

Section	Sub-section	Description of change	Consequences
1. Excellence	List of partners	The Fintech Almax Analytics has withdrawn from the Consortium due to legal status issues.	The budget and the tasks assigned to this partner were transferred to the global coordinator – University of Pavia
1. Excellence	1.3. Concept and methodology; quality of the measures	The topic of fraud detection, market risk and cyber risk were reclassified under the three main topic (i) big data analytics, (ii) AI and (iii) blockchain	No significant consequences to the overall meaning of Annex 1.
3. Implementation	3.2.1 Organisational structure	The composition of the Project Technical Committee was expanded to include the project validation task leader (B-hive) and its fintech hub connections	No significant consequences to the overall meaning of Annex 1
3. Implementation	3.2.4 Innovation management	In line with comments, we have explained in more details the way in which the project's results will be made publicly available	No significant consequences to the overall meaning of Annex 1.
3. Implementation	3.2.6 Risk Management	The magnitude of specific risk factors has been re-evaluated in line with the received feedback. Additional to this, the consequences of specific risks have been explained in more details	No significant consequences to the overall meaning of Annex 1.

Table 1. History of changes

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1. Excellence

The Financial Stability Board (2017b) defines FINancial TECHnology 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 the provision of financial services”.

While innovation in finance is not a new concept, the focus on technological innovations and its pace have increased significantly. Fintech solutions that make use of big data analytics, artificial intelligence and blockchain technologies are currently introduced at an unprecedented rate. These new technologies are changing the nature of the financial industry, creating many opportunities for fintechs to offer more inclusive access to financial services (European Commission, 2018). The advantages notwithstanding, FinTech solutions leave the door open for many challenges such as cyber-attacks, underestimation of creditworthiness, potential for fraud, compliance concerns, consumer and investor protection issues and disrupted market integrity, which represent central points of interest for regulators and supervisory bodies.

In this context, a key issue becomes identifying the desired level of trade-off between innovation incentives on one hand, and consumer protection, on the other. The European regulatory framework should enable fintech companies operating in its jurisdiction to benefit from innovations in technology and finance while at the same time ensuring both a high level of protection for consumers and investors, and resilience of the financial system (European Commission, 2018 and European Banking Authority, 2018). This point has been precisely framed by the current European Commissioner for the Euro and Social Dialogue and Vice-President of the European Commission, Valdis Dombrovskis: “*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*”. While the objective is clear, relevant barriers persist. At his address at the Innovative Finance Global Summit (2018), the UK’s Financial Conduct Authority Executive Director of Strategy and Competition, Christopher Woolard, stated a key point: “*Fintech is a global revolution and yet regulatory structures are national.*”

These remarks apply, in particular, to the European Union. There is a strong need to improve the competitiveness of the European fintech sector, introducing a framework for a common regulatory approach across all countries, that can supervise fintech companies without stifling their economic potential. A framework that can help both fintech and supervisors: on one hand, Fintech firms that want to grow and scale-up across Europe need a neutral technology and proportional regulatory compliance as well as advices on how to identify opportunities for innovation procurements, for example in advanced regulatory technology (RegTech) solutions; on the other hand, the supervisory bodies’ ability to monitor innovative financial products proposed by fintechs is limited, and advanced supervisory technology (SupTech) solutions are required.

Both RegTech and SupTech solutions can be considered sub-categories of the FinTech evolution and have been growing strongly within the last couple of years. The difference between the two categories is based on the entity to which the solutions are tailored. Specifically, RegTech focuses on technology-based solutions to attenuate or solve regulatory and supervisory challenges which are faced by fintechs. On the other hand, SupTech are technology-based solutions that tackle issues and challenges faced by supervisory authorities.

Although these trends have started to benefit regulatory and supervisory processes, a crucial step to transforming compliance and supervision is to develop uniform and technology-driven risk management tools which could reduce the barriers between fintechs and supervisors.

We believe that a training support action, coordinated at the European level, and benchmarked at the worldwide level, could help to close the gap between technical and regulatory expertise, in particular providing risk management procedures common to both sides and uniform across countries. It could lead to the development of a regulatory framework that encourages innovations in big data analytics, artificial intelligence and blockchain technologies which, at the same time, satisfies supervisory concerns to apply regulations in an effective and efficient way, that well protects consumers and investors.

Regulations and related supervisory requirements are placing great focus on risk management practices, which in turn drives the need for deep, transparent and auditable data analyses across organizations. Technologies such big data analytics, artificial intelligence and blockchain ledgers may address more efficiently risk management requirements and the associated costs. In particular, these technologies can: (i) reduce credit scoring bias in peer-to-peer lending; (ii) measure and monitor systemic risk in peer-to-peer lending; (iii) identify and prioritise cyber risks and IT operational risks; (iv) enhance client risk profile matching in robo-advisory; (v) identify fraudulent initial coin offerings and crypto assets; (vi) identify and quantify illegal activities and money laundering in crypto asset allocation.

In line with these developments, the FIN-TECH project, under the EU's Horizon2020 funding scheme, aims to create a European training programme, aimed at providing shared risk management solutions that automatize compliance of Fintech companies (RegTech) and, at the same time, increases the efficiency of supervisory activities (SupTech). In other words, we aim at connecting FINancial supervision with TECHnological compliance, from which the acronym of the project: FIN-TECH.

Specifically, the main goal of the project is to develop a knowledge exchange programme to enhance the European FinTech ecosystem, delivering uniform procedures for fintech compliance in risk management, dynamically updated with emerging state-of-the-art technologies, best practice business models and international regulatory developments. A programme that will be built jointly by universities, regulators, supervisors, fintechs and fintech hubs, **covering all 28 European Union countries, plus Switzerland**. In other words, the goal of the project is to reduce barriers between supervisors and supervised entities, encouraging the development of uniform European technology-driven and regulatory compliant risk management procedures.

This goal will be achieved through two levels of knowledge exchange sessions. The first level is decentralised, at the location of the involved regulator or supervisor in each of the 29 countries, to achieve uniformity across Europe. It will consist of training sessions, led by academic and fintech experts, with consolidated knowledge in technology, their financial applications and the measurement of the associated risks. In doing this, experts will share their knowledge with the host regulator or supervisor and with the invited fintechs. The second level is centralised, at the European level, and will consists of 6 coding sessions which will aim at “converting” the content of the training sessions into a practical and reproducible implementation. The purpose of the coding sessions is to allow participants to experiment and test possible solutions for automatized regulatory compliance (RegTech) and financial supervision (SupTech).

The knowledge exchange programme will be supported by a continuous research activity, which will be presented in three workshops (initial, mid-term and final) where regulators, supervisors, fintechs and universities, with the help of an international advisory board, will discuss, in the light of emerging technologies, new proposed regulations, new business models and new risk management models,

In the light of the recent EU Action plan (European Commission, 2018), the project can be considered a pilot action, complementary to the EU Fintech Lab, focused on risk management and on the related compliance side. Note that the proposed project is led by

academic partners and, therefore, is by definition, non-commercial and technologically neutral. In addition, it is distributed at the national level, allowing for implementation flexibility within common standards. The project can also be considered a pilot action that can support the EU Blockchain Observatory and Forum (European Commission, 2017), in monitoring trends and developments in risk management compliance associated with Initial Coin Offerings and crypto assets. We finally remark that the project contains a specific focus on the measurement of cyber risks, a specific area of attention in the EU Action Plan.

1.1. Objectives

The rise of technologically enabled financial innovations has resulted in new financial services, with increased opportunities for consumers and investors (IMF, 2017). These developments may lead to the emergence of new risks, which can affect consumer and investor protection, as well as financial stability. Differences in risk ownership between traditional and peer to peer lending may lead to biased credit scoring algorithms, which might in turn lead to bad debt accumulation. Wider use of algorithms in financial decisions may violate risk preferences and increase vulnerability to market risk. New means of payment may lead to significant increase in the speed and volume of transactions, which might result in greater volatility, IT risks and cyber-attacks. and in dangers for market integrity. All previous developments may also increase interconnections between financial operators and, therefore, systemic risks. Currently, supervisors and fintechs do not have a common framework to understand the opportunities/risks balance, leading to different perceptions, as exemplified in Figure 1.1a.

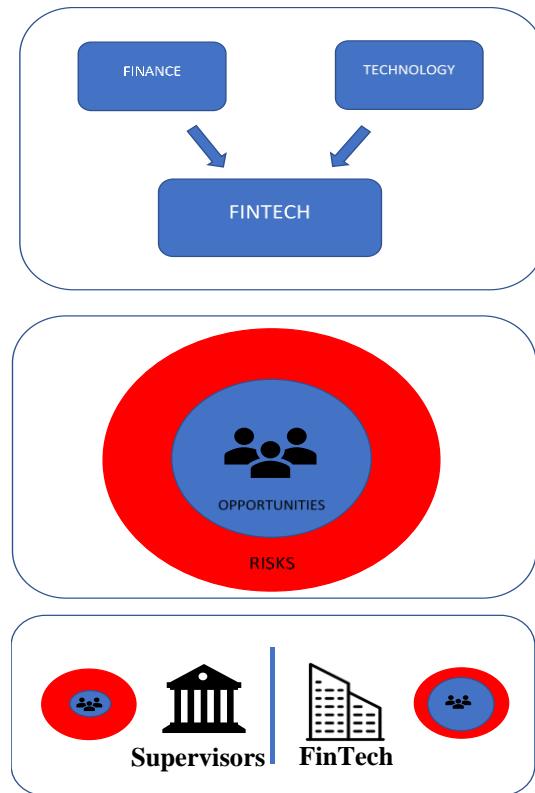


Figure 1.1a: Lack of a common opportunity/risk balance

The FIN-TECH project aims at providing solutions that efficiently automatize both fintech compliance (RegTech) and supervisory monitoring (SupTech). Specifically, we propose a knowledge exchange programme that will help build uniform data-driven risk management procedures common to supervisors and supervised fintech entities, uniform across Europe, thus providing a regulatory environment which encourages innovations in big data analytics, artificial intelligence, and blockchain technologies which, at the same time, allows authorities to ensure consumer/investor protection and resilience of the overall financial system. The project aim is symbolically represented by the difference between Figure 1.1b and Figure 1.1c below.

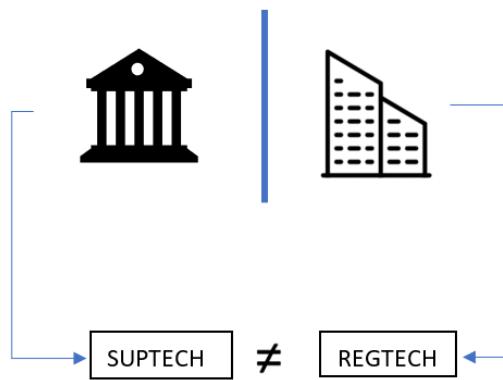


Figure 1.1 b: State of RegTech and SupTech, current

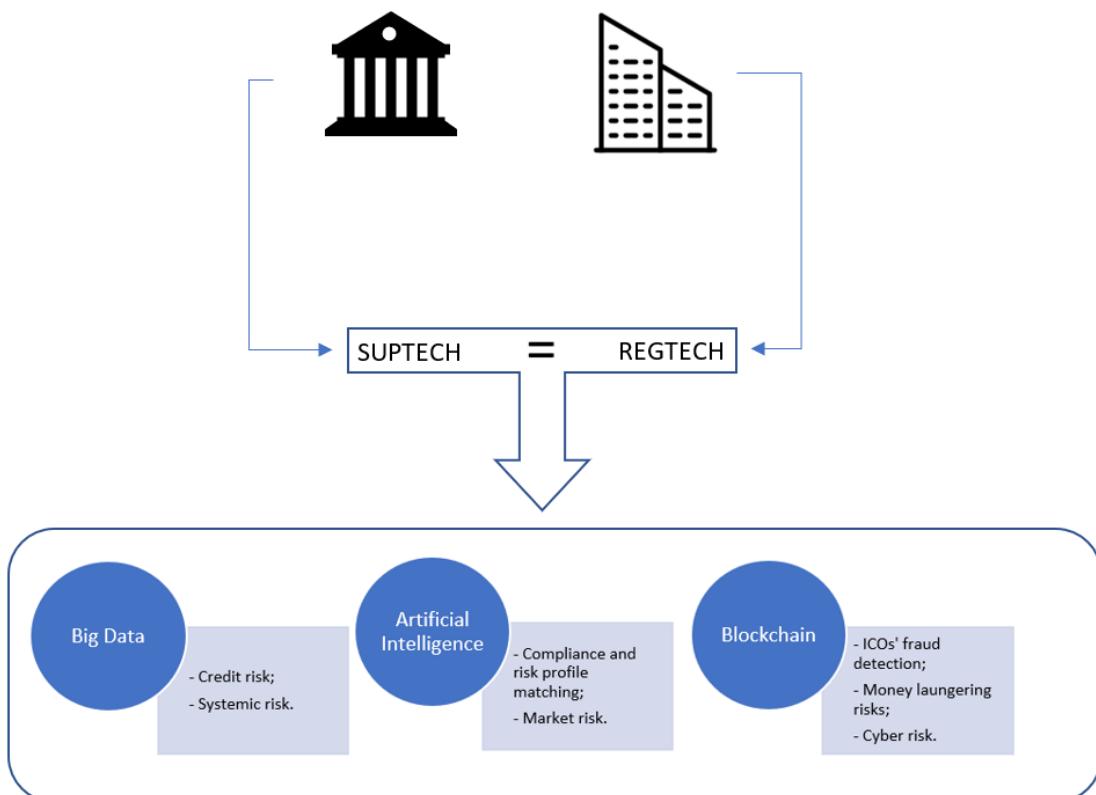


Figure 1.1 c: State of RegTech and SupTech, after the FIN-TECH project

Our vision is to build a collaborative innovative environment from which both supervisory bodies and regulated institutions can benefit. Specifically, we aim at connecting the two sides of the coin by organizing knowledge exchange (training and coding) sessions, as well as research workshops, which will have the purpose of sharing risk measurement solutions that fit the needs of both regulated institutions and regulators. These activities, organized by the FIN-TECH project, will draw on the contribution from three types of project participants:

- (i) Fintechs and fintech hubs, who have detailed understanding of business models based on financial technologies;
- (ii) Regulators and supervisors, who have detailed understanding of the regulations and risks that concern financial technologies;
- (iii) Universities and research centres, which have detailed understanding of the risk management models that can be applied to financial technologies.

