition/disruptive-innovation.html

Innovative Technologies

In the following find short descriptions of the upcoming innovative technologies in the textile sectors:

Sewbots

Robots capable of sewing – "sewbots" – will soon change the calculus of textile-production. Sewbots are unlikely to displace current workers in garment factories, but more likely to be deployed in destination markets such as China, Europe and the United States. The disruptive impact on the sector could be very substantial, as robotic automation poses a significant threat of job displacement. An automated sewing machine (ASM) can run on a continuous basis without a human operator. Innovative technology at the sewing stage is pushing apparel production to what seemed impossible in the past – sewing robots automating the more difficult and labour-intensive tasks in garment making. The deployment of sewbots could be disruptive. If the total cost of using sewbots proves more economical than sourcing from off-shored countries, with direct savings accumulated in shipping and duty and wider benefits of reduced reputational risk, a strong case can be made for reshoring garment production.

Digital printing

Digital printing helps lower costs, gives a lot more options because you can take a white fabric and offer the consumer a lot more options. It's more sustainable and enables much shorter lead times.
Digital printing allows higher qualities combined with less ink-input and significant reduced less water pollution.

Body scanning technology

Body scanning technology is an especially attractive technology, as it customizes clothes in ways that Internet ordering and off-the-shelf purchases cannot accomplish. Body scanning will only become more commonplace.
Actually body-scanning technology is limited to upper mid-range products for which consumers pay a price premium. What is yet to come is mass customization offered by large retailers at no additional cost. However, technology exists to make large-scale retail customization a reality. Once a cost-effective combination of technologies is achieved for 3D body scanners, computerized pattern making, computerized size grading, computerized spreading, computerized cutting, fast-turn sewing, computerized packing and localized production, the time between consumer purchase and delivery will be drastically reduced, offering enormous efficiency.

Automated cutting machines

Automated cutting as a key innovation strategy, and targets are set to lower the losses of surfaces through manual cutting.

Nanotechnology

Advancements in nanoparticle research have introduced nanoparticle-infused clothes that are waterproof, stain-proof, UV protecting and/or odourless.

Non-sewing (stitchless) technology, or seamless technology

Seamless technology involves a special type of glue that fuses layers of fabric together. Reports show that seamless methods reduce production time by 25 to 35 per cent less than cut-and-sew methods and reduce the labour input required. The end result is a clothing piece that is sew-free, or seamless. For special functionality clothing, such as sports or active outdoor wear, a complete light-weight, waterproof clothing is possible because there are no seams to lock in moisture once the clothing comes in contact with rain or water.

Environmentally friendly manufacturing techniques

Significant steps are taken to introduce more sustainable, environmentally friendly manufacturing techniques. Consumer and enterprise consciousness is increasing with regards to environmental sustainability and zero-waste products. Textile production is well-known for its high consumption of material, water and energy to produce, pack, and ship merchandise across the globe. The cotton required for a single t-shirt consumes up to 2,700 litres of water; dyeing and printing requires vast amounts of water and chemicals and releases volatile agents.

Other green manufacturing efforts relate to integrating biodegradable materials, non-harmful chemicals and water-saving processes during production. Overall, these trends will pressure manufacturers to equip their facilities with such technologies to improve efficiency and compliance. This will, in turn, create a demand for skilled operators, engineers and others with relevant skills.