# GEOAI Skill Needs Survey – Private Sector

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What is GeoAI

Definition: GeoAI is the amalgamation of artificial intelligence (AI) with spatial computing to develop a better understanding of the physical world around us at the levels of an individual, communities, cities, nations, and the planet using geospatial data.
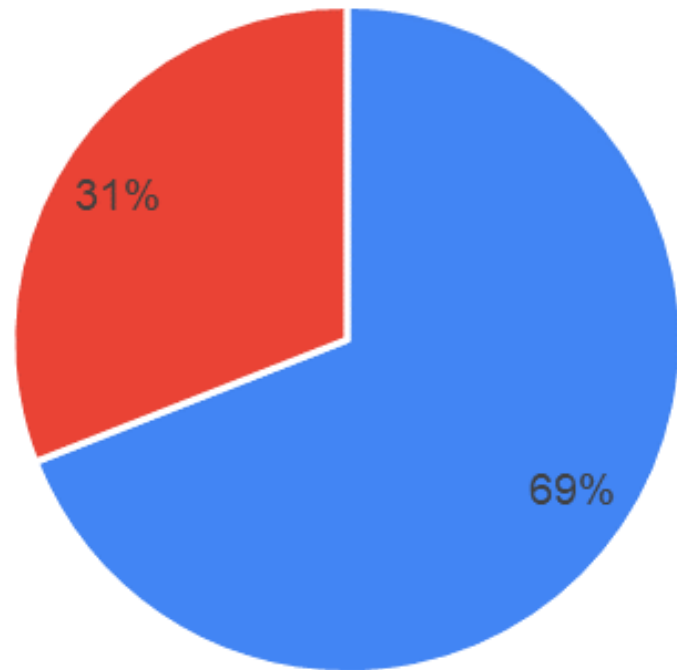
Geographical Representation

