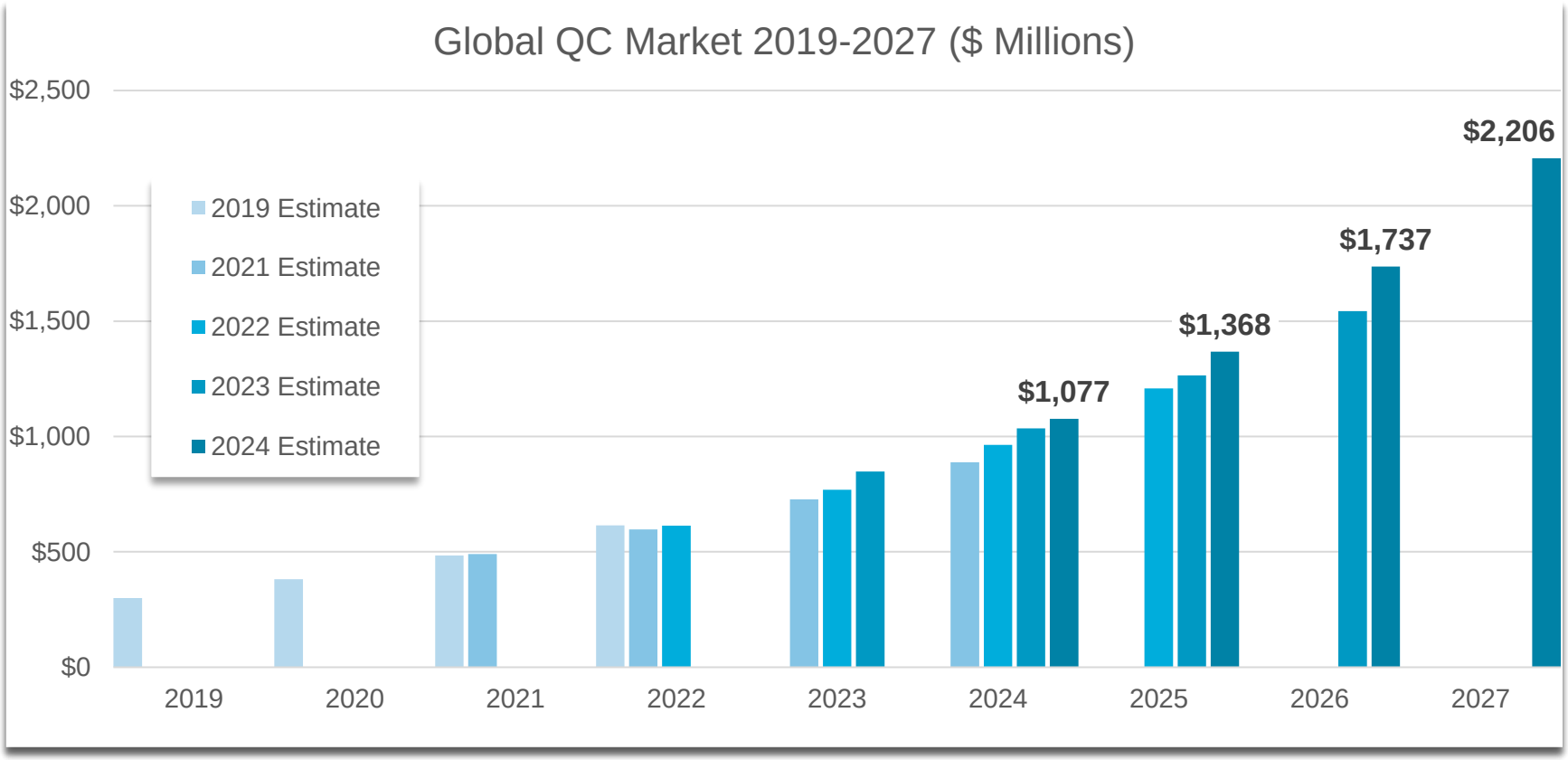
5th Annual Global QC Market Survey: Continued Progress But Changes in the Air

Bob Sorensen
Chief Analyst for Quantum Computing
Hyperion Research, LLC

www.HyperionResearch.com
www.hpcuserforum.com

QC Market Estimate: $1.07 billion in 2024

27% annual growth rate drives global QC market to $2.2 billion in 2027



- Exponential curve begins to dominate growth
- Consistently underestimating growth?

