Introduction to Data Science

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Chapter 7
Challenging Issues in Data Science

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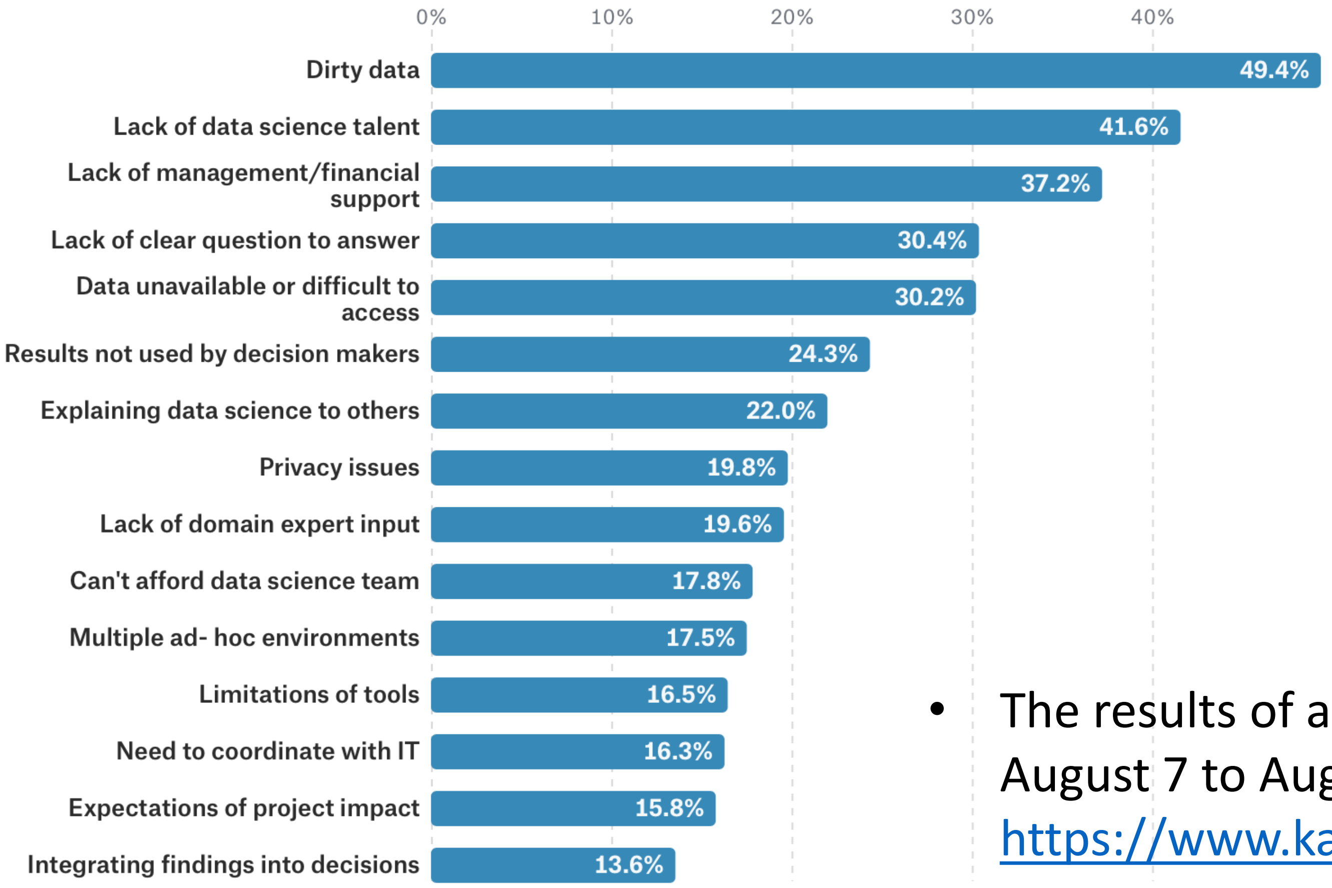
Challenging Issues in Data Science

What barriers are faced at work?



- The results of a survey conducted by Kaggle, from August 7 to August 25, 2017. https://www.kaggle.com/surveys/2017

7,376 responses

Only displaying the top 15 answers. There are 7 answers not shown.

Challenging Issues in Data Science

What barriers are faced at work?

