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BANK TECH INDEX

VOLUME 4 – NOVEMBER 2024
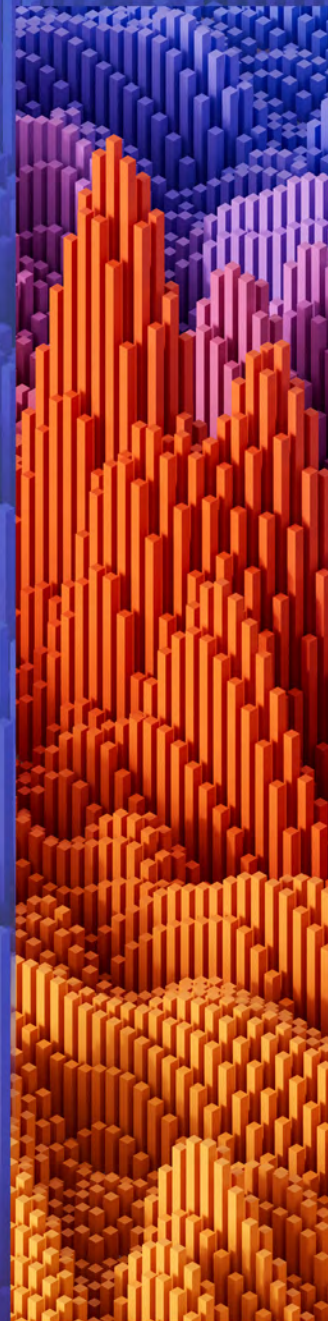
Contents

Introduction

Introduction

Dennis Gada
EVP, global head, Banking & Financial Services

Welcome to Volume 4 of the Infosys Bank Tech Index.

In this edition, we see that banks are turning a corner on their strategic priorities and tech spend.

Banking thrives when customer trust is built, and compliance is adhered to. In Volume 4, we have found that banks have shifted their focus towards regulatory compliance, while their focus on cost reduction has begun to wane.

Regulations related to AI and open banking have kept regulators and banks on their toes.

AI continues to be the fastest-growing area of technology spend for banks globally. Banks continue to believe that AI will boost productivity. Yet, in our discussions with clients, we have found that only a handful are AI-ready across all five dimensions of strategy, governance, talent, data, and technology. AI and cybersecurity continue to dominate banks' budgets, but the growth in spending has subsided in the last quarter. Often, these technologies compete and complement each other in driving investments.

Following a year of growth in AI and cybersecurity, recruitment is cooling off. Interestingly, the convergence of AI and other digital technologies is driving talent demand for other digital technologies: Demand is now increasing for tech roles that encourage new business models, payment initiatives, and changing regulations.

This is an intriguing period for regulatory developments. With regulations that guide banks on their path of AI adoption in Europe and stronger consumer protection in the US, this edition captures the compelling time.

The findings from this index will help executives understand:

- How senior executives decide to spend their budgets across different technology areas
- The effectiveness of technology spending
- The evolving technology talent demand within banks
- The technologies that banks are adopting

We will continue to track these trends in the coming quarters. If you have any questions or if you would like to discuss these trends, please reach out to us.

Key findings — summary
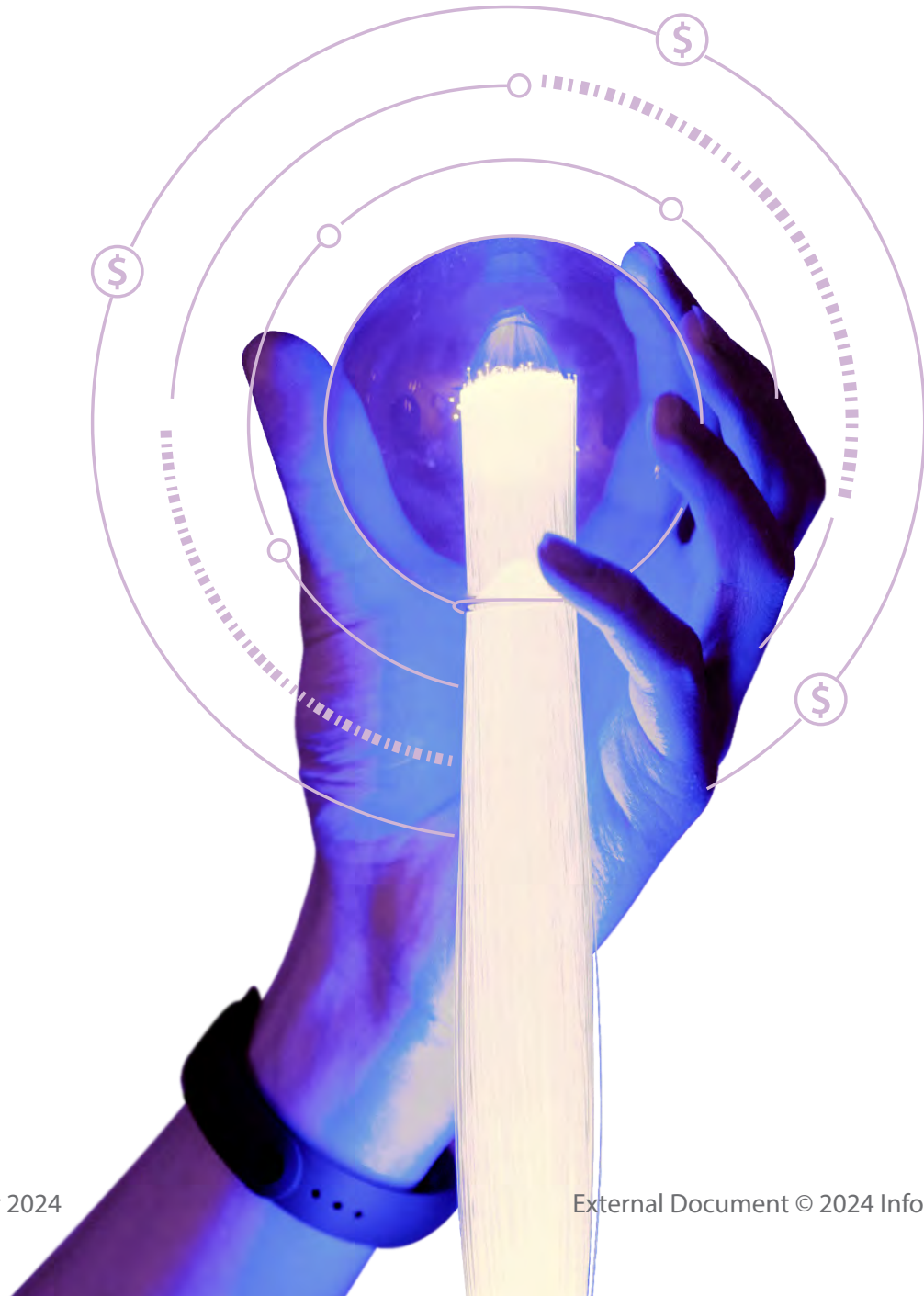
Banks continue to shift focus away from cost reduction

Focus on cost reduction continues to fall
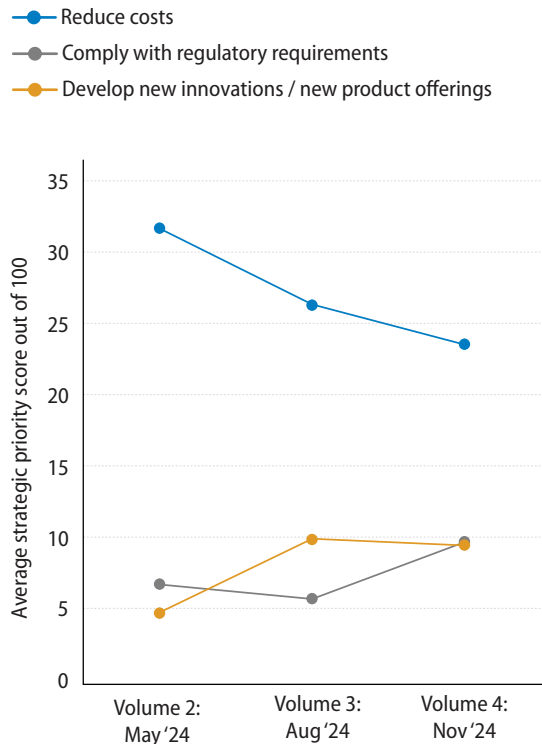
- → Reduce costs
- → Comply with regulatory requirements
- → Develop new innovations / new product offerings

Average strategic priority score out of 100

| Volume 2: May '24 | Volume 3: Aug '24 | Volume 4: Nov '24 |

Notes:

1. *Priorities are scored on a 100-point scale.*
2. *Chart shows only three of seven priorities surveyed.*
3. *Refer to page 9 for further details.*

Slow down in tech hiring begins to flatten

- ● Overall
- ● APAC
- ● Europe
- ● Latin America
- ● Middle East and Africa
- ● North America

Average expected FTE recruitment per bank

| Volume 2: May '24 | Volume 3: Aug '24 | Volume 4: Nov '24 |
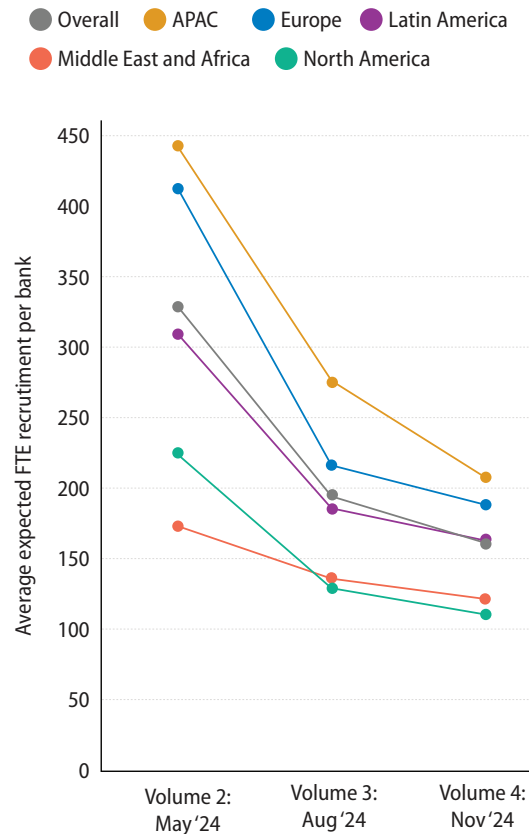
Notes: 1. Refer to page 23 for further details.

Tech spending is expected to rise 3%

Projected spending change during July to December 2024 (median)

2.2% — New projects
3.3% — IT operations
3.8% — Regulations

Average growth

Spending type
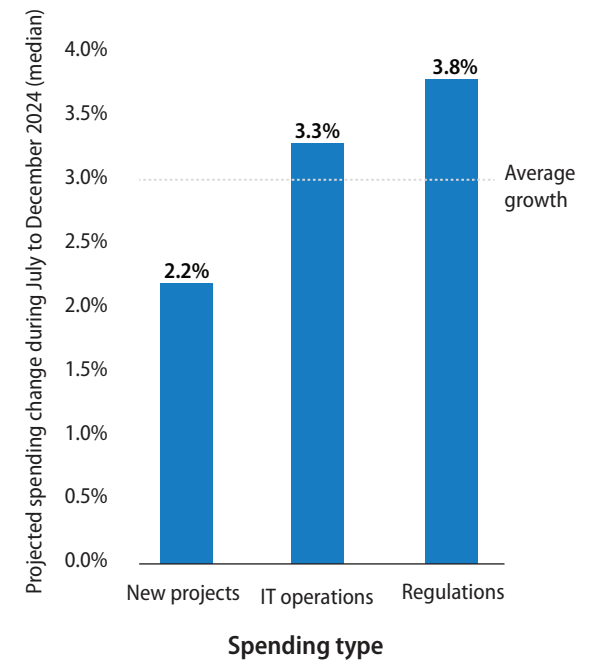
Notes: 1. Growth rates over July to December 2024
2. Refer to page 14 for further details on tech spending.

AI spend has slowed, but a further rise is likely

AI spending is cooling...

Legend:
- Artificial intelligence
- Cybersecurity
- Others

Y-axis: Average budget allocation (%)

X-axis:
- Volume 2: May '24
- Volume 3: Aug '24
- Volume 4: Nov '24

Notes:
1. Refer to page 17 for further details.
2. Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.

...and tech recruitment is declining, especially in AI

Artificial intelligence:
- Machine learning: -22
- Large language models: -5
- Deep learning or neural networks: -1

Cybersecurity: -15

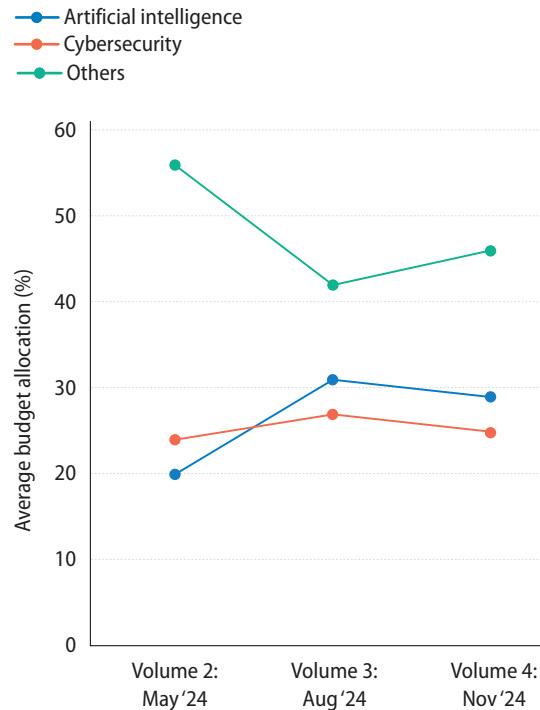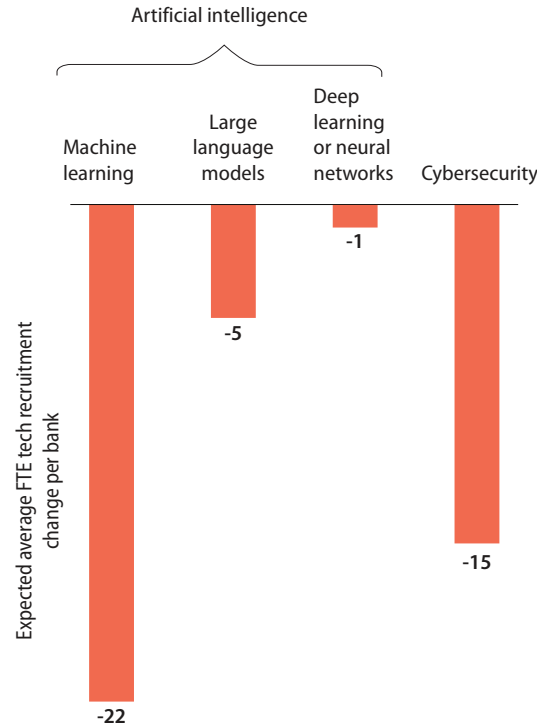Y-axis: Expected average FTE tech recruitment change per bank

Recruitment for machine learning is falling faster than other tech areas. Recruitment for large language models and deep learning has also slowed. However, cybersecurity, another area of high spend in previous volumes, has also slowed significantly, suggesting this could be seasonal.

Notes: 1. Refer to page 24 for further details.

Yet, banks intend to grow AI spend

Technology	Growth
Artificial intelligence	7.7%
Cybersecurity	4.7%
Banking as a service platform	3.5%
Cloud computing	3.0%
Robotic process automation	1.9%
Open banking or APIs	1.1%
Real-time payments	0.8%
Quantum computing	0.7%
Voice technologies	0.6%
Blockchain	0.4%
Virtual or augmented reality	0.3%
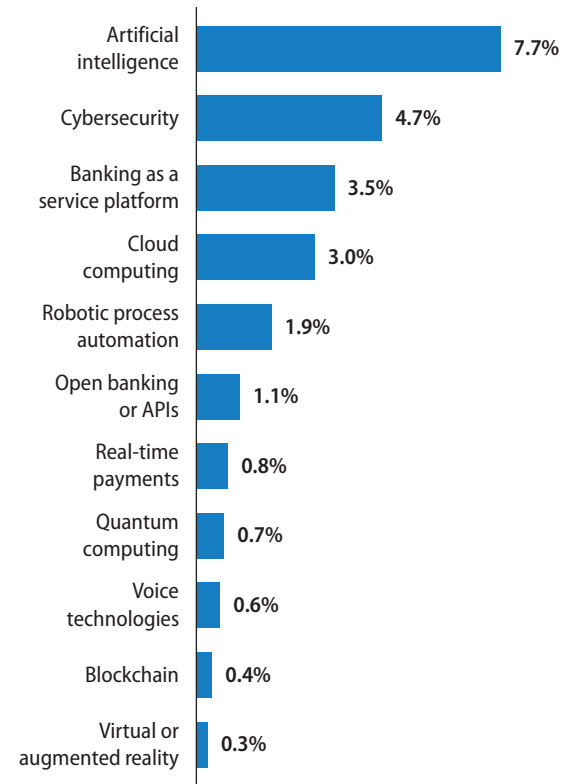
Projected spending growth during July to December 2024