Within the consortium, the participating universities and research centres, fintechs and fintech hubs, regulators and supervisors, are presented in Figure 1.1d. Each of them is described in Section 4, either as a formal partner, or as a supporting institution, through a formal letter of intent.

UNIVERSITIES and RESEARCH CENTRES	FINTECH HUBS and ASSOCIATIONS	REGULATORS and SUPERVISORS

Figure 1.1 d: The FIN-TECH project participants

The stated goal of the FIN-TECH project can be subdivided in several main objectives, which correspond to different work packages:

- O1.** Create a panel of experts in fintech risk management, through the daily management and coordination of the project (**WP1 - Management**);
- O2.** Create, through individual research activity and the organisation of a dedicated workshop, common standards for risk management in big data analytics, specifically for peer-to-peer lending applications (**WP2 - Big Data Analytics Research**);
- O3.** Create, through individual research activity and the organisation of one dedicated workshop, common standards for risk management in artificial intelligence applications to finance, specifically for robo-advice consulting in asset management (**WP3 - Artificial Intelligence Research**);
- O4.** Create, through individual research activity and the organisation of one dedicated workshop, common standards for risk management in blockchain technology applications to finance, specifically for Initial Coin Offerings (ICO) and crypto-assets (**WP4 - Blockchain Research**);

O5. Develop and update pilot innovation hubs in each European country, connecting national supervisors with fintech hubs through knowledge exchange training programmes, according to the research developed in O2, O3 and O4, matching the monitoring needs of supervisors with the business needs of fintechs (**WP5 - Training Hubs**);

O6. Develop and update a pilot European innovation hub, connecting fintech hubs through the production of open source software for FinTech risk management, and consequent coding exchange sessions, according to the research developed in O2, O3 and O4, matching the business needs of fintechs with the monitoring needs of supervisors (**WP6 - Coding Lab**);

O7. Communicate externally the advancement of the project, through: dedicated website repositories and social networks activity; publications of papers and participation at conferences in financial technology (particularly to those organised by the European Supervisory Authorities, the European Central Bank and the Financial Stability Board); validation of the developed work with established banks, insurances and investment funds. (**WP7 – Dissemination**).

1.2. Relation to the work programme

This section explains in detail how the project will address the different scopes of the work programme.

Scope 1. *Bring together a group of regulatory or supervisory bodies, and other relevant organisations to investigate new approaches for piloting innovative Fintech solutions, anticipating risks, and facilitating the operations of Fintech firms that want to grow and scale-up across Europe*

The FIN-TECH project is based on a large network of partners and supporters from all European countries, that includes regulatory and supervisory bodies, fintechs and fintech hubs, universities and research centers as well as established banks, insurances and investment fund companies, and it relies on an international advisory board of experts. The partners of the network are research centers and fintechs which have pioneered different solutions that can automatize FinTech compliance (RegTech) and increase the efficiency of supervisory activities (SupTech). The supporters of the network are national regulatory/supervisory bodies from each country in the EU (plus Switzerland) as well as fintech hubs and associations from the same countries, along with the three European Supervisory Authorities and a member of the ECON committee of the European Parliament. The project proposes a great variety of networking and knowledge exchange opportunities for all participants, including: training sessions, coding sessions and workshops.

Scope 2. *Build capacity and expertise regarding new technologies and models to support early understanding for regulators or supervisors and to offer specific advice to Fintech firms that want to grow and scale-up across Europe.*

The FIN-TECH project addresses this scope through thorough research activity and workshops which will focus on the construction of risk management models for fintech applications. The wide inclusiveness of the projects, that includes academic, industrial and regulatory participants from all European Union countries, is among its crucial advantages in this context. The topic of innovative technologies (as they apply to financial services) has taken centre stage in almost all finance-related discussions and yet there are confusions or

differing opinions about what these technologies cover, what are their applications and what are the main associated risks. The fact that the network includes all relevant players in the discussion is crucial to delivering a comprehensive and objective overview of each topic, and to develop appropriate risk management models, which can help both supervisors, in early monitoring of risks arising from fintechs, and fintechs in acquiring risk management practices necessary to be compliant and, therefore, scale-up and grow across Europe.

Scope 3. *Support the cross-border networking of ecosystems, hubs and accelerators focusing on Fintech, in particular to help start-ups appraise regulatory issues, to engage with other stakeholders like established financial or insurance firms and to identify opportunities for innovation procurements in Fintech.*

The FIN-TECH project addresses this scope in its “RegTech” component, based on the cross-border networking of ecosystems, through dedicated knowledge exchange training and coding sessions, and dissemination activities, in which start-up fintech companies, together with supervisors and universities, can learn and identify innovation procurements in RegTech issues. Fintechs can also engage with established banks, insurances and investment funds, particularly through the activity of the evaluation lab, organised with the European Banking Federation. Additional to the knowledge exchange sessions, the FIN-TECH project will organize three workshops focused on different risk management models, in which fintechs can further appraise regulatory issues.

Scope 4. *Envisage possible actions and technical solutions to evaluate the impact of regulation and facilitate regulatory compliance in financial areas.*

The FIN-TECH project addresses this scope in its “SupTech” part, aimed to support regulators and supervisory authorities to improve their activities. The knowledge exchange sessions are comprised of training and coding sessions organized around the three technologies (big data analytics, artificial intelligence and blockchain). The main aim of all classes is to present and practically implement different solutions that increase the effectiveness and efficiency of supervisory activities, while facilitating regulatory compliance for fintechs. For the purpose of evaluating the impact of the proposed solutions, the project includes a continuous supervisors’ feedback evaluation and a dedicated validation lab that has the purpose to evaluate the maturity of the proposed solutions with established banks, insurance companies and investment funds.

Besides the previous general points, we remark that the project work packages contribute directly to the work programme scopes, as follows:

- WP1 contributes to the development of a network of European experts in FinTech, able to connect the needs of the emerging fintech companies with the regulatory supervision needed to protect consumers and maintain financial stability.
- WP2, WP3, WP4 will be developing new risk management standards in FinTech, encouraging the development of a European research innovation hub that brings together universities, regulators and fintechs.
- WP5 aims at creating nationally distributed innovation hubs, through knowledge exchange platform training, developed according to the high-level standards developed in WP2-WP4. The sessions will be attended jointly by supervisors, regulators, and fintechs, and will be grouped in three main modules: big data analytics, artificial intelligence and

blockchain; each of which integrates emerging technologies, FinTech applications, emerging risks and risk management models.

- WP6 aims at developing a European innovation hub, implementing a technological platform for FinTech risk management, that will draw on the research and training developed in WP2-WP4 and WP5, generating a common operational knowledge across Europe.
- WP7 ensures that the results are grown and shared, with external stakeholders, such as established banks, insurance companies and investment funds and with fintechs, regulators, supervisors and research centres, that are not yet part of the project network but may join it during or after its course.

Overall, we believe that the FIN-TECH project sets a programme of work that is challenging, timely and novel, and aimed to tackle all work programme scope, in an effective way, that heavily relies on the experience of the partners of the consortium, and their past joint work, and that is well supported by many regulators, supervisors and fintech hubs.

1.3. Concept and methodology; quality of the measures

The FIN-TECH project partnership is composed of 25 leading research universities and fintech hubs representing all 28 countries from the European Union plus Switzerland. Individual university representatives are leading academics that possess extensive experience in risk management models applied on real-life case studies and data. As a result of previously established research collaboration, and on the basis of two project preparatory workshops, organised in January and in March 2018, all partners have agreed on a classification of FinTech risk management models, which will constitute the conceptual map of the project. The classification, which correspond to three distinct research work packages, is based on the three main technologies that drive FinTech innovations:

1. **Big data analytics**, with its application to peer-to-peer lending, with main risks arising from credit risk and systemic risk;
2. **Artificial intelligence**, with its application to financial robo-advice, with main risks arising from compliance risk and market risk ;
3. **Blockchain**, with main application to initial coin offerings and crypto-assets, with main risks arising from ICOs' fraud detection, money laundering risk and cyber risk.

The overall workflow of the project is summarised in figure 1.3a below.

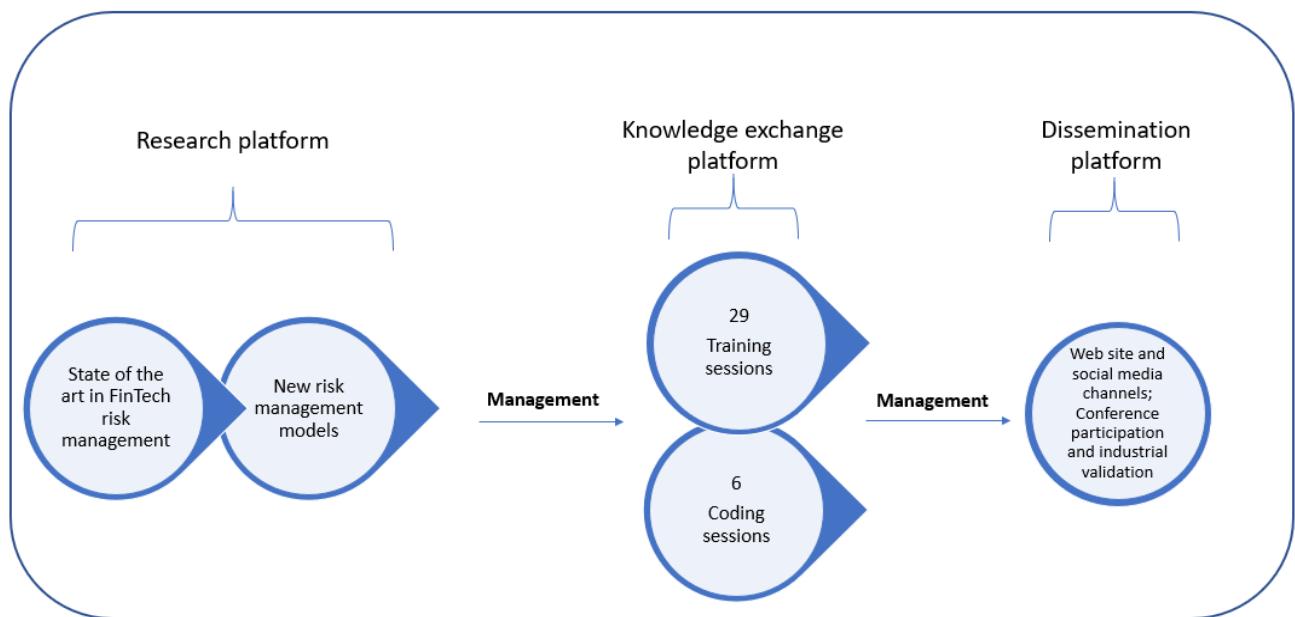


Figure 1.3 a: FIN-TECH project summary work flow

The work programme described in Figure 1.3a consists of three main platforms.

The research platform will aim to review the state of the art and create new knowledge about risk management models for: big data analytics, artificial intelligence and blockchain applications in finance. This task will be accomplished with individual research activities (preparation and submission of papers, participation to conferences) and with the organisation of three workshops (initial, mid-term and final) during which universities, supervisors, regulators and fintechs will meet and focus the discussion on specific risk management aspects, reaching a consensus on how to measure and manage them. The agenda of each workshop will be split into two parts: (i) focused research discussion on one of the three technology drivers and on the related risk management models, and (ii) management board meeting, joint with the advisory board, for a general update on all research topics and for the overall planning and evaluation of the project. The final workshop will also include the final project evaluation, based on all received feedbacks and evaluations.

The knowledge exchange platform will consist of training hubs and of coding labs. Training hubs will organise 29 training sessions of 72 hours each (one in each of the involved countries), which will be delivered jointly to regulators/supervisors and to fintechs, by senior experts from universities that have leading research experience in big data analytics, artificial intelligence and blockchain, their application in finance, and on the related risk management models. The content of the training sessions will be uniform across all countries and will be based on three sets of teaching materials (slides) that will be based on the output from the three corresponding research work packages. The coding labs will operationalize the training sessions showing how to reproduce their content using reproducible open source software code (typically in the R language), embedded in a user-friendly research and development environment. There will be 6 coding lab sessions, centralised at the European level, at the location of six different fintech hubs. To increase effectiveness and efficiency and to further encourage networking between the different involved partners and supporters, six intermediate board meetings will be organized jointly with the coding lab sessions.

