



mendix

Low-code Verticals Study 2022

August 11th, 2022



Global findings

The COVID-19 pandemic forced organizations to overlook concerns about security risks and communication challenges and use new technologies, including low-code, to keep their businesses trading.

- 1 in 9 (12%) businesses would have failed during the COVID-19 pandemic if they hadn't made a technological leap. Technology changes, including low-code, kept businesses open.
- The top priorities of boards in 2021 were keeping businesses running and ensuring team collaboration. At that time senior business leaders viewed low-code as an inexpensive, quick-to-implement solution.
- COVID-19 made 79% of organizations choose quick solutions over data security. However, 35% now consider managing app-security issues to be one of low-code's main benefits.

Low-code has become a core technology across the four Mendix verticals.

- 69% say low-code has evolved from crisis solution to core technology.
- Nearly 4 in 10 (38%) businesses using low-code use it for mission-critical solutions: enterprise-grade software (42%), productivity apps (41%) and customer portals (43%).
- 10% say low-code is the foundation of the business.

By 2024, organizations expect low-code to overtake traditional coding when developing software.

- 87% of companies plan to speed up the pace of their software development in the next 2 years.
- Low-code will fuel the shift to smart manufacturing, unified retail commerce, and user-centric government.

From crisis to core; low-code's evolution.

	Overall	Manufacturing	Finance, Banking & Insurance	Public Sector	Retail Sector
COVID-19 Years 2020-2021	In order to survive, businesses adopted low-code to create emergency solutions for critical operations.	Low-code used on noncritical support services such as logistics.	The rise of fintech and insurtech challenged traditional banks and insurers.	Innovative solutions to comply with government obligations during lockdowns.	Emergency need for digital-first trading to avoid losing customers.
Present Day 2022	Low-code is an accepted technology with early adopters replacing core and legacy systems.	Integrated with engineering, design, and QC to support supply chains and realize lean manufacturing.	Low-code automates purchasing of financial products and customer service.	Enabler to handle increasing data and security needs.	Focus on hybrid solutions built on old processes with continued supply chain challenges.
Near Future 2023 onwards	Low-code will overtake traditional coding, and provide a way for traditional players to compete with disruptive industry challengers.	Low-code is a key component of Industry 4.0 connecting systems and people in real-time to smart manufacturing.	Multimodal enterprise platforms that use tools like AI to simplify transactions, make data secure but accessible, rapidly reacting to changing markets/regulations.	User-centric government connecting users to their data and evolving regulatory requirements.	Unified retail commerce with accurate real-time inventory and pricing data through effortless collaboration across businesses.

Retail and Wholesale Trade Sector

Key Findings

Low-code will help trade leaders to provide unified retail commerce by improving collaboration across organizations (44%) and with third parties (41%), synchronizing customer data (43%), and improving real-time inventory accuracy (36%) through technologies like smart shelves and computer vision.

Retail leaders are ready for staff to take the initiative. 88% say their staff have autonomy to build their own software solutions.

28% identify inventory management as a hurdle to hybrid retail models, which is key for unified retail commerce experiences.

- A third of retail and wholesale trade organizations still track inventory using paper (35%) or verbal communication (31%).
- 42% of trade organizations say they aren't doing extremely well on accurate inventory management.



Manufacturing, Production, or Industry

Key Findings

Low-code has already been adopted by manufacturing for support services such as logistics, and are now integrating into engineering, design, and quality control to realize lean manufacturing.

- 64% have used low-code/no code solutions to improve collaboration and access to transportation and suppliers and in production, 44% have used low-code to replace legacy systems (MES, ERP, QMS).
- Nearly two thirds (63%) of manufacturers have already developed solutions using low-code/no code to mitigate transport, logistics, and supply chain issues.
- After IT, product engineering (43%), design (32%), and quality control (30%) have the biggest need for low-code, but only 23% say the next biggest need is on the shop floor.

As low-code becomes a proven technology, the future is low-code enabled smart manufacturing.

- 41% want low-code to integrate with shop-floor devices and systems and 39% to integrate with existing systems. 43% want low-code to provide manufacturing-specific app templates.
- 63% say smart manufacturing using IoT is extremely important to the future of manufacturing.
- Manufacturers say low-code can help them integrate IoT (31%) and make legacy systems accessible on-the-go (32%).

Banking, Finance, and Insurance

Banking – Key Findings

Finance leaders see tech challenging tradition and say low-code can simplify financial systems.

- Six-in-ten senior finance leaders say the pandemic accelerated the prominence of fintech to challenge the dominance of traditional banks.
- 63% of senior finance leaders say low-code has high potential to simplify complex financial systems. Experts in the media say simplification is crucial for traditional banks to compete with fintech.
- 44% of senior finance leaders say low-code helps them react quickly when business needs change.

Insurance – Key Findings

Consumers expect simpler ways to buy financial products. Leaders say low-code is helping by improving quotation and purchasing processes.

- 57% say customer expectations of how simple purchasing financial products should be, are currently outpacing the industry's performance.
- Another 57% say better underwriting and risk management is the most important aspect of apps that link customers and intermediaries.
- Automated quote services (60%) and simpler buying processes (55%) are the top benefits financial services have seen after low-code adoption.

There are reports in the media about Low-Code being used to help financial institutions. Does Mendix have a similar example?

provider of low code digital automation platform, announced that the Iowa-based MidWestOne Bank has processed nearly 1,000 small business loan applications in just two days, utilizing the API-based E-Tran integration capability of its lending software for the SBA Paycheck Protection Program (PPP).

Government or Public Sector

Key Findings

- Low-code is enabling user-centric government. 52% of leaders in the public sector have seen low-code improve identity authentication and 48% say low-code increases access to their services.
- Over half (57%) of public sector organizations are starting or midway through low-code adoption; 22% have fully adopted it.
- Leaders in the public sector expect low-code to assist organizations cope with the amount of data they collect (28%) and with security issues (30%).
- As war, climate impacts, rising immigration, and new data restrictions accelerate the need for new regulations; 1 in 10 public sector leaders say their supporting software cannot keep up.

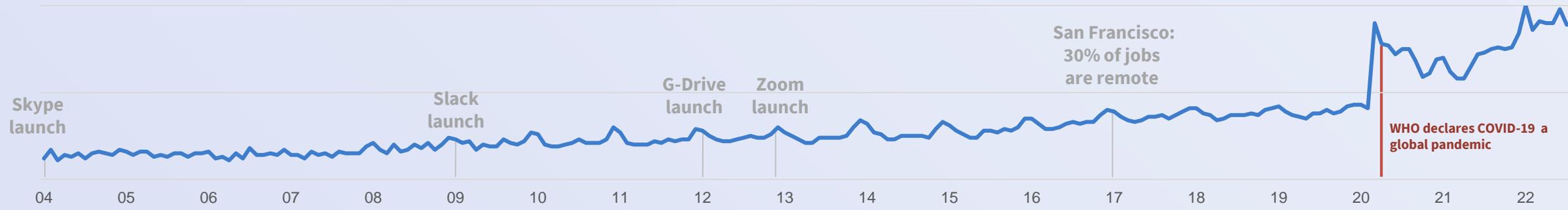


Global Narrative

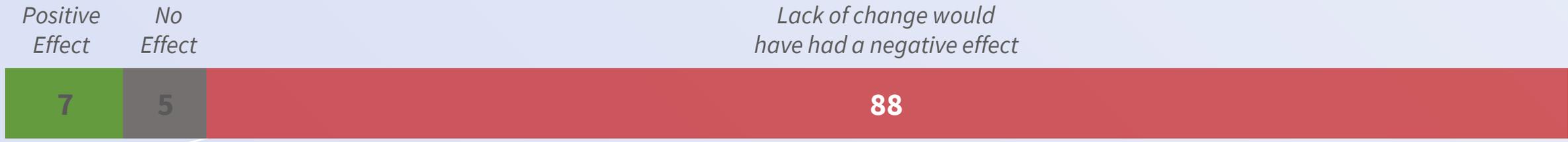
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length, c=!1)}a.memory
function(){return n.each(arguments
function(){return e
function(a){var b=["resolve","done"]
function(){return e.done arguments
resolve).fail(c.reject):c}
[1][2].disable,b[2][2].
function(a,b,c){return functi
fail(g.reject):—f;return
—n.readyWait>0||1, resolve
"readystatechange",K),a.default
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setTimeout(f,50)}J(),n.ready
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style: none;"),c.removeChild
/^(?:\{[\w\W]*\})\|[\w\W
data(a,b,c)}else c=void
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1 in 9 would have closed if they hadn't made changes during COVID pandemic.

Global Google searches for "remote work"



Expected result if changes had not been made during the pandemic, % of Senior Business Leaders

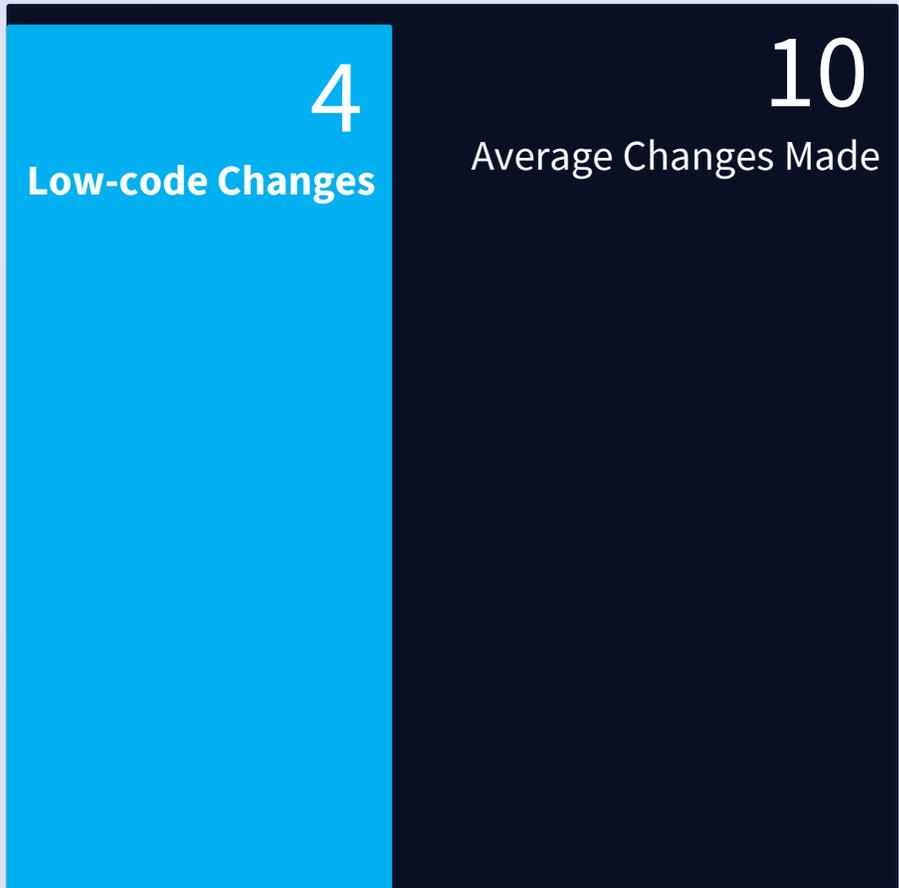


- 50**
We would have lost customers
- 45**
Our reputation would have suffered
- 39**
We would have raised prices
- 39**
We would have lost revenue
- 32**
We would have let staff go

12
Our organization would have closed

BL:Q11. If your organization hadn't made these changes, what situation would you have been in?; base n=556; BR: Q13. How much do you agree or disagree with the following statements; base n=556

89% of businesses made low-code changes during the pandemic.
Low-code was used, on average, for 4 out of 10 technology changes.



89%
made at least one low-code
change during the COVID-19 pandemic
(2020-2021)

“[Low-code] is one of the most critical and valuable functionalities that facilitates the production process and offers support for both citizen developers and technical developers throughout the development of app.”

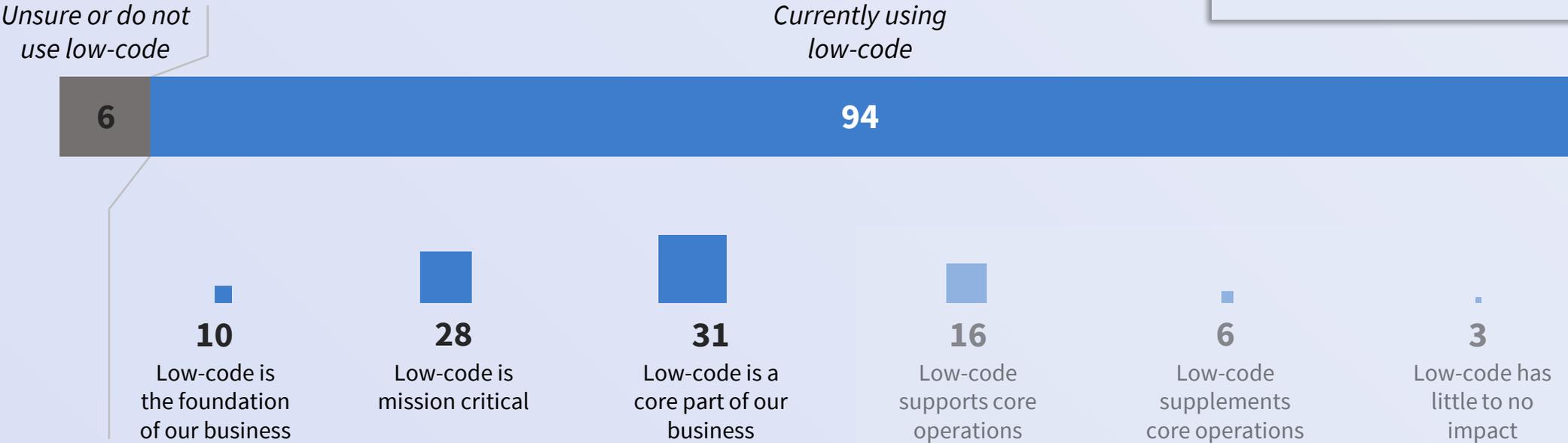
IT Decision Maker, Public Sector, Germany

69% consider low-code a core part of their business.
10% say low-code is the foundation of their business.

We told organizations the following:
“There are many low-code and no code platforms available today. Below is a list of some of the most popular. Please look through them and then answer the question below:
AgielPoint, Ali Yida, Amazon Honeycode, etc.”

Then asked:
Is low-code being used anywhere in your organization for software development?