Notes: 1. Refer to page 19 for further details.
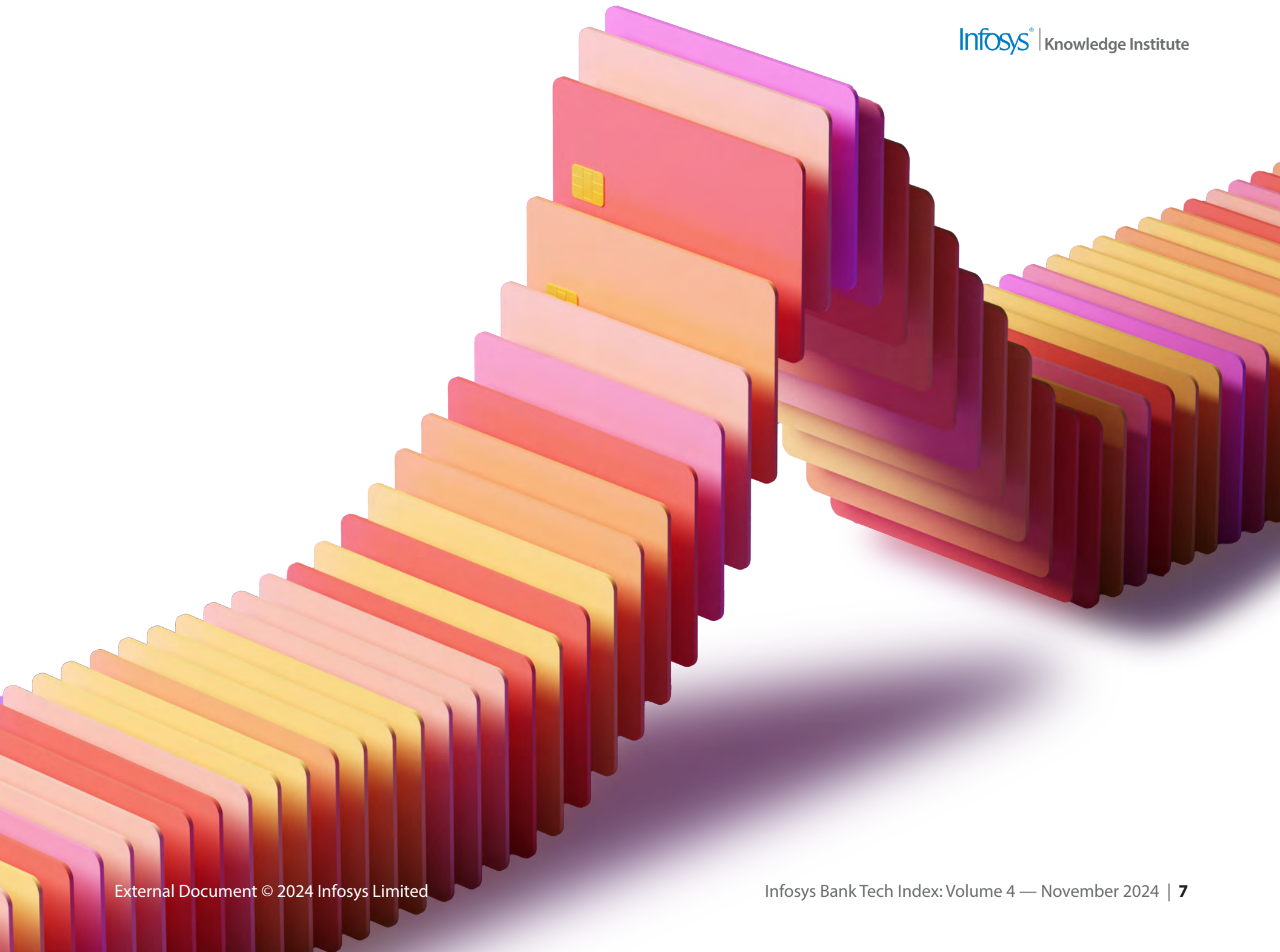
Technology strategic priorities

Reducing costs is still the top priority, while regulatory compliance picks up pace

Focus shifts to compliance from costs

Technology strategic priorities comparison across volumes
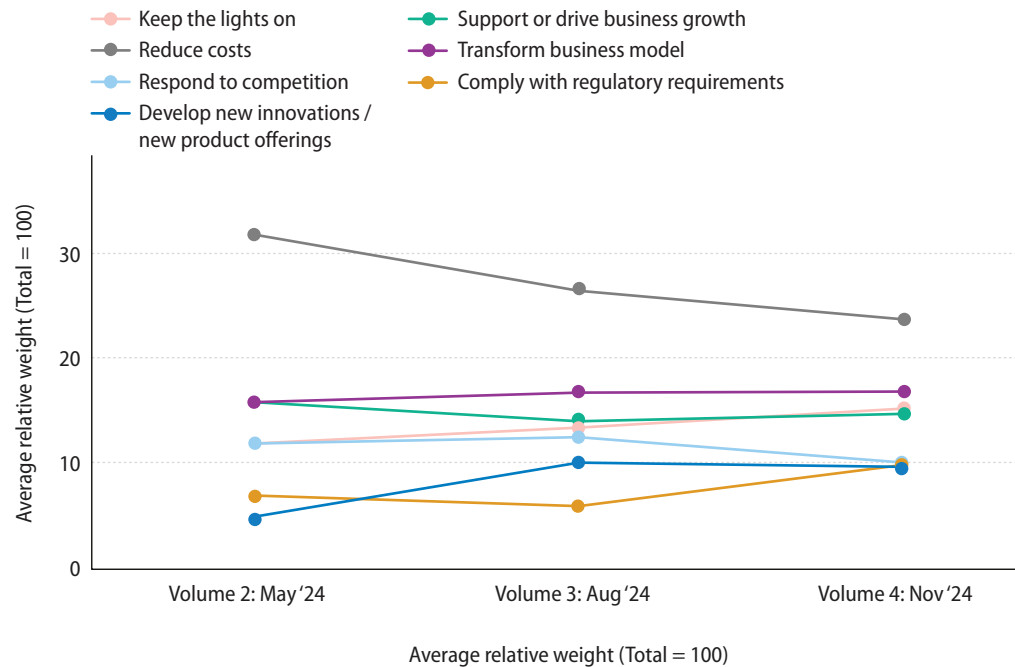
Legend:
- Keep the lights on
- Reduce costs
- Respond to competition
- Develop new innovations / new product offerings
- Support or drive business growth
- Transform business model
- Comply with regulatory requirements

Y-axis: Average relative weight (Total = 100)

X-axis: Volume 2: May '24, Volume 3: Aug '24, Volume 4: Nov '24

Average relative weight (Total = 100)

Notes:
1. N = 379, where N is the number of banks surveyed in Volume 4.
2. N = 396, where N is the number of banks surveyed in Volume 3.
3. N = 324, where N is the number of banks surveyed in Volume 2.

Banks decrease focus on reducing costs: Cost reduction remains the number one strategic priority for banks in Volume 4. However, its importance has decreased by three percentage points from Volume 3, and eight percentage points from Volume 2.

Complying with regulation rises in priority: Banks have increased their focus on regulatory requirements by four percentage points compared to Volume 3.

Cost reduction remains the top strategic priority

Technology strategic priorities

Strategic priority	Overall	Region				
		APAC	Europe	Latin America	Middle East and Africa	North America
Reduce costs	24	22	24	27	25	24
Transform business model	17	17	16	17	17	16
Support or drive business growth	15	14	16	15	15	15
Keep the lights on	15	16	15	15	14	15
Respond to competition	10	12	10	10	11	9
Develop new innovations / new product offerings	10	10	10	9	9	10
Comply with regulatory requirements	10	10	9	8	9	11

Average relative weight (Total = 100)

Notes: 1.   N = 379, where N is the number of banks surveyed in Volume 4.

Reducing costs is the top priority among banks across regions: Cost reduction is the top priority for banks globally, regardless of where they are. However, the biggest decrease was in APAC, with a fall of five percentage points.

Focus on complying with regulatory requirements rises: Banks around the world have increased their focus on compliance with regulatory frameworks, with the most pronounced increase in the APACregion, followed by Europe.

Focus on competition is reduced: All the regions we surveyed reported a reduction in the importance they place on competition since Volume 3. This shift away from competition was most prominent in Europe and North America.

TECHNOLOGY SPENDING REPORT

Regulatory tech spending grows
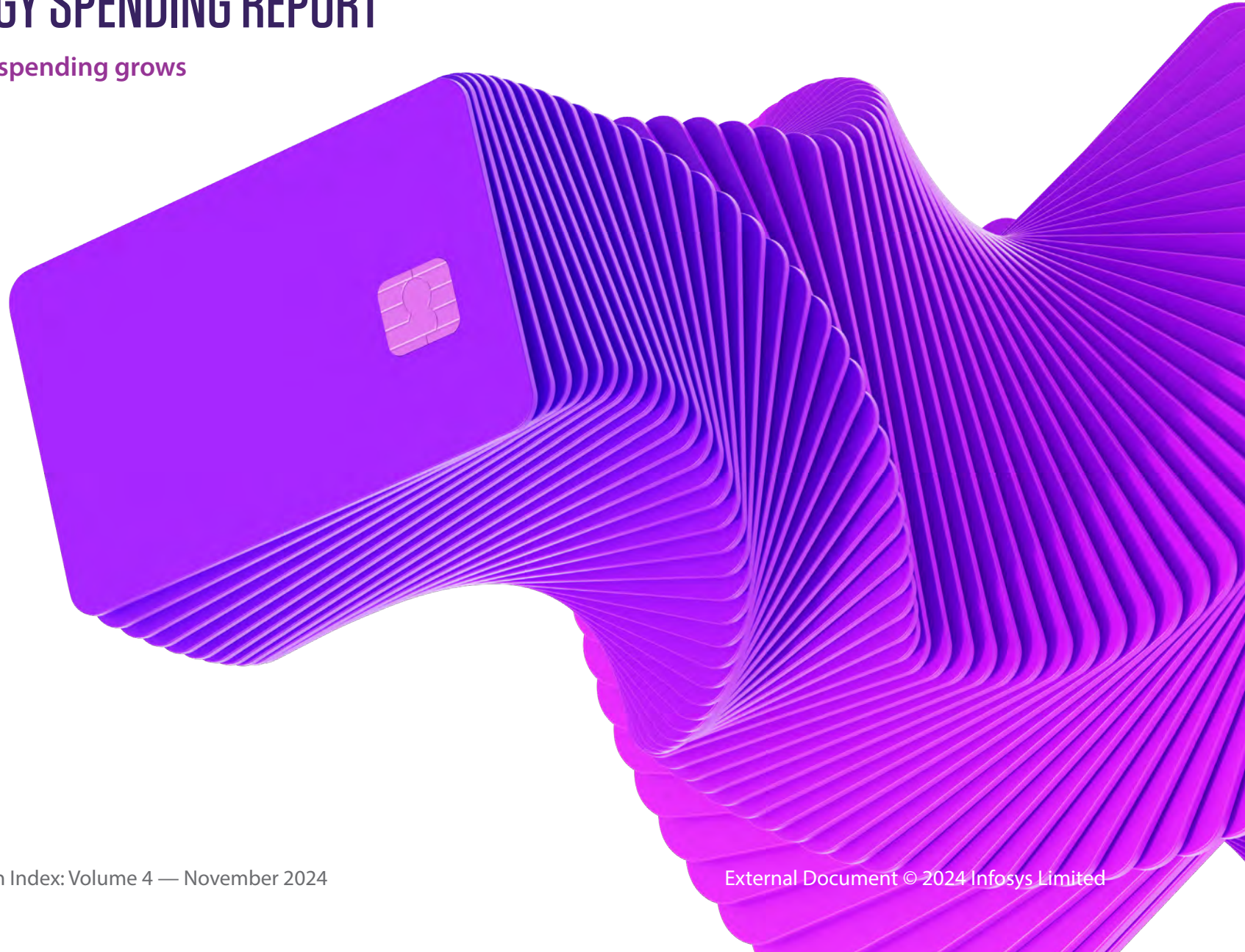
Estimated total tech spend is $65 billion

Total technology spending by category

$65 bn

$42 bn

$23 bn

Tech spednign in billions (US$)

Total   CapEx   OpEx

Spending category

Total technology spending by category and type

■ IT Ops ■ New projects ■ Regulatory

$65 bn
$24
$18
$24

$42 bn
$15
$11
$16

$23 bn
$9
$6
$8

Tech spending in billions (US$)

Total   CapEx   OpEx
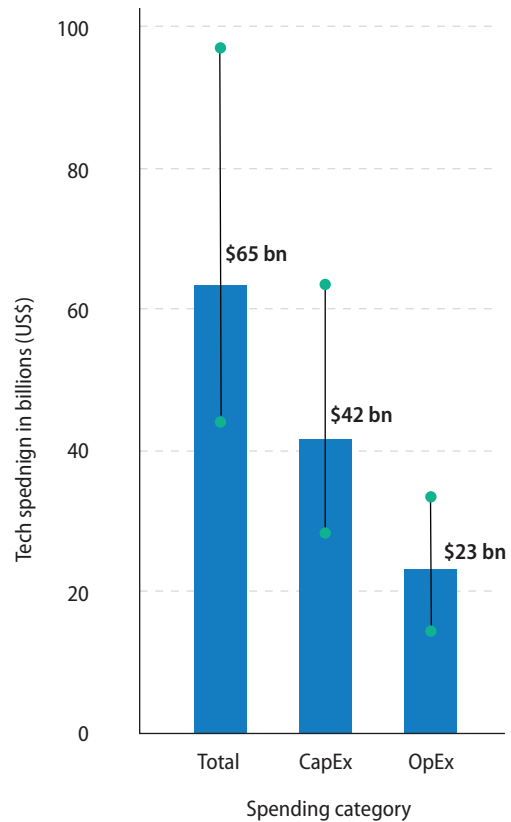
Spending category / type
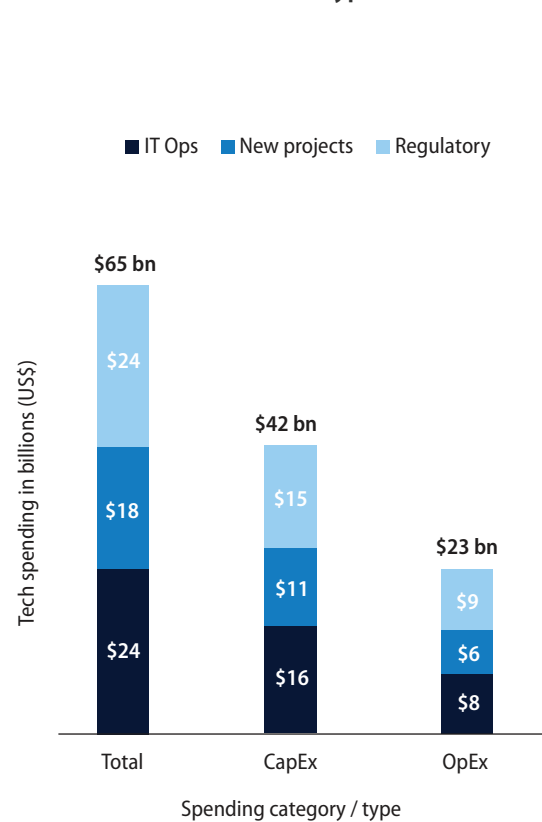
Estimated total tech spending stood at $65 billion in the second quarter of calendar 2024: Our best estimate is that banks in our survey spent nearly $65 billion on technology in Q2 of 2024 but the true value could be anywhere between $44 billion and $97 billion.

CapEx accounted for two-thirds of total tech spend: CapEx was at $42 billion and accounted for 64% of total technology spending. OpEx was at $23 billion and accounted for the remaining 36%.

Regulatory and IT ops represented the largest component of tech spending: Total regulatory and IT operations spendings were at $24 billion each and combined for 73% of total tech spend. New projects accounted for the smallest proportion of total spend at 27%.

Notes: 1. N = 379, where N is the number of banks that responded to spending questions in Volume 4.

2. Error bars indicate the possible range of spending reported by banks in the survey.

3. Total spending is a combination of CapEx and OpEx. The range of the total spending is based on a fixed ratio of CapEx to Opex derived from the average expected value

Total tech spending declines but is expected to rise 3%

Total technology spending by category and type
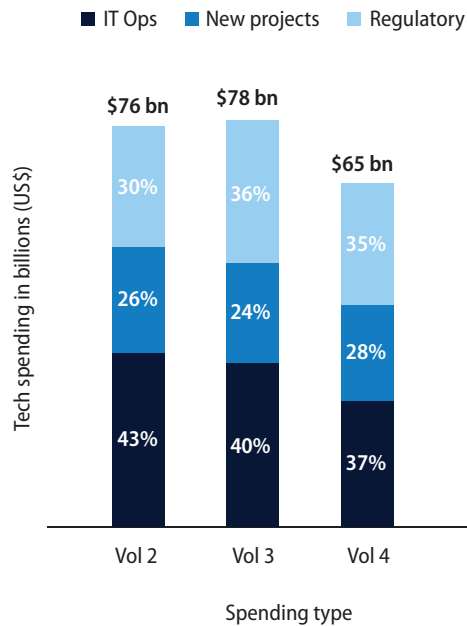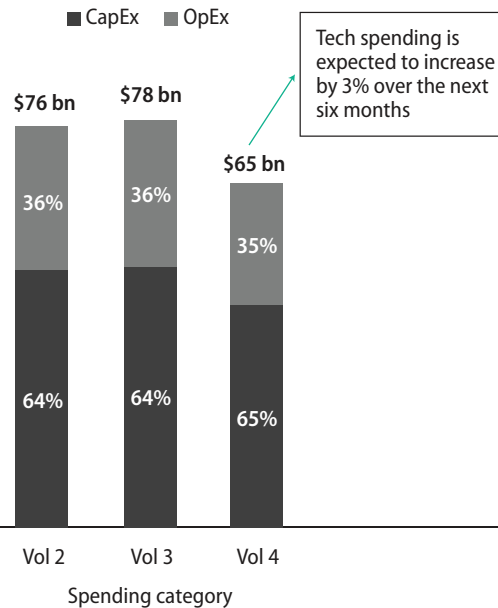
Legend: ■ IT Ops ■ New projects ■ Regulatory

Tech spending in billions (US$)

	Vol 2 ($76 bn)	Vol 3 ($78 bn)	Vol 4 ($65 bn)
Regulatory	30%	36%	35%
New projects	26%	24%	28%
IT Ops	43%	40%	37%

Spending type

Total technology spending by category

Legend: ■ CapEx ■ OpEx

	Vol 2 ($76 bn)	Vol 3 ($78 bn)	Vol 4 ($65 bn)
OpEx	36%	36%	35%
CapEx	64%	64%	65%

Spending category

Tech spending is expected to increase by 3% over the next six months

Notes:
1. N = 379, where N is the number of banks that responded to spending questions in Volume 4.
2. N = 396, where N is the number of banks that responded to spending questions in Volume 3.
3. N = 320, where N is the number of banks that responded to spending questions in Volume 2.

Total tech spending stood at $78 billion in the first quarter of calendar 2024: Between Volume 3 and Volume 4 of our index, banks decreased their total quarterly tech spending from $78 billion to $65 billion.

