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M U N I

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FINancial supervision and TECHnology compliance training program

Overview of the Horizon2020 project

Oleg Deev

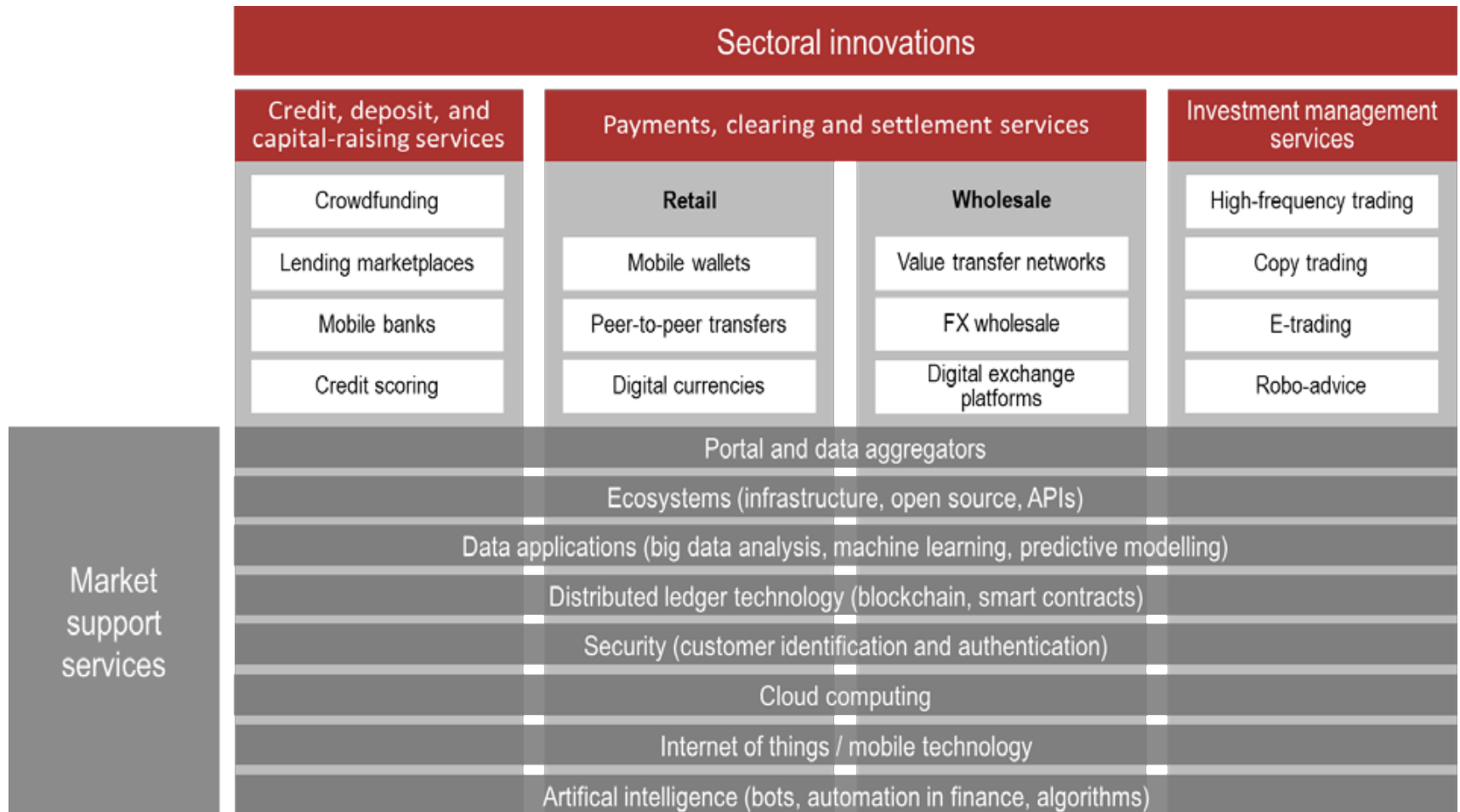
Financial Technologies

- The [Financial Stability Board](#) (2017) defines Financial Technology (FinTech) as “technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and on the provision of financial services”
- Peer to peer lending, robot advisory asset management and crypto payments are examples of Financial Technologies, enabled by big data analytics, artificial intelligence and blockchain technologies.
- *"This creates new dynamics, such as the growing importance of a larger user base for network effects"* (VP Dombrovskis, 26 February 2019)
- While innovation in finance is not a new concept, the focus on technological innovations and its pace have increased significantly.

