Mapping of the Data Ecosystem Across the Federal Government

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NIST NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

Manufacturing USA®

Where I Worked

NIST - Gaithersburg

- National Measurement Institute for the United States
- Defines units, sets standards, and accelerates innovative research

nist.gov

Office of Advanced Manufacturing (OAM)

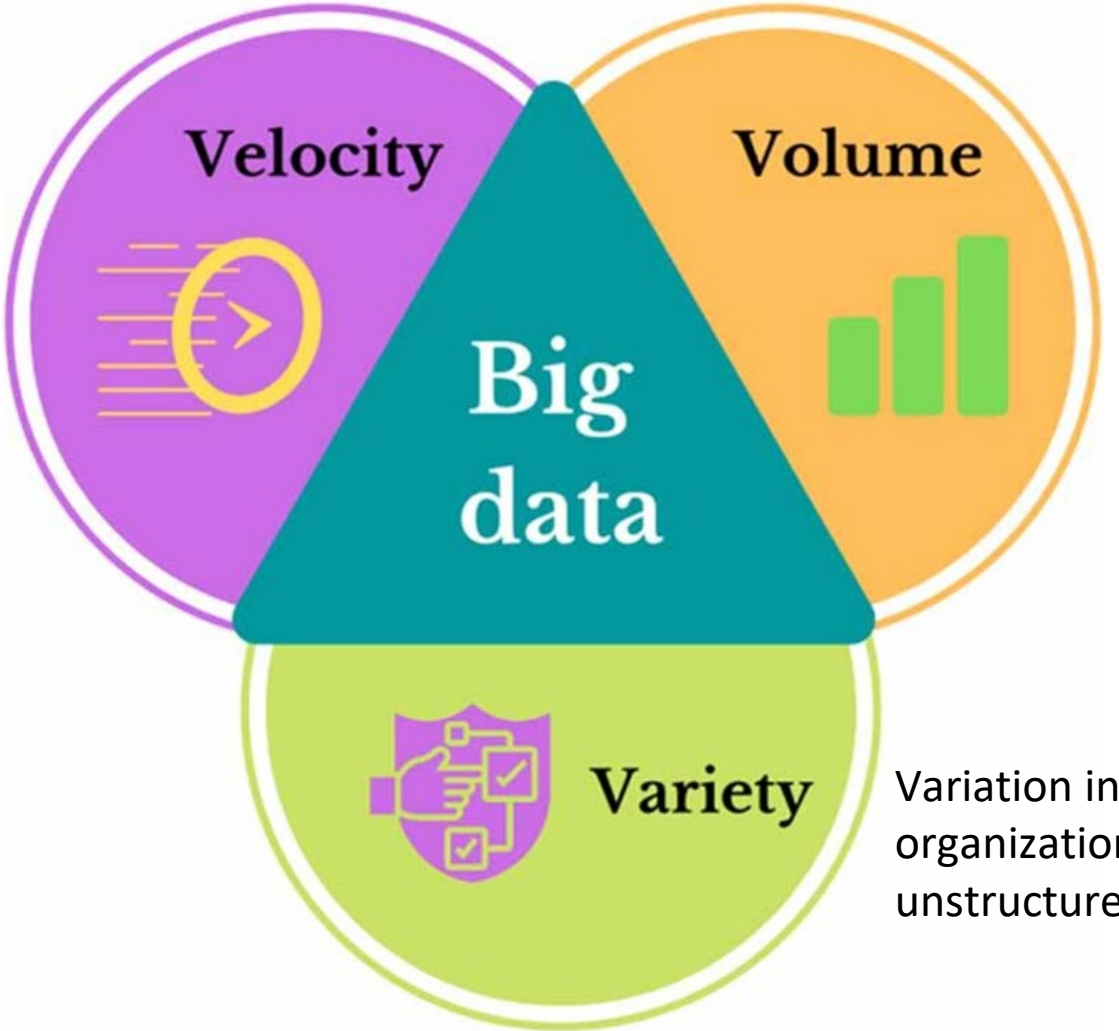
- Externally facing
- Home of public-private partnership called Manufacturing USA

nist.gov

What is Big Data?

Too large and complex to be handled by traditional data management systems

Constantly produced (Internet of Things, satellites, internet, etc.)



> 400 million terabytes generated every day

Variation in types and organization; mostly unstructured

Addressing Challenges in Data Analytics: A Comprehensive Review and Proposed Solutions