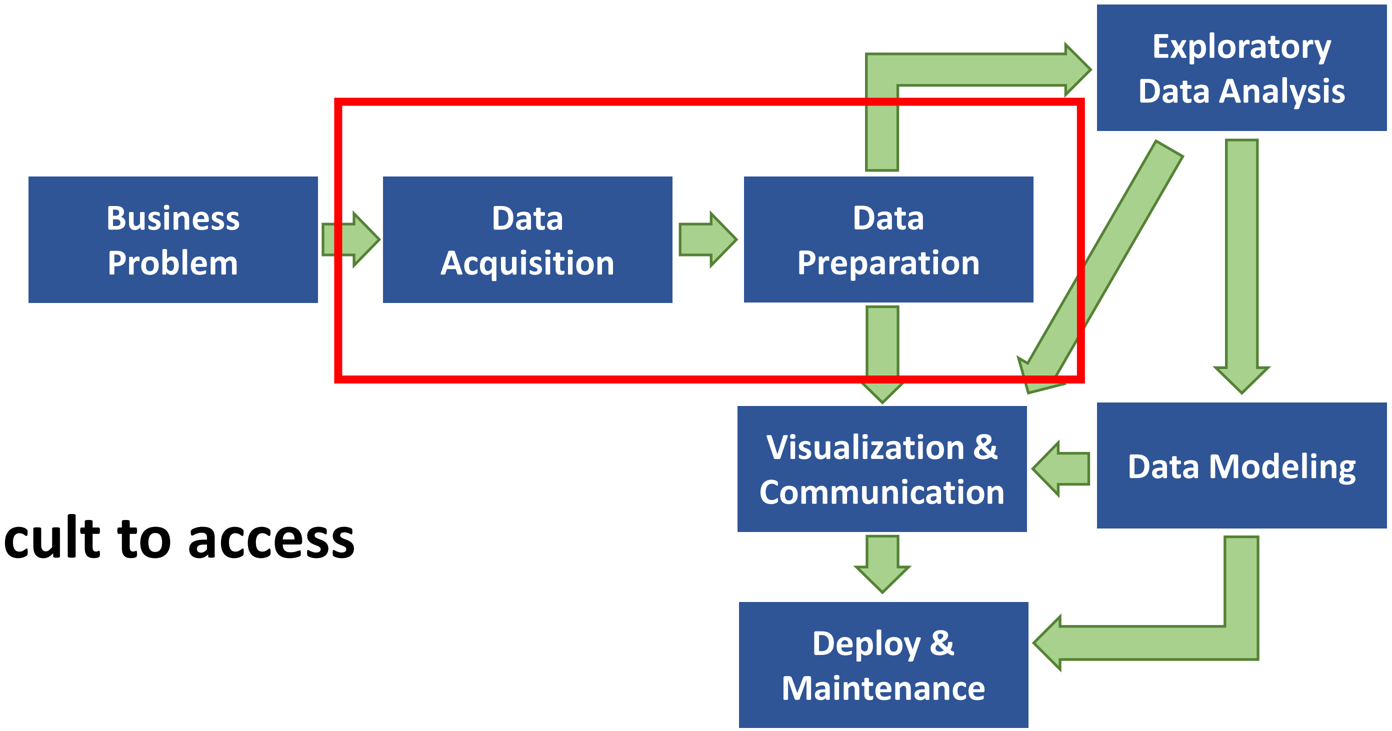
- Dirty Data
- Data unavailable or difficult to access
- Privacy issues
- Lack of clear question to answer
- Lack of domain expert input
- Results not used by decision makers
- Explaining data science to others
- Need to coordinate with IT

- Lack of data science talent
- Integration finding into decisions
- Multiple ad-hoc environments
- Limitations of tools
- Lack of management/financial support
- Can’t afford data science team
- Expectation of project impact

