Industry 4.0: Building the digital enterprise

South Africa highlights

61

executives interviewed in South Africa across the industrial and mining industy

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Methodology

The PwC Global Industry 4.0 Survey is based on research conducted between November 2015 and January 2016 with almost 2,100 senior executives from industrial products companies in 26 countries across Europe, the Americas, Asia Pacific, Middle East and Africa. The majority of participants were Chief Digital Officers or other senior executives with top-level responsibility in their company for Industry 4.0 strategy and activity.

Results were weighted by country GDP to provide a balanced view in global totals. Country results reported are unweighted.

This territory findings report is based on interviews with 61 executives.

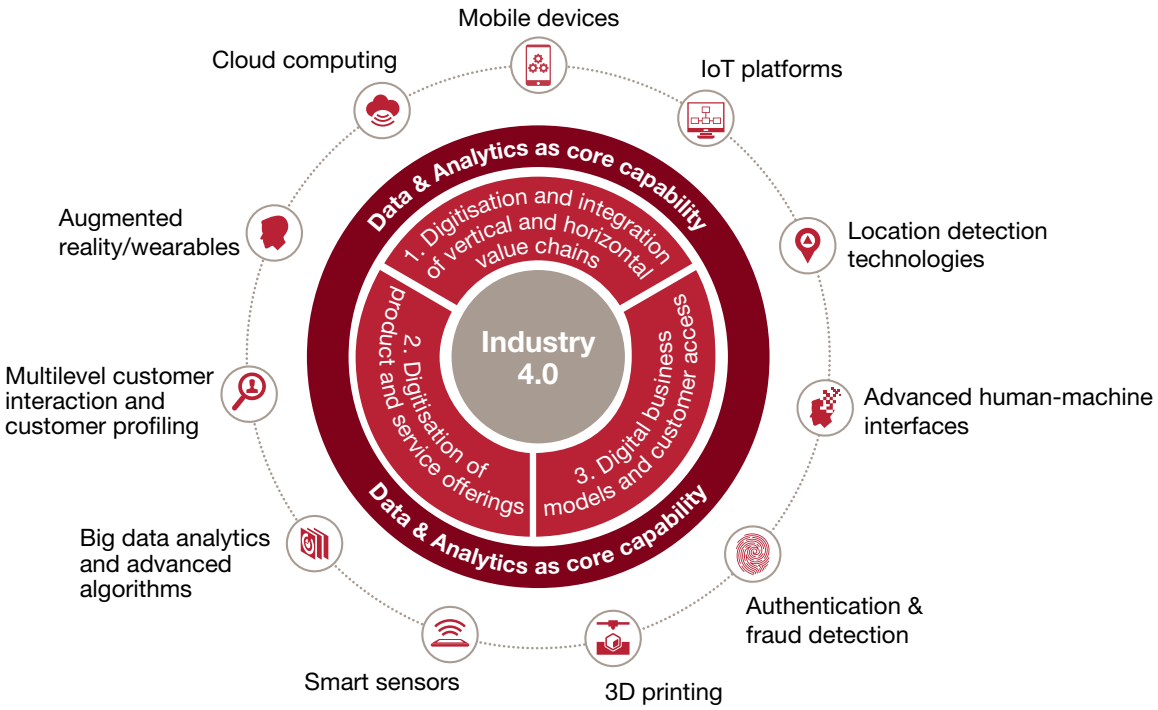
Behind the scenes of the world's leading industrial and manufacturing companies, a profound digital transformation is now underway. Industrial leaders are digitising essential functions within their internal vertical value chain, as well as with their horizontal partners along the supply chain. In addition, they are enhancing their product portfolio with digital functionalities and introducing innovative, data based services.

PwC's 2016 Global Industry 4.0 survey of industrial companies is the biggest survey of its kind studying Industry 4.0 to date among 2000+ global industrial and mining companies in 26 countries. South Africa, with 61 companies surveyed, was one of the largest single country inputs into this research. The 2,000+ companies that we surveyed are expecting to dramatically increase their overall level of digitisation. While just 33% rate their company as advanced today, that number jumps to over 70% looking ahead to 2020.

While terms like the industrial internet are also used to describe these changes, in this report we use Industry 4.0 as a shorthand to describe a journey industrial companies are taking towards a complete value chain transformation.

At the end of this transformation process, successful industrial companies will become true digital enterprises, with physical products at the core, augmented by digital interfaces and data-based, innovative services. These digital enterprises will work together with customers and suppliers in industrial digital ecosystems.