Total tech spending is expected to rise by a median of 3%: However, banks are expected to increase their tech spending by 3% between July and December 2024

Regulatory spending expected to grow the fastest: Regulatory spend overall (across CapEx and OpEx) is likely to grow by 3.8%, higher than IT operations (3.3% growth) and new projects (2.2% growth).
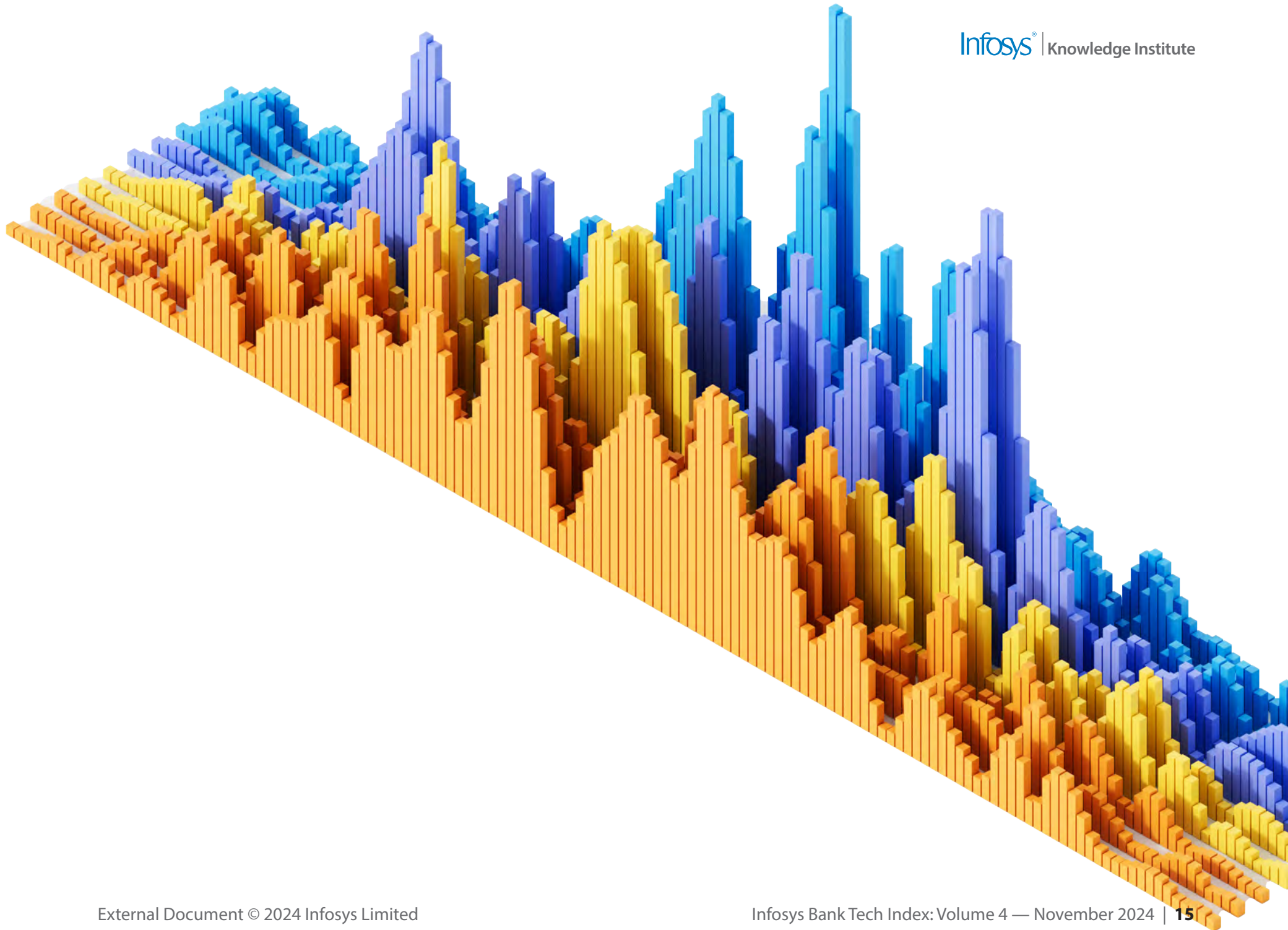
TECHNOLOGY BUDGET ANALYSIS

AI remains top tech spending area
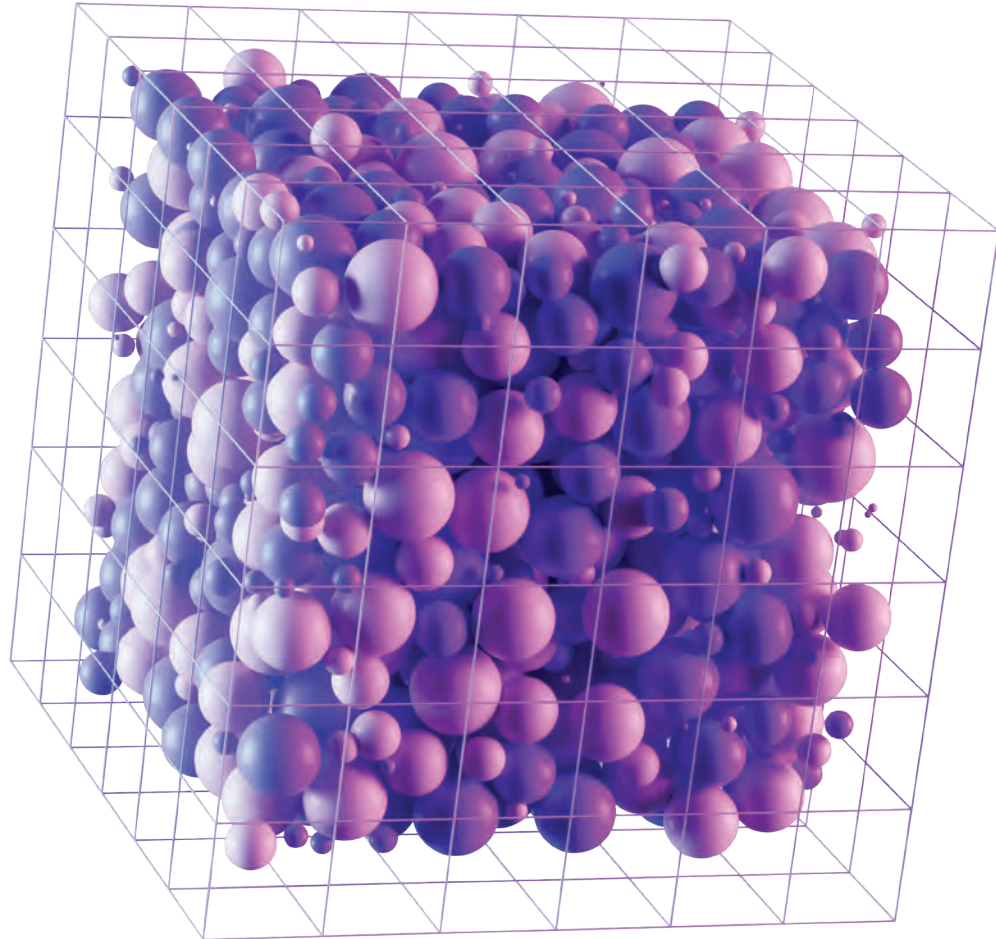
AI and cybersecurity continue to lead budget allocation

Technology budget distribution change by volume
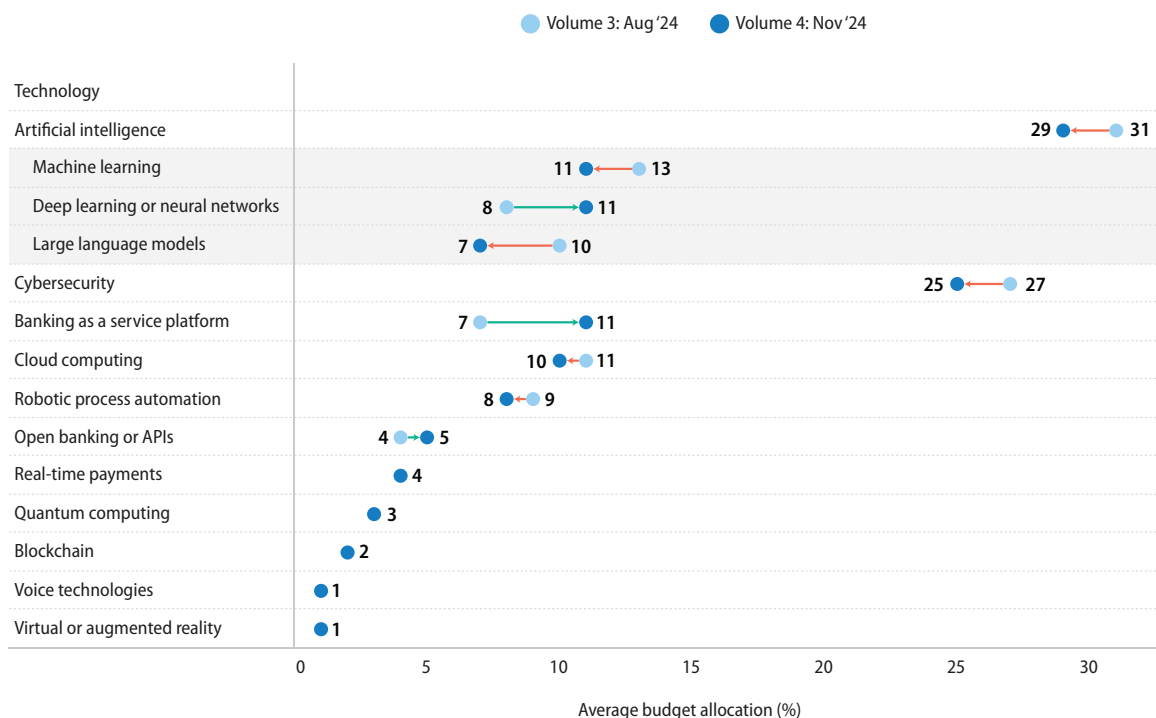
● Volume 3: Aug '24   ● Volume 4: Nov '24

Technology	Average budget allocation (%)
Artificial intelligence	29 → 31
Machine learning	11 ← 13
Deep learning or neural networks	8 → 11
Large language models	7 ← 10
Cybersecurity	25 ← 27
Banking as a service platform	7 → 11
Cloud computing	10 ← 11
Robotic process automation	8 ← 9
Open banking or APIs	4 → 5
Real-time payments	4
Quantum computing	3
Blockchain	2
Voice technologies	1
Virtual or augmented reality	1

Average budget allocation (%): 0, 5, 10, 15, 20, 25, 30

Notes:
1. *N = 379, where N is the number of banks surveyed in Volume 4.*
2. *N = 396, where N is the number of banks surveyed in Volume 3.*
3. *Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.*

AI and cybersecurity represent 54% of overall budget allocation: Banks allocate 29% of their technology budget to AI, and 25% to cybersecurity in Volume 4, a decrease of two percentage points each.

Within AI, LLMs and ML drive the degrowth: Banks have decreased their allocation on large language models (LLMs) and machine learning (ML) by two and three percentage points respectively since Volume 3. However, the budget allocation to deep learning increased by three percentage points in Volume 4.

BaaS finds a spurt in budget distribution: Allocation to banking as a service (BaaS) among banks has jumped 4 percentage points to 11% of technology budgets in Volume 4.

APAC leads on AI budget allocation

Technology budget distribution by region

Technology	Overall	Region				
		APAC	Europe	Latin America	Middle East and Africa	North America
Artificial intelligence	29	31	30	28	28	27
Machine learning	11	12	12	9	9	10
Deep learning or neural networks	11	10	10	13	12	10
Large language models	7	9	8	6	7	7
Cybersecurity	25	24	24	26	25	27
Banking as a service platform	11	11	9	10	12	11
Cloud computing	10	10	10	11	12	11
Robotic process automation	8	9	8	8	7	8
Open banking or APIs	5	4	6	5	5	5
Real-time payments	4	3	5	5	4	4
Quantum computing	3	4	4	3	3	3
Blockchain	2	2	2	2	3	2
Virtual or augmented reality	1	2	2	1	1	1
Voice technologies	1	1	0	2	1	2

Average budget allocation (%)

Notes:
1. Artificial intelligence includes machine learning, deep learning or neural networks and large language models.
2. N = 379, where N is the number of banks surveyed in Volume 4.
3. Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.

APAC and Europe lead growth in AI budgets: Banks in APAC and Europe are ahead of their North American counterparts, allocating 31% and 30% of budgets to AI respectively, while North American banks allocated 27%.

Latin America and Middle East banks lag on machine learning budgets: Our survey found that banks in APAC and Europe allocate the most to machine learning, comprising 12% of budgets.

North American banks allocate the most to cybersecurity: North American banks allocate 27% of budgets to cybersecurity, while APAC and European banks allocate the least at 24%.

Spending on AI is expected to outpace other technologies

Expected technology spending change during July to December 2024
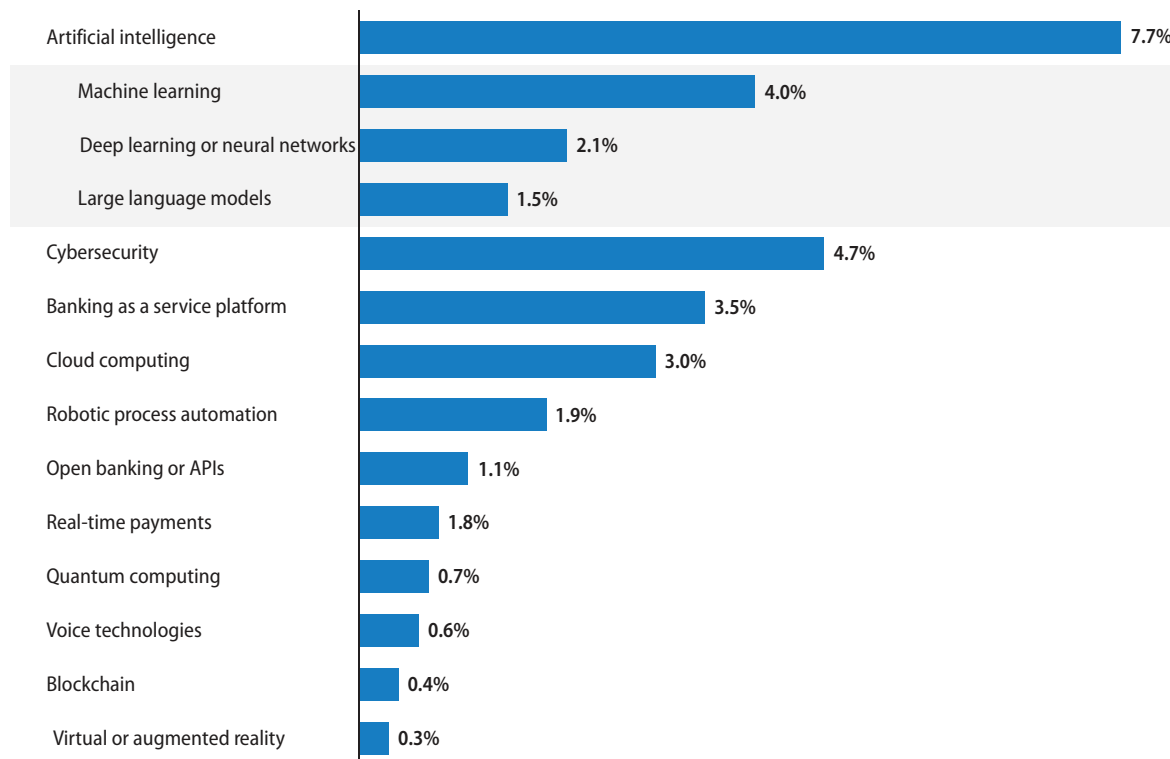
Technology	Growth
Artificial intelligence	7.7%
Machine learning	4.0%
Deep learning or neural networks	2.1%
Large language models	1.5%
Cybersecurity	4.7%
Banking as a service platform	3.5%
Cloud computing	3.0%
Robotic process automation	1.9%
Open banking or APIs	1.1%
Real-time payments	1.8%
Quantum computing	0.7%
Voice technologies	0.6%
Blockchain	0.4%
Virtual or augmented reality	0.3%

Projected spending growth during July to December 2024

AI leads the race on spend growth: Growth in AI spending is expected to increase at 7.7% during July to December 2024. This is nearly 300 basis points higher than the expected growth of cybersecurity budgets and double the expected growth in BaaS budgets. Within AI, the growth in ML spending at 4.0% is expected to drive the growth in AI spending.

Cybersecurity spending regains traction: Growth in cybersecurity spending is expected to increase at 4.7% during July to December 2024, from the 2.6% growth expected during April to September.

