

DigiChem SurVEY 2022

Digital transformation in a global comparison

Purpose

Digitalization has become one of the most important drivers and enablers for business development and performance improvement in the chemical industry.

The DigiChem SurVEY 2022 is the only long-term study with a focus on implementation progress and benefits of digitalization.

Agenda

1. Study approach and summary of results
2. Global results and regional comparison (2022)
3. Progress in 2020–22

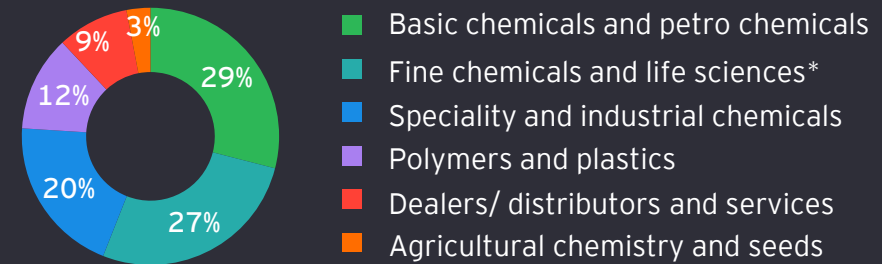


Study approach and summary of results

Survey demographics

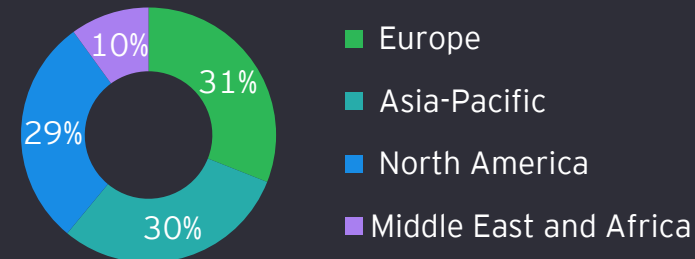
- ▶ Last 3-year review and next 3-year outlook
- ▶ Conducted by an independent market research institute
- ▶ 637 top management members and executives from various segments and sizes of chemical companies
- ▶ Global approach including Europe, North America, Asia-Pacific, Middle East and Africa

Chemical segments

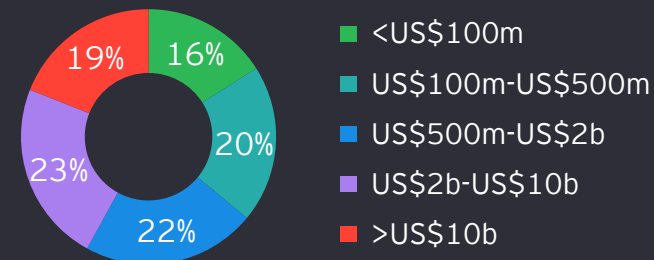


*incl. Active ingredients

Regions



Revenue





Global results and regional comparison (2022)

Summary of global results and regional comparison (2022)

- ▶ Respondents in Europe with revenues between US\$2b and US\$10b report high progress in the implementation of digitalization; in the Americas, smaller companies see the highest progress; and in Asia-Pacific, the big companies are making the most progress.
- ▶ A major share of respondents expect significant progress in personnel development, admin and central functions, and process efficiency in the operational value chain, as well as sustainability.
- ▶ Digitalization in supply chain management and purchasing is expected to affect the operational competitiveness of chemical businesses to a large extent in the next three years.
- ▶ Respondents with revenues between US\$2b and US\$10b report high progress in the implementation of digitalization across all regions.
- ▶ Digital security, data analysis and management are among the most implemented technology, while 3D printing and metaverse have limited implementation.
- ▶ North America and Asia-Pacific have achieved benefits in e-networking, Europe in cost reduction, and the Middle East and Africa in new products and services.
- ▶ Stable and secure digital solutions and good interaction of digitalization with internal IT and leadership support are the most critical factors for the success of digital transformation, according to chemical players.
- ▶ Qualified personnel and investment requirements are the top barriers in Europe and North America, while Asia-Pacific, the Middle East and Africa suffer from a lack of technical infrastructure.

Summary of global results and regional comparison (2022)

- ▶ More than 60% of respondents have their complete data legally secured in diversified locations.
- ▶ After two years of the pandemic, the speed of digitalization in more than half of the respondents has accelerated, but it remains unchanged for more than one-third of them.
- ▶ A majority of chemical companies are moderately affected by environmental sustainability issues and changes, with almost one-third being severely affected in Europe, the Middle East and Africa.
- ▶ Almost two-thirds of respondents expect moderate to high savings by engaging in sustainability activities.
- ▶ While chemical players in Asia-Pacific see a strong potential in using digitalization for faster implementation of sustainability goals, Europe and North America see a medium potential.
- ▶ Europe-based firms believe in technologies for production control, Asian companies see potential in technology in the field of equipment and machinery, while Middle Eastern players see the highest potential in communication and cooperation.
- ▶ According to most chemical players, their CEOs are driving digitalization for faster implementation of sustainability goals.

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Respondents in Europe with revenues between US\$2b and US\$10b report high progress in the implementation of digitalization; in the Americas, smaller companies see the highest progress; and in Asia-Pacific, the big companies are making the most progress.

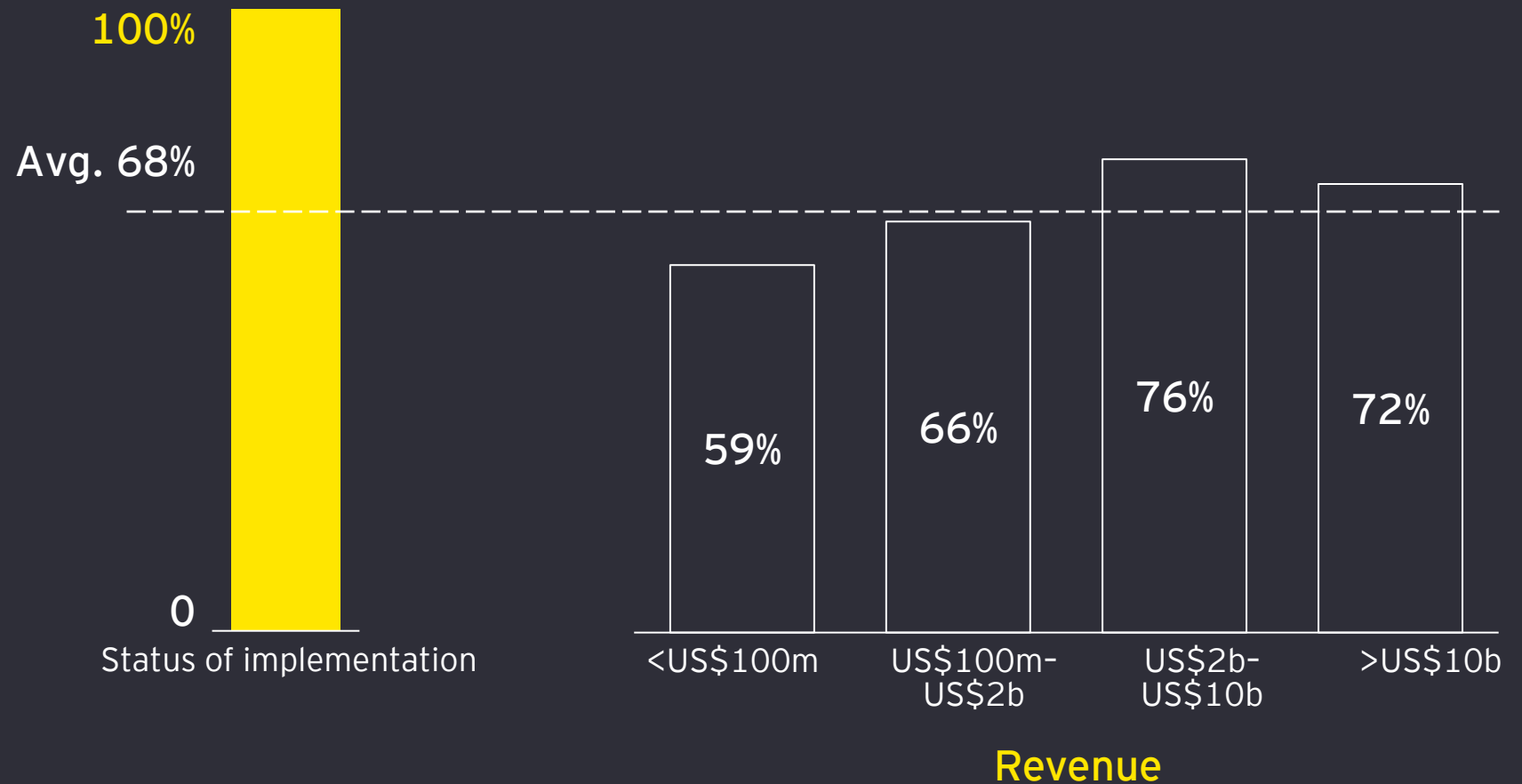
How would you assess the current status of the implementation of digitalization projects in your company?

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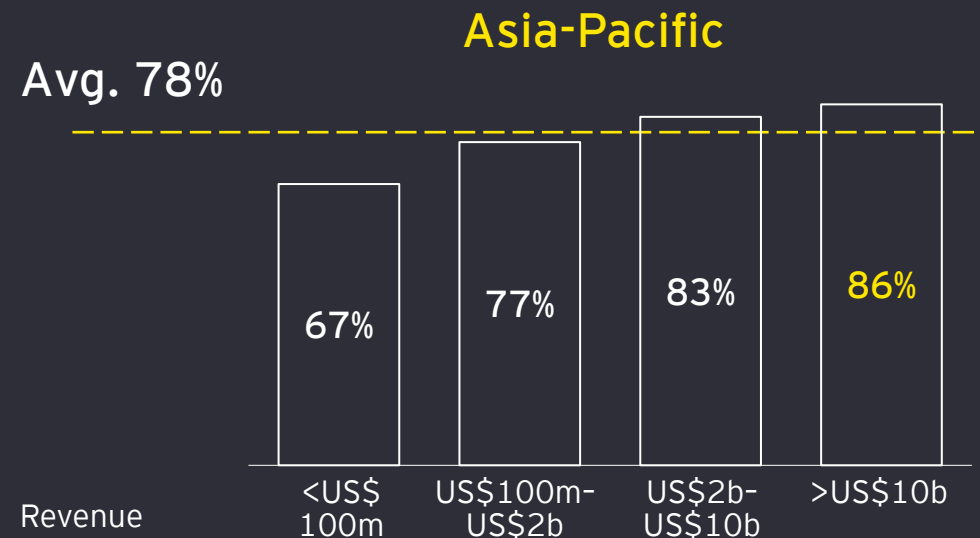
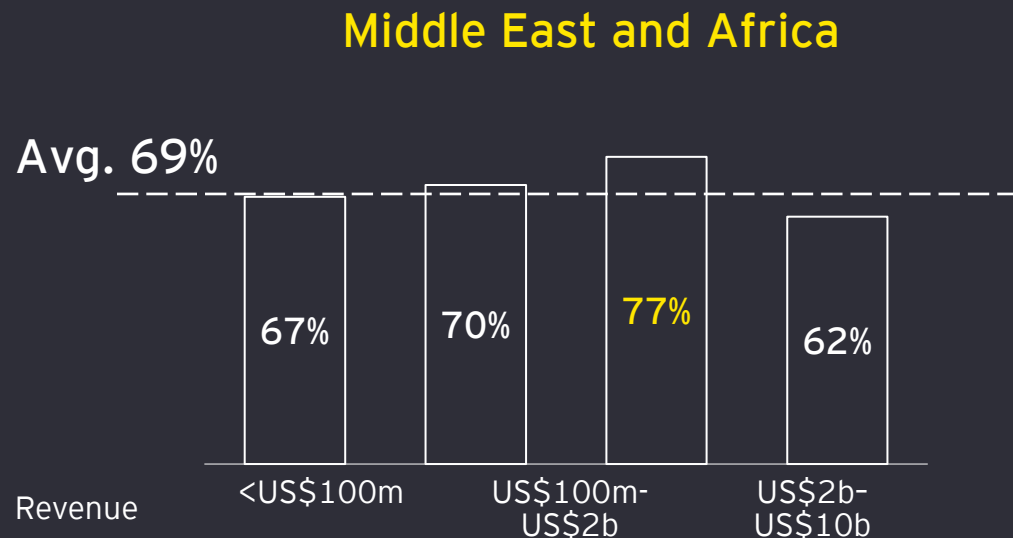
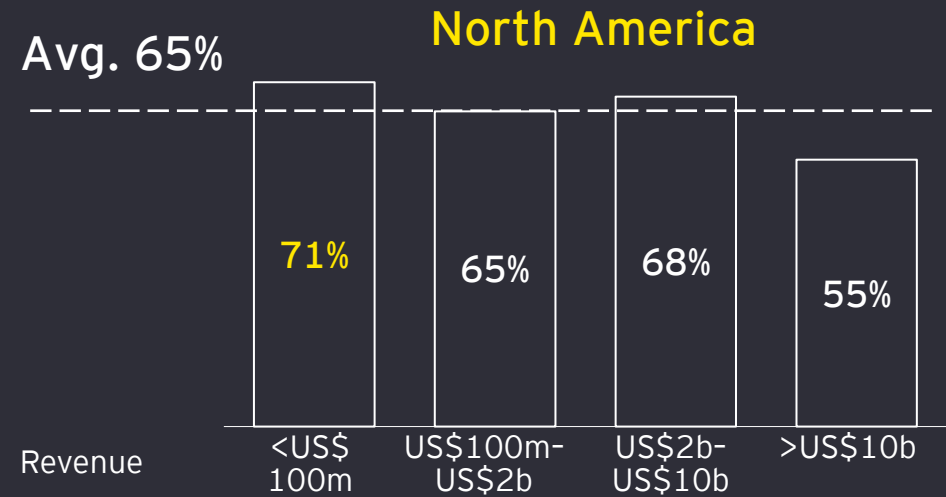
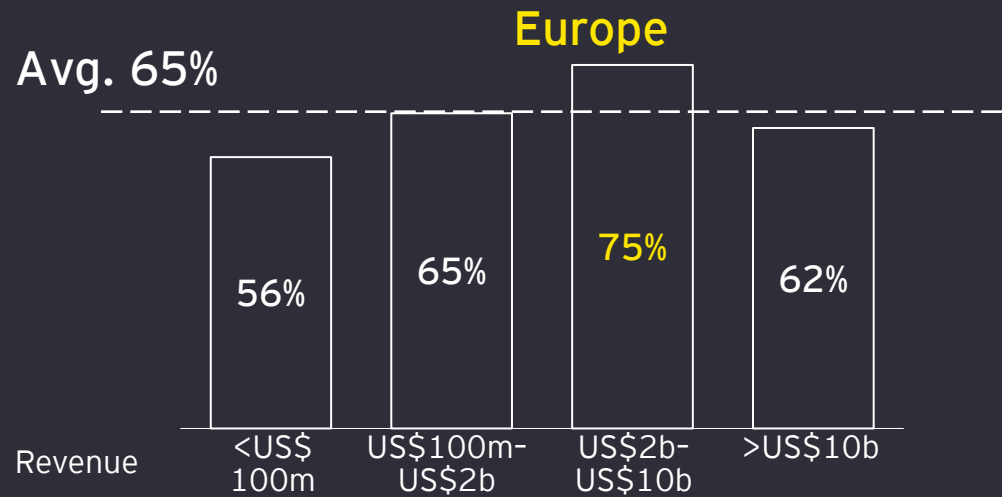
The digital transformation of the entire company is already running smoothly.

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We have not yet started any digitalization projects or activities.



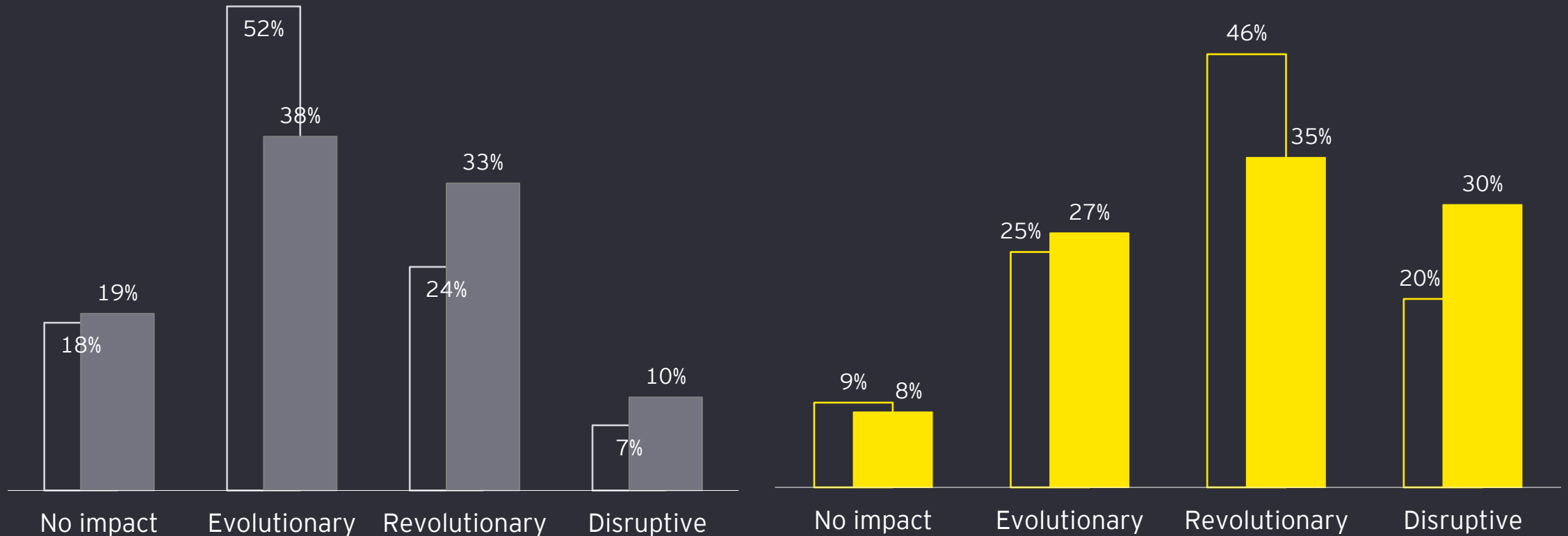
How would you assess the current status of the implementation of digitalization projects in your company?



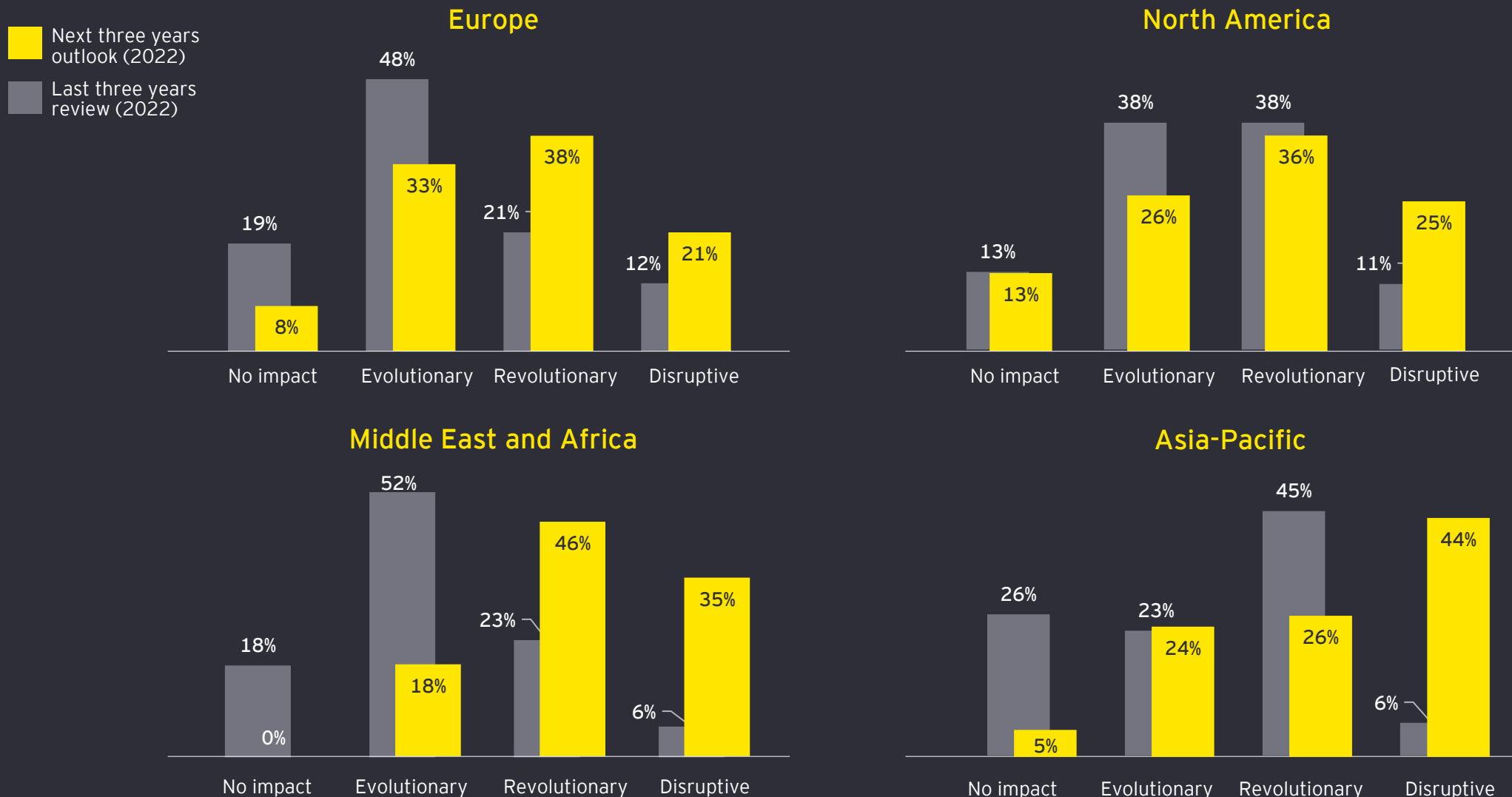
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Compared with North America, Europe and Asia-Pacific, participants in the Middle East and Africa are expecting a revolutionary and disruptive impact of digitalization to a much higher degree.