QC Market 2027: Top End User Sectors

Chemicals and QC R&D on top, but broad applicability envisioned

- Chemical/Chemistry sector hits number 1
  - Up from #2 last year, #4 year before that
  - Reinforces early emphasis on mod/sim, especially computational chemistry, as major algorithm
- Likewise, pharmaceuticals continues its upward climb
  - 21% last year, 35% this year
- Applicability spans academic, commercial, and government spaces
- Finance drops from 30% to 21%
  - Optimization issues, saturation or contrived lack of visibility?
- Government labs hold steady, for now
- Although nearly every sector choice deemed important by some, there are clear concentrations in key areas

QC Market 2027: Primary End User Motivations

New algorithms and future classical performance concerns lead

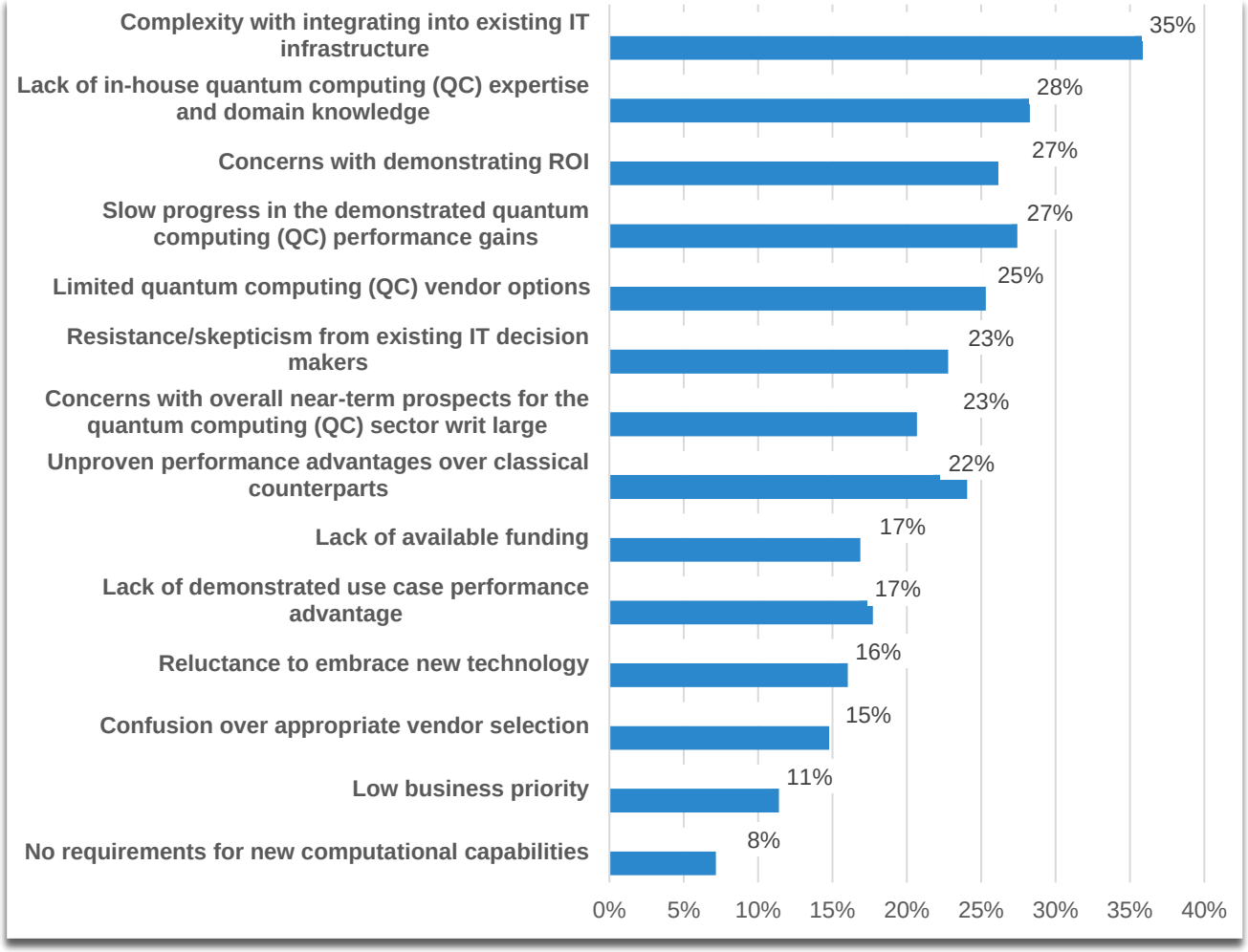
Option	% Selected
Implement new algorithm(s) not possible on classical counterpart systems	56.5%
Address concerns with future performance capabilities of classical computing systems	51.3%
Explore organizationally relevant QC use case potential with no expectations of near-term advantage	47.0%
Develop in-house familiarization with QC skills with no expectations of near-term end use deployment	45.2%
Engage with the QC vendor community for future activities	31.3%
Enable better real-time computational capabilities	27.8%
Realize faster turnaround time on existing classical counterpart systems	27.0%
Reduce overall computing systems costs	23.5%
Reduce overall computational power and cooling requirements	14.8%
Don't know/Not sure	5.2%
Other	2.6%

