

Innovation trends in the architectural, engineering, R&D, and technical testing sectors, 2019-2021



South Africa's scientific, engineering, design and testing businesses make substantial contributions to innovation, infrastructure development, and knowledge creation.¹ Drivers of growth and global relevance in these sectors are international competition, evolving technological landscapes, and demand for sustainable practices.

This brief examines how much innovation happened in the architectural, engineering, R&D and technical testing sector from 2019 to 2021, including the types of technologies businesses in these sectors used, the innovation challenges they faced, and the outcomes of their innovations.

During 2019-2021, 62.3% of businesses in the architectural, engineering, R&D and technical testing sectors carried out activities intended for innovation. Not all these businesses had developed product or process innovations by the end of 2021.

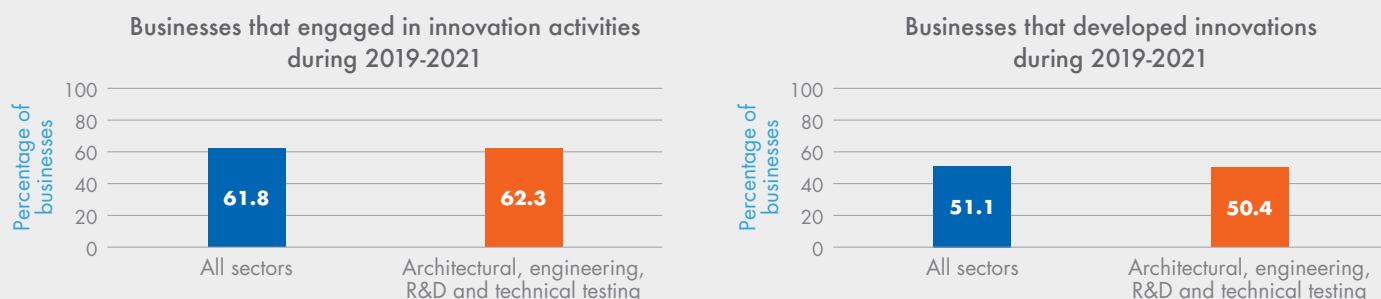


Figure 1: Percentage of businesses in the architectural, engineering, R&D and technical testing sectors that engaged in innovation and developed innovations.

What types of advanced and emerging technologies did businesses in the architectural, engineering, R&D and technical testing sectors use or develop during 2019-2021?

Internet of Things was by far the most widely used or developed technology, by 78.1% of businesses in the sector.

Computerised design and engineering and **business intelligence technologies** were both used by around 38% of businesses, and **green technologies** were used by just over one-third of businesses.

All other technologies were used by only about one-fifth or lower proportions of businesses.

Internet of Things was the most widely used technology, by almost 80% of businesses in the architectural, engineering, R&D and technical testing sectors.

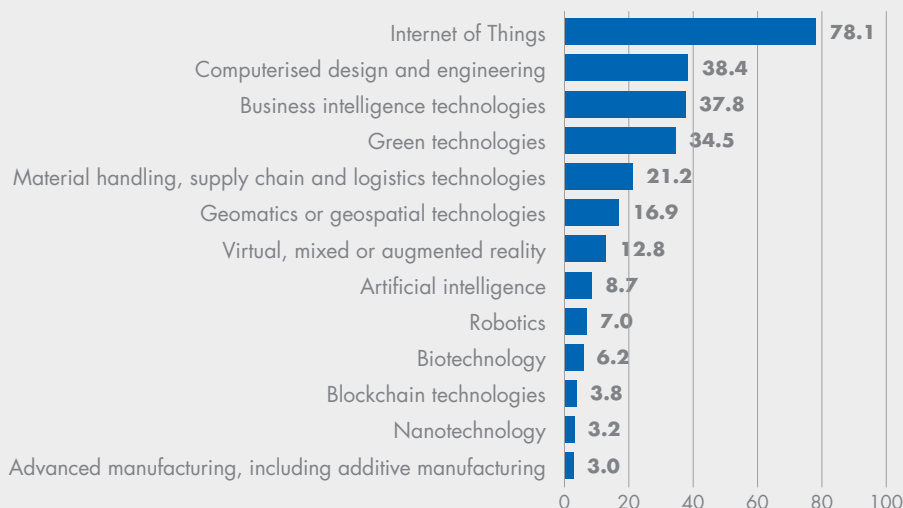


Figure 2: Percentage of businesses in the architectural, engineering, R&D and technical testing sectors that used or developed advanced or emerging technologies.

Percentage of businesses in the architectural, engineering, R&D and technical testing sectors

¹ The three sectors included in this group are: architectural and engineering activities (SIC code 8821), R&D (SIC code 87), and technical testing and analysis (SIC code 8822).

What were the most important barriers to innovation that businesses in the architectural, engineering, R&D and technical testing sectors faced during 2019-2021?

The most important barriers to innovation were financial (**lack of funds or external finance, and high costs of innovation**) and market-related (**too much competition and market domination**).

Human resource constraints, including **lack of technicians and managerial or engineering skills**, were of relatively low importance to businesses in these sectors.

The most important barriers to innovation experienced by businesses in the architectural, engineering, R&D and technical testing sectors were financial and market-related.