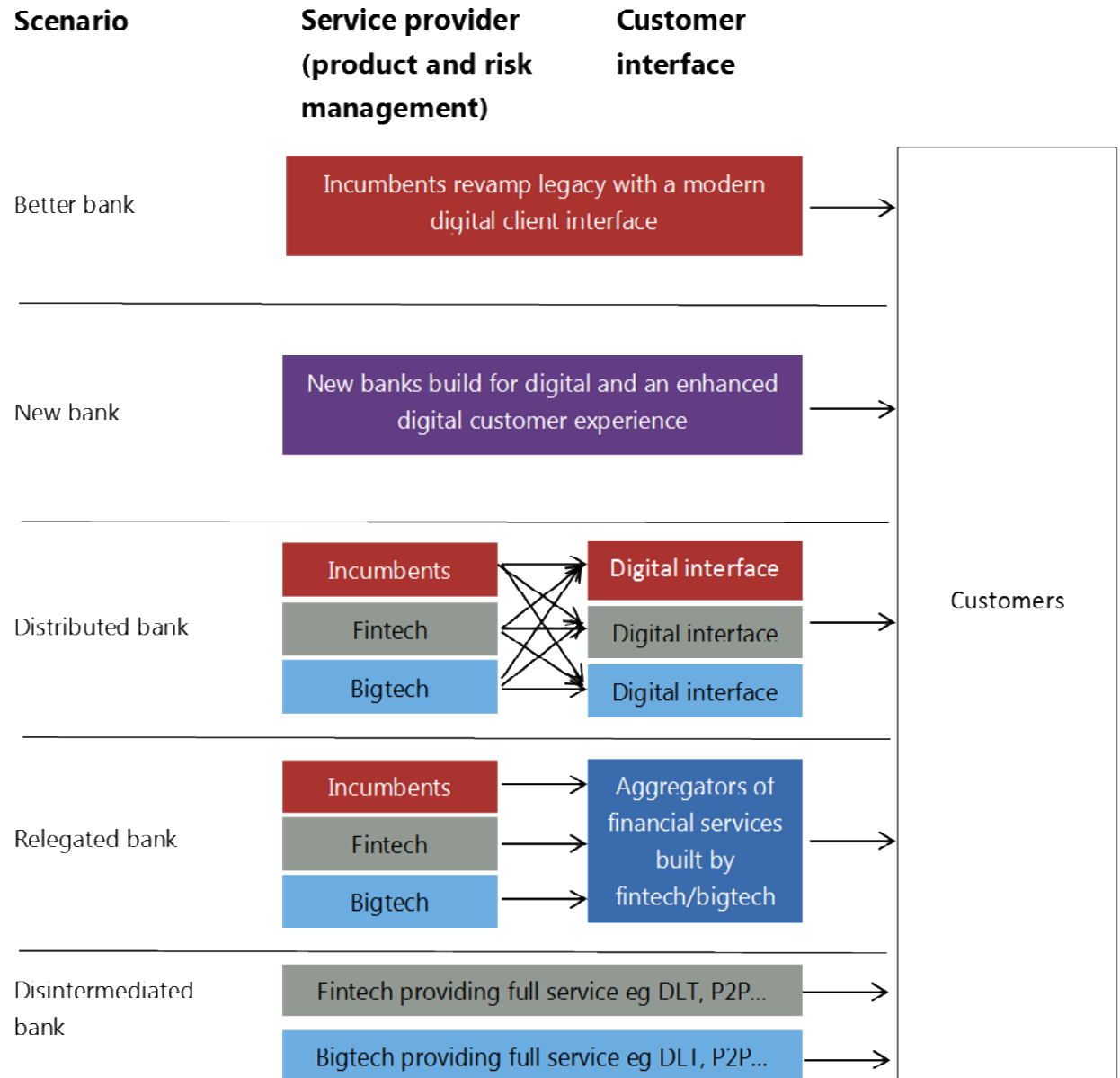
Financial Technologies

- Financial Technologies are changing the nature of the financial industry, creating many opportunities to offer more inclusive access to financial services (European Commission, 2018):
 - competitive prices,
 - better user experience,
 - wider inclusion.
- Financial Technologies may bring higher risks
 - underestimations of credit risks,
 - market risk noncompliance,
 - cyber risks (cyber attacks and frauds),
 - All amplified by the interconnectedness of fintech platforms, which generates systemic risks.