Challenging Issues in Data Science

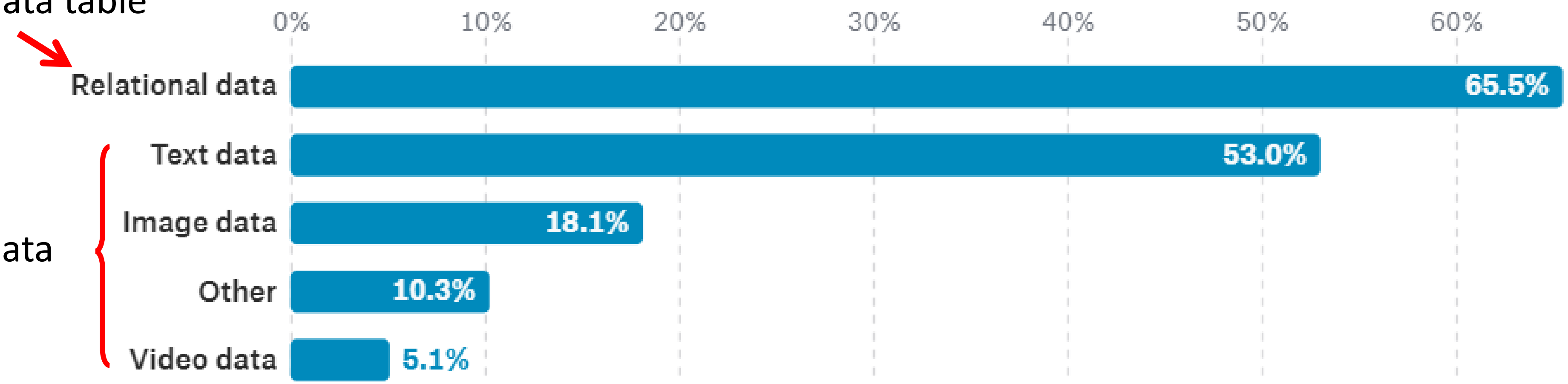
Data is the biggest challenge in data science

1. Dirty Data
   - Inaccurate
   - Incomplete
   - Inconsistency
   - Invalid
   - Nonuniform
   - Duplicate
2. Data unavailable or difficult to access
3. Privacy issues