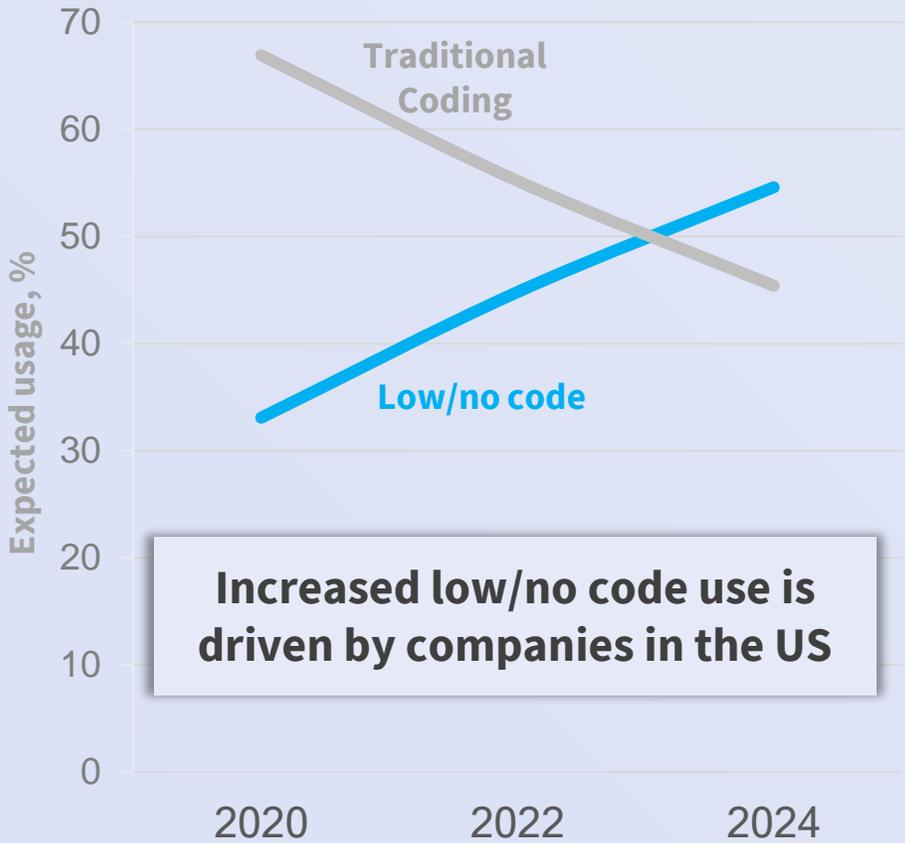
The importance of low-code to organizations, % of Senior Business Leaders



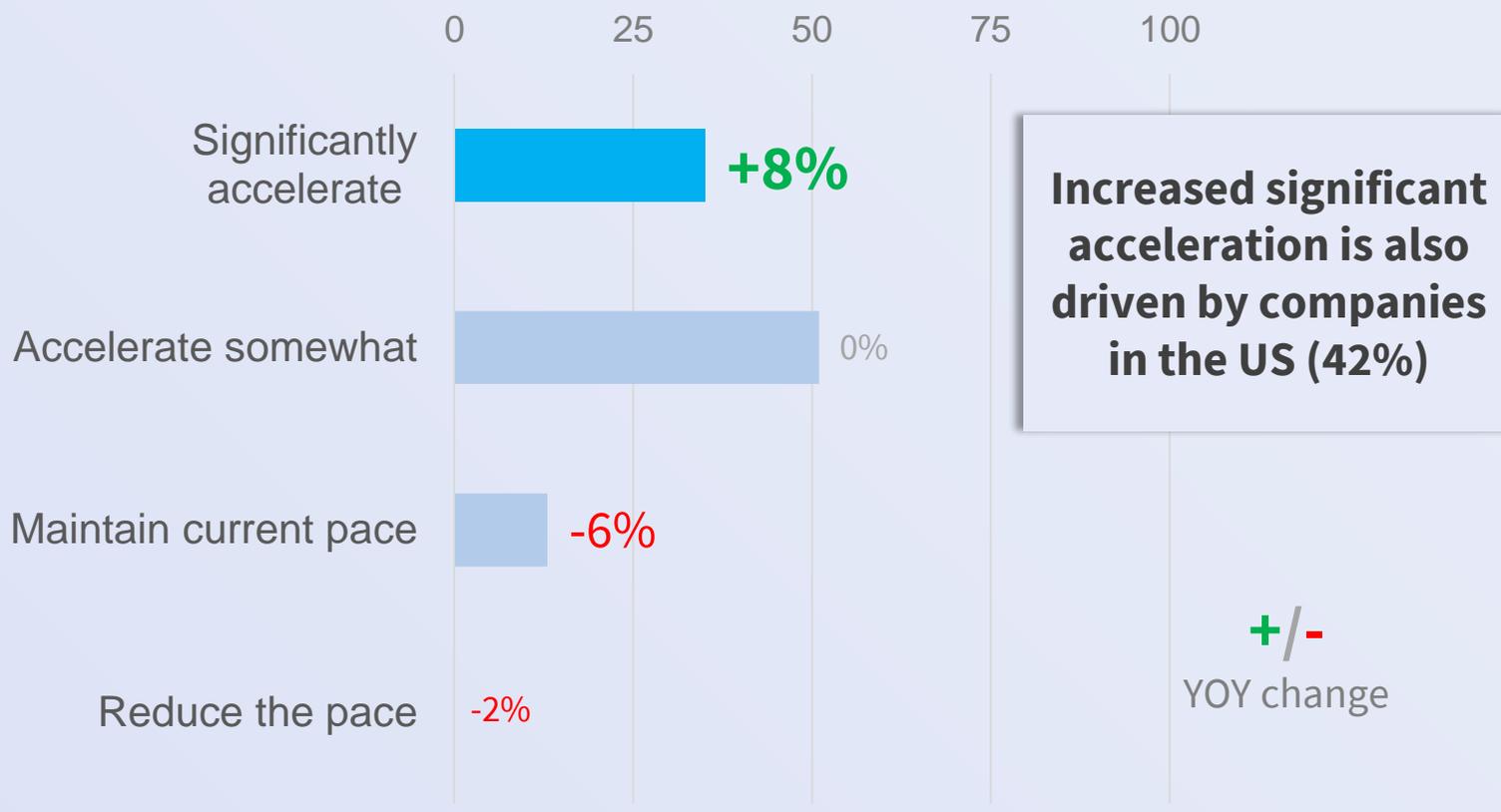
Q14A. Is low-code being used anywhere in your organization for software development?
Q15. (Including low-code nonusers) Which of these statements most closely matches how your organization uses low-code?; base n=556;

Low-code is expected to be used more than traditional coding by 2024.
 1 in 3 companies plan to speed up software development in the next 2 years.

Global expected use of coding practices, %



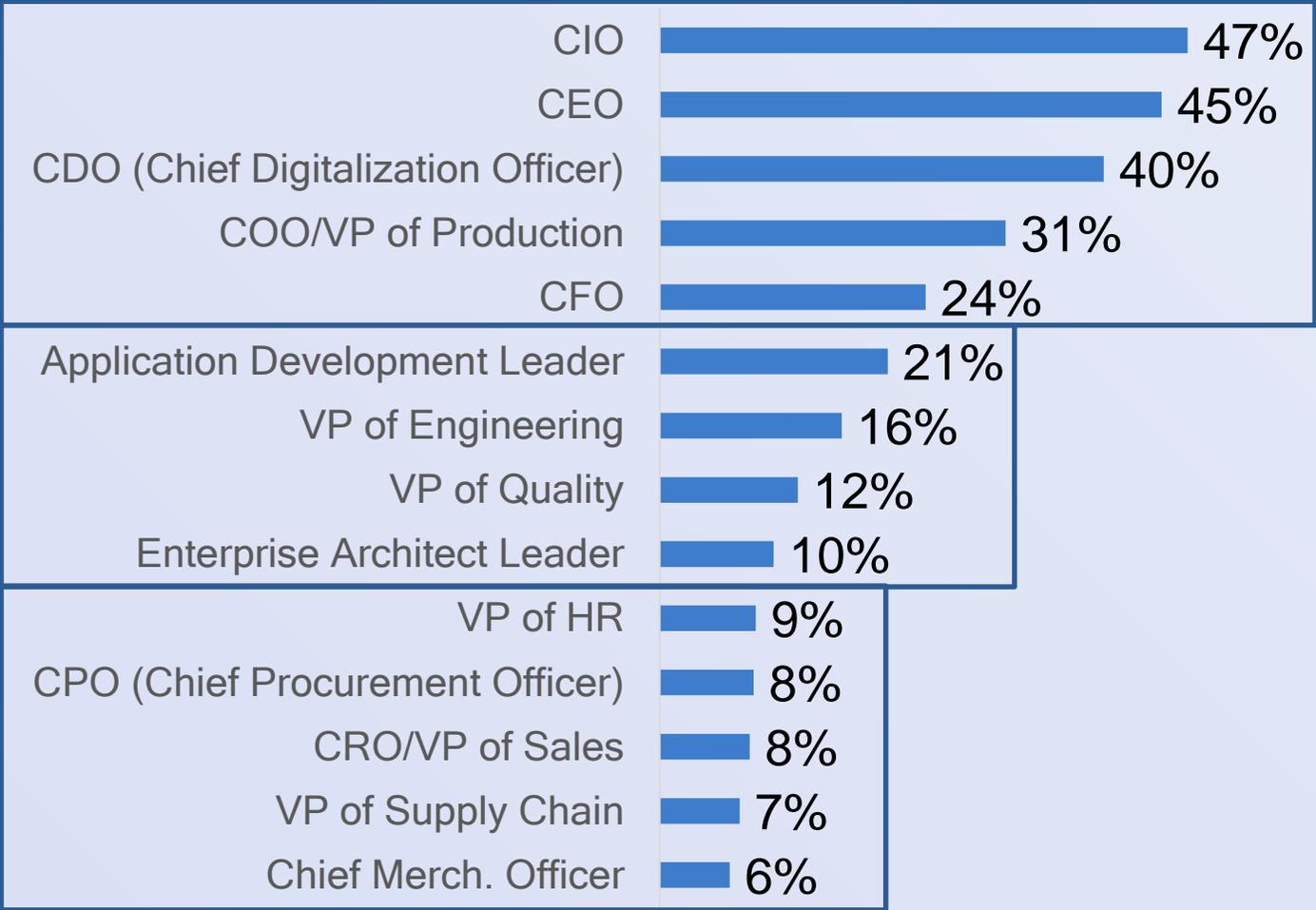
Global expected pace of development in next 2 years, %



Q20. How much would you estimate your organization will use low-code or no code approaches compared to traditional software development?; base n=556;
 2021 - Q10. Now thinking about the next two years (2022-23), does your company plan to accelerate, maintain or reduce the pace of its software development? (US,UK, Germany, Netherlands NOT France); base n=1482
 2022 - Q22. Now thinking about the next two years (2023-24), does your organization plan to accelerate, maintain, or reduce the pace of its software development?; base n=556;

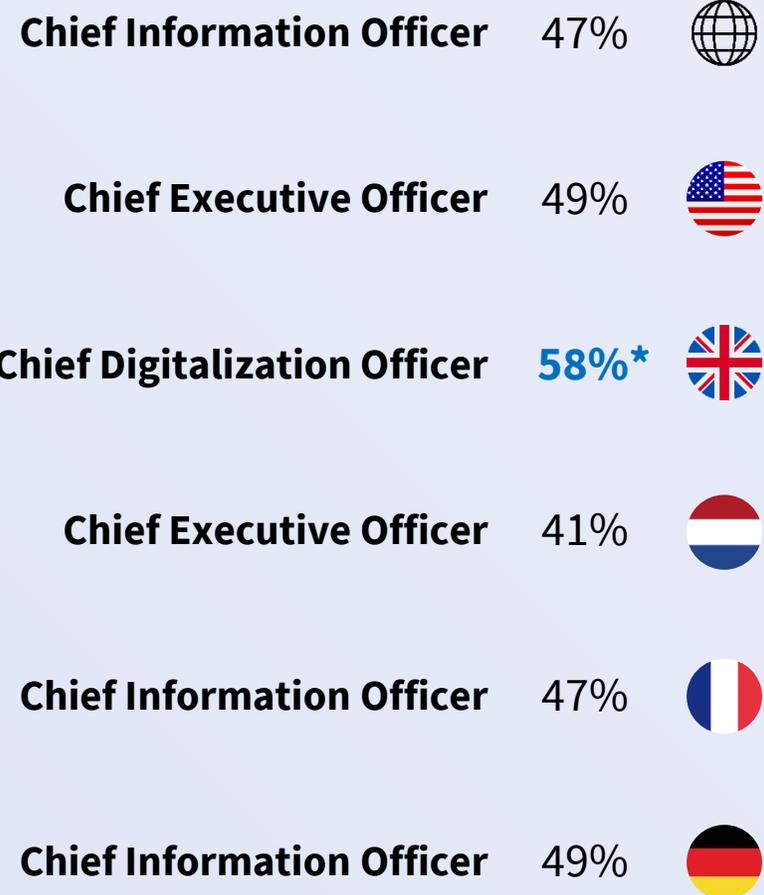
Low-code investment is a strategic decision; the C-suite drives the decision to invest in low-code, rather than IT leaders.

Main individuals driving low-code investment, %



Top individual in each market

**significantly higher*



Q21. Who was/would be the key driver of decisions to invest in low-code?; Total sample n = 556; Markets: US n=277; UK n=80; Germany n=76; France n=72; Netherlands n=51

Low-code was adopted in 2021 for collaboration, cost, and speed. Now, its agility, ease-of-tech adoption, and security are key benefits.

Top 5 benefits of low-code, %

2021



2022



2021 Study - Q20B: What benefits has your organization seen from implementing low-code? (US, UK, Germany, Netherlands, but not France); base n=1565;
2022 Study - Q16: What benefits, if any, has your organization seen from implementing low-code?; base n=556

Mendix Verticals

Manufacturing, Production or Industry

Finance, Banking, and Insurance

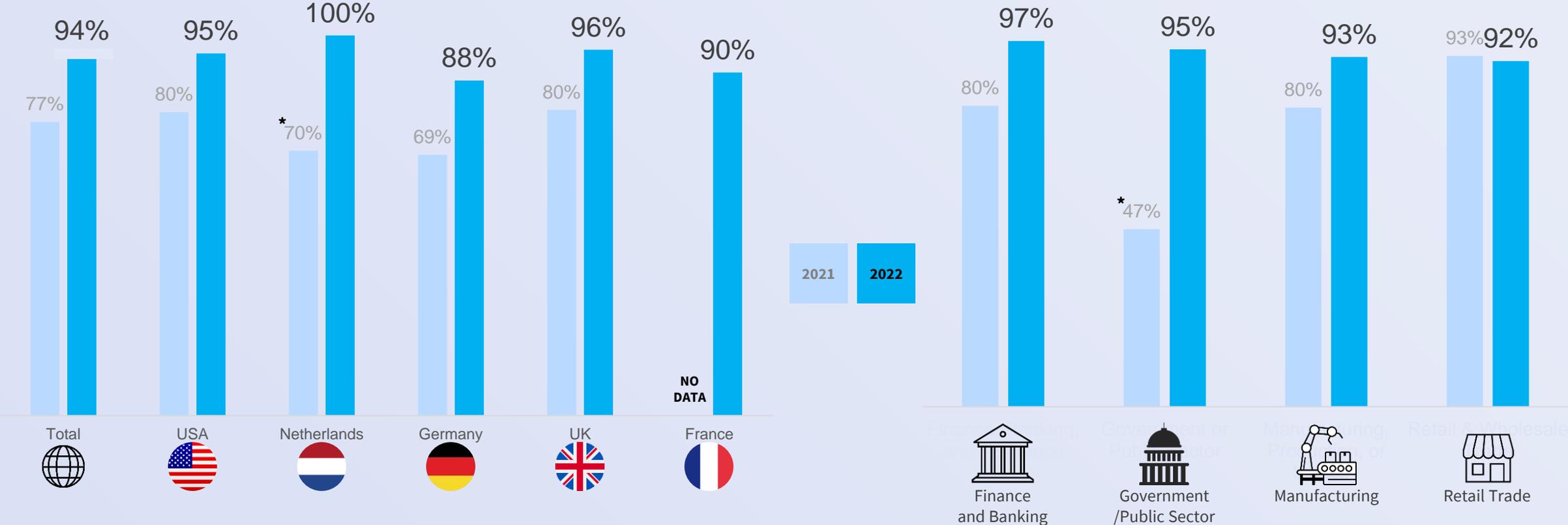
Government or Public Sector

Retail and Wholesale Trade Sector



Low-code usage has grown to an almost universal level across markets and industries

Companies using low-code, %



Q14A. Is low-code being used anywhere in your organization for software development?;

Total sample n = 556; *Low base size; Markets: US n=277; UK n=80; Germany n=76; France n=72; Netherlands n=51

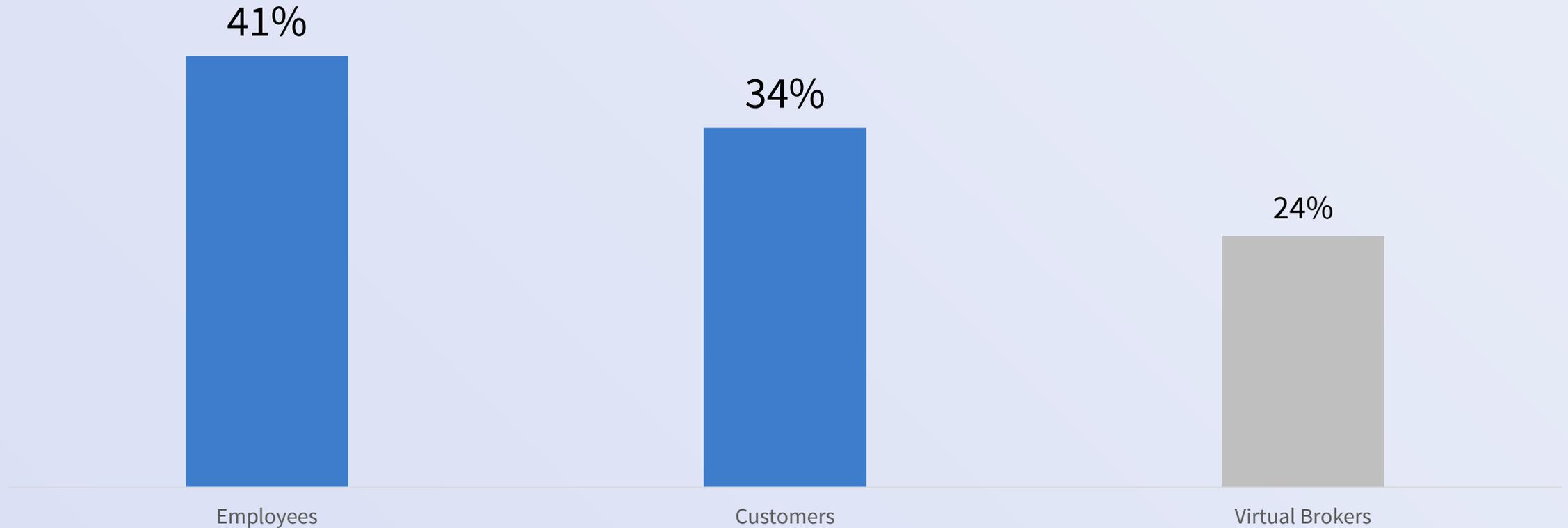
Verticals: Manufacturing n=200; Financial Services n=145; Government/Public Sector n=100; Retail and Wholesale Trade n=111.

