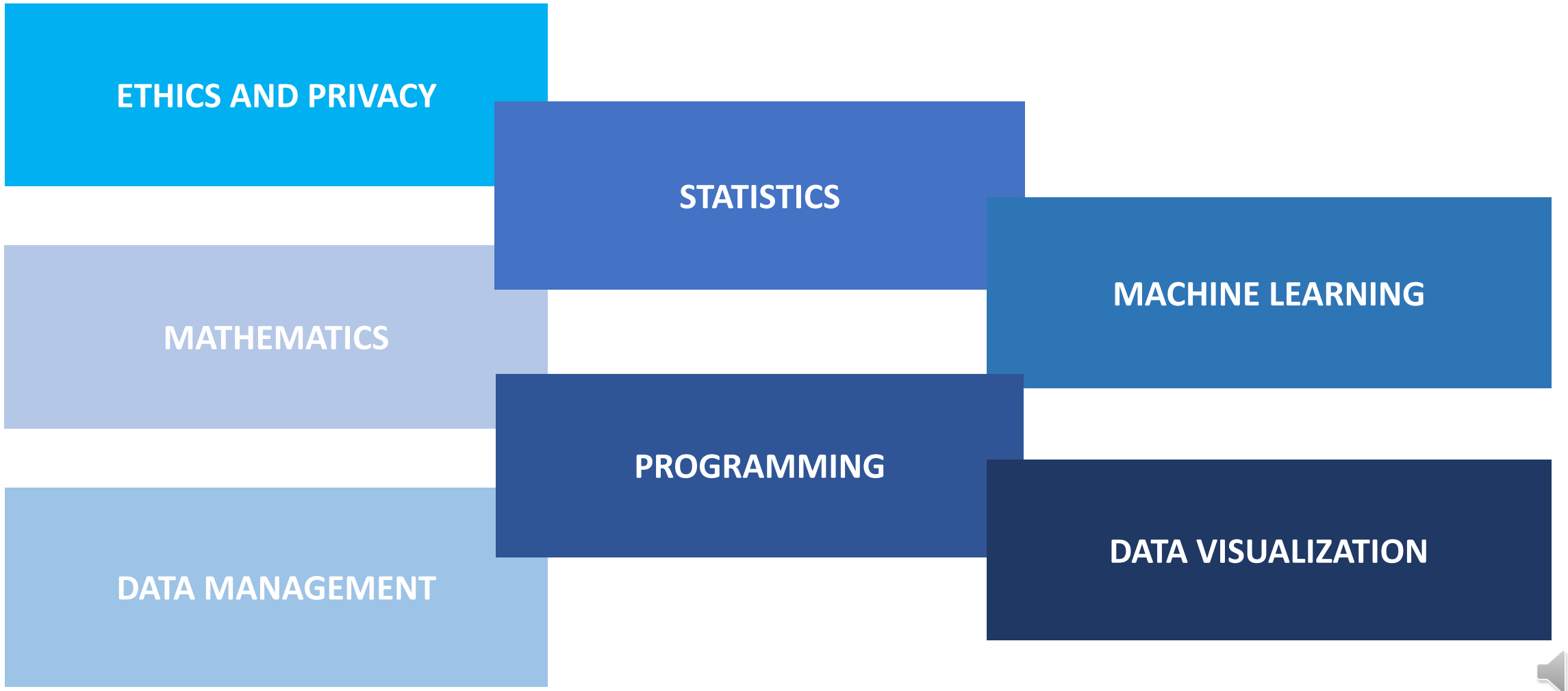
The Competency Framework

- General guidance for the NSOs on building Big Data skills
- Extensive (yet not exhaustive) set of skills and knowledge useful for acquiring and processing big data
- Recognition that:
  - different NSOs run different projects
  - different types of data specialist (e.g. data analyst, data engineer, data scientist, etc.) require different compositions of skills and knowledge
  - not each data specialist must possess all of the skills listed in the framework

- Two approaches:
  - Competency areas approach
    - Core competencies
    - Generic (soft) skills
  - (Simplified) statistical production process approach

Competency areas approach - core competencies



Competency areas approach – the format

Dimension 1			
Name of the area			
Dimension 2			
Competence title and description			
Dimension 3	**A** - Foundation	**B** - Intermediate	**C** - Advanced
Proficiency levels			
Dimension 4			
Knowledge examples			
Skills examples			
Attitude examples			