Notes:
1. Artificial intelligence includes machine learning, deep learning or neural networks and large language models.
2. N = 379, where N is the number of banks surveyed in Volume 4

Technology talent

AI and cybersecurity, while still the largest share of tech roles, cool off
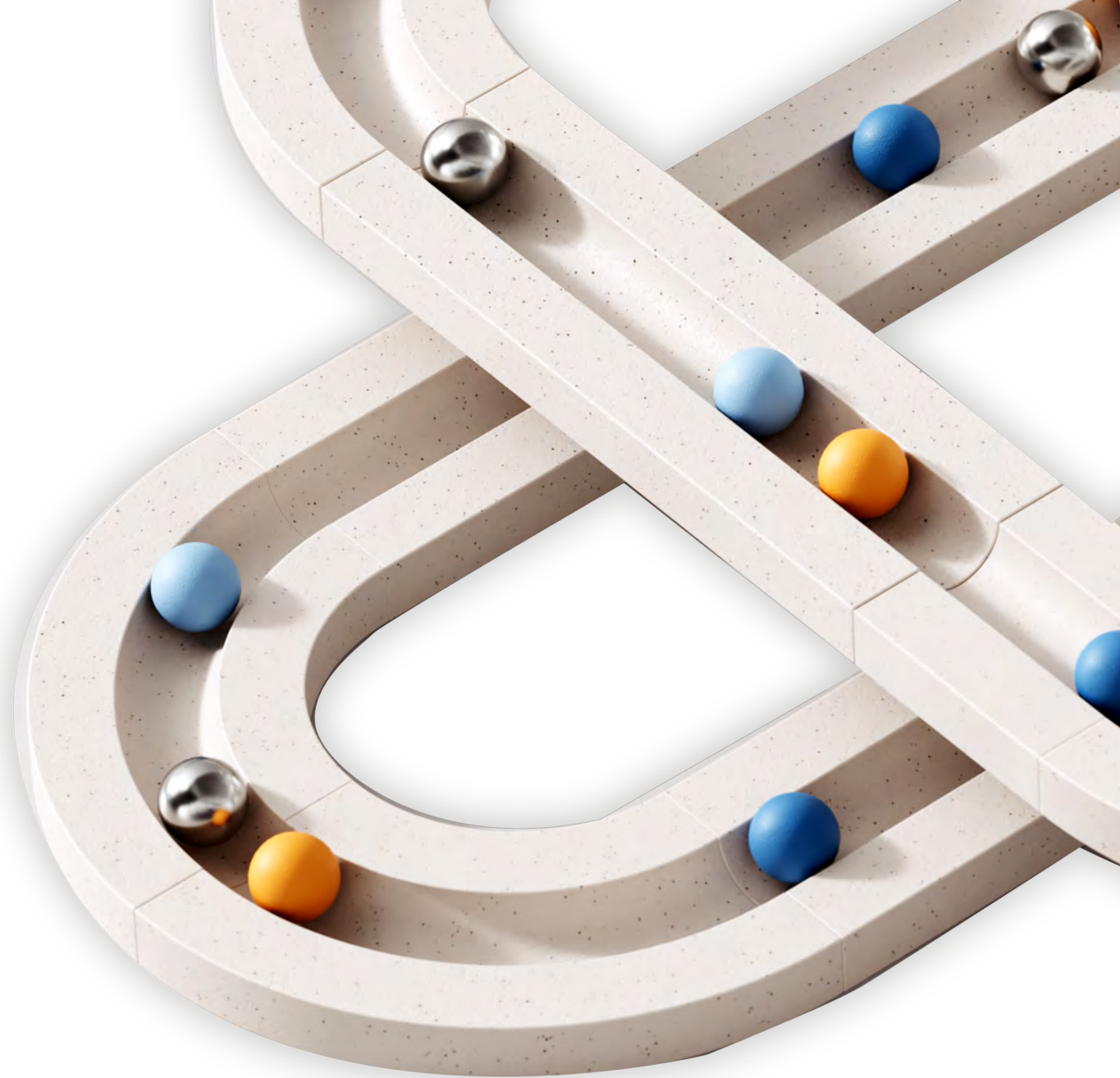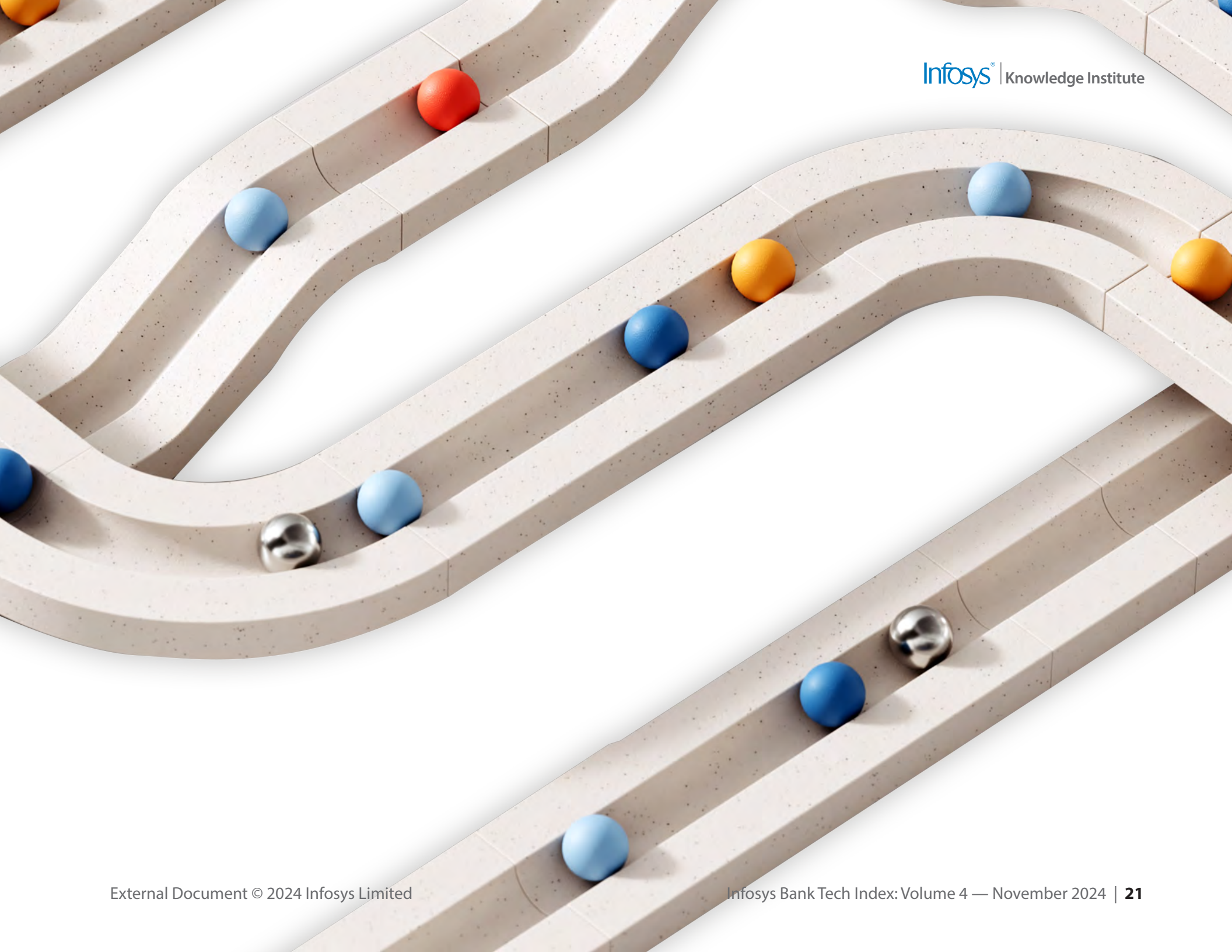
Recruitment continues to cool down, although at a slower pace

Average expected technology recruitment per bank by region
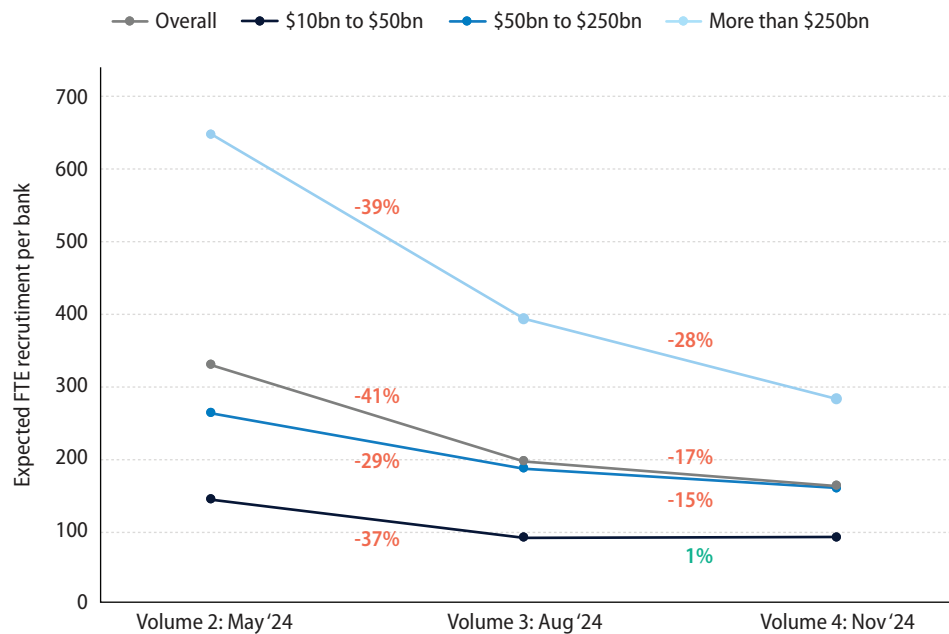
Legend: Overall — $10bn to $50bn — $50bn to $250bn — More than $250bn

Y-axis: Expected FTE recruitment per bank

X-axis: Volume 2: May '24, Volume 3: Aug '24, Volume 4: Nov '24

Data labels: -39%, -28%, -41%, -29%, -17%, -15%, -37%, 1%

Tech recruitment slows most in APAC and North America: Average technology recruitment slows the most in APAC (down 25%), followed by North America (down 15%) between Volume 3 and Volume 4.

Tech recruitment slows least in Middle East and Africa: Down 11%, the Middle East and Africa have the least degrowth in average technology recruitment.

Notes: 1. N = 379, where N is the number of banks surveyed in Volume 4.
2. N = 396, where N is the number of banks surveyed in Volume 3.
3. N = 324, where N is the number of banks surveyed in Volume 2.

Largest banks continue to expect decreased hiring

Average expected technology recruitment per bank by size

Legend: ── Overall ── APAC ── Europe ── Latin America ── Middle East and Africa ── North America

Y-axis: Expected FTE recruitment per bank (0 to 500)

X-axis: Volume 2: May '24, Volume 3: Aug '24, Volume 4: Nov '24

Data labels on chart: -37%, -48%, -41%, -40%, -42%, -21%, -25%, -13%, -17%, -12%, -11%, -14%
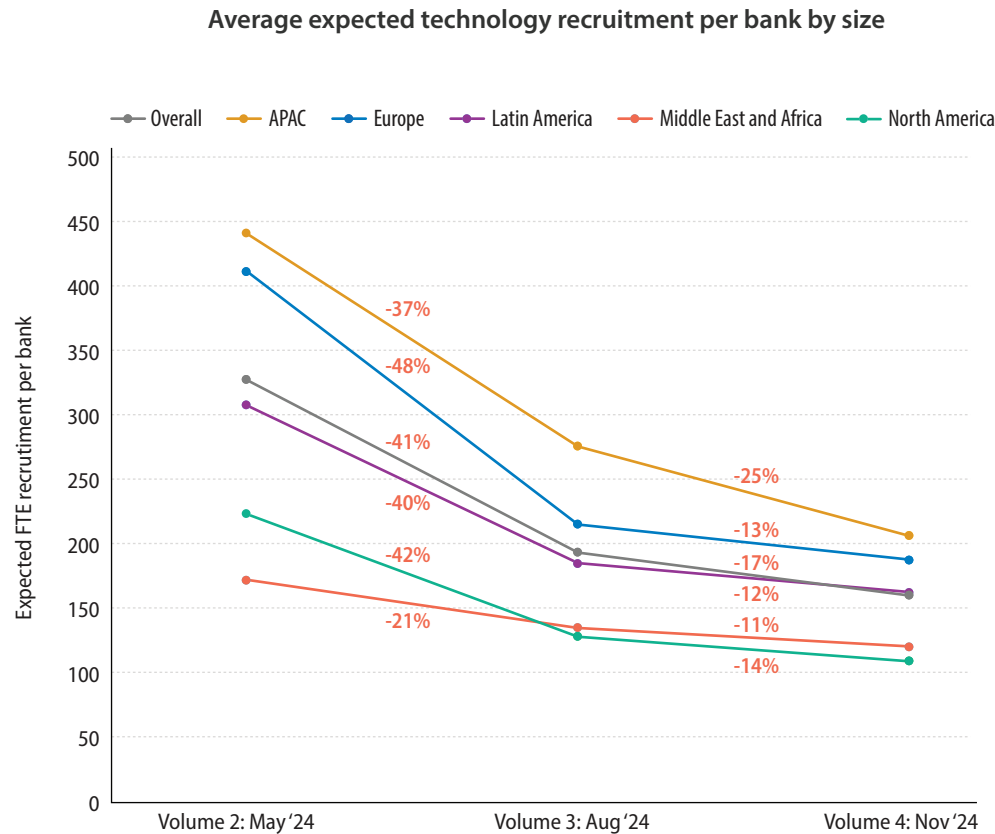
Tech recruitment slows most among largest banks: Average technology recruitment slows the most (down 28%) among banks with assets over $250 billion.

Smaller banks expect a marginal growth in recruitment: Average technology recruitment among banks with assets over between $10 billion to $50 billion to see a slight growth of 1%

Notes: 1.   N = 379, where N is the number of banks surveyed in Volume 4.
2.   N = 396, where N is the number of banks surveyed in Volume 3.
3.   N = 324, where N is the number of banks surveyed in Volume 2.

Recruitment for AI and cybersecurity roles expected to drop

Average expected technology recruitment per bank by technology
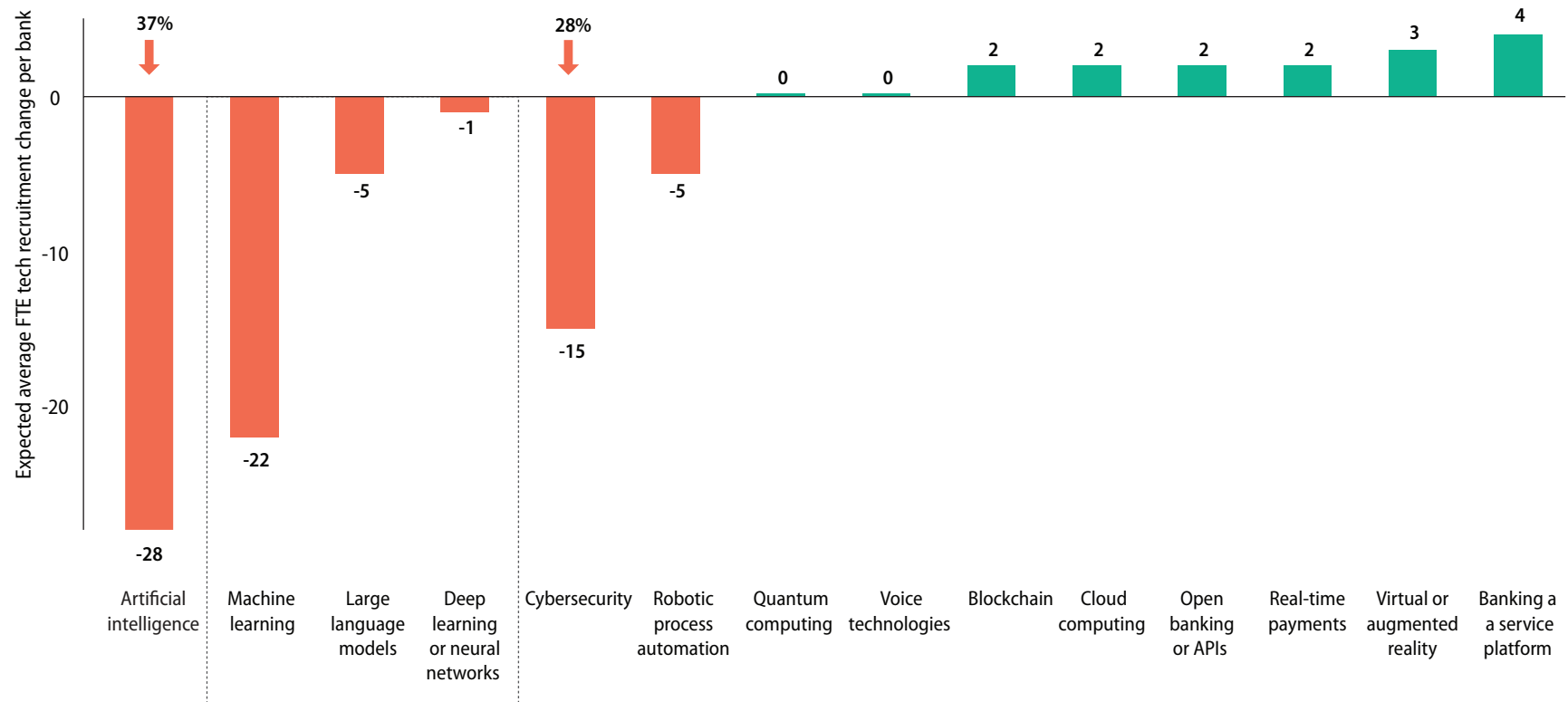
Notes:
1. Artificial intelligence is a combination of the technologies outlined within the box.
2. N = 379, where N is the number of banks surveyed in Volume 4.
3. N = 396, where N is the number of banks surveyed in Volume 3.

Overall full-time equivalents (FTEs) are expected to fall 17%, as AI and cybersecurity recruitment estimated to cool off: Banks are expected to slow down recruitment of AI and cybersecurity by 37% and 28%, respectively. The fall in AI recruitment is expected to be led by a decline primarily in hiring for ML roles.

Recruitment focus shifts to cloud, BaaS, and RTP roles: Banks are likely to increase recruitment for roles in cloud computing, RTP, and BaaS on the back of a focus on new business models, payment initiatives, and regulatory changes.

Cybersecurity and AI set to account the largest share of hiring across bank sizes

Expected technology recruitment allocation by size

Technology	Overall (Expected tech jobs per bank =161)	Total asset category		
		$10 bn to $50 bn (Expected tech jobs per bank = 90)	$50 bn to $250 bn (Expected tech jobs per bank =158)	More than $250 bn (Expected tech jobs per bank = 281)
Cybersecurity	24%	24%	23%	25%
Machine learning	14%	12%	13%	15%
Cloud computing	10%	9%	11%	10%
Banking as a service platform	9%	9%	11%	7%
Robotic process automation	9%	7%	11%	8%
Deep learning or neural networks	8%	11%	7%	7%
Large language models	8%	6%	8%	8%
Real-time payments	6%	6%	6%	7%
Quantum computing	3%	3%	4%	3%
Open banking or APIs	3%	4%	3%	2%
Blockchain	3%	2%	4%	3%
Virtual or augmented reality	2%	2%	2%	3%
Voice technologies	2%	2%	2%	1%

Proportion of expected technology recruitment

Notes: 1.   N = 379, where N is number of banks surveyed in Volume 4.

Banks expect to recruit 161 FTEs on average during July 2024 to December 2024: Banks with assets between $10 billion and $50 billion expect to recruit 90 technology staff; banks with assets between $50 billion and $250 billion expect to recruit 158 technology staff; and banks with assets over $250 billion expect to recruit 281 technology staff on average.

Cybersecurity and AI talent are in demand: Over half of technology positions banks are recruiting relate to cybersecurity or AI. Recruitment for AI technology is expected to account for 30% of tech hiring, followed by cybersecurity with 24%.

Recruitment for BaaS expected to rise more among banks with assets between $50 billion to $250 billion: 11% of recruitment expected to be for BaaS among banks with assets between $50 billion and $250 billion, higher than banks with larger assets.

Recruitment for cloud expected to outpace all technologies except cybersecurity and ML: Recruitment for cloud technology is expected to rise 10%, outpacing BaaS, RPA, deep learning, and LLMs.