Finance, Banking, and Insurance

Base n=145

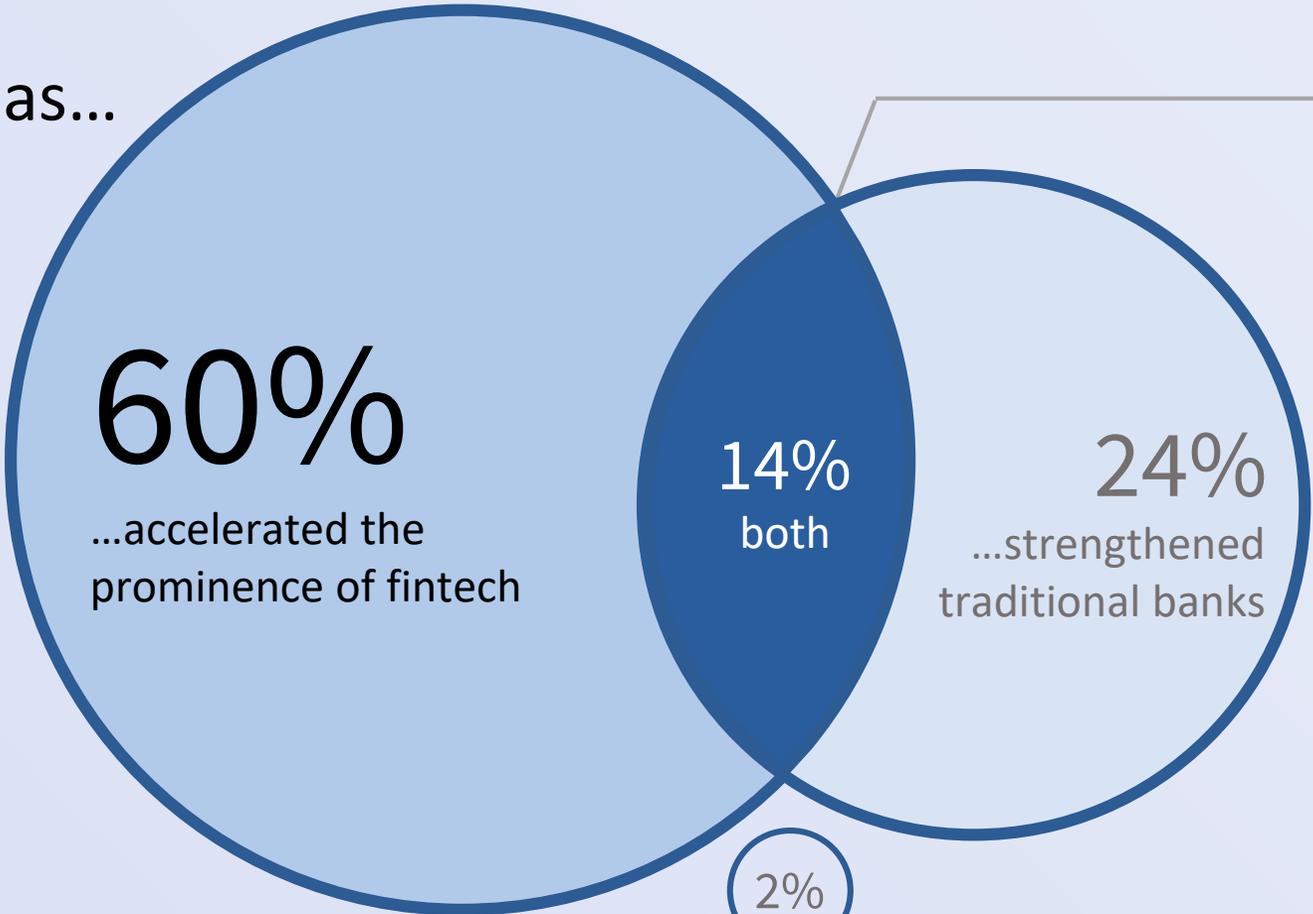
Nearly as many business leaders say that customers benefitted most from changes to working models as those that say employees.

Which of the following has benefited most from online business models and virtual working, if any?



6 in 10 finance business leaders say the pandemic accelerated the prominence of fintech challenging traditional banks.

COVID-19 has...



Why do you say both?

“Mutual progress and co-development of technological innovations.”

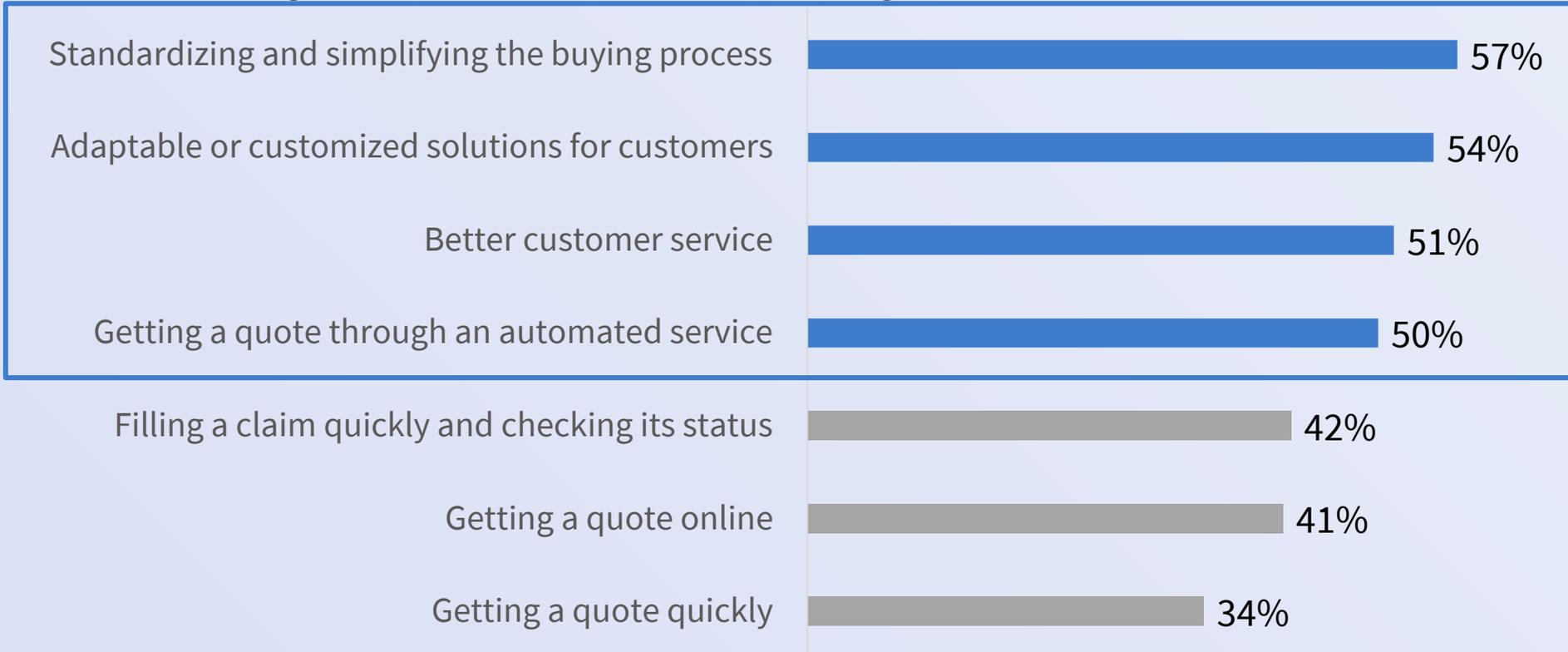
CTO, Finance, US

“[Both have] raised the standard of digital experience and provide banking services to the unbanked.”

VP of IT, Finance, US

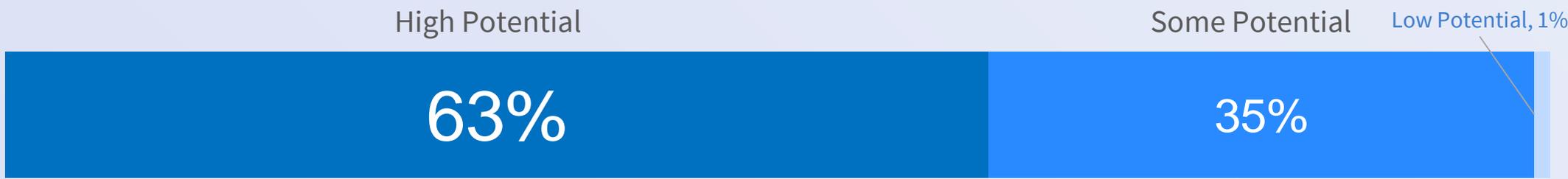
Customers expect better service and a simple but customized buying process.

In which of the following areas do you see customer expectations outpacing current industry standards or performance?



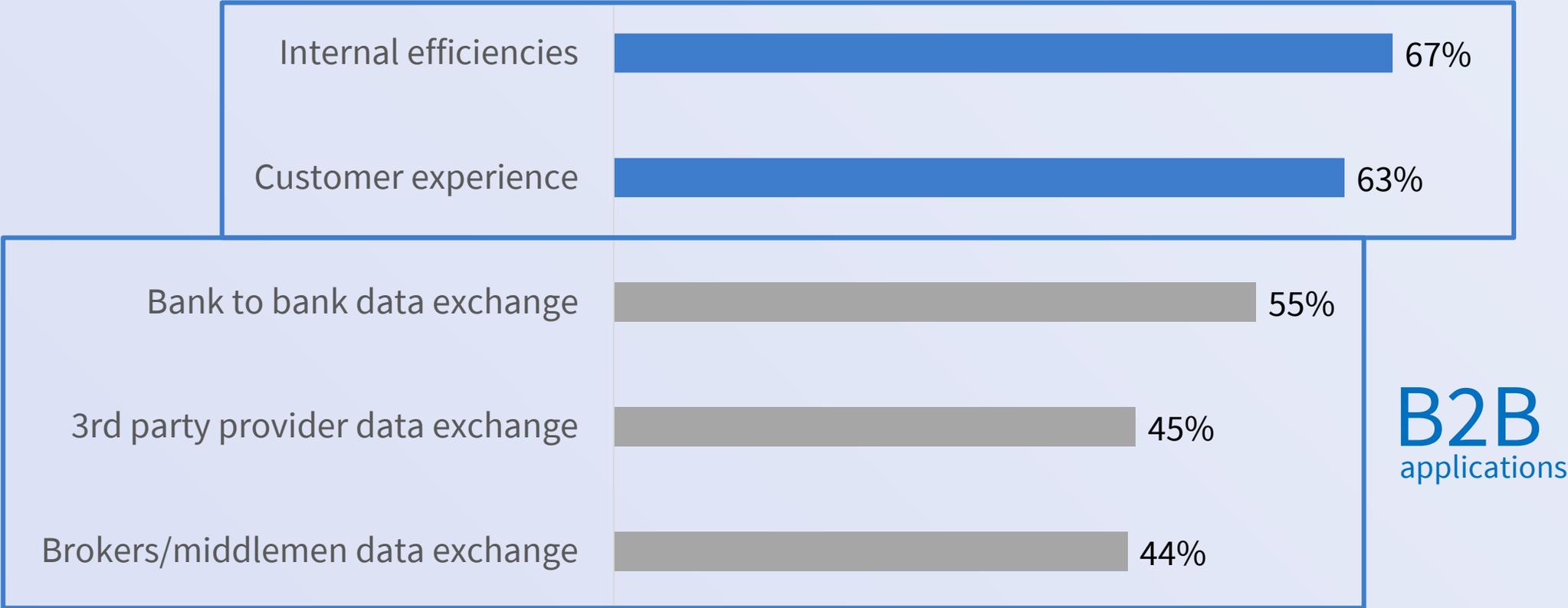
63% feel low-code has high potential to simplify complex financial systems.

How much potential is there for low-code to simplify complex financial systems, platforms, and processes?



Leaders see better data management improving internal processes and customer interactions over improving collaboration with third parties.

In which areas are there commercial opportunities for better data management?



The app priorities for leaders are improving the core offer and customization. Functional issues (cost, data integration, and biometrics) come second.

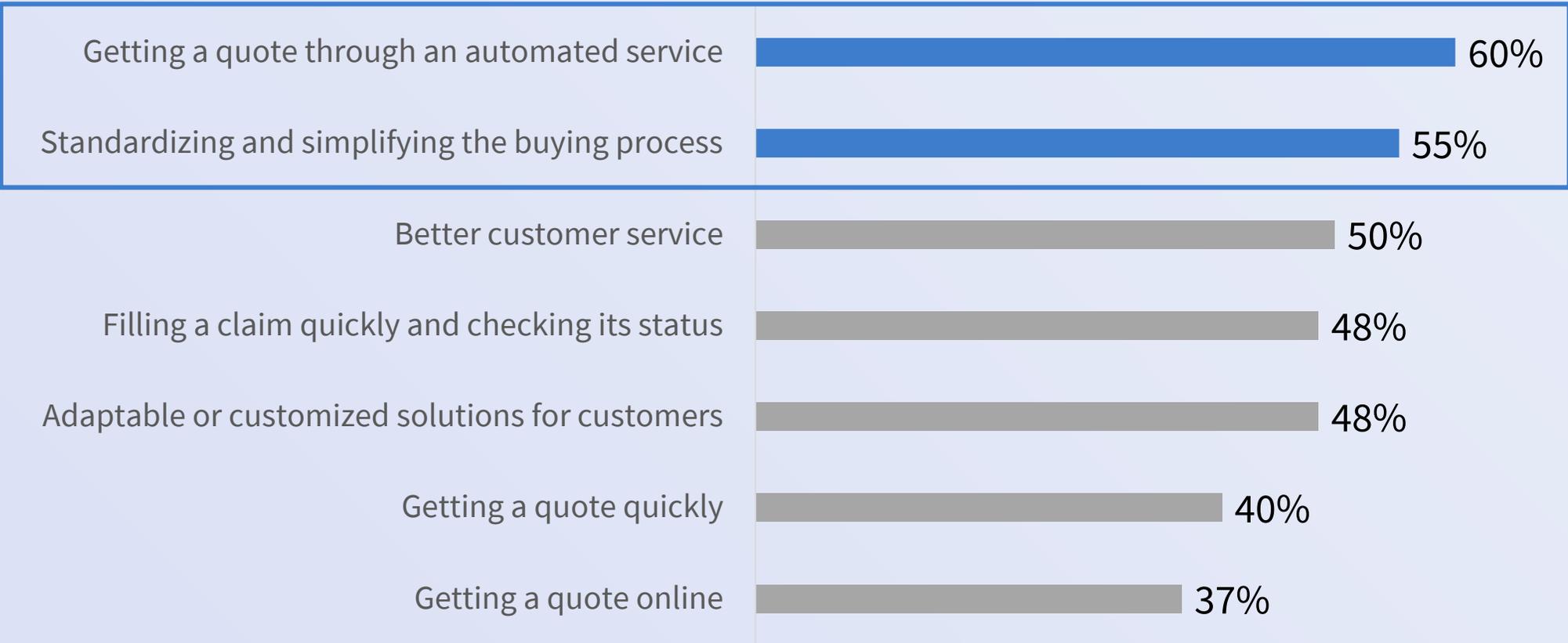
How important are the following when creating app solutions to interact with customers and intermediaries?



Q34. How important are the following when creating app solutions to interact with customers and intermediaries, e.g., agents and brokers; Finance, Banking, and Insurance; base n = 145

The majority of financial services realize the main benefits of low-code improving customer acquisition. Customization and speed are secondary goals.

What benefits have you seen in your organization due to the adoption of low-code?