Industry 4.0 framework and contributing digital technologies



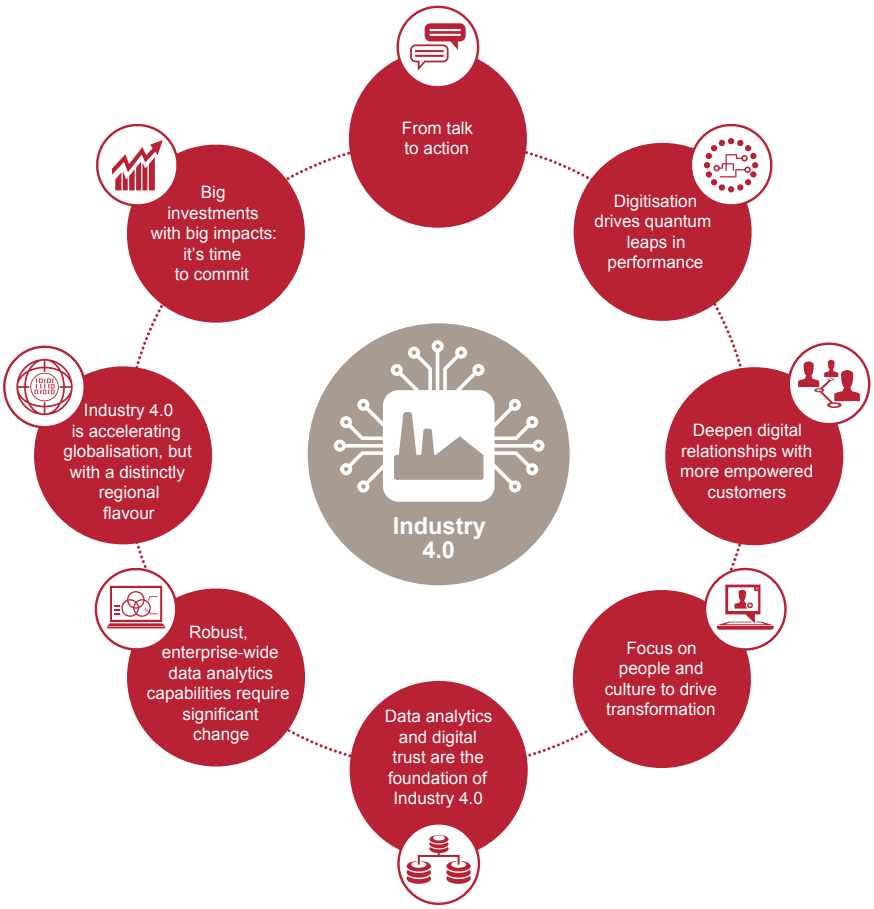
South Africa Overview

Digital Transformation is now a priority for most CEOs of the surveyed industrial companies in South Africa. More than a quarter (27%) of the industrial companies in our survey have rated their level of digitisation as high, and this value is expected to rise to 64% within the next five years.

Industrial leaders in South Africa are digitising essential functions within their internal vertical operations processes and are focussed on driving both revenue growth and operational efficiencies by adopting Industry 4.0. Also, 9 out of 10 companies expect to expand their product portfolio with digital offerings.

It was observed that industrial companies in Asia-Pacific and South Africa have the advantage to leapfrog ahead of those in the developed economies given their greenfield starting positions. As a result, they have fewer legacy issues pertaining to outdated systems, processes, technological capabilities, etc., which need to be addressed. In order for industrial companies to leverage the full value of Industry 4.0, they need to overcome key challenges. We have distilled the results of our research into eight distinct key findings. Our report explores each finding in more detail, and based on our findings, we have identified six steps to help companies move from initial strategy all the way to talking a leading role in tomorrow's digital ecosystems which will enable them to reach their potential and objectives of digitisation by 2020.

Key findings from our survey research



Significant increase in digitisation by 2020

Industry 4.0 is no longer a 'future trend'. For many industrial companies, it is now a part of their strategy and research agenda. Companies are combining advanced connectivity and advanced automation, cloud computing, sensors and 3D printing, connected capability, computer-powered processes, intelligent algorithms and Internet of things (IoT) services to transform their businesses.