In the dissemination platform, the results from the previous work packages will be integrated for external communication purposes. This for the purpose of increasing project awareness, using a dedicated web site and social network channels; expanding project impact, with the participation at focused workshops and conferences in FinTech and FinTech risk

management, within the academic, regulatory and fintech communities. A special attention will be dedicated to the exploitation of the results of the project with established banks, insurance companies and investment management funds. For this purpose, we will set up a continuous evaluation of project activities, with the members of the European Banking Federation, whose results will be presented during the final workshop.

A central aspect of the FIN-TECH project is the classification of fintech risk management models according to the three main technological drivers of FinTech (big data analytics, artificial intelligence and blockchain). The following sections explain in detail the positioning of each topic within the project, in terms of driving technology, financial applications, related risk concerns and the respective risk management tools.

1.3.1. Big Data analytics risk management

Technology. The European Commission (2014) argues that the term big data refers to “*large amounts of different types of data produced with high velocity from a high number of various types of sources*”. Big data analytics refers to the variety of technologies, models and procedures that involve the analysis of big data aimed revealing insights, patterns of causality and of correlation, and to predict future events (similarly to data science and to its predecessor, data mining: see e.g. Giudici, 2003).

Applications. Despite the fact that big data analytics is considered a novelty, this technology has been used increasingly by a great variety of financial institutions across the banking, insurance and investment industries. The reasons for such a wide use of this technology is associated with the type of activities which are facilitated by the use of big data analytics, such as the assessment of creditworthiness, the profiling of consumers and the detection of their fraudulent behaviours.

Many fintech applications rely on big data analytics and, in particular, 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 units, which eliminates the need for a central intermediary. In particular, peer to peer lending enacts disintermediation by allowing borrowers and lenders to communicate directly, using the platform as an information provider which, among other things, assesses the credit risk of borrowers. From a regulatory perspective, a key point of interest is whether such credit risk measurements reflect the actual capacity of borrowers to repay their debt. Regulation must be technologically neutral and, therefore, credit risk compliance should be imposed on fintechs as they are for banks. At the same time, it cannot be so burdensome to disincentivise the growth of alternative financial service providers (see Talonen et al. 2016).

Risk concerns. Although national legislations could differ, the European Union overall approach to competition, consumer and investor protection share common goals. Innovative financial institutions that rely on big data analytics for their operations must consider whether they are compliant with existing consumer and investor protection legislation. In the context of consumer protection requirements, the current legislation includes, among others, the Unfair Commercial Practices Directive, the Directive on Distance Marketing and Financial Services, The Misleading and Comparative Advertising Directive, The Directive on Unfair Contract Terms (European Supervisory Authorities, 2018). In addition, there are several other EU legislations which are particularly relevant for financial institutions that use big data, such as the Payment Services Directive, the Mortgage Credit Directive, the Consumer Credit Directive, the Payment Accounts Directive, PRIIPS, the Insurance Distribution Directive,

MiFID/MiFIR, UCITS, AIFMD, EMIR, Solvency II, CRD IV (European Supervisory Authorities, 2018).

Although there are many existing legislations that are intended to serve in the interest of consumer and investor protection, peer to peer fintechs give rise to 'disintermediation', which requires the need for further protection of consumers and investors. In the case of peer to peer lending, there are two main causes of concern. First, P2P platforms have less information on their borrowers, compared to classical banks, and are less able to deal with asymmetric information. Second, in most P2P lending platforms the credit risk is not born by the platform but, rather, by the investors. Both causes lead to a high likelihood that the scoring system of P2P lenders may not adequately reflect the "correct" probability of default of a loan. A further issue associated with the nature of P2P platforms is that they give rise by construction to globally interconnected networks of transactions. This suggests that they cannot avoid the measurement of systemic risks arising from contagion mechanisms between borrowers.

Risk Management Tools. In the context of P2P lending, a key risk to measure is the risk associated with the default of borrowers: credit risk. Statistical theory offers a great variety of supervised models for credit scoring and credit risk management and, in particular, logistic regression and generalized linear models (Bernè et al., 2006). The same models can be applied to similar classification problems, such as consumer's fraud and money laundering detection.

A key issue that arises in employing generalised linear models for P2P classification problems is that the event to be predicted is multivariate. To solve this issue, Lauritzen (1996) introduced graphical models to model dependencies between random variables, by means of a unifying and powerful concept of a mapping between probabilistic conditional independences, missing edges in a graphical representation, and suitable statistical model parametrisations. These models have been applied in a variety of financial contexts, including credit scoring, churn modelling and fraud detection (for a review see Giudici, 2003 and Guegan and Hassani, 2017).

In line with these developments, Giudici and Hadji-Misheva (2018) suggest to model credit risk of peer to peer lending taking advantage of their natural interconnectedness, by means of correlation network models, a subset of graphical models that has been introduced in finance to measure systemic risks risk (see e.g. Battiston et al., 2012; Billio et al., 2012; Diebold and Yilmaz, 2014; Arakelian and Dellaportas, 2012, Výrost et al., 2015). This allows to improve the accuracy of credit risk models and, furthermore, to measure a risk type that is particularly evident in P2P lending: systemic risk, recently applied to bank and sovereign default. Giudici and Hadji-Misheva (2018) show how to build a correlation network for P2P lending: associating each borrower with a statistical unit, at each time point many variables can be observed for that unit; in the case of SME lending, balance sheet variables; in the case of consumer credit, transaction account variables. A correlation network between borrowers can then be built on the basis of the observed values of one variable over time. Associating each borrower with a node in the network, each pair of nodes can be thought to be connected by an edge, whose weight is equal to the correlation coefficient between the two-time series of the chosen variable, each corresponding to a specific borrower. If we consider all pairs of borrowers, we will get a matrix of correlation weights, also known as "adjacency matrix". Once the adjacency matrix is derived, summary network centrality measures suggest which are the most important units in the network or, in financial risk terms, which are the most contagious borrowers (Giudici and Spelta, 2016 and Tomašev et al. 2016). Furthermore, Giudici and Hadji-Misheva (2018) show, in real P2P lending data analysis that, when network centrality measures are embedded in a generalised linear model specification, they can improve the predictive accuracy of credit scoring algorithms.

The above approaches are useful to measure credit risk and systemic risk involved with big data analytics applications in peer to peer lending, and can thus be employed to offer an “automated” risk management tool, for both RegTech and SupTech purposes.

1.3.2. Artificial Intelligence risk management

Technology. Over the years, academics and experts in computer science and statistics have developed advanced techniques to obtain insights from large datasets combining a variety of data types obtained from a variety of sources (see Brito, 2014). These models are able to utilize the ability of computers to perform complicated tasks by learning from experience. Following a definition offered by the Financial Stability Board (2017a) artificial intelligence is a broad term capturing *“the application of computational tools to address tasks traditionally requiring human sophistication”*. It is important to mention that often the terms AI and machine learning are used interchangeably. However, Artificial Intelligence is a broader term, of which machine learning represents a subcategory: the difference being that machine learning is a data-driven way to achieve AI, but not the only one; similarly, big data analytics is broader than machine learning, as it includes also statistical learning.

Application. The Financial Stability Board (FSB) in its two recent reports (FSB 2017a, 2017b) identifies three common drivers of FinTech: (i) shifting consumer preferences on the demand side; (ii) evolving technology and (iii) changing financial regulation on the supply side. The first concerns higher customer expectations for convenience, speed, cost and “user-friendliness”, the second concerns advancement in technology, mainly related to big data and mobile technology, and the third regards the increased frequency of changes in regulatory and supervisory requirements. The same factors have also spurred the adaptation of AI in financial services.

Automated consultants, known as robot advisors, are considered the main application of AI in financial services. The European Supervisory Authorities joint report (2017a) defines the phenomenon of automation in financial advice as *“a procedure in which advice is provided to consumers without, or with very little human intervention and with providers relying on computer-based algorithm and/or decision trees.”* In practice, robot advisors build personalised portfolios for investors, on the basis of algorithms that take into account investors’ information such as age, risk tolerance and aversion, net income, family status. Obtaining this information is a legal requirement and robot advisors employ online questionnaire to obtain it.

Risk concerns. The advantages associated with automatized advice may be offset by the greater risks that are brought on board, among which the risks of making unsuitable decision (due to lack of information or reduced opportunities) and risks of errors and functional limitations of the tool (European Supervisory Authorities, 2017).

As is the case with big data analytics, there are several regulatory requirements that already exist and apply to automated advice, among which: the Markets in Financial Instruments Directive (MiFID), the Insurance Distribution Directive (IDD) and the Mortgage Credit Directive (MCD) (European Supervisory Authorities, 2017). However, some risks are yet to be fully considered and measured. Among them, we believe the following are the most relevant: (i) compliance risk – mismatch between expected and actual investment risk class; (ii) market risk – volatility of financial assets which may result in financial losses.

Risk Management Tools. As for big data analytics, the increased risks connected with the use of robot advisory platforms can be mitigated by an appropriate analysis of the data they generate. In this respect, robot advisors generate, in an automated way, a large amount of data, which can be leveraged not only to improve the service, making it more personalized, but also to reduce compliance risk and, in particular, the risk of an incorrect profile matching between "expected" and "actual" risk classes (see e.g. Valkanov et al., 2016).

Recent studies have shown that an accurate analysis of risk propensity questionnaires can allow robo-advisors to estimate the "expected" risk class of each investor. Data analysis algorithms can be implemented also on the supply side, considering the returns of the available financial products to classify them into homogeneous "actual" risk classes. Linking together the "expected" risk classification of an investor with its "actual" classification allows to evaluate whether a robot advisor respects its risk profile (Kabašinskas et al., 2017), one of the most important requirement of the MIFID regulation, which thus becomes, in the context of robot advisory, a verifiable requirement, not only from a formal viewpoint, but also from an operational one.

The literature on the measurement of expected risks in robot advisory is very limited. Scherer (2016) investigates, within a machine learning approach based on tree models, the key investor characteristics that can predict financial market participation; Alexy et al. (2016) is a related work. Similarly, the literature on the measurement of the actual risk of a given set of financial products is also very limited. Tumminello et al. (2005) and Tola et al. (2008), who employ clustering models to construct homogeneous asset classes, and Baintinger and Papenbrock (2017), who considered interconnectedness risk, are noticeable exceptions.

Giudici and Polinesi (2018) extend Scherer's approach deriving expected risk classes from the responses to the MIFID questionnaire, building correspondence analysis models on the observed contingency table, that results from the cross-classification of the responses to the questionnaire. They also show how to employ feed forward neural network models to estimate the risk class of a given investor's portfolio, on the basis of the observed returns. By comparing the expected with the actual risk class, for a sample of investors, it is thus possible to evaluate, in an automated way, whether the robot advisor is compliant with the risk profile of the investor.

Robot advisors could very likely include crypto assets in the suggested portfolio, for diversification purposes. Although the benefits of crypto assets, and of the bitcoin in particular, could be significant for a wide range of users around the world, many reasons for concerns do exist. A relevant concern about bitcoins is associated with market risk, as they have been associated with exceptionally high volatility and greatly sensitive prices (see Chen et al., 2018, Žiković, 2017; Traian et al. 2017 and Kokoszczyński et al., 2015). Indeed, fluctuations are very common throughout the existence of the crypto assets, which in turn raises the question whether this behaviour is attributed to general market conditions or to idiosyncratic factors (as discussed by Makrichoriti and Moratis, 2016).

In the context of market risk, correlation network models can be employed to detect the main determinants of volatility (as in Papenbrock and Schwender, 2015, and Barucci and Marazzina, 2016). Giudici et al. (2018) have applied correlation VAR models to check whether there exists price contagion between different bitcoin exchange markets, and found that this is the case, especially for smaller exchanges.

All the above approaches are useful to quantify and/or prioritise compliance risks and market risks associated with the application of artificial intelligence methods in finance and can thus be employed to offer an "automated" risk management tool, for both RegTech and SupTech purposes.

1.3.3. Blockchain risk management

Technology. Among the emerging technologies with significant potential to change the financial systems and industry from its core, the blockchain has received a significant amount of attention over the last few years. A blockchain is a distributed database of records of all transactions or digital events that have been executed and shared among participating parties (De Filippi and Hassan, 2016). Each transaction in the distributed database of records is verified by the participants through a majority consensus and, once confirmed, the transaction can never be altered or deleted (see for e.g. Tasca and Hayes, 2016). Hence, the blockchain contains a certain and verifiable record of every single transaction ever made between the participants in a network (see e.g. Pontiveros et al., 2018).

Applications. Crypto assets are the first application of this technology and are considered one of the largest markets in the world which remain to be unregulated. Within the last decade, digital currencies, operating independently of a central bank have massively grown in popularity, price and volatility. Looking at the Bitcoin alone, its market capitalization is close to \$200 billion USD as of March 2018. The Bitcoin is the oldest, most popular and widely used digital currency, and it offers low-cost, decentralized transfer of value anywhere in the world with the only constraint representing the availability of an internet connection. Because of its construct and the value it provides, the Bitcoin represents a new and significantly lower-cost alternative to traditional banking transfer systems.

Many other crypto assets are available, and new ones are continuously emerging through Initial Coin Offerings, in which a company sells digital tokens that eventually can be exchanged for goods, services or other currencies. It is a new fundraising method, which combines elements of both crowdfunding and traditional initial public offerings. From a regulatory perspective, as summarized by European Securities and Markets Authority (2017), the features and purpose of the issued coins or tokens vary across ICOs: (i) some coins or tokens serve to access or purchase a service or product that the issuer develops using the proceeds of the ICO; (ii) some coins or tokens provide voting rights or a share in the future revenues of the issuing venture; and (iii) some coins or tokens are traded and/or may be exchanged into fiat or virtual currencies at specialised coin exchanges after issuance.