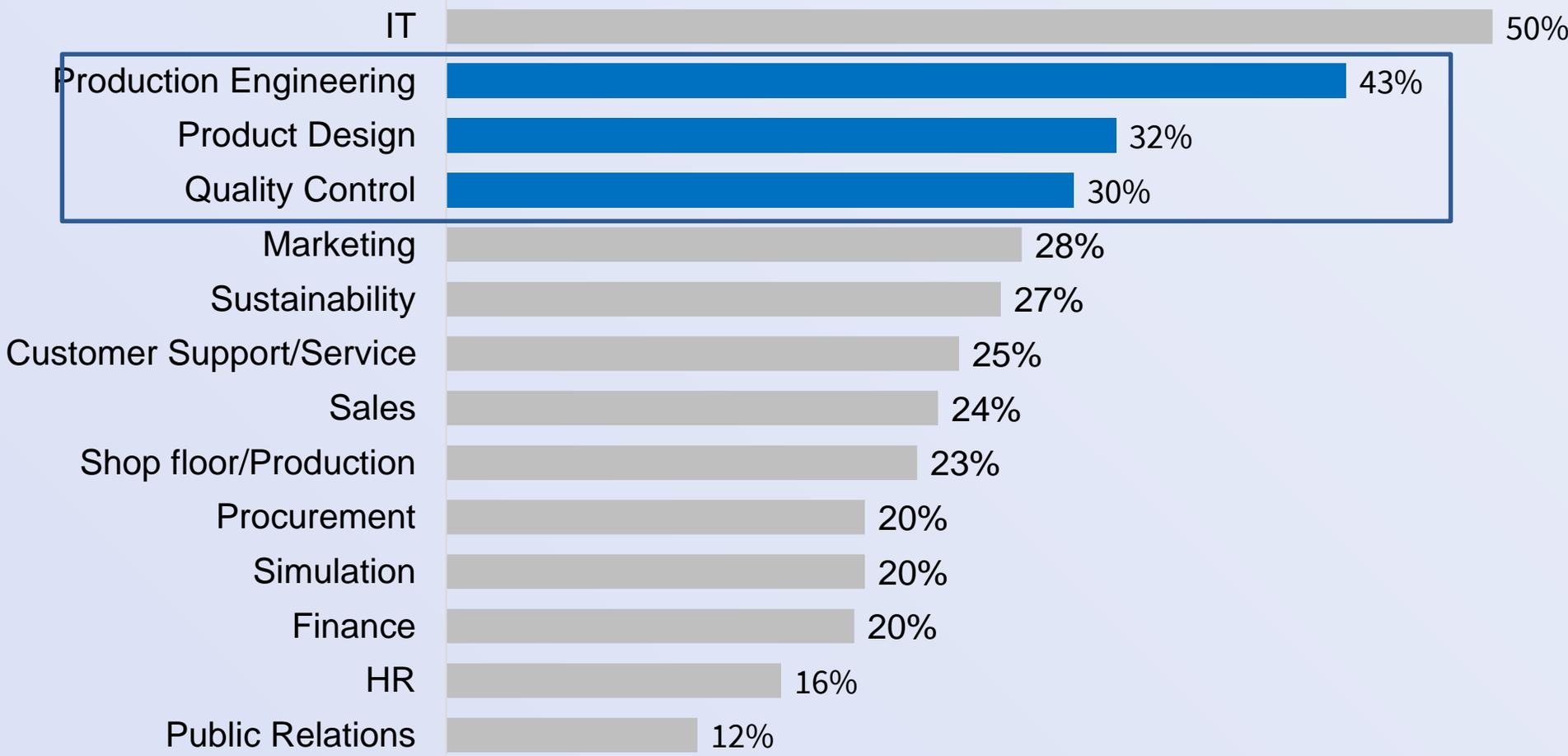


Manufacturing, Production, or Industry

Base n=200



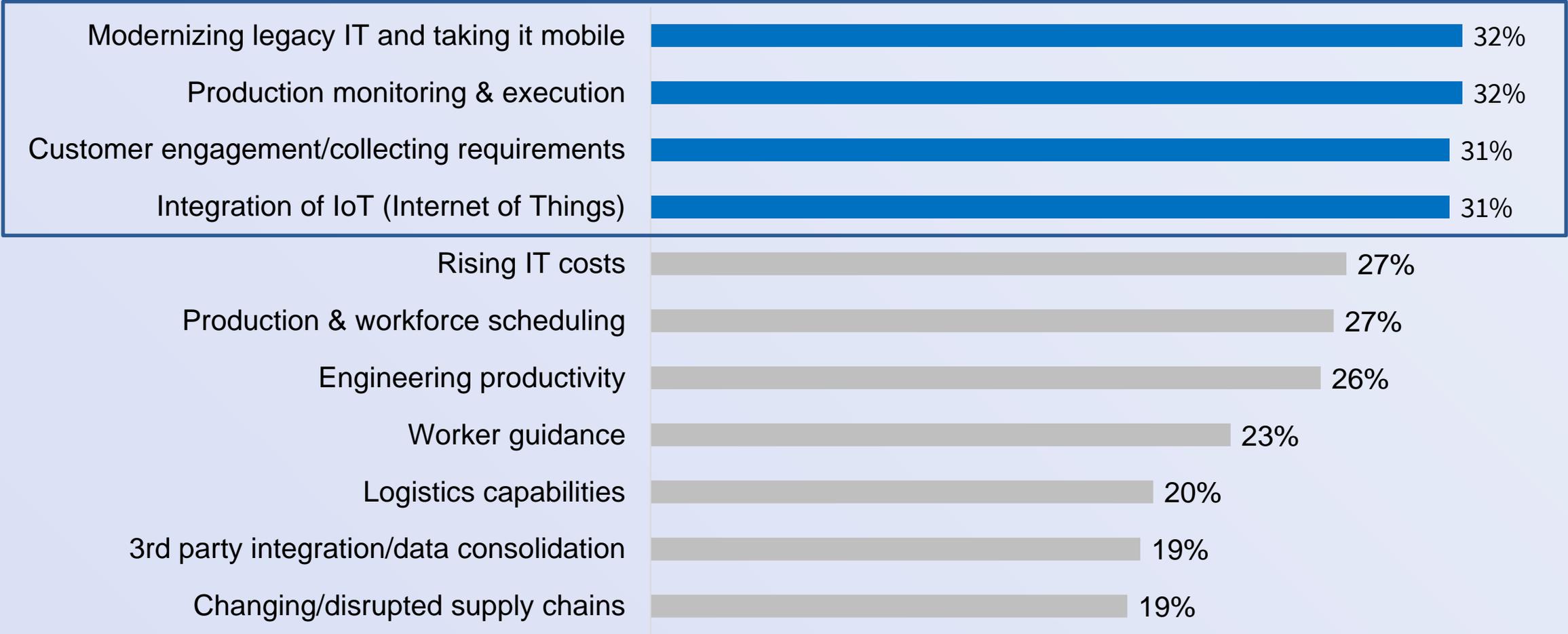
For leaders in manufacturing, after IT, production engineering, product design, and quality control have the biggest needs for low-code.



Q29. In which functions does your organization have the biggest need for low-code adoption?; base n = 200

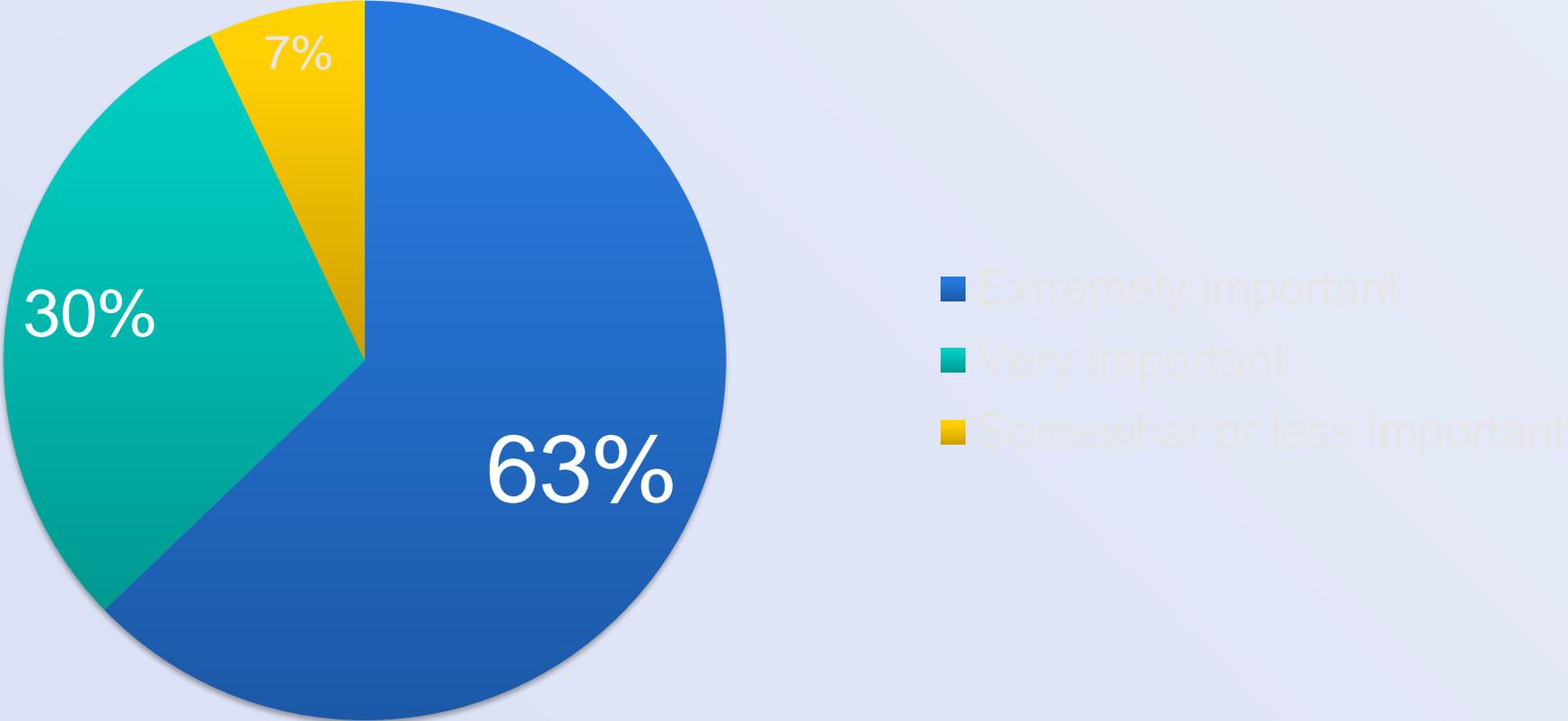
Monitoring production and mobilising legacy systems are challenges leaders see low-code solving; it also has a role in IoT and engaging customers.

Which of the following are the most pressing challenges in manufacturing companies that low-code can help to address?



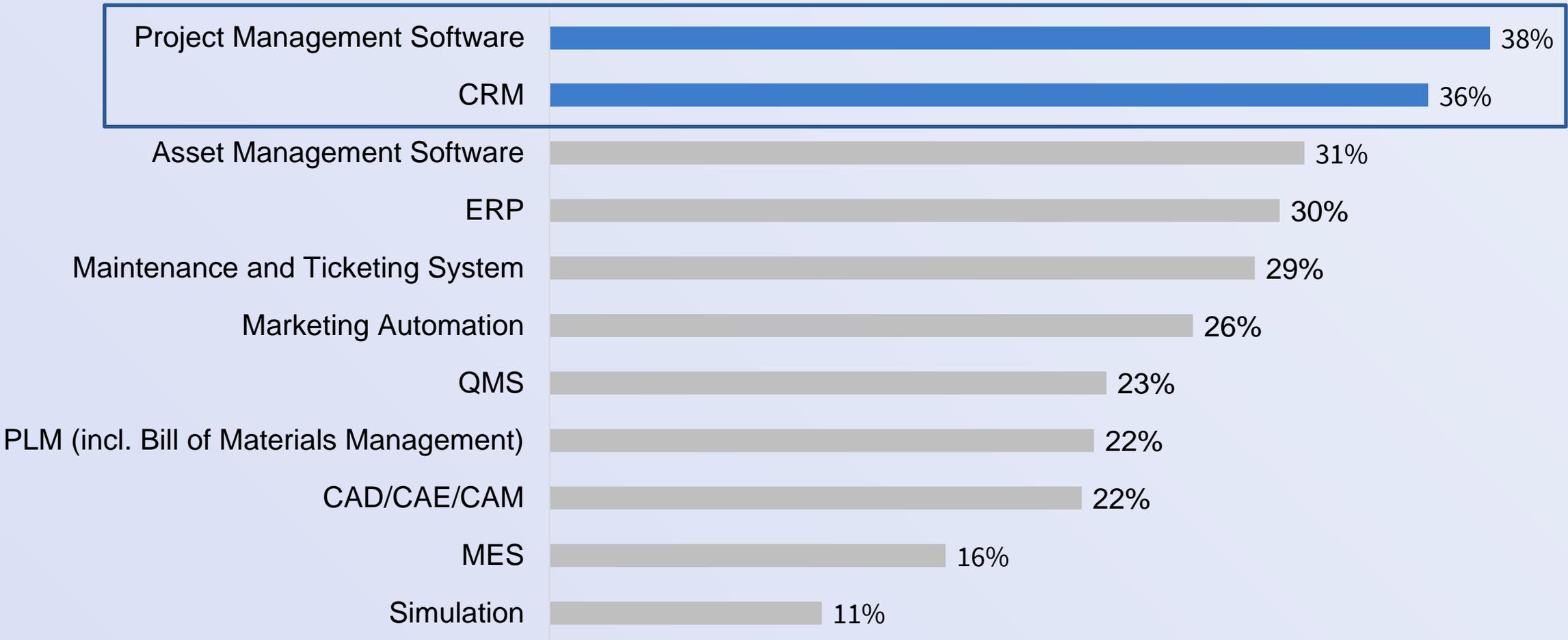
Q24. Which of the following are the most pressing challenges in manufacturing companies that low-code can help to address?; Total sample n = 200

63% say smart manufacturing using IOT is extremely important to the industry's future.



Systems to manage projects and customer data require the most IT investment.

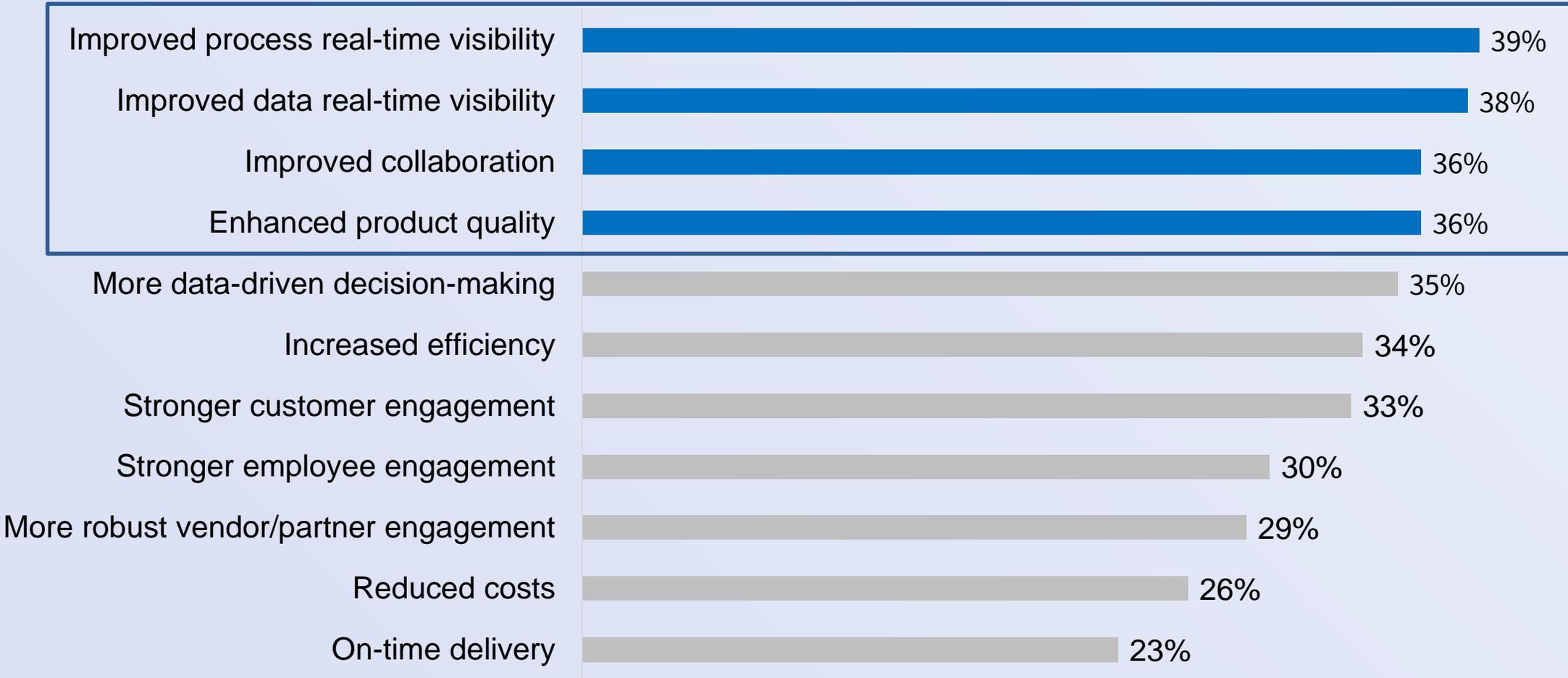
Which IT systems currently consume most of your IT budget?



Q31. Based on what you know, which three IT systems currently consume most of your IT budget?; base n = 200

Low-code gives manufacturers a real-time view of data and processes. Leaders also feel it improves the quality of their products and collaboration.

