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ADVANCED DATA
ANALYTICS IN BUSINESS



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Survey for the project “Advanced Data Analytics in Business”



**We make
DATA DO
business for you**

Prepared by [Data Do](#)
for the Serbian Association of Managers (SAM) and ADA project

April – May 2019



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Agenda



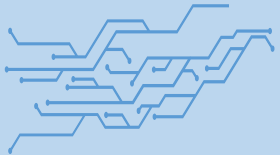
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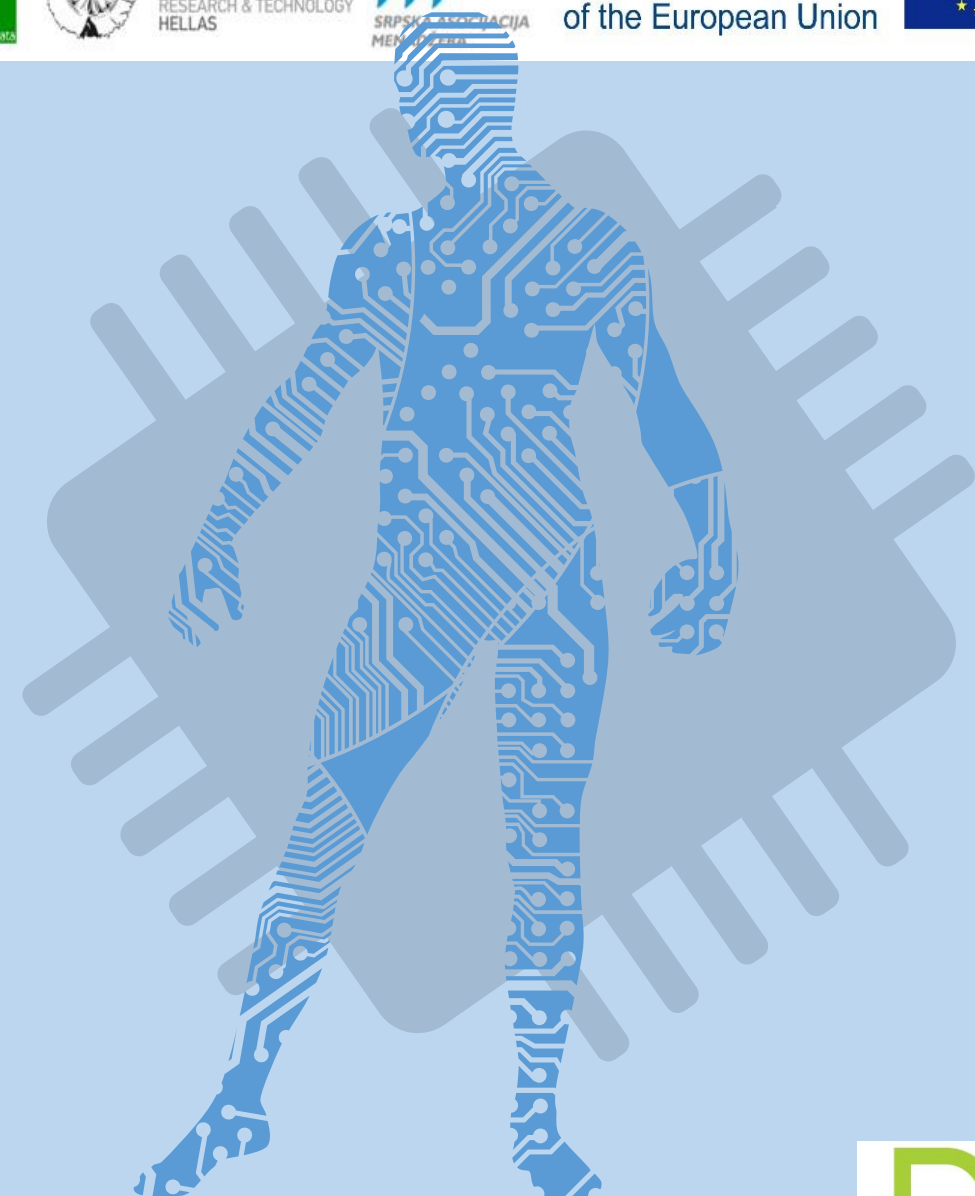
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04 Methodology

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ERASMUS & ADA & SAM

This survey is part of the ERASMUS project “Advanced Data Analytics in Business - ADA” in which SAM is participating in partnership with 4 major universities in Serbia (the Universities of Novi Sad, Belgrade, Niš and Kragujevac) and EU partners from Cergy, Rome, Thessaloniki and Vienna.

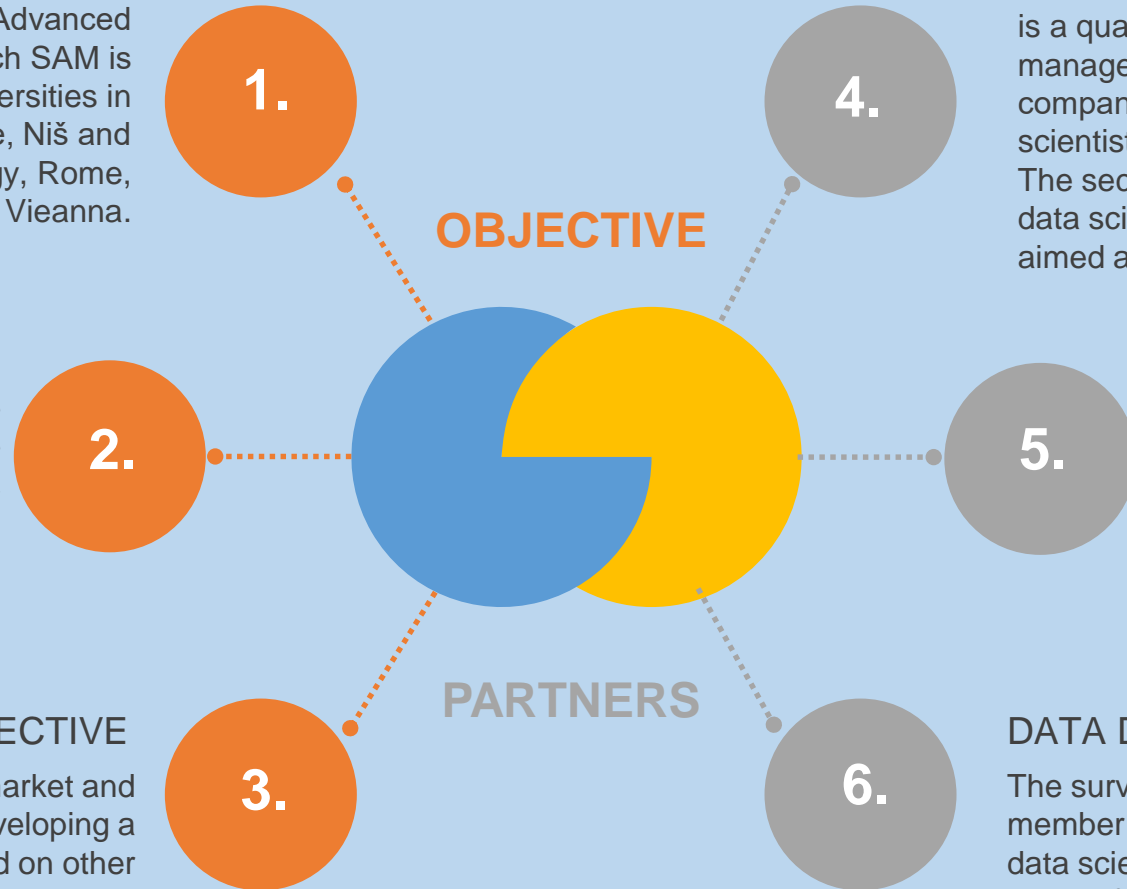
PROJECT FOR BUSINESSES

The project focuses on generating new experts in business analytics, whose task within companies will be to perform a wider form of data analysis (using mathematical and statistical analyses, data mining, business forecasting models, data testing, big data analysis, machine learning, text analysis, etc.).