Challenging Issues in Data Science

Types of data used at work



Structured Data that are
in form of data table

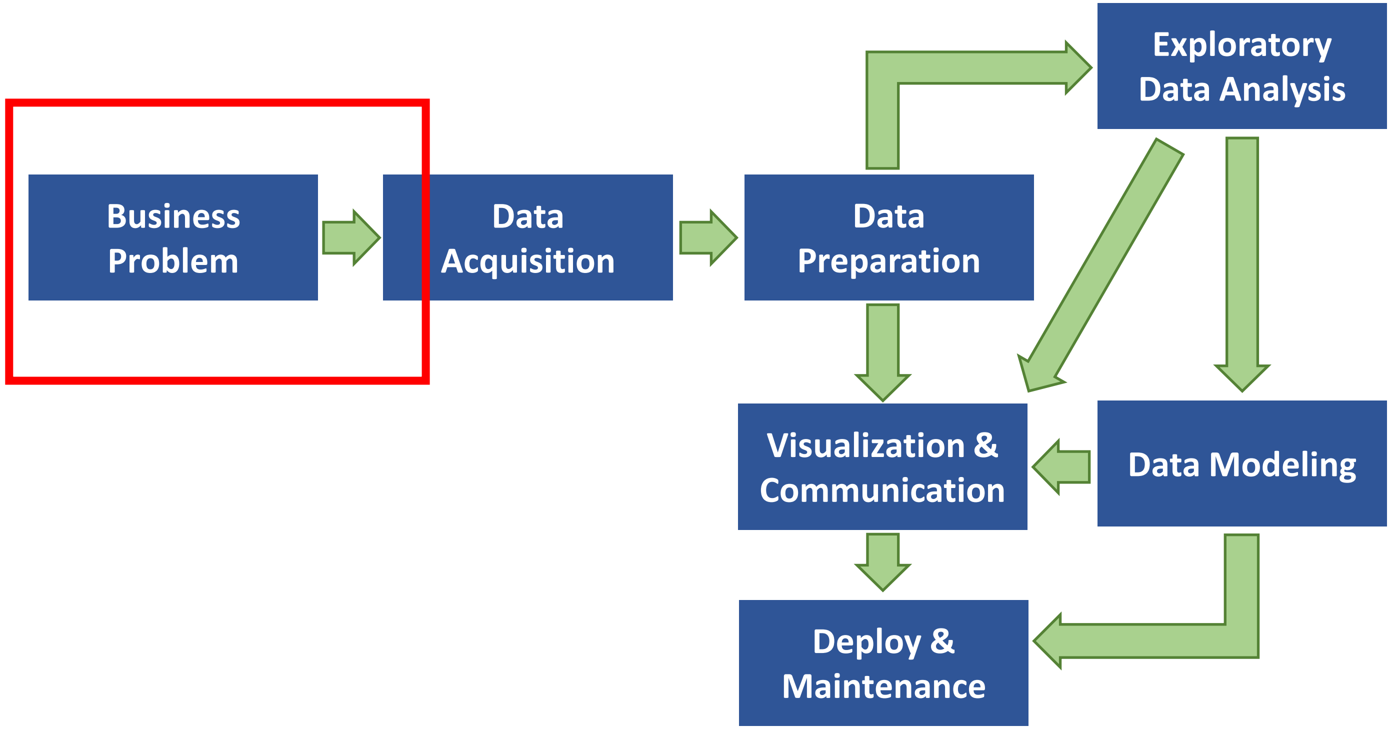
Unstructured Data

A survey conducted by Kaggle, from August 7 to August 25, 2017.
https://www.kaggle.com/surveys/2017

Challenging Issues in Data Science

Lack of clear question to answer

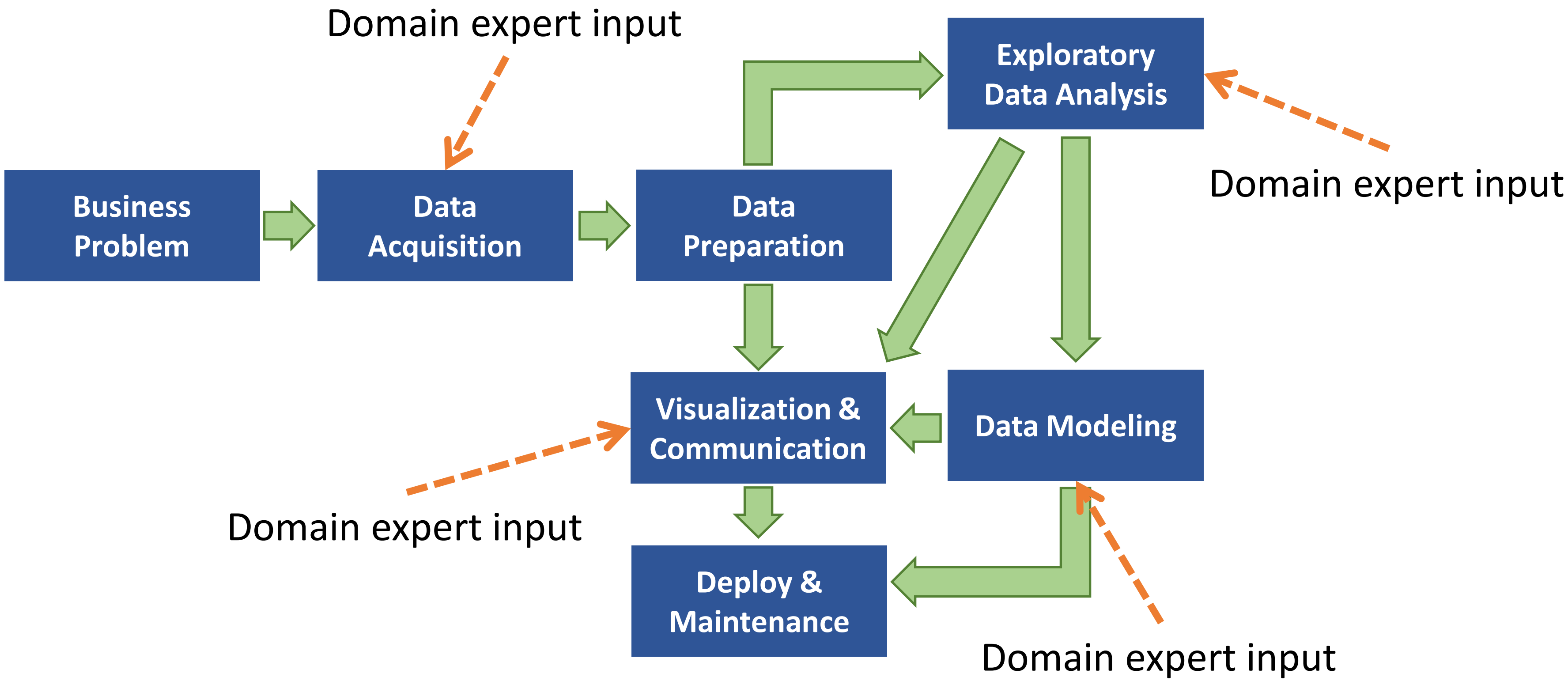
- Understanding the business problem is important
- If the business problem is not clear, the next processes will fail.