Regions vary, but overall trend towards hiring for cybersecurity and AI set to stay

Expected technology recruitment allocation by region

Technology	Overall (Expected tech jobs per bank=161)	Region				
		APAC (Expected tech jobs bank=208)	Europe (Expected tech jobs bank=189)	Latin America (Expected tech jobs bank=164)	Middle East & Africa (Expected tech jobs bank=122)	North America (Expected tech jobs bank=111)
Cybersecurity	24%	24%	27%	23%	20%	24%
Machine learning	14%	12%	18%	10%	15%	14%
Cloud computing	10%	12%	9%	10%	10%	8%
Robotic process automation	9%	8%	9%	8%	11%	9%
Banking as a service platform	9%	8%	6%	11%	10%	10%
Deep learning or neural networks	8%	7%	8%	7%	9%	10%
Large language models	8%	8%	7%	9%	6%	8%
Real-time payments	6%	7%	6%	6%	4%	7%
Quantum computing	3%	3%	3%	4%	3%	3%
Open banking or APIs	3%	3%	2%	5%	3%	3%
Blockchain	3%	4%	2%	4%	3%	1%
Virtual or augmented reality	2%	3%	3%	1%	3%	1%
Voice technologies	2%	2%	1%	0%	2%	2%

Proportion of expected technology recruitment

Notes: 1. N = 379, where N is number of banks surveyed in Volume 4.

Over half of bank tech recruitment to be for AI and cybersecurity talent: During July to December 2024, overall banks are expected to hire a majority of AI (30%) and cybersecurity (24%) roles.

APAC to lead average expected full-time equivalents recruitment per bank during July to December 2024: APAC banks expect to recruit 208 full-time equivalents (FTEs) during July to December 2024, followed by Europe with 189 FTEs. North America is expected to recruit the fewest, at 111 FTEs for its technology staff.

Cybersecurity recruitment to be highest in Europe and lowest in Middle East: Evolving regulation in Europe, such as NIS2 coming into effect, is driving recruitment for cybersecurity roles in European banks (27%) cybersecurity talent. However, Middle East and Africa is expected to recruit the least cybersecurity talent at 20%.

Europe expected to recruit the highest proportion of ML positions: Banks in Europe are expected to recruit a significantly higher proportion (18%) of talent in ML than banks in the rest of the world (14%). Latin America is

expected to recruit the least ML talent at 10%.

APAC banks expect to lead on cloud recruitment: APAC banks (12%) is expected to recruit relatively more in cloud, while North America is expected to hire the least cloud talent (8%).

BaaS talent in demand in North America, Latin America and Middle East: With the exception of Europe (6%), most regions are expected to hire for more BaaS positions.

Banks find it harder to hire for deep learning roles

Tech areas difficult to acquire by quarter on quarter

● Volume 3: Aug '24   ● Volume 4: Nov '24

Tech area difficulty score

Technology	Score
Artificial intelligence	28 ●←● 29
Machine learning	11 ●←● 15
Deep learning or neural networks	6 ●→● 10
Large language models	7 ●←● 8
Cybersecurity	23 ●←● 28
Robotic process automation	11 ●
Cloud computing	8 ●←● 9
Banking as a service platform	7 ●→● 8
Real-time payments	5 ●→● 6
Open banking or APIs	4 ●→● 5
Quantum computing	3 ●→● 5
Blockchain	2 ●→● 4
Virtual or augmented reality	1 ●→● 2
Voice technologies	0 ●→● 1

0   5   10   15   20   25   30

Notes: 1. N = 379, where N is the number of banks surveyed in Volume 4.
       2. N = 396, where N is the number of banks surveyed in Volume 3.

Cybersecurity and AI talent continue to remain the hardest to acquire: Banks report that these technologies continue to be the hardest for them to recruit talent. Positively, the difficulty to hire these skills has reduced.

Difficulty to recruit for deep learning has risen: Within AI, the relative difficulty of recruiting deep learning talent has increased by four points, while for ML, the difficulty has reduced by four points.

Service design, product management, and software engineering skills harder to acquire

Skills difficult to acquire by quarter on quarter

● Volume 3: Aug '24   ● Volume 4: Nov '24

Skills difficult to source (y-axis) / Recruitment difficulty score (x-axis)

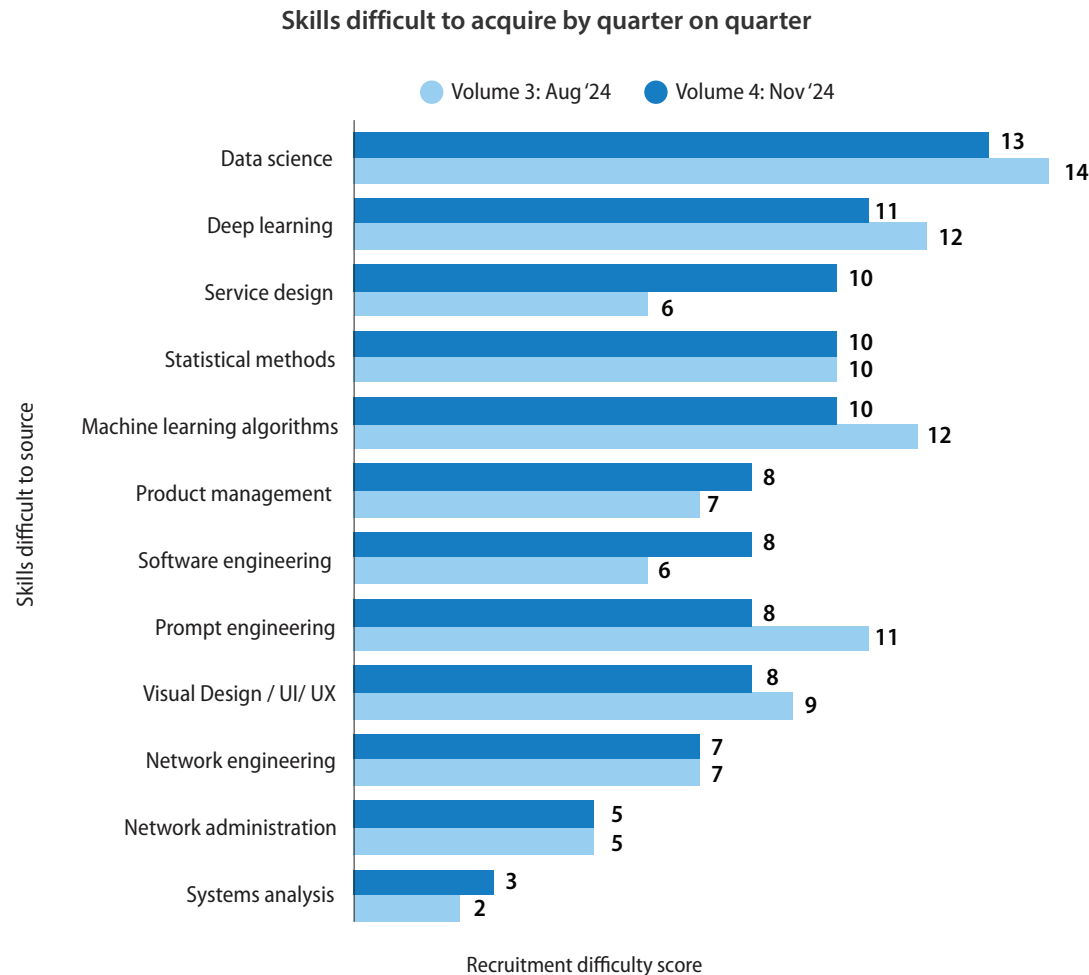| Skill	Volume 4: Nov '24	Volume 3: Aug '24
Data science	13	14
Deep learning	11	12
Service design	10	6
Statistical methods	10	10
Machine learning algorithms	10	12
Product management	8	7
Software engineering	8	6
Prompt engineering	8	11
Visual Design / UI/ UX	8	9
Network engineering	7	7
Network administration	5	5
Systems analysis	3	2

Notes: 1. N = 379, where N is the number of banks surveyed in Volume 4.
2. N = 396, where N is the number of banks surveyed in Volume 3.

We asked respondents about the difficulty they face in acquiring skills. This could reflect the supply of the skills in the market. It could also reflect the changing focus: Either showing the momentum of a shift in focus and that a bank has yet to build momentum in hiring that role, or a reflection of the pressure to hire that banks are under.

We have noticed that AI related skills are easier to hire for. This data combined with the data that shows banks are declining hiring, it likely means that banks are filing AI roles now, i.e. there is less pressure to hire in AI.

Banks find non-AI skills more difficult to hire: Service design, product management, and software engineering are the areas where skills are difficult to hire for

Banks focus on upskilling and retraining to fulfill any skill gap shortage
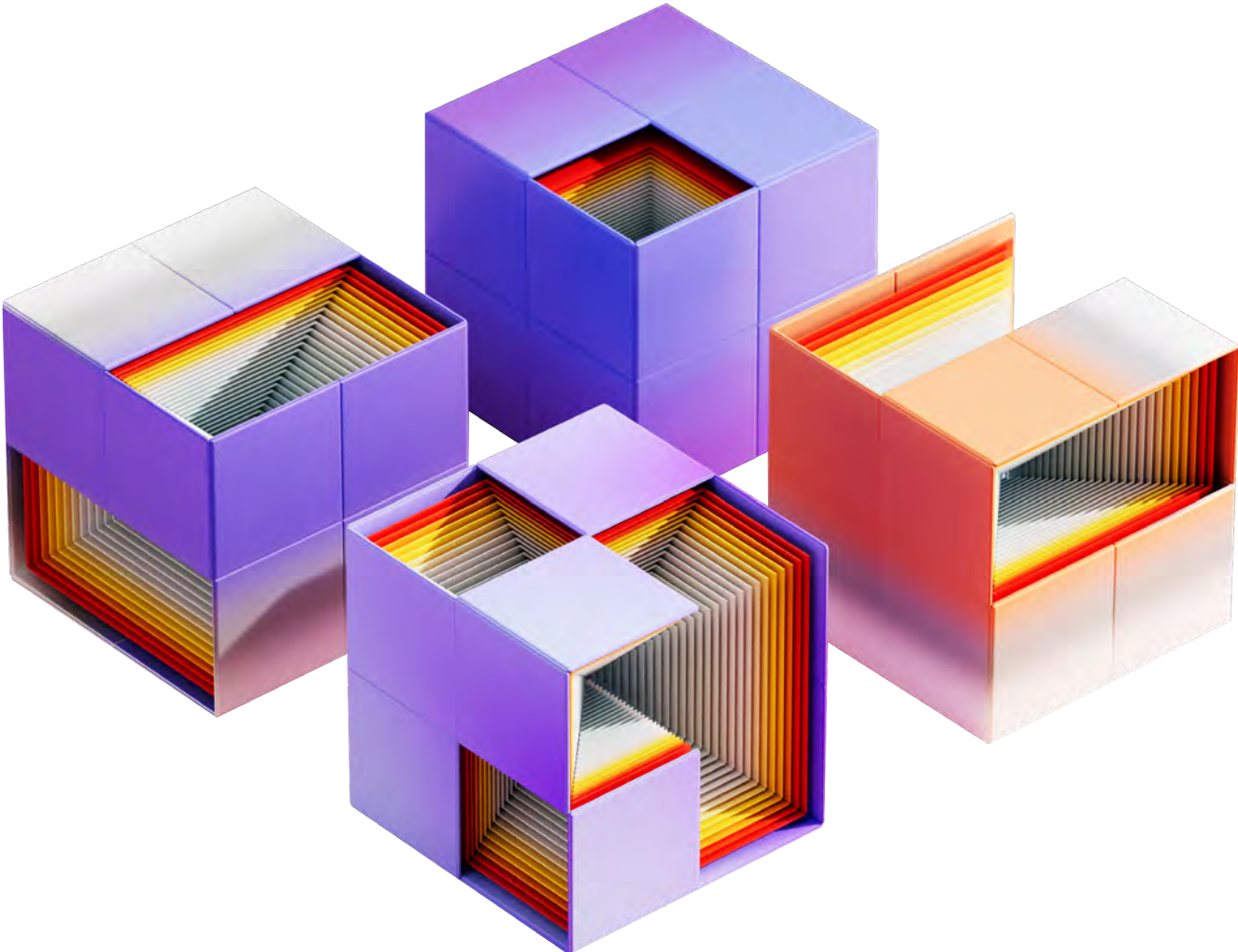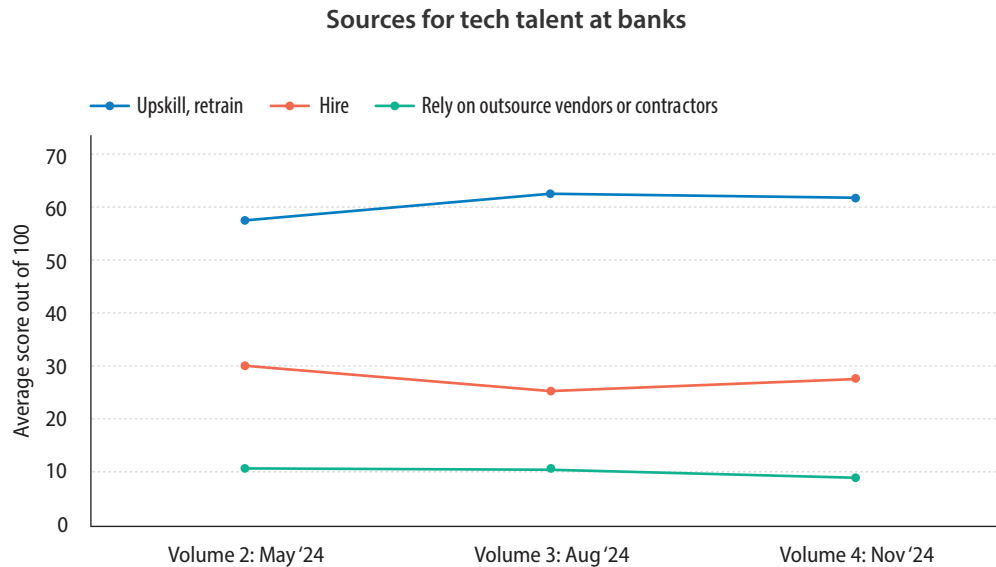
Sources for tech talent at banks

Notes:
1. N = 379, where N is the number of banks surveyed in Volume 4.
2. N = 396, where N is the number of banks surveyed in Volume 3.
3. N = 324, where N is the number of banks surveyed in Volume 2.

The cycle of sourcing talent for new technologies: When a new technology or innovation presents itself, enterprises prefer to pilot and test them in-house to better understand the technology. Once the technology matures, enterprises are more open to outsourcing and relying on vendors. That is the trend we see happening with AI as well.

Banks expect to fill their tech talent gap through upskilling and retraining: Banks have increased their reliance on upskilling and retraining from 58% in Volume 2 to 63% in Volume 4.

TECH HOTSPOTS: OUR BANK TECH INTENSITY BAROMETER

Cybersecurity remains pivotal

BaaS and deep learning see the largest rise in importance

Technology intensity barometer

● Volume 3: Aug '24   ● Volume 4: Nov '24

Technology intensity barometer

Technology		
Cybersecurity	94 ● 95	High
Machine learning	61 ●→ 70	
Deep learning or neural networks	48 ●→ 56	
Banking as a service platform	47 ●→ 56	
Cloud computing	54 ● 55	
Robotic process automation	54 ● 55	
Large language models	49 ●← 54	Medium
Real-time payments	● 42	
Open banking or APIs	● 41	
Quantum computing	● 39	Low
Blockchain	36 ● 37	
Virtual or augmented reality	33 ● 35	
Voice technologies	32 ● 34	

0 20 30 40 50 60 70 80 90 100

BaaS and deep learning move into the high importance category: The importance of BaaS and deep learning has risen by a score of nine and eight respectively. These technologies have now moved into the "high importance" category on the intensity barometer.

Cybersecurity's importance outstrips all other technologies — With a score of 95 out of 100 points, cybersecurity ranks as the most important banking technology, with. ML and cloud next.

Cloud rises while RPA wanes in importance: Cloud moved into the top three technologies for banks, outpacing RPA, which fell marginally in importance.