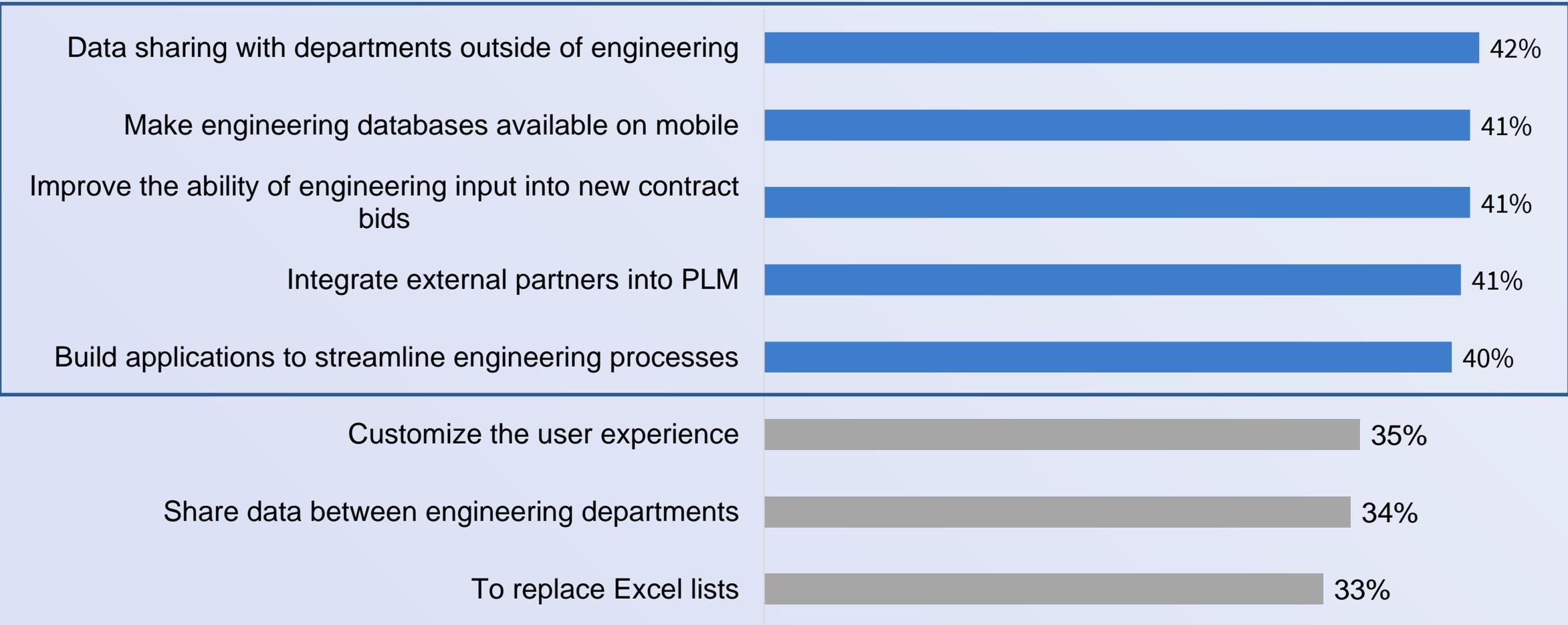
What benefits have you seen in your organization due to the adoption of low-code?



Q25. What benefits have you seen in your organization/the manufacturing industry due to the adoption of low-code?; base n = 200

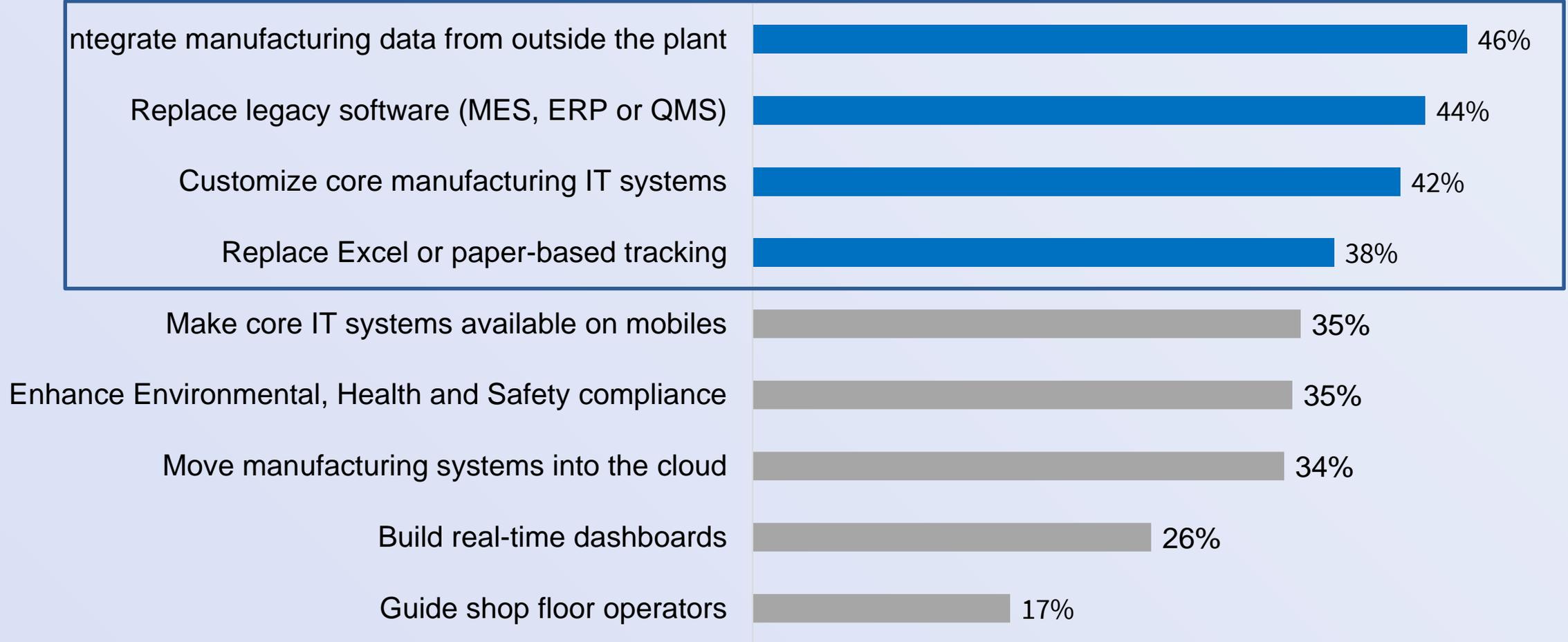
In engineering, low-code is mobilising data across internal teams, assisting in contract bids. It is also helping integrate and share data with external partners.

How have you used low-code in engineering?



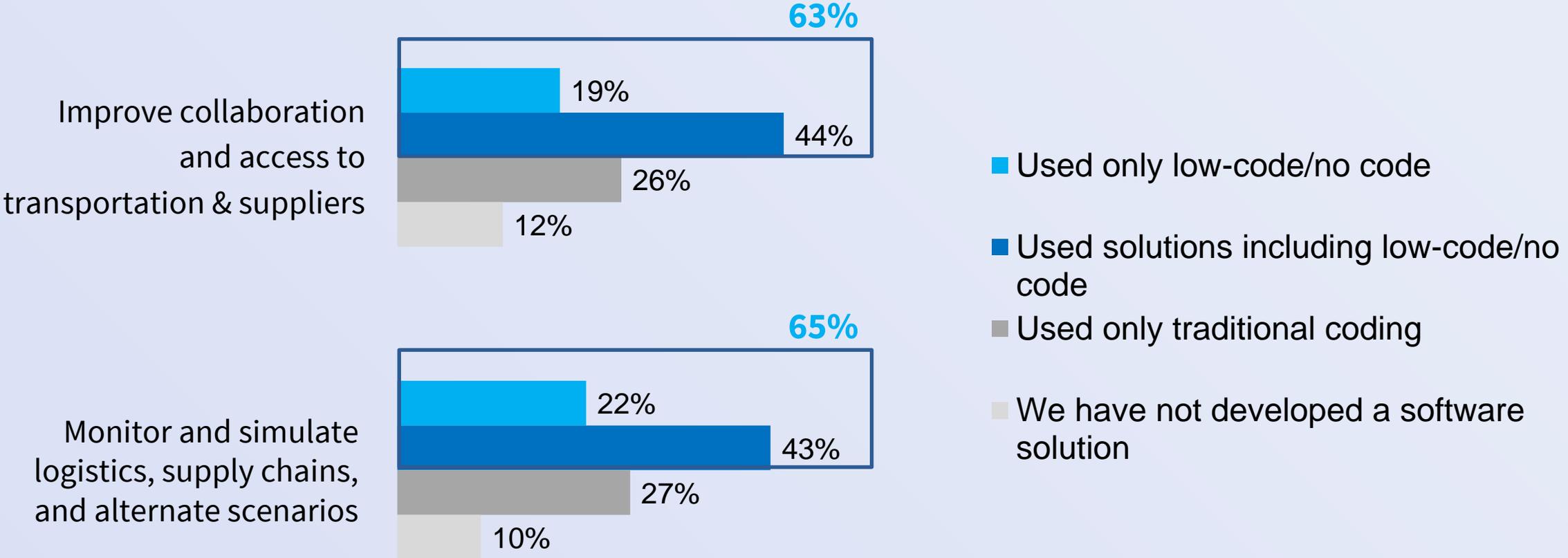
In production, low-code is replacing software, from basic Excel tracking, to core manufacturing systems. It is also used to integrate external data.

How have you used low-code in production?



Q28. How have you used low-code in production? If so, in what areas?; base n = 186

Nearly two thirds of manufactures have developed solutions using low-code/no code to mitigate transport, logistics and supply chain issues.

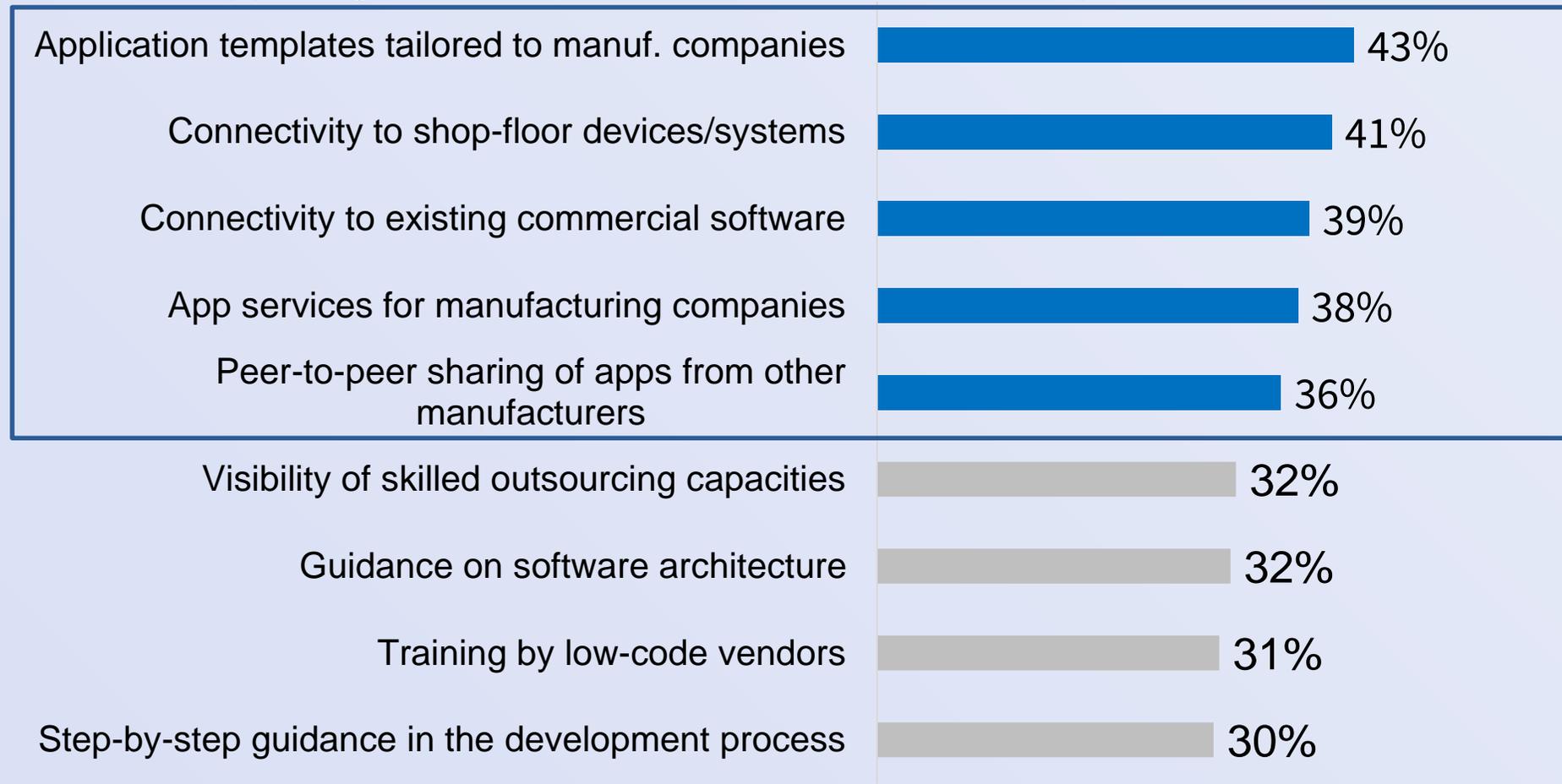


Q26c: Have you developed software to mitigate any issues in logistics and supply chains; base n = 200

Manufacturers want to see industry-specific app templates and services to use low-code more.

Leaders also want low-code to connect with the shop floor and their existing systems.

What would help your organization most to raise the level of low-code development?



36%
are open to peer-to-peer app sharing with other manufacturers

The definition of composable enterprise isn't widely known.

32% “An organization created to impact the environment positively”

17% “An organization built to service a larger business”

15% “An organization where all employees can fulfill all roles”

6% “I don't know”

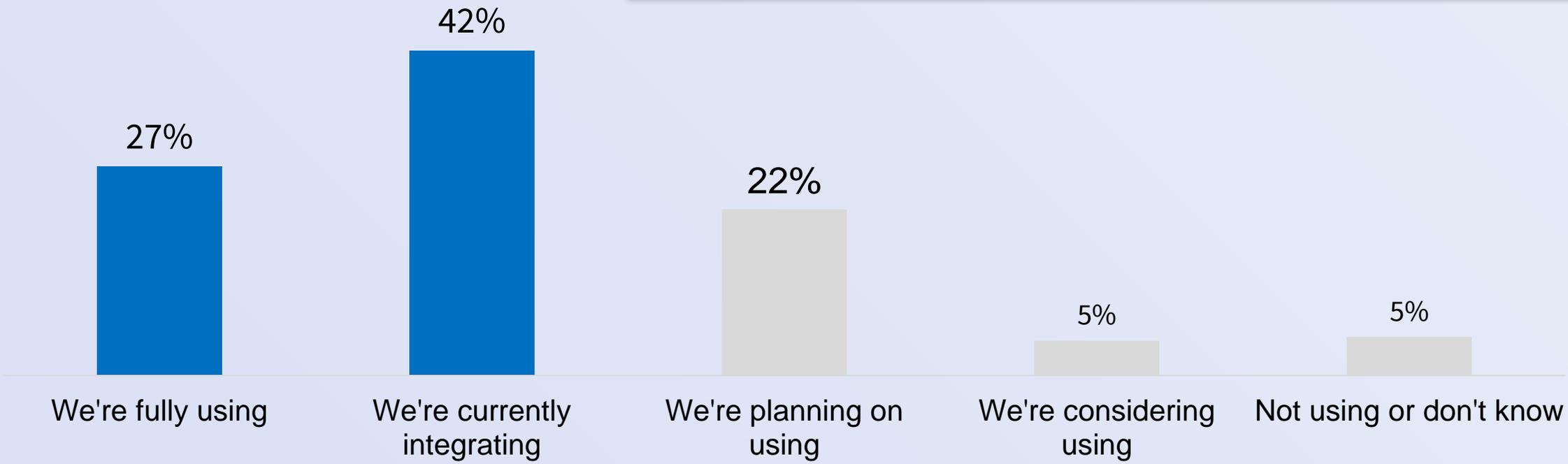
31% “An organization created from interchangeable building blocks”



4 in 10 are currently integrating composable solutions within the business.
A quarter are already fully using them.

Given this definition, to what extent is your enterprise using "composable" solutions?

"An organization that delivers business outcomes and adapts to the pace of business change. It does this through the assembly and combination of packaged business capabilities (PBCs). PBCs are application building blocks that have been purchased or developed."