PROJECT OBJECTIVE

Closing the current gap on the labor market and cooperating with companies with a view to developing a sustainable study program, which will be modelled on other international programs, in order to become a leading business analytics program in the Western Balkan region. A new master study program will be developed, implemented and accredited, and accompanied by versatile lifelong learning programs for experts from different spheres of the business community.

Survey objective & partners



TWO PHASES OF THE SURVEY

The survey is organized in two phases. The first phase is a quantitative survey conducted on a sample of managers, who are members of SAM, to identify the companies' development stage and understand how data scientists may fit into the current organizational structure. The second phase is a semi-structured discussion with data scientists (or their immediate superiors), which is aimed at getting more in-depth findings.

GUIDELINES FROM BUSINESSES

Based on inputs and best practices of universities in France, Greece, Austria and Italy, Serbian universities will design new methodologies, courses and master study programs in the field of data analytics, which will be available to students and staff of companies alike.

DATA DO

The surveys are conducted by DATA DO company, a member of SAM. DATA DO is a company dealing with data science use in business. Our experts boast many years of experience in working with data - they assist companies to put data to the purpose, i.e. to monetize data both internally (by optimizing internal processes using new analytics) and externally (by generating additional income through selling data that may be valuable on the data market).



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Summary

Survey of managers' (SAM members') views

Key findings

Most respondents claim that, to their own knowledge and understanding, their companies **have not implemented any data science projects so far**. Those companies that have implemented them have used **internal resources** to do so.

Respondents **have average awareness of what a data scientist actually does**. **One in five companies employs data scientists**. Respondents mostly **don't know whether they are going to employ new data scientists** within the next year or so.

Data scientists work in different departments. This definitely **makes training adjustments much more difficult**. Apart from communication skills, managers believe that **knowledge of industry and business knowledge** are very important skills.

What representatives of companies currently **value more is output creation and visualization rather than the process** of reaching outputs (probably due to a low level of knowledge of techniques that data scientists can utilize).

April 2019
CAWI, n=46

Processes that are already perceived as priorities in terms of use of new analytics: consumer-related insights and more precise targeting (more common in medium-sized and big companies), financial planning and analysis (more common in small companies), pricing and profitability.

Respondents assess the **use of advanced analytics** in their respective companies to be **at a rather low level**. The main **obstacle is the lack of understanding** as to how to apply advanced analytics.

Departments that are mainly responsible for optimal data management and improvement of business decision-making processes include those for **finance, management and business intelligence**.

Unlike more developed countries where a clear separation of data management functions is already in place, respondents (especially those from medium-sized and big companies) have listed a **broad spectrum of functions**.



Knowledge and skills which are important for Data scientist to have today and to be an expert in, are:

- data analytics,
- statistics & algebra,
- data visualization,
- descriptive analysis (transforming data into information),
- to be open towards cooperation with domain experts,
- to work with advance tools,
- to understand data,
- to recognize business problem,
- to shape data,
- to understand basics of strategy and financing,
- to communicate with other sectors and
- to have experience.

Summary – part II

Survey among technical / expert professionals

(May 2019, n=12)

One knowledge which is **particularly important is understanding business processes**, which allows Data scientist to participate in designing them thru defining data that those processes create, as well as IoT and machine learning.

Things which Data scientist **does not need to know excellently**, but does need to understand, is architecture of data and work with data bases (not only to administrate them).



Processes which are treated as a priority in terms of use of new analytics driven by big data opportunities

Consumer-related insights and more precise targeting

Financial planning and analysis

Pricing and profitability

Operations

Sales and tracking of customers' orders

Planning and use of company resources

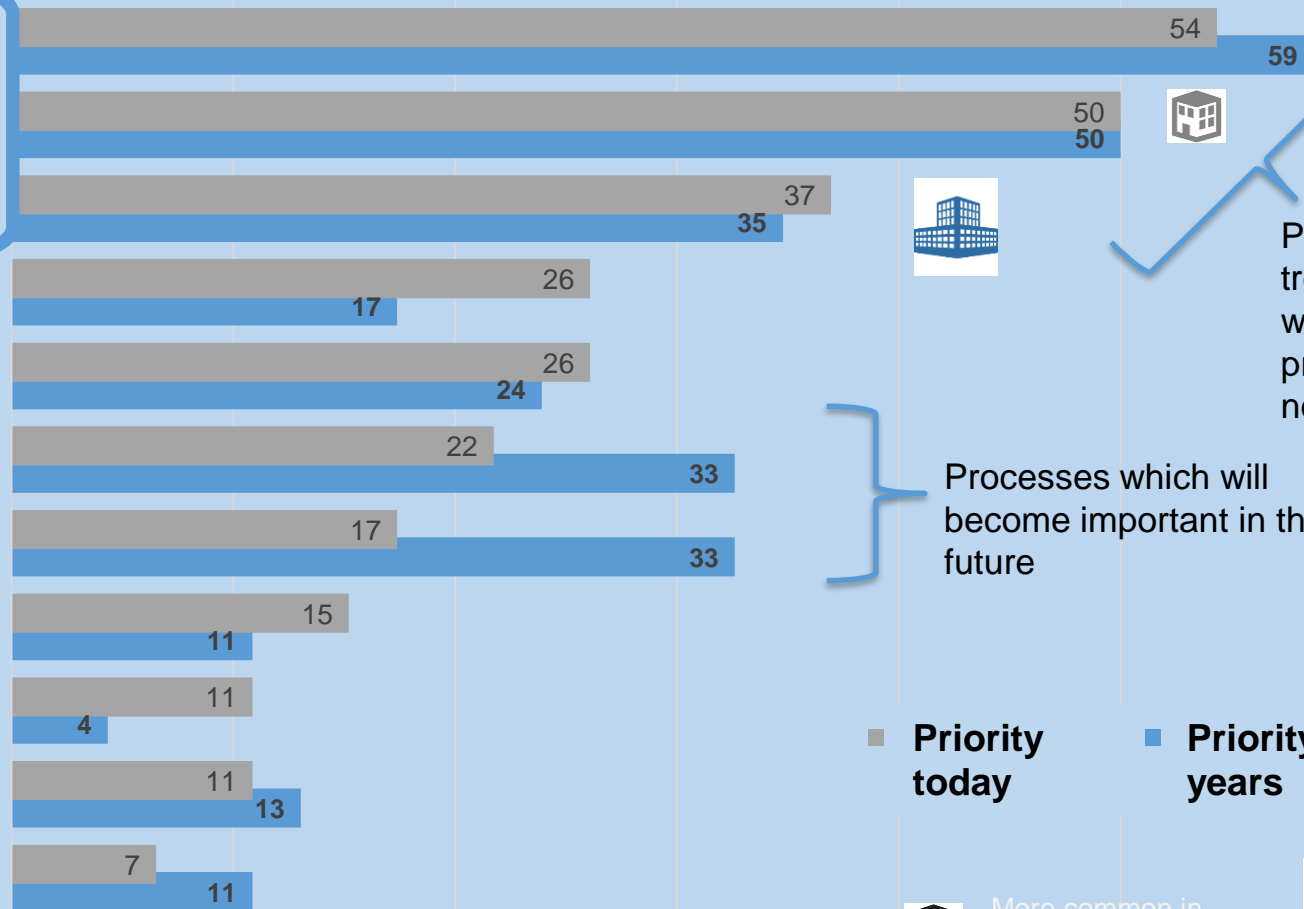
Risk management and performance management