What impact do you expect digitalization will have on your company in the next three years?



What impact do you expect digitalization will have on your company in the next three years?

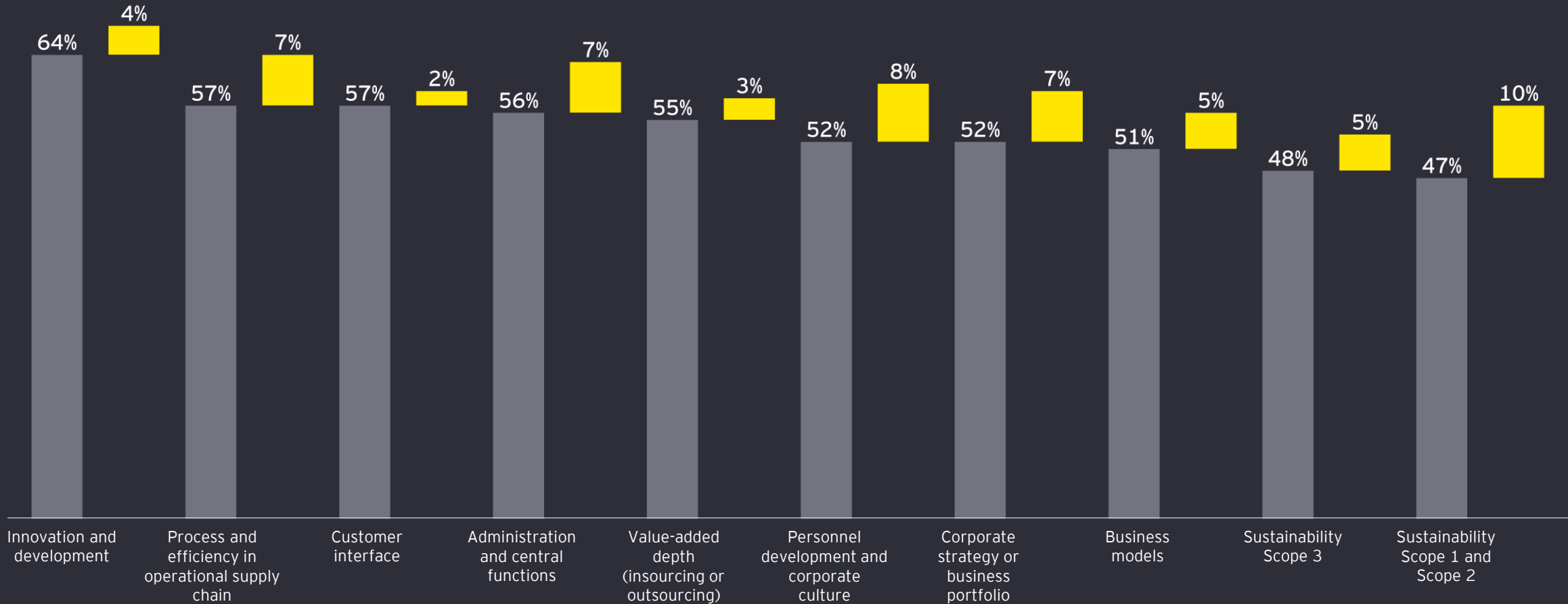


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A major share of respondents expect significant progress in personnel development, admin and central functions, and process efficiency in operational value chain, as well as sustainability.

To what extent digitalization will affect the success of the strategic and operational positioning of your company in the next three years?

■ Percentage of change in expected impact over next three years
■ Current status of implementation

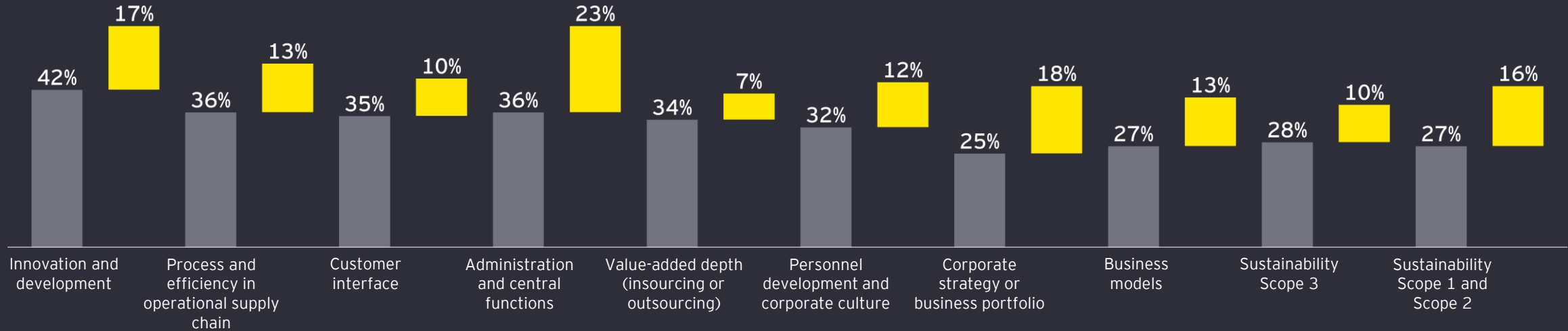


Note: Includes responses for strong and very strong impact

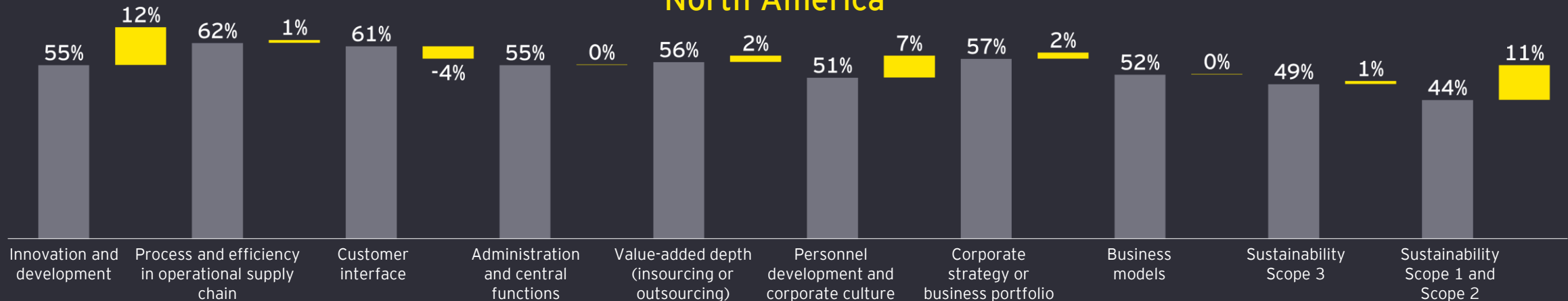
To what extent digitalization will affect the success of the strategic and operational positioning of your company in the next three years?

■ Percentage of change in expected impact over next three years
■ Current status of implementation

Europe



North America

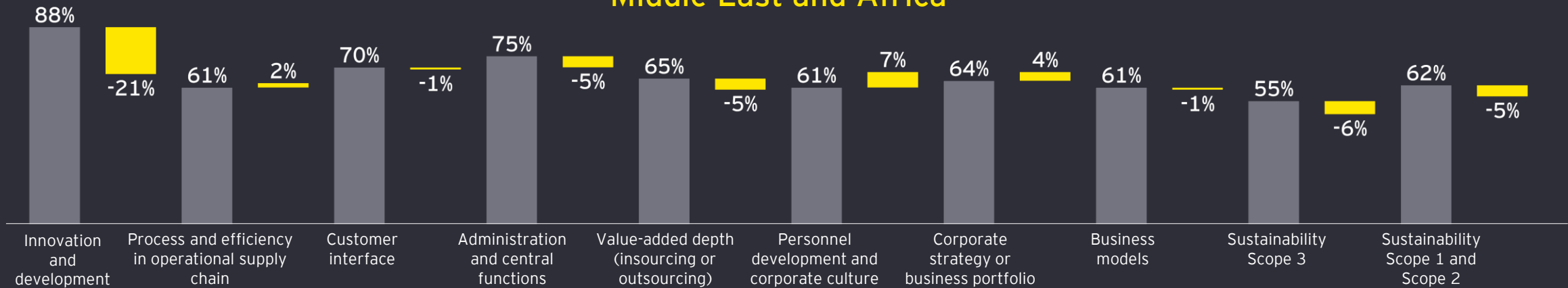


Note: Includes responses for strong and very strong impact

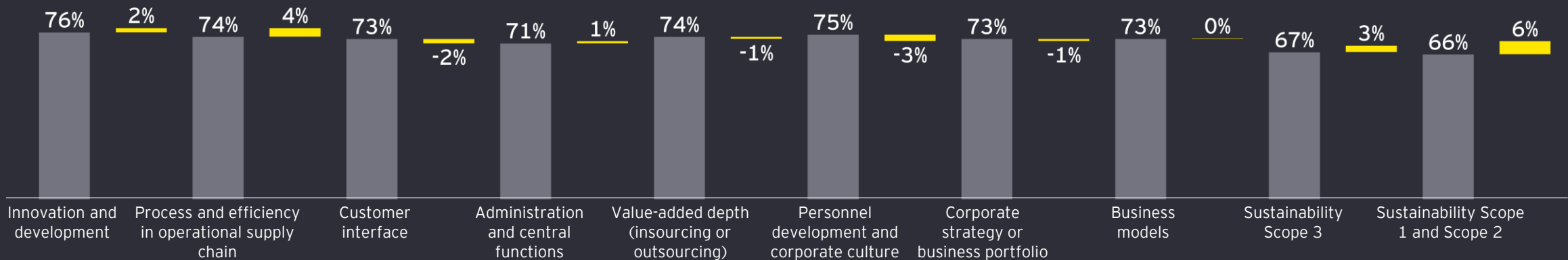
To what extent digitalization will affect the success of the strategic and operational positioning of your company in the next three years?

■ Percentage of change in expected impact over next three years
■ Current status of implementation

Middle East and Africa



Asia-Pacific

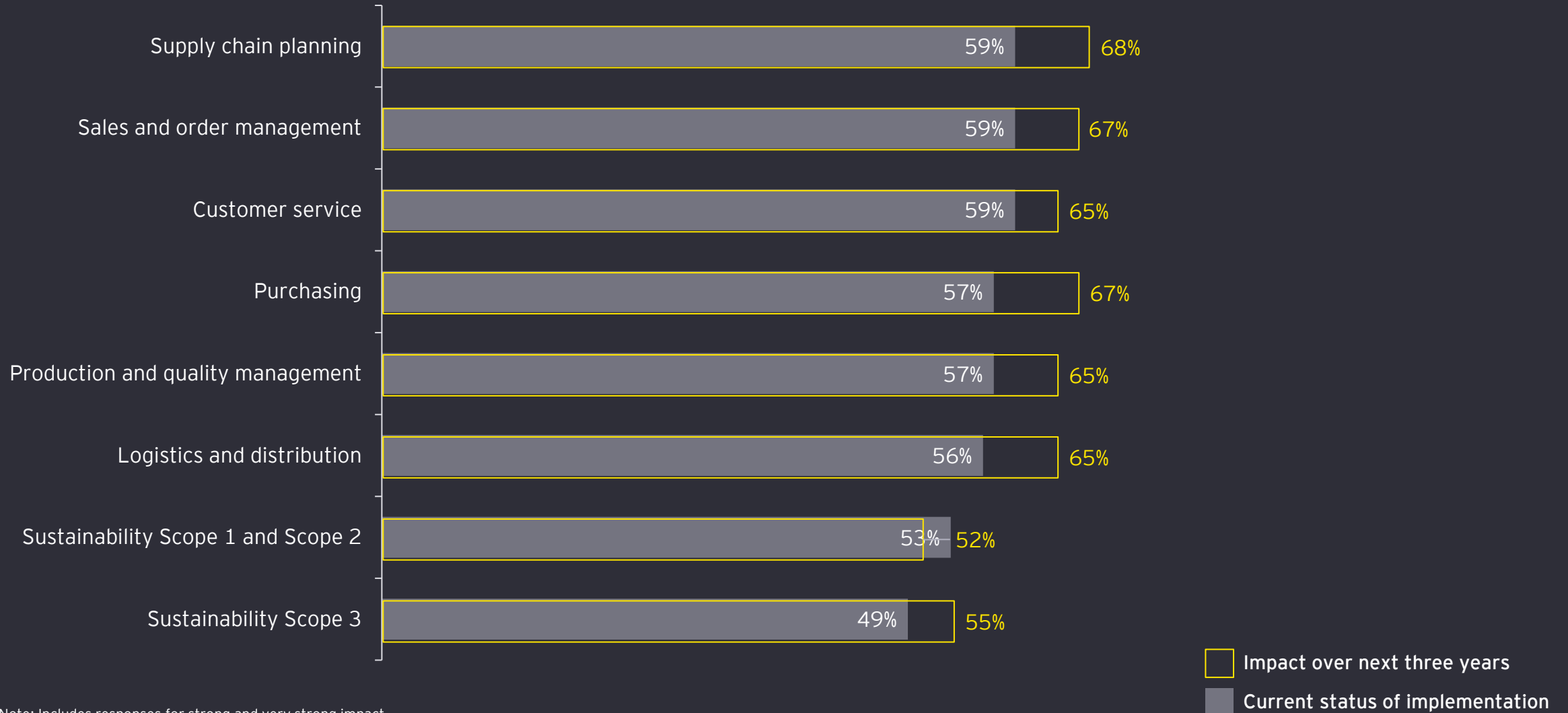


Note: Includes responses for strong and very strong impact

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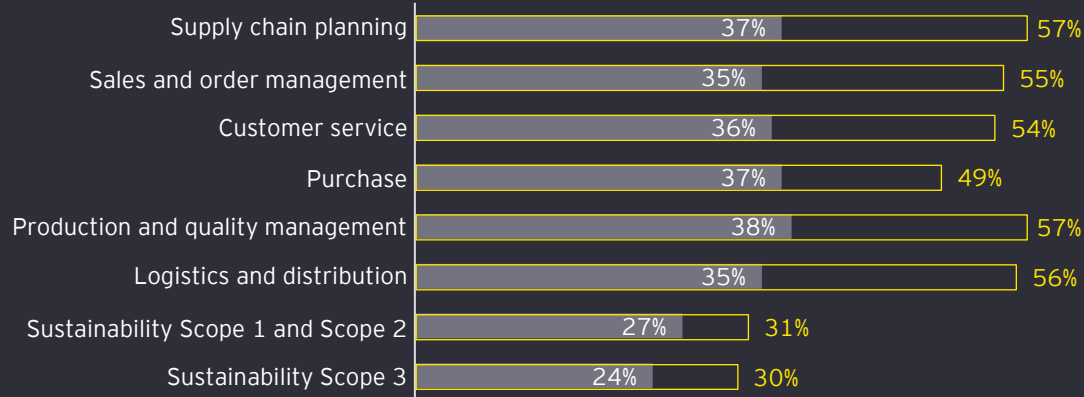
Digitalization in supply chain management and purchasing is expected to affect the operational competitiveness of chemical business to a large extent in the next three years.

To what extent will operational competitiveness be affected by digitalization in the next three years?

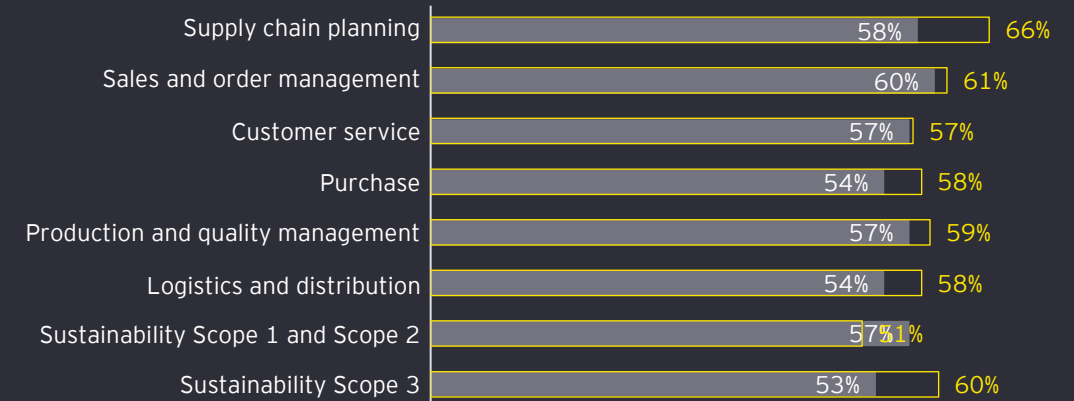


To what extent will operational competitiveness be affected by digitalization in the next three years?