24 Countries Represented by Respondents
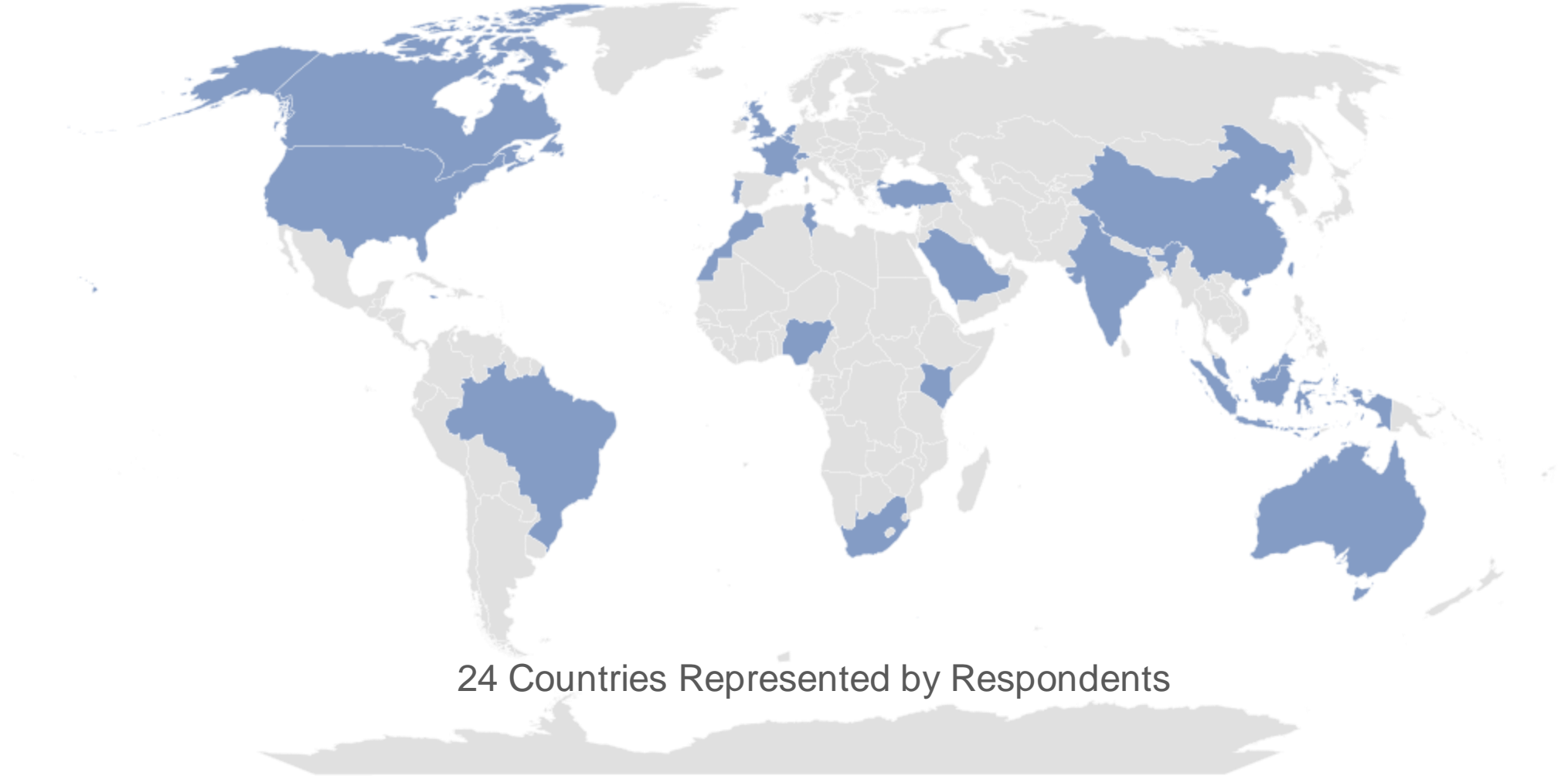
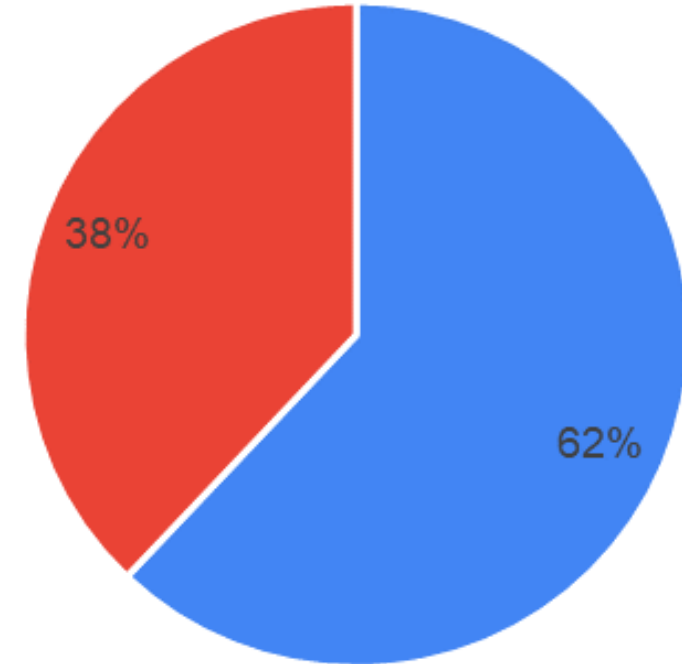# GEOAI