Risk Concerns. A first point of concern with respect to the blockchain applications in finance is that of fraudulent Initial Coin Offerings. Many international regulatory authorities have raised many concerns, particularly in the context of investor protection, suggesting that, in most cases, small investors do not adequately understand the risk involved with ICOs. Although many legitimate start-ups use ICOs for the purpose of raising money, there also exist many projects (particularly those launched in 2017) which are considered copycats in the sense that they copy the same materials from other successful projects and do not intend to deliver any value to the investors. Put simply, the market has seen many cases of fraudulent ICOs which in turn raises many concerns for investor protection and overall financial stability. A recent report by the Hong Kong Securities and Futures Commission states that “*as these arrangements and the parties involved operate online and may not be regulated, investors may be exposed to heightened risks of fraud*”. If ICOs qualify as financial instruments, there are several existing European legislations which fintechs need to comply with, including the Prospectus Directive, the Markets in Financial Instruments Directive (MiFID), the Alternative Investment Fund Managers Directive (AIFMD); and the Fourth Anti-Money Laundering Directive (European Securities and Markets Authority, 2017). Nevertheless, there are many contexts in ICOs fall outside the scope of laws and regulations. The European Securities and Markets Authority has argued that the hype concerning ICOs,

virtual currencies and blockchain technology can lead to speculative behaviour with only very limited attention to the underlying project and the risks associated with it. For this purpose, the European Securities and Markets Authority and many other EU regulatory bodies have published a great number of press releases and reports alerting investors of the risks associated with ICOs.

Another cause of concern is that crypto assets allow for a multi-billion dollars global market of anonymous transactions, which does not undergo any control. Hence, its emergence and growth can create considerable challenges for market integrity, particularly coming from money laundering activities. Money laundering embraces all those operations to disguise the illicit origin of capital, to give it a semblance of legitimacy, and facilitate the subsequent reinvestment in the lawful economy. A recent study conducted by Foley et al. (2018) aims at quantifying and characterizing the illegal trade facilitated by the Bitcoin, to provide better understanding of the nature and scale of the problem facing this technology. The results from the study suggest that approximately one-quarter of Bitcoin users and one-half of Bitcoin transactions are associated with illegal activity. The authors find that around \$72 billion of illegal activity per year involves Bitcoin, which is close to the scale of the US and European markets for illegal drugs. Looking at the activity over time, Foley et al. (2018) find that the illegal share of Bitcoin activity declines with mainstream interest in Bitcoin and with the emergence of other opaque crypto assets.

Another very important cause of concern is cyber risk and IT operational risk in general. While the literature on the quantitative measurement of operational risk constitute a reasonably large body (see for example Cruz, 2002), that on cyber risk measurement is very limited.

Risk Management Tools. In the context of the blockchain technology, key risks to measure are: (i) money laundering detection; (ii) ICO fraud detection; (iii) cyber risk, hacking or manipulation of the algorithms. As for the other two FinTech classes, the technology themselves generate the data that can be usefully employed to mitigate their risks.

In the context of money laundering detection, network-based community detection models can be employed. They exploit the transactional network topology for the purpose of identifying communities of users and, in particular, to identify communities of money launderers, using the transactions between them. More formally, the method that can be applied is a network cluster analysis algorithm that takes as inputs the set of users (“nodes” in network terminology) and the trades between users (“edges” or “links” in network terminology) (Foley et al., 2018). The output of the algorithm is an assignment of users to communities such that the “modularity” of the communities (density of links within communities and sparsity of links between communities) is maximized (Foley et al., 2018).

To identify the main determinants of fraudulent ICOs, text mining analytics methods, that use network models to reduce their curse of dimensionality, can be applied. Following most recent statistics, 99% of all ICOs use Telegram as a channel for interacting with their communities. Typically, the Telegram groups are characterized by many members and detailed discussions about the value of the individual projects as well as by the expectations of the communities concerning the success of the ICO and the company. By collecting data from the Telegram ICOs (including the corresponding white papers) and discussions on Telegram chats relating the value and prospects of the projects in question, we can build, train and test supervised models to discriminate and classify ICOs by their probability of fraud, using for example the methods shown in Hochreiter (2015).

Last, concerning cyber risks, as they are typically not repeatable, a useful approach to measure them is to consider an ordinal-based, scorecard approach, similarly to that done in self-assessment-based operational risk management (see e.g. Giudici, 2015), in reputation

measurement (see e.g. Cerchiello and Giudici, 2015) or in portfolio analysis using stochastic dominance (Post and Potì, 2016).

In this way a cyber risk measure can be used to rank cyber risks and prioritise interventions, preventing failures and reducing ex-ante the impact of risks. This on the basis of ordinal random variables, that represent the levels of frequency and severity for different cyber risk events, in different business areas. A similar approach can be consistently undertaken to measure operational risks deriving from the use of robo-advisors, caused by their malfunctioning, rather than by cyber-attacks. Note also that an ordinal-based measurement of operational risks and cyber risks can be easily adapted to scenario testing, which is one of the best ways for the financial industry to protect from them, specifically when they are conducted across the industry.

We remark that the above approaches are useful to measure money laundering risk, of ICO fraud detection risk and cyber risk, associated with the application of blockchain methods in finance and can thus be employed to offer an “automated” risk management tool, for both RegTech and SupTech purposes.

2. Impact

2.1. Expected impacts

2.1.1. Contributions to expected impacts

The FIN-TECH project will contribute to all expected impacts set out in the work programme. In this section, we provide detailed explanations of the individual contributions.

Expected Impact 1: *Reinforce the position of Europe amongst leaders in Fintech, encouraging cross border collaboration and practical approaches for Fintech experimentation frameworks; enabling Fintech firms to grow and scale-up across Europe.*

The FIN-TECH project is an experimental framework that involves a cross-border practical collaboration between fintechs, regulators and supervisors from 29 European countries, through common knowledge exchange activities (training and coding sessions) which will cover the main technologies (big data analytics, artificial intelligence and blockchain), their applications in finance, the associated risk concerns and the related risk management solutions. It will enable fintech firms to grow and scale-up across Europe by providing operational solutions which automatize regulatory compliance and increase supervisory efficiency. Furthermore, the project will aim to reinforce Europe’s position as a leader in FinTech through benchmarking activities with other international ecosystems, through: (1) consultation with the advisory board, (2) participation in international conferences and workshops.

Expected Impact 2: *Develop common understanding, interpretation and expertise regarding technology evolution and Fintech-related regulations and policies, in particular those concerning data.*

The FIN-TECH project aims to develop a common risk management expertise for FinTech activities, driven by the technology evolution, across different European regulations. It will do so by running knowledge exchange sessions, which will follow a comprehensive and

objective training programme, developed by leading FinTech risk management experts. This will create a shared understanding concerning the scope, application and risk management associated with the three disruptive technologies in finance (big data analytics, artificial intelligence and blockchain), and their application in financial services, across various ecosystems (fintech, regulators, academic experts). A key component of the knowledge exchange platform is the sharing of data-driven risk management tools which will help the process of building common expertise concerning the risk management tools that can allow for automated compliance (RegTech) and supervision of fintech services (SupTech).

Expected Impact 3: Put Europe in the lead for innovating in regulation, appraising the impact of regulation and facilitating regulatory compliance

The FIN-TECH project aims to pave the way for innovation in risk management regulation and supervision. By bringing together all relevant parties in a common environment and motivating the exchange of knowledge and expertise, the project will reduce the barriers between supervisors and supervised entities and in turn will lead to a uniform approach concerning the risk and opportunities associated with innovative financial technologies. This will promote a levelled European playing field which will motivate innovation in supervisory processes and regulatory compliance. The risk management tools that will be developed by the FIN-TECH project can be seen as innovative technology-based compliance solutions which, while based on the existing regulations, try to minimise their impact on fintechs, facilitating their regulatory compliance.

2.1.2. Barriers to impact

The major barriers to the expected impact of the work programme are the following:

- i) Competitiveness gap:** the speed of FinTech innovations in other regions of the world, and also the haste with which some non-European countries are adopting policy and regulatory measures to facilitate the growth of fintechs may impede, or limit, the growth of the European FinTech ecosystem.
- ii) Knowledge gap:** technological, on the regulators' and supervisors' side; financial and regulatory, on the fintech side. The first one may lead to an inadequate, or disproportionate regulation; the second one to high risks for the consumers, as adequate risk management procedures are not established.

iii) Intra-European differences: while some countries have a more developed FinTech ecosystem and/or a more sophisticated regulation, others are lagging; this may prevent growth of fintechs, which require a common European playing field to grow, as national markets are too small to scale up.

iv) Asymmetric views: while fintech companies care about developing their business models, and see regulation as an “inevitable” burden, regulators and supervisors may overemphasize regulatory measures in some areas, thus limiting or impeding FinTech developments.

We aim to overcome all the above barriers. In particular, i) will be addressed by benchmarking the project with what happens at the worldwide level, through the participation at international conferences and events and with the help of the Advisory Board; ii) will be addressed by the research activities of the project, that bring together universities, regulators and fintechs in sharing solutions for RegTech and SupTech compliance; iii) and iv) by the training and coding sessions of the project, unified across different ecosystems and different countries, which will reduce inter-country differences and asymmetric views between

supervisors and fintechs. We also expect the above barriers to be weakened by the very large and inclusive structure of the project, which involves fintechs, universities, regulators and supervisors from all European countries and with the participation of established financial institutions and investment funds as validators of the project.

2.2. Measures to maximise impact

2.2.1. Dissemination and exploitation of results

Dissemination activities are a key element of the FIN-TECH project. The dissemination plan of the project is operational and can be described in terms of the objectives, the means for reaching the objectives, and the addressed targets of the objectives, as follows.

- a) to promote and raise awareness on the project approach and of its impact for the FinTech industry: through different social networking channels; addressed separately to research centres, fintechs, regulators and supervisors, including those not involved in the project;
- b) to provide information and access to project results: through research repositories, slides repositories from the training sessions, scripts and datasets from the coding sessions, made available through a dedicated on-line web site; accessible by all stakeholders, and to the general public;
- c) to create reputational impact for the project: through the validation of its results from the participation at scientific conferences, regulatory workshops and fintech events, and through publication of its results in high quality scientific journals; addressed to the international communities of researchers, supervisors and fintechs;
- d) to create industrial impact for the project: through the validation of its results with the feedback given by the supervisors and regulators within the training hubs, and by fintechs during the coding hubs; addressed to fintechs and supervisors participating to the project;
- e) to create exploitation impact for the project: through the validation of its the results with the evaluation laboratory that will be conducted by established banks, insurances and investment funds belonging to the European Banking Federation; addressed to fintechs, supervisors, and established financial institutions participating to the project.

All dissemination activities will be run through a dedicated on-line platform, which will integrate the project website, all the outputs from the project, and the results from feedback and evaluation in a dynamic web site, which will periodically generate both “internal” communication, within the network of partners and supporters, and social network communications, with internal and external stakeholders. This “automated” dissemination activity will be integrated by “human” dissemination, that will flow, in particular, through the large network of fintech hubs in the project and, in particular, to those connected indirectly to the project through B-Hive.

Concerning exploitation, the network of fintechs, regulators, supervisors and experts that will be built by the end of the project will be the first “result” to be exploited. A large and dense network, with many interactions, will make it highly sustainable, beyond its duration. We will discuss which forms will guarantee the best survival, including the establishment of academic degrees dedicated to FinTech, in the involved universities, particularly at the PhD level; the establishment of a European FinTech risk management association, which can set standards and provide a permanent discussion forum; and the setting of an advisory board on fintech risk management for European regulators and supervisors.

A second result that could be exploited is the fintech risk management methodology that will be produced by the project. We will use the academic practice of publishing original scientific results in technical reports and submit them to scientific journals, whenever

possible in an open access format. All technical reports and published papers will be inserted in the research repositories of the web site and become public as they are available.

A third result that could be exploited is the common training content (the slides). They will be released on the website, so they could be used and reproduced by any interested party.

A fourth result that could be exploited will be the fintech risk management coding R&D environment that will be generated by the coding platform. We plan to use open source software and publicly available data, to avoid any issues about the reproducibility of our results. The coding environment will be made publicly available on the web site.

We finally remark that the website, with all its content, will be maintained after the end of the project, jointly by the management and the dissemination work packages leaders.

2.2.2 Communication activities (2.2.1a, b)

Project information. The website will be set up as one of the first tasks of the project. It will host the project's objectives and its structure; the events of the project, as they develop: training hub sessions, coding sessions, initial, mid-term and final workshops; the deliverables of the projects, organized according to work packages.

Project awareness. To communicate the project and its results from the project, specific social network communication channels will be set up. In particular, we will use Facebook and Twitter for general purpose communication and LinkedIn and/or Telegram to target specific communities.

Scientific impact. The main channel to achieve scientific impact of the project are workshop and conferences. In addition to our workshops, we plan to participate to the most relevant scientific workshops and conferences in FinTech and fintech risk management, including those organized by the Financial Stability Board and by the European Security Agencies (EBA, ESMA, EIOPA). We also plan to participate at relevant industry conferences and meetings, particularly those targeted to FinTech. Examples are leading conferences such as Money2020, Paris FinTech Conference and Digital Finance Europe where the consortium will seek active participation through keynotes and panel discussions. We will also link the project network with events organised by related European initiatives and, in particular, with those of the EU Blockchain observatory and forum as well as with those of the EU Cybersecurity agency and, more generally, to all those related with fintech risk management issues. Besides conferences, the consortium members will be writing up research results in the form of technical reports, conference and journal papers with high scientific impact. Research with important regulatory and supervisory implications will be of particular interest.