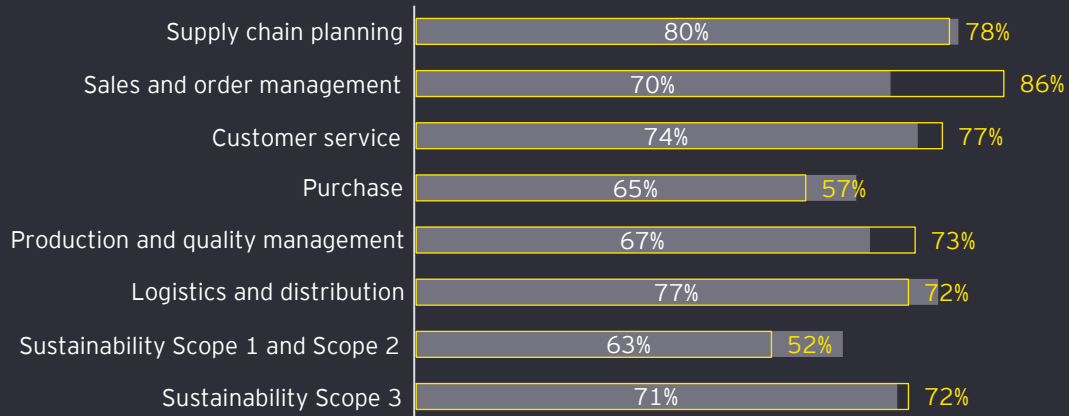
Europe



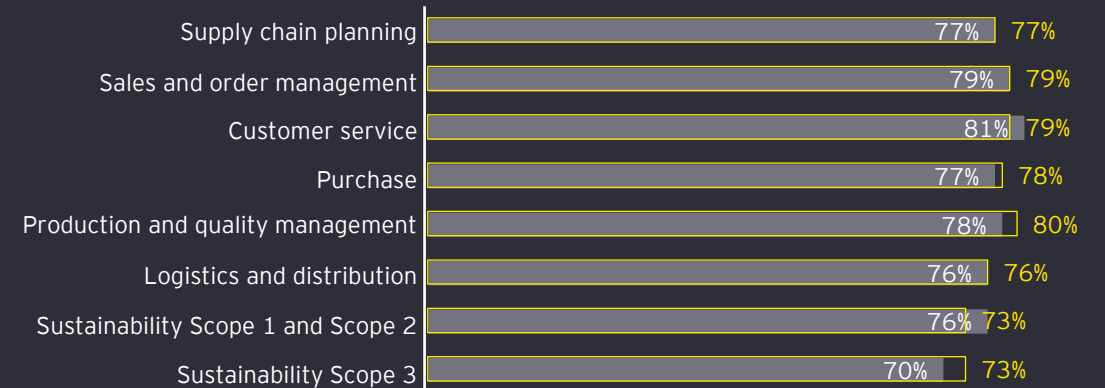
North America



Middle East and Africa



Asia-Pacific



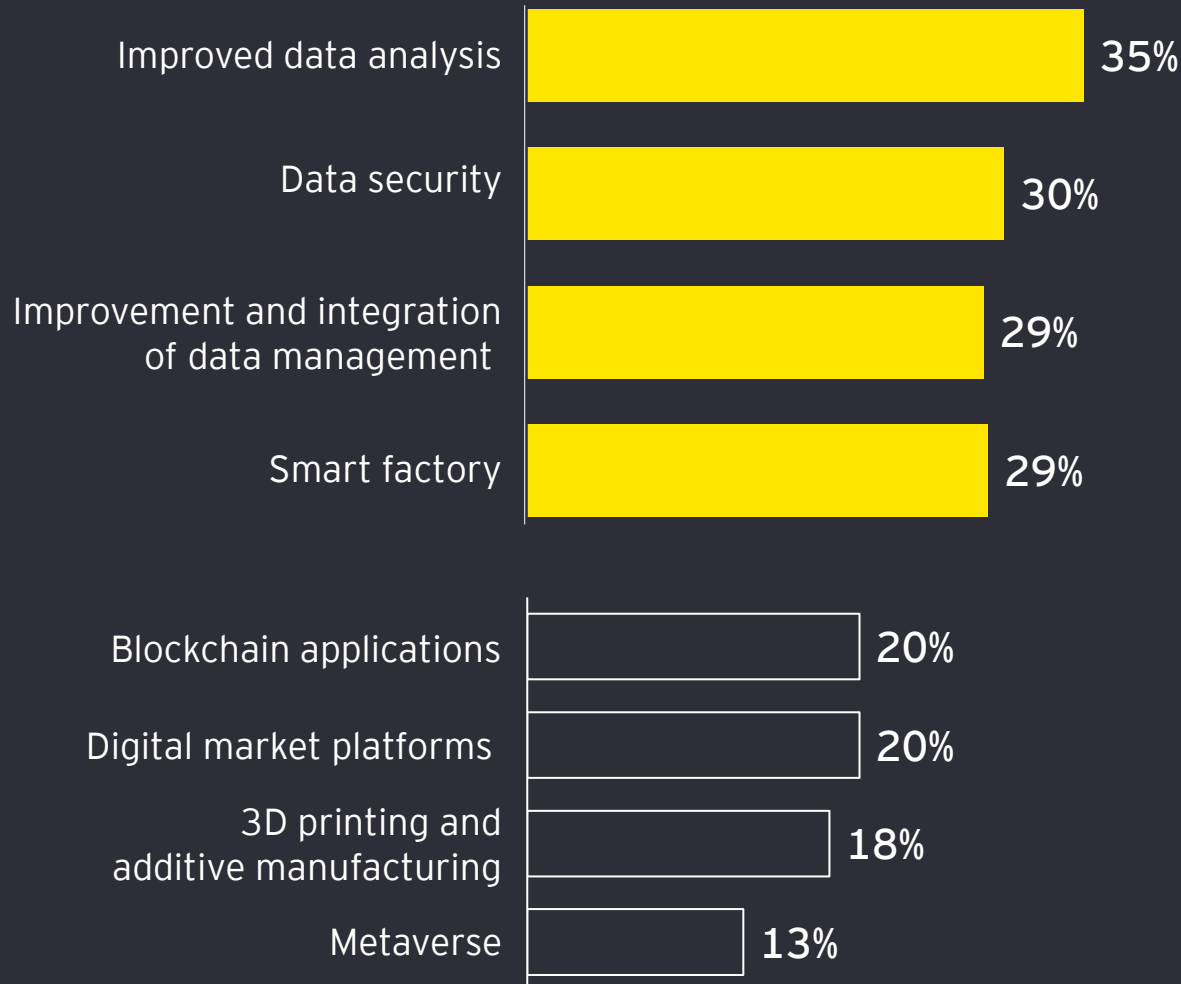
Note: Includes responses for strong and very strong impact

Impact over next three years
 Current status of implementation

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Digital security and data analysis and management are among the most implemented technology, while 3D printing and metaverse have limited implementation.

Irrespective of whether the topic is already being implemented in your company, select the three digitalization topics with the highest potential



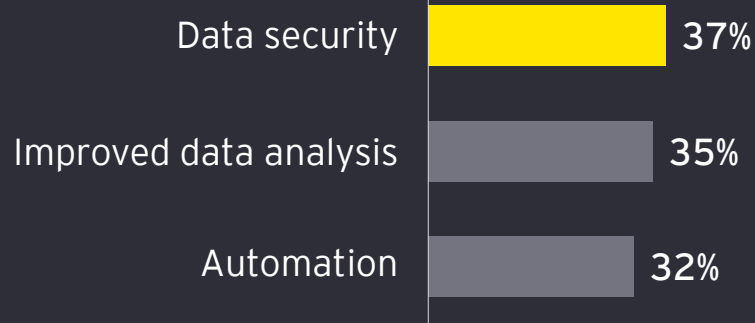
Additional digitalization topics:

- ▶ Digital ecosystems
- ▶ Smart products and services
- ▶ Integration and optimization of processes and systems
- ▶ Automation

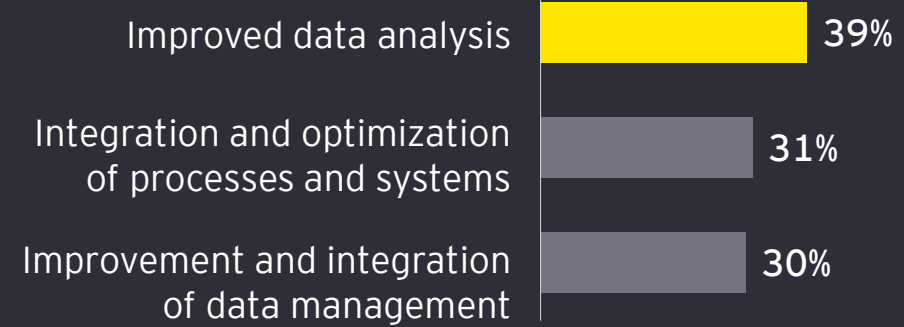
■ Highest potential
□ Lowest potential

What are the three digitalization topics with the highest potential?

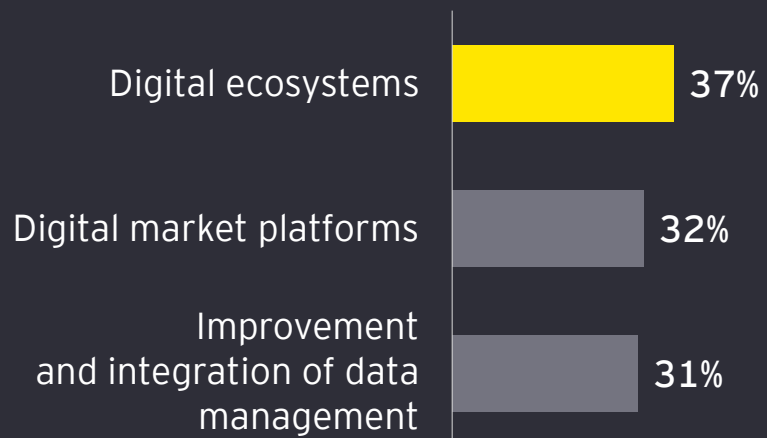
Europe



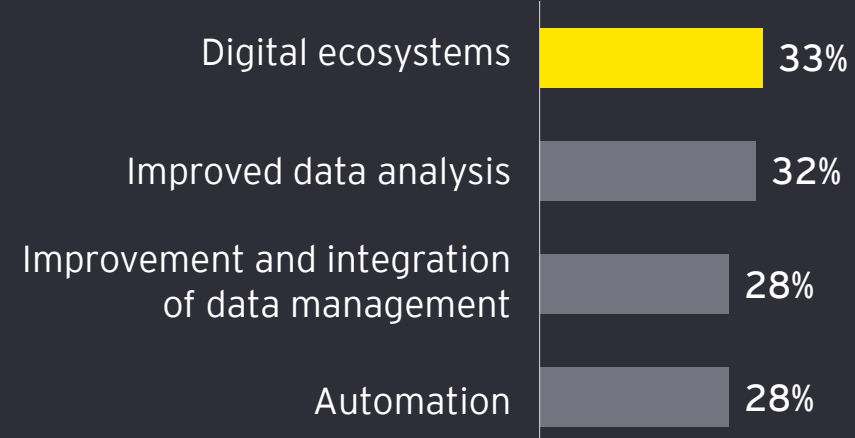
North America



Middle East and Africa



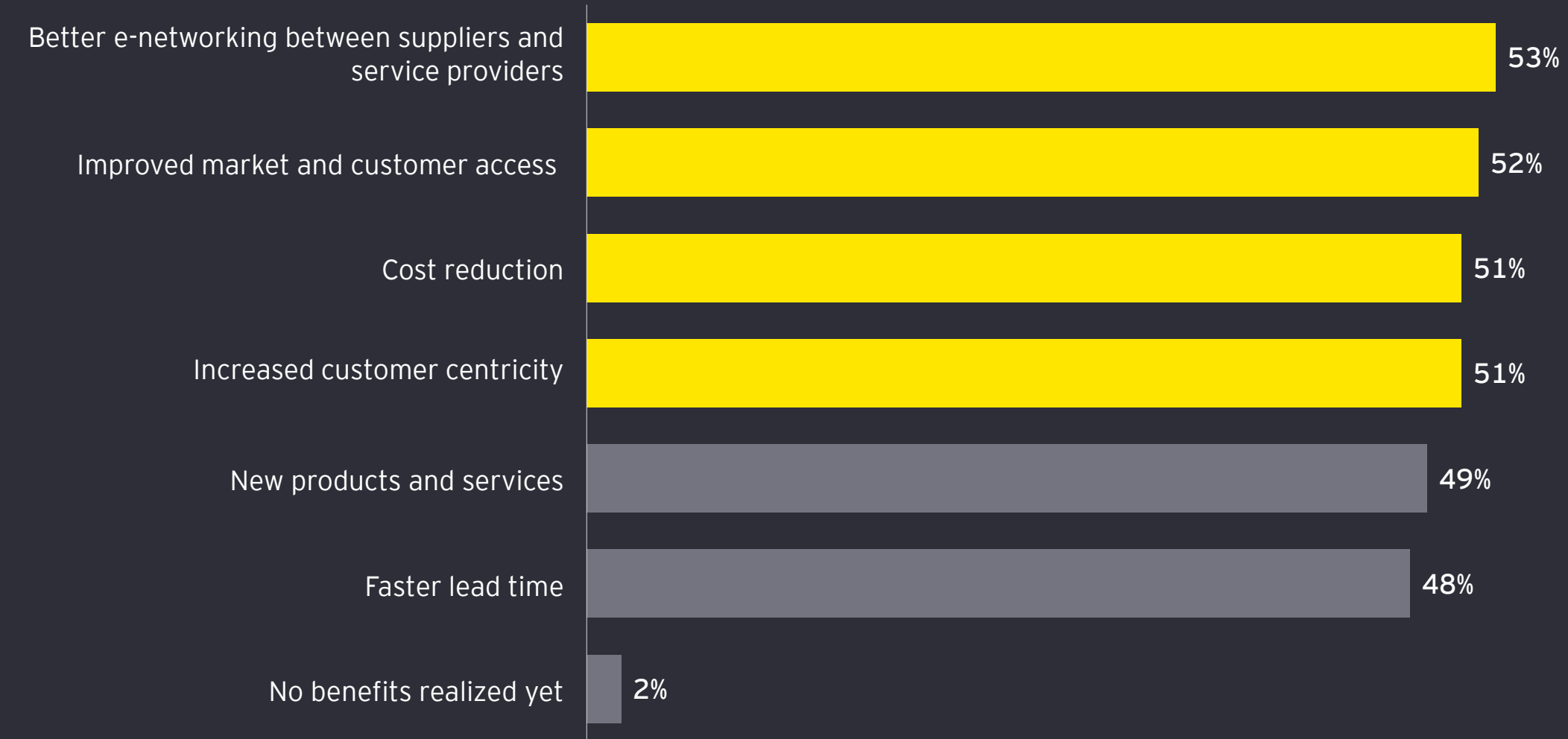
Asia-Pacific



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North America and Asia-Pacific have achieved benefits in e-networking, Europe in cost reduction, and the Middle East and Africa in new products and services.

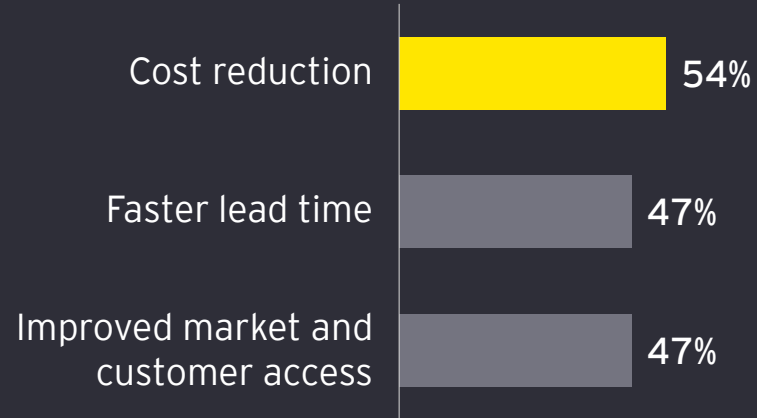
Which benefits of digitalization have already been realized in your company?



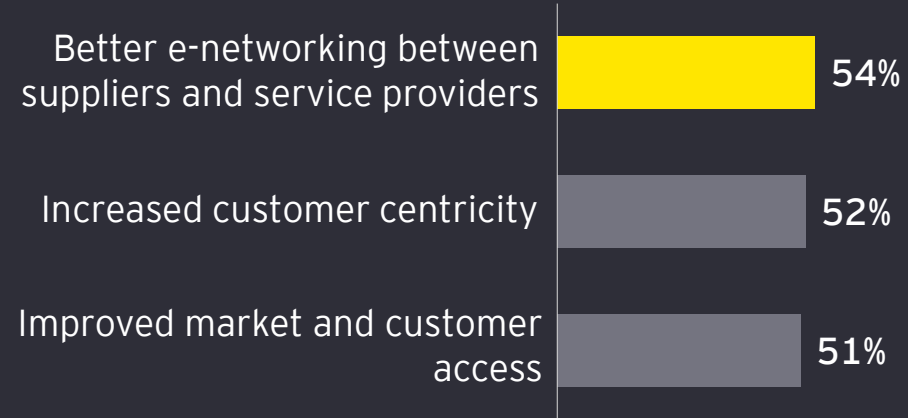
■ Top three

Which benefits of digitalization have already been realized in your company?

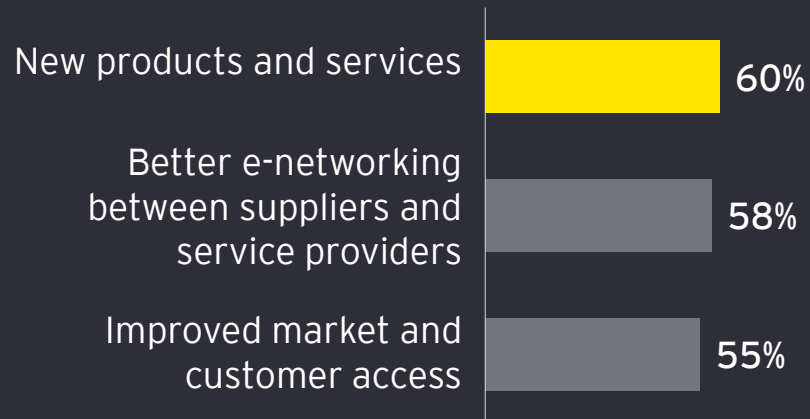
Europe



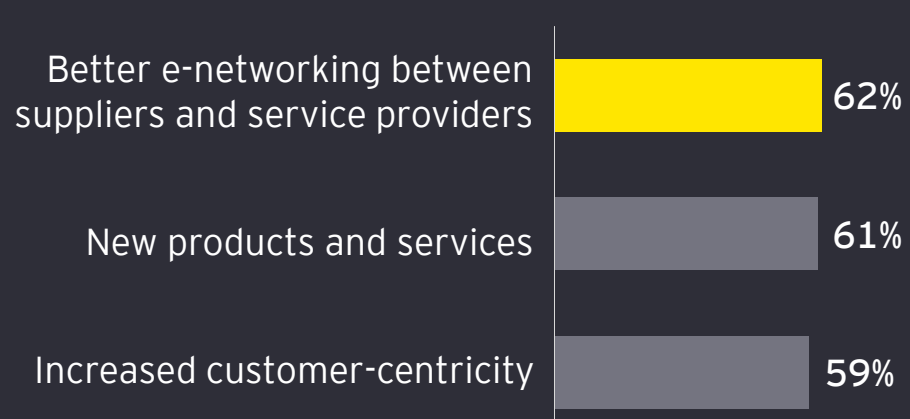
North America



Middle East and Africa



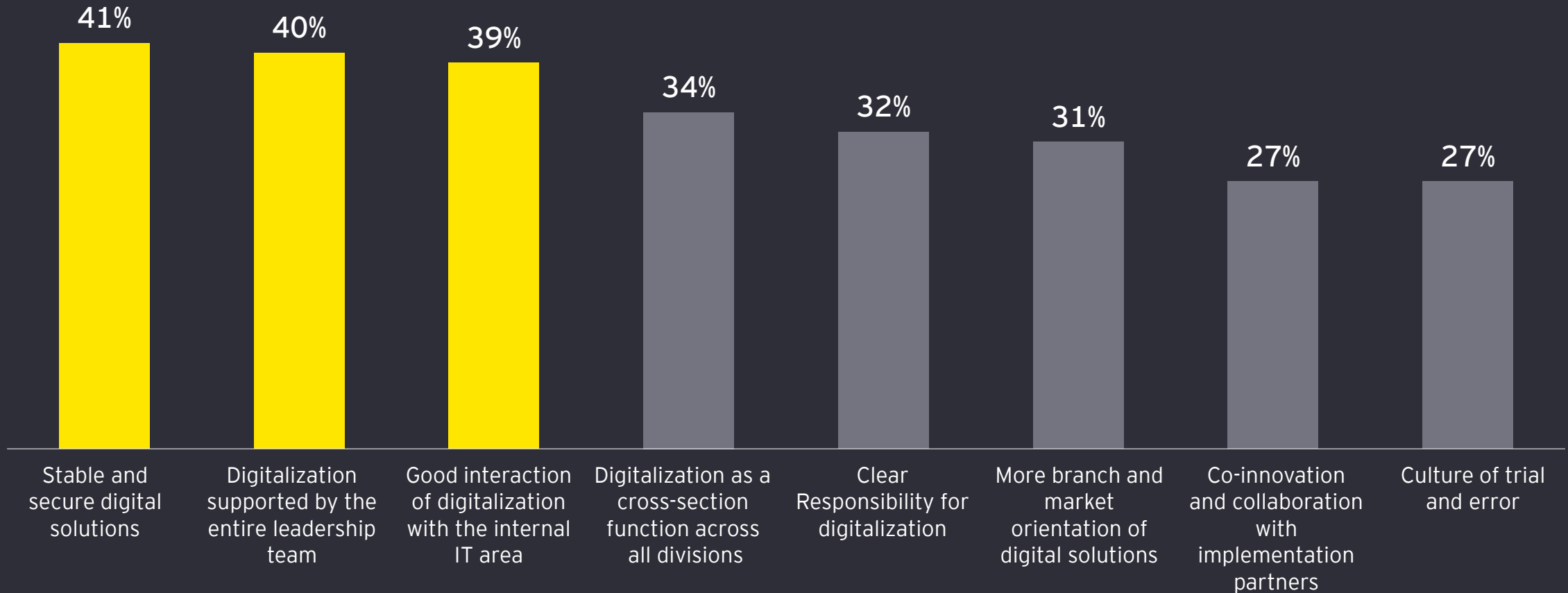
Asia-Pacific



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Stable and secure digital solutions and good interaction of digitalization with internal IT and leadership support are the most critical factors for the success of digital transformation, according to chemical players.

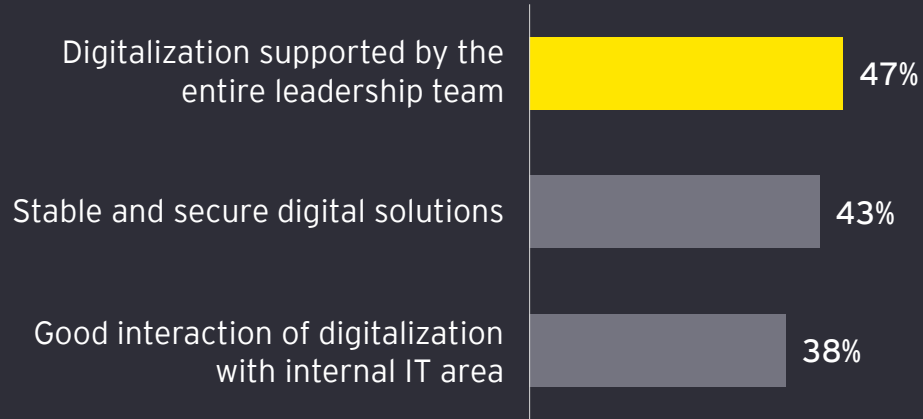
What are the three major success factors for an effective digital transformation?