Survey – Association Memberships
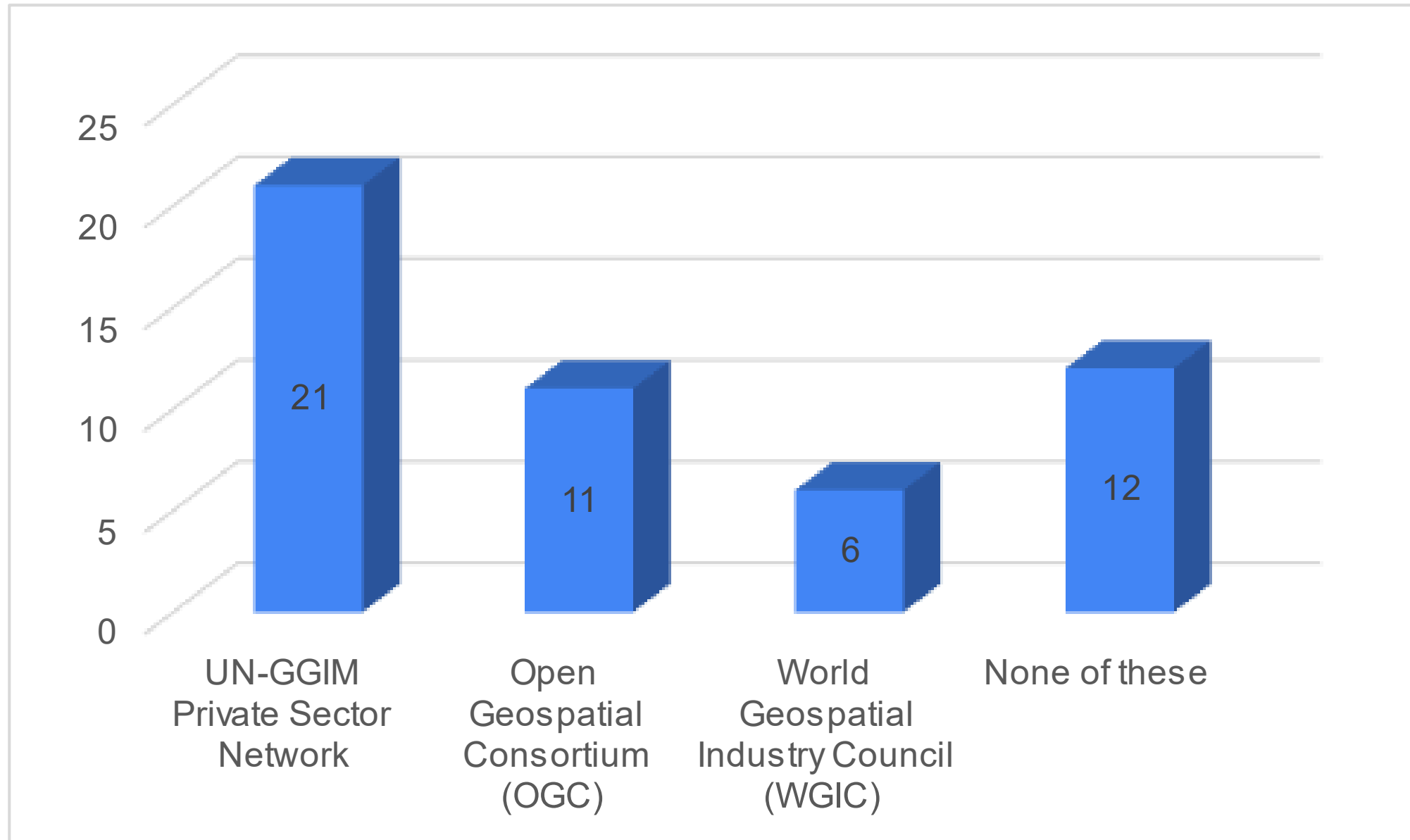
Findings from Private Sector Survey

