

Spotlight falls on manufacturing

Almost 500 of the world's foremost experts in production engineering - working at leading companies in the aerospace, automotive, tooling, biomedical and other hi-tech industries - are gathering in Cape Town this month to share the latest research and information on innovation in manufacturing.

The 65th general assembly of the International Academy for Production Engineering (CIRP) meets from August 23 to 29. CIRP was founded in 1951 to address critical issues related to manufacturing through production technology development and international cooperation. It has about 600 members from 46 countries.



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Its annual meeting is the most prestigious global event in production engineering. It takes place in a different location each year to extend its impact and spread ideas to scientists, researchers and the manufacturing industry in as many countries as possible.

A lack of competitiveness

Africa and Southern Africa in particular, are regarded as an important driver of future global economic and industrial growth. To realise this potential, economies in the region need to continue to diversify to reduce reliance on traditional primary industry sectors such as mining. This is the first time that the general assembly is being held on the African continent.

Competitiveness in the manufacturing sector internationally is today primarily determined by talent-driven innovation and advanced technologies above and beyond the traditional factors of production such as labour, materials, capital goods and energy. Advanced technologies include digital manufacturing, novel advanced materials, nanotechnology, biotechnology, additive manufacturing, and information and communications technology. Talent-driven innovation is underpinned by knowledge workers and their outputs, and knowledge intensive public-private partnering.

SA's competitiveness as a low-cost producer has been lost. Trade liberalisation in the early 1990s led to a surge in cheap imports. There have also been steep rises in electricity and labour costs without a concomitant rise in productivity. Manufacturers have largely not adjusted to a higher cost base, and appear reluctant to invest in new technologies and new knowledge to regain competitiveness, despite the need for such investments based on international best practice.

Export potential

The manufacturing sector shows good export potential based on analysis by the McKinsey Global Institute - specifically the subsectors of basic metals; motor vehicles and parts; chemicals; machinery, equipment and appliances; food and beverages; refined petroleum products and nuclear fuel; and niche clothing and textiles.

The Department of Trade and Industry also sees potential in the capital and transport equipment, agri-processing, plastics and aerospace subsectors.

The Department of Science and Technology has observed emerging pockets of technological excellence in additive manufacturing, fibre composites, titanium metal value chains, fluorochemicals, nanotechnology, photonics, the bio-economy, hydrogen fuel cells and advanced battery technologies.

THE CIRP general assembly will allow local manufacturers access to global manufacturing and production engineering expertise to enhance their competitiveness.

Current developments and future trends

Delegates from the manufacturing industry will have an opportunity to hear current developments and future trends in engineering. Policy makers will have an opportunity to reflect on problems and solutions in manufacturing systems and organisations, and the assembly will create conditions and opportunities for networking and collaborative initiatives.

During the first three days of the assembly, the latest research and development results in the manufacturing chain will be presented. This often sets a benchmark, enables a comparison with own research and allows opportunities for a vast exchange of ideas.

As the vital link in the value-adding chain, manufacturing must play a critical part in reducing Africa's reliance on resource wealth and is regarded by the government as a crucial sector for achieving the desired growth in economic activity and employment. Several government strategies have been developed to support the growth of the manufacturing sector, such as the minerals beneficiation strategy of the Department of Mineral Resources and the industrial policy action plan and the mineral beneficiation action plan led by the Department of Trade and Industry.

The South African Titanium Industry Strategy Framework, formulated by the Department of Science and Technology in collaboration with other departments is also part of this approach.

A change in mindset

The promotion and adoption of such approaches will contribute to the strategic goal of building a knowledge-based economy in SA, which requires a fundamental change in attitude. Participation in the CIRP proceedings will be a powerful factor in developing and implementing this attitude.

International competition between nations in manufacturing is fierce and SA possesses few, if any, natural advantages. The competitiveness and sustainability of our manufacturing sector demand that companies adopt modern and efficient production technologies to improve energy and materials efficiencies and develop a strong culture of innovation. This requires high levels of alignment and collaboration between industry and the local and international scientific community.

Seminars and workshops

To maximise opportunities to discuss the latest technologies, trends and developments in manufacturing, seminars and workshops will be offered at the assembly.

The Fraunhofer Gesellschaft of Germany, one of the world's largest applied research organisations, will host a workshop for industrial leaders and policy makers on strategic issues. The four sessions will address the digitalisation of products, processes and services as a driver for innovative business models and advanced production concepts, including the potential of the fourth industrial revolution, known in Germany as Industry 4.0.

Other topics at the general assembly include the potential of additive manufacturing to revolutionise product design and manufacturing concepts, and the potential of rare-earth elements as critical raw materials for many industry sectors of the future such as clean energy, communications and healthcare.

The workshop sessions will be conducted by CIRP fellows from the Fraunhofer Gesellschaft. They are intended to be highlevel and thought-provoking, and are aimed at leaders in the manufacturing industry, the government and academic communities.

SA IS an essential player in developing country networks, and manufacturing and engineering is a significant component of these countries' economic activities now and in the future. There will be several workshops and seminars on advanced manufacturing topics, presented by renowned global experts and CIRP fellows.

In a partnership with the Department of Science and Technology, the Stellenbosch University-based local organising committee of the general assembly developed a plan to increase awareness of the event in SA, as well as knowledge

sharing and exposure to high-level research. Financially supported by the Department of Science and Technology, this plan hopes to ensure that there is a lasting legacy in SA following the general assembly.

Important topics

The workshops are aimed at technical experts from industry, academia and local research organisations. Each workshop will start with a presentation on the topic on major advances and challenges. Participants will have ample opportunity to table questions and discuss issues.

Important topics that will be addressed in seven workshop sessions include sustainability in manufacturing; optimisation of production systems and organisations; learning factories; hybrid and additive manufacturing; innovative processes in engineering design; and advances in forming and machining.

The CIRP general assembly is normally closed to nonmembers. The South African organising committee has successfully negotiated with CIRP to make the this year's gathering open to South African non-fellows.

SA has been allocated 50 delegate slots on a first come, first served basis to allow for production engineering researchers and technologists from academia and the private sector to attend this once-in-a-lifetime event.

Prof Dimitrov is the chairman of the local organising committee. Further information on the event, the Fraunhofer Gesellschaft and advanced industry workshops can be obtained by e-mailing him on dimitrov@sun.ac.za or by visiting www.sbs.co.za/cirpworkshops. Damm is a senior adviser: SA for the Fraunhofer Gesellschaft, Germany, and associate professor at Stellenbosch University.

Source: Business Day

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