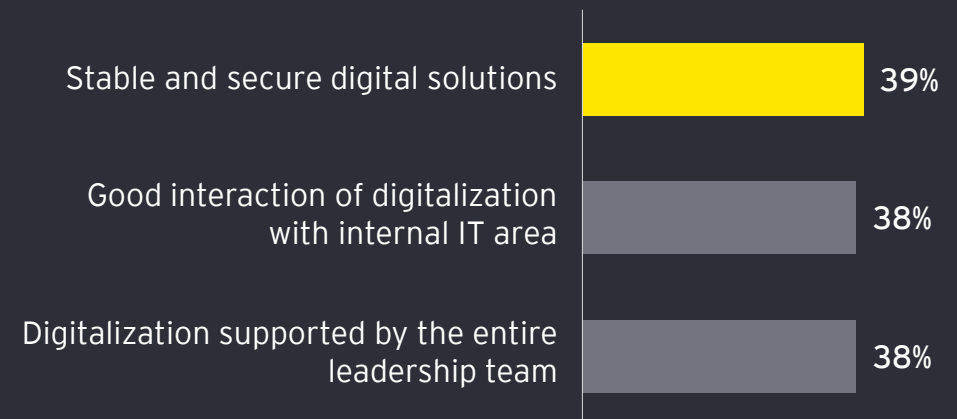
■ Top three

What are the three major success factors for an effective digital transformation?

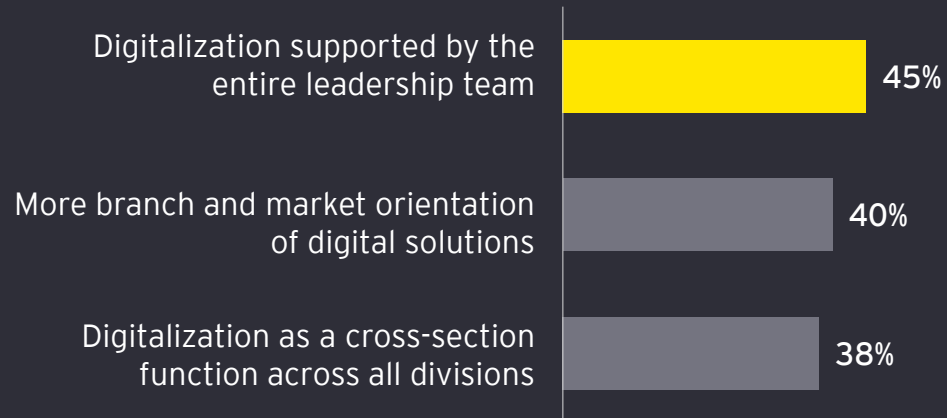
Europe



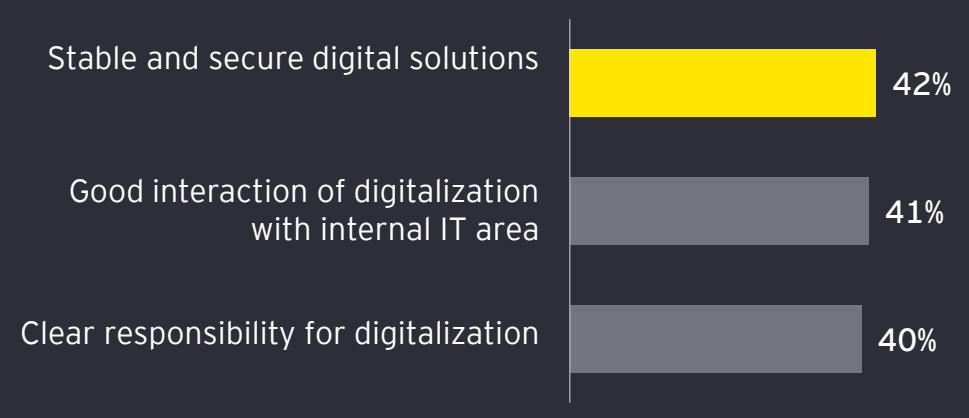
North America



Middle East and Africa



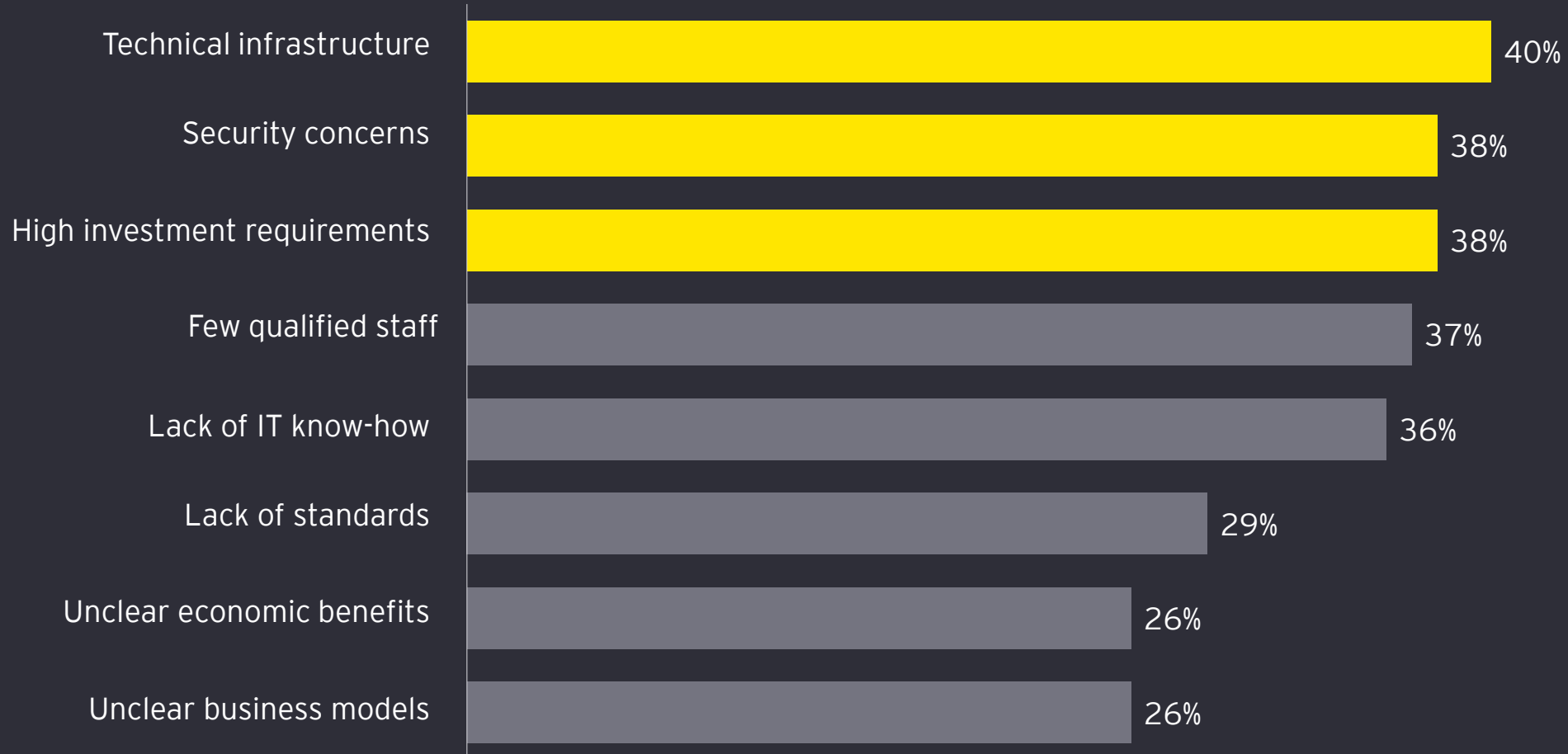
Asia-Pacific



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Qualified personnel and investment requirements are the top barriers in Europe and North America, while Asia-Pacific, the Middle East and Africa suffer from lack of technical infrastructure.

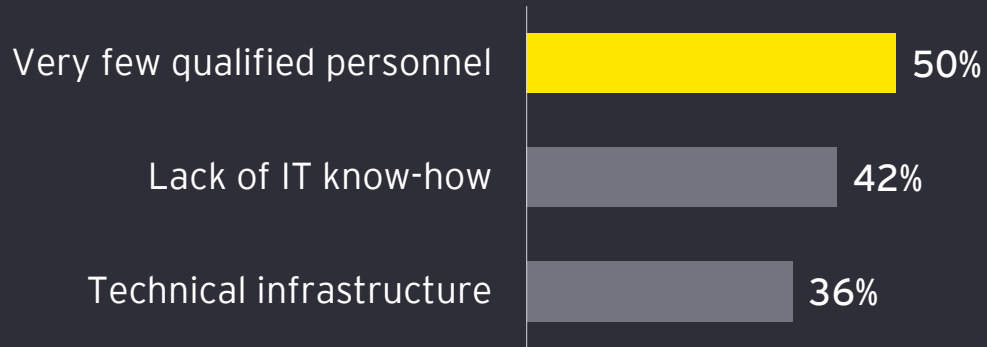
What are the three biggest barriers to digitalization?



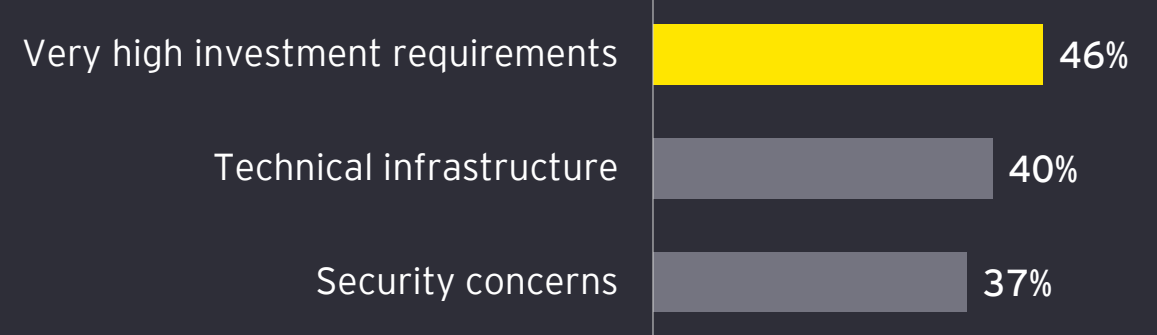
■ Top three

What are the three biggest barriers to digitalization?

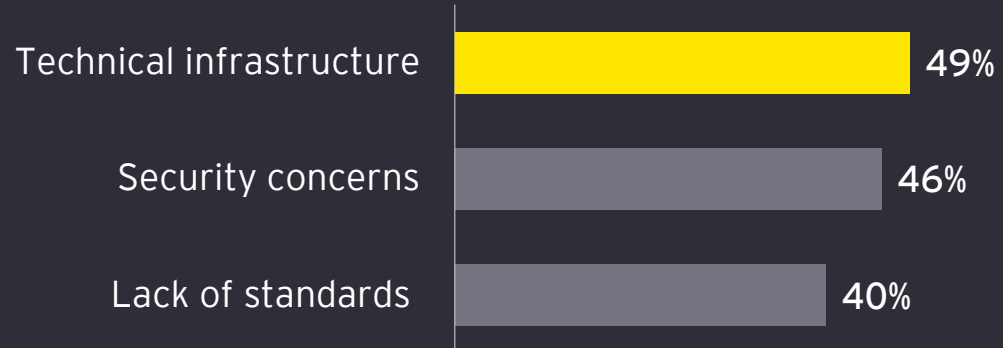
Europe



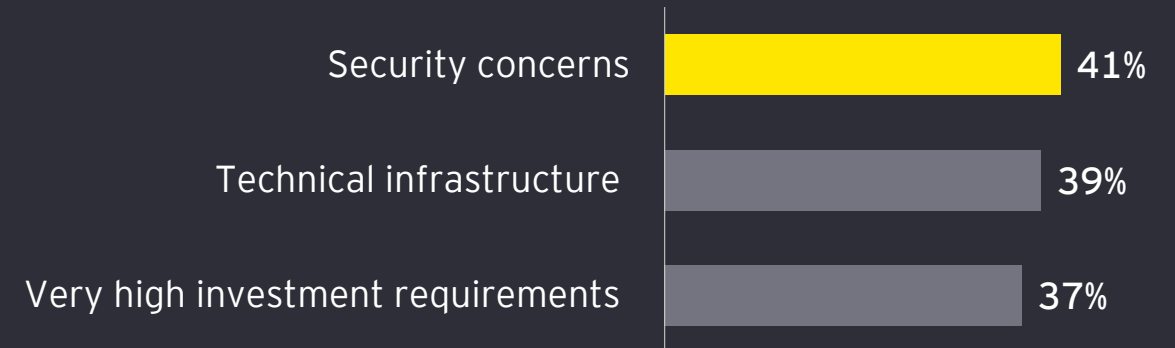
North America



Middle East and Africa



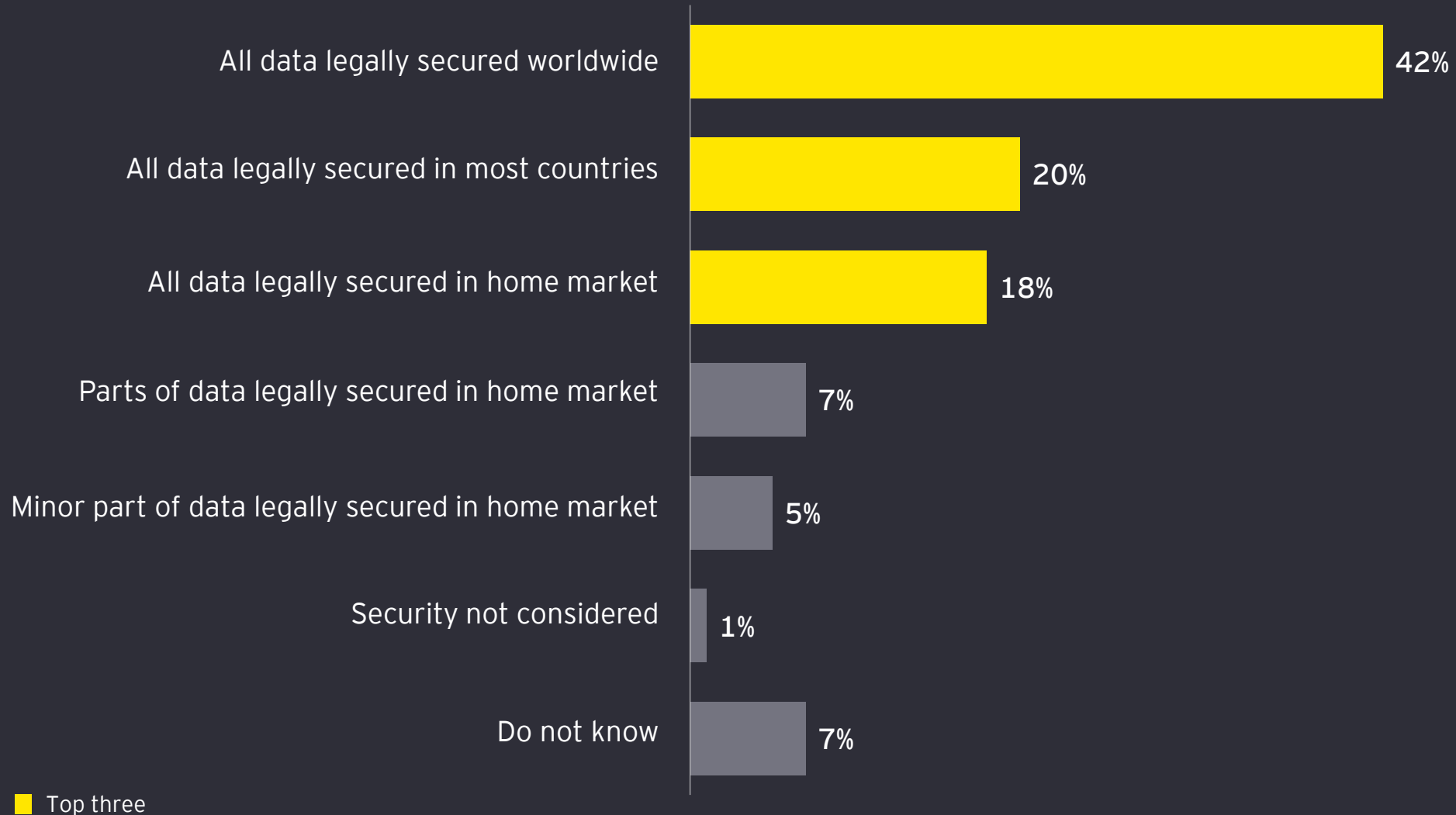
Asia-Pacific



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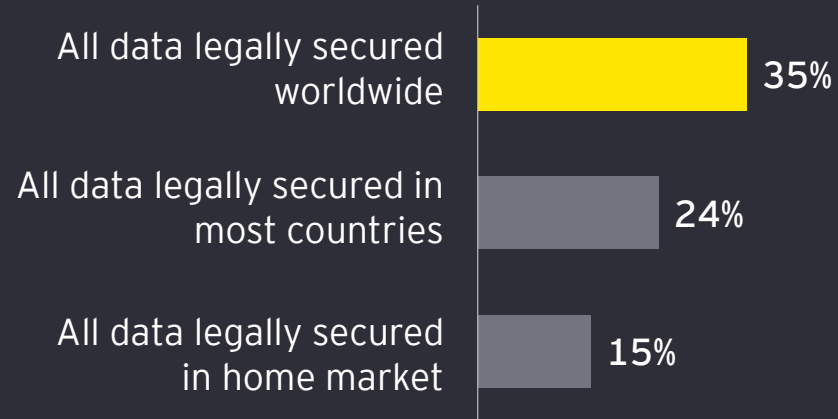
More than 60% of respondents have their complete data legally secured in diversified locations.

Which of the following statements describe the situation for your company data best?

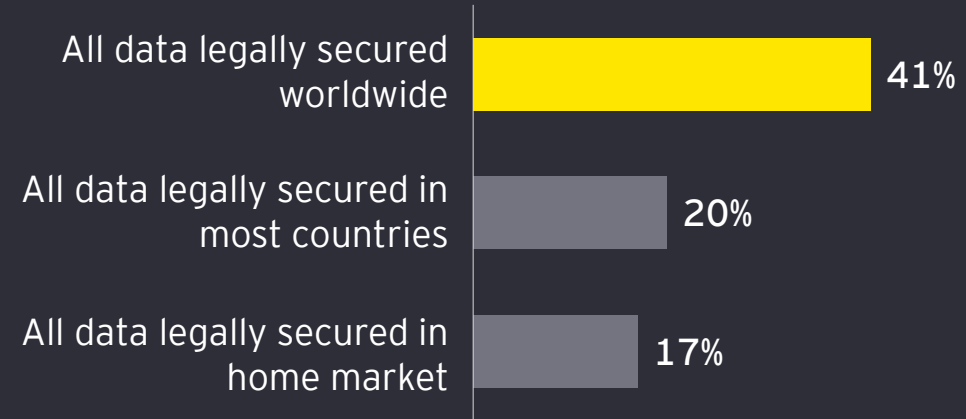


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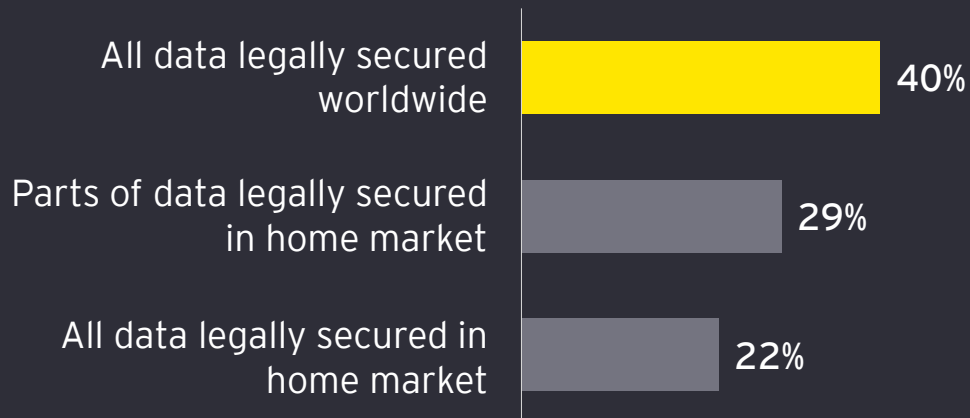
Europe