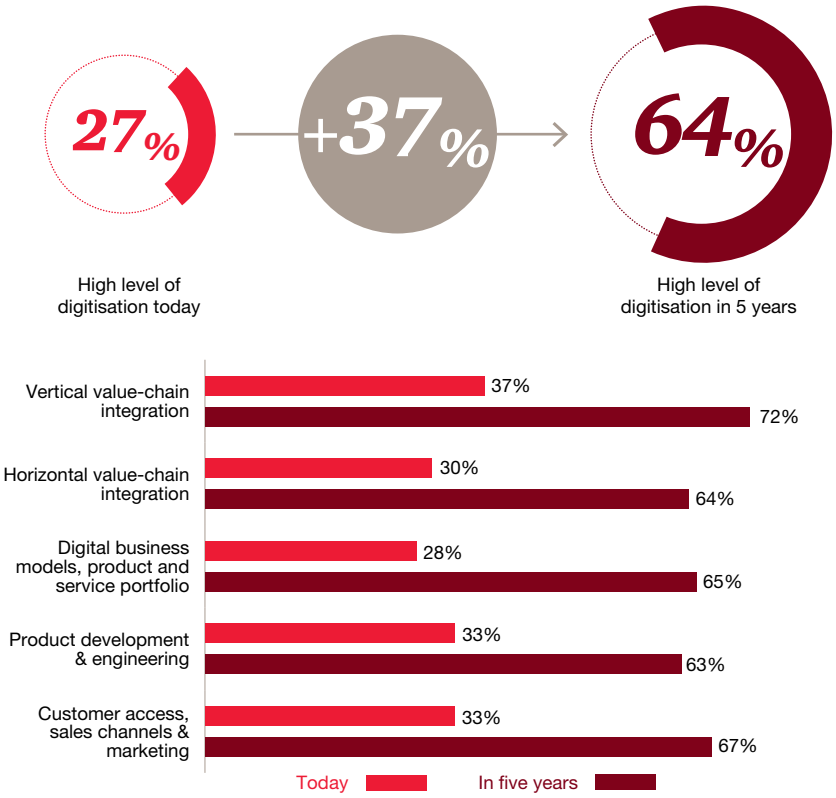
About one third of the industrial companies surveyed in South Africa believed their vertical value chains and their product development and engineering functions were already benefitting from an advanced level of digitisation and integration.

The areas of focus include digitising and connecting functions, such as digital order processes, customised product development and the automated transfer of product data to connected planning and manufacturing systems, and further on to integrated customer service. These are also the areas that they anticipate will be advanced in five years' time. Currently, South Africa (27%) is slightly behind the global average (33%) and Asia-Pacific (36%) in terms of level of digitisation. While advanced digitisation and integration of horizontal value chain (i.e. with suppliers, customers and other value chain partners), digital business models and customer channels are progressing a little slowly, big advances are expected in five years' time. Most South African companies expect to reach a digitisation level of around 64% in five years as against 67% in Asia-Pacific.

72%

of South Africa respondents say they expect to reach advanced levels of digitisation in their vertical value chains in five years' time.

Figure 1: ***Industry 4.0 is beyond the hype – it has arrived at the strategic and operational core of many Industrial companies in South Africa***



Shown: Percentage of companies reporting advanced levels of digitisation and integration

Q: How would you classify the current level of digitisation and integration in the following areas in your company? What levels of digitisation and integration are you expecting in the next five years?

Generating additional revenues through new digital products and services

Industrial companies that successfully implement Industry 4.0 no longer need to choose between focussing on a better top or bottom line. They can improve both at the same time. More than 70% of the respondents in South Africa are expecting a greater than 10% improvement in efficiency gains. Also, more than 70% are expecting an over 10% reduction in costs from operations and an over 70% improvement in additional revenue in the next five years. High levels of cost reduction are expected in every industry sector studied for this report.

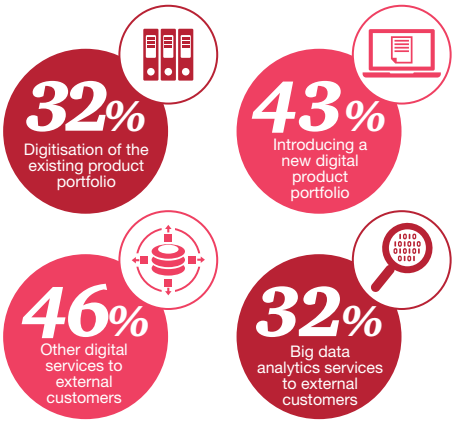
Some of these cost savings can be achieved by implementing smart manufacturing initiatives such as integrated planning and scheduling for manufacturing. Such systems combine data from within the enterprise—from sensors all the way through to enterprise resource planning (ERP) systems— with information from horizontal value chain partners, like inventory levels or changes in customer demand.

Integrated shop floor planning improves asset utilisation and product throughput time. Another example is predictive maintenance of key assets, which uses predictive algorithms to optimise repair and maintenance schedules and to improve asset uptime.