N = 115, Select all that apply

- Implement new algorithms and address concerns with future classical performance selected by majority of respondents
  - Classical developments could impact QC uptake
- An average of 3.3 options selected per respondent
- Many are still exploring for the sake of exploration
- One in four are looking at real-time compute opportunities
- Reduce overall compute systems cost:
  - 2023 Survey: 9.0%
  - 2025 Survey: 23.5%
- Reduce Power/Cooling Costs
  - 2023 Survey: 17.3%
  - 2025 Survey: 14.8%

Greatest Hurdles to QC Adoption

Led by complexity with IT integration and a lack of in-house QC expertise



- These are typical concerns found in many major advanced computing surveys going back five years or more
  - Spanning classical HPC, GPUs, AI, and now QC
- An average of ~3 identified hurdles per respondent
- No requirements for new compute capability: a perennial low number
  - Signifying pent-up demand for new solutions

Respondents could select all options that apply.

QC Partnerships: With QC End Users

Most respondent organizations have a range of partnerships with QC end users

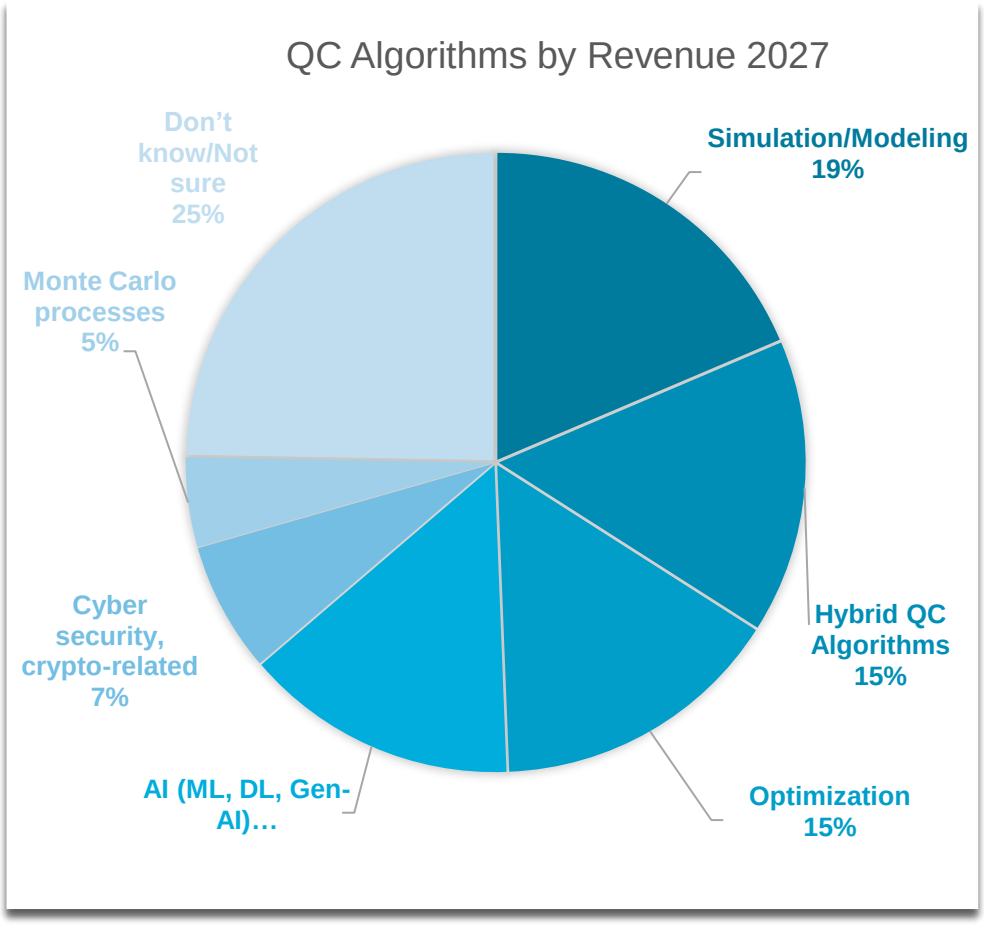
Option	% Selected
Explore new QC sector/vertical-specific QC-related opportunities	74.1%
Field test/evaluate new QC hardware	44.8%
Field test/evaluate new QC software	44.8%
Explore key performance gains over classical counterpart	43.1%
Establish sector-specific capabilities	41.4%
Foster public attention	39.7%
Encourage follow-on sales	36.2%
Explore QC/classical integration issues	31.0%
Access QC end user QC expertise	29.3%
Explorer QC sector/vertical-specific performance opportunities on existing classical workloads	27.6%
Access QC end user classical IT expertise	8.6%
Other	5.2%