Supply chain logistics

Record-keeping and execution of customers' orders

HR management

Product life cycle evaluation



Processes which are treated as a priority and which will remain a priority in terms of use of new analytics

Processes which will become important in the future

■ Priority today ■ Priority in 3 years

More common in small companies

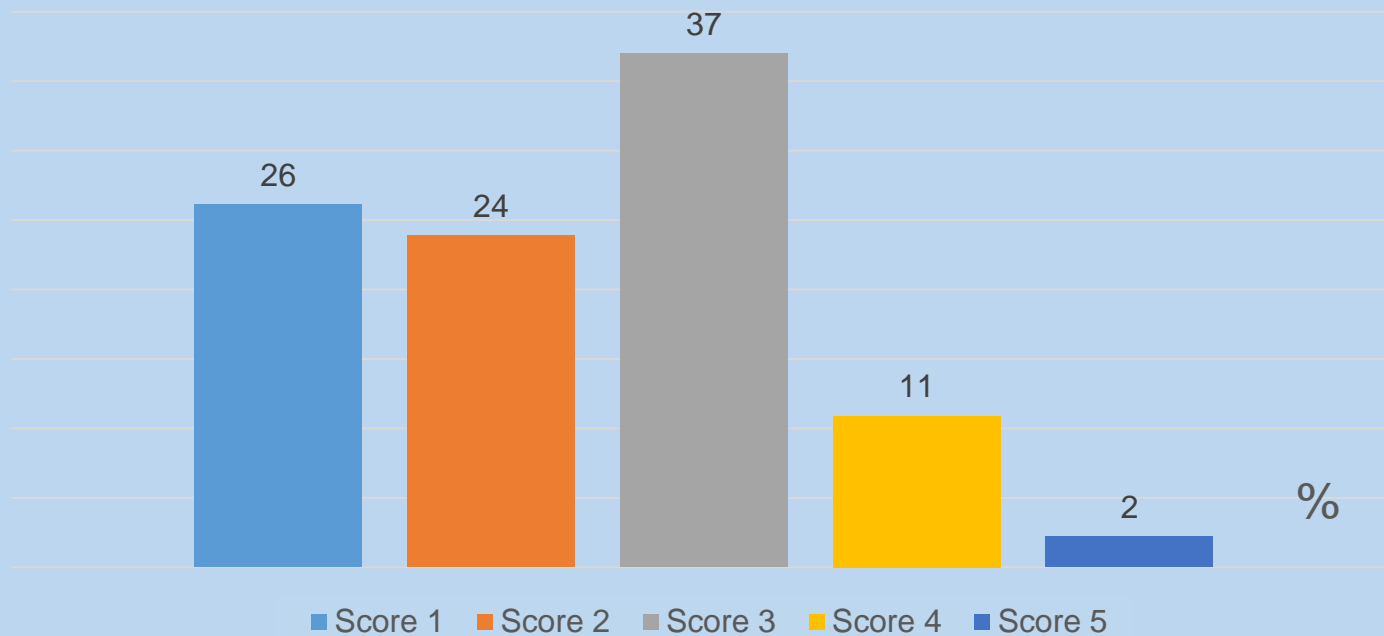
More common in medium-sized and big companies



Use of advanced analytics

2.4

Average score



Representatives of companies have assessed the use of advanced analytics to be at a very low level

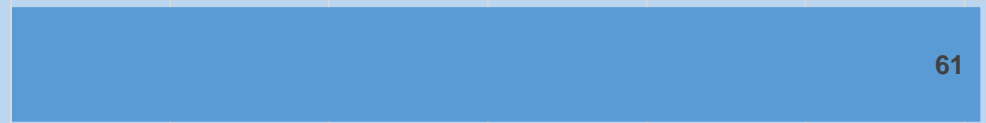
One in 4 companies has still not started using advanced analytics. Larger companies, foreign owned companies and companies which are also active on foreign markets are more advanced in this regard

Q2x3 [Please select an answer from the multiple choice] How do you assess the current use of advanced data analytics based on big data concept in your company? Please give a score on the scale of 1 to 5; the score of 1 meaning that the company has not started using it yet; and the score of 5 meaning very advanced use.

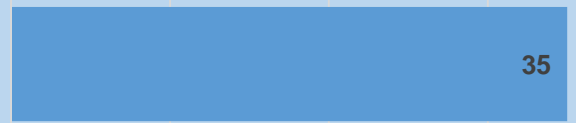


Obstacles to use of advanced analytics

Lack of understanding how to apply advanced analytics at certain positions within the organization



Data is not recognized as a valuable asset throughout the organization



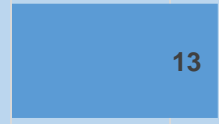
Lack of financial resources



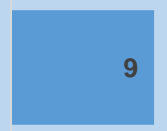
Organizational silos and data silos



Other



Lack of agreement among top managers as to the value for money that advanced analytics and big data can bring to the company



Particularly affects small companies

More common in larger companies and companies that employ data scientists

%



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CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS



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Details of use of data and advanced analytics systems

Data is a key element of our strategy.



More common in companies operating on foreign markets, as well as in larger companies

We use data to create reports (graphic reports and tabular reports) or dashboards.

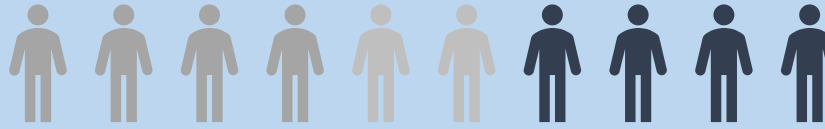


We keep all our data in a central data repository, such as data warehouse, data lake, etc.



13% don't know

We use online data integration tools.



We use data to develop predictive models.



We use Business Intelligence systems, such as Power BI, QlikView, IBM Cognos, Oracle BI, Sisence, Tableau, etc.



11% do not know

More common in foreign owned companies

In our company the process of data gathering and processing for the purpose of loading the data warehouse (ETL process) is fully automated.



11% don't know

Q2x6 Please score the following statements on the scale of 1 to 5; 1 is for complete disagreement with a statement; and 5 is for complete agreement with a statement. % is top 2 boxes (i.e. the percentage of respondents who partly or completely agree with a statement)



Departments that have optimal data management and use data to improve business decision-making processes





Job titles of company officers who are mainly responsible for data management and use of data to improve business-decision making processes

- FINANCIAL DIRECTOR / CFO**
- CEO**
- CONTROLLER**
- BUSINESS ANALYTICS**
- CHIEF DATA SCIENTIST**
- NO POSITION**
- MARKET INTELLIGENCE MANAGER**
- BUSINESS INTELLIGENCE MANAGER**
- CRM SPECIALIST**

According to a similar survey in the USA*, 65 companies on the Fortune 1000 list have clearly separated two positions: Chief Data (Analytics) Officer and Chief Information Officer.