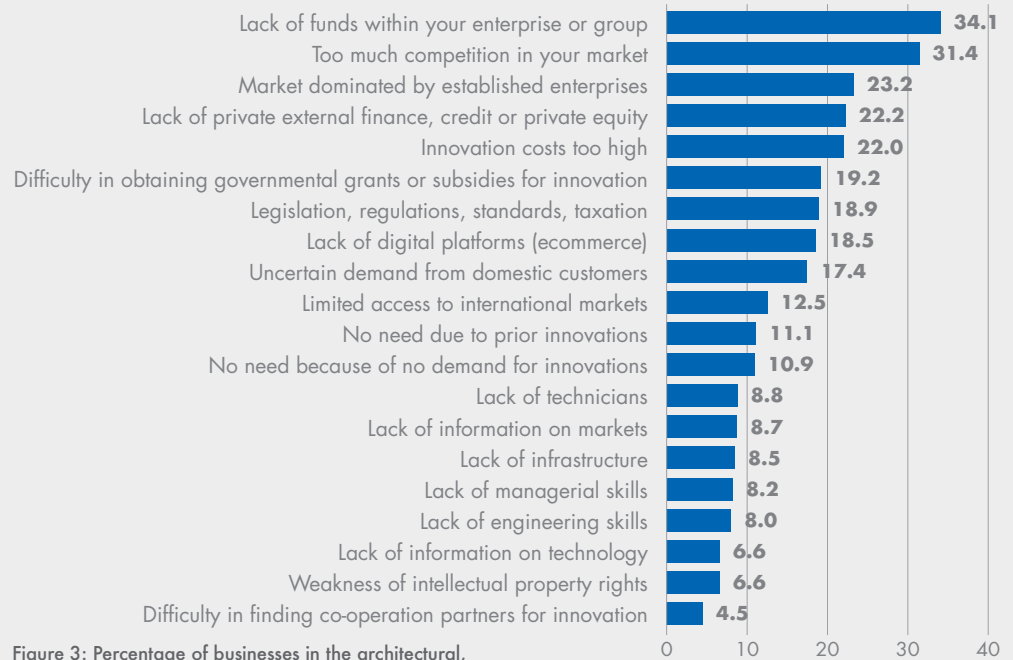


Figure 3: Percentage of businesses in the architectural, engineering, R&D and technical testing sectors that rated barriers to innovation as highly important.

Percentage of businesses in the architectural, engineering, R&D and technical testing sectors

What did innovative businesses in the architectural, engineering, R&D and technical testing sectors perceive to be the most important outcomes of their innovation(s) during 2019-2021?

About two-thirds of businesses in these sectors reported that an **improvement in working conditions, health or safety of their personnel** were highly important outcomes of their innovations. Over half of businesses had innovations that led to an **improvement in the quality of their products (54.9%), or improvement in quality of life or well-being (53.4%)**.

Entering new export markets or increasing export market share were the least important outcomes of innovation and were experienced by only 4.8% of businesses in the sectors.

The most important outcome of innovations in the architectural, engineering, R&D and technical testing sectors was an improvement in working conditions, health or safety of personnel.

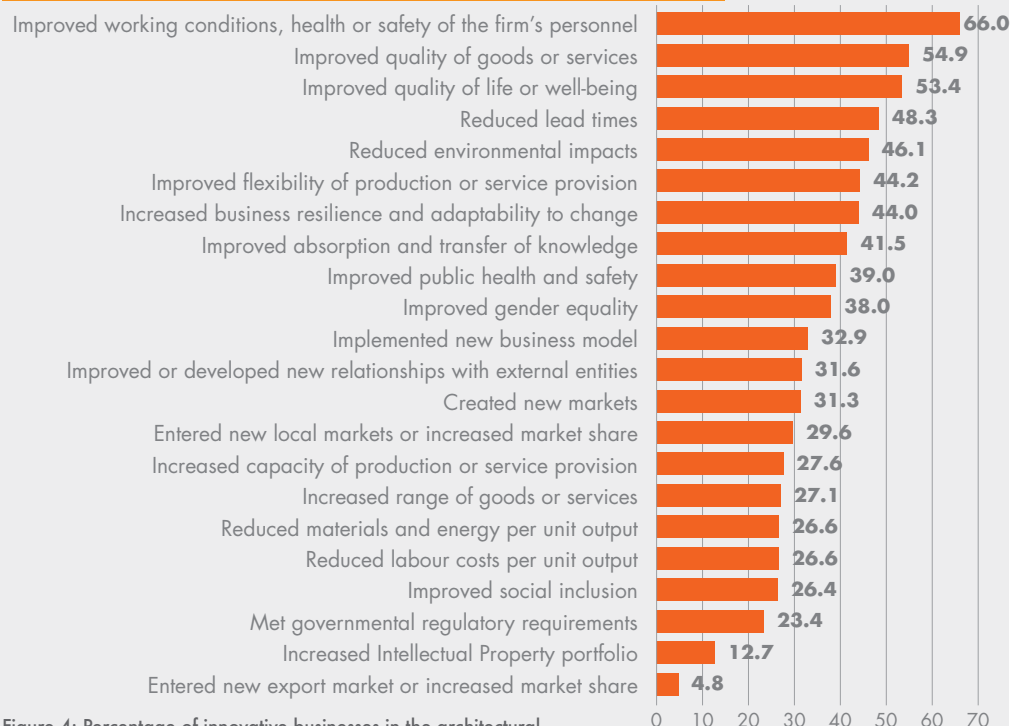


Figure 4: Percentage of innovative businesses in the architectural, engineering, R&D and technical testing sectors that rated outcomes as highly important.

Percentage of businesses in the architectural, engineering, R&D and technical testing sectors

About this brief

This brief is one of eight sector-specific analyses drawn from the South African Business Innovation Survey 2019-2021. It provides deeper insight into innovation trends in the **architectural, engineering, R&D and technical testing sectors**, so that businesses can compare and benchmark their innovation activities. Industry associations and policymakers can use the data in their efforts to mobilise and support innovation activities across these sectors.

Contact us: innovation@hsrc.ac.za | First published: March 2024