N = 58, Select all that apply

- 71% of respondent organizations have a partnership with at least one QC end user
- Average respondent selected 4.2 options
- Field testing QC hardware and software both selected 44.8%
- Exploring sector-specific opportunities was overwhelming justification (74.1%)
- Building sector-specific skills (41.4%) and exploring QC performance advantages (43.1%) also key drivers

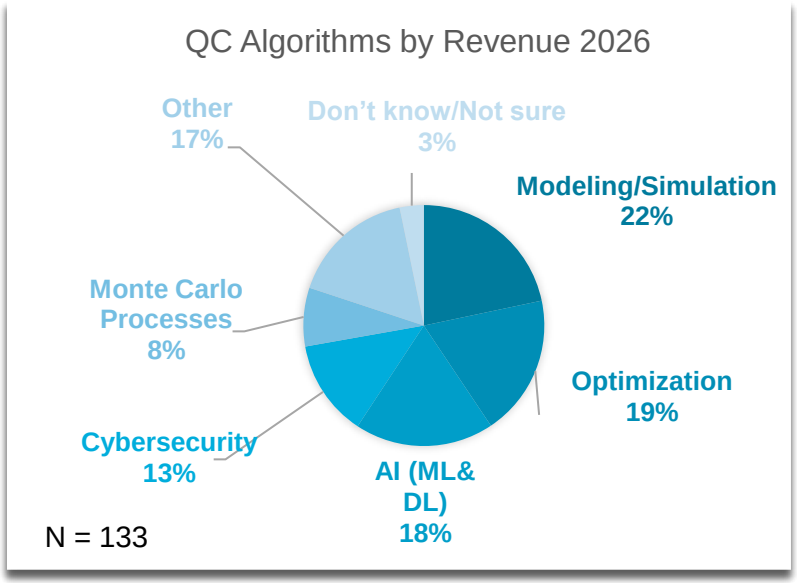
QC Market 2027: Major Algorithms by Revenue