2.2.3. Validation activities (2.2.1c, d, e)

Validation activities are an essential element of the dissemination platform of the project and will be an important input of both financial and technical management as well. Both training and coding will be evaluated by supervisors and fintechs. On the supervisors' side, training sessions will be evaluated and tested continuously; in addition, the three European Supervisory Authorities (ESMA, EBA, EIOPA) have declared, in a joint personal communication to the coordinator (see Section 4), their intention to participate to its activities: this will provide a very important validation benchmark. On the fintech side, coding sessions will also be evaluated and tested continuously: this will provide a very important operational benchmark. A second important validation exercise will be conducted

by the international supervisory board, which will assess the results from the project in a continuous way and, in particular, during the mid-term and final workshops.

A third validation activity will concern the exploitation of the project. The output of the project and, specifically, its coding platform, will be tested within the European Banking Federation, where the results of the project will be discussed with established finance experts, from the European banking, insurance and investment fund sectors. This activity will provide very important input for project exploitation by fintechs, established financial institutions and supervisors.

3. Implementation

3.1 Work plan – Work packages and deliverables

This section presents in detail the objectives, tasks and deliverables associated with each of the seven work packages of the project: (1) management, (2) big data analytics research platform, (3) artificial intelligence in finance research platform, (4) blockchain research platform, (5) training hubs, (6) coding lab and (7) dissemination. Figure 3.1a provides a graphical description of the work packages of the project and shows how they interact.

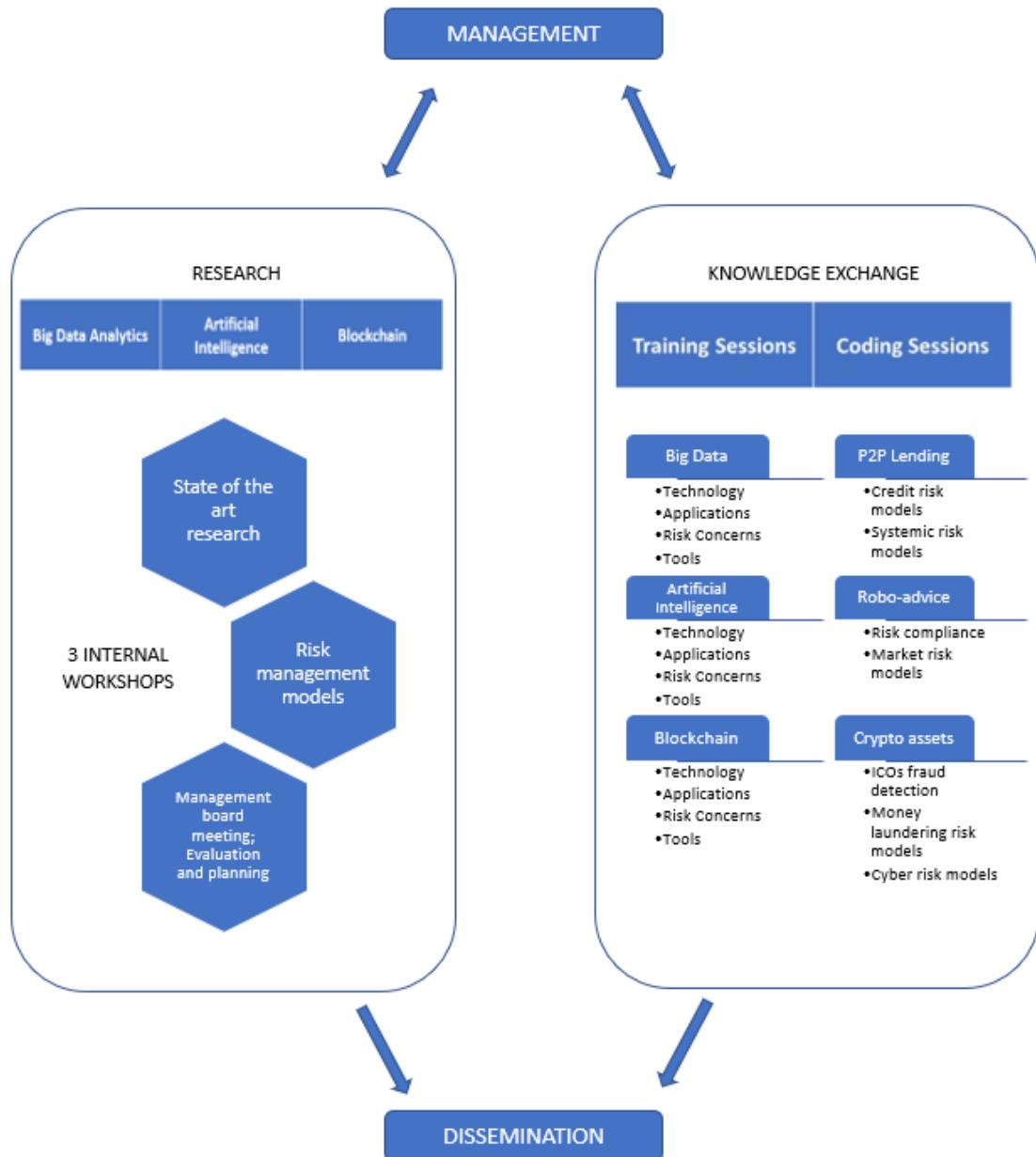


Figure 3.1a: The FIN-TECH project's work packages

Figure 3.1a shows that the management work package connects the research work packages with the knowledge exchange work packages. In practice, this means that the results from the research activity are taken to update the training materials which are also used to update coding materials. We emphasize that the network partners have already agreed on a common

syllabus for the three knowledge exchange activities, through e-mail exchanges and during the two preparatory workshops. They are reported in Tables 3.1a-3.1c below.

Table 3.1a: Syllabus for the big data analytics knowledge exchange platform

Date	Topics	Methods
M1-3	Background	Big data analytics and application to peer-to-peer lending, main risk concerns
M1-3	Statistical learning	Generalized linear models, tree models and random forests
M1-3	Network models	Transactional networks, correlation networks
M4-6	Risk management I	Credit risk models
M4-6	Risk management II	Contagion and systemic risk models
M4-6	Risk management III	Network-based credit risk models

Table 3.1b: Syllabus for AI knowledge exchange platform

Date	Topics	Methods
M7-9	Background	AI in finance and application to robo-advisory, main risk concerns
M7-9	Classification models	Cluster analysis, distance models and community detection
M7-9	Financial econometrics	Volatility and connectedness models, VAR and VECM models
M13-15	Risk management I	Market risk and contagion models in financial markets
M13-15	Risk management II	Market risk and contagion models in crypto markets
M13-15	Risk management III	Asset allocation and compliance risk management

Table 3.1c: Syllabus for blockchain knowledge exchange platform

Date	Topics	Methods
M16-18	Background	Blockchain in finance and application to crypto markets, main risk concerns
M16-18	Text data analytics	Documents and bag of words, text mining and sentiment analysis
M16-18	Machine learning	Discriminant analysis, neural networks, deep learning
M19-21	Risk management I	Initial coin offering fraud detection models
M19-21	Risk management II	Money laundering prevention models
M19-21	Risk management III	Cyber risk management models

3.2. Management structure and procedures

The management structures and procedures that will be used in the FIN-TECH project are based on the experiences accumulated in other large-scale projects and university-industry relationships in which the partners and, in particular, the coordinator, have been involved in the past. The coordinator (UNIPV) has extensive experience and expertise in managing large teams and projects, and especially joint projects between the academia, the industry and the supervisors, and has also pre-established good working relations with most of the project partners. The consortium has already thought of the necessary legal framework for the project (Consortium Agreement) and has already signed non-disclosure agreements between all partners so we believe that if the project gets selected, these issues will not delay the starting of the project as we expect the Consortium Agreement to be fully negotiated and signed before the grant agreement is signed.

3.2.1 Organisational structure

The overall project management structure for the FIN-TECH project can be seen in Figure 3.2.1a.



Figure 3.2.1a: Organisational structure of the FIN-TECH project.

The Project Coordinator (PC) from UNIPV (Paolo Giudici) has a substantial track record from various research and development projects as well as extensive management experience and coordination of large teams. Two researchers, respectively with project management and financial management experience, will be hired to take on the role of Project Technical Manager (PTM) and Financial Technical Manager (FTM). The PTM will assist the PC in the technical coordination, and the FTM will assist the PC in the financial coordination. The main governance body of the Project is the Project Management Committee (PMC), composed by one representative per partner, and chaired by the PC, with collective responsibility for the overall project progress and results. The PMC will meet at least once a quarter, in coincidence with the coding sessions and workshops.

Each work package will be led by a work package leader (WPL) who will be responsible for overseeing the work and coordinating the contributions of all partners involved while also ensuring the timely delivery of the respective WP deliverables and achievement of

milestones. The work package leaders and the project validation task leader compose the Project Technical Committee, which may be delegated by the PMC to discuss the most urgent, especially technical, matters.

Several institutions have pledged their support and will be involved as project supporters: these include national regulators and supervisors, fintech hubs and associations, as well as ESMA, EBA and EIOPA. Though these partners are not formally part of the project, they are committed to working with us (and formal letters of support are reported in Section 4). In addition, a Project Advisory Board will provide independent advice and feedback on the project, based on the benchmark of Europe with international experiences.

3.2.2. Internal communication management

The organization of the project is specified to allow swift communication between all the involved parties. In particular:

- A website will be set up to act as the repository for all working documents and reports;
- Internal communications will be maintained via face-to-face discussions, at least once a quarter, during the coding sessions and workshops, at which the participation of at least one member per partner will be compulsory. In addition, we will use emails and teleconferences.
- Written record of formal meetings will be kept by minutes, whose responsibility will lie with the PC, assisted by the PTM and/or by the PFM.

3.2.3. Project Management and Control

Project management will be led by the project coordinator, on the basis of a financial plan and of a technical plan. The financial plan is summarised in Table 3.2.3a below, showing how the budget is allocated by responsibility, and the controls that will be employed to progressively release it, depending on the % of completion.

Table 3.2.3a: Financial Plan

Responsibility	Budget	Beneficiary partners	Controls
Training hubs (29)	50K	All partners (except Firamis and MF)	72 hours of teaching completed (24 per topic).
Coding lab with management board meeting (6)	50K	Firamis, MF, ZHAW, UCM, Paris 1, WU	4 hours of coding sessions completed; all partners present with at least one participant during the management board meeting
Workshops (3)	50K	UNIPV, BUES, B-HIVE	All partners present with at least one participant; all advisory members present
Management	250K	UNIPV	All deliverables completed; all events (workshops, training hubs, coding sessions) completed
Research WP leadership (3)	50K	UCL, HU, Paris 1	All three research repositories completed

Training hubs WP leadership	50K	UNIPV	Slide repository completed
Coding hub WP leadership	50K	Firamis	Research and development environment completed with scripts and datasets
Dissemination WP leadership	100K	Firamis, B-HIVE	Web site, social media channels, event participation, feedback repository completed; Evaluation lab and evaluation lab repository completed

The technical plan is described in Table 3.2.3b. It will be based on several effective control points, that correspond either to the completion of project deliverables, or to their intermediate realisations. The most important control points are those that coincide with the initial, mid-term and final management board meetings. The complete list of milestones is contained in Table 3.2.3 b below.

3.2.4 Innovation Management

The FIN-TECH consortium recognises the importance of properly managing innovation within the project. At the start of the project, the Project Technical Manager (PTM) will start looking after Intellectual Property Rights (IPR) for the project. During the project, the PTM will work with all project partners in identifying IPR and ensure that they are protected within the consortium, either by the owner itself or, when the owner is unwilling or unable to protect IPR by itself, by other consortium members. All such activities shall be governed in accordance with the rules set out and will be agreed as part of the formal Consortium Agreement, including the preservation of the individual participant's right to exploit its own IPRs and information as it wishes. In consideration of the structure of the project, IPR issues are not expected to present obstacles on reaching consortium agreement, if the proposal is accepted.

All results from the project will be made available in the public domain and, in particular, through open access scientific publications. This will enable researchers, supervisors and fintechs to leverage and exploit its results. We believe that opening most of the results to scientific scrutiny and providing them to other interested parties will increase the impact of the project on financial technologies and, specifically, on risk management practices, both on the fintechs' and the supervisors' side.

3.2.5 Financial Management

The conditions on payment procedures and resource re-allocation will be laid out within the Consortium Agreement. The PC, assisted by the PFM, will control the distribution of project funds according to the financial plan in Table 3.2.3a. Payments will be delivered only if the committed work and/or deliverable has been well executed. In particular, for the training hubs activity, payment will be performed only if all planned hours of training are performed. For the coding hub activity only if all hours of coding lab are executed. For the research work packages only if the corresponding repositories are completed. For the management work package, only if all the activities and deliverables are completed. For the dissemination work

package, only if all external outputs are completed. This will guarantee an effective, activity-based control of all activities. If a partner is not able to deliver its assigned work, the PTM in liaison with the PC may propose the re-allocation of assigned tasks to other partners who offer to complete the work, subject to PMC approval. This procedure ensures a high degree of flexibility and security of funds and will help to ensure that work will be delivered according to plan, even if a partner may fail to deliver a specific piece of work.