Q33. To what extent is your enterprise using "composable" solutions?; base n = 200

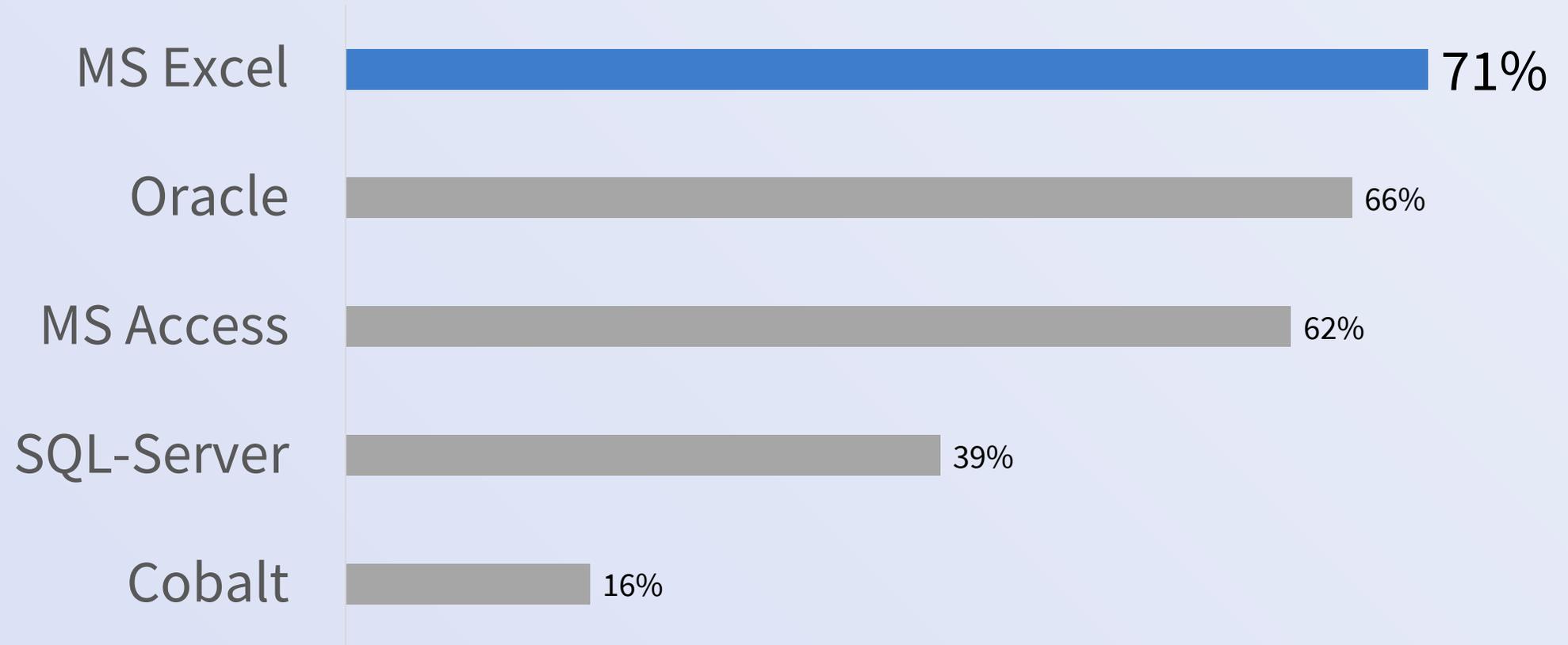
Government or Public Sector

Base n=100



71% of public sector leaders say their organizations still rely on Excel.

Which of these software tools does your organization rely on?



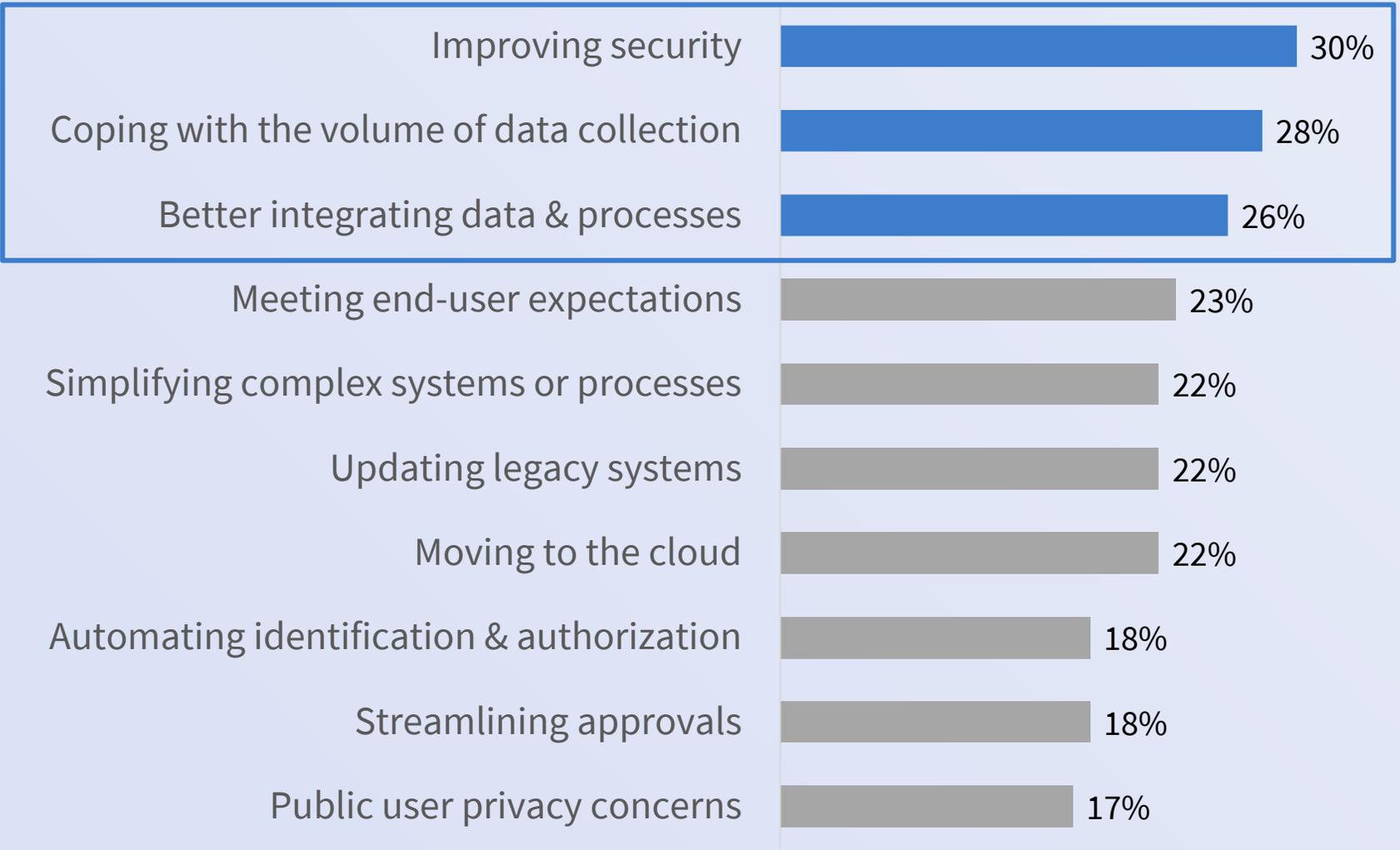
The majority (57%) are in the low-code adoption process; less than a quarter have fully adopted low-code.

Where are you in the low-code adoption process?



Public sector organizations feel low-code could help them cope with the amount of data they collect, its integration, and their overall security.

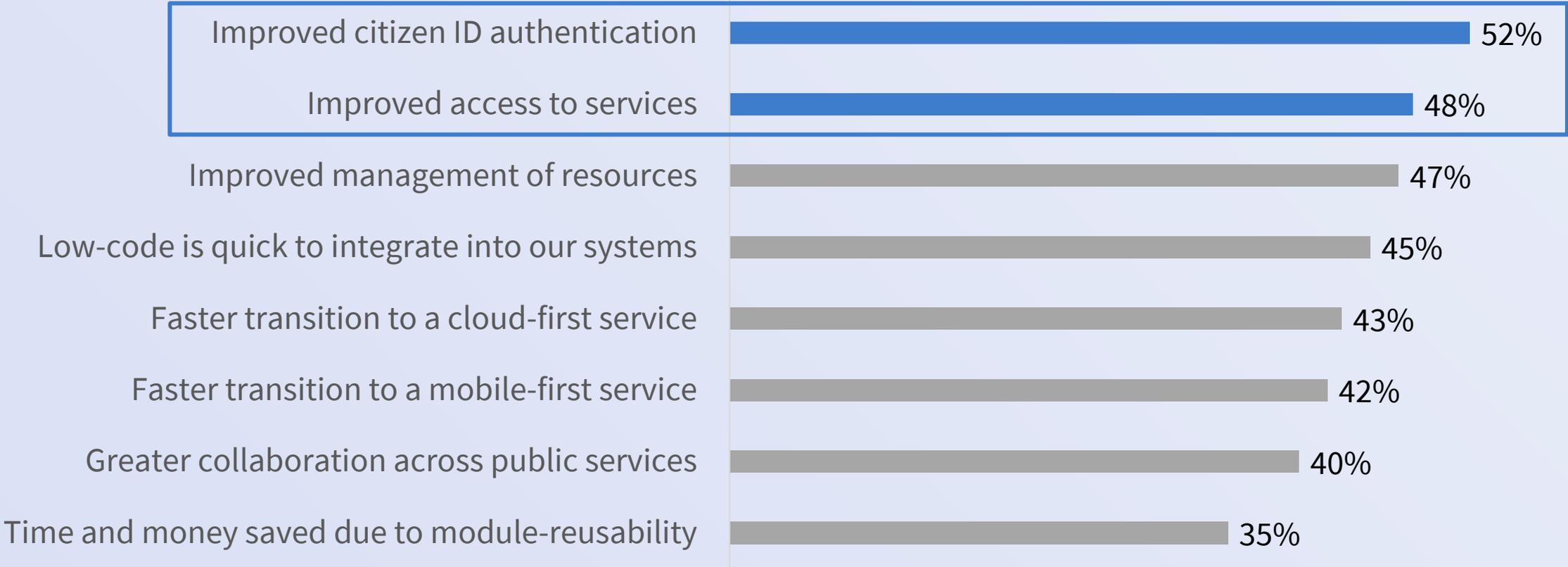
10 most pressing challenges in the public sector that low-code could help address?



Q43. What are the most pressing challenges in the public sector that low-code could help address?; Government or Public Sector; base n = 100

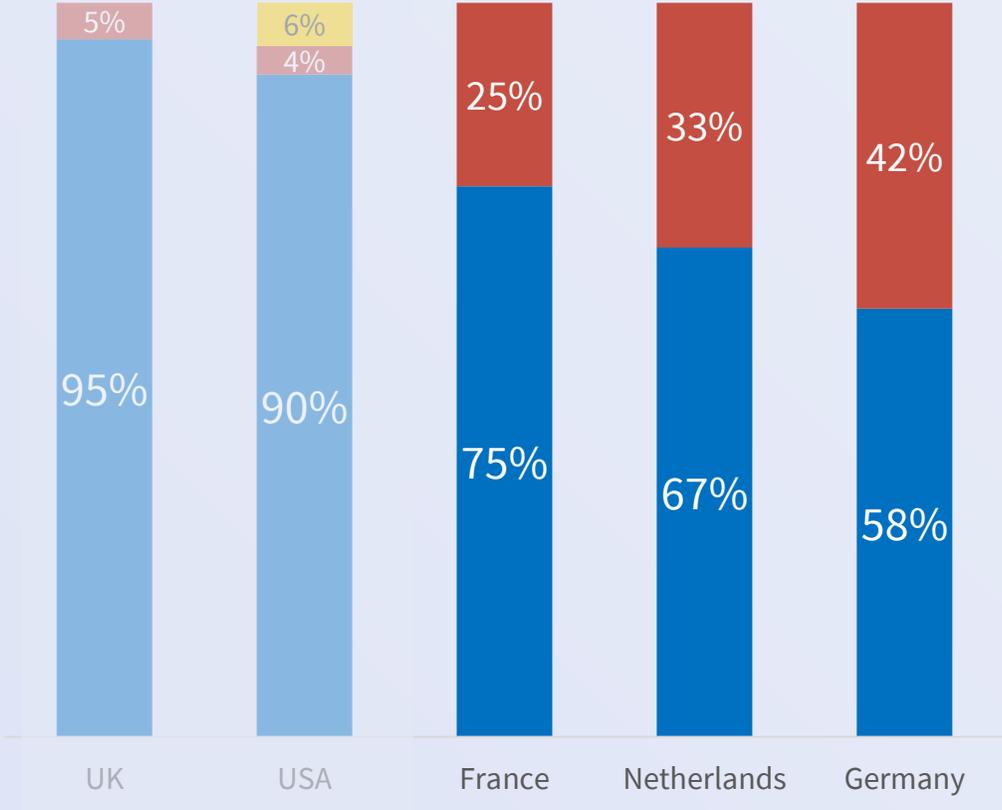
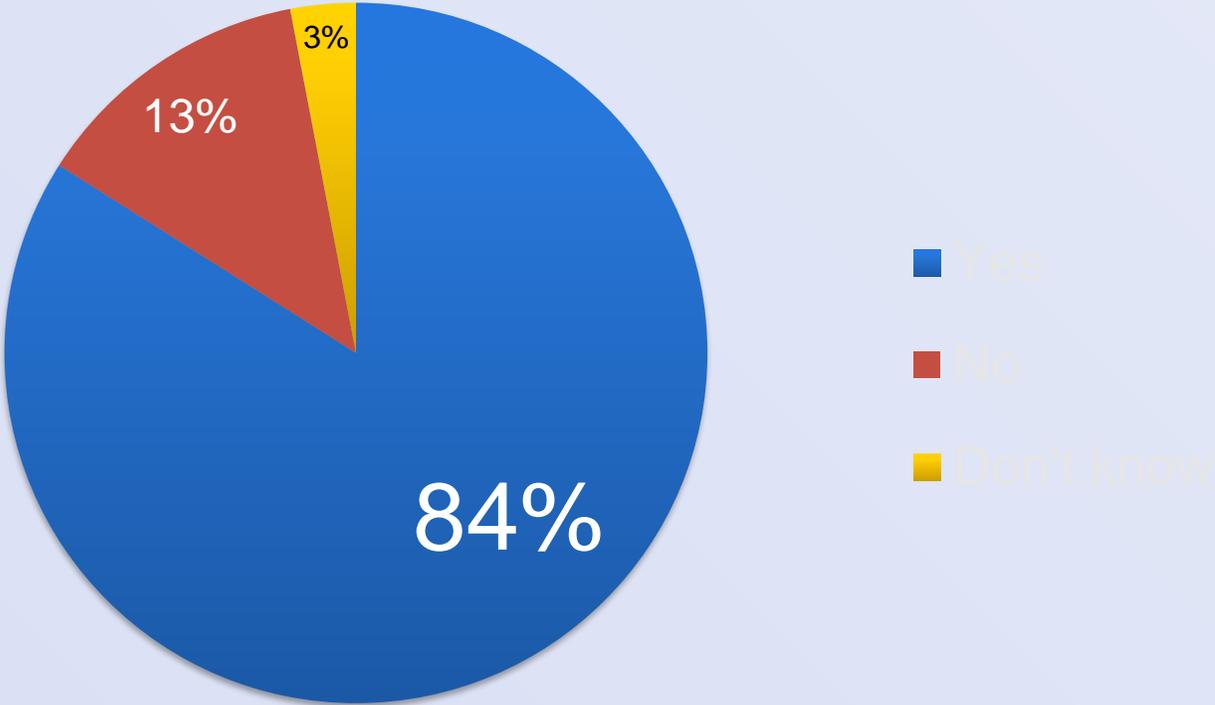
Low-code has specifically helped with identity authentication as well as the general accessibility of citizen-facing applications.

What benefits have you seen due to the adoption of low-code?



European markets have less confidence that cyber regulations keep up with cyber threats than in the US/UK markets.