Challenging Issues in Data Science

Lack of domain expert input

- Domain knowledge is required in many steps of data science process.

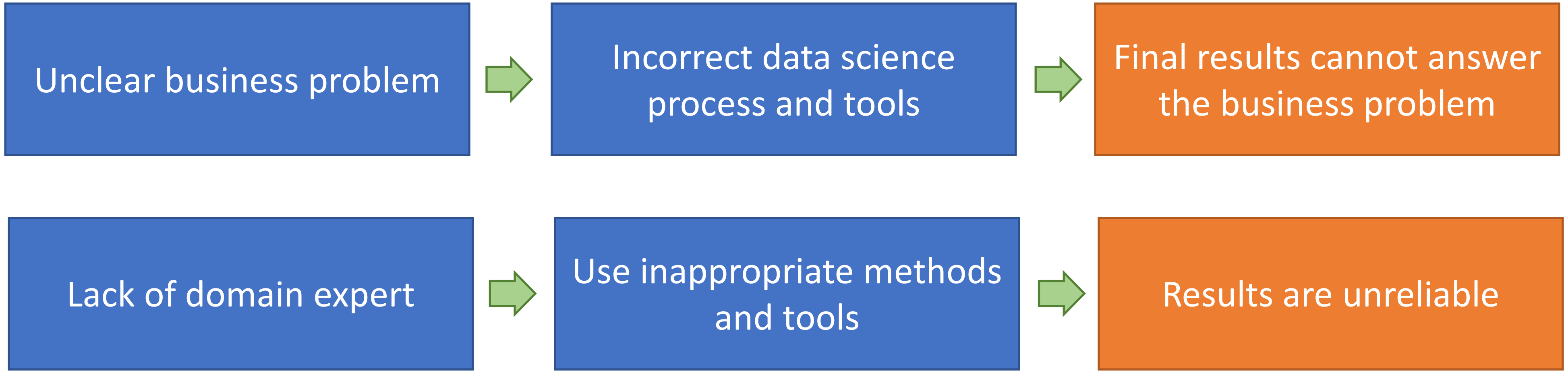


Challenging Issues in Data Science

Results not used by decision makers

This issue may be caused by

- Lack of clear question to answer
- Lack of domain expert input



Unclear business problem → Incorrect data science process and tools → Final results cannot answer the business problem

Lack of domain expert → Use inappropriate methods and tools → Results are unreliable