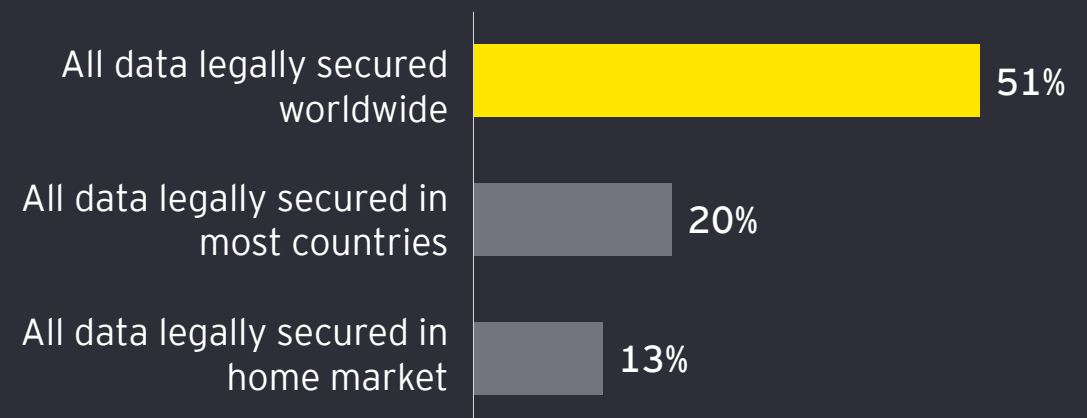
North America



Middle East and Africa



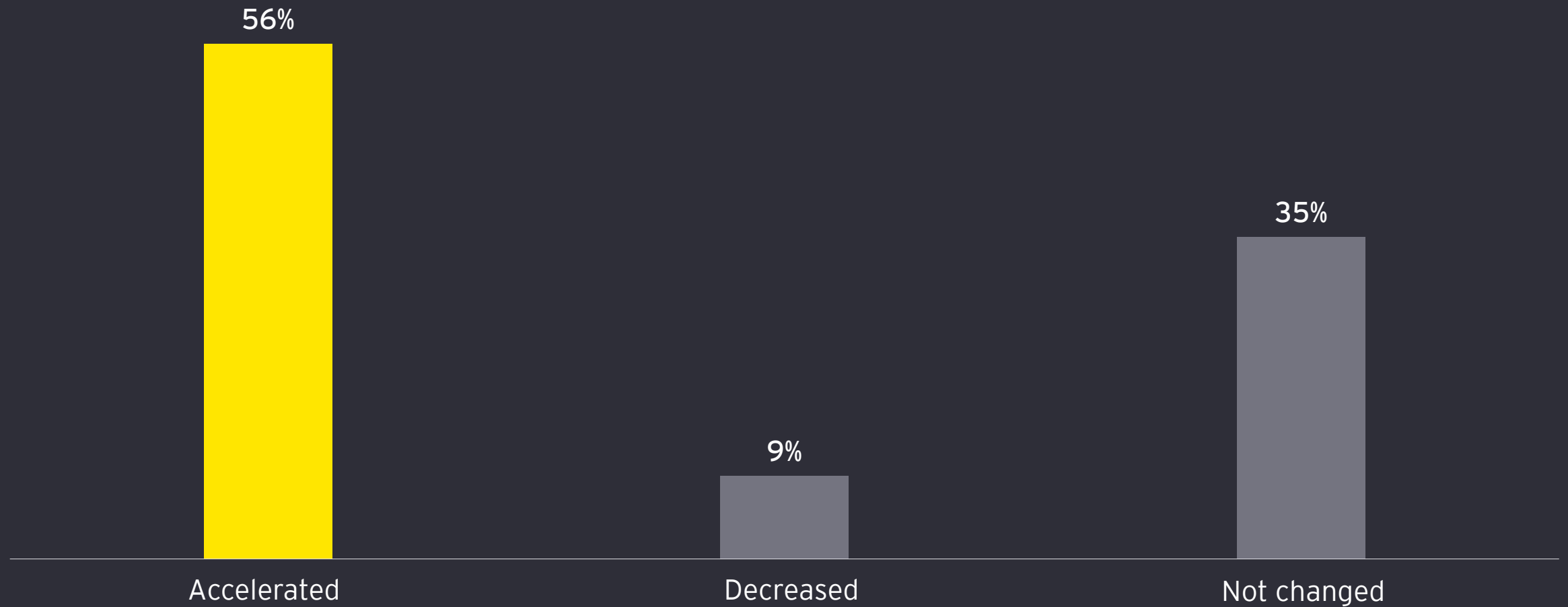
Asia-Pacific



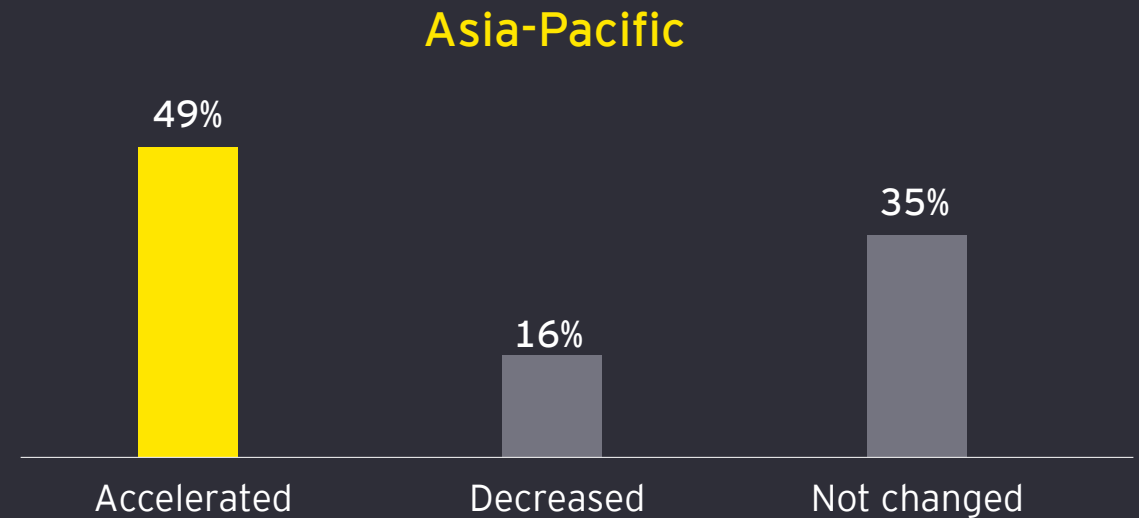
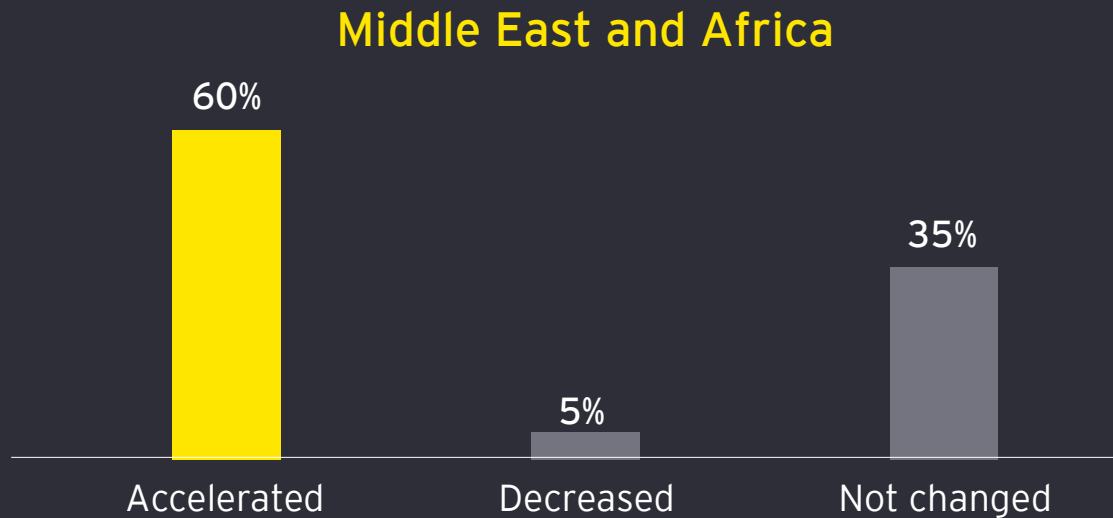
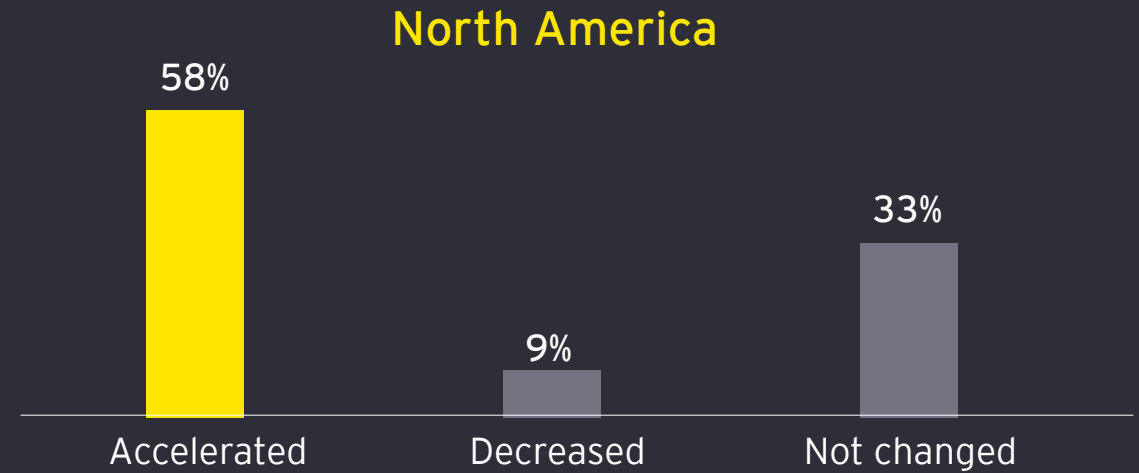
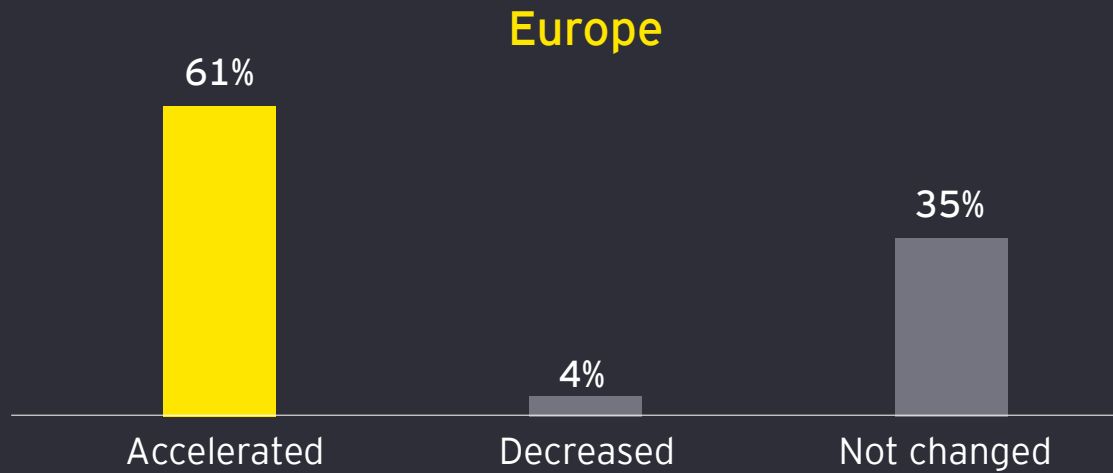
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After two years of the pandemic, the speed of digitalization in more than half of the respondents has accelerated, but remains unchanged for more than one-third of them.

After two years of COVID-19, how has the speed of digitalization in your company changed?



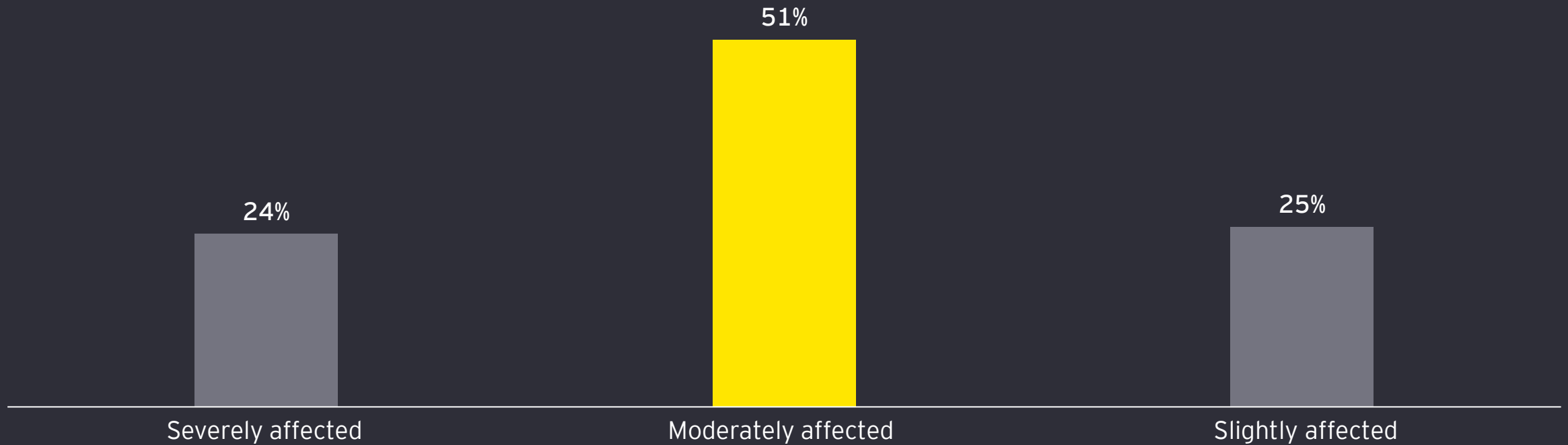
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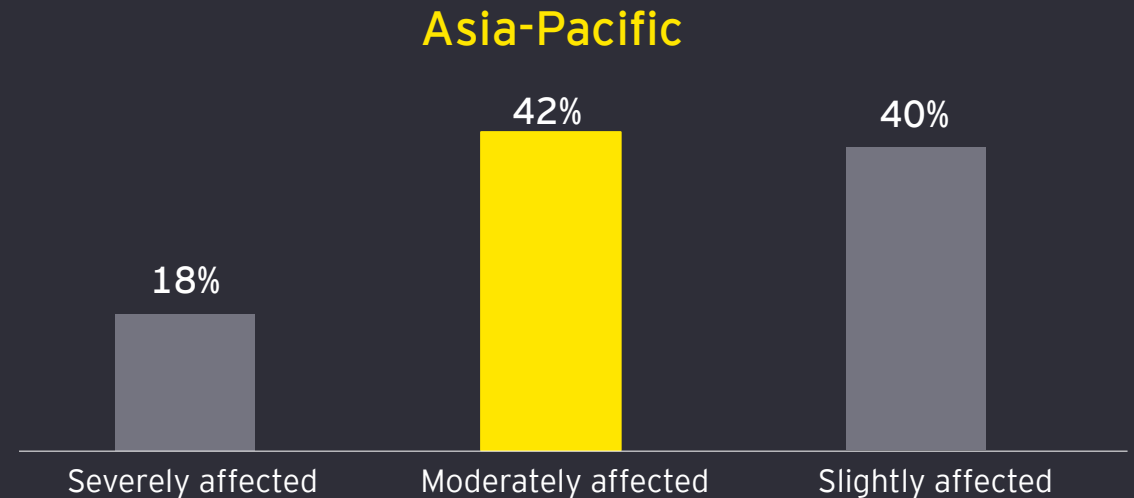
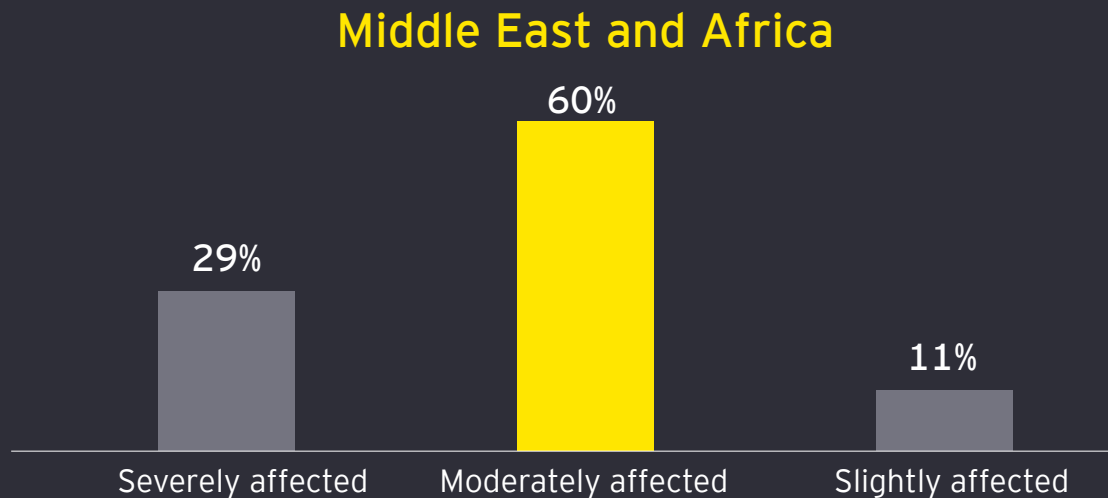
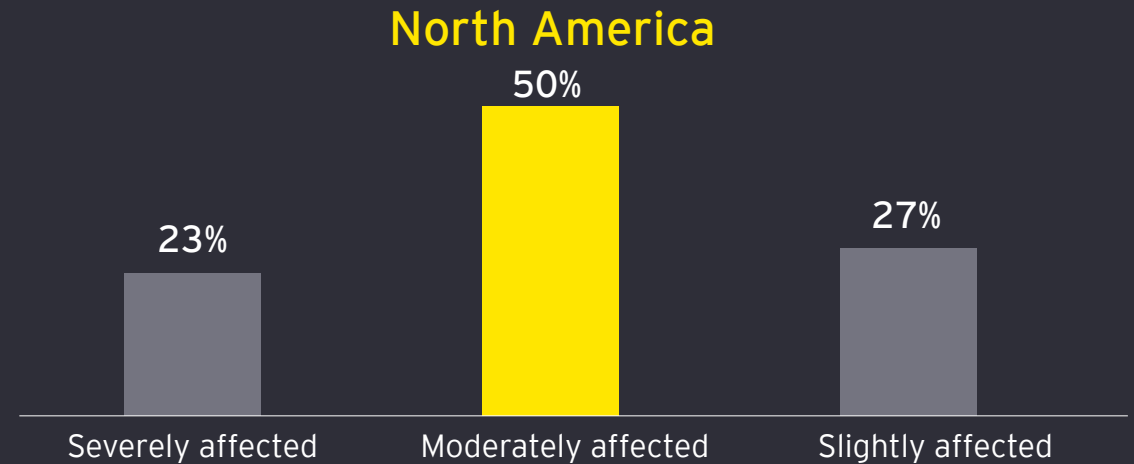
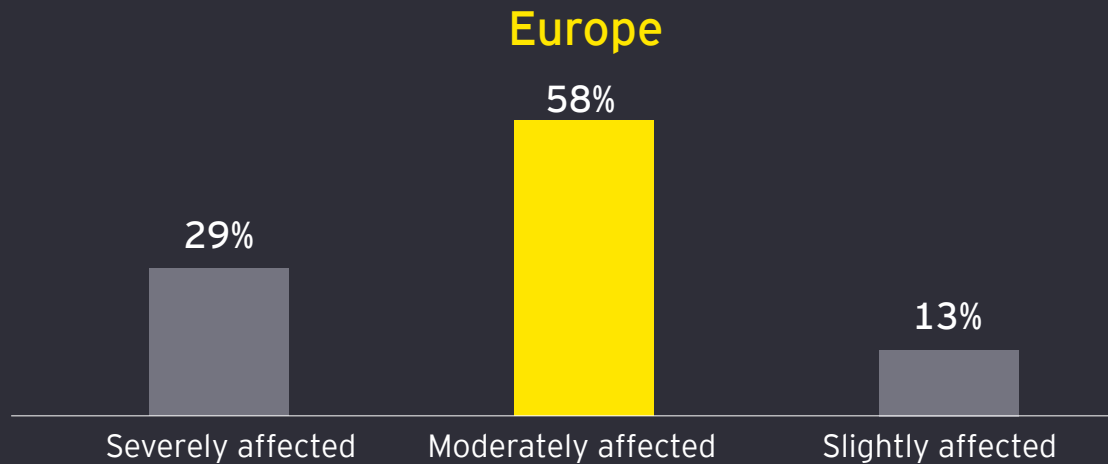
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Majority of chemical companies are moderately affected by environmental sustainability issues and changes, with almost one-third being severely affected in Europe and the Middle East and Africa.

To what extent is your company affected by environmental sustainability issues and changes?



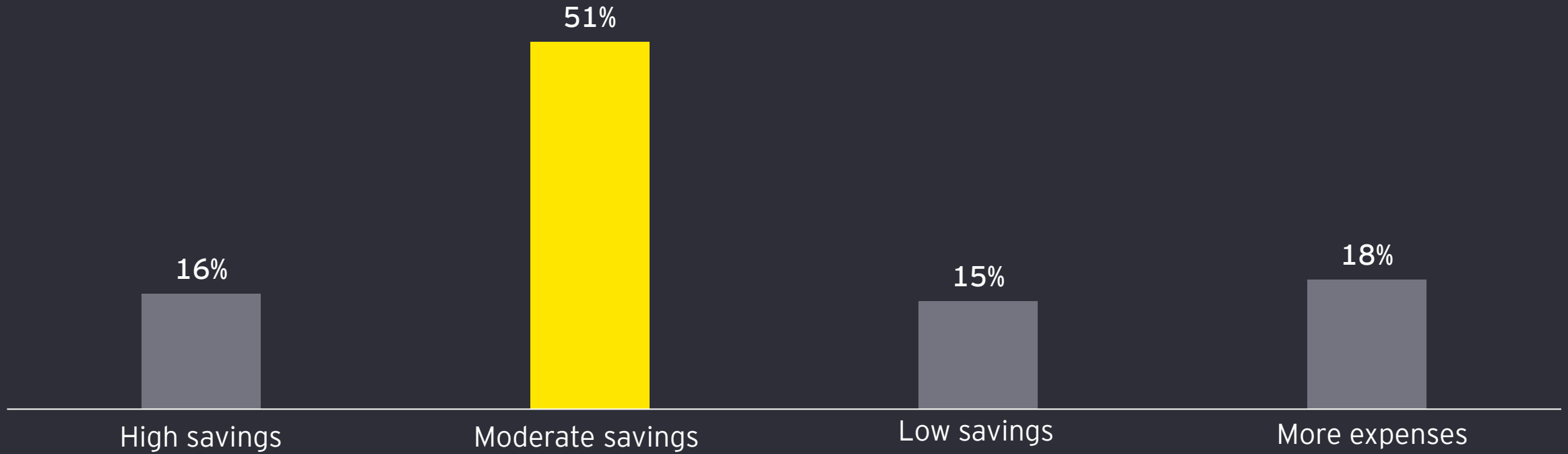
To what extent is your company affected by environmental sustainability issues and changes?