Mod/sim #1 algorithm, but hybrid comes to the fore



N = 115

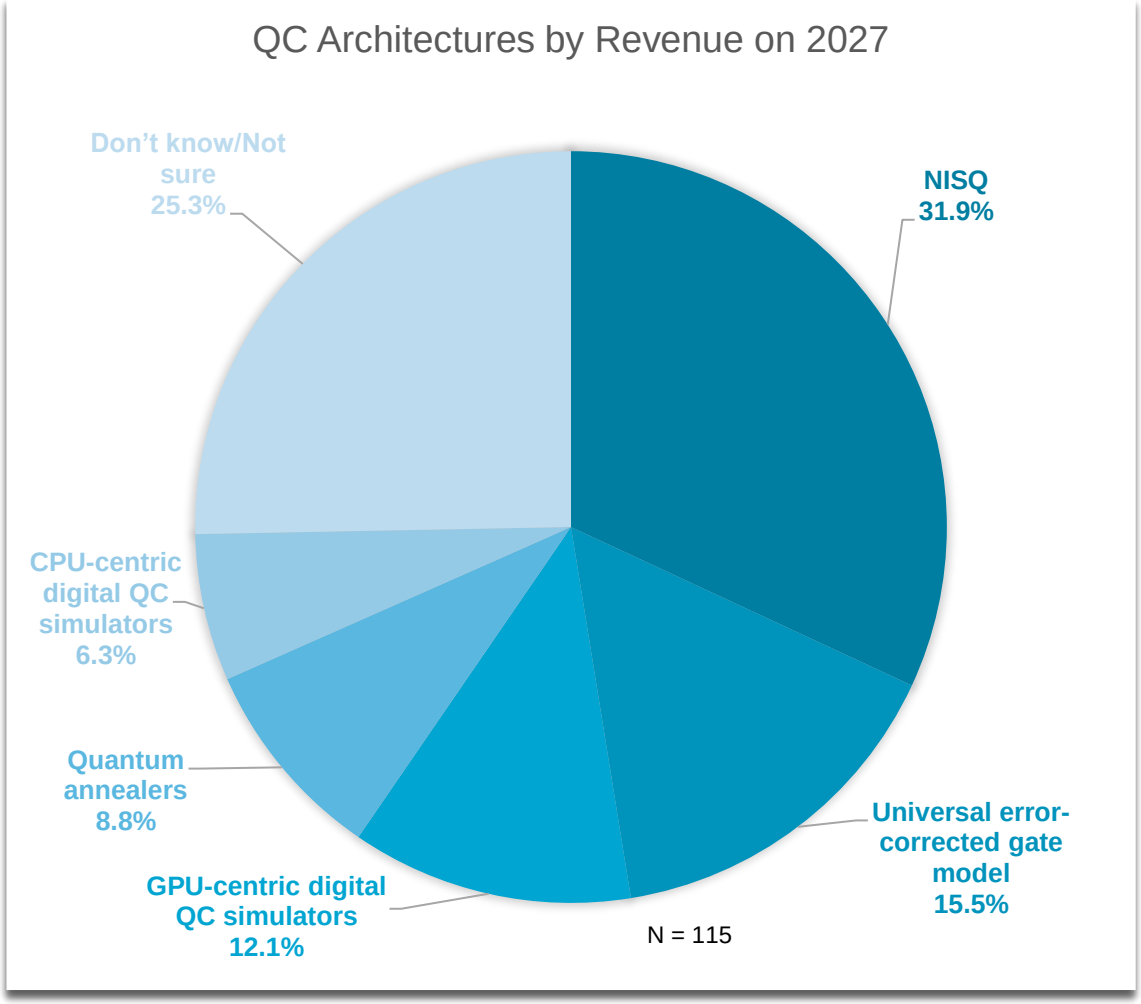
- Modeling/simulation remains at #1
- Appearance of hybrid QC algorithms follows refinement of Others option from previous years
- Don't know/Not Sure dominates responses
  - Is this a problem for the QC supplier base?