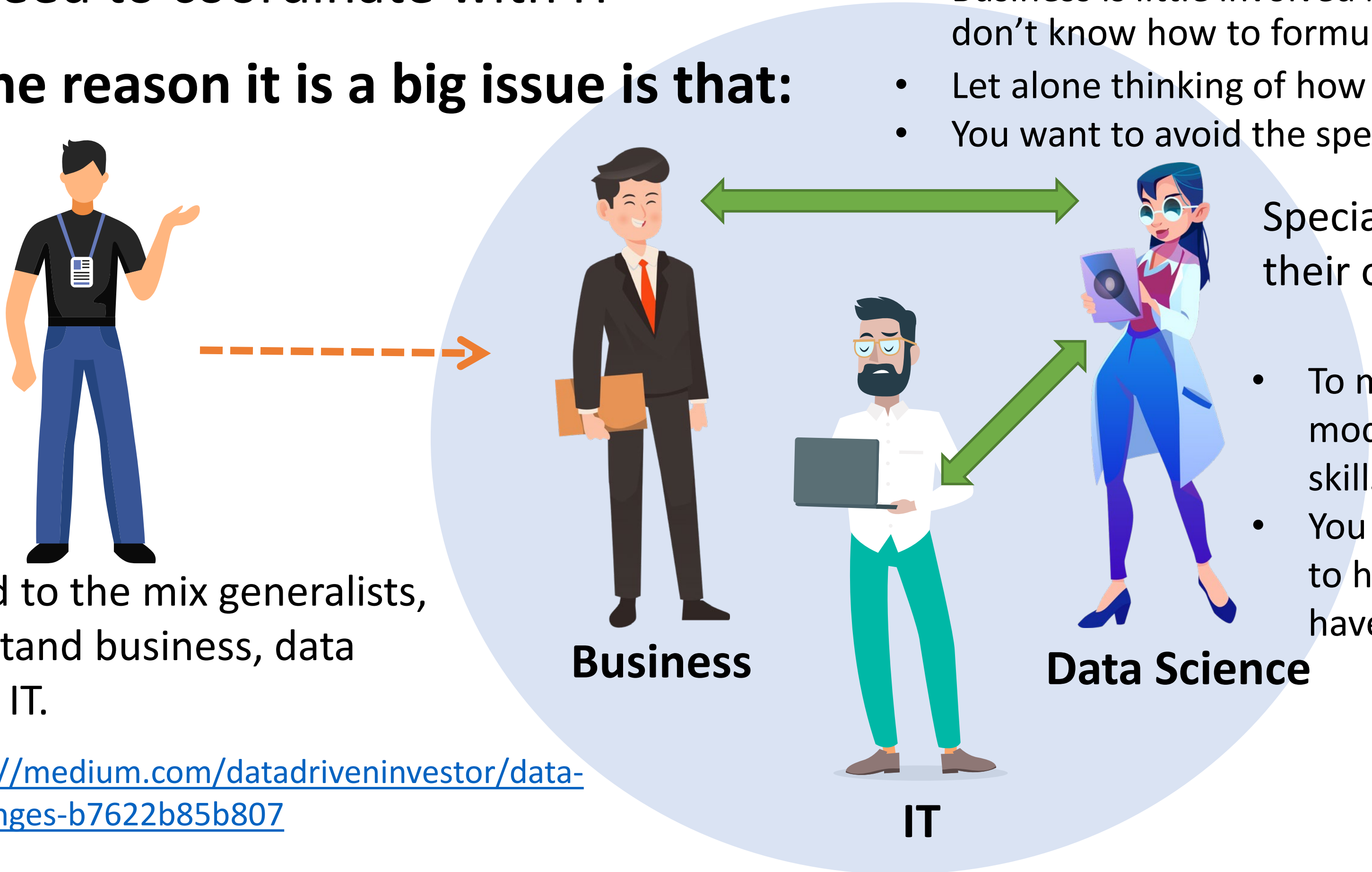
Challenging Issues in Data Science

Collaboration and organizational issues

1. Explaining data science to others
2. Need to coordinate with IT

The reason it is a big issue is that:

- Business is little involved because they don’t know how to formulate the problem.
- Let alone thinking of how to solve it.
- You want to avoid the specialist bias.



Specialists tend to have their own language

- To minimize the time required to put a model in production, good software design skills are required.
- You do not want your development team to have to rewrite the code data scientists have produced.

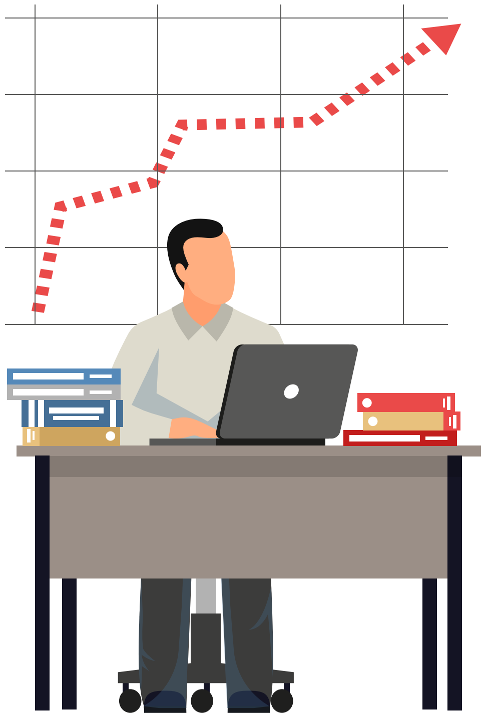
Need to add to the mix generalists, who understand business, data science and IT.

Source: https://medium.com/datadriveninvestor/data-science-challenges-b7622b85b807

Challenging Issues in Data Science

Talent

1. Lack of data science talent
   - The generalist talent is required to do the initial problem solving
2. Integration finding into decisions
   - Need more experiences.