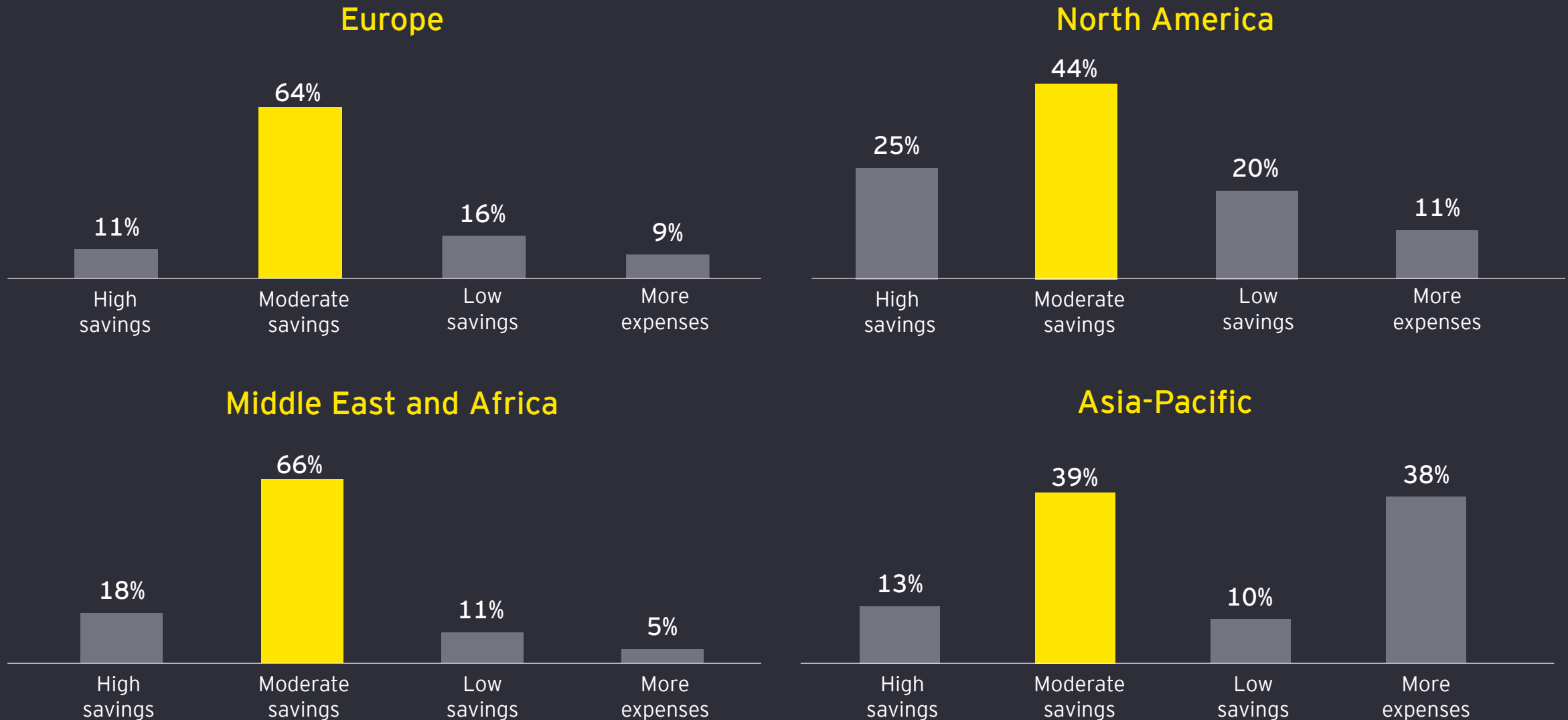
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Two-thirds of respondents expect moderate to high savings by engaging in sustainability activities.

What do you expect in terms of margin savings through sustainability activities?



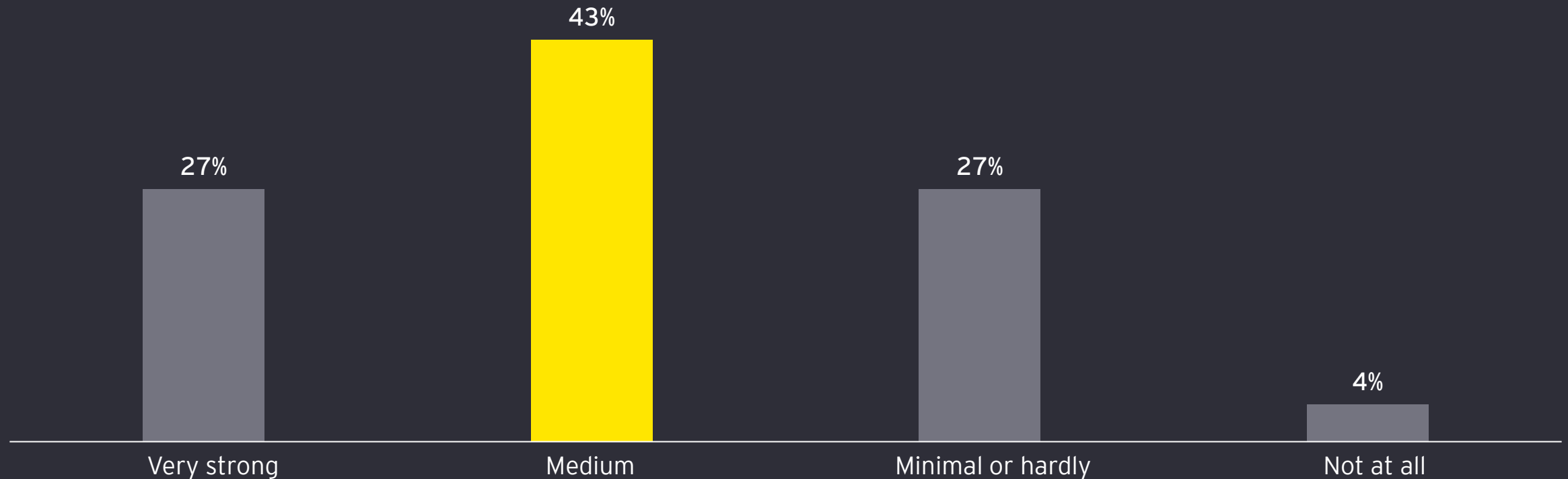
What do you expect in terms of margin savings through sustainability activities?



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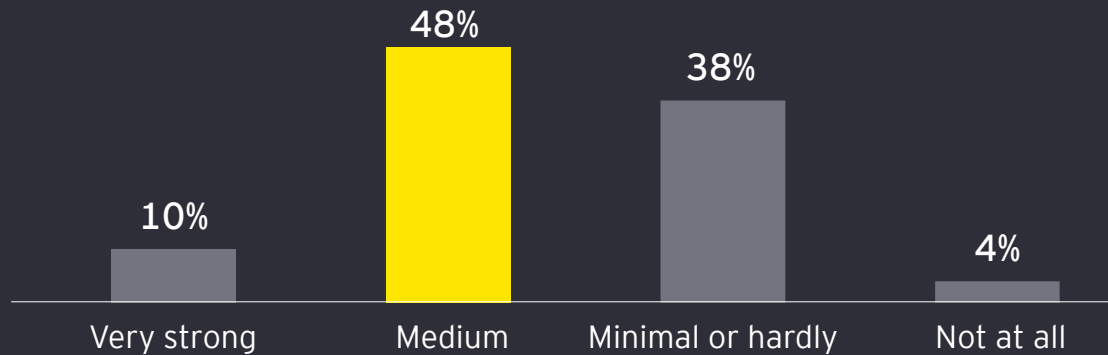
While chemical players in Asia-Pacific see a strong potential in using digitalization for faster implementation of sustainability goals, Europe and North America see a medium potential.

To what extent do you see potential in your company to use technology and digitalization for a better and faster implementation of your sustainability goals?

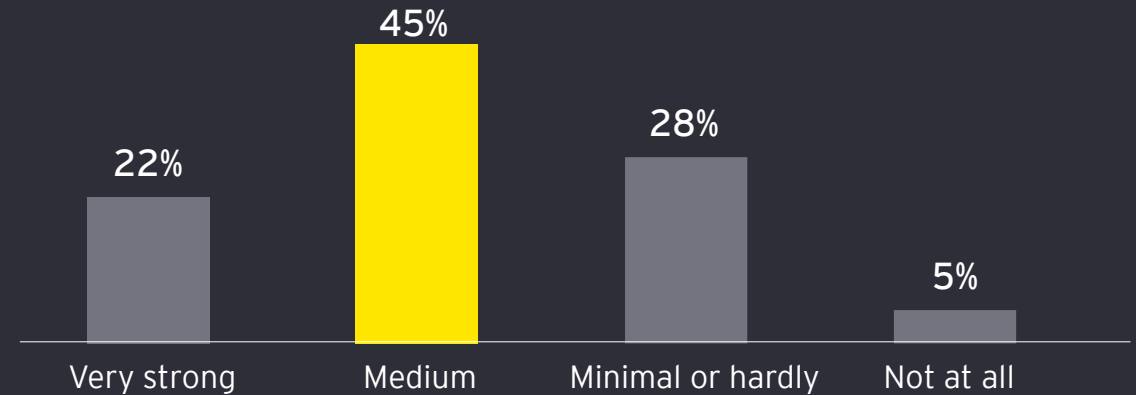


To what extent do you see potential in your company to use technology and digitalization for a better and faster implementation of your sustainability goals?

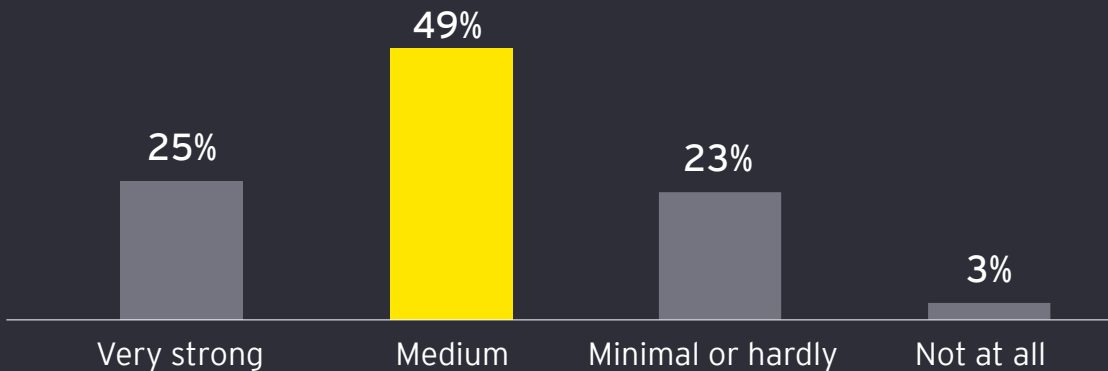
Europe



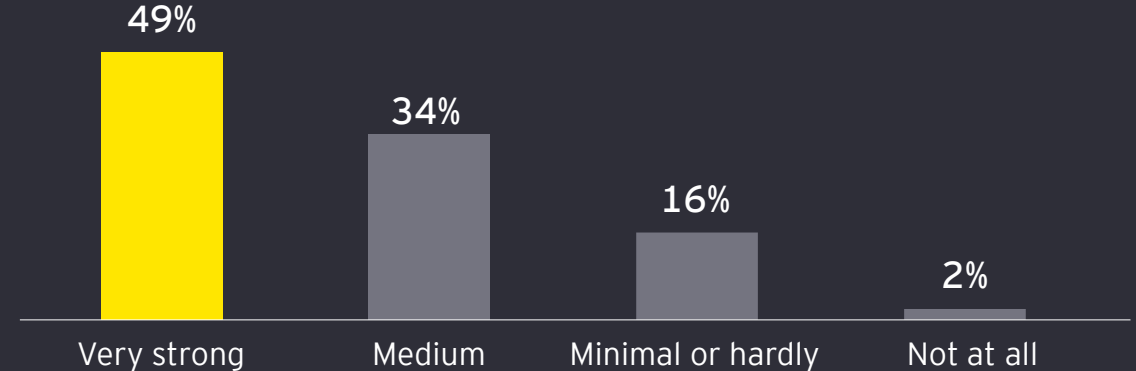
North America



Middle East and Africa



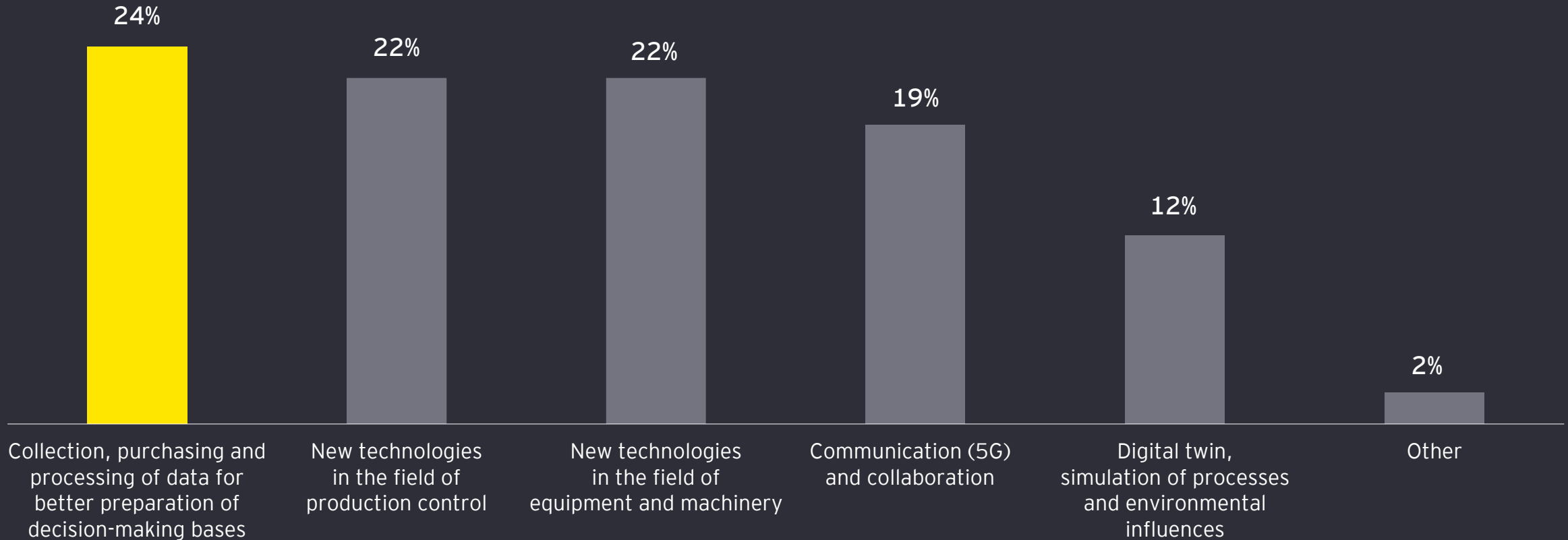
Asia-Pacific



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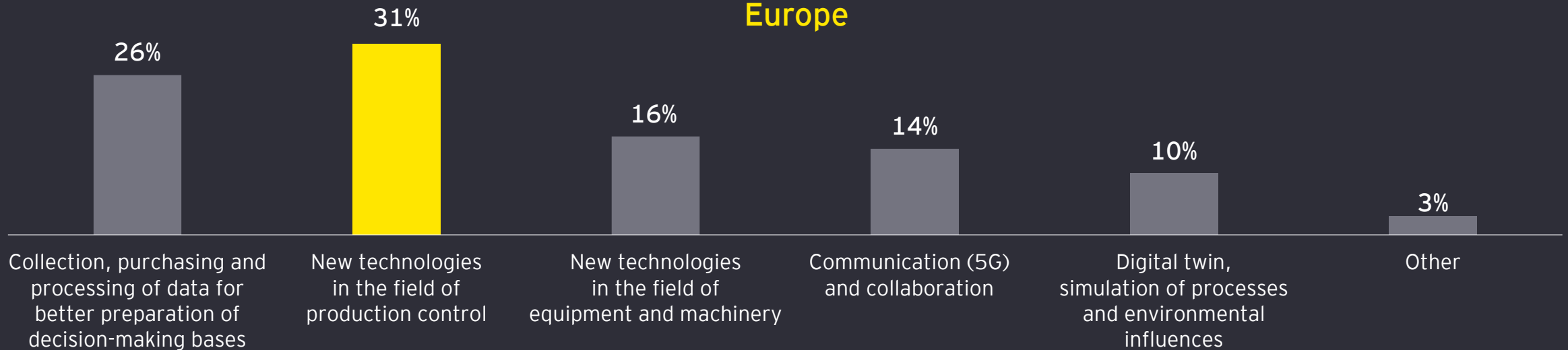
Europe-based firms believe in technologies for production control; Asian companies see potential in technology in the field of equipment and machinery, while Middle Eastern and African players see the highest potential in communication and cooperation.

Where do you see the greatest potential to use technology and digitalization to implement your sustainability goals better and faster?

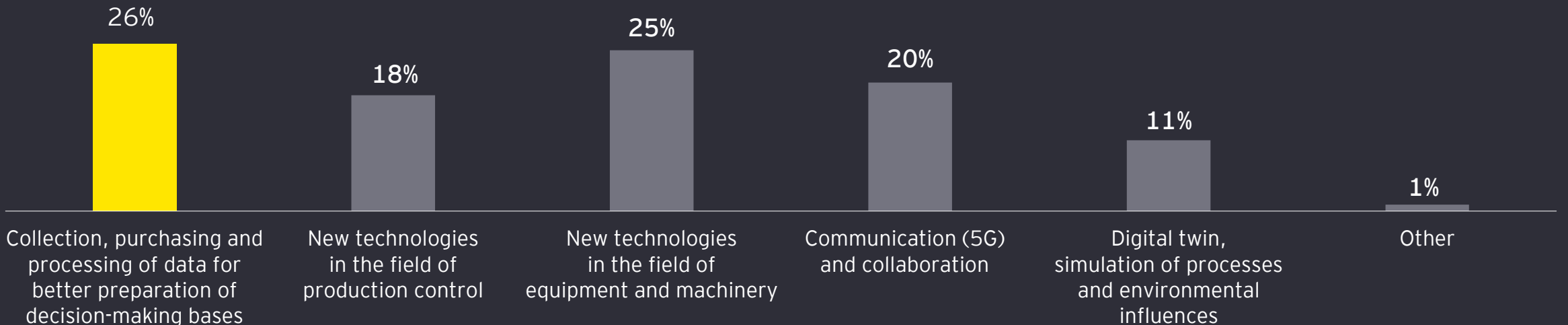


Where do you see the greatest potential to use technology and digitalization to implement your sustainability goals better and faster?