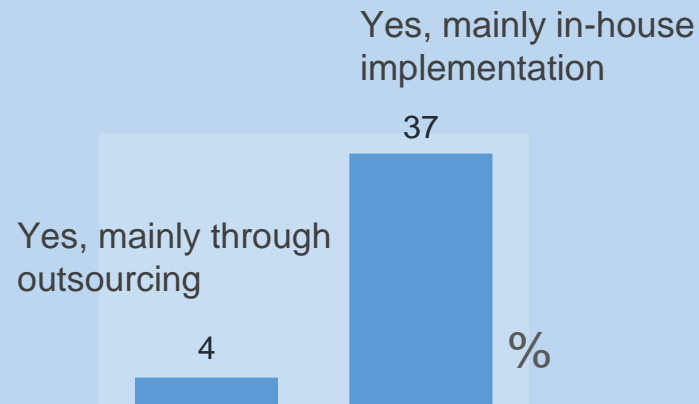
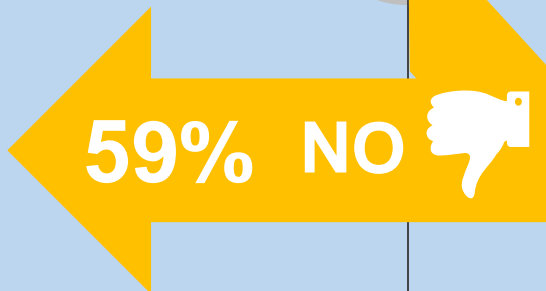
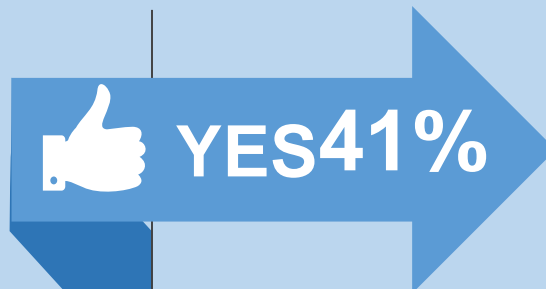
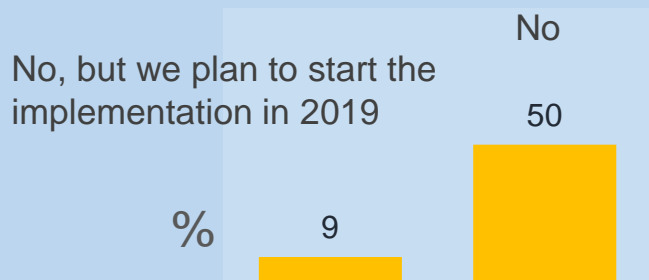
In smaller companies CEOs usually perform this role, whereas larger companies have much more diverse positions. Most of these positions are related to finance and controlling.



Data science project implementation in companies

Have not implemented it

More often the case with small, locally owned companies



Have implemented it

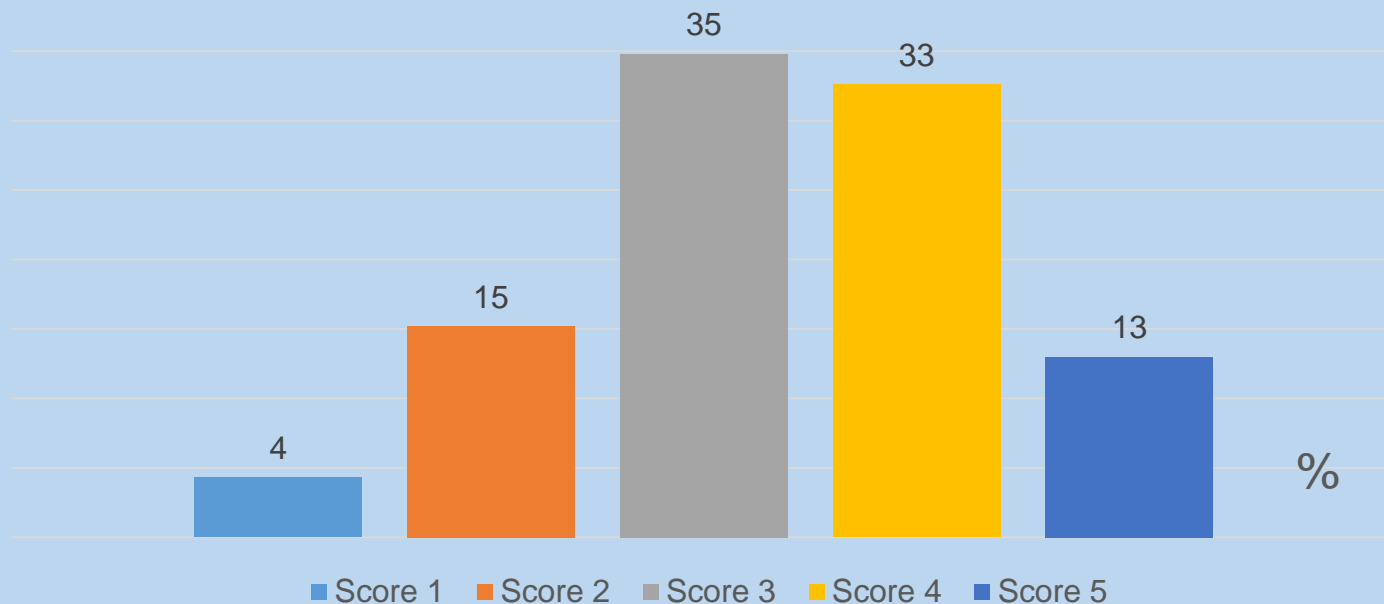
More often the case with medium-sized and larger, foreign owned companies



Respondents' own awareness of data scientist's place and role in the organization

3.3

Average score

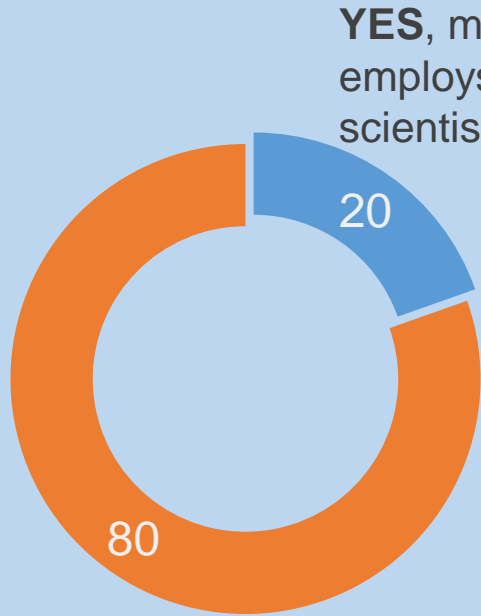


There is an average awareness of what a data scientist does – companies need to be trained on the role of data scientists

Medium-sized and larger companies, foreign owned companies and companies which are also active on foreign markets are more aware of the place and role that data scientists may have in a company



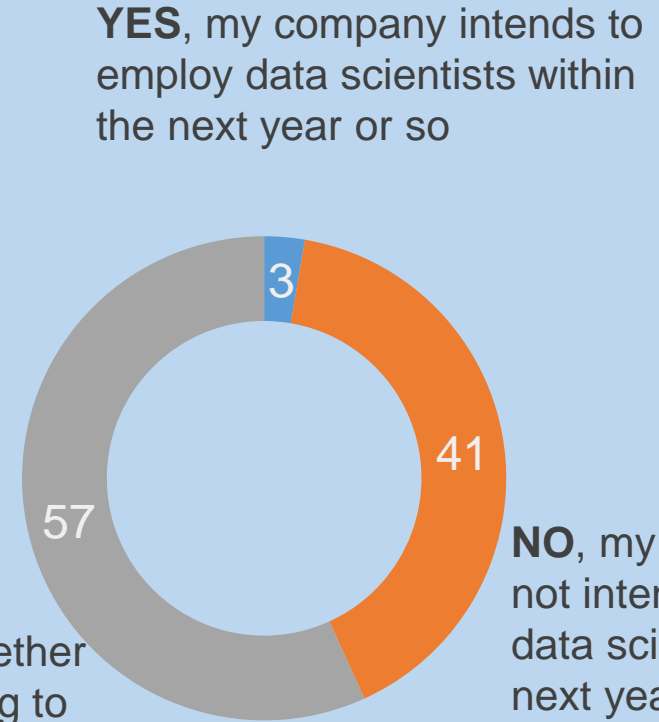
Demand for data scientists



NO, my company does not employ data scientists

More often the case with companies with 50 or more employees

I DON'T KNOW whether my company is going to employ data scientists within the next year or so