Challenging Issues in Data Science

Tools

1. Multiple ad-hoc environments

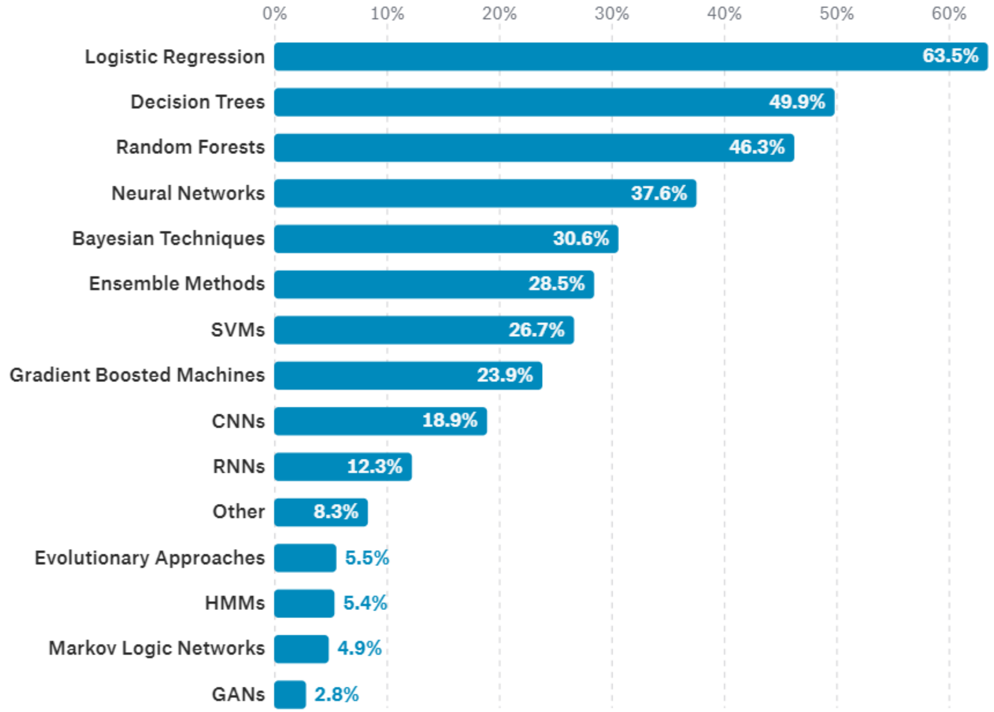
   Ad-hoc code needs to be written to optimize the computing time required to run the models.

2. Limitations of tools
   - Limitation of software
     - A software has both advantages and drawbacks.
     - We need to use more than one software to perform a data science project.
   - Limitation of hardware
     - Hight computing power
     - Expensive technology stack
   - Limitation of algorithms/methods
     - Simpler algorithms might limit your findings.
     - Most advanced algorithms do not scale well with the size of the datasets.