Financial Technologies (BCBS)



Future of Banking (BCBS)



Motivation

Across the board, we are working to strike the right balance between risks and opportunities, so that Europe can benefit fully from new technologies in the financial services sector.

Valdis Dombrovskis
Vice President of the European Commission

Motivation

- There is a strong need to improve the competitiveness of the European fintech sector, introducing a framework for a common risk management approach across all countries, that can supervise fintech companies without stifling their economic potential.
- A framework that can help both fintech and supervisors:
 - Fintech firms that want to grow and scale-up across Europe need advanced regulatory technology (RegTech) solutions;
 - the supervisory bodies' ability to monitor innovative financial products proposed by fintechs is limited, and advanced supervisory technology (SupTech) solutions are required.

Horizon 2020 FIN-TECH project

- The FINancial supervision and TECHnological compliance training program (under the EU's Horizon2020 funding scheme) aims at building a fintech risk management platform which measures risks to make fintech innovations sustainable.
 - A platform that aims to automatize compliance of fintech companies (RegTech) and to increase the efficiency of supervisory activities (SupTech).
- The aims will be achieved through a knowledge exchange hub, which will eventually lead to a European sandbox laboratory, that evaluates risks and opportunities of fintech innovations.

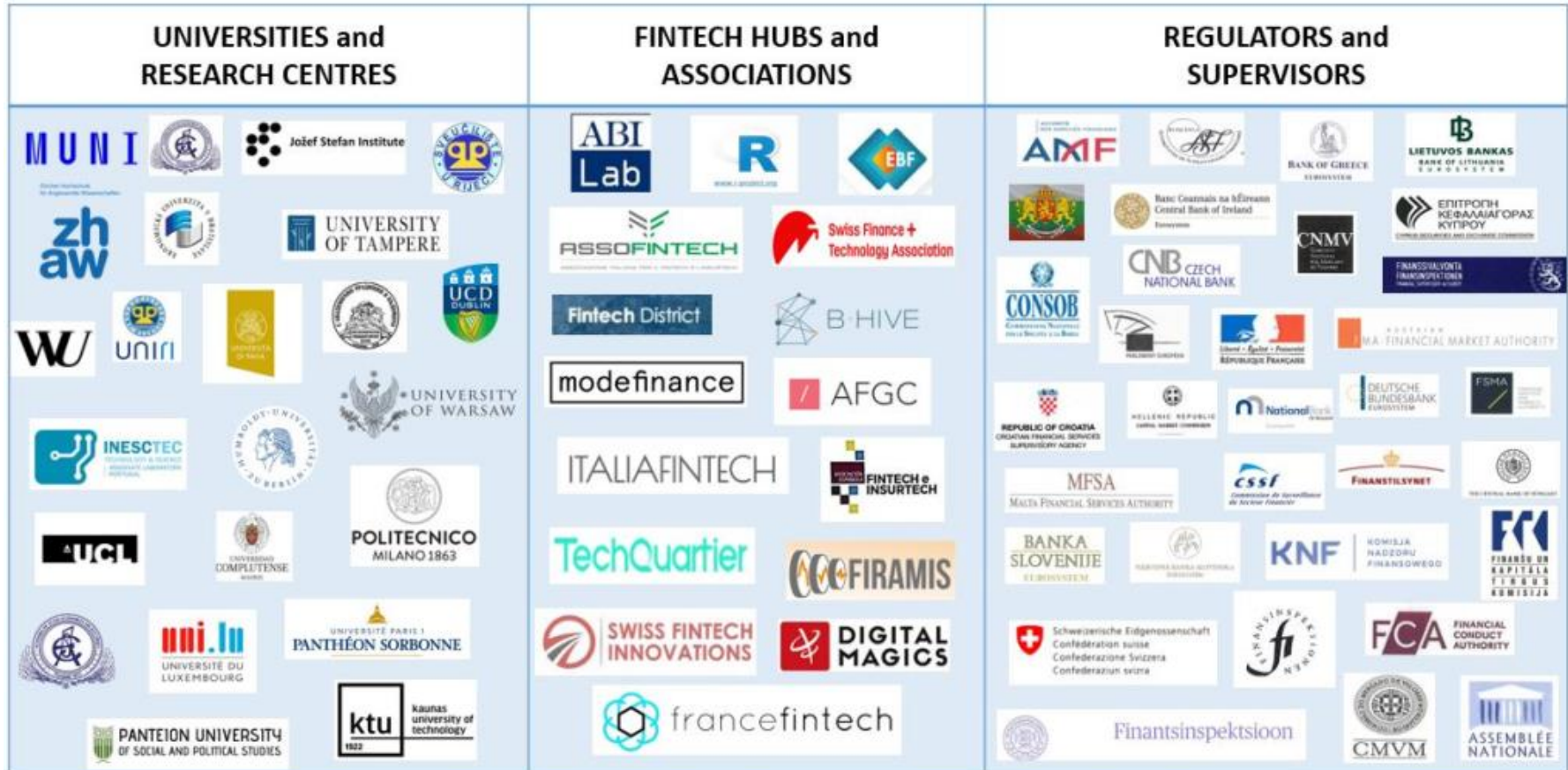
Project Framework

- Research framework
 - builds risk management models and selects use-cases for big data analytics, artificial intelligence and blockchain applications in finance (according to the guidelines of international regulators): 6 research workshops
- SupTech framework