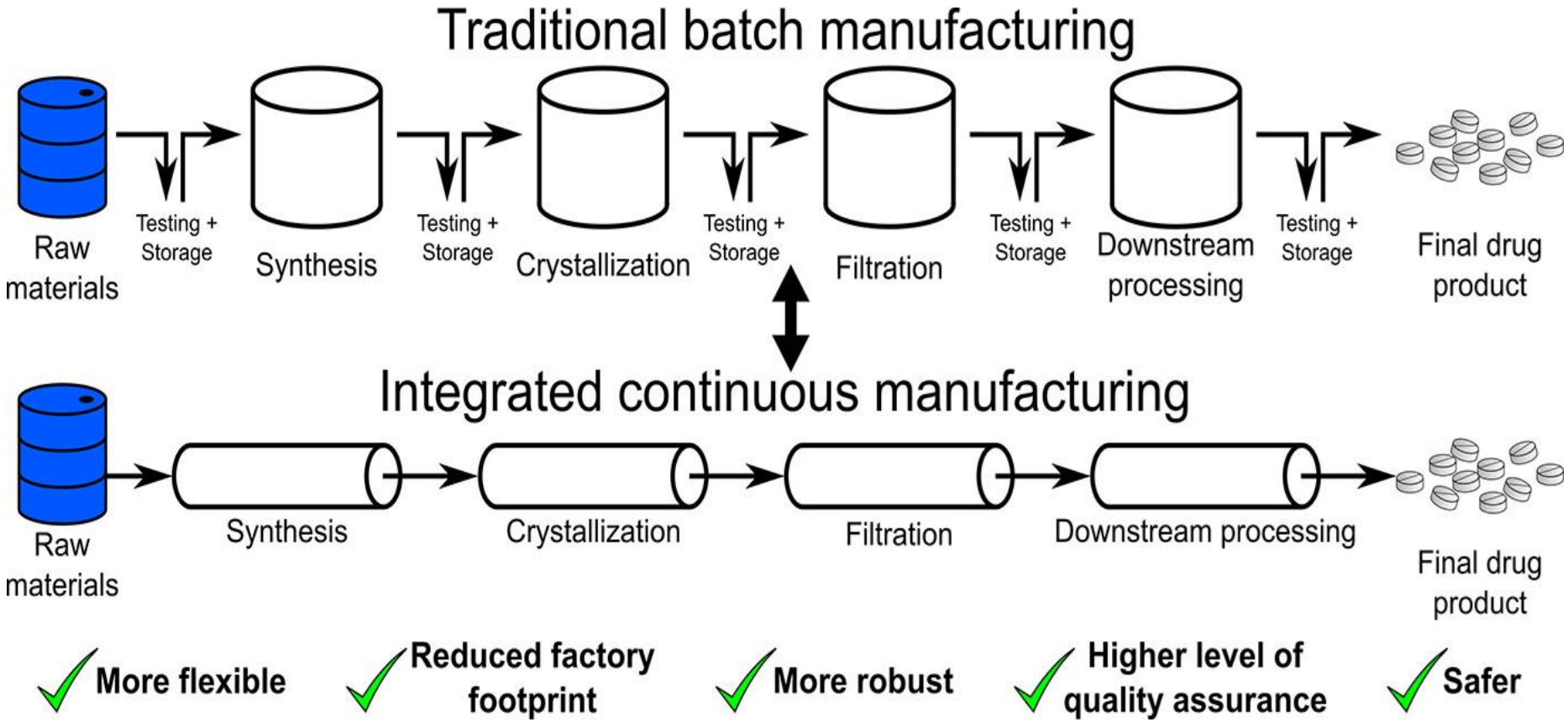
Challenges in Big Data

- Extensive data is needed for AI applications
  - Data sharing is necessary
- Data Interoperability – differences in structure and naming
- Cybersecurity
- Storage – cloud-based
- Privacy – anonymization
- Intellectual Property

Challenges in Big Data: Example

Continuous manufacturing in biopharmaceutical advanced manufacturing

- Requires interoperability, predictive AI, etc.



ACS Publications: Integrated Continuous Pharmaceutical Technologies—A

Federal Big Data Initiatives

Federal Agency	Scope	Challenge Addressed	Level of Investment
DoD	Agency-wide	Cybersecurity, interoperability, ethical use	~ $2.5 billion in FY 2020-22
HHS	Agency-wide Specific initiatives for NIH and CDC	Interoperability, data sharing	> $1 billion
DOC	Agency-wide Specific initiatives for Census Bureau, NIST, and NOAA	Data literacy, data sharing	> $450 million/year
NSF	Agency-wide	Infrastructure for data sharing and privacy	~ $155 million
DOE	Agency-wide, starting January 2025 Specific projects historically	Security and enforcing compliance with standards	~ $150 million in grants since FY 2019
NASA	Agency-wide Specific initiatives for certain projects	Data interoperability and storage	~ $100 million/year
DOL	Agency-wide	Ethical data governance, cataloging for ML	> $35 million

NIST's Role

Standards

- Accelerates development of industry standards
- Initiatives across sectors supported

Nist Illustrated (nist.gov)

NIIMBL Big Data Program

- Manufacturing USA institute for biopharmaceutical advanced manufacturing in DOC
- Public-private partnership is ideal for coordinating among industry

NIIMBL® The National Institute for Innovation in Manufacturing Biopharmaceuticals

niimbl.org

Conclusion

- Big data: powerful but requires additional efforts
- Public-private partnerships can leverage the resources of industry with long-term goals of government
- In-depth critical analysis highlights needs
- Likely to be published in technical report

Public-Private Partnerships (PPP) 101

Summer Overview

- Capstone: Mapping of the Big Data Ecosystem
- Mini Project 1: Modern Makers
- Mini Project 2: Success Stories
- A little bit of tours and learning about NIST and manufacturing!

IMPACTS | **Building Long-Term Support with Institutes**

BioFabUSA was part of a coalition awarded a $44M Build Back Better Regional Challenge Award in 2022 to establish a biofabrication cluster. The award will be used to develop a "Work and Learn" program to remove barriers for youth and adult students interesting in the biofabrication field in part through scholarships, technological access, transit, and English Language acquisition.

The ARM institute received 14.2M as part of a Build Back Better Regional Challenge to create a Robotics Manufacturing Hub at its Mill 19 in Pittsburgh. The goal of this hub is to de-risk the adoption of advanced robotics and automation technology for small/medium manufacturers and accelerate the use of robotics technologies.

SUCCESS STORIES

Acknowledgements

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Rhodes College
—1848—

NIST's Role

- ***Standards***
- Accelerates development of industry standards
- NIIMBL: Manufacturing USA institute housed in the DOC
- Public-private partnership is ideal for coordinating among and supporting industry
- NIIMBL Big Data Program
  - Ontology Project

NIIMBL® The National Institute for Innovation in Manufacturing Biopharmaceuticals

References

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