Europe

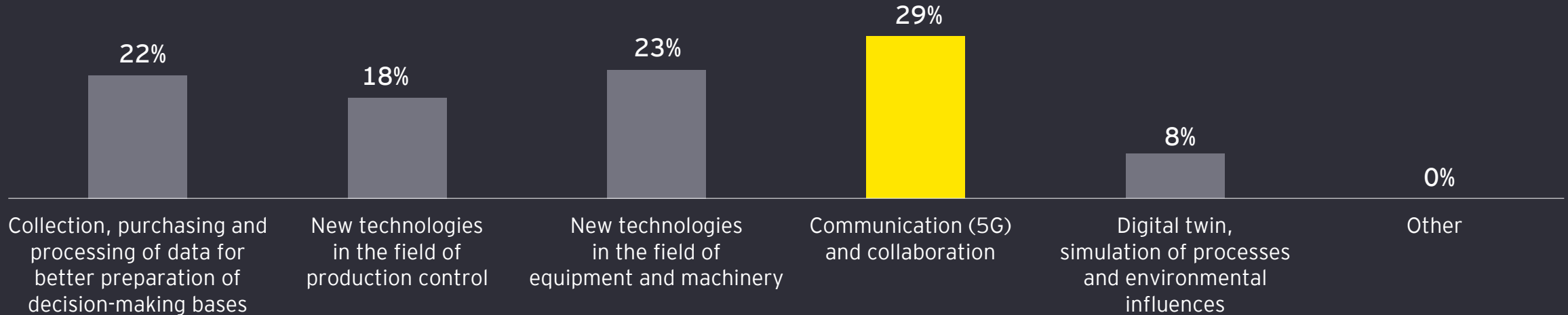


North America

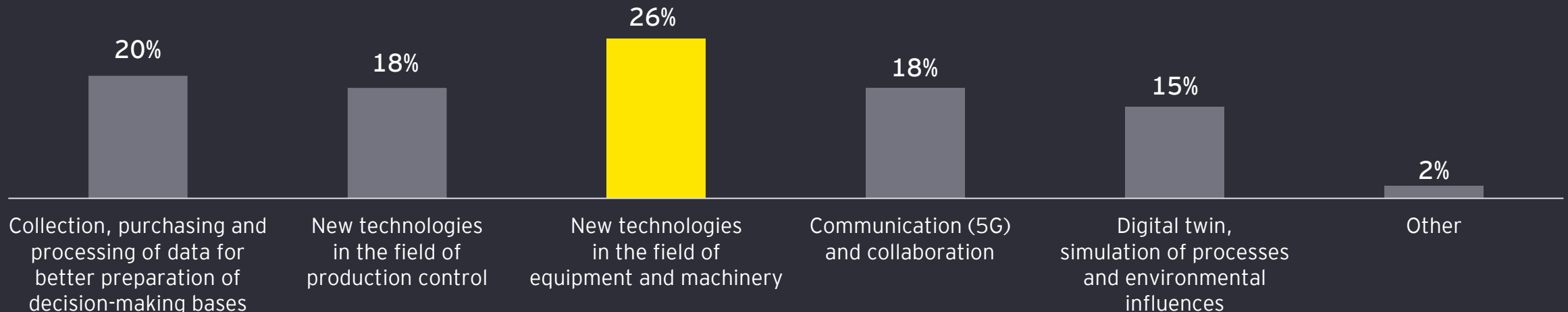


Where do you see the greatest potential to use technology and digitalization to implement your sustainability goals better and faster?

Middle East and Africa



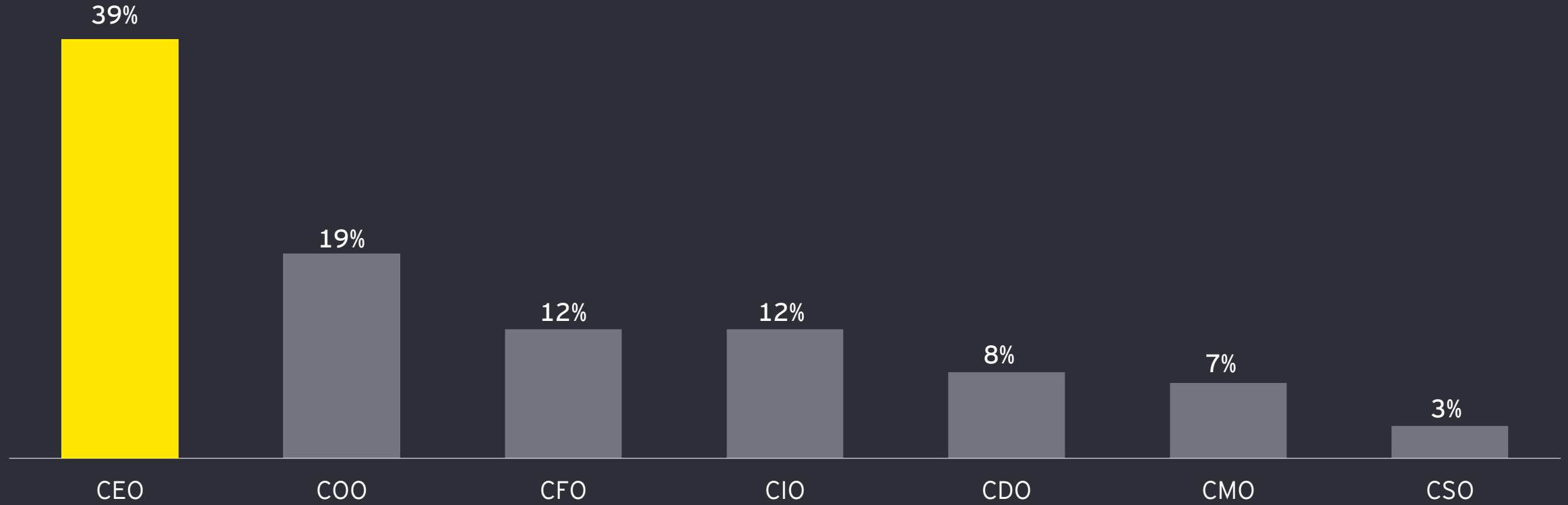
Asia-Pacific



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According to most chemical players, their CEOs are driving digitalization for faster implementation of sustainability goals.

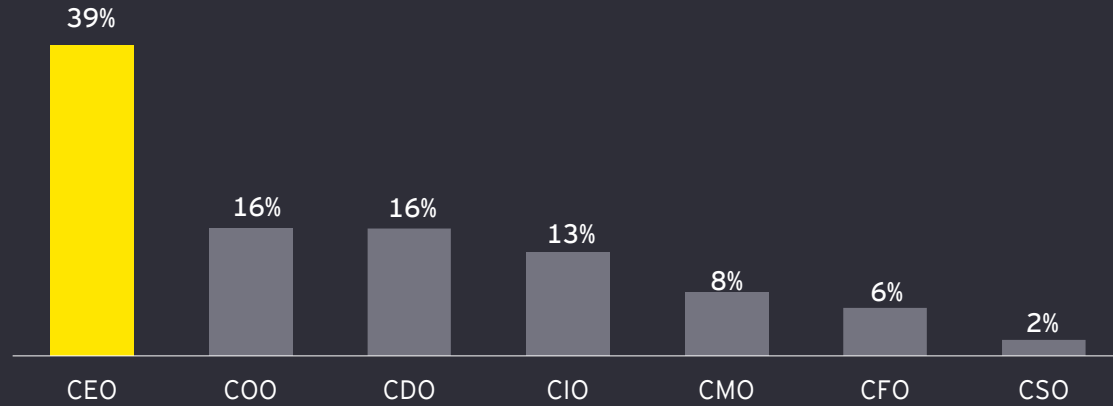
Who in your company is driving digitalization toward better and faster implementation of your sustainability goals?



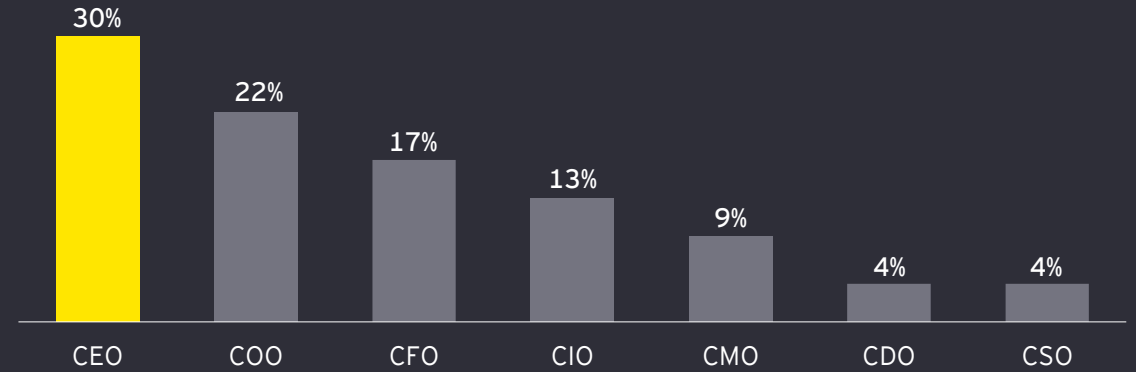
■ Top one

Who in your company is driving digitalization toward better and faster implementation of your sustainability goals?

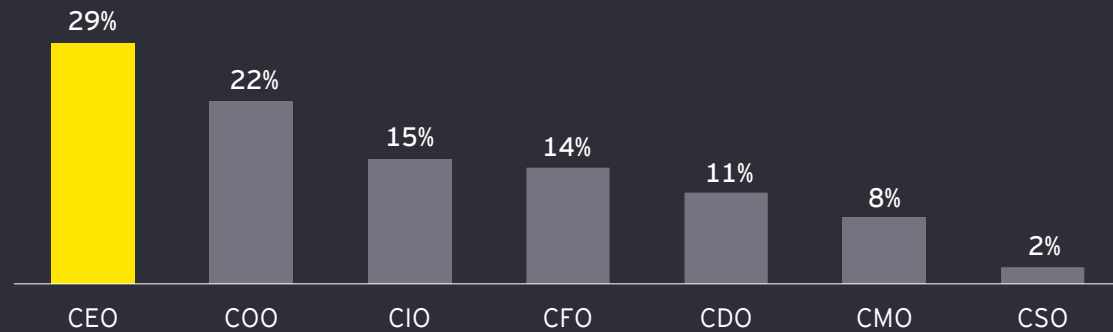
Europe



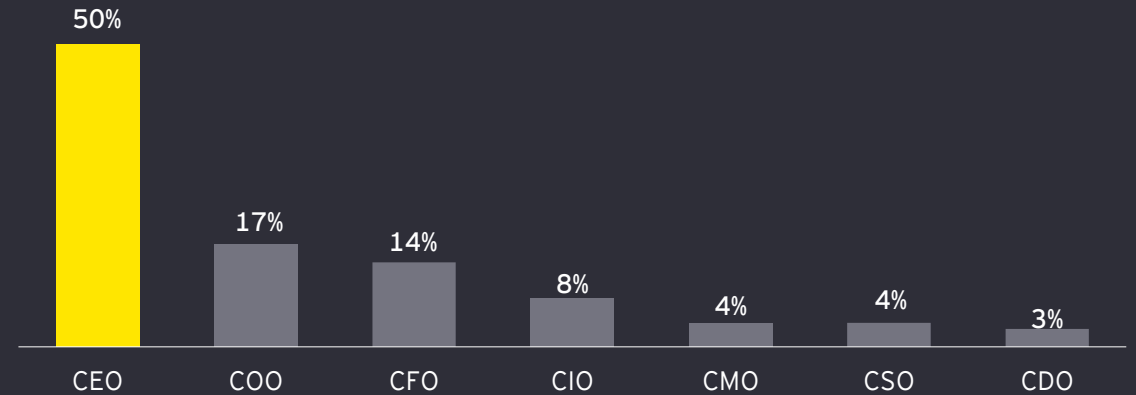
North America



Middle East and Africa

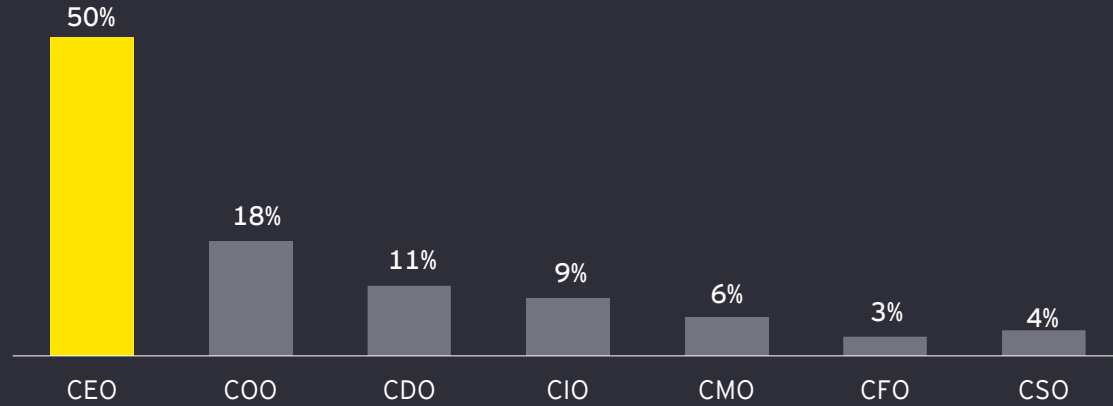


Asia-Pacific

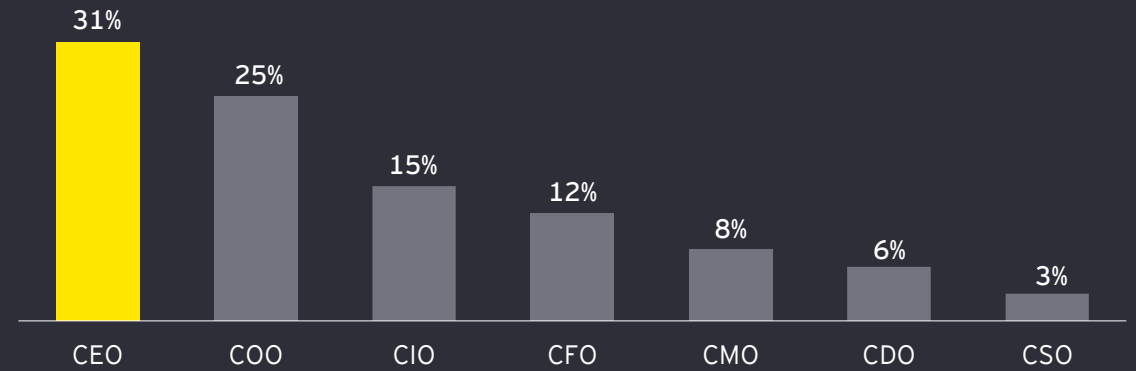


Who in your company is driving digitalization toward better and faster implementation of your sustainability goals?

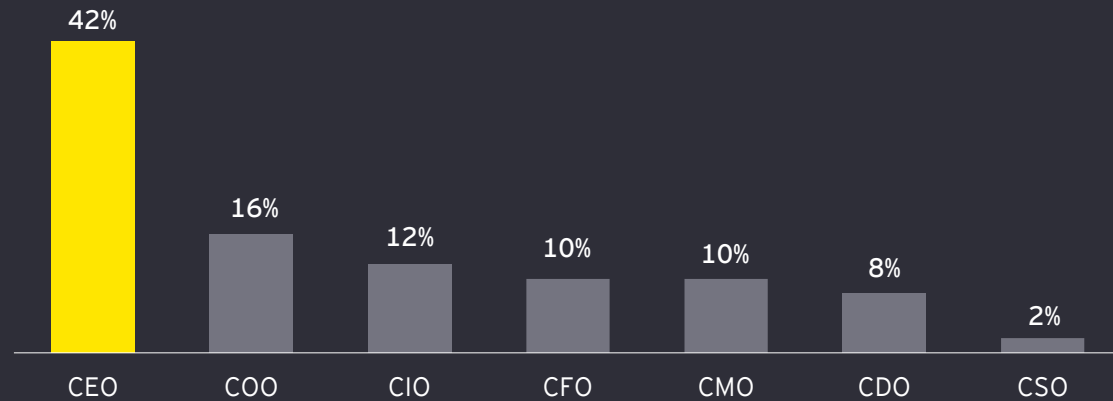
<US\$100m



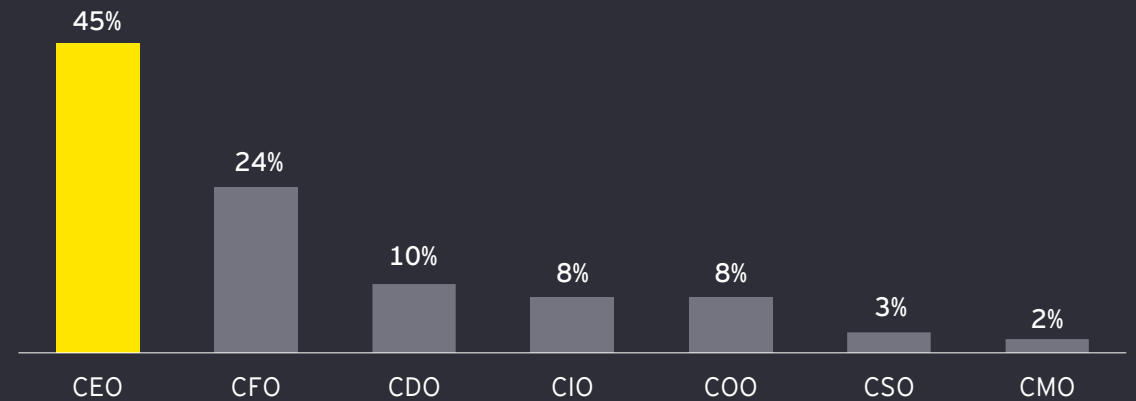
US\$100m – US\$2b



US\$2b – US\$10b

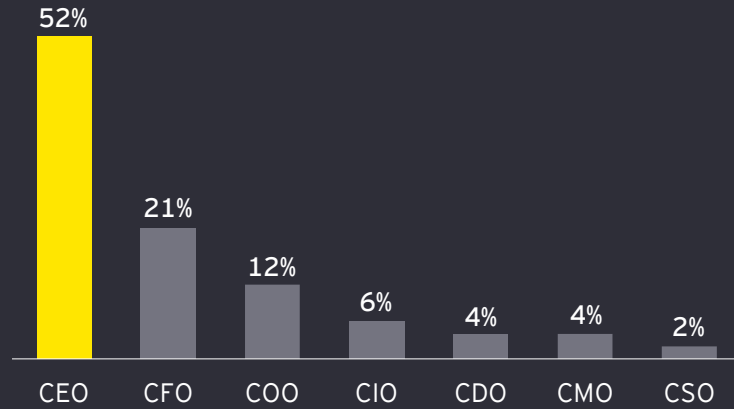


>US\$2b

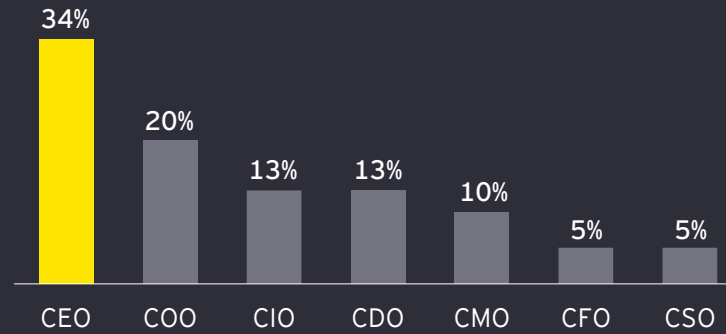


Who in your company is driving digitalization toward better and faster implementation of your sustainability goals?

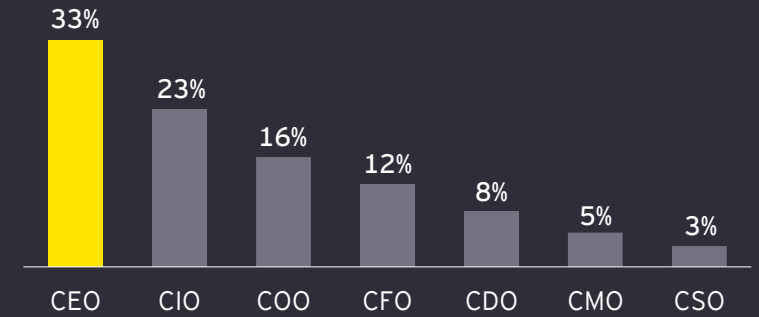
Basic chemicals and petrochemicals



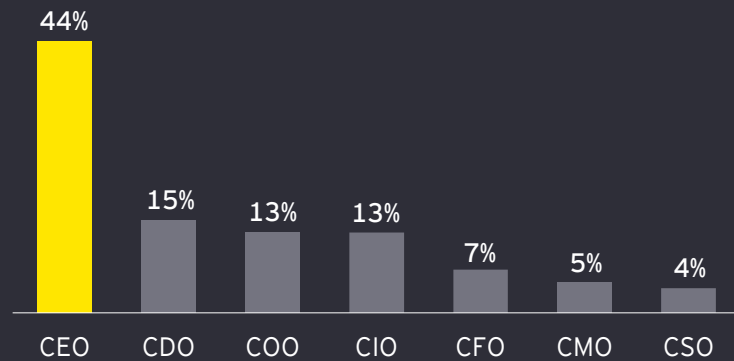
Fine chemicals and life sciences*



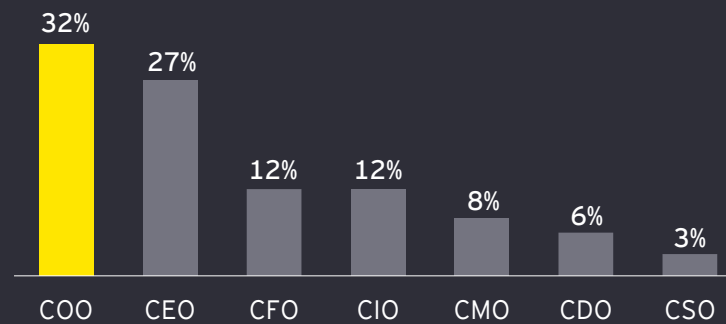
Polymers and plastics



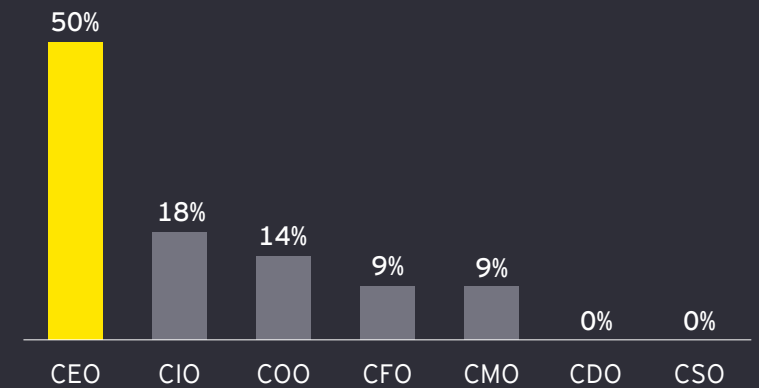
Dealers and distributors, and services



Specialty and industrial chemicals



Agrochemicals and seeds



A large, light blue, stylized number '3' is positioned on the left side of the slide, serving as a background element for the title.