N = 133

QC Market 2027: QC Architectures

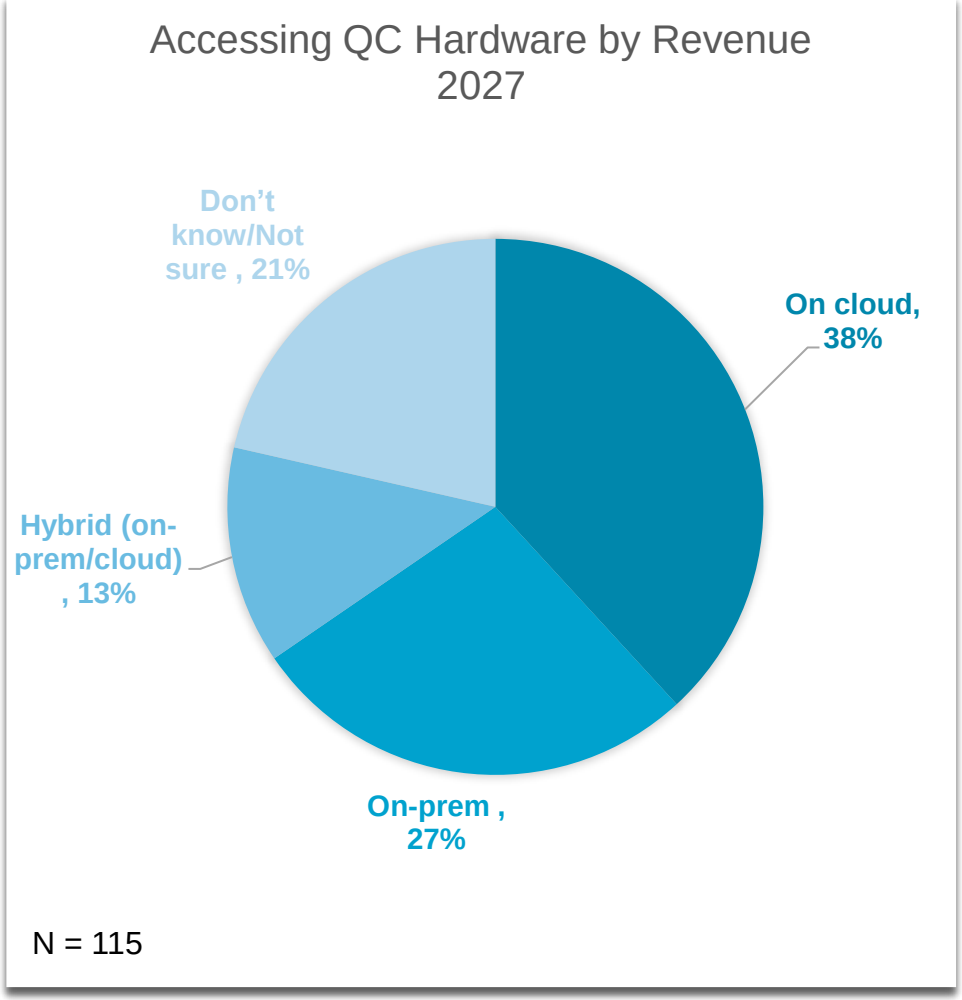
NISQ maintains lead, QC simulators still major element of QC architecture



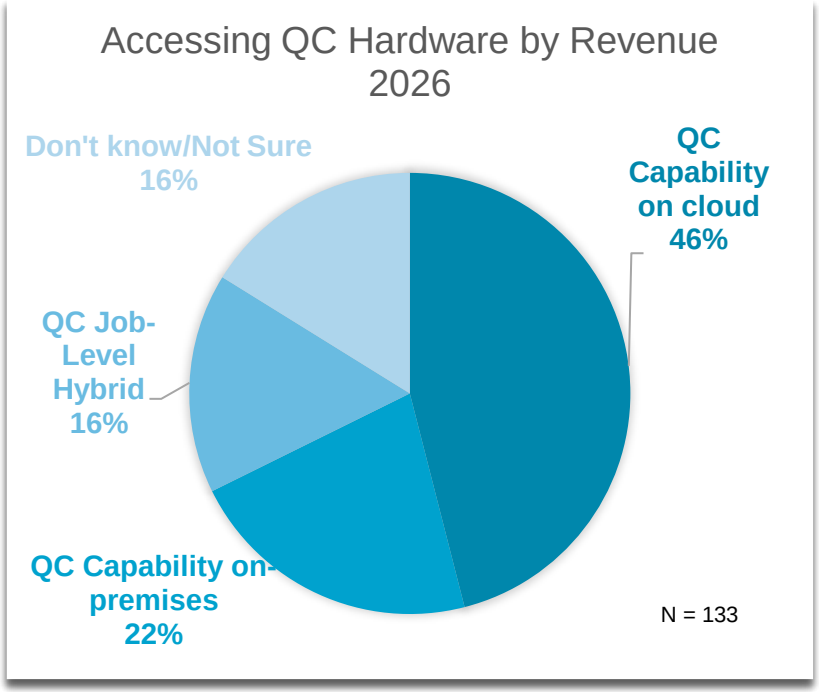
- NISQ dominates QC architecture in 2027
  - 2X universal error corrected gate model alternative
- Digital simulators (CPU and GPU based) combine for almost 19% of hardware market
  - But GPUs are preferred at 2x CPU rate
  - Room for options here
- Many Don't Knows/Not Sures
  - More fence sitting or lack of information?