3.2.6 Risk Management

Project execution can be hampered by factors that are internal and external to the partner consortium. Internal risk factors depend on conflicts between partners. Detailed conflict resolution mechanisms will be described in the Consortium Agreement which will be signed before signing of the Grant Agreement takes place. In general, partners should attempt to resolve their conflicts within the framework of the Project consortium and legal and court disputes should be avoided. No conflict resolution measures may contradict the project contract, the Consortium Agreement or any national or EC regulations. The PC, PTM and PFM will act as mediators in conflict resolution issues depending on the level where they arise and on their severity. The methods used to reach agreement over an issue will mainly consist of live discussions, followed by written confirmations in the form of e-mails, and/or accepted meeting minutes. If agreement cannot be reached, a position paper will be prepared by the PTM, and if necessary, by the WPL of the work package in question. This paper will then be circulated to all partners and opinions related to the conflict at hand will be gathered and discussed, at the PTC and, if necessary, at the PMC level. Naturally, the consortium aims to take decisions by consensus, but if this turns out to be impossible to achieve, simple majority voting will be enacted.

External risk factors are summarised in Table 3.2b, which contains the main critical risks we have identified in the implementation of the project, whose realisation may imply that the stated project's objectives are not achieved. For each risk we detail the corresponding risk mitigation measure.

3.3 Consortium as a whole

The FIN-TECH project brings together a strong consortium of 24 partners, each of which is mapped to at least one regulator, a supervisor, or a fintech hub, in each of the 29 considered European countries. The partnership has been constructed by the FIN-TECH project coordinator on the basis of previous common research work in risk management and/or networking knowledge from related workshops. Partners have been chosen according to the following rule: one European country, one partner, with the exception of Germany and Italy. All partners have research experience in risk management models and related fields; most are universities but there are also some fintech companies. The academic partners are all recognised research organisations with a strong track record in statistics, data science, econometrics and/or financial risk management. The industrial partners include specialised fintechs and fintech hubs with considerable expertise and reputation. The consortium has been formed by people that share the common vision that the opportunity of financial technologies must be balanced with an appropriate proper measurement and management of the related risks.

When a partner was contacted to represent a country, it was told that a necessary condition to become member of the network was to contact at least one supervisor or regulator or fintech hub from the same country and get its support to the project in the form of a letter of intent that declares the availability to participate in the activities of the project. The project plan has been shared through email and Dropbox repositories, since the beginning of October 2017, and also during two organised preparatory workshops, in Winterthur (January 2018) and in Brussels (March 2018). The regulators, supervisors and fintech hubs that signed the letter of intent have been actively involved as a draft presentation of the project was sent to them, and the feedback was incorporated in the draft project.

In addition, the project has been shared with representatives from all European Security Agencies (EBA; ESMA; EIOPA), from the Financial Stability Board, the European Systemic Risk Board, and with the members of the international advisory board, chosen to represent different world regions and expertise. Overall, the “enlarged” consortium, that includes the partners plus the supporting authorities and fintech hubs that have signed the letter of intent, constitute a highly representative and multi-disciplinary team of research experts, fintech experts and supervisory experts. This will ensure that the project objectives are achievable and inclusive of all European countries.

3.3.1 Individual contributions and complementarity of expertise

The complementarity of the partners’ expertise and their main contributions related to the FIN-TECH project are illustrated in Table 3.3.1a. Further information, including a detailed description of all organizations and biographies of key personnel is available in Section 4, from which several past common activities between partners can be deduced.

Table 3.3.1 a: FIN-TECH partner contributions and associated training hub participants

PARTNERS AND EXPERTISE	CONTRIBUTIONS	ASSOCIATED REGULATORS/SUPERVISORS	ASSOCIATED FINTECH HUBS/ASSOCIATIONS
University of Pavia (Research Center)	Coordination and management; Coordination of training hubs; Initial workshop; Training in Malta	Malta Financial Services Authority (Malta); The Central Bank of Hungary (Hungary); EBA, ESMA and EIOPA.	
Humboldt University Berlin (Research Center)	Coordination of artificial intelligence research; Training in Germany	Deutsche Bundesbank (Germany)	
ZHAW Applied Sciences (Research Center)	Coding session 3; Training in Switzerland;	State Secretariat for International Financial Matters (Switzerland)	Swiss Fintech Association (Switzerland);, the Swiss Fintech Innovations (Switzerland).
University College London (Research Center)	Coordination of big data analytics research; Training in UK	Financial Conduct Authority (UK)	
Bucharest University of Economic Studies	Mid-term workshop; Training in Romania	Autoritatea de Supraveghere Financiara (Romania)	

(Research Center)			
MODE FINANCE (Fintech)	Coding session 1		AssoFintech (Italy); Fintech District S32 (Italy); Italia Fintech (Italy); Digital Magics (Italy).
FIRAMIS (Fintech)	Coordination of Coding Lab and Dissemination; Coding session 2		Fintech Community Frankfurt GmbH (Germany);
Panteion University (Research Center)	Training in Greece and Cyprus	Bank of Greece (Greece) and Capital Market Commission (Greece)	
		Cyprus Security and Exchange Commission (Cyprus)	
INESC-TEC (Research Center)	Training in Portugal	Portuguese Securities Market Commission (CMVM) (Portugal)	
University of Paris 1 (Research Center)	Coordination of blockchain research; Coding session 5; Training in France	Ministry of Digital Affairs (France); Members of the French Parliament; Autorité des Marchés Financiers (France)	France Fintech (France); Association Française pour la Gestion de Cybermonnaies AFGC (France).
Politecnico of Milan (Research Center)	Training In Italy	Commissione Nazionale per le Società e la Borsa (Italy)	
University College Dublin (Research Center)	Training in Ireland	Central Bank of Ireland (Ireland)	
University of Luxembourg (Research Center)	Training in Luxembourg	Commission de Surveillance du Secrétaire Financier (Luxembourg)	
Jozef Stefan Institute (Research Center)	Training in Slovenia	Banka Slovenija (Slovenia)	
University of Warsaw (Research Center)	Training in Poland	Komisja Nadzoru Finansowego (Poland)	
University of Rjeka (Research Center)	Training in Croatia	Croatian Financial Services Supervisory Agency (Croatia)	
Universidad Complutense de Madrid (Research Center)	Coding session 6; Training in Spain	Comisión Nacional del Mercado de Valores (Spain)	Spanish Fintech and Insurtech Association (Spain)
University of Economics in Bratislava (Research Center)	Training in Slovakia	Národná Banka Slovenska	
Kaunas University of Technology (Research Center)	Training in Lithuania, Estonia, Latvia	Lietuvos Bankas (Lithuania)	
		Finantsinspeksiõon (Estonia)	

		Finanšu un Kapitāla Tirgus Komisija (Latvia)	
Masaryk University Brno (Research Center)	Training in the Czech Republic	Czech National Bank (Czech Republic)	
B-Hive (Fintech Hub)	Evaluation lab (through ABI Lab); Final workshop; Training in Belgium, Training in the Netherlands and in Denmark; Coordination with fintech hubs.	ECON Committee of the European Parliament (Caroline Nagtegaal - Dutch member)	Holland Fintech (The Netherlands)
		Danish Financial Supervisory Authority (Denmark)	Copenhagen Fintech (Denmark)
		Financial Services and Market Authority (Belgium) with National Bank of Belgium	
Varna University of Economics (Research Center)	Training in Bulgaria	Financial Supervision Commission (Bulgaria)	
University of Tampere (Research Center)	Training in Finland and Sweden	Financial Supervisory Authority (Finland); FinansInspektionen (Sweden)	
WU Vienna (Research Center)	Coding session 4; Training in Austria	Austrian Financial Market Authority (Austria)	R Foundation

3.4 Resources to be committed

The number of person/months over the whole duration of the planned work, for each work package, and for each participant is illustrated in Table 3.4a and other direct cost items are presented in Table 3.4.b.

Table 3.4 b ‘Other direct cost’ items (travel, equipment, infrastructure, goods and services, large research infrastructure)

3 ZHAW	Cost (€)	Justification
Travel	12000	Travel costs for partner participants to the board management meeting
Other goods and services	5800	Coding session location rent and catering
Total	17800	

5 BUES	Cost (€)	Justification
Travel	32460	Travel costs for partner participants and advisory board members to the intermediate workshop
Other goods and services	4000	Intermediate workshop location rent and catering
Total	36460	

6 MF	Cost (€)	Justification
Travel	9425	Travel costs for partner participants to the board management meeting
Other goods and services	5000	Coding session location rent and catering
Total	14425	

7 Firamis	Cost (€)	Justification
Travel	15000	Travel costs for partner participants to the board management meeting
Other goods and services	8000	Coding session location rent and catering
Equipment	14780	Computing facilities to implement the R&D coding platform and the dissemination platform
Total	37780	

25 WU	Cost (€)	Justification
Travel	20000	Travel costs for partner participants to the board management meeting
Other goods and services	8150	Coding session location rent and catering
Equipment	10000	Computing facilities to support the R&D coding platform
Total	38150	

B-HIVE	Cost (€)	Justification
Travel	35000	Travel costs for partner participants and advisory board members to the final workshop
Other goods and services	25000	Final workshop location rent and catering
Equipment	8510	Materials and computing facilities to support the organization and the reach of the final workshop
Total	68510	

4. Members of the consortium

4.1. Participants

4.1.1 Partners of the consortium

Participant Number	1	Organisation official name	UNIVERSITÀ DEGLI STUDI DI PAVIA
Partner presentation			
Partner entity description and relevance:			
<p>The University of Pavia (UNIPV) was founded in 1361 and is located within a University town that facilitates interaction and inter-disciplinarity, located near to the Milan financial centre. All international rankings reveal that the University of Pavia is well placed among the top Italian Universities, in terms of research, advanced teaching, and particularly in technological transfer. The Department of Economics and Management conducts international leading research in quantitative models for economics and finance. The statistical group of the department focuses its research on artificial intelligence, data science and network models, and related stochastic processes, and has ranked first among Italian University in the recent research assessment exercises. It collaborates with the Department of Computer Engineering through a common PhD programme, in Financial technologies. Since 2016 it coordinates a FinTech research laboratory, established in 2001 as a Data Mining laboratory, that has carried out research and consulting projects for leading institutions such as the Bank for International Settlements, the Asian Development Bank, the Deutsche Bundesbank, the Bank of Italy, the Italian Banking Association, Cariplo Foundation, Intesa San Paolo, UniCredit, BancoBPM, UBI, MPS, BPS, Creval, Mediolanum, Accenture, KPMG, Mediaset, Mondadori, SAS Institute, Sirti, Sky.</p>			
Main roles: <p>UNIPV will be the global coordinator of the project and will be responsible to assure the quality and the delivery of the planned outcomes of the project in the specified timeline (leader of work package 1 – Management). UNIPV will be in charge of conducting the training hub sessions for Malta’s national regulator - Malta Financial Services Authority and for the Hungarian regulator. It will organize the first general “launch” workshop in which partners, supporters and advisory board members will participate. Besides management, UNIPV will be the leader of the knowledge exchange work package (WP5) and, in this role, will be responsible for the delivery of common syllabus and slides for the three training classes.</p>			
A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal: <p>Paolo Giudici is Professor of Data Science and Statistics at the Department of Economics and Management of the University of Pavia and Research Fellow at the Blockchain technology center of London University College. He has been research fellow at the Bank for International Settlements in Basel. He is academic supervisor of about 160 master's students and of 12 Ph.D. students. Most of them currently work in the financial industry, in IT/consulting companies or as academic researchers. He is a researcher author of 78 scientific publications in internationally refereed journals, and of a Wiley book on “Applied data mining”, with 3326 total citations and an h-index of 26 (see Google Scholar for the details). The corresponding research profile is that of a data scientist, focused on statistical modelling, especially in</p>			

Bayesian analysis, Computational statistics, Graphical network models; and on data science models in finance, especially financial risk management, systemic risk and operational quality management. He is a Board of Directors member of the Credito Valtellinese Banking group; Advisory Board member of BABB, the Blockchain Based Account Bank; Honorary member of the Association of the Italian Financial Industry Risk Managers; member of the scientific committee of the Italian Fintech Association (AssoFintech).

Both Paolo Giudici and Paola Cerchiello have been key figures in the MUSING project, a European ICT project funded within the 6th Framework programme (2006-2010), dedicated to the development of semantic based business intelligence technology, and its application to credit risk, operational risk and (international) strategic risk. UNIPV, with Giudici as PI, was funded about €650K from this project. Both Paolo Giudici and Paola Cerchiello have been global coordinators of the Project MISURA, on big data for financial risk assessment, funded by the Italian Ministry of Education, University and Research, for the period 2013-2016, for a total of about €900K.

Infrastructure and equipment:

The University of Pavia is part of the CINECA Big data laboratory, a nationwide initiative that gathers computing power from a large number of Universities in the field of big data. In addition, the University of Pavia has a technological centre where a number of start-up companies in the field of big data, artificial intelligence and blockchain, operate.