Nine in ten industrial companies plan to introduce and invest in at least one digital solution to generate more revenue over the next five years. Also, South African companies seem to believe that they will benefit more from digitising their product portfolio or introducing newer digital products. In contrast, their global counterparts think that enhancing digital services to customers will be more beneficial.

South Africa companies expect significant additional revenue growth to flow from their digitisation and integration initiatives.

Figure 2: ***Revenues from digitising the product and service portfolio will grow significantly in the future (Industrial companies in South Africa)***



Note: Companies achieving 10% or more additional revenue in the following areas over the next 5 years. Multiple answers possible

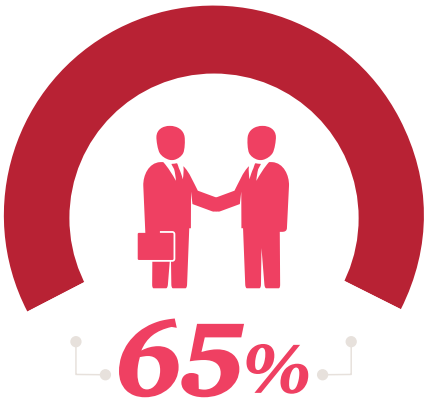
Q: Which of the following new digital products or services do you plan to introduce and expect will generate more than 10% of your future revenue over the next 5 years?

Enabling industrial companies to optimise customer relationships

Customers will be at the centre of the changes to value chains, products and services. Products, systems and services will be increasingly customised to customer needs, and many of our survey respondents (65%) said they plan to use data analytics to understand and meet them. First movers who are able to establish successful industrial platforms will have a significant advantage over competitors. Ultimately, industrial companies will need to own relationships with the end consumers who drive demand, even if that is not a model they are pursuing today. Businesses are also strengthening their offerings to customers by digitising existing products, either by offering them through digital channels, offering connected services or using data analytics to find hidden correlations to identify new product ideas even before customers know they want them. The opportunity is there not only to greatly increase the ability to respond flexibly and more rapidly to customer demands but also to anticipate demands, thereby helping customers get ahead of themselves in a range of predictive ways.

Greater integration of data between manufacturers and customers can open up new collaboration opportunities. Clever use of pooled data, for example, can allow manufacturers in business-to-business (B2B) markets to help customers in value-chain planning, drive efficiencies within the customer's operations and vice versa. Many companies have such collaborative opportunities in sight.

Figure 3: ***Industry 4.0 is helping industrial companies optimise customer relationships***



Q: In which areas will your company use data analytics in five years? Improving customer relationship and customer intelligence along the product life cycle.

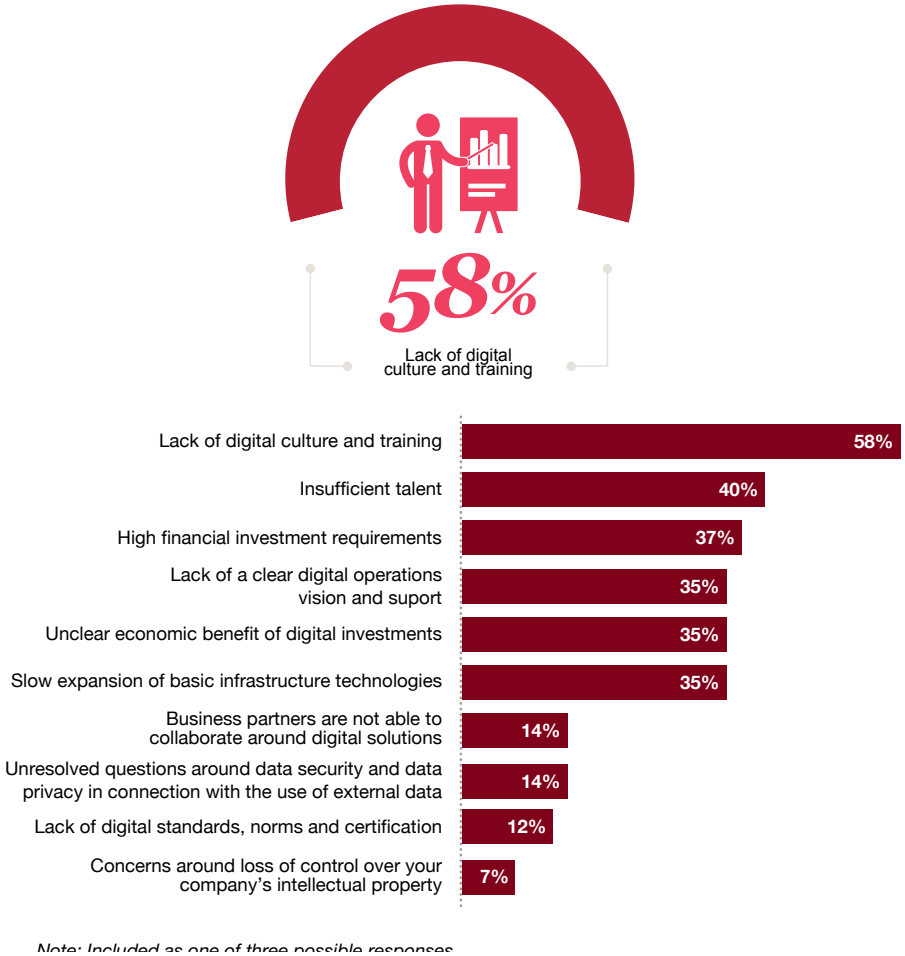
How industrial companies are getting closer to customers