Dimension 1			
Name of the area	**Data management**		
Dimension 2			
Competence title and description	To possess data management knowledge in a range of below-listed issues: 1) Database systems: database management systems, data models – definition and types, entity relationship model, models implementation (pre-relational, relational and object-oriented models) 2) Basics of cryptography: hash function, binary tree 3) Database: relational database, tabular data, data frames and series, shard, on-line analytical processing, data warehousing, data lakes, data vaults, logical multidimensional data model, extract, transform and load (ETL), NoSQL 4) Varied data formats: (Json, shp, XML, csv)		
Dimension 3	A - Foundation	B - Intermediate	C - Advanced
Proficiency levels	Demonstrate knowledge and understanding basic data management skills.	Demonstrate knowledge and understanding of, data base management tools and methods, and ability to apply some of them.	Thorough knowledge of proficiency in data base management and skillfulness in performing operations on varied data sets. Is able to advise others in finding data management solutions.
Dimension 4			
Knowledge examples	• Know the basic concept of SQL and NoSQL databases (such as table, column, field, field type, primary and foreign key) • Understand the consequences of using the hash function • Define functional dependencies occurring among the analyzed data		
Skills examples	• Able to create database structures in selected database management systems (e.g. MySQL, MongoDB, *more in annex*) • Able to present the logical structure of the database using tables and graphical relationships in selected programs • Apply ETL techniques - acquisition, processing (including pre-purification) and loading data from non-statistical sources		
Attitude examples	• Systematically supplement knowledge of new trends in the field of computer science on the subject of computer data storage • Identify data sources and assess their usefulness in complementing studies at hand • Carefully analyze the data and adjust them to the needs of database users		

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Generic (soft) skills

Indispensable and inherent part of Big Data competencies catalogue

Span all stages of the statistical production process

*Not the main focus of this Competency Framework

Source: cleanpng.com

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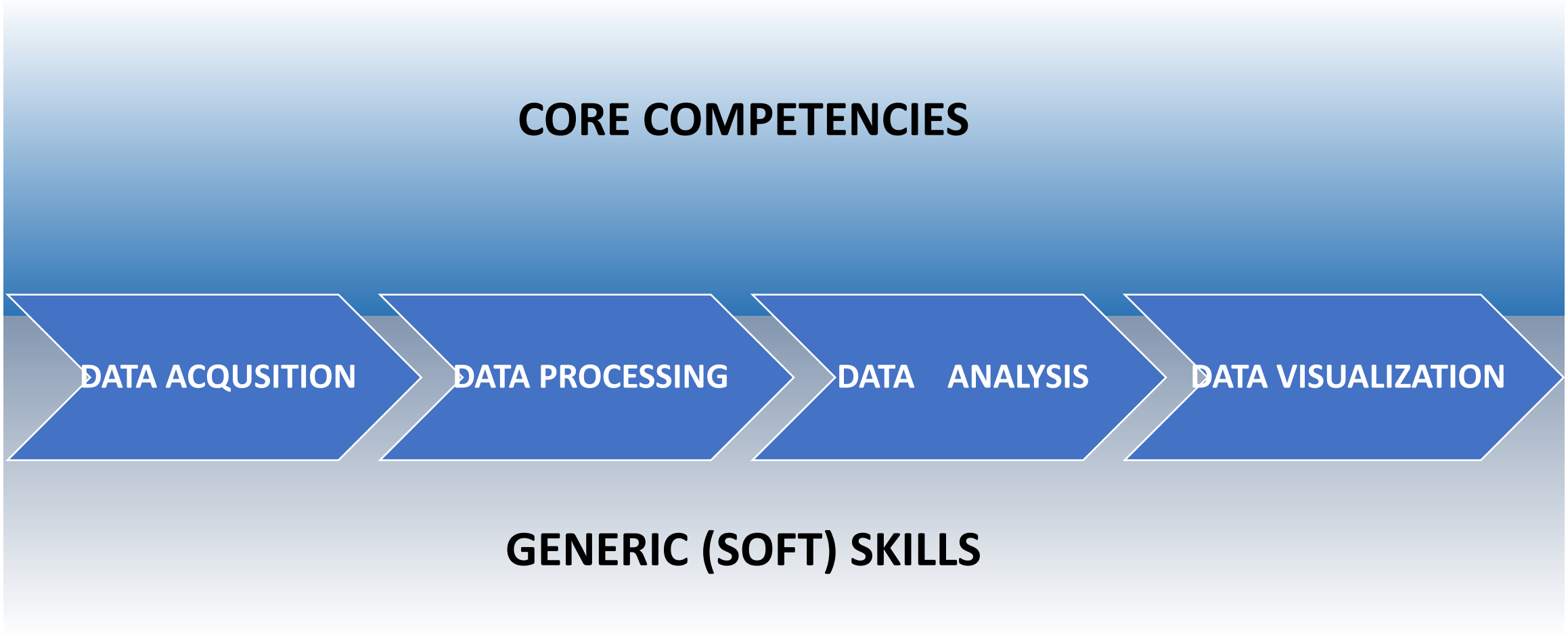
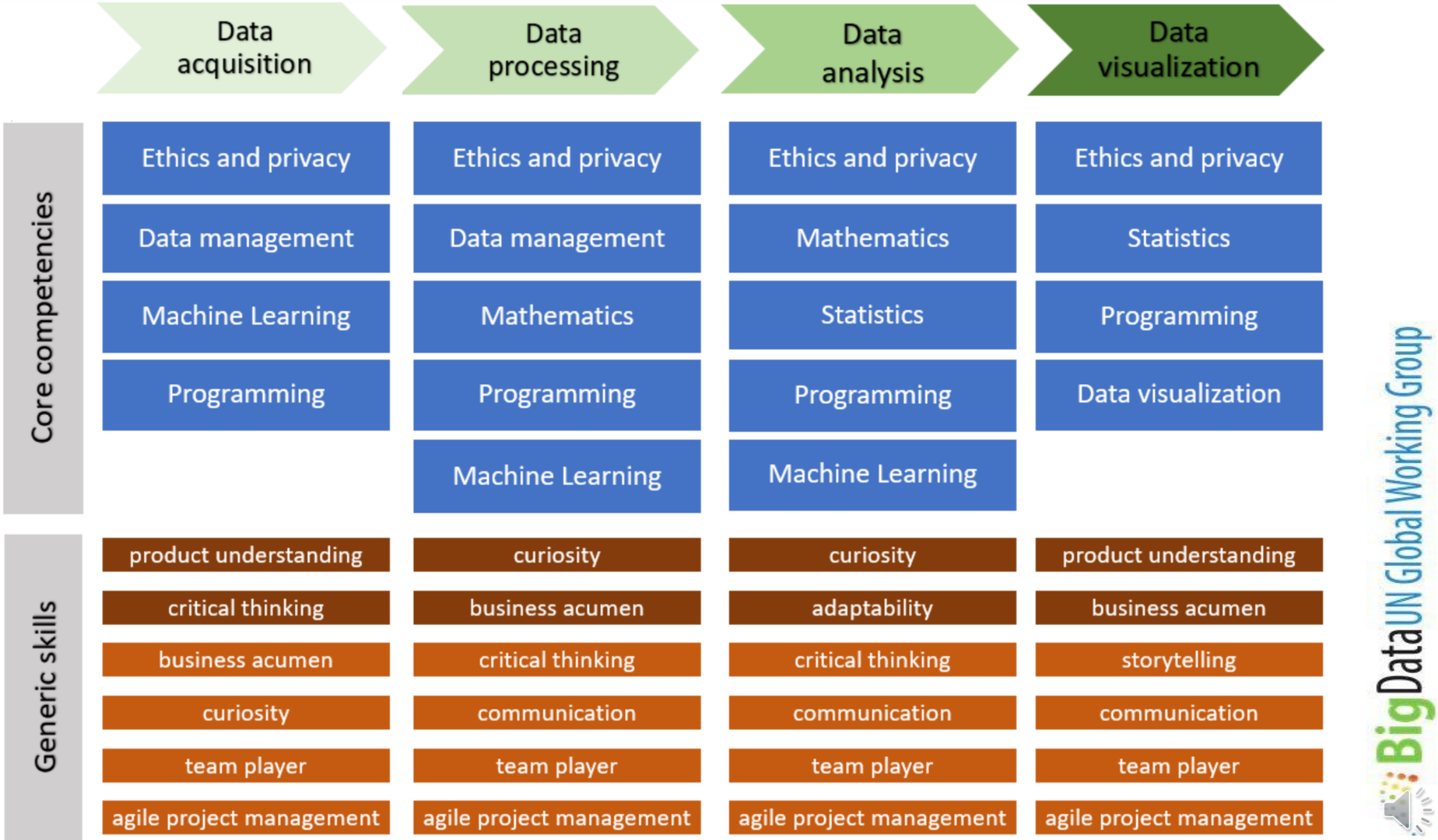
Generic skills