GeoAI Capabilities

31%
69%

- Lack GeoAI Talent
- Good GeoAI capabilities

Upskilling Plans

38%
62%
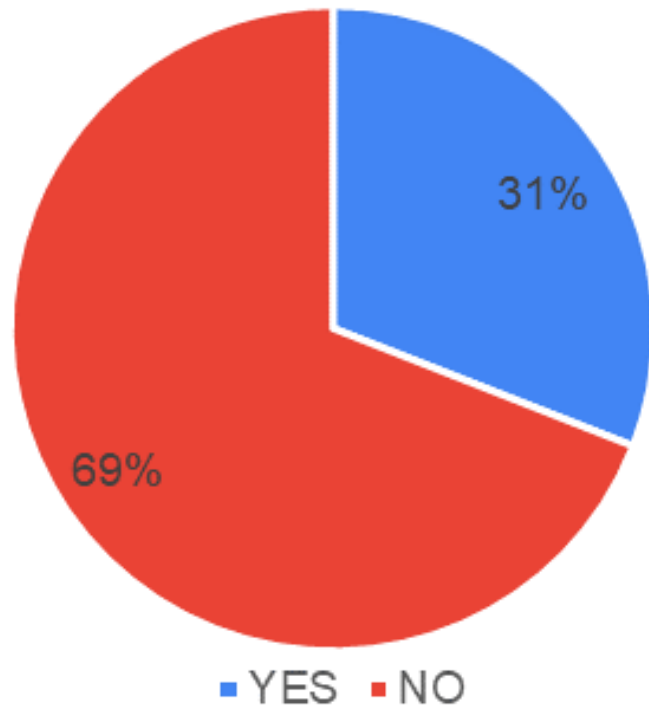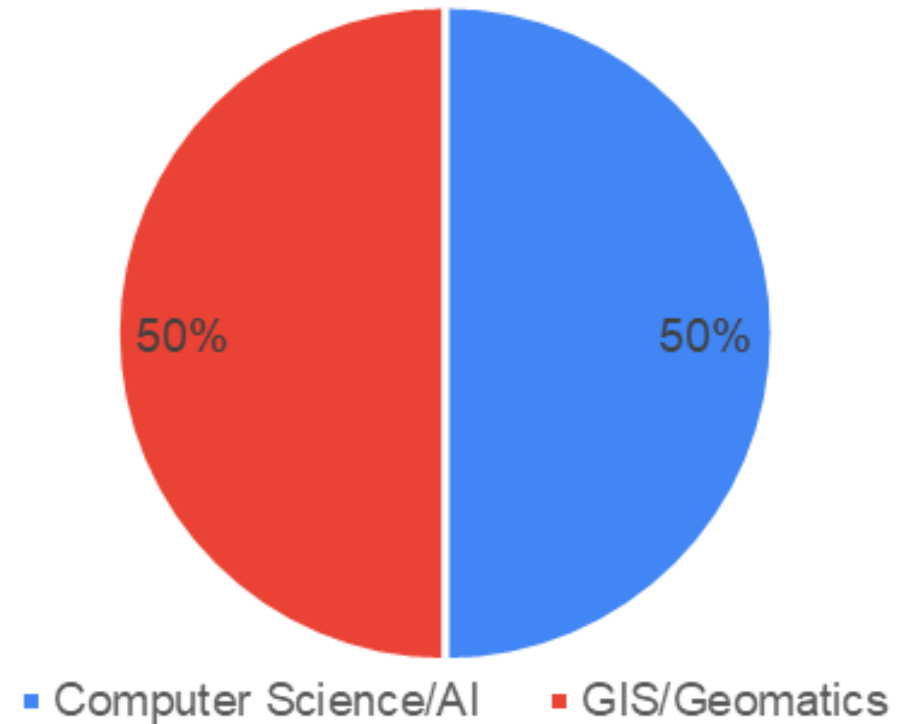
- Upskilling employees
- Difficult to recruit

Findings from Private Sector Survey

Do University Graduates have Required Skills for GeoAI Jobs?

