

New tyre chamber Phase II step down report

Title: Skills demand foresight analysis research study

Purpose: To unpack incipient and future trends in the global tyre industry so as to understand how these trends will affect the future skills requirements of the five tyre manufacturers located in South Africa (and hence change the linear projections incorporated into the **Skills Demand Profiler** through to 2020). The key areas included:

- Changes in respect of the materials being used to manufacture tyres;
- Changes to product design and associated engineering innovations;
- Changes to the tyre manufacturing process (most notably shifting levels of capital intensity); as well as
- Changes to the manner of work organisation at leading global manufacturers.

Research methodology

Foresight analysis approach was used in interrogating emerging global trends and exploring their potential impact on skills demand. To complete the foresight analysis research a high-level secondary desktop review was completed to identify a collection of prominent emerging local, regional and global trends in the tyre manufacturing industry. This review drew from a number of publically available industry research sources. A Mix of secondary (desktop) and primary (interviews) research (*Analysis, interpretation and prospection*) was also conducted to gain more insight into the problem being investigated.

Key findings

The research completed as part of this foresight analysis produced some important findings that suggest the South African tyre manufacturing industry's future skills demands are likely to be shaped by emerging global industry trends only in certain instances. For example, future developments in **synthetic rubbers** used to enhance tyre performance will continue to be a significant trend in the tyre industry moving forward. However, the resultant implications on future skills demand for South African manufacturers is limited given that the role of South African firms in the value chain is limited to the manufacturing process and that the recipes for new tyres manufactured locally are received from company headquarters. While chemical engineering and polymer science skills will continue to be important given the need for local manufacturers to understand new recipe mixes as they emerge, there is unlikely to be any change to the current skills demand profile.

The trajectory of chemical engineering and polymer science skills identified in Phase 1 of the research consequently remains unchanged.

The **end-of life tyre (ELT)** trend is also unlikely to have any significant implications on future skills demand requirements. High level chemical engineering skills required to further improve opportunities to reuse tyre crumbs for manufacturing new tyres will continue to be needed in traditional R&D centres of excellence with limited impact on local operations.

While local manufacturers will continue adhering to the new **Integrated Industry Waste Tyre Management Plan**, this is also unlikely to have significant implications for skills development. The activities required to adhere to the process are purely administrative and the research indicated no intent on the part of local tyre manufacturers to become involved in any new downstream recycling activities.

Unlike the first two major trends outlined above, the **upgrading of capital equipment** is recognised as an important trend for local manufacturers that will have major implications on future skills requirements. The increased use of mechatronics in likely capital upgrades will place an enhanced emphasis on mechanical, electronic and/or mechatronic engineering skills. Specifically this trend will have implications for the associate professional, artisan and production worker employment categories - with mechanical, electronic and mechatronic engineering skills being prioritised.

Finally the importance of successfully implementing **Lean Manufacturing** processes in local tyre manufacturing operations is also likely to shape the skills requirements of the industry.

However, this trend does not necessarily have implications for specific skills or qualifications. The implications appear to be more generalised, impacting on all levels of the tyre manufacturers' organisational hierarchy. On the shop floor, multi-skilling, problem solving and strong numeracy skills will become more important, and will also need to be combined with an understanding of the core principles of Lean Manufacturing. Senior organisation levels (executives/senior management, professionals and associate professionals) will also need to actively drive the change in company culture to ensure that Lean is implemented effectively at the factory level. This requires a strong understanding of both the theoretical and practical dimensions of Lean Manufacturing within a tyre manufacturing environment.

Recommendations

The table below provides a **summary** overview of the recommendations for each of the **four trends identified**. Based on the findings there was a general argument by the researchers that the **synthetic rubber trend**, nor the **end-of-life tyre (ELT) trend**, will have a material impact on the present profile of domestic tyre manufacturer skills demands. On the other hand, the **capital equipment upgrading trend** is likely to have an impact on future skills demand in the professional, associate professional and artisan employment groups, where qualifications specialising in mechanical, electronic and mechatronic engineering have been identified as becoming more important in future. Finally, the researchers concluded that future **productivity gains associated with successful Lean Manufacturing** in the industry will have a moderating effect on employment demand. However, this trend does not prioritise or deprioritise any specific qualifications and its implications will therefore be felt across all employment categories

Summary of key research findings and recommendations for the Skills Demand Profiler Trend	Effect on future skills demand	Employment categories impacted	Qualifications impacted
Synthetic rubbers	None	-	-
ELTs	None	-	-
Upgrading Capital Equipment	Yes: Certain qualifications to be prioritised. Overall decrease in employment (labour displacing) – change to the elasticity of employment	<ul style="list-style-type: none"> <input type="checkbox"/> Professionals <input type="checkbox"/> Associate professional <input type="checkbox"/> Artisans 	<ul style="list-style-type: none"> <input type="checkbox"/> Mechanical Engineering <input type="checkbox"/> Electronic Engineering <input type="checkbox"/> Engineering (Mechatronics)
Lean Manufacturing	Yes: The employment elasticity of manufacturing value add is likely to be affected based on the productivity gains through Lean Manufacturing	<ul style="list-style-type: none"> <input type="checkbox"/> Executives/Senior Management Professionals <input type="checkbox"/> Associate professionals <input type="checkbox"/> Artisans/craft <input type="checkbox"/> Production workers 	No specific qualification group identified.