The scope for digital collaboration with customers at many different levels is considerable.

The biggest challenge: Lack of digital culture and training

Industry 4.0 has massive implications on how a company chooses to organise itself and its delivery model. Companies will need to make sure that employees understand how the company is changing and how they can be a part of it. From our interviews with industrial companies, the biggest challenges centre around internal issues such as culture, organisation, leadership and skills rather than external issues such as whether the right standards, infrastructure and intellectual property protection are in place. The lack of digital culture and training (58%) and insufficient talent (40%) were identified as top challenges by most companies. Lack of skills or competencies in the company's workforce was also rated as one of the biggest challenges by survey respondents when it came to making use of data analytics (66%).

Figure 4: ***Lack of a clear digital operations vision and leadership from top management is the biggest challenge facing Industrial companies in South Africa***



Note: Included as one of three possible responses

Q: Where are the biggest challenges or inhibitors for building digital operations capabilities in your company?

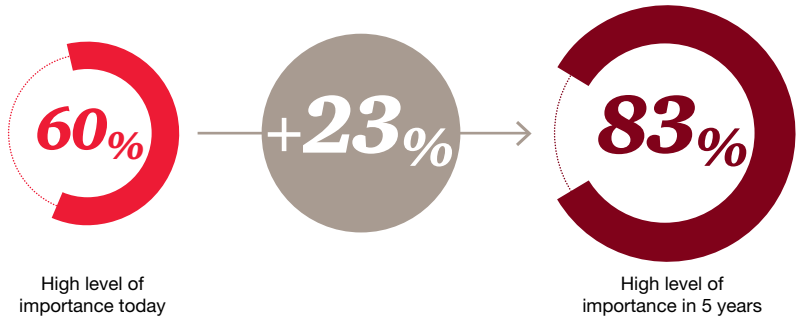
Data at the heart of Industry 4.0

Data forms the core of Industry 4.0 and embedding data analytics in operations workflow will make organisations truly digital enterprises. Around 60% of the industrial companies in South Africa are already using data analytics and 83% expect data to have a significant impact on their decision-making in five years (see Figure 5).

The volume, velocity (data refresh rates) and variety (types of data formats) have exploded in the last few years; hence, it is important to use innovative techniques to analyse structured and unstructured data for deriving meaningful business insights. Our research suggests that companies who are already ahead on their digitisation and integration journey are also much more likely to be putting data analytics to work. Many companies already use data analytics to analyse and report on processes (see Figure 6). Our survey respondents say their companies are focusing most on using data analytics to control and improve their overall business planning and manufacturing operations, followed closely by efforts to get closer to their customers, both today and in five years.

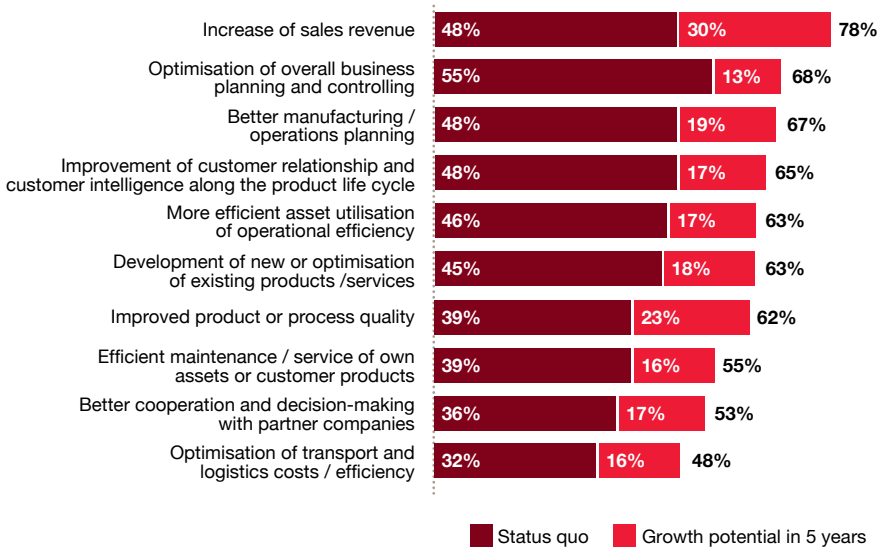
83% of industrial companies in South Africa expect data to have a significant impact on their decision making in five years