NO, my company does not intend to employ data scientists within the next year or so



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Departments where data scientists work



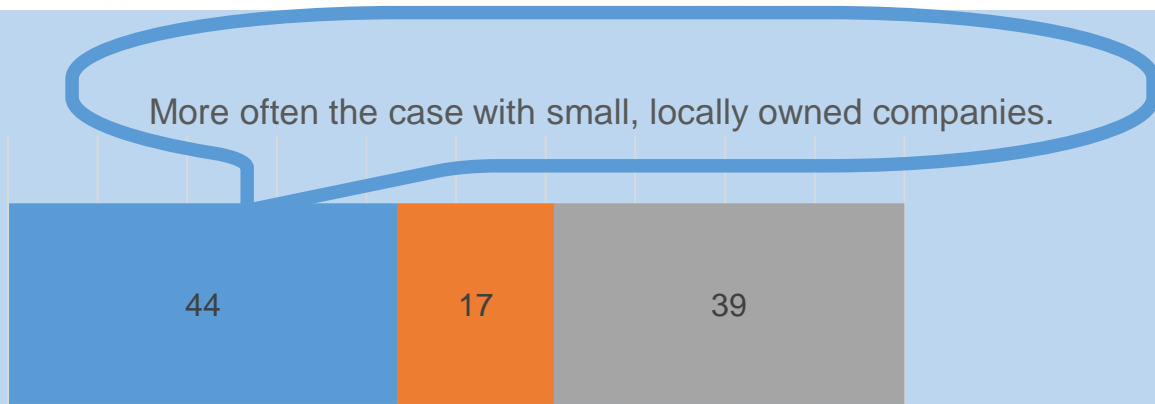
It appears that there is no universal place (department, position) where a data scientist can work. This fact additionally complicates development of a relevant curriculum for education of future data scientists.

Q2_8 (If your company does employ data scientists) In which department(s) are they based? n=9 (Note: The sample is too small for inference)

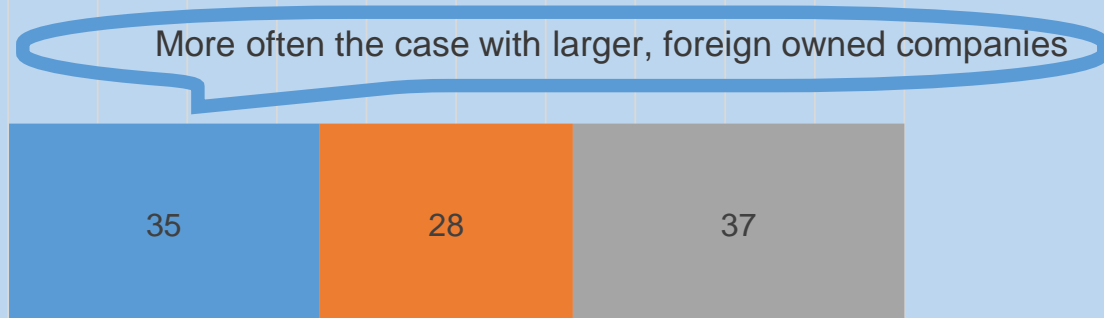


Obstacles that data scientists (may) encounter in a company

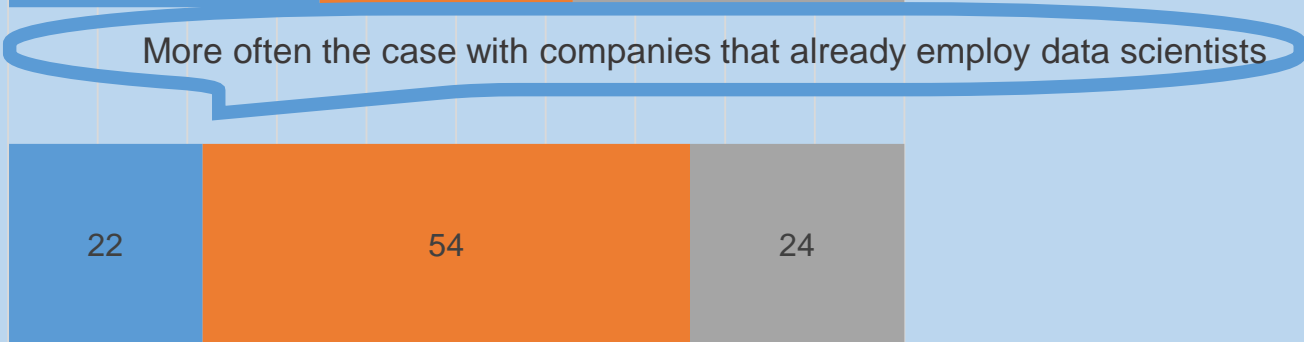
1. Technological obstacles (inability to collate and unify data, data not available, inability to process and warehouse data, lack of appropriate tools, etc.)



2. Organizational culture (resistance to change, silos organizations, etc.)



3. Organizational obstacles (what processes are being used to obtain data, silos decision-making, etc.)



Rank 1 Rank 2 Rank 3

Q3_6 What are the most common obstacles that data scientists in your company may encounter (or have already encountered) in your company? On the scale of 1 to 3 please rank the options provided.

A similar survey in the USA* has shown that the main obstacle that is preventing a company from becoming more data-driven is people much more than technology.



Data scientists' skills that company managers deem important

Business intelligence skills



Comprehensible communication with non-data scientists



Knowledge of industry in which data scientists are working



Business knowledge in general



Statistical modelling



Adequate data visualization



Data mining



Programming



Machine learning



What managers deem important is communication and knowledge of industry

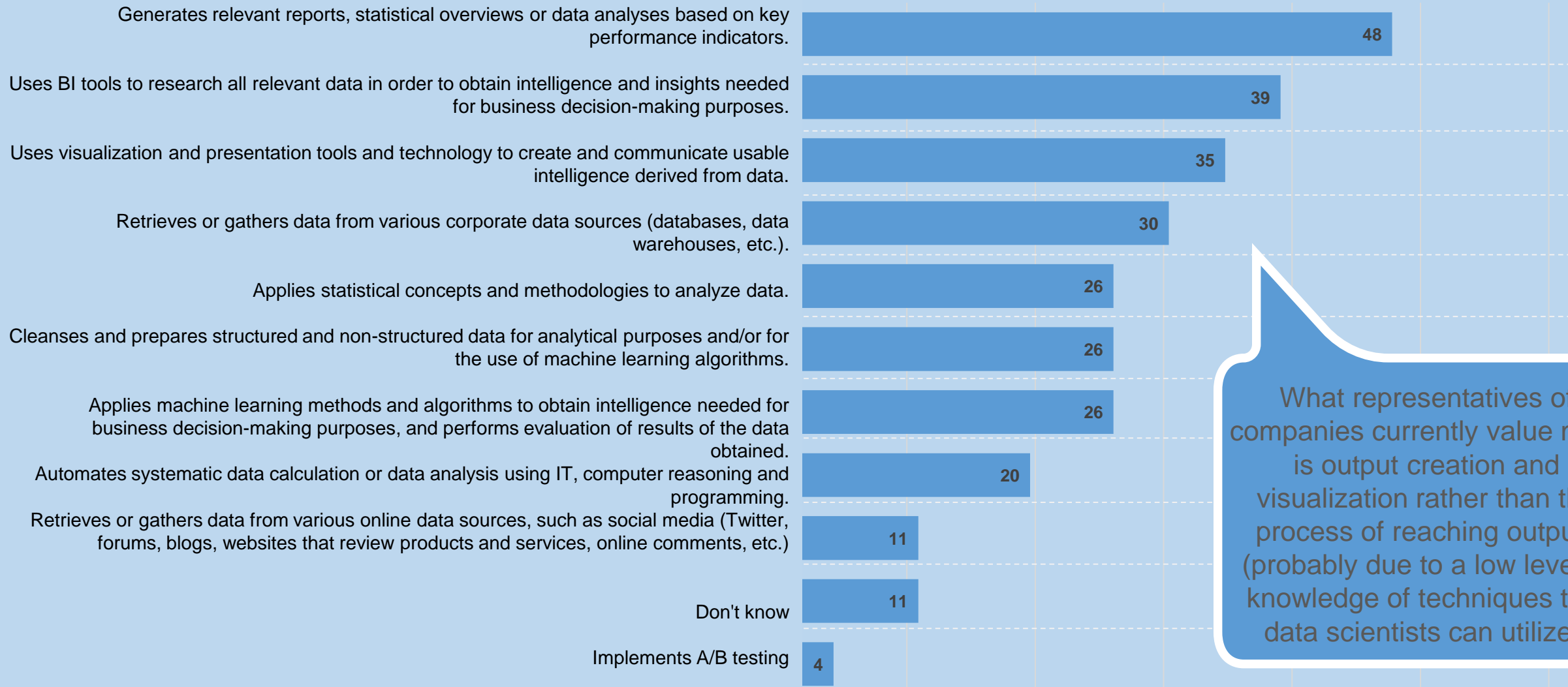
Q4_1 In your opinion, what skills should data scientists possess? Please score the following statements on the scale of 1 to 5; 1 is for unnecessary skills; 2 is for irrelevant skills; 3 is for a neutral view; 4 is for relevant skills; and 5 is for crucial skills. n=46; % is the top 2 boxes (i.e. the percentage of respondents who gave the score of 4 or 5).