QC Market 2027: Access to QC Hardware

Cloud continues to dominate but on-prem moving up

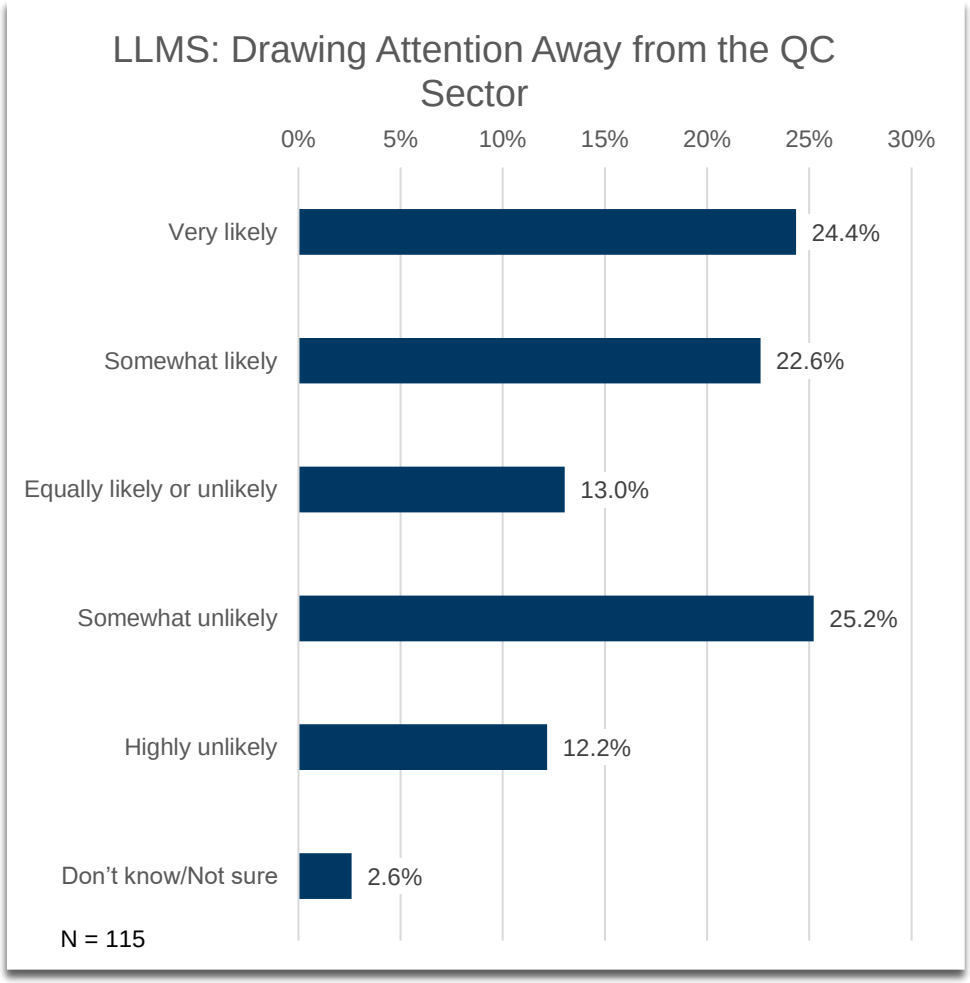


- Cloud revenues move from 46% to 38%
- Biggest move since tracking this number
- More Don't know/Not sure: more fence sitting?



QC Distractions and LLMs

How likely is it that the emergence of large language models like ChatGPT and BERT will draw attention away from end user interest in quantum computing?



- LLMs - and likely generative AI in general - seen as near-term competitor for end user interest in QC by 47% of respondents
  - Up from 42% last year
- 37% not overly concerned
  - Down from 42% last year
- Demonstrates need for QC to continue to deliver on technology/performance gains
- Highlights perceived end user interest in performance gains no matter how it is delivered

QUESTIONS?

bsorensen@hyperionres.com

Float to the top or sink to the bottom. Everything in the middle is the churn.

- Amos Burton, Engineer *The Expanse*