Notes:
1. The "technology intensity barometer" measures the importance of a technology to banks in our survey. The components of the barometer are (a) tech spending in the last quarter, (b) expected tech spending growth in the current quarter, (c) technology staff expected to be added in the current quarter, and (d) difficulty in acquiring staff for each technology area. The score is on a scale of 0 to 100 with 0 being much less important than everything else, 50 indicating an average (or indistinct) level importance, and 100 being most important.
2. N = 379, where N is the number of banks surveyed in Volume 4.
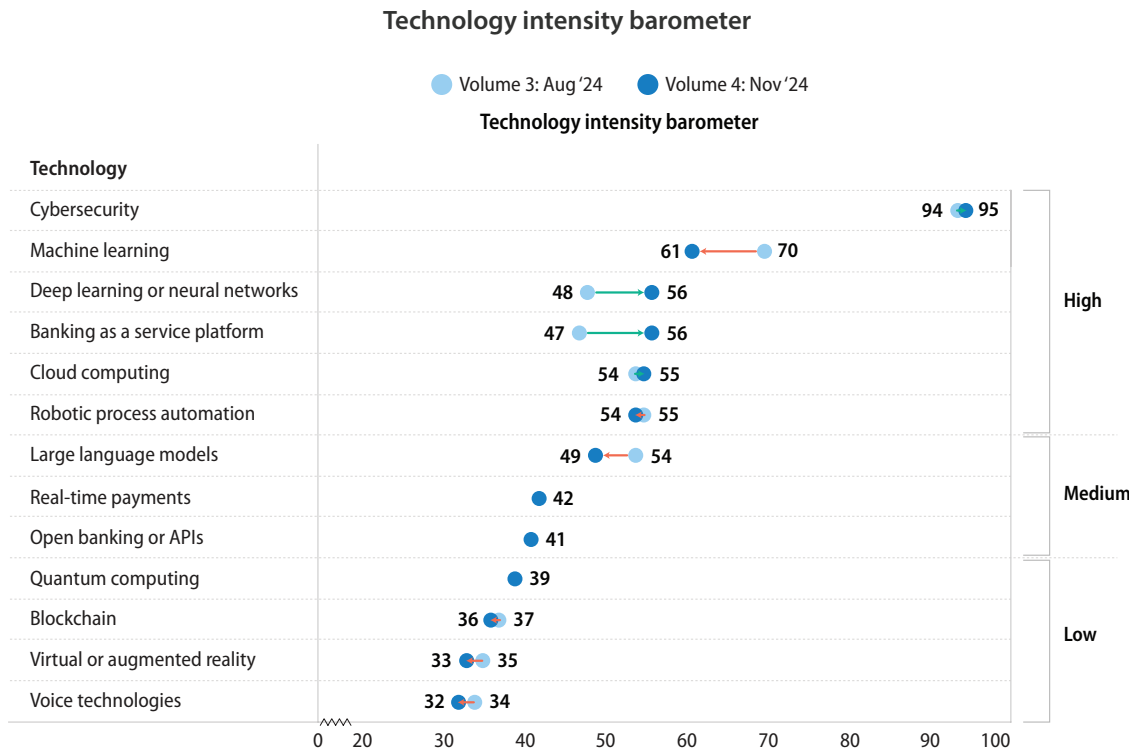3. N = 396, where N is the number of banks surveyed in Volume 3.
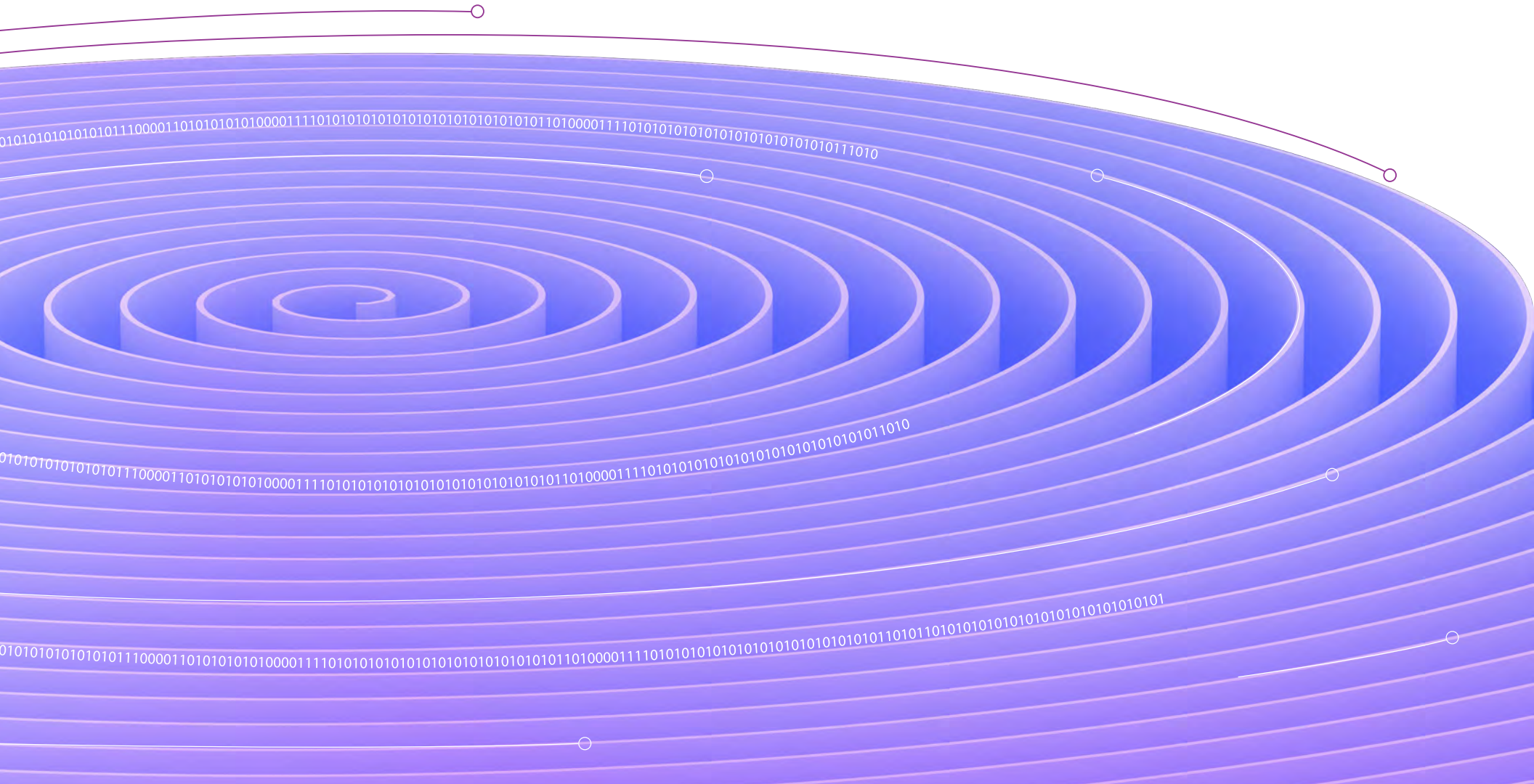
Appendix

Appendix A: Methodology

The Infosys Bank Tech Index is a quarterly, survey-based research report that indexes technology investment and talent trends across the banking industry.

This fourth edition gathers quantitative data from 379 of the largest banks by total assets in Asia Pacific, Europe, Latin America, Middle East and Africa, and North America. Our survey, exclusive to banks with assets surpassing $10 billion, represents 94% of this asset pool. This quarterly research gathers insights on technology spending, staffing, and performance from a panel of leading banks.

Our executive panelists are key decision makers for their respective banks' technology investments and talent strategies. Panel respondents will remain confidential to maintain data privacy and ethical considerations.

The research delves into the following areas:

1. **Technology strategic priorities:** Current priorities of banks related to growth, operational efficiency and transformation.

2. **Technology spending report:** Investment levels across CapEx and OpEx, IT operations, New Projects and Regulatory.

3. **Technology budget forecast:** Current technology budget distribution and Expected technology budget distribution

4. **Tech hotspots — our bank tech intensity barometer:** A measure of intensity to identify where technology investment and hiring is pressuring the supply of talent.

5. **Technology talent:** The distribution of technology vacancies for which banks are looking to acquire human resources.

6. **Technology project success:** The proportion of technology projects that are on track.

As data is gathered in subsequent quarters, this research will provide a dynamic view of the trends, track evolving patterns, and help decision-makers at banks make informed choices about technology and talent.

In Volume 4, we asked our panel to provide the spending estimates for their current quarter. Depending on the bank's budget cycle, this could be any three month period between April 2024 and September 2024. For simplicity, we consider Volume 4 to cover the period July to September 2024. Forecasts for spending cover the period of July to December 2024.

In this report we refer to banks' "performance," calculated through the asset turnover ratio (revenue divided by net total assets) to provide a consistent measure of operational performance across the sample.

Appendix B: Panel distribution

Banks by region

- 110 banks, 29% — APAC
- 67 banks, 17% — Europe
- 50 banks, 12% — Latin America
- 52 banks, 14% — Middle East and Africa
- 100 banks, 28% — North America

Legend:
- APAC
- Europe
- Latin America
- Middle East and Africa
- North America

Banks by total assets

- 146 banks, 40% — $10 bn to $50 bn
- 142 banks, 36% — $50 bn to $250 bn
- 91 banks, 23% — More than $250 bn

Legend:
- $10 bn to $50 bn
- $50 bn to $250 bn
- More than $250 bn
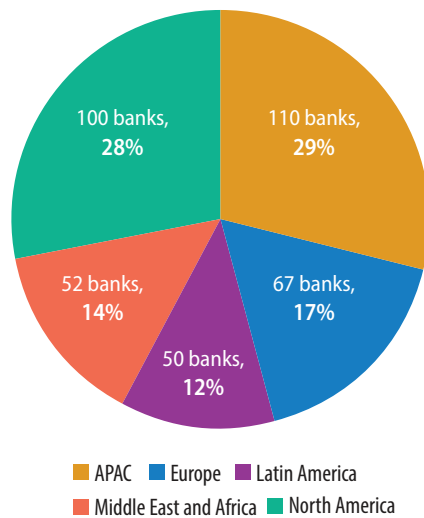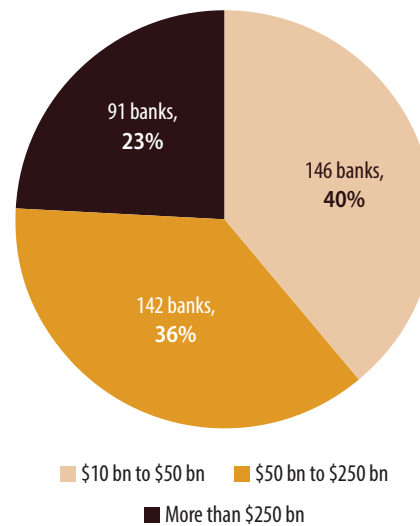
Our sample represents 94% of banking assets for banks with over $10 billion in assets

- Number of banks with more than $10 billion in assets: 379 (In survey)
- Total assets (in trillions US$): $121 (In survey)
- 94% Total banking assets

Legend:
- In survey
- Not in survey

Appendix C: Technology budget distribution and growth for APAC

● Volume 3: Aug '24   ● Volume 4: Nov '24

APAC

Technology	Average budget allocation (%)	Percentage point change
Artificial intelligence	31 ●–● 32	-1
Machine learning	12 ●←● 15	-3
Large language models	9 ●←● 10	-1
Deep learning or neural networks	8 ●→● 10	2
Cybersecurity	24 ●–● 25	-1
Cloud computing	10 ●←● 11	-1
Robotic process automation	● 9	0
Banking as a service platform	7 ●→● 11	4
Open banking or APIs	4 ●–● 5	-1
Real-time payments	3 ●–● 4	-1
Quantum computing	3 ●–● 4	1
Blockchain	● 2	0
Virtual or augmented reality	1 ●–● 2	1
Voice technologies	● 1	0

Average budget allocation (%)
0   10   20   30   40

Notes:
1. N = 110, where N is the number of APAC banks surveyed in Volume 4.
2. N = 114, where N is the number of APAC banks surveyed in Volume 3.
3. Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.

APAC banks focused on AI and cybersecurity: Banks allocated 31% of budgets to AI, followed by cybersecurity with 24% in their most recent reported quarter.

Increasing focus on banking as a service: APAC banks have increased budget allocation to banking as a service.

Real-time payments and open banking saw a dip in allocation: APAC banks allocation to real-time payments and open banking reduced by one percentage point each.

Technology budget distribution and growth for APAC

APAC

Technology	Growth
Artificial intelligence	8.1%
Machine learning	4.2%
Deep learning or neural networks	2.0%
Large language models	2.0%
Robotic process automation	1.7%
Cloud computing	2.7%
Cybersecurity	4.6%
Open banking or APIs	1.0%
Banking as a service platform	3.5%
Real-time payments	0.5%
Quantum computing	0.7%
Blockchain	0.3%
Virtual or augmented reality	0.3%
Voice technologies	0.3%

Projected spending growth during July to December 2024
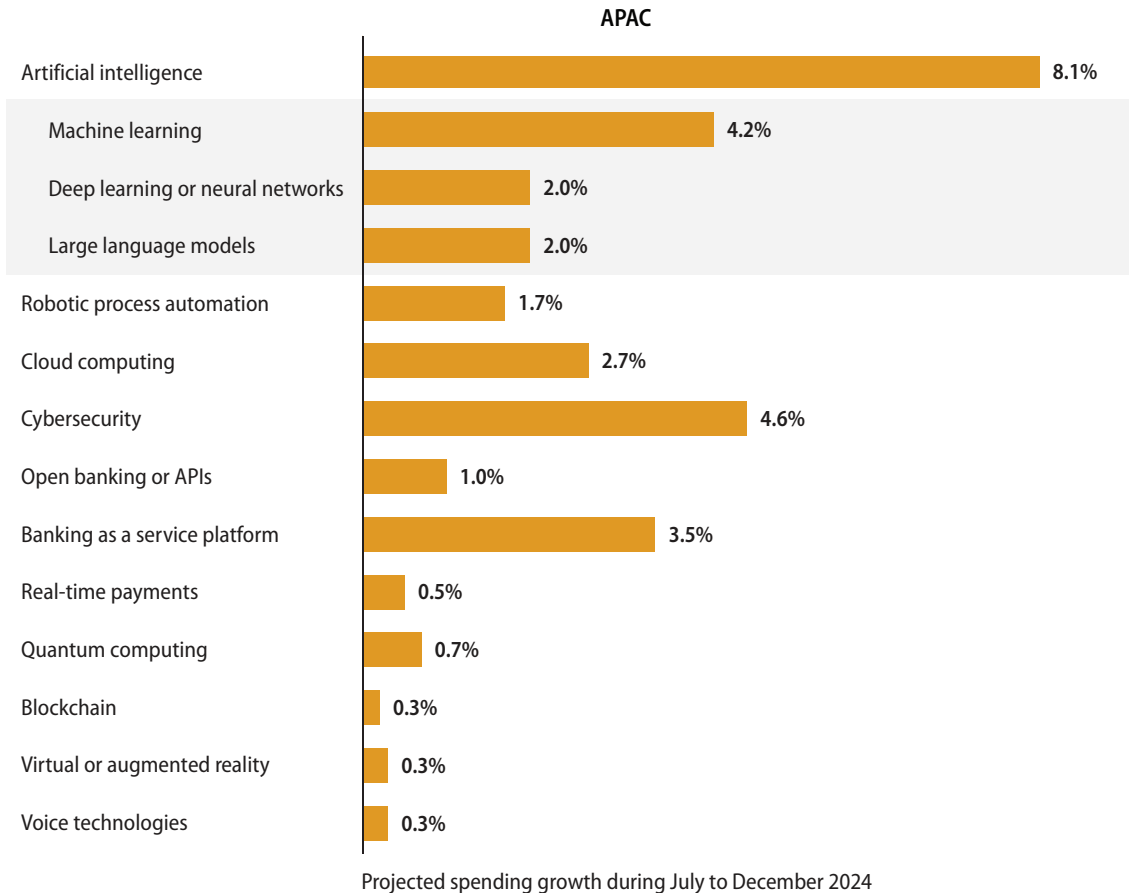
Notes: 1.   N = 110, where N is the number of APAC banks surveyed in Volume 4.
         2.   N = 114, where N is the number of APAC banks surveyed in Volume 3.

Banks set to boost spending on AI: The spending on AI by APAC banks is likely to increase to 8.1% during July to December 2024, which is higher than the overall average of 7.7%. This growth will be led by a 4.2% growth in ML spending.

Cybersecurity spending growth marginally lower than peers: APAC banks spending on cybersecurity at 4.6% is expected to lag the 4.7% spending by peers on the technology.

Appendix C: Technology budget distribution and growth for Europe

● Volume 3: Aug '24 ● Volume 4: Nov '24

Europe

Technology	Average budget allocation (%)	Percentage point change
Artificial intelligence	29 ●–● 30	1
Machine learning	12 ●–● 13	-1
Large language models	8 ●–● 9	-1
Deep learning or neural networks	7 ●——● 10	3
Cybersecurity	24 ●←● 26	-2
Cloud computing	9 ●–● 10	1
Robotic process automation	8 ●–● 9	-1
Banking as a service platform	● 9	0
Open banking or APIs	● 6	0
Real-time payments	4 ●–● 5	1
Quantum computing	3 ●–● 4	1
Blockchain	● 2	0
Virtual or augmented reality	● 2	0
Voice technologies	●–● 1	-1

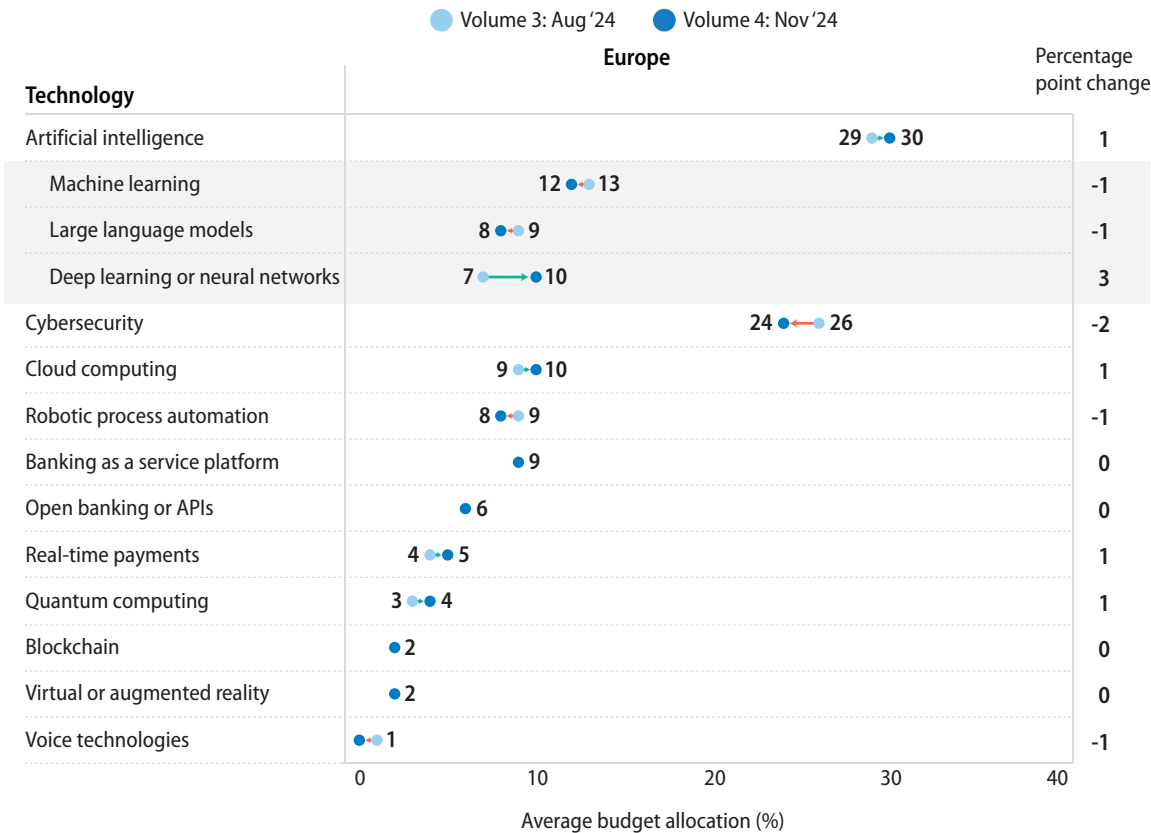Average budget allocation (%) — axis: 0, 10, 20, 30, 40

Notes: 1. *N = 67, where N is the number of European banks surveyed in Volume 4.*
2. *N = 69, where N is the number of European banks surveyed in Volume 3.*
3. *Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.*