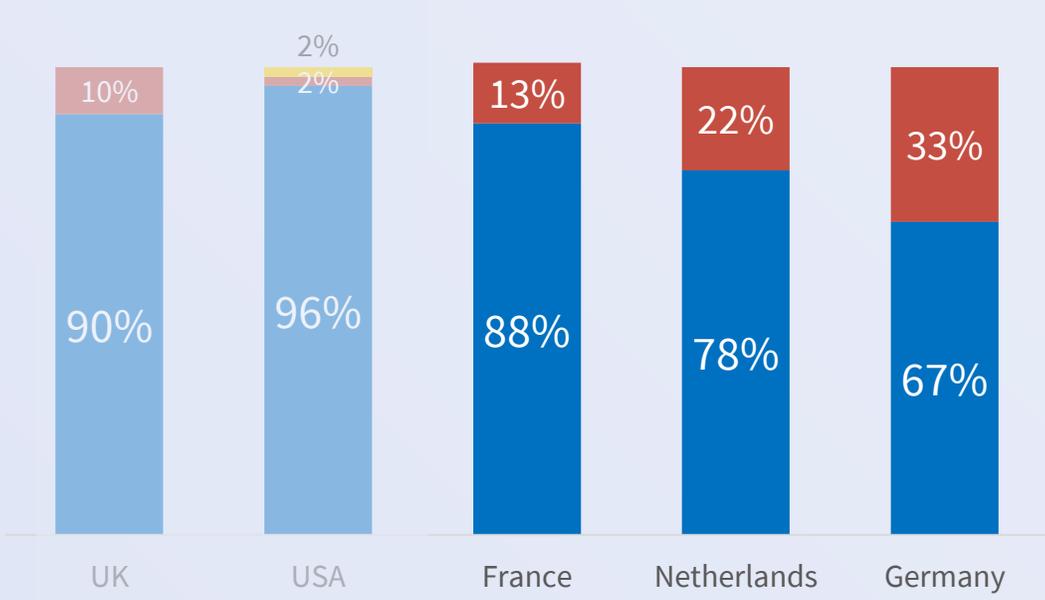
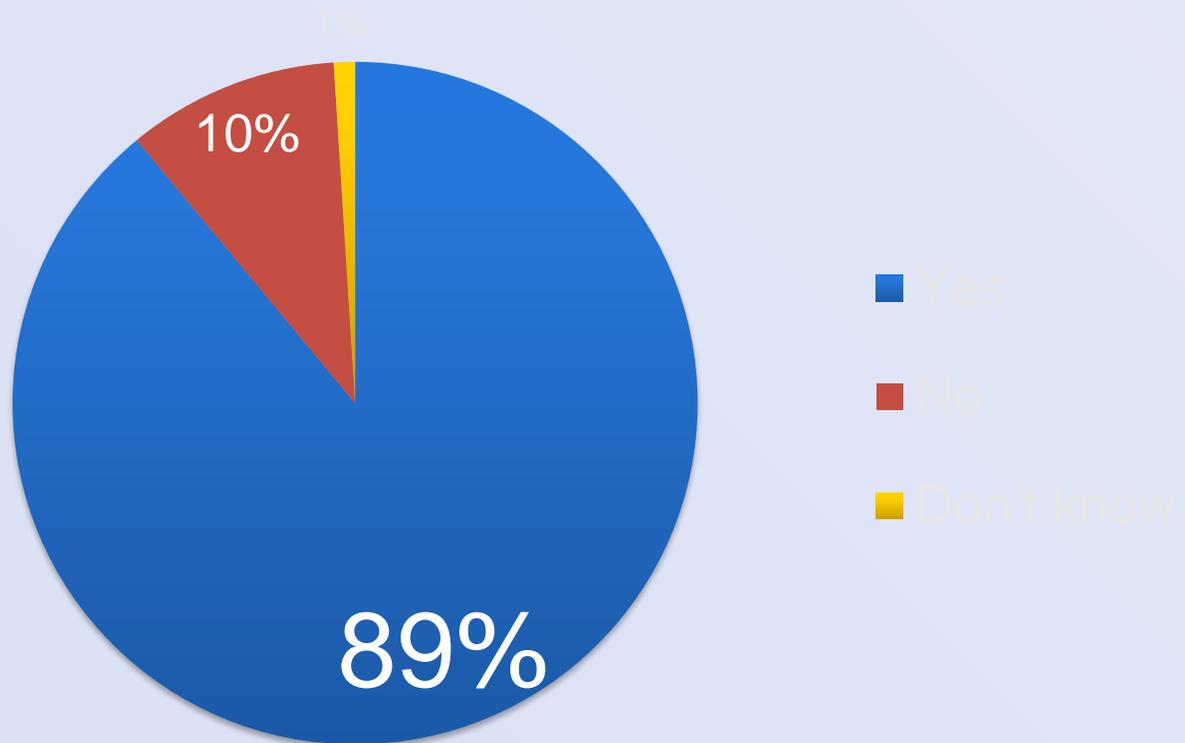
Overall, do you think the regulations in your country keep up with the cyber threat landscape?



Q46. Overall, do you think the regulations in your country keep up with the cyber threat landscape?; Government or Public Sector; base n = 100

The public sector in Netherlands and Germany are the least confident that their software keeps up with regulations.

Overall, do you think software supporting public sector systems keeps up with the regulations?

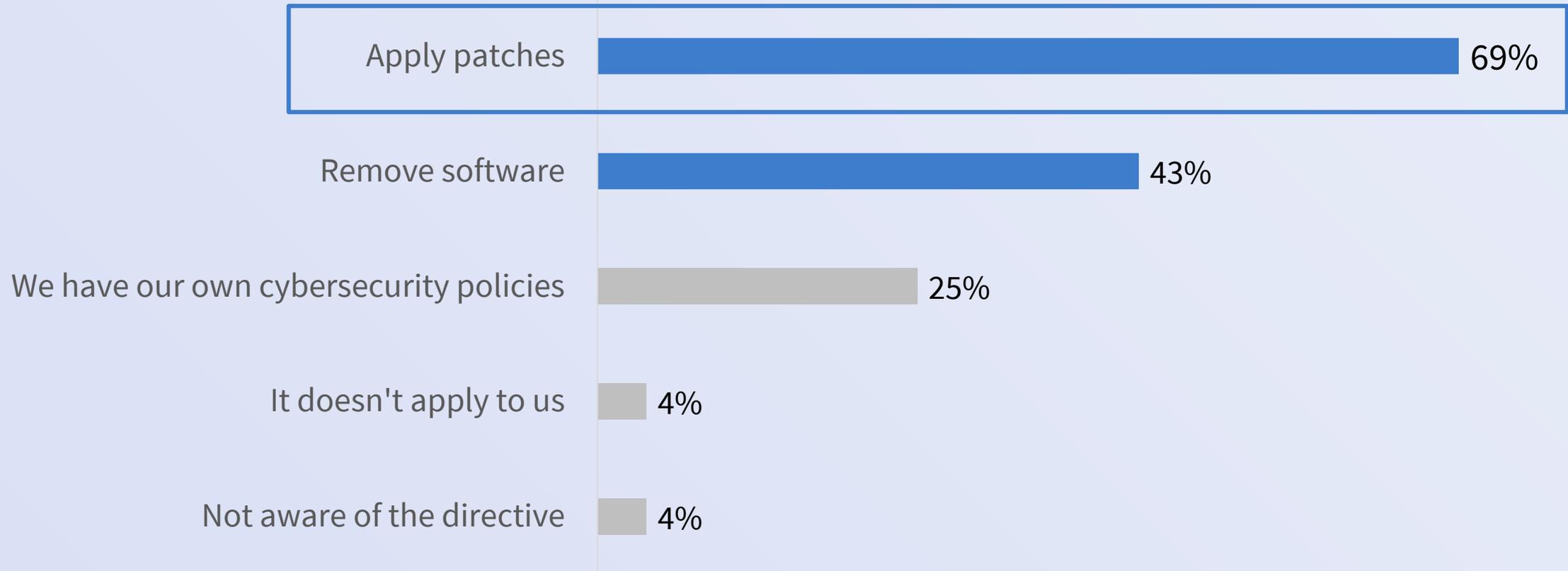


How have geopolitical events impacted your organization?
“Significant extra work due to taking in war refugees.”
Head of Compliance, Public Sector, Germany

Q47. Overall, do you think software supporting public sector systems keeps up with the regulations?; Government or Public Sector; base n = 100

In response to the May 2022 Cybersecurity and Infrastructure Security Agency (CISA) directive to fix vulnerable software, the majority in US Government organizations are applying patches.

US ONLY - How do you intend to address the CISA directive to all federal agencies to fix vulnerable software?



Retail and Wholesale

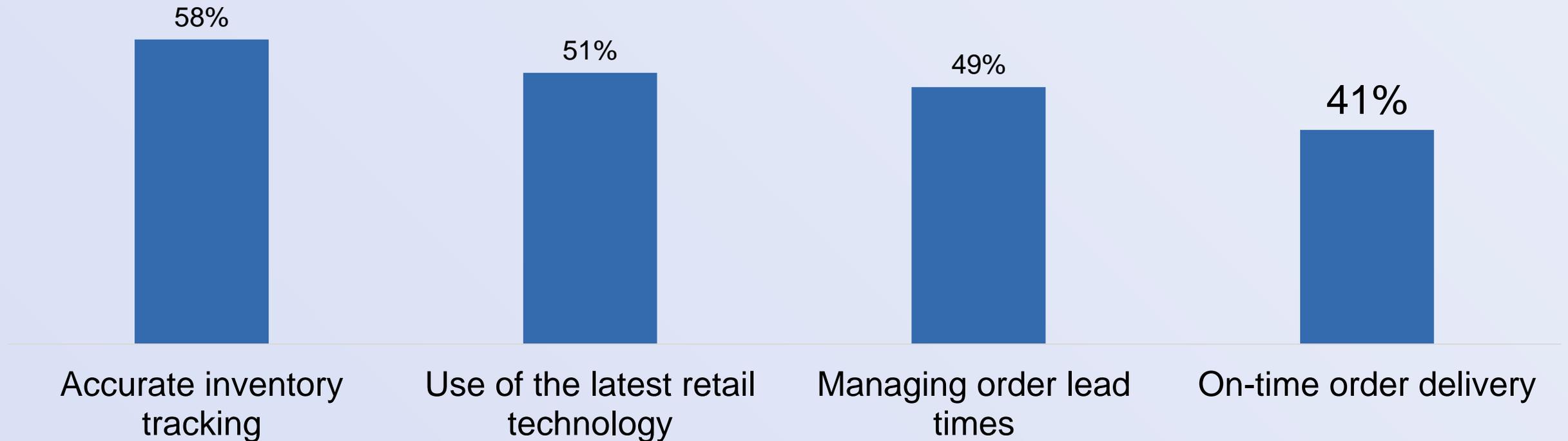
Base n=111



Retailers are confident they are using the latest technology and are performing extremely well when managing inventory and orders.

There is less confidence in on-time deliveries.

How well is your organization performing on the following?, % selecting 'Extremely Well'



Delivering orders on-time is the area the most retailers lack full confidence

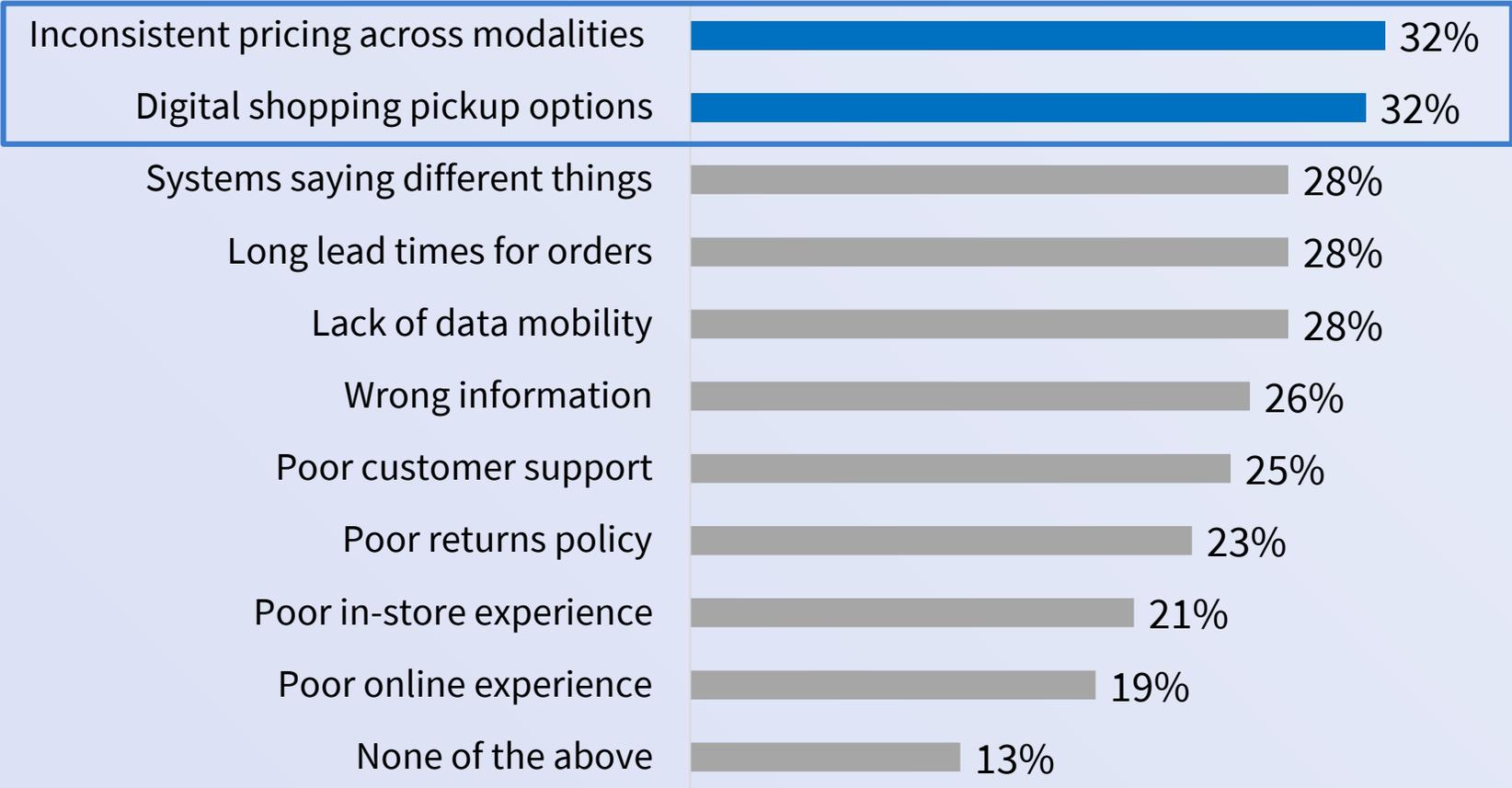
How well is your organization performing on the following?, % that did not select 'Extremely Well'

Negative version of previous slide



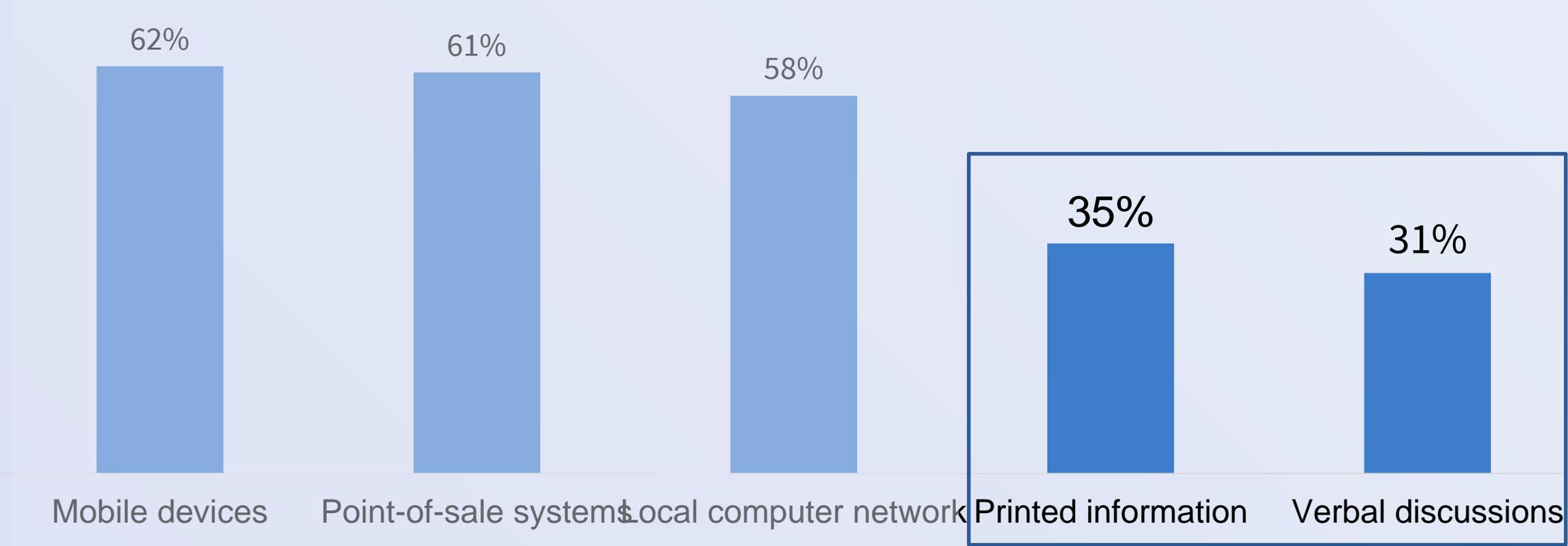
Customers are most frustrated by inconsistent pricing and issues with digital pick-up services.

What most frustrates your customers?