Figure 5: ***Industrial companies in South Africa: in five years from now even greater importance will be placed on data analytics***



Q: What significance does the gathering, analysis and utilisation of data for decision making have for your company?

Figure 6: ***Are companies underestimating the scope of data analytics?***



Q: In which areas are you using big data analytics today? In which additional areas will your company use data analytics in five years?

06 Robust, enterprise-wide data analytics capabilities require significant change

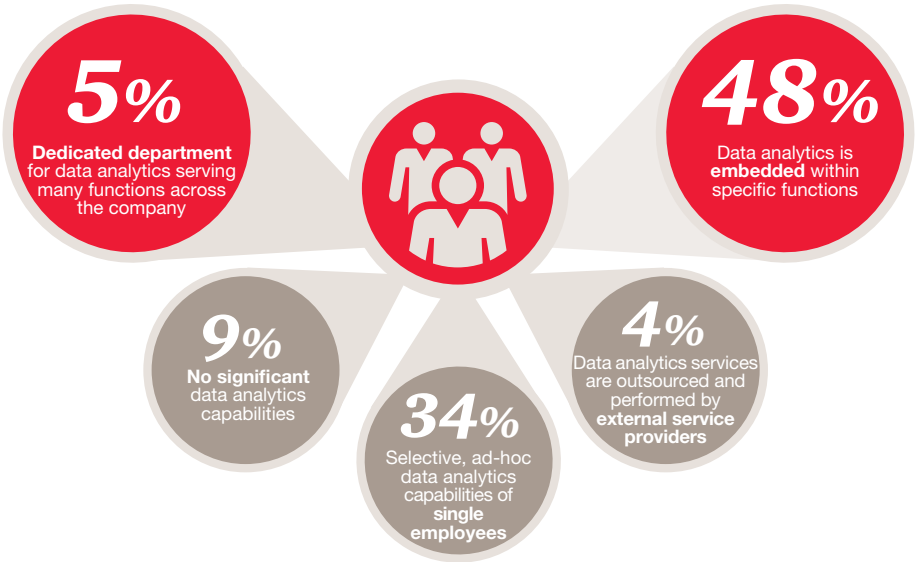
Ten per cent of the respondents in South Africa rated their maturity in data analytics as advanced, while the majority (59%) rated it as medium, which is better than the global result (52%) for medium. Also, South African companies match their global counterparts in outsourcing analytics to external partners to the tune of 4% (see Figure 7). This points to a trend where South African and global enterprises are looking to build in-house capabilities in data analytics, rather than outsourcing it.

Industrial companies have not been able to utilise data analytics effectively in their operations. 43% of the companies either rely on the selective, ad hoc data analytics capabilities of individual employees or have no significant data analytics capabilities at all.

Almost half have embedded data analytics into specific functions, giving themselves the flexibility and proximity to business knowledge in order to fully utilise the potential of data analytics. Only 5% of South African industrial companies have a dedicated department for data analysis serving many functions across the company. This is significantly lower than the global figure of 14%.

Industrial companies need to develop various skills in order to excel in data analytics, including data management, statistical modelling and data visualisation in addition to workflow integration for decision support. Our survey results shows that lack of these skills sets is a major concern for the companies in South Africa as there is a general scarcity of individuals trained in analytics. Other challenges include lack of analytical methods and overall poor quality of data. However, organisations can overcome the challenges if they follow the strong data governance and structured analytics development methodology.