European banks are the exception in AI budget allocation: Only European banks see an increase in AI budget allocation at 30%, rising marginally by one percentage point from Volume 3. This rise was led by an increased allocation to deep learning, partially offset by a fall in ML and LLM allocations. Cybersecurity followed AI with a share of 24% of technology budget allocation.
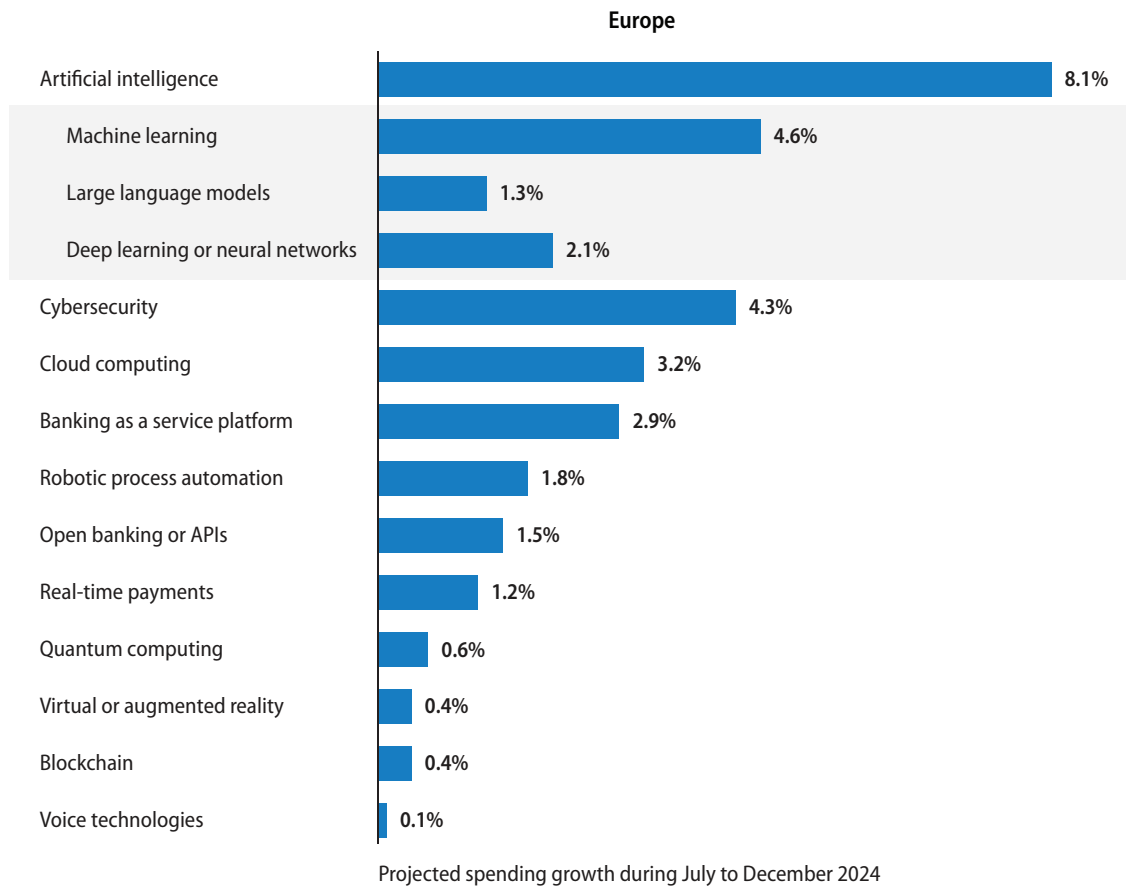
RPA gathers momentum: Banks in Europe indicated an increase in allocation to RPA at 9%, in line with the average bank in our survey.

Cloud, real-time payments and quantum computing see a marginal rise in allocation: European banks allocation to cloud, real-time payments, and quantum computing marginally increased from Volume 3.

Technology budget distribution and growth for Europe

Europe

Technology	Projected spending growth
Artificial intelligence	8.1%
Machine learning	4.6%
Large language models	1.3%
Deep learning or neural networks	2.1%
Cybersecurity	4.3%
Cloud computing	3.2%
Banking as a service platform	2.9%
Robotic process automation	1.8%
Open banking or APIs	1.5%
Real-time payments	1.2%
Quantum computing	0.6%
Virtual or augmented reality	0.4%
Blockchain	0.4%
Voice technologies	0.1%

Projected spending growth during July to December 2024

Notes: 1. N = 67, where N is the number of European banks surveyed in Volume 4.
2. N = 69, where N is the number of European banks surveyed in Volume 3.

AI spending growth ahead of peers: The spending on AI by European banks is likely to increase by 8.1%, during July to December 2024, led by a rise in ML. This growth is higher than the global average of 7.7%.

Cybersecurity and banking as a service marginally lags global average: European banks expected spending on cybersecurity at 4.3% is slightly lower than the spending by peers at 4.7% on the technology. The spend on banking as a service at 2.9% is also expected to lag peer spending of 3.5%

Cloud spend growth higher than peer group: Banks spending on cloud at 3.2% is higher than the 3% likely growth in spending on the technology by peers.

Appendix C: Technology budget distribution and growth for Latin America
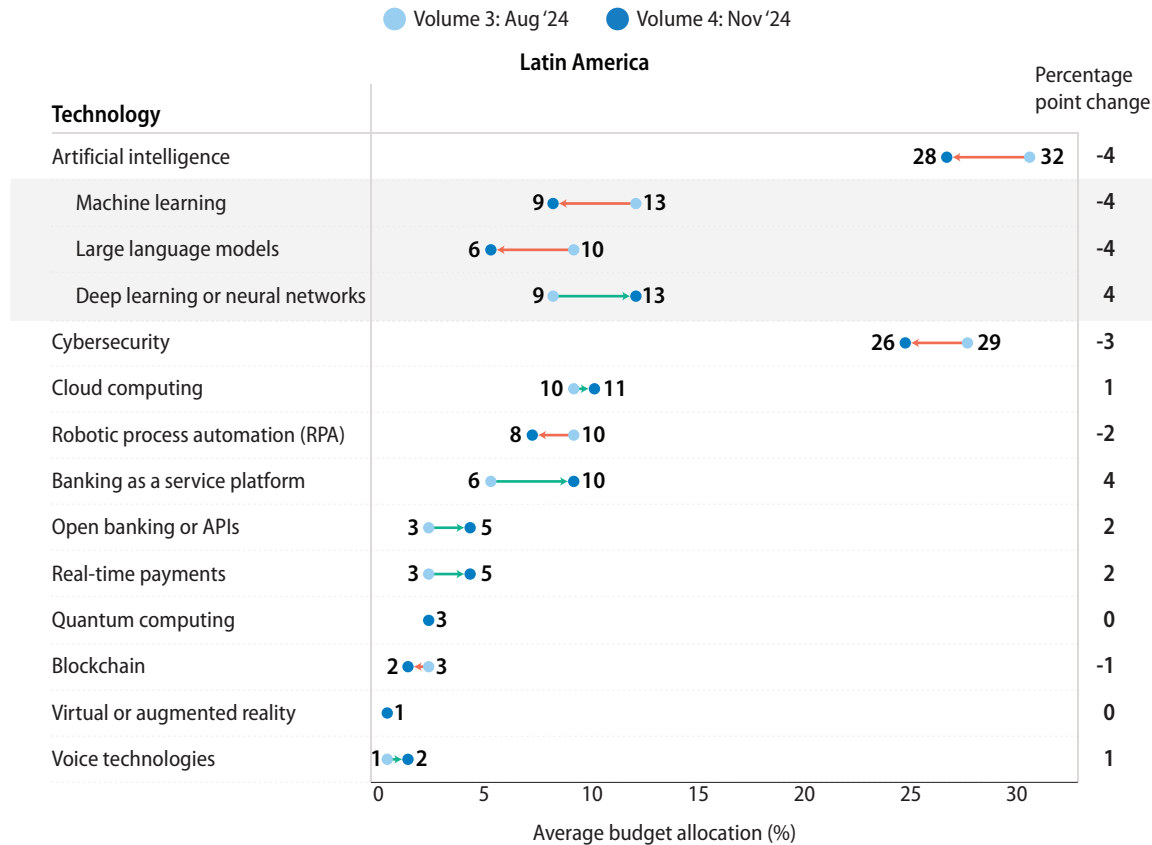
Volume 3: Aug '24 **Volume 4: Nov '24**

Latin America

Technology	Average budget allocation (%)	Percentage point change
Artificial intelligence	28 ← 32	-4
Machine learning	9 ← 13	-4
Large language models	6 ← 10	-4
Deep learning or neural networks	9 → 13	4
Cybersecurity	26 ← 29	-3
Cloud computing	10 → 11	1
Robotic process automation (RPA)	8 ← 10	-2
Banking as a service platform	6 → 10	4
Open banking or APIs	3 → 5	2
Real-time payments	3 → 5	2
Quantum computing	3	0
Blockchain	2 ← 3	-1
Virtual or augmented reality	1	0
Voice technologies	1 → 2	1

Average budget allocation (%): 0 5 10 15 20 25 30

Notes: 1. *N = 50, where N is the number of Latin American banks surveyed in Volume 4.*
   2. *N = 49, where N is the number of Latin American banks surveyed in Volume 3.*
   3. *Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.*

Latin American banks continue to put money into AI and cybersecurity: Banks allocated 28% of budgets to AI, followed by cybersecurity with 26% in their most recent reported quarter. However, their allocation has decreased since Volume 3. Within AI, ML and LLMs led the decline.

Increasing focus on banking as a service, open banking, and real-time payments: Latin American banks increased allocation to banking as a service, open banking, and real-time payments.

RPA saw a dip in allocation: Allocation to RPA reduced by two percentage points among Latin American banks.

Technology budget distribution and growth for Latin America

Latin America

Technology	Growth
Artificial intelligence	6.6%
Machine learning	3.3%
Large language models	0.8%
Deep learning or neural networks	2.4%
Cybersecurity	4.3%
Cloud computing	3.4%
Banking as a service platform	2.6%
Robotic process automation	1.9%
Open banking or APIs	1.2%
Real-time payments	0.6%
Voice technologies	0.4%
Quantum computing	0.4%
Virtual or augmented reality	0.3%
Blockchain	0.2%

Projected spending growth during July to December 2024

Latin American banks set to lag peers in AI spending: AI spending by Latin American banks is likely to increase by 6.6%, much lower than the overall average of 7.7%. This lag is due to slower growth in LLMs and ML spending. But the region's banks are likely to spend higher on deep learning.

Banking as a service and cloud spending growth lags peers: Latin American banks' spending on banking as a service (2.6%) and cybersecurity (4.3%) is lower than the 3.5% and 4.7% spending by peers on these technologies.

Notes: 1.   N = 50, where N is the number of Latin American banks surveyed in Volume 4.
2.   N = 49, where N is the number of Latin American banks surveyed in Volume 3.

Appendix C: Technology budget distribution and growth for Middle East and Africa

● Volume 3: Aug '24   ● Volume 4: Nov '24

Middle East and Africa

Technology	Average budget allocation (%)	Percentage point change
Artificial intelligence	28 → 29	-1
Machine learning	9 ← 13	-4
Large language models	7 ← 10	-3
Deep learning or neural networks	6 → 12	6
Cybersecurity	25	0
Cloud computing	11 → 12	1
Robotic process automation	7 ← 11	-4
Banking as a service platform	6 → 12	6
Open banking or APIs	5	0
Real-time payments	3 → 4	1
Quantum computing	3 ← 4	-1
Blockchain	2 → 3	1
Virtual or augmented reality	1 ← 2	-1
Voice technologies	1 ← 2	-1

Average budget allocation (%)
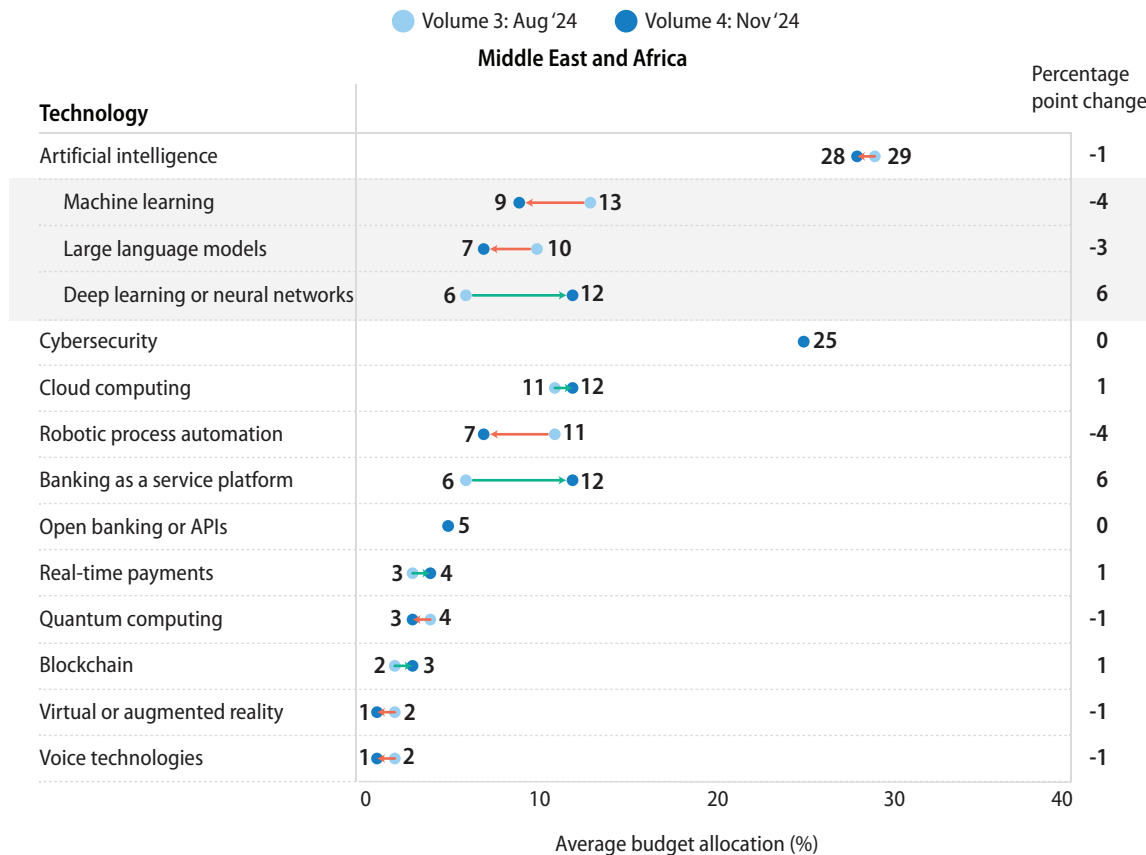
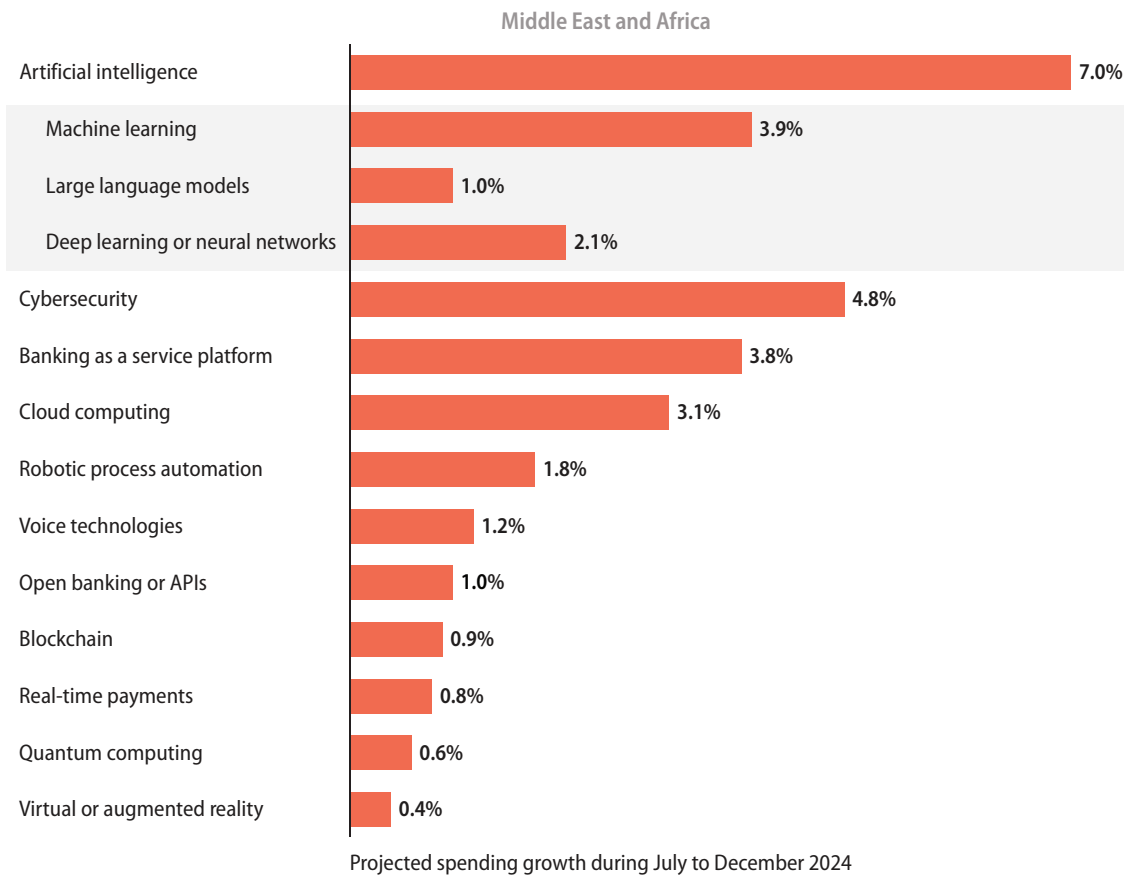**Middle East and African banks focused on AI and cybersecurity:** Banks allocated 28% of budgets to AI, followed by cybersecurity with 25% in their most recent reported quarter. Within AI, budget allocation to deep learning surged, while allocation to ML and LLMs dropped

Significant boost to banking as a service: Middle East and African banks saw a surge in allocation to banking as a service.

Notes: 1.   N = 52, where N is the number of Middle East and African banks surveyed in Volume 4.