Progress in 2020-22

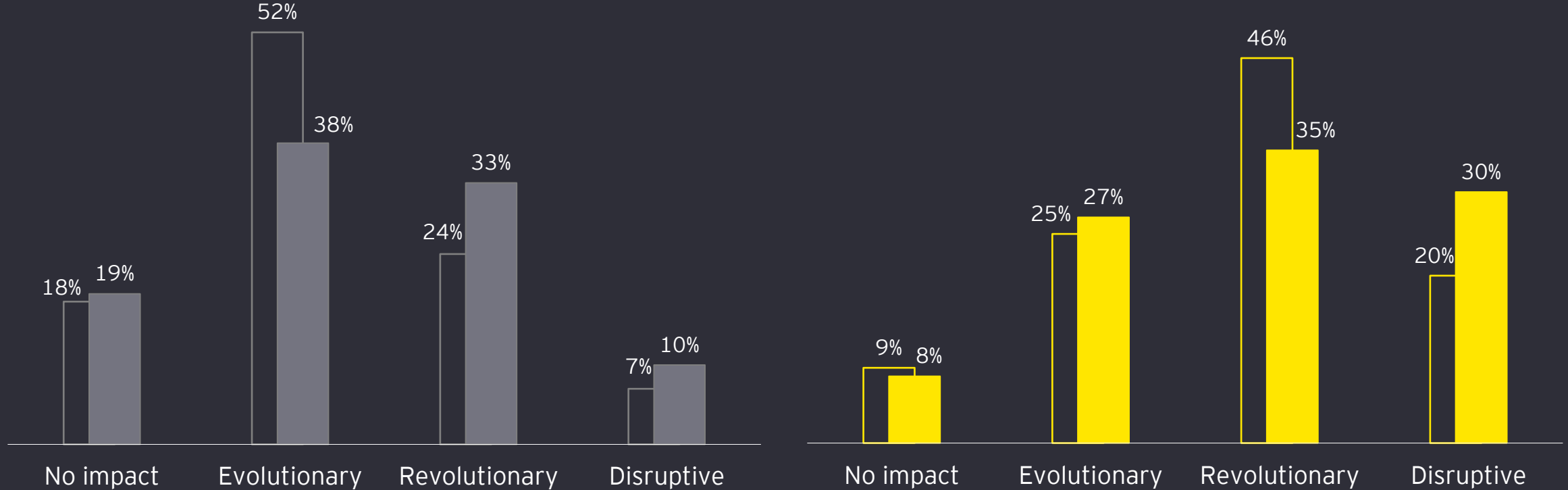
Summary of year-over-year comparison (2020 and 2022)

- ▶ Post COVID-19 and amid geopolitical uncertainties, an increasing share of chemical players (though still a smaller share than evolutionary) expect digitalization to have a more revolutionary impact on their business over the next three years.
- ▶ Process efficiency, customer interface and innovation witnessed the most progress in the past three years. In Europe, North America and Asia-Pacific, innovation is the leading area to be affected by digitalization.
- ▶ Supply chain planning and sales management have been recognized as the functions benefiting most in terms of operational competitiveness.
- ▶ Better e-networking, improved market and customer access are among the top benefits of digitalization recognized by chemical companies.
- ▶ Stable and secure digital solutions are consistently one of the most critical factors for a successful digital transformation over the three years.
- ▶ The biggest barriers to digitalization are weak technical infrastructure (continues to be a barrier for the past three years), high investment requirements and security concerns.
- ▶ Chemical players in revenue range of US\$2b-US\$10b have witnessed the highest growth in terms of implementation of digitalization projects.
- ▶ Compared with 2020, the expected cost reduction driven by digitalization has increased from 22% up to 27% in 2022.

“

Post-COVID-19 pandemic and amid geopolitical uncertainties, an increasing share of chemical players (though still a smaller share than evolutionary) expect digitalization to have a more revolutionary impact on their business over the next three years.

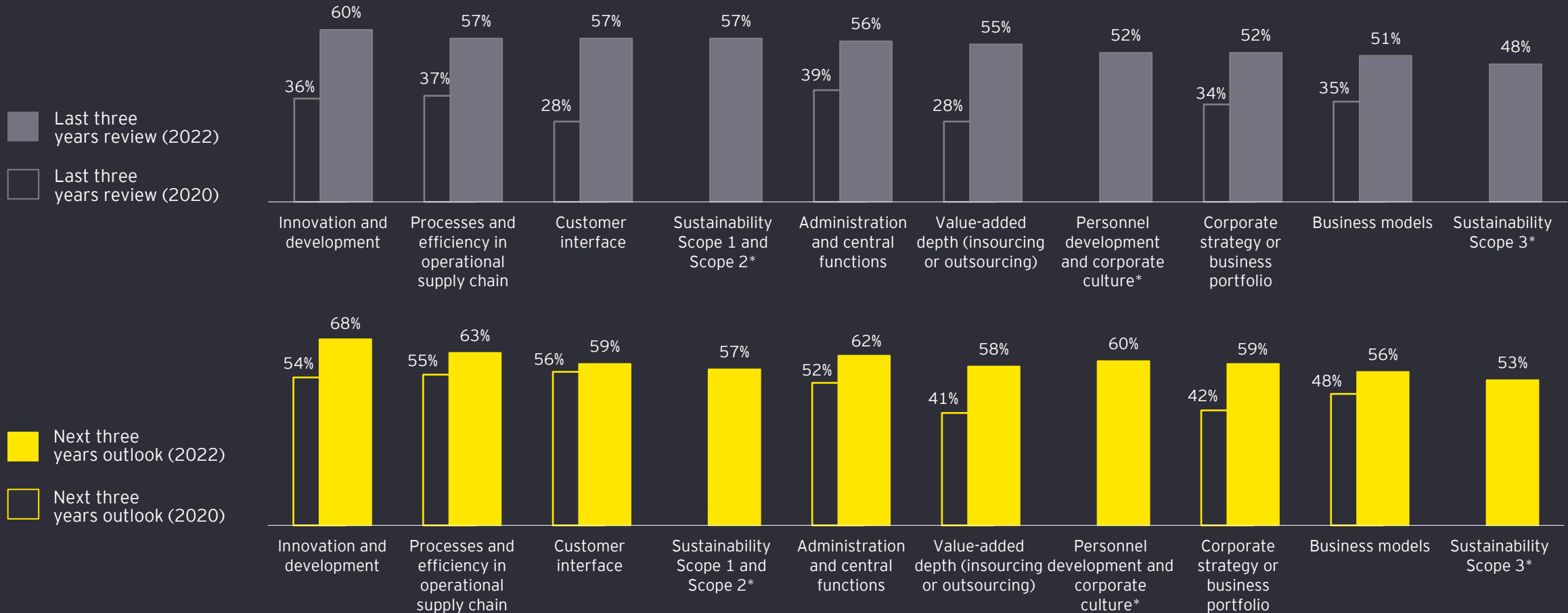
What impact do you expect digitalization will have on your company in the next three years?



“

Process efficiency, customer interface and innovation witnessed the most progress in the past three years. In Europe, North America and Asia-Pacific, innovation is the leading area to be affected by digitalization.

To what extent digitalization will affect the success of the strategic and operational positioning of your company in the next three years?



Note: Includes responses for strong and very strong impact

*Values only for 2022

“

Supply chain planning and sales management have been recognized as the functions benefiting most in terms of operational competitiveness. In Europe and North America, digitalization has affected competitiveness in supply chain management, while in Asia-Pacific, sales management is most affected.

To what extent will operational competitiveness be affected by digitalization in the next three years?



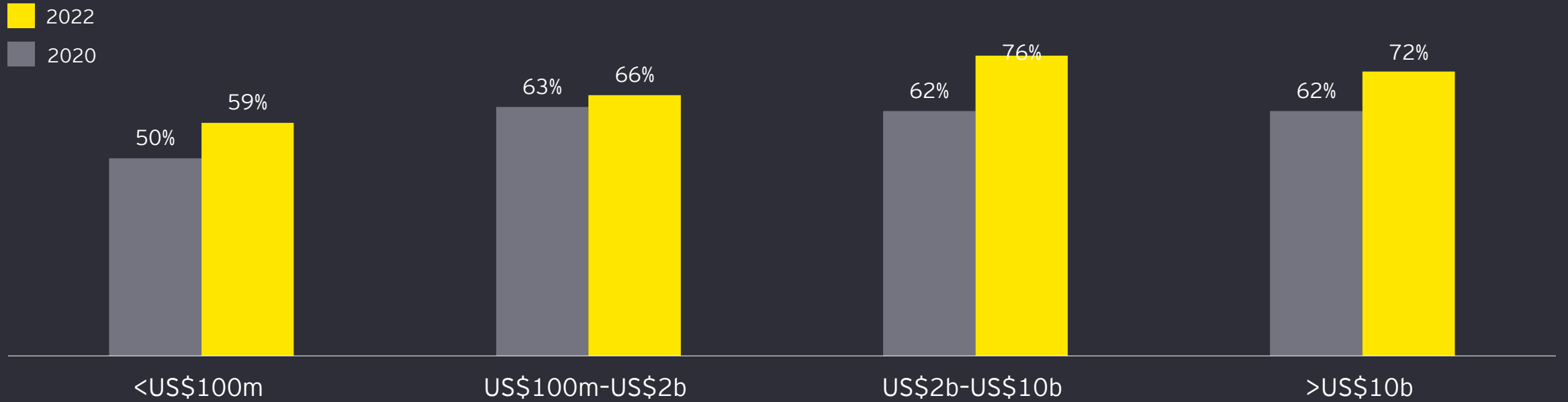
Note: Includes responses for strong and very strong impact

*Values only for 2022

“

Chemical players with a revenue range of US\$2b–US\$10b have witnessed the highest growth in terms of implementation of digitalization projects.

How would you assess the current status of the implementation of digitalization projects in your company?



Average

2020	59%
2022	68%

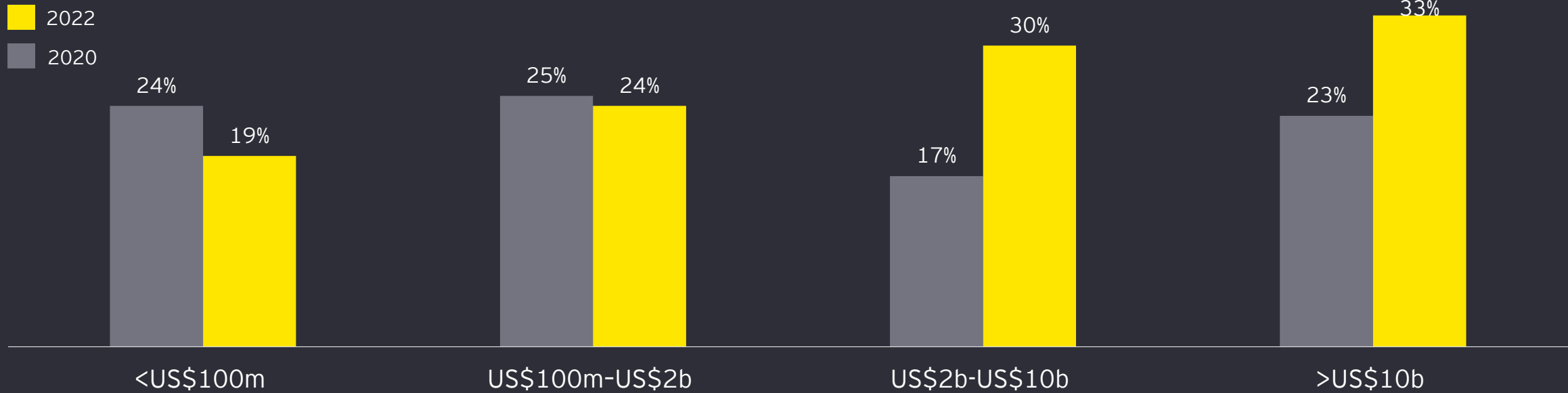
100%: "The digital transformation of the entire company is already running smoothly."

0%: "We have not yet started any digitalization projects or activities."

“

Compared with 2020, the expected cost reduction driven by digitalization has increased from 22% up to 27% in 2022.

How much of the annual costs could be saved at most by implementing digitalization in your business?



Average

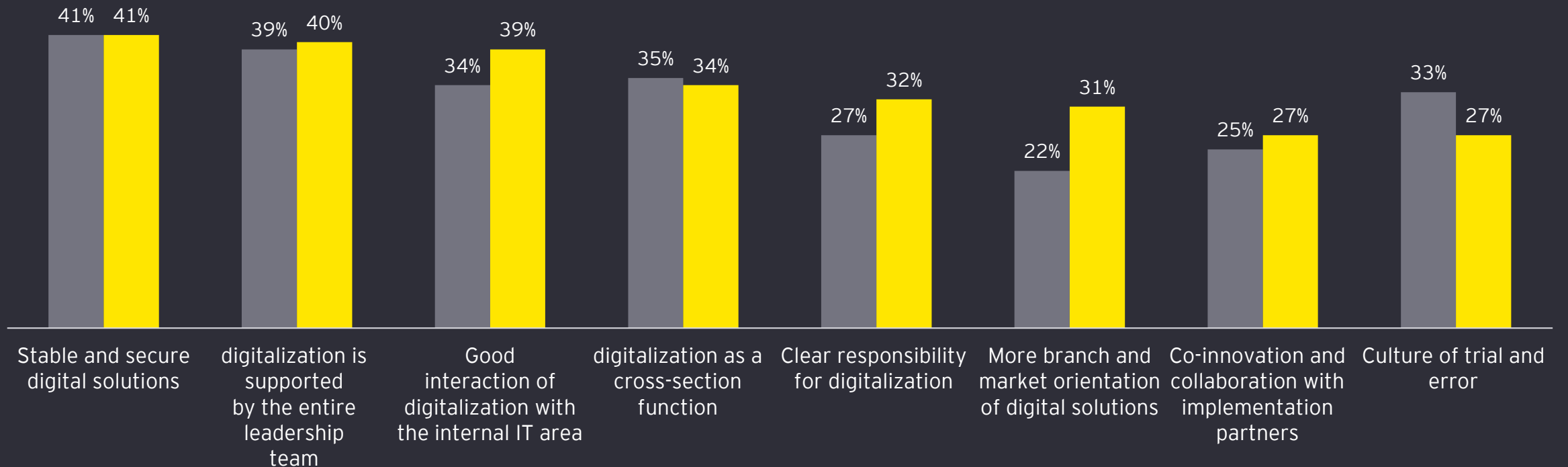
2020	22%
2022	27%

“

Stable and secure digital solutions are consistently one of the most critical factors for a successful digital transformation over the next three years.

What do you think are the three most critical factors for a successful digital transformation?

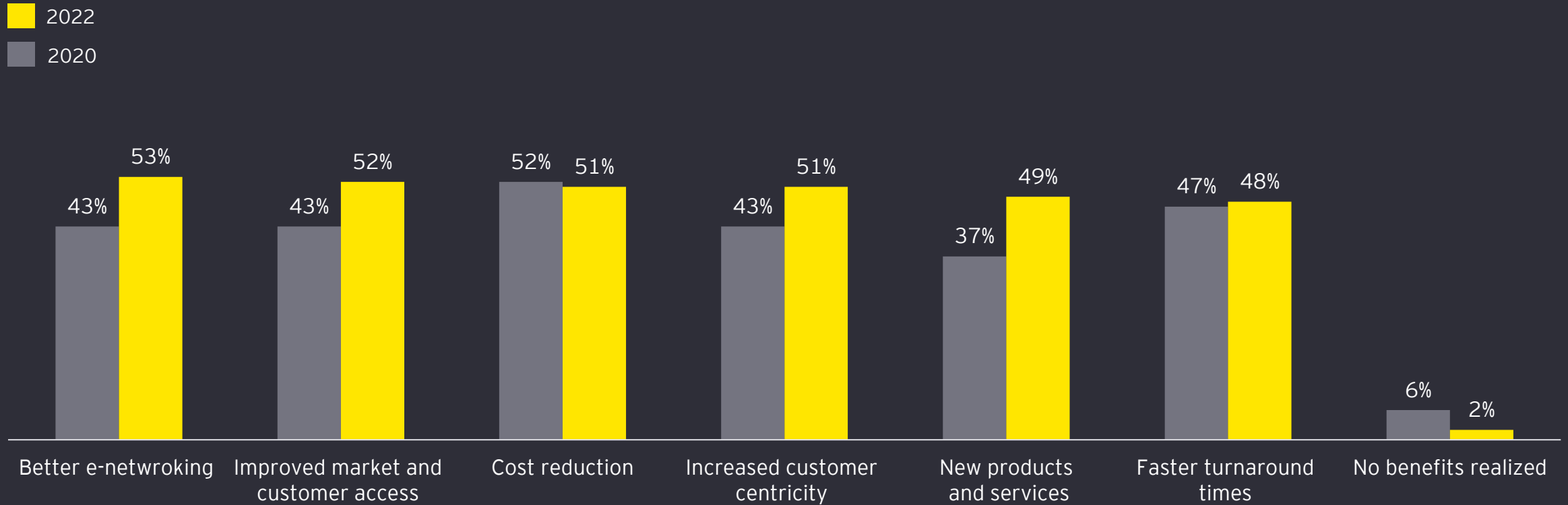
2022
2020



“

Better e-networking and improved market and customer access are among the top benefits of digitalization recognized by chemical companies. The basic chemical players' segment has benefited the most through better e-networking, while specialty chemical players found maximum value in improved market access.

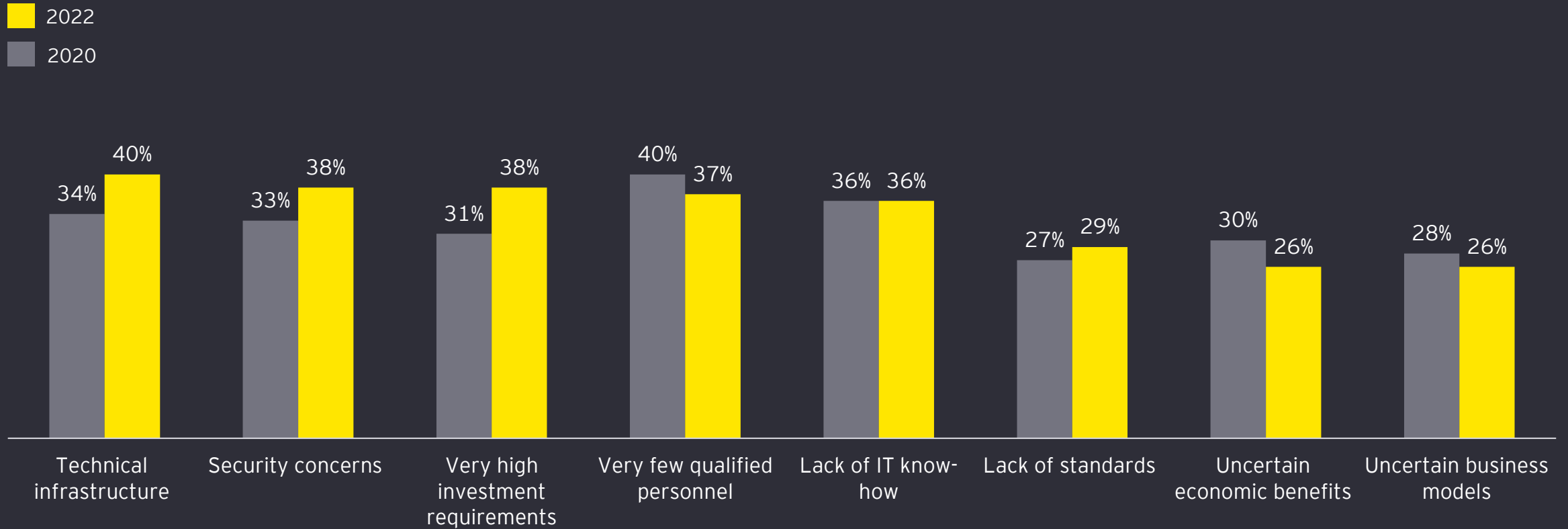
What benefits of digitalization have already been recognized by your company?



“

The biggest barriers to digitalization are a weak technical infrastructure (which continues to be a barrier for the prior three years), high investment requirements and security concerns. The lack of qualified personnel was not as severe a barrier as in 2019.

Please indicate the three biggest barriers to digitalization in your general opinion



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