Figure 7: ***Industrial companies in South Africa: organisation of data analytics capabilities***

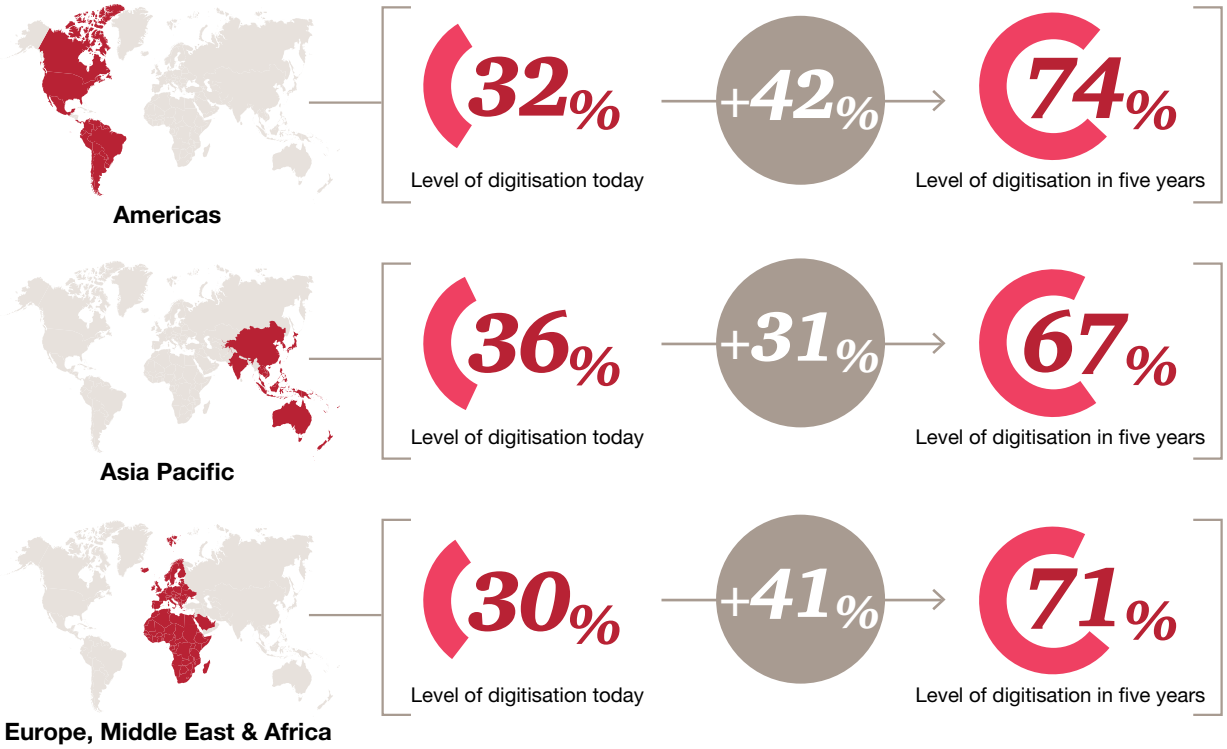


Q: How are data analytics capabilities organised in your company?

07 Industry 4.0 is accelerating globalisation, but with a distinctly regional flavour

Many industrial organisations have operations across the world, so successful Industry 4.0 implementation is not limited to specific countries and can be done across the globe. The companies in the Asia-Pacific region currently have the highest level of digitisation. However, the companies in the Americas and Europe, the Middle East and Africa (EMEA) are more confident of increasing their digitisation in the next five years. Emerging nations most likely have the most to gain, as Industry 4.0 takes hold around the globa. They can leverage digitisation to gain efficiency in their horizontal and value chain, efficiently working within a global manufacturing network to supply key components, products and systems. In addition, rising personnel costs and high potential to digitise processes will lead to above- average efficiency gains in emerging economies.

Figure 8: ***Companies all over the world are expecting to dramatically increase digitisation over the next five years***



Q: How would you classify the current level of digitisation and integration in the following areas in your company? What levels of digitisation and integration are you expecting in the next five years?

08 Big investments with big impacts: it's time to commit

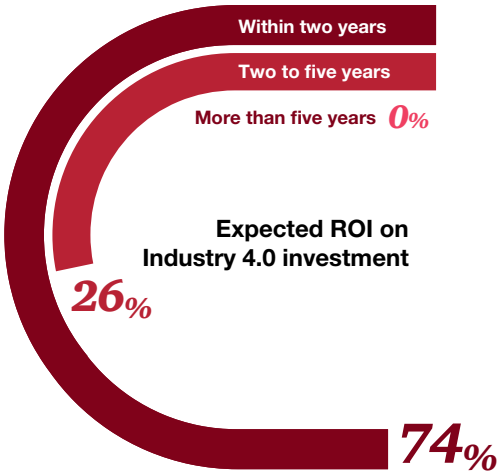
South African industrial companies are willing to invest heavily in digitisation technologies such as sensors or connectivity devices as well as software and applications such as manufacturing execution systems.