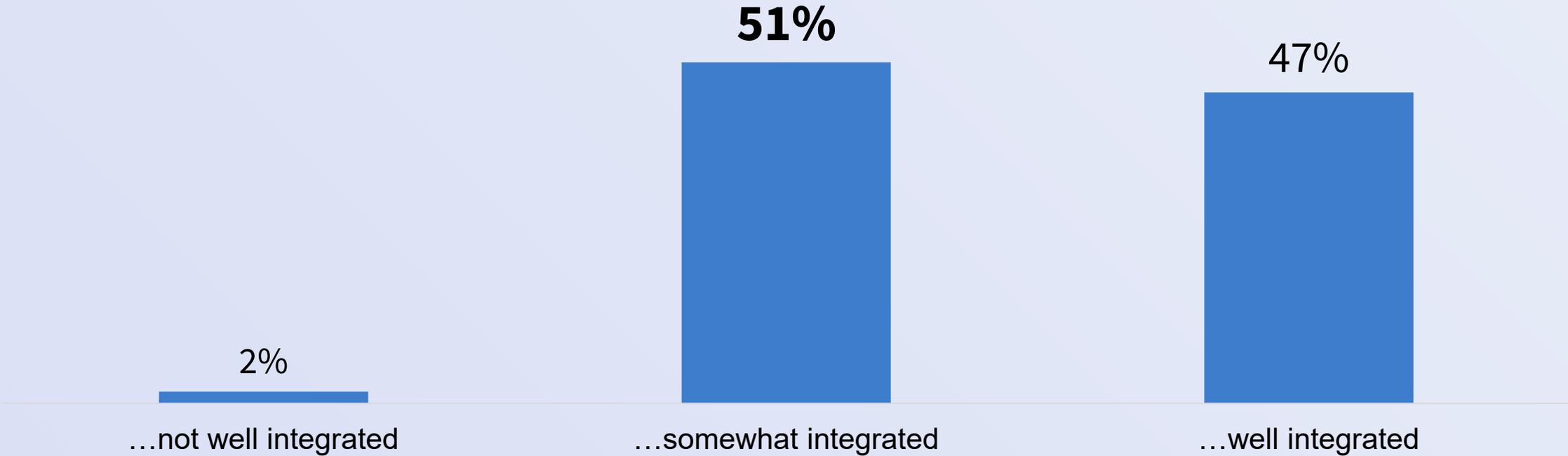
About a third of retail trade organizations still use paper and/or verbal communication to track inventory.

How do shop workers/customer reps access inventory and product data?



Half of the leaders in the retail and wholesale trade sector feel their vendors are only somewhat integrated with their organization's systems.

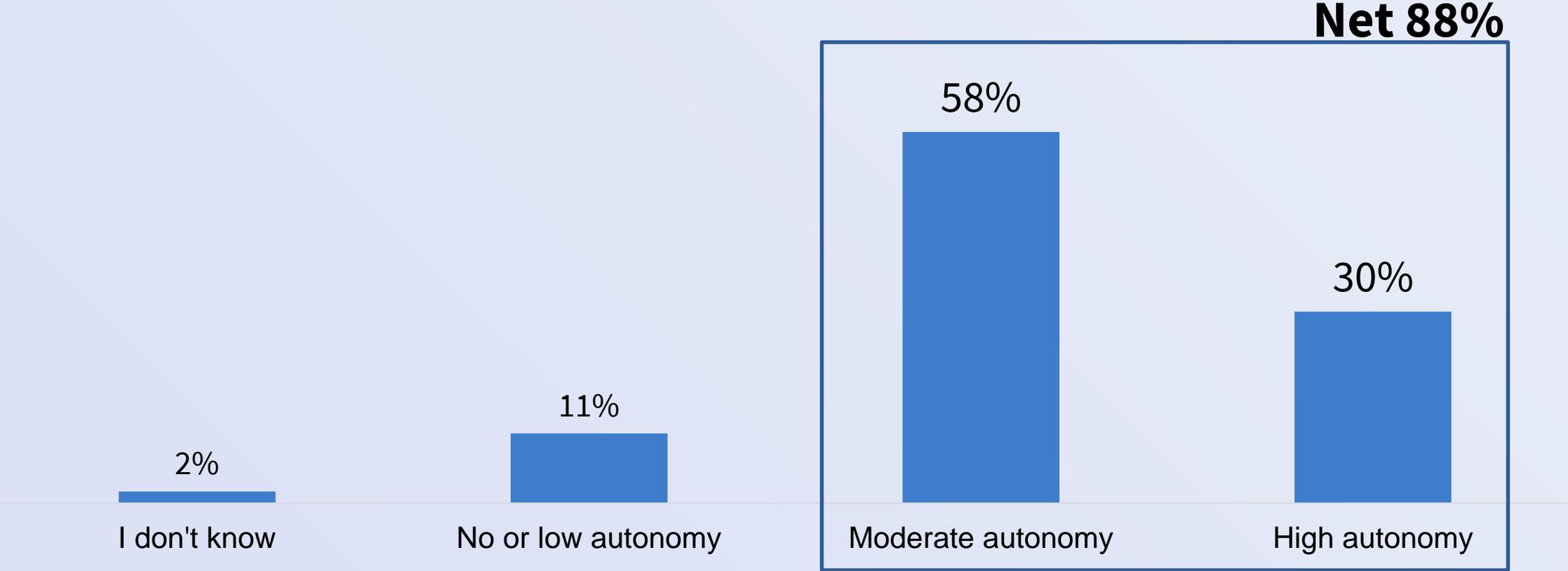
Regarding our vendors, our organization's systems are...



Q55: Which option best describes your organization's systems integration with vendors? Our systems are...; base n = 111

Almost all say their staff are free to build their own software solutions.

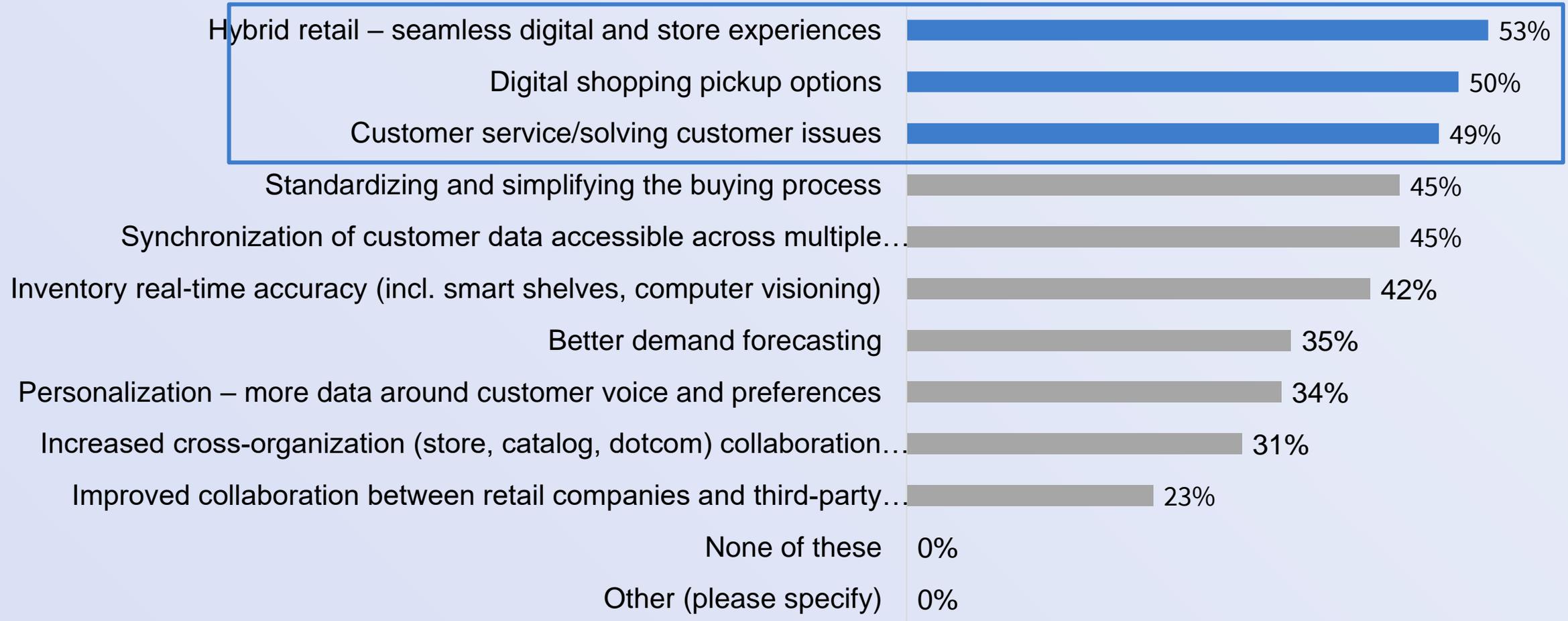
How much autonomy do staff currently have to create their own software solutions?



Q56: How much autonomy do staff currently have to create their own software solutions?; base n = 111; Percentages do not sum to 100% due to rounding.

Retail organizations expect to see the most growth around hybrid retail models, pick-up options and customer management platforms.

In what retail areas do you expect the most business growth over the next 5 years?

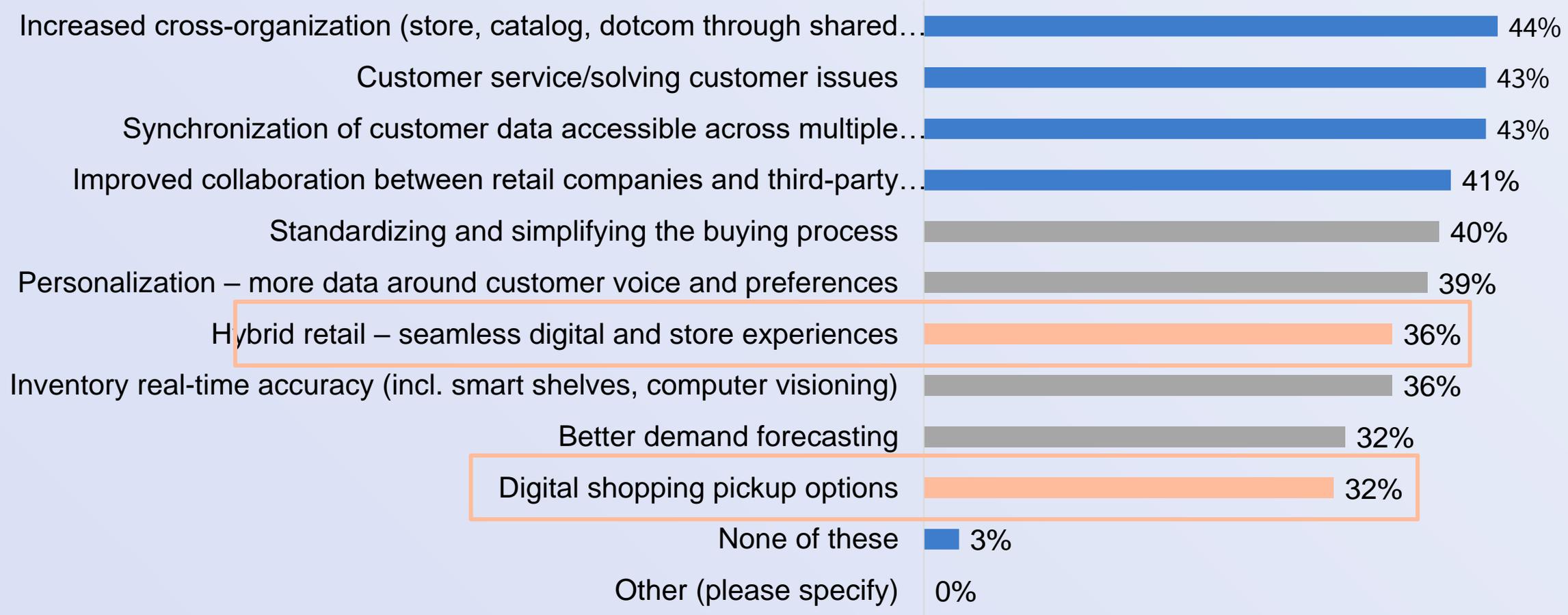


A third say low-code has helped them to implement hybrid retail models and digital pick-up shopping.

Collaboration and customer management are the main benefits.

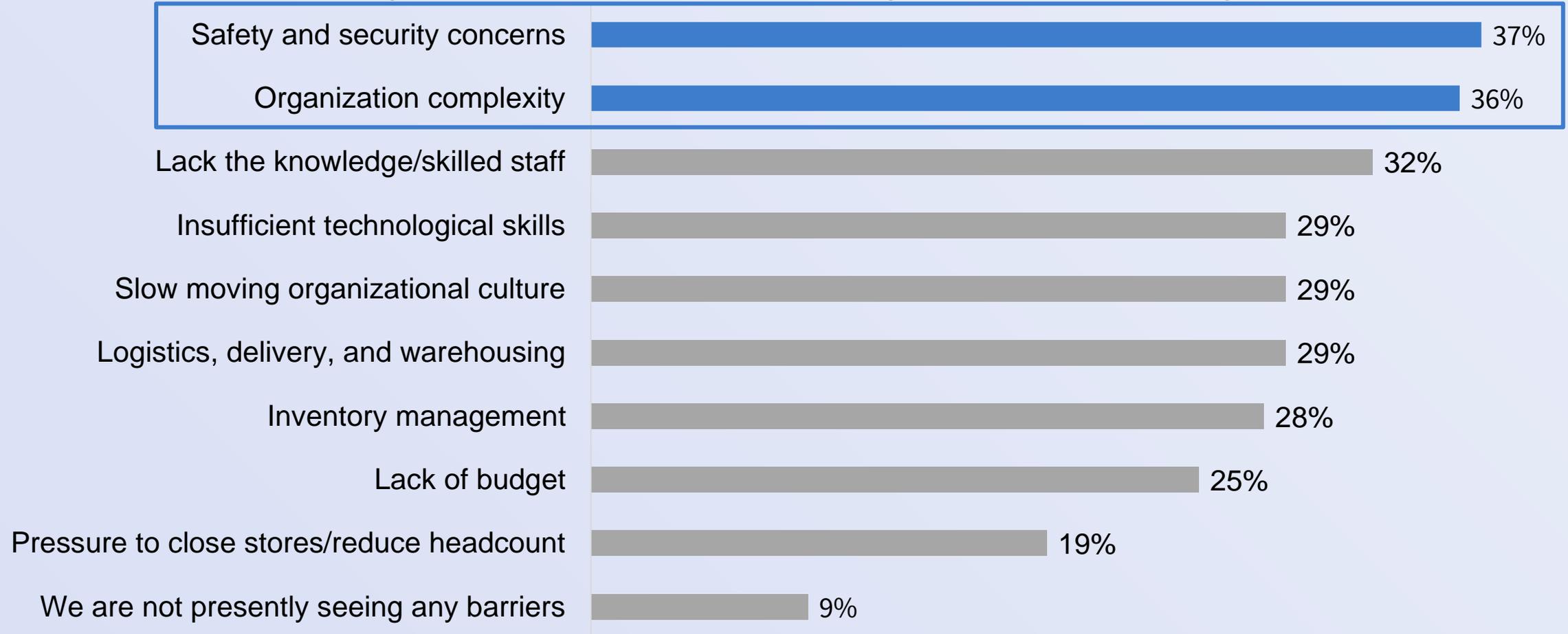
Hybrid retail and digital shopping pick-up are the two areas leaders expect to grow the most over the next 5 years.

What benefits have you seen in your organization due to the adoption of low-code?



Safety, security and complexity are the biggest barriers to implementing hybrid retail models. Budgets, pressure to close stores and logistics are lesser concerns.

Which of the following are barriers to companies better facilitating a hybrid retail model with digital and in-store experiences?



Low-code Verticals Study



METHODOLOGY

Mendix commissioned research among 556 Senior Business Leaders in 5 countries: US, UK, Netherlands, France and Germany, fielded between June 8th -June 20th, 2022.

The margin of error for the total sample of is +/- 4% at the 95% level of confidence.

The research uncovers what senior business leaders have learned during and following the COVID-19 pandemic and how they have used low-code lessons to accelerate their business forward.

Senior Business Leaders:

1. Decision makers around the purchase and use of software solutions or apps
2. C-suite, head of department, or reporting to the C-suite
3. Working for companies over 250 to 100,000+ employees from Manufacturing (n=200), Financial Services (n=145), Government/Public Sector (non-defense) (n=100), or Retail (n=111).



mendix

Low-code Verticals Study 2022

```
length, c=!1)}a.memory
function(){return n.each(arguments
function(){return e
function(a){var b=["resolve","done"]
function(){return e.done arguments
resolve).fail(c.reject):c}
[1][2].disable,b[2][2].
function(a,b,c){return functi
fail(g.reject):—f;return
—n.readyWait>0||1).resolve
"readystatechange",K),a.default
addEventListener("DOMContentLoaded
setTimeout(f,50)}J(),n.ready
element"div"),e.style.cssText="joo
state:done=1),c.removeChild
/^(?:\{[\w\W]*\})\|[\w\W
data(a,b,c)}else c=void
if(k&j[k]&&(e||j[k]).p
void 0!==d&&(g[n.camelCase
camelCase)):b in d?b=[b]:c=
"embed":!0,"object":!0
removeData:function(a,b){retu
camelCase(d.slice(5)),P
removeData(this,a))
function(){n.dequeue
_removeData(a,b+"queu
n.dequeue(this
```