The five most relevant publications:

1. (2017) Pejman Abedifar, Paolo Giudici, Shatha Hashem. Heterogeneous market structure and systemic risk: evidence from dual banking systems. *Journal of Financial Stability*, 33, 96-119.
2. (2017) Paolo Giudici, Peter Sarlin, Alessandro Spelta. The interconnected nature of financial systems: direct and common exposures. *Journal of Banking and Finance*, in press.
3. (2017) Paolo Giudici, Laura Parisi. Sovereign risk in the Euro area: a multivariate stochastic process approach. *Quantitative Finance*, 17 (12), 1995-2008.
4. (2017) Paola Cerchiello, Paolo Giudici, Giancarlo Nicola: Twitter data models for bank risk contagion. *Neurocomputing*, 264, 50-56.
5. (2016) Paolo Giudici, Alessandro Spelta. Graphical network models for international financial flows. *Journal of Business and Economic Statistics*, 34 (1), pp. 126-138.

Key Personnel:

Prof. Paolo Giudici (male) PhD in Statistics (1994), graduated from the University of Trento, MSc in Statistics from University of Minnesota, MSc in Economics from Bocconi University. Area of research/work: statistical data science models for economics and finance. Has published 77 papers in international refereed journals and a book on “applied data mining” for Wiley in 2003, with an h-index of 26. He teaches Statistics, Financial Risk Management and Data Science. He will be the coordinator of the project. He will commit 25% of his time for the project.

Prof. Paola Cerchiello (female) PhD in Statistics (2005), graduated from the University of Milan MSc in Economics from the University of Pavia. Area of research/work: statistical and computational models for big data analysis in economics and finance. She teaches Applied statistics and Big data analysis. She will commit 25% of her time for the project.

Prof. Claudia Tarantola (female) is Associate Professor of Statistics at the Department of Economics and Management of University of Pavia. She has taken part in various research programs, both National and International. She is a member of the Italian Statistical Society

and International Society for Bayesian Analysis. She served as a referee for various scientific journal including Biometrika, European Journal of Operational Journal of the Royal Statistical Society series B, Journal of Statistical planning and Inference among others. She will commit 25% of her time for the project.

Participant Number	2	Organisation official name	HUMBOLDT-UNIVERSITAET ZU BERLIN
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Partner presentation

Partner entity description and relevance:

The **Humboldt University of Berlin (HU)** (German: *Humboldt-Universität zu Berlin*, abbreviated *HU Berlin*), established in 1810, is the oldest of Berlin's four universities. The *British Times Higher Education World University Ranking 2016* listed Humboldt-University as the 49th best university in the world and 3rd best in Germany. The Chair of statistics at HU Berlin has an outstanding expertise in development of new training courses as well as in successful implementation of experimental teaching approaches in the area of FinTech and Digital economy.

Main roles:

HU Berlin will be a local coordinator of the project across Germany. Specifically, HU Berlin will be in charge of conducting the training hub sessions for the Financial Services Authority Staff (The Deutsche Bundesbank) and German FinTech companies.

HU Berlin, as leader of AI work package (WP3) will be the one of key contributors of content for the training sessions in artificial intelligence as applied in finance. Specifically, HU Berlin will be responsible for establishing the state of art concerning AI technology, its application in finance, the related main risk concerns and the risk management tools which will enable automated compliance by FinTech companies and increased efficiency of the supervisory activities.

Previous experience relevant to those tasks:

The HU Berlin has a long-standing experience in the FinTech area both from research and training perspectives. The following list of some of the funded grant can demonstrate both.

1. Collaborative Research Center 649 “Economic Risk”, 2005-2016, CRC 649 was established by the German Research Foundation (DFG) and was a part of the interdisciplinary Center for Applied Statistics and Economics (C.A.S.E.) at the HU Berlin in order to expand and to extend understanding of economic risk, decision making and economic opportunities. Participating economists, mathematicians and statisticians were affiliated with HU Berlin, Freie Universität Berlin, Technische Universität Berlin, Weierstrass Institute for Applied Analysis and Stochastics (WIAS) and Wissenschaftszentrum Berlin (WZB). Researchers of the CRC 649 employed empirical as well as quantitative-theoretical methods, which were supported by an innovative Research Data Center (RDC). The aim was also to provide external researchers with access to the data, algorithms and results. The CRC 649 has built a great network of researchers during its eleven years lifespan.
2. The International Research Training Group (IRTG) 1792 “High Dimensional Nonstationary Time Series”, 2013-2022. The financial support of the project is provided by the German Research Foundation (DFG-Graduiertenkolleg). IRTG offers outstanding young researchers an internationally competitive doctoral program with a unifying

research focus and financial support. The IRTG's research focus is on identifying low dimensional factors that help to forecast and understand dynamic aspects of possibly non-stationary economic data in high dimension.

3. CRIX – CRyptocurrency IndeX (hu.berlin/crix), since 2015. The CRIX is real time computed at the HU Berlin. The development was a joint work with the SKBI at Singapore Management University and CoinGecko, who provide the data for the computation. CRIX is a benchmark for the crypto-tokens and crypto currencies market. It gives insight about the current and past movement of this emerging market.
4. DEDA – Digital Economy and Decision Analytics (Lecture course and Q Kolleg research group, Master & PhD level), 2016-2017. DEDA is a collaborative training project with National University Singapore (NUS), including financial support for three master students for a research/learning exchange trip to NUS. The course was also televised to the NUS. The amassment of data makes it hard to find structures and requires a skilful analysis of the massive raw material available. The thoughts presented in this course analyzed these challenges and offered ways to handle the questions arising in this evolving context. Different levels for analysis were presented. Concrete examples concerned Credit default swaps, Dynamic Topic modeling, Cryptocurrencies and quantitative analysis of real data in this context. Teaching was focused on highly complex mechanisms with pre-programmed decision-making algorithms.
5. Crypto-currencies in a digital economy (hu.berlin/CC conference ECDF 2017), November 2017. Funding provided by the German Research Foundation (DFG). More than 60 international speakers and guests took part at this event. The conference aimed to provide a platform for interdisciplinary discussion between researchers and practitioners in the following fields: macro-economic consequences of the blockchain technology, implementing decentralized monetary policy via a blockchain protocol, high-frequency markets of altcoins, chances for financial inclusion, portfolio optimization with altcoins, risk management with cryptos.
6. Blockchain Nights (<https://hu.berlin/blockchain-nights>): since 2017, partial funding provided by the LvB Chair of Statistics HU Berlin and the International Research Training Group 1792. The Blockchain Nights are a monthly cross-disciplinary discussion series to foster a factual debate about Crypto-Currencies, Blockchain Technology, and Smart Contracts. The aim of the Blockchain Nights is to bring together students, researchers, and start-ups from the digital venture scene. The inter-disciplinary series addresses all interested in business, economics, or technology perspectives -- theorists as well as practitioners.
7. Special Issue of the Journal of Financial Econometrics, 2018 (forthcoming). Professor Härdle WK (HU Berlin) and Professor Harvey CR (Duke university) have initiated the special issue dedicated to research of the digital economy and especially finance. The specific focus is taken on algorithmic trading, risk and social sentiment analysis and on utilizing real-time financial, social and news data.

Infrastructure and equipment:

The Humboldt Lab for Empirical and Quantitative Research (LEQR) forms the foundation for the empirical and computer supported (numeric) theoretical research. It offers access to proprietary and non-proprietary databases and state-of-the art computing facilities as well as being the internal platform for the exchange of software and numeric algorithms. LEQR also hosts and provides access to the scientific publications. It is open to other research projects.

The goal is the creation of a communication network concentrated on the empirical risk research and economy research for data and algorithms between physically separated research groups. LEQR fulfils thereby a pioneering role in the realization of the science council's

recommendation to strengthen and advance empirical economic research in Germany.

The five most relevant publications:

1. Chen CYH, Härdle WK, Ai JH, Wang W (2018) Pricing Cryptocurrency options: the case of CRIX and Bitcoin. SFB DP 2018-004.
2. Chen S, Chen CYH, Härdle WKH, Lee TM, Ong B (2017) A first econometric analysis of the CRIX family, in Handbook of Blockchain, Digital Finance and Inclusion, Vol 1, Cryptocurrency, FinTech, InsurTech, and Regulation, David LEE Kuo Chuen Robert Deng, eds. ISBN: 9780128104415, Academic Press, Elsevier.
3. Trimborn S, Li M, Härdle WK (2017) Investing with cryptocurrencies – A liquidity constrained investment approach. SFB DP 2017-014.
4. Linton M, Teo EGS, Bommes E, Chen CYH, Härdle WK (2017) Dynamic Topic Modelling for Cryptocurrency Community Forums, in Applied Quantitative Finance (Härdle, Chen, Overbeck eds) Springer Verlag, ISBN 978-3-662-54486-0.
5. Härdle WK, Trimborn S (2015) CRIX or evaluating Blockchain based currencies. Oberwolfach Report No. 42/2015 „The Mathematics and Statistics of Quantitative Risk“ DOI: 10.4171/OWR/2015/42.

Key Personnel:

Prof. Dr. Wolfgang Karl Härdle, born in 1953, has been director of the Ladislaus von Bortkiewicz Chair of Statistics at the Department of Economics and Business Administration at the Humboldt-Universität zu Berlin since 1992. He was Coordinator of the DFG "Collaborative Research Center 649: Economic Risk" from October 2005 until December 2016. He currently heads the DFG International Research Training Group 1792 "High Dimensional Nonstationary Time Series" joint project with Xiamen University, China (since 2013). His research interests include smoothing methods, discrete choice models, statistical modelling of financial markets and computer-aided statistics. His more recent work deals with the modelling of implied volatilities, statistical analysis of financial risk and crypto-currencies. He will manage the project assigned tasks within his internal team or with new resources if needed.

Participant Number	3	Organisation official name	ZURCHER HOCHSCHULE FUR ANGEWANDTE WISSENSCHAFTEN
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Partner presentation

Partner entity description and relevance:

With 12.234 students and 2977 employees, **Zurich University of Applied Sciences (ZHAW)** is the leading University of Applied Sciences in Switzerland. It was founded in 2007 and is owned by Canton of Zurich. The personnel are of 259 professors, 853 lecturers, 1013 scientific staff and 852 administrative and technical staff. ZHAW runs a yearly research budget of 116 mln CHF. From this budget, 75% is industry-related research. So far, ZHAW participated in 50 EU projects, 12 of them within the Horizon 2020 framework. An important source of external funding are Innosuisse (formerly known as Commission for Technology and Innovation, CTI) projects to develop innovations together with SMEs. The organization is structured in 7 schools and 37 institutes. For this application, three institutes (IWA, IDP, IBL) from the School of Management and Law and the School of Engineering. The three institutes are regularly working together in projects of applied research. The common interest of the three institutes is the application of data-driven methods to financial market and industry

research. This topic requires cooperation across institutes and research disciplines to achieve results that become relevant for application partners. This interdepartmental cooperation led to the foundation of the ZHAW DataLab in 2013, the annual conference for Data Science and the annual COST conference for Mathematics in Industry and Finance as well as the annual “Deep Learning Day”. ZHAW is especially strong in applied research projects together with industry partners.

Main roles:

ZHAW will be the local coordinator of the project across Switzerland. Specifically, ZHAW will be in charge of conducting the training hub sessions for the Swiss national regulator (Swiss International Finance). Additional to this, they will be responsible for organizing a meeting with a coding session.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

1. “European Government Bond Dynamics and Stability Policies”, Project Partner and Funding: European Stability Mechanism (ESM), Budget: 50,000 EUR. From 2004 to 2015, the market perception of the sovereign risks of euro area government bonds experienced several different phases, reflected in a clear time structure of the correlation matrix between the yield changes. “Core” and “peripheral” bonds cluster in a bloc-like structure, but the correlations between the blocs are time-dependent and even become negative in periods of stress. Using noise-filtered partial correlation influences, this time-dependency can be evaluated and visualized using network graphs. Our results support the view that market-implied spill-over risks have decreased since the European rescue and stability mechanisms came into force in 2011.
2. “Risk Management System for Asset Managers”, Project Partner: nectar financial, Funding: Innosuisse (CTI), Budget: 790,000 CHF. A risk management system for asset managers is developed. It addresses operational risk and connects market-, liquidity- and credit risk. Important components are a scoring system to evaluate operational risks and an “earnings-at-risk” concept specific for asset managers.
3. “Libra: A One-Tool Solution for MLD4 Compliance”, Project Partner: Deep Impact AG, Funding: Innosuisse (CTI), Budget: 800,000 CHF. Compared with earlier regulations, the 4th European Money Laundering Directive (MLD4) imposes rigorously increased requirements. It compels obliged entities to conduct in depth screenings of customers and their associations. The Libra Project aims at providing a one tool solution for meeting MLD4 compliance. The project will in particular offer a cloud based “Google-like” search experience to bring up reliable information on persons of interest and their surroundings.
4. “Large-Scale Data-Driven Financial Risk Modelling”, Project Partner: Ariadne Business Analytics, Fintegral, Funding: Innosuisse (CTI), Budget: 600,000 CHF. To meet regulatory requirements financial risk assessment should be done at the level of the individual financial contracts; this requires the use of Big-Data technology. The risk and profitability management software of the main implementation partner Ariadne, which is based on the ACTUS open standard for financial contract modeling, will be extended to offer a scalable, cloud-based solution, and the latest simulation and credit risk modeling methodologies will be added.
5. “Regulation of Virtual Currencies”. Funding: Swiss National Science Foundation (SNF), Budget: 280,000 CHF. The legal framework applied to virtual currencies is examined, both from a private and public law perspective. The purpose of the project is to clarify the application of the existing law to virtual currencies and to propose new rules which take into account the various interests involved.