And more...





Data scientist's knowledge that the company needs



What representatives of companies currently value more is output creation and visualization rather than the process of reaching outputs (probably due to a low level of knowledge of techniques that data scientists can utilize).



Job Description „Advanced data analyst in business“ (data scientist) – *consensus among surveyed experts*

Business aspect

Recognizing
business problem

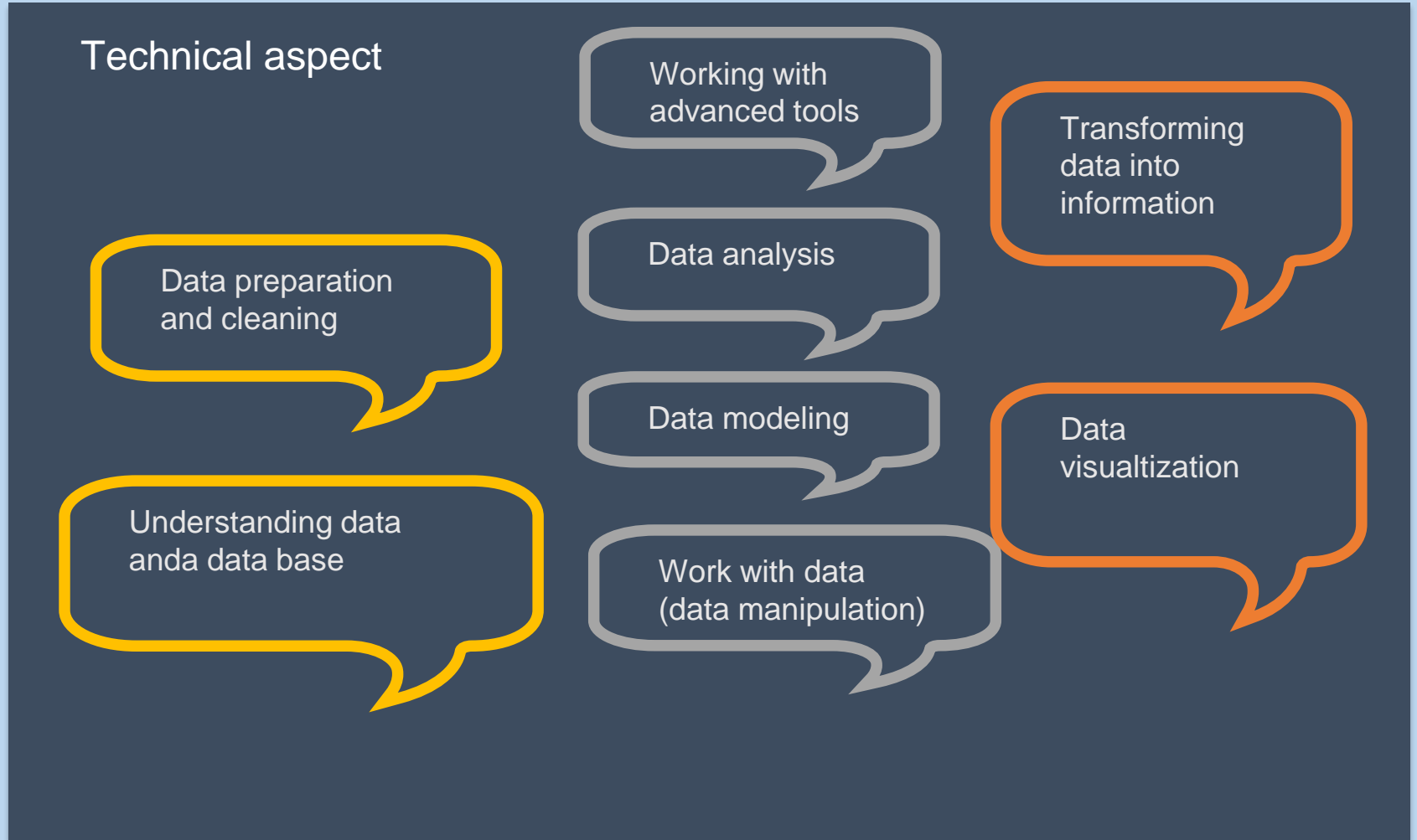
Communication with other
departments

Open to cooperation with domain experts („it is not possible to be expert in all areas where analytics is needed”).

To be involved in defining processes in the firm i.e. in defining data that are produced by those processes („today we have situations that new applications are implemented within the company, without including data scientists in the process, and then those data are not complete or are later unusable”).



Job Description „Advanced data analyst in business“ (data scientist) – *consensus among surveyed experts*





Job Description „Advanced data analyst in business“ (data scientist) – *consensus among surveyed experts*

Knowledge

Know how data base work (understanding, not administration).

Is familiar with data architecture (not to create, but to know it)

Basics of strategy and finance

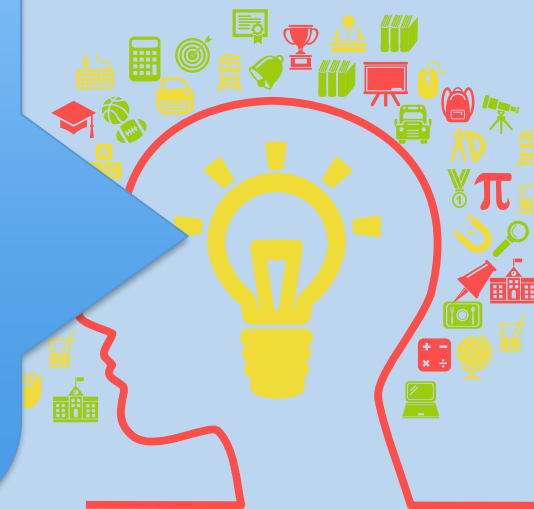
Statistics, algebra

Understanding & following IT technologies (does not need to be an expert)