 - shares use-cases to all 27 EU national regulators via on-site training: 27*3 workshops
- RegTech framework
 - shares use-cases to fintechs and banks in 6 European hubs: 6 coding and data modality workshops
- Validation framework
 - improves use-cases based on all received feedback: from regulators, supervisors, fintech, banks and external advisors

Project Network

- 8 international regulators (FSB, BIS, IMF, OECD, EBA, ESMA, EIOPA, ECB) – guide and prioritize the research
- 24 research partners – research and develop fintech risk management models
- 28 national supervisors (all EU countries) – participate give feedback in SupTech workshops
- 6 European fintech hubs – participate and give feedback in RegTech workshops
- 5 European bank risk managers and 5 non-European advisory board members – evaluate the developed fintech risk management models

Project Network



SupTech workshops

Topics	Applications	Associated risks
Big Data	P2P finance	Credit risk Fraud detection Systemic risk
Artificial Intelligence	Robo-advisory Asset management Cognitive computing	Market risk Compliance Risk profile matching (MiFID) Cyber and operational risks
Blockchain	Crypto-assets and exchanges	Market risk Cyber and operational risks ICO's fraud detection Money laundering

SupTech workshops at CNB

Course	Dates
Big Data Analytics in Finance	March 14-15, 2019 May 6-7, 2019
Artificial Intelligence Applications in Finance	September 26-27, 2019 December 9-10, 2019
Blockchain and Financial Crypto-assets	February-May 2020 (TBA)

Big Data Analytics in Finance

Big data analytics in finance = Financial data science

– A process that consists of:

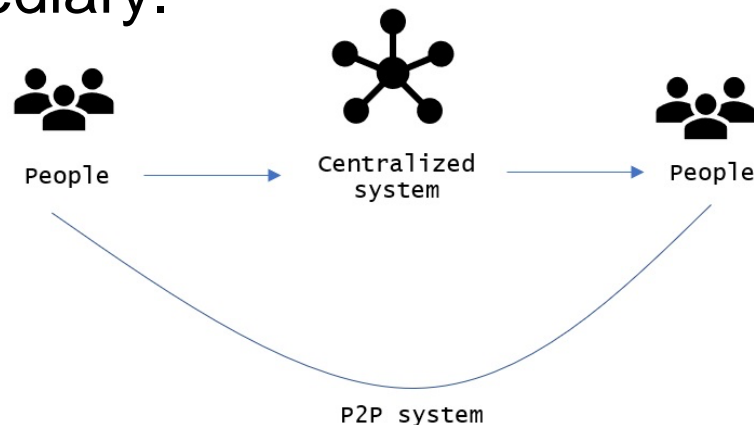
1. The acquisition and management of big data (Computer Science)
2. The discovery of regularities and/or relations: (Statistical Science)
3. The acquisition of new domain specific knowledge (Economics and Finance)