- 31% YES
- 69% NO

Easier to upskill Geo degree holders or Computer Science

- 50% Computer Science/AI
- 50% GIS/Geomatics

Findings: Skillsets sought

Skillset	Count (Percentage)
Programming, and software de…	25 (59.5%)
GIS, mapping/visualization, an…	33 (78.6%)
Data engineering capabilities	29 (69%)
Application domain expertise	22 (52.4%)
ML Operations (ML-Ops) knowl…	24 (57.1%)
Computer Science degree	13 (31%)
Geography/GIS degree	15 (35.7%)
Coding, programming, and soft…	7 (16.7%)
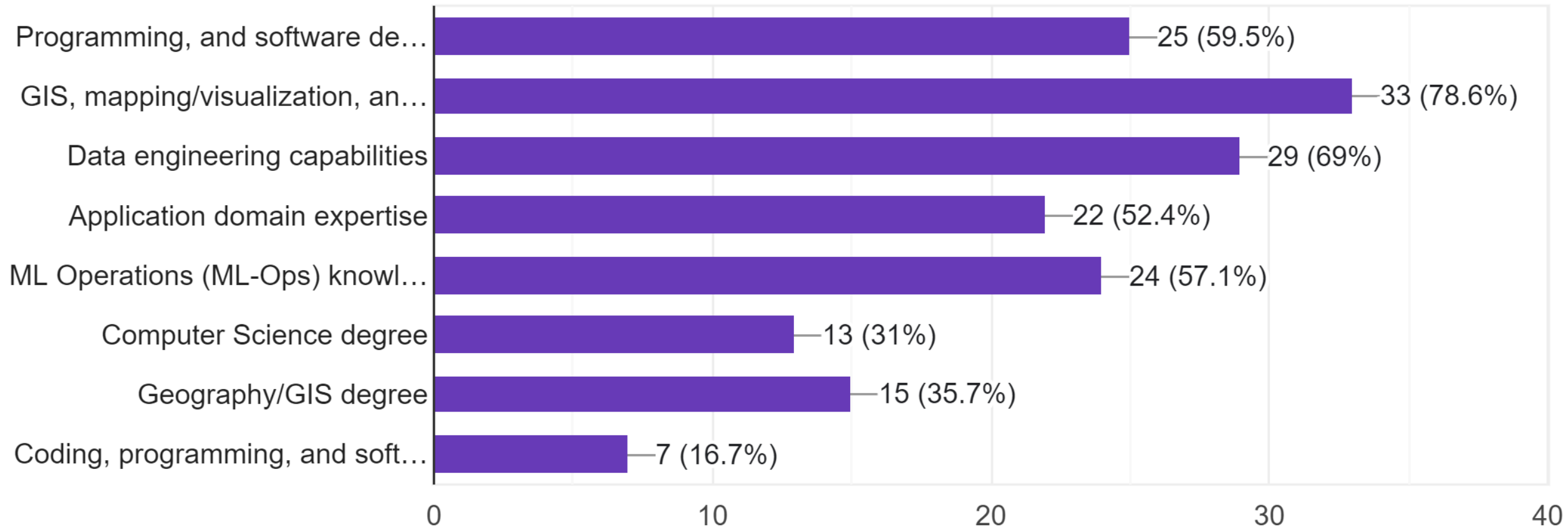
Findings from Private Sector Survey

Almost Unanimous Agreement on

AI & geo skills requirements – both foundational and analytical

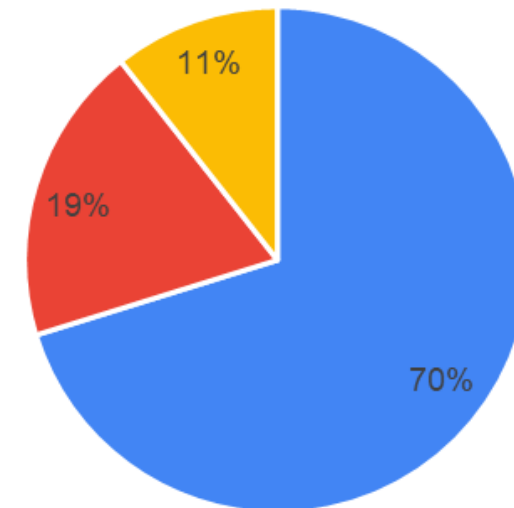Keeping-up with scientific and tech advances in GeoAI research

95%

> ❑ e-Learning resources/Just in time training
>
> ❑ Social media based knowledge management
>
> ❑ Standards Group for GeoAI

Community Resource Needs

- GeoAI Hub 70%
- e-Learning 19%
- Other ideas 11%

Skills and Competencies Required

GEO AI Solutions

Geospatial Science
➤ GIS e.g. ArcGIS, QGIS, etc.

➤ Spatial Databases e.g. PostGIS, Oracle Spatial, H3

➤ Spatial data science

➤ Remote sensing (raster), vector & point cloud data analysis

Artificial Intelligence
➤ Machine learning: SVM, regression, clustering, PCA

➤ Deep learning: CNNs, Transformers

➤ Graph analysis: GNN

➤ Math: linear algebra, stats, probability, calculus, etc.