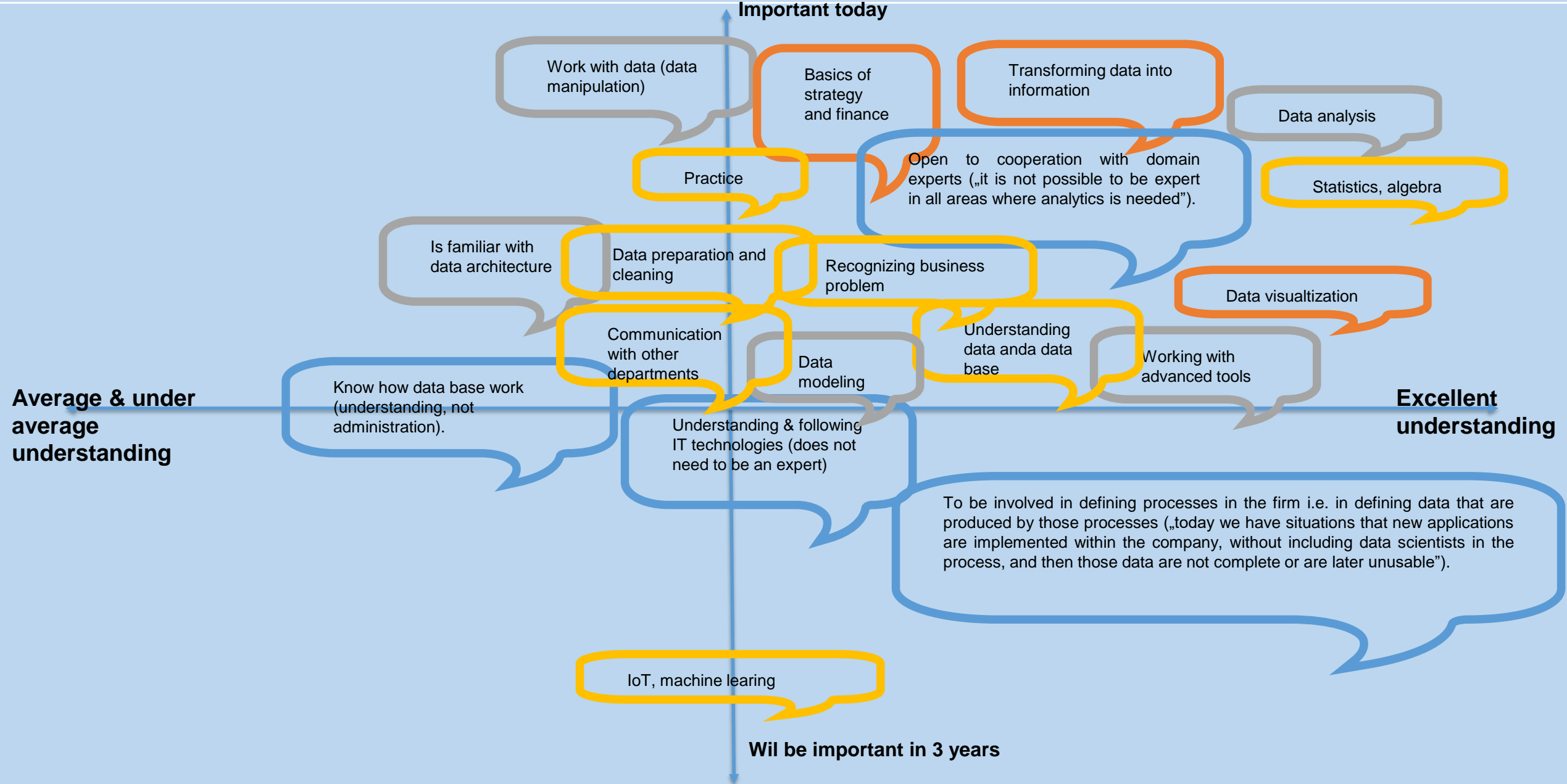
IoT, machine learning

IT IS NOT THE JOB OF DATA SCIENTIST:

- Does not need to be an expert in programming or in program language, which is not part of his job
- Data base administration
- To be financial expert .
- To do all IT work
- To create data architecture (data engineering)



JD Data scientist: what is important to know today, what in 3 years





Job Description „Advanced data analyst in business“ (data scientist): different opinions

CANNOT BE A DOMAIN EXPERT

It is not possible to be expert in his area of work and to understand each industry and all business process in each industry.

DOES NOT NEED TO BE GOOD PRESENTER

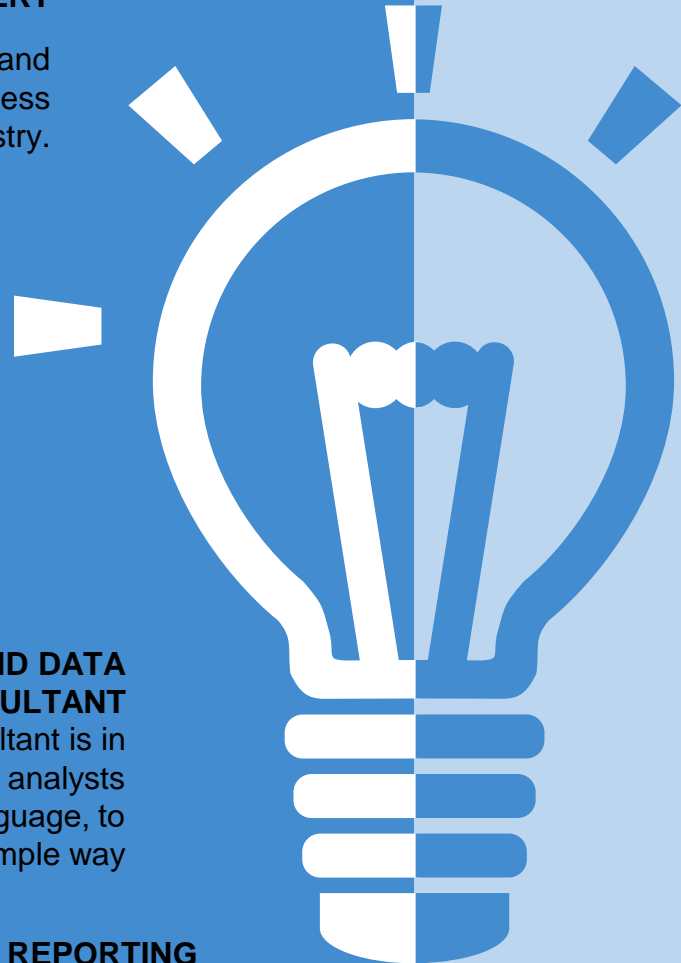
It is enough to prepare domain expert (how is not data scientist) for presentation.

THERE ARE 2 POSITIONS DATA ANALYST AND DATA CONSULTANT

„Analyst must have more technical knowledge. Consultant is in business, he should translate the work that data analysts executes, to model, to has the „understandable“ language, to know how to communicate in simple way

DOES NOT NEED TO DO REGULAR REPORTING

Regular reporting should not be part of his work.



MUST HAVE EXCELLENT KNOWLEDGE OF PARTICULAR INDUSTRY

„Understanding business is of crucial importance. Without that, it is not possible to communicate with people who are not familiar with analytics. People need to understand why data are important, why analytics is critical, what will be the outcome of analysis and what will be the positive influence on their business. Experts claim that it is easier to find Data scientist than domain experts who understand what they can learn by utilizing data science“

MUST BE GOOD PRESENTER

Must be capable to explain in simple and understandable way the results of his work, and how complex analytics can improve business.