Big Data Analytics in Finance

- Two main ways to learn data science models:
 - Statistical Learning: models explainable and reproducible but less efficient
 - (Machine Learning models: models efficient but less transparent and reproducible)
- Classification of learning models:
 - descriptive (unsupervised) models
 - cluster analysis (community detection)
 - graphical models (network models)
 - predictive (supervised) models
 - regression models (deep neural networks)
 - tree models (random forests)

Peer to Peer Lending

- Among FinTech applications that rely on big data analytics, innovative ones are those based on peer-to-peer (P2P) financial transactions, such as peer to peer lending, crowdfunding and invoice trading.
- The concept peer-to-peer captures the interaction between individual units, which eliminates the need for a central intermediary.



Peer to Peer Lending: Opportunities

- improved rates of return compared to those available on bank deposits, together with relatively low fees for borrowers
- improved financial inclusion - P2P platforms are able to provide financing to borrowers unable to access bank lending
- improved quality, speed of service and user experience to both borrowers and lenders

Peer to Peer Lending: Risks

- While both classic banks and P2P platforms rely on credit scoring models for the purpose of estimating the credit risk of their loans, the incentive for model accuracy may differ significantly:
 - In a bank, the assessment of credit risk of the loans is conducted by the financial institution itself which, being the actual entity that assumes the risk, is interested to have the most accurate possible model.
 - In a P2P lending platform, credit risk of the loans is determined by the platform but the risk is fully borne by the lender.
- Another factor that penalizes the accuracy of P2P credit scoring models is that they are (still) based on limited data.

Peer to Peer Lending: Proposal

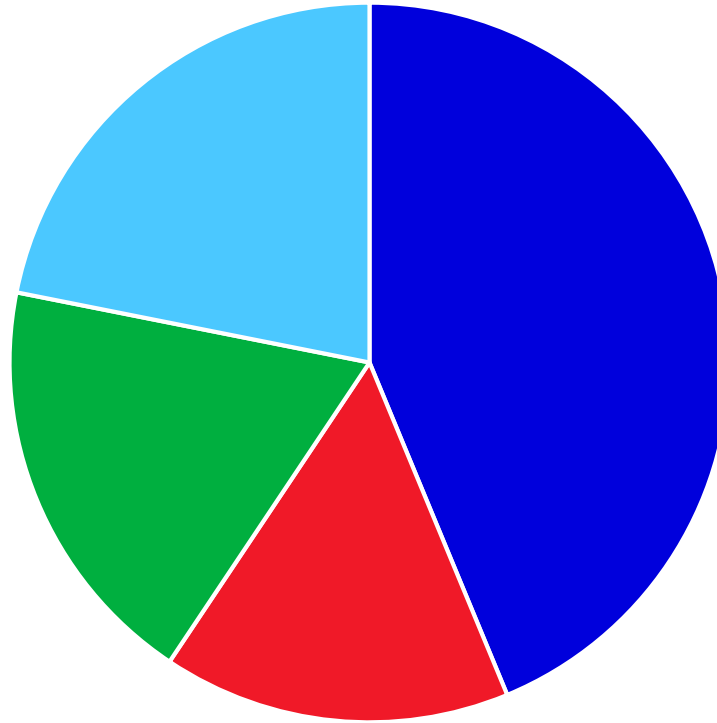
- P2P platforms operate as social networks, which involve their users and, in particular, the borrowers, in a continuous networking activity.
- From the P2P platform perspective, network data models should be employed, to improve credit risk measurement accuracy.
- From a supervisory viewpoint, the modelling of network data should be allowed, so that P2P lenders produce more reliable credit risk estimates.

Course "Big Data Analytics in Finance" at MUNI

- Background Training in Statistics
 - Simple and multiple linear regression
 - Machine learning prediction methods
 - Logistic regression
 - Network analysis
 - *Hands-on coding examples*
- 3 use-cases in P2P lending risk management
- Presentations of Czech Fin-Techs?