Domain Knowledge
➤ Data structure and data selection

➤ Model architecture design

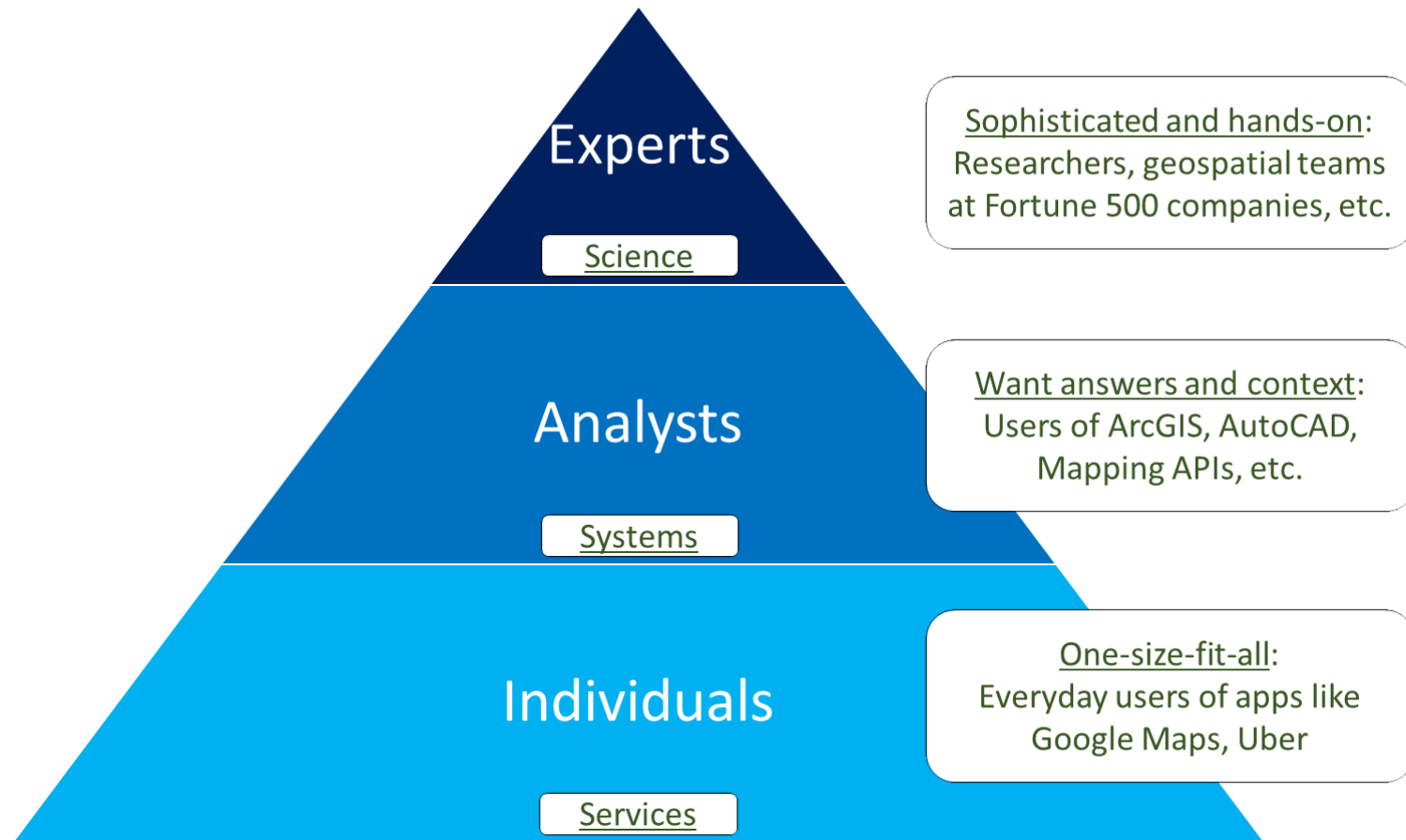➤ Loss function design to ensure models learn the right thing

Computational Skills
➤ Python, JavaScript, PyTorch, API development, container management and cloud deployment skills
➤ Data engineering and management: Querying, processing, fusion/harmonization,

Ethics and Safety Considerations
➤ Know and tackle biases due to geographical data availability (or lack), scale, problem selection, etc.
➤ Manage data privacy issues through consent, self-determination and subsidiarity in data governance

Hierarchy of Geospatial Users

Experts

Science

Sophisticated and hands-on:
Researchers, geospatial teams
at Fortune 500 companies, etc.

Analysts

Systems

Want answers and context:
Users of ArcGIS, AutoCAD,
Mapping APIs, etc.

Individuals

Services

One-size-fit-all:
Everyday users of apps like
Google Maps, Uber

Next phase: Multimodal GeoAI foundation models (FM) for answering spatiotemporal and retrieval queries in natural language.

Question: When everyone becomes a GeoAI FM user, what kind curriculums would be required?

Questions