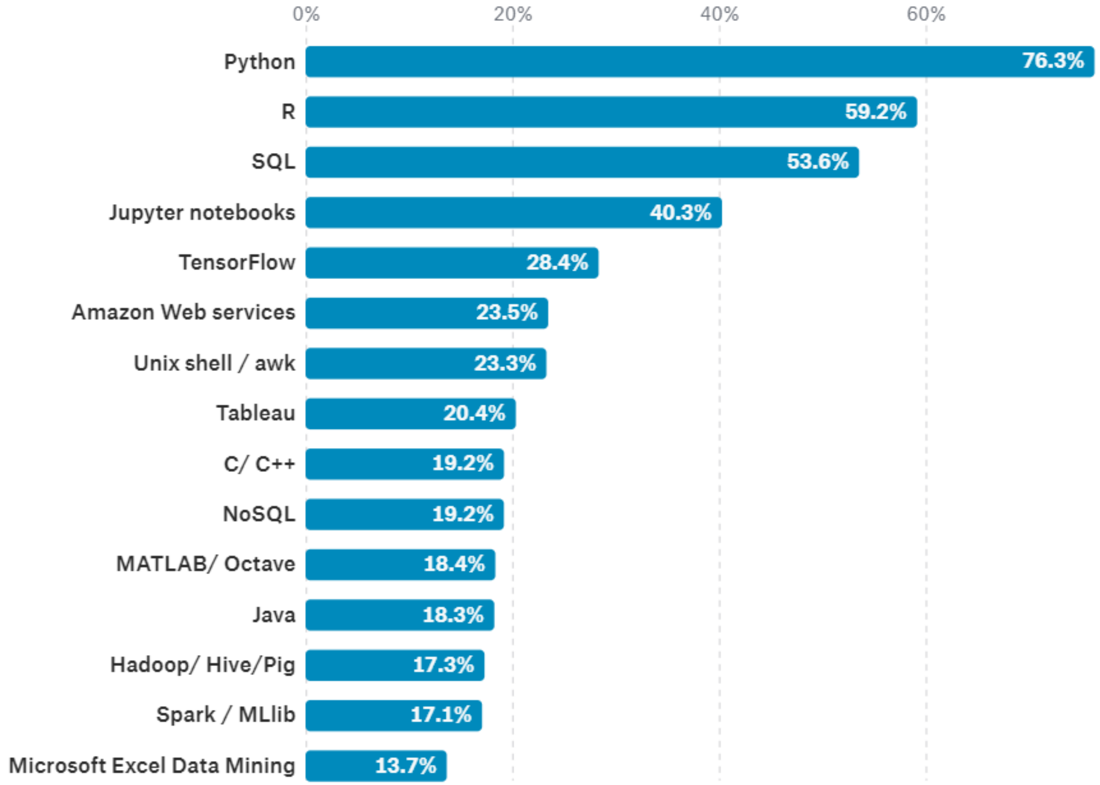
Challenging Issues in Data Science

Tools

Most commonly data science method used at work



Most commonly used data analysis tool



A survey conducted by Kaggle, from August 7 to August 25, 2017.
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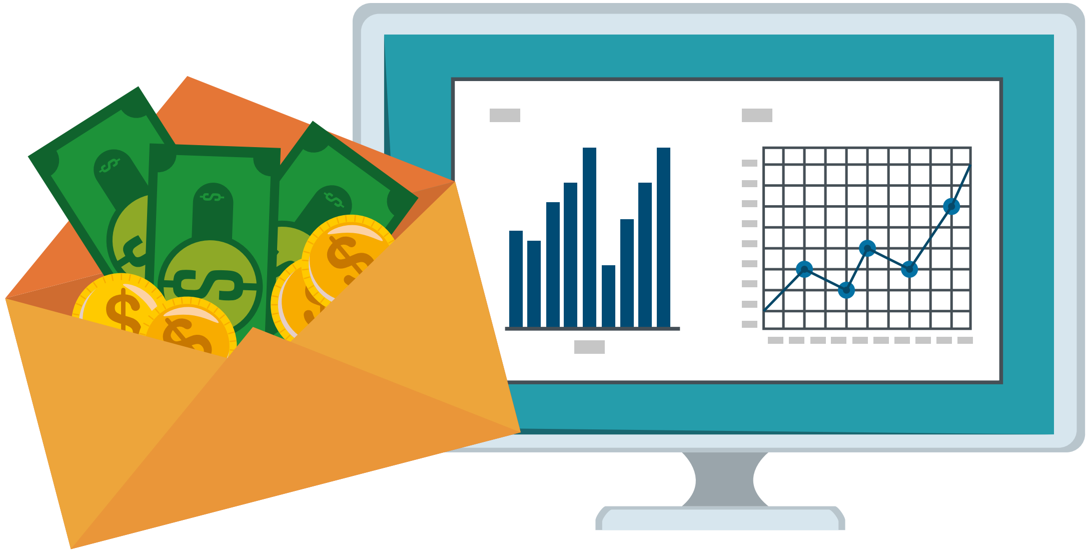
Challenging Issues in Data Science

Budget

1. Lack of management/financial support
2. Can’t afford data science team
3. Expectation of project impact
    - If the costs are higher than the expected outcome of the project, then there is no point doing this project.



Reference and Further Study

- Kaggle (2017). Kaggle Machine Learning & Data Science Survey. Accessed on 7 April 2020. url: https://www.kaggle.com/kaggle/kaggle-survey-2017
- Stef Caraguel (2018). Data Science Challenges. Accessed on 7 April 2020. url: https://medium.datadriveninvestor.com/data-science-challenges-b7622b85b807