Questions at registration:

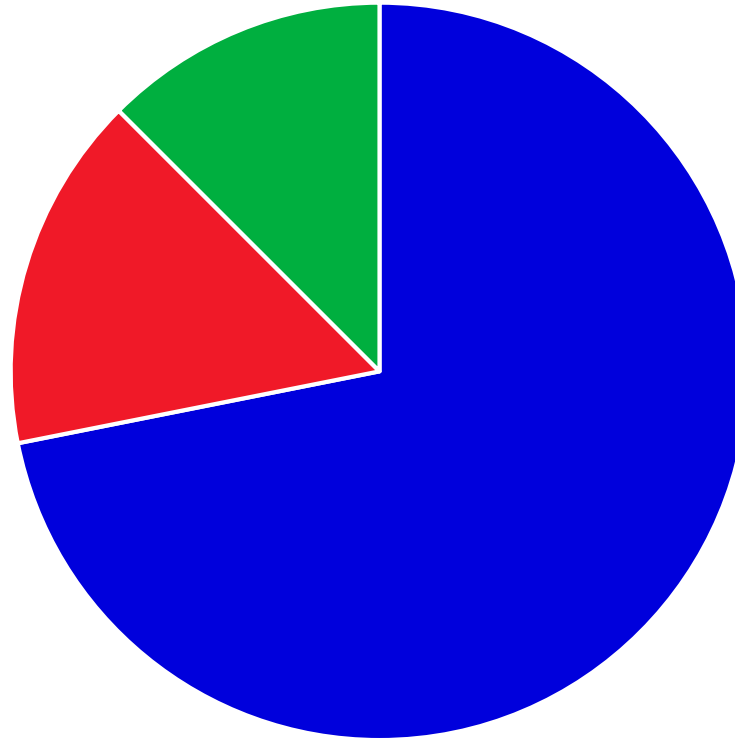
Field of study



■ Finance/economics ■ Mathematics ■ Law ■ Other

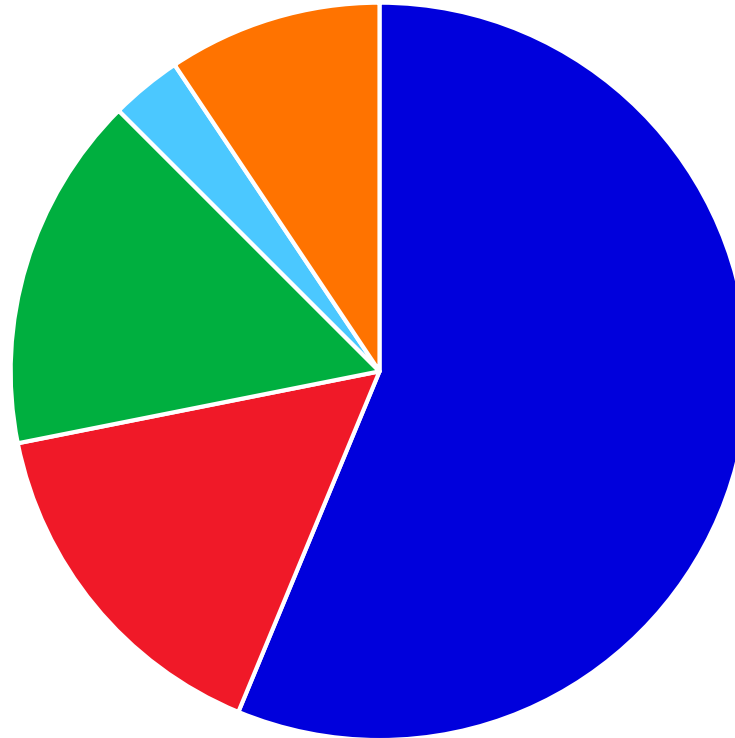
Questions at registration:

Mean, median, standard deviation



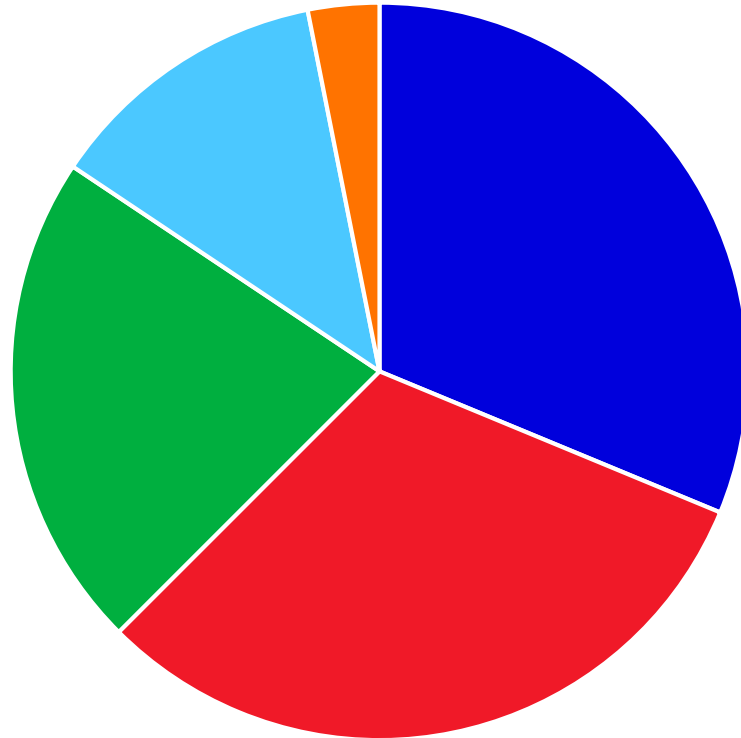
■ Strongly agree ■ Agree ■ Neither agree nor disagree

Questions at registration: Histogram



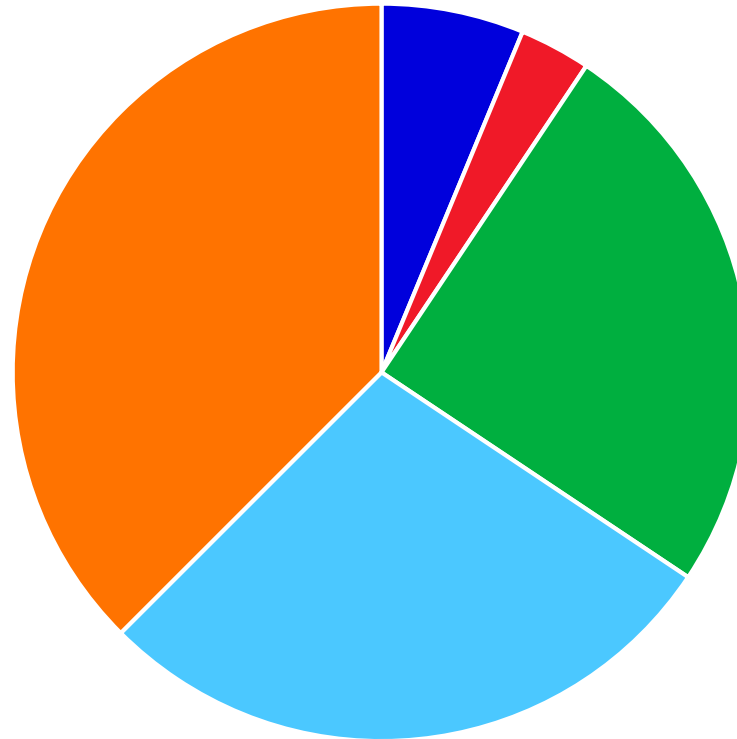
■ Strongly agree ■ Agree ■ Neither agree nor disagree ■ Disagree ■ Strongly disagree

Questions at registration: Linear regression



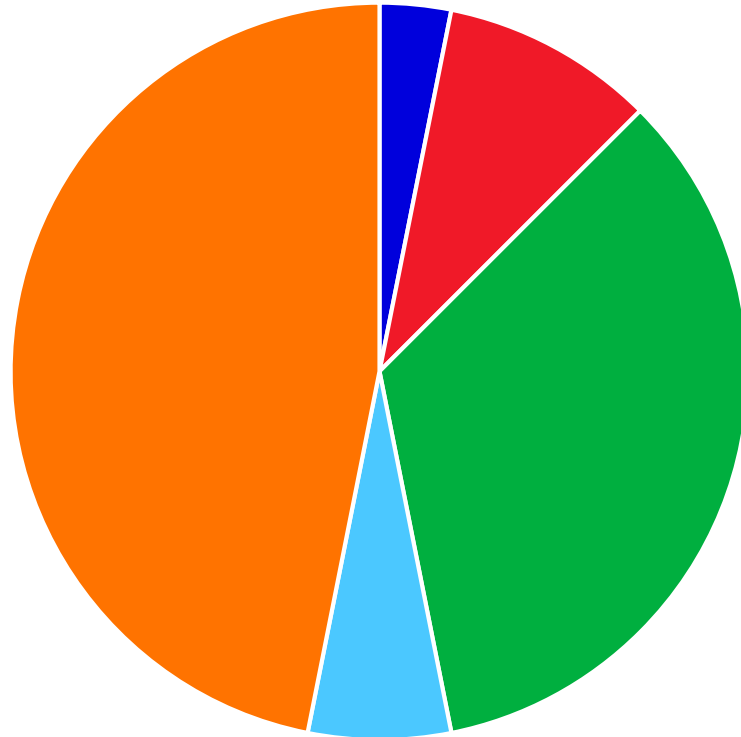
■ Strongly agree ■ Agree ■ Neither agree nor disagree ■ Disagree ■ Strongly disagree