There is a tremendous change in the outlook of South African industrial companies in terms of their commitment to investments for digital operations solutions. According to the survey, 48% of the companies plan to invest more than 8% of their annual revenues in digital programmes in the next five years, which reflects their commitment to the vision of Industry 4.0. The survey suggests that the average amount the companies are seeking to invest in the next five years is 6.8% of their annual revenue. Companies are fast realising that being the first mover can provide them with a substantial competitive advantage over other players who have not been investing in digitisation programmes.

South African industrial companies are more optimistic than their global and Asia-Pacific counterparts in terms of the payback period. All of them believe that they can get the return on investment (ROI) within five years, with 74% expecting it within two years (see Figure 9). Further, a majority of the decision makers believe that it is the right time to invest and they intend to make substantial efficiency gains as well as generate additional revenue using digital technologies in the future. Organisations need to act fast. Investing sooner and spreading out investments over a period of time will enable companies to avoid any huge capital investment costs later on. Within the next five years, implementation of Industry 4.0 will no longer be a luxury for organisations, but a necessity to drive their operations effectively and profitably.

It simply won't be possible for companies to achieve advanced digitisation without making a step change in investment, given the continued rapid progress anticipated by companies who are already leading

Figure 9: ***South Africa companies: most companies expect Industry 4.0 investments to pay back within two years***



Note: Answers shown are rounded

Q: Which return on investment period (ROI) do you expect from your digital investments?

Blueprint for digital success

To move forward with Industry 4.0, digital capabilities are all-important. These take time and concentration; a step-by-step approach is important. But move with deliberate speed, so that you don't lose the first-mover advantage to competitors.

1) Map out your Industry 4.0 strategy

Evaluate your own digital maturity now and set clear targets for the next five years. Prioritise the measures that will bring the most value to your business and make sure these are aligned with your overall strategy. Make sure company leadership is ready and willing to champion your approach.

2) Create initial pilot projects

Use them to establish proof of concept and demonstrate business value. Target a confined scope, but highlight the end-to-end concept of Industry 4.0. Not every project will succeed, but they will all help you to work in a cross-functional and agile approach with customers and technology partners – the new norm of the future. With evidence from early successes, you can also gain buy-in from the organisation, and secure funding for a larger rollout.

Design pragmatically to compensate for standards or infrastructure that don't yet exist. Collaborate with digital leaders outside your organisation, by working with start-ups, universities, or industry organisations to accelerate your digital innovation.

3) Define the capabilities you need

Building on the lessons learned in your pilots, map out in detail what capabilities you need to achieve your vision. Include how enablers for Industry 4.0, such as an agile IT infrastructure, can fundamentally improve all of your business processes.

Remember to develop strategies for attracting people and improving processes as well as for implementing new technologies. Your success with Industry 4.0 will depend on skills and knowledge. Your biggest constraints may well be your ability to recruit the people needed to put digitisation into place.

4) Become a virtuoso in data analytics

Consider how you can best organise data analytics; cross-functional expert teams are a good first step. Later these capabilities can be fully embedded in your functional organisation.

Learn to get value out of data by building direct links to decision-making and to intelligent systems design. Use the data to improve products and their use in the field to offer and build new service offerings. Think big, but start small, with 'proof of concept' projects.

5) Transform into a digital enterprise

Capturing the full potential of Industry 4.0 often requires company-wide transformation. Look to set "tone from the top", with clear leadership, commitment and vision from the C-suite and financial stakeholders. Foster a digital culture: many of your employees will need to think and act like digital natives, willing to experiment with new technologies and learn new ways of operating.

Remember that change doesn't stop once you've implemented Industry 4.0. Your company will need to re-invent its capabilities at faster rates than in the past to stay ahead of the game.

6) Actively plan an ecosystem approach

Develop complete product and services solutions for your customers. Use partnerships or align with platforms if you cannot develop a complete offering internally. You may find it difficult to share knowledge with other companies, and you may prefer acquisition. But look for ways to bridge this gap – perhaps with technical standards – so that you can profit from being part of platforms that you don't fully control.

Real breakthroughs in performance happen when you actively understand consumer behaviour and can orchestrate your company's role within the future ecosystem of partners, suppliers and customers.

Don't buy the hype. Buy the reality. Industry 4.0 will be a huge boon to companies that fully understand what it means for how they do business.

Blueprint for digital success

About PwC

At PwC, our purpose is to build trust in society and solve important problems. We're a network of firms in 157 countries with more than 208,000 people who are committed to delivering quality in assurance, advisory and tax services. Find out more and tell us what matters to you by visiting us at www.pwc.com.

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