2.   N = 55, where N is the number of Middle East and African banks surveyed in Volume 3.

3.   Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.
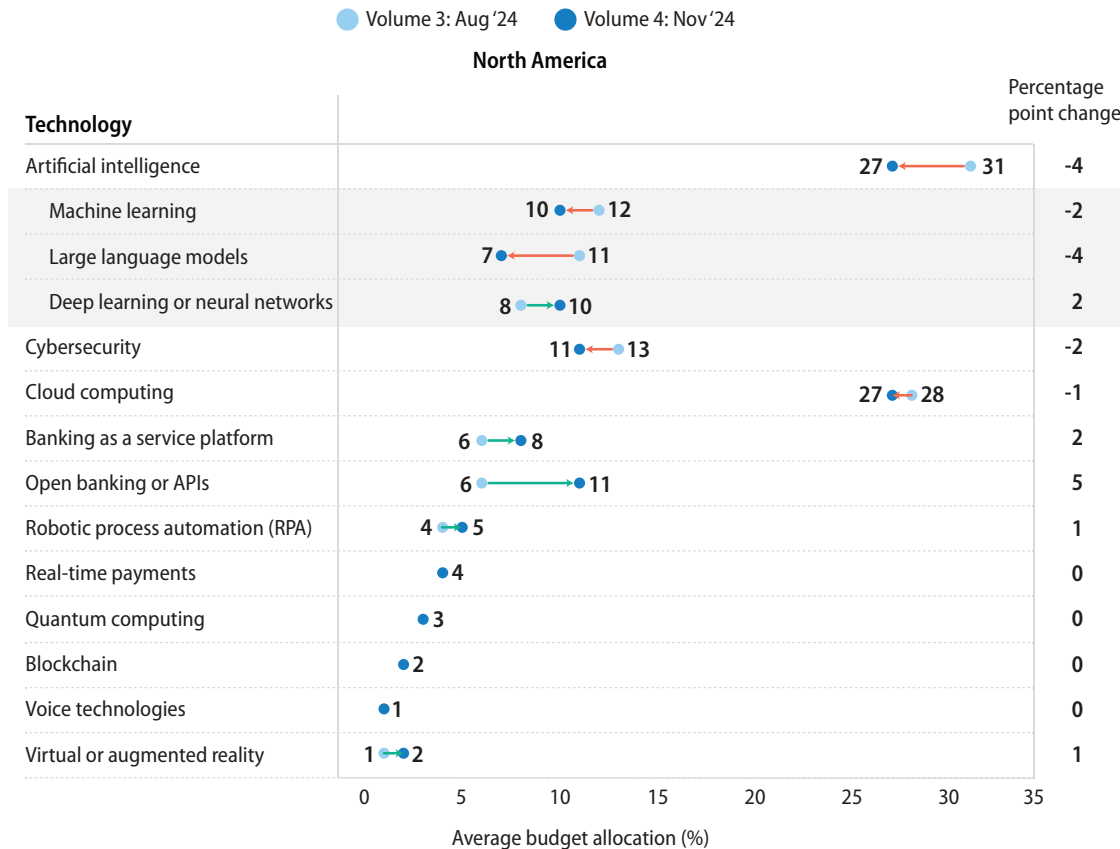
Technology budget distribution and growth for Middle East and Africa

Middle East and Africa

Technology	Growth
Artificial intelligence	7.0%
Machine learning	3.9%
Large language models	1.0%
Deep learning or neural networks	2.1%
Cybersecurity	4.8%
Banking as a service platform	3.8%
Cloud computing	3.1%
Robotic process automation	1.8%
Voice technologies	1.2%
Open banking or APIs	1.0%
Blockchain	0.9%
Real-time payments	0.8%
Quantum computing	0.6%
Virtual or augmented reality	0.4%

Projected spending growth during July to December 2024

Spending on AI likely to increase, although lags peers: The spending on AI by Middle East and African banks is likely to increase by 7%, which is slower than the overall average of 7.7%. ML and LLM spend is likely to lag peers.

Notes:
1. N = 52, where N is the number of Middle East and African banks surveyed in Volume 4.
2. N = 55, where N is the number of Middle East and African banks surveyed in Volume 3.

# Appendix C: Technology budget distribution and growth for North America

North America

● Volume 3: Aug '24   ● Volume 4: Nov '24

Technology	Average budget allocation (%)	Percentage point change
Artificial intelligence	27 ← 31	-4
Machine learning	10 ← 12	-2
Large language models	7 ← 11	-4
Deep learning or neural networks	8 → 10	2
Cybersecurity	11 ← 13	-2
Cloud computing	27 ← 28	-1
Banking as a service platform	6 → 8	2
Open banking or APIs	6 → 11	5
Robotic process automation (RPA)	4 ← 5	1
Real-time payments	4	0
Quantum computing	3	0
Blockchain	2	0
Voice technologies	1	0
Virtual or augmented reality	1 → 2	1

Average budget allocation (%): 0 5 10 15 20 25 30 35

AI and cybersecurity continue to lead North American banks budget allocation: Banks allocated 27% of budgets to AI and cybersecurity each. Allocation to AI dropped since our previous edition due to a fall in allocation to LLMs and ML.

Significant boost to open banking and APIs: North American banks saw a surge in allocation to open banking and APIs. The region's banks also increased allocation to banking as a service.

Notes:
1. N = 100, where N is the number of North American banks surveyed in Volume 4.
2. N = 109, where N is the number of North American banks surveyed in Volume 3.
3. Budget allocation is based on the 13 technologies we surveyed and not total technology budgets.

Technology budget distribution and growth for North America

North America

Technology	Projected spending growth
Artificial intelligence	7.8%
Machine learning	3.8%
Large language models	1.9%
Deep learning or neural networks	2.1%
Cybersecurity	5.1%
Banking as a service platform	4.3%
Cloud computing	2.9%
Robotic process automation	2.4%
Voice technologies	1.2%
Real-time payments	1.0%
Quantum computing	0.9%
Open banking or APIs	0.9%
Blockchain	0.4%
Virtual or augmented reality	0.3%

Projected spending growth during July to December 2024

Notes: 1. N = 100, where N is the number of North American banks surveyed in Volume 4.
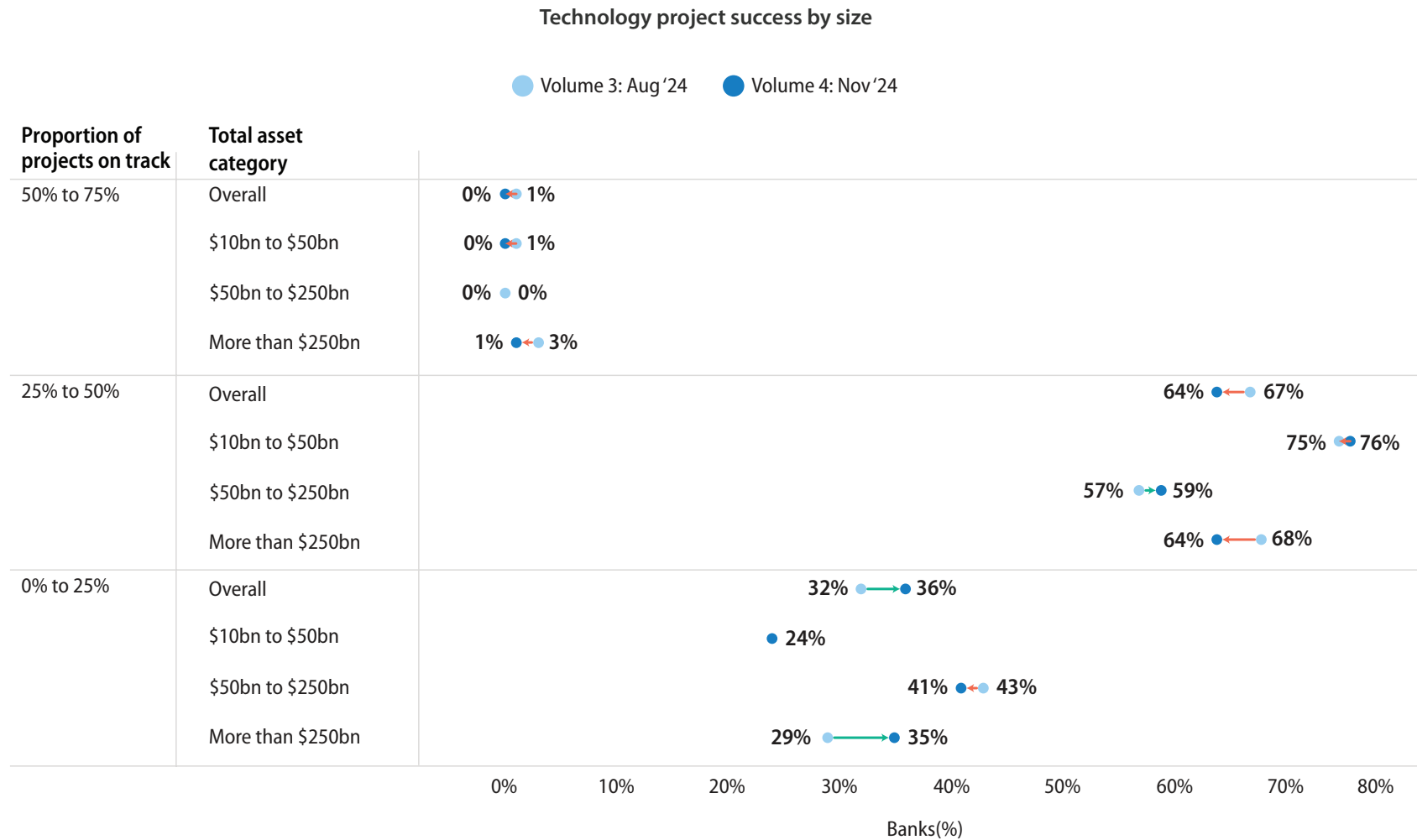2. N = 109, where N is the number of North American banks surveyed in Volume 3.
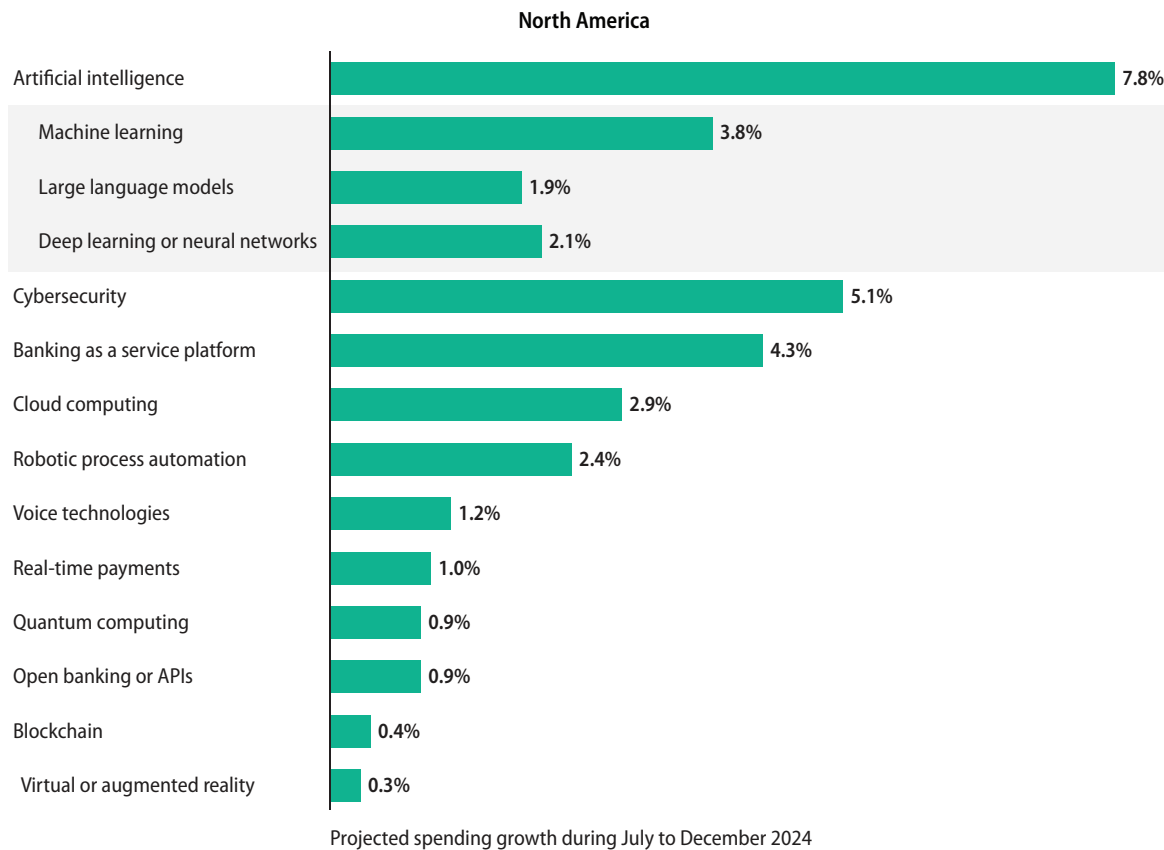
AI spending likely to grow in line with global peers: The spending on AI by North American banks is likely to increase by 7.8% during July 2024 and December 2024, in line with the overall average of 7.7%.
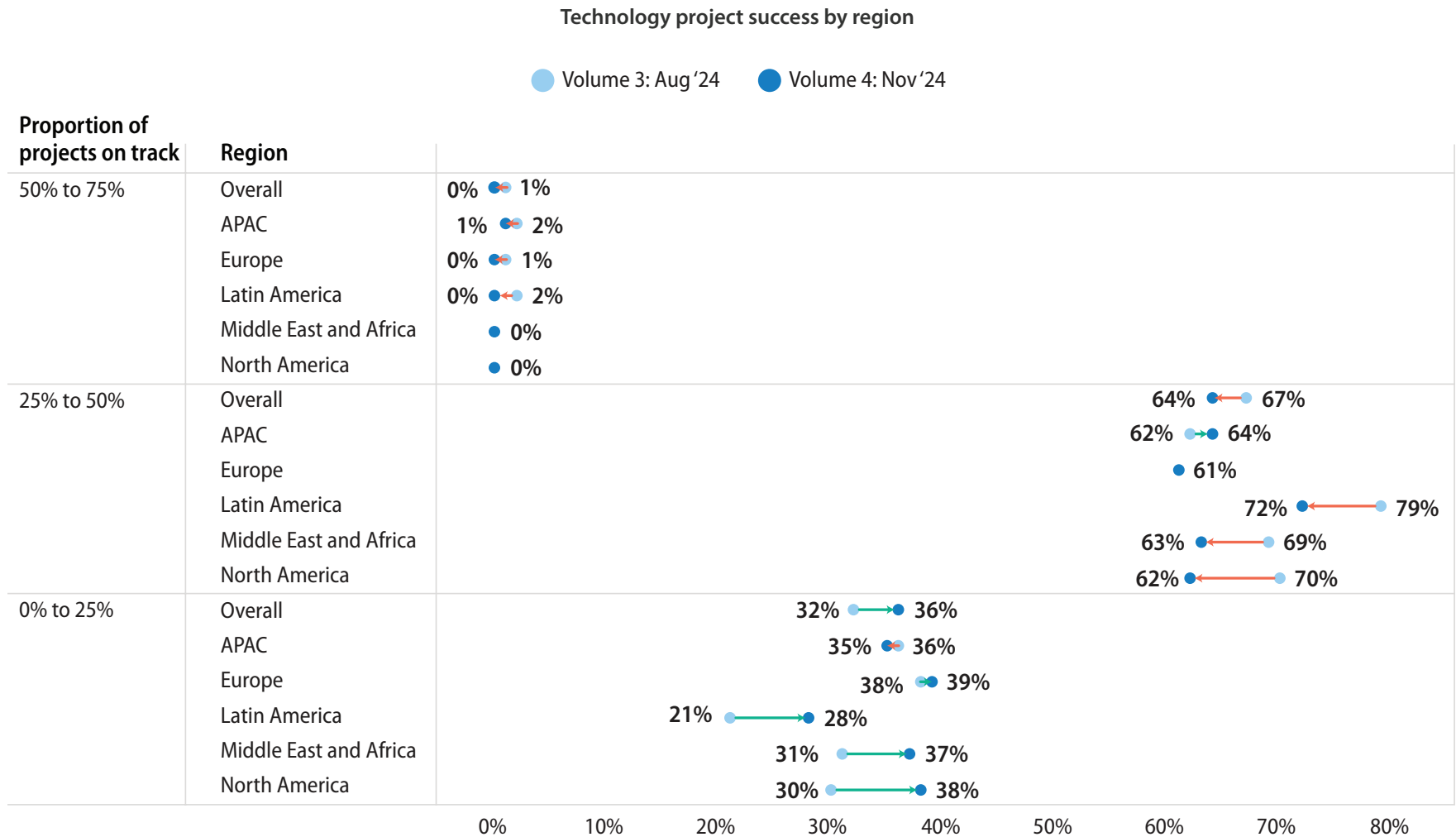
Cybersecurity and banking as a service spending growth higher than peer average: North American banks projected spending growth on cybersecurity at 5.1% and banking as a service at 4.3% is higher than the 4.7% and 3.5% spending by peers, respectively.

Appendix E: Most banks have fewer than 50% of their technology projects on track

Technology project success by size

● Volume 3: Aug '24   ● Volume 4: Nov '24

Proportion of projects on track	Total asset category	Banks (%)
50% to 75%	Overall	0% ← 1%
	$10bn to $50bn	0% ← 1%
	$50bn to $250bn	0% 0%
	More than $250bn	1% ← 3%
25% to 50%	Overall	64% ← 67%
	$10bn to $50bn	75% ← 76%
	$50bn to $250bn	57% → 59%
	More than $250bn	64% ← 68%
0% to 25%	Overall	32% → 36%
	$10bn to $50bn	24%
	$50bn to $250bn	41% ← 43%
	More than $250bn	29% → 35%

0%   10%   20%   30%   40%   50%   60%   70%   80%

Banks(%)

Most banks have fewer than 50% of their technology projects on track

Technology project success by region

● Volume 3: Aug '24   ● Volume 4: Nov '24

Proportion of projects on track	Region	
50% to 75%	Overall	0% ● 1%
	APAC	1% ● 2%
	Europe	0% ● 1%
	Latin America	0% ● 2%
	Middle East and Africa	● 0%
	North America	● 0%
25% to 50%	Overall	64% ← 67%
	APAC	62% → 64%
	Europe	● 61%
	Latin America	72% ← 79%
	Middle East and Africa	63% ← 69%
	North America	62% ← 70%
0% to 25%	Overall	32% → 36%
	APAC	35% ● 36%
	Europe	38% ● 39%
	Latin America	21% → 28%
	Middle East and Africa	31% → 37%
	North America	30% → 38%

0%   10%   20%   30%   40%   50%   60%   70%   80%

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