Questions at registration: Statistical software



■ Strongly agree ■ Agree ■ Neither agree nor disagree ■ Disagree ■ Strongly disagree

Questions at registration: Programming



■ Strongly agree ■ Agree ■ Neither agree nor disagree ■ Disagree ■ Strongly disagree

IS MUNI

The screenshot displays the IS MUNI web application interface. At the top, the browser address bar shows 'Masaryk University (CZ) https://is.muni.cz/auth/'. The main header features the 'MUNI' logo and a search bar with the text 'vyhledat v ISu'. A navigation menu on the left lists 'MOJE APLIKACE' with sub-items: Pošta, Učitel, Rozvrh, Školitel, Student, Předměty, Publikace, and Studium. The central area is a grid of application tiles: POŠTA (Poslat dopis, Nastavení, Hromadný e-mail), KALENDÁŘ (Můj rozvrh), OBCHODNÍ CENTRUM (Správa OC, Přehled objednávek, Moje objednávky), UČITEL (Moji studenti, Dopis, Známký), ŠKOLITEL (Moji studenti, Hodnocení, Rozpisy), PUBLIKACE (Moje publikace, Repozitář), VÝVĚSKA (Pozvánky, Inzerce), DISKUSE (Blogy), and SOUBORY (Dokumenty, Předpisy MU, Úschovna). On the right, there are sections for 'Život na MU', 'MASARYKOVA UNIVERZITA', 'Volba rektora 2019', 'Pokládejte dotazy kandidátům na rektora', 'Dotazy z roku 2011', 'IS TIP', 'Položky v menu na přání', and 'MU a zahraniční instituce'. A 'Více aplikací' button is located at the bottom right of the main content area.

R and R Studio

The image shows a screenshot of the R Studio interface. The main window is divided into several panes:

- Source Editor (R script):** Contains R code for biomass calculation per tree across various plots. The code includes comments and function calls like `kalimantan$w.brown<-brown.moist.d(kalimantan$dbh)`. A box labeled "R script" is overlaid on this pane.
- Environment:** Lists global objects in the environment, including `hil.trees` (716 obs. of 23 variables), `kal.plot` (94 obs. of 18 variables), `kalimantan` (1993 obs. of 44 variables), and `tsi.plots` (59 obs. of 19 variables). A box labeled "R environment" is overlaid on this pane.
- Console (R console):** Shows the execution of R commands, such as `kal.plot<-merge(kal.plot, Dmed.Hmed.plot, by="Plot")` and `bio.plot.brown<-as.data.frame(tapply(kalimantan$w.brown, list(kalimantan$plot_id, kalimantan$subplot_id), FUN=function(x) sum(x), MARGIN=2)))`. A box labeled "R console" is overlaid on this pane.
- Plots:** Displays a box plot titled "Biomass estimation per plot with different models". The y-axis is labeled "Biomass (Mg/ha⁻¹)" and ranges from 100 to 500. The plot shows the distribution of biomass for different plots. A box labeled "Graphical output" is overlaid on this pane.

Workshop evaluation

[https://www.fintech-ho2020.eu/
free/app/evaluation-suptech-prague](https://www.fintech-ho2020.eu/free/app/evaluation-suptech-prague)

Please fill in the evaluation form:

- Name
- Affiliation
- Department
- Position
- Role
- E-mail
- Comments at the end of the form