THERE IS ONLY 1 POSITION

„He in on the front, next to business, next to people who will make decisions“

RESPONSIBLE FOR REGULAR AND ACCURATE REPORTING



Interesting findings

„Data scientist is part of the team (internal or external). There are a lot of specialization within this area so it is not possible that one person has it or knows it all: from news in architectures, application of predictive analytics and modeling, thru application of neuro networks (as science area that are developed constantly) ... A lot of time need to be invested in knowing how to create high quality models, and business does not have time. You need to have a person who understands that need, but not only to design complex models at the level which is required from the person in charge of modeling, since there are not enough time”.

„It is very important that lecturers of this master studies are not only from academic and theoretical side, but also people from business practice. Also, it is important that students have practical experience of 3 months to understand and see how things are done in companies. Each industry has its own specifics, margins, etc.“

„There are two positions: data analyst i data consultant – he is in business, he is the on who should translate that things that data analysts executes, to model, to has the „understandable“ language, to know how to communicate in simple way....“

There are 2 types of Data Scientist IT oriented & business oriented.

„THE MAIN GOAL IS FOR DOMAIN EXPERTS TO BE IMPROVED IN ORDER TO BETTER UNDERSTAND AND UTILIZE THE WORK OF DATA SCIENTIS! It is easier to find Data scientist than a domain experts who understand what they can learn by utilizing data science“

Organizational solution: „BI integrates business and data science“.

Organizational solution: „to have Data lab at company level and which is at disposal to all departments“.



How important are the following program languages, technologies, cloud platforms and tools for Data Scientist position?

Average & under average knowledge

Important today

Excellent knowledge

Important in 3 years

Java
Html
Mat Lab
Pig

SAS
SPSS
Excel
Rapid miner

Python
R

SQL

PowerBI
Tableau
GGPlot
Plotly
Qlik

AWS (S3)
Google cloud

Private cloud

Hadoop
Scala
Hive
Spark

Docker

Tensor Flow

NLP

NoSQL



Business basics that Data scientist must be familiar with:

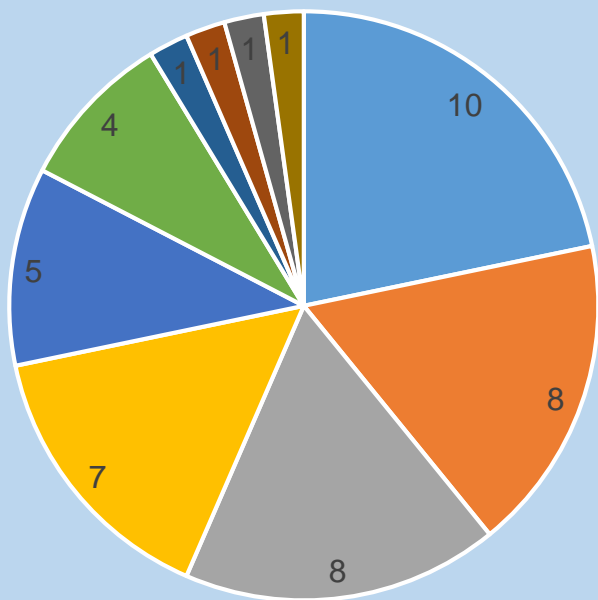
- Strategic Management
- Understanding value chain
- Understanding business processes (because they are changed by data science)
- Basics of finance (ROI, Balance Sheet, Income Statement...)
- Soft skills: presentation skills, communication skills...)



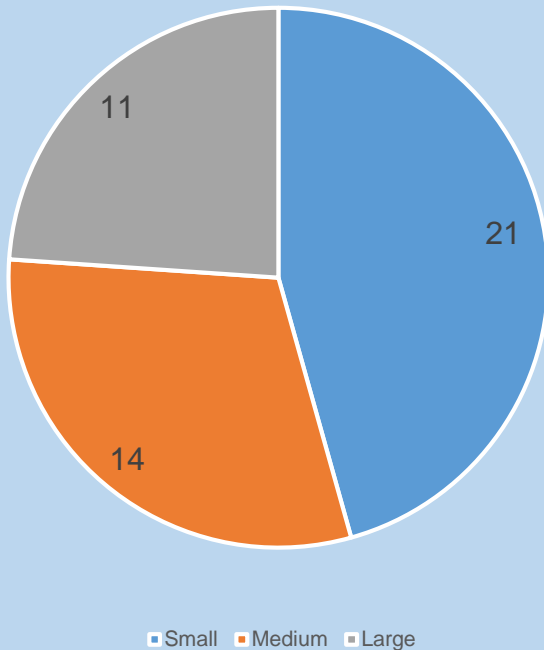
Quantitative Survey details

SAMPLE (number of respondents):

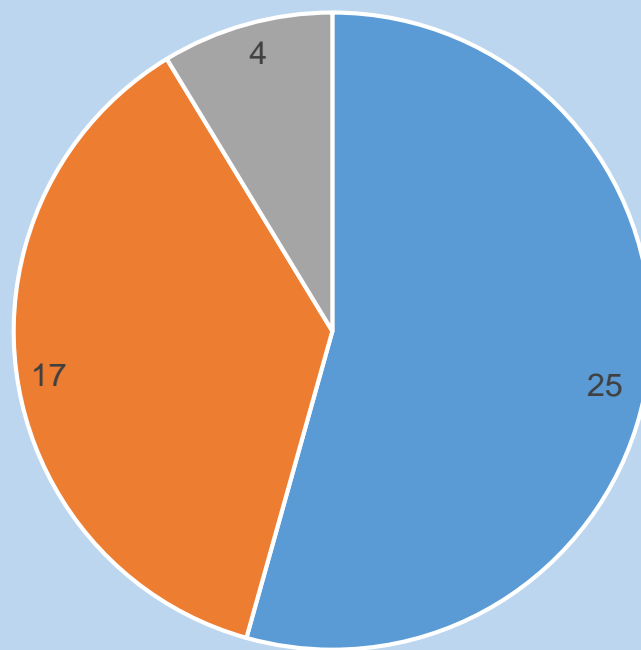
Business activity:



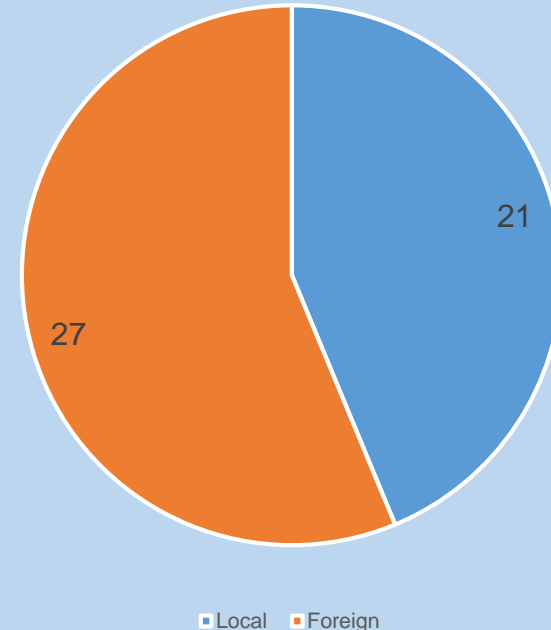
Company size:



Operating for:



Ownership:



- Professional services
- Production
- Telecommunication
- Media, communication, entertainment
- Insurance
- Other
- Financial services
- Retail
- Education
- Transport

- Domestic market
- Equally domestic and foreign markets
- Foreign markets

Note: The sample DOES NOT represent companies in Serbia, which means that the conclusions of this survey may not reflect other companies in Serbia.

Survey technique: online (CAWI)
Target group: members of SAM
Survey period: April 2019



Details on qualitative survey

- Group discussion held on May 5th 2019 in Serbian Association of Managers
- Participants: 12 representatives of SAM members' companies, directly or indirectly responsible for application of advanced analytics



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