AGILE PROJECT MANAGEMENT	ADAPTABILITY	BUSINESS ACUMEN
COMMUNICATION	CRITICAL THINKING	CURIOSITY
PRODUCT UNDERSTANDING	STORYTELLING	TEAM PLAYER

Simplified production process approach




Data acquisition
Data processing
Data analysis
Data visualization
Core competencies
Ethics and privacy
Data management
Machine Learning
Programming
Ethics and privacy
Data management
Mathematics
Programming
Machine Learning
Ethics and privacy
Mathematics
Statistics
Programming
Machine Learning
Ethics and privacy
Statistics
Programming
Data visualization
Generic skills
product understanding
critical thinking
business acumen
curiosity
team player
agile project management
curiosity
business acumen
critical thinking
communication
team player
agile project management
curiosity
adaptability
critical thinking
communication
team player
agile project management
product understanding
business acumen
storytelling
communication
team player
agile project management
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On-going & future work - training development & provision

- On-line training to be developed by subject matter UN GWG Task Teams (earth observation, AIS, scanner data, mobile phone data)
- Guidelines by TT on Training, Competencies and Capacity Development
- Link of the skills acquired during training to the Competency Framework
- Ensuring global accessiblity of the training
- Additional work: a tool to help the learner to select the right training for their needs

Useful Links

- UN Big Data: https://unstats.un.org/bigdata/
- Task Team products: https://unstats.un.org/bigdata/taskteams/training/

Contacts:

- Maturity Matrix test input - Ceri.regan@ons.gov.uk
- Competency Framework feedback - Do.nowak@stat.gov.pl

THANK YOU.