Infrastructure and equipment:

ZHAW is a leading technology university in Switzerland. The DataLab is an interdisciplinary institution. Datalab is a virtual organization at Zurich University of Applied Sciences, spanning several departments and institutes. It concentrates Data Science activities conducted by different researchers at their respective institutes and research units within ZHAW, bringing them into close collaboration by means of various activities.

The five most relevant publications:

1. Wildi, Marc; McElroy, Tucker (2016). Optimal Real-Time Filters for Linear Prediction Problems. *Journal of Time Series Econometrics*.
2. Packham, Natalie; Papenbrock, Jochen; Schwendner, Peter; Wöbbeking, Fabian: Tail-risk protection strategies. *Quantitative Finance*, 17, 5. 729-744, 2017.
3. Schwendner, Peter; Schüle, Martin; Ott, Thomas; Hillebrand, Martin. European government bond dynamics and stability policies: taming contagion risks. *Journal of Network Theory in Finance*, 1, 4, 2015.
4. Papenbrock, Jochen; Schwendner, Peter: Handling Risk On/Risk Off Dynamics with Correlation Regimes and Correlation Networks. *Financial Markets and Portfolio Management*, 29, 2. 125-147, 2015.
5. Abegg, Andreas; Bärtschi, Harald; Dietrich, Andreas (2017): Principles of Financial Market Law (2nd edition).

Key Personnel:

Peter Schwendner (male) is a Professor at the Institute for Wealth and Asset Management (IWA) at ZHAW School of Management and Law, Zurich, Switzerland. He leads the Center for Asset Management at the institute. His research interests are financial markets, quantitative asset management and financial network analytics. Peter received a PhD in Physics in 1998 for his research at the Max Planck Institute for Fluid Dynamics in Goettingen. He has 15 years' work experience in the financial industry as a head of quantitative research at Sal. Oppenheim jr & Cie and as a partner at Fortinbras Asset Management, developing investment products for institutional clients. He has 9 scientific publications in well-known refereed academic journals and has given numerous presentations at conferences targeted at academic and financial industry audience. At ZHAW, he was project leader for:

- “Multi-Asset Investment Process using Bayes Ensembles of Trading Models”
- “European Government Bond Dynamics and Stability Policies”
- “Risk Management System for Asset Managers”

He will manage the project assigned tasks within the team that follows.

Marc Wildi (male) is a Professor at the Institute for Data Analysis and Process Design (IDP). He holds an Msc in Mathematics from the Swiss Federal Institute of Technology (ETH) in Zurich; he obtained his PhD from the University of St-Gallen, Switzerland. After being lecturer in Statistics at the Universities of Fribourg and of St-Gallen, he began his current position as a Professor in Econometrics in 2002 at the Zurich University of Applied Sciences. His novel forecast and signal extraction methodology, the so-called Multivariate Direct Filter Approach (MDFA), won two international forecast competitions in a row. His current research interests involve applications of the MDFA to mixed-frequency (daily) macro-economic indicators and to algorithmic trading.

Jörg Osterrieder (male) is a Professor of Finance and Risk Modelling at the Institute for Data Analysis and Process Design (IDP). His research interests are automation, digitalization and industrialization of the finance industry, financial mathematics, algorithmic trading and portfolio management. Jörg earned a PhD in financial mathematics at ETH Zurich before joining the financial industry. During his career, Jörg served at Merrill Lynch, Goldman Sachs,

Credit Suisse and Man Investments. He has 9 scientific publications in refereed academic journals and has also given numerous talks at international conferences. He is the main organizer of the COST Artificial Intelligence conferences at ZHAW in Winterthur.

Wolfgang Breymann (male) is a Professor and head of the group Finance, Risk Management and Econometrics at Zurich University of Applied Sciences, Institute of Data Analysis and Process Design, which he shaped by developing the research activities in financial markets and risk. After a career in theoretical physics, he turned to finance in 1996 as one of the early contributors to the then burgeoning field of Econophysics. Since 2004 he is professor at the Institute of Data Analysis and Process Design at Zurich University of Applied Sciences, where he developed the activities in Financial Mathematics and Quantitative Risk Management. He is one of the originators of project ACTUS for standardizing financial contract modelling and member of the board of directors of the ACTUS Financial Research Foundation as well as founding member of Ariadne Software AG and Ariadne Business Analytics AG. His current R&D interests are focused on the automation of risk assessment to improve the transparency and resilience of the financial system. Wolfgang Breymann has managed large national and international projects. He authored or co-authored over 40 refereed papers and co-authored the book "Unified Financial Analysis". He has given many invited talks at universities and conferences all over the world.

Harald Bärtschi (male) is Adjunct Professor of Private and Commercial Law of the University of Zurich and head of the Center for Corporate and Tax Law at the Zurich University of Applied Sciences (Institute of Business Law). His main area of expertise is financial market law and corporate law. He is a graduate from the University of Zurich (dissertation and habilitation/post-doctoral thesis) and from Yale Law School (LL.M.). Harald is author of various books, commentaries and articles, co-editor of the law journal *ius.focus* and a frequent speaker at conferences, mainly in the area of fintech and blockchain. Besides his academic work, he worked in a large Swiss law firm for more than ten years, being admitted as an attorney at law in Zurich (Switzerland) and New York (USA).

Alexander Posth (male) is a senior lecturer at the Institute for Wealth and Asset Management (IWA) at ZHAW School of Management and Law, Zurich, Switzerland. Alexander has 14 years of experience in the financial industry as a quant, portfolio manager and trader at banks and hedge funds and as an index product developer at STOXX. He earned a PhD in physics.

Tomasz Orpiszewski (male) is a senior lecturer at the Institute for Wealth and Asset Management (IWA) at ZHAW School of Management and Law, Zurich, Switzerland. Tomasz has 8 years of experience as an economist, fixed income strategist and quantitative analyst at international asset managers. He earned a PhD at Université Paris-Dauphine as well as the CFA and CQF degrees.

Participant Number	4	Organisation official name	UNIVERSITY COLLEGE LONDON
Partner presentation			
Partner entity description and relevance: University College London (UCL) is a world-leading multidisciplinary university, and consistently ranked in the top 10 International Universities (QS World University Rankings). It is a wonderful environment in which to do research. It is entrepreneurial, open, collegial and ideally placed intellectually and geographically. Our location in the heart of London gives us access to many other world-leading academic institutions, financial institutions and regulators. London is the world's financial and technology capital and UCL has privileged access to banks, financial services industries and regulators. Specifically, UCL Department of			

Computer Science collaborates with over 40 financial institutions, as well as the EBA, Bank of England, Prudential Regulatory Authority and Financial Conduct Authority. UCL members of this project are affiliated to UCL Computer Science Department and the UCL Centre for Blockchain Technologies (CBT). The UCL CBT is a world-leading research Centre committed to becoming the leading global research hub with an industry focus on: the impact of Blockchain technologies on our socio- technical systems and the promotion of a safe and organic development and adoption of Blockchain-based platforms.

The **UCL CBT** goes beyond established discipline boundaries to set the foundations for a new interdisciplinary research area on Distributed-Consensus ledgers and Network Based Technologies. The Centre's research is divided into three pillars: Science & Technology, Economic & Finance and Regulation & Law. It counts on the support of 8 UCL Departments, about 100 researchers and faculty members and fellows from all over the world, and the worldwide largest student community on blockchain which count about 600 units. The research strategy of UCL is oriented around a number of grand challenges explored by interdisciplinary centres such as the UCL Centre for Decision-Making Uncertainty. The Department of Computer Science at UCL has particular strengths in financial computing, cryptography, big data analytics, text mining, data visualization, computer graphics, digital environments, machine learning, computer networking and distributed systems, bio-informatics, programming languages, medical imaging, and software systems engineering.

The Financial Computing and Analytics group are leading the research in the impact of information technologies on global finance and economy, (<http://fincomp.cs.ucl.ac.uk>, <http://www.financialcomputing.org>).

Main roles:

UCL will be a local coordinator of the project across UK. UCL will be in charge of conducting the training hub sessions for the Financial Services Authority Staff.

UCL will be the leader of the Big Data Work package (WP2) contributing on the content for the training sessions in big data analytics. Specifically, UCL will be responsible for establishing the state of art concerning big data analytics, its application in finance, the related main risk concerns and the risk management tools which will enable automated compliance by FinTech companies and increased efficiency of the supervisory activities.

Previous experience relevant to those tasks:

UCK and UCL-CBT have a long-standing experience in the FinTech area both from research and training perspectives. The following list of some of the funded grants can demonstrate both.

A list of up to 5 relevant previous projects or activities, connected to the subject of this proposal;

- CDT Centre for Doctoral Training in Financial Computing & Analytics: 2008 – 2018, €10m and renewed 2014-2022 with extra €8m. In collaboration with London School of Economics and Imperial College.
- Systemic risk Centre: 2012 – 2017, €10m, in collaboration with London School of Economics.
- BARAC - EPSRC project: Distribute Ledger Technologies for Regulation, 2017-2019, € 800,000.
- UN Project: Use of Distributed Ledger Technologies for Identity Management System Jul-Dec 2017, £100,000. Significant infrastructure and/or any major items of technical equipment UCL has great facilities to perform research with total annual research income that stands at an impressive £717.4m. UCL receives the highest share of any UK university of the UK Government's investment fund. UCL is also one of the leading recipients of EC funds, with over 350 funded projects, contributing to an annual incurred expenditure of €30 million EU funds. UCL has recently invested more than £250 million into state-of-the-art infrastructure, facilitating cutting edge research across a broad range of disciplines. UCL in collaboration with Microsoft has developed two computational financial environments for managing large volumes of real-time and archived data (financial, economic and social media) and supporting data mining, simulation modelling and stream processing analytics using high-performance computer clusters. The specific focus of our environments is algorithmic trading, risk and social sentiment analysis; utilising real-time financial, social and news data. The system architecture consists of a set of distributed, multi-threaded, event-driven, real-time, Linux services communicating with each other via an asynchronous messaging system, allowing multi-user real and digital trading. UCL, Computer Science has a high performance computing cluster with 5728 cores, each with 4GB RAM. Furthermore, UCL has a secure data facility. The environment and IT systems have compliant with ISO 27001 standard for Information Security Management Systems and is secured using selected ISO 27002 controls.
- **P2P-IoET Project** (The Internet of Energy Things: Supporting peer-to-peer energy trading and demand side management through blockchains) supported by Lloyds Register Foundation.

Infrastructure and equipment:

UCL has great **infrastructure** to perform research with total annual research income that stands at an impressive £717.4m. UCL receives the highest share of any UK university of the UK Government's investment fund. UCL is also one of the leading recipients of EC funds, with over 350 funded projects, contributing to an annual incurred expenditure of €30 million EU funds. UCL has recently invested more than £250 million into state-of-the-art infrastructure, facilitating cutting edge research across a broad range of disciplines. UCL in collaboration with Microsoft has developed two computational financial environments for managing large volumes of real-time and archived data (financial, economic and social media) and supporting data mining, simulation modelling and stream processing analytics using high-performance computer clusters. The specific focus of our environments is algorithmic trading, risk and social sentiment analysis; utilising real-time financial, social and news data. The

system architecture consists of a set of distributed, multi-threaded, event-driven, real-time, Linux services communicating with each other via an asynchronous messaging system, allowing multi-user real and digital trading. UCL, Computer Science has a high performance computing cluster with 5728 cores, each with 4GB RAM. Furthermore, UCL has a secure data facility. The environment and IT systems have compliant with ISO 27001 standard for Information Security Management Systems and is secured using selected ISO.

The five most relevant publications:

1. T. Aste, P. Tasca and T. Di Matteo, "Blockchain Technologies: The Foreseeable Impact on Society and Industry," in Computer, vol. 50, no. 9, pp. 18-28, 2017.
2. P. Tasca, T. Aste, L. Pelizzon, N. Perony, "Banking Beyond Banks and Money. A Guide to Banking Services in the Twenty-First Century", Springer 2016 (<https://link.springer.com/book/10.1007/978-3-319-42448-4>).
3. F. Caccioli, G. Livan, and T. Aste, "Scalability and Egalitarianism in Peer-to-Peer Networks", Banking Beyond Banks and Money, Springer International Publishing, pp. 197-212, 2016.
4. G. Pappalardo, T. Di Matteo, G. Caldarelli, and T. Aste, "Blockchain inefficiency in the bitcoin peers network", arXiv preprint arXiv:1704.01414, 2017.
5. P. Tasca P., A. Hayes, "Blockchain and Crypto Currencies" in The Fintech book (<http://thefintechbook.com/>), Wiley, London, 2016 (ISBN: 978-1-119-21887- 6).

Key Personnel:

Prof. Tomaso Aste (male) is a professor of complexity science in the Computer Science Department at University College London (UCL), founder and director of the UCL Centre for Blockchain Technologies (UCL CBT), head of UCL's Financial Computing and Analytics Group, program director of UCL's MSc in financial risk management, and vice director of the UCL Centre for Doctoral Training in Financial Computing & Analytics. His research interests include financial systems modeling and complex data analytics, predictive analytics using network theoretic and statistical physics tools, and the application of blockchain technologies to domains beyond digital currencies. Aste received a PhD in material sciences and engineering from Politecnico di Milano. He is a member of the board of the London School of Economics and Political Science (LSE) Systemic Risk Centre. He will be primarily responsible for carrying out the proposed research. He will manage the project assigned tasks within the team that follows or new resources if needed.

Dr. Paolo Tasca (male) PhD, is a Digital economist specialising in P2P financial systems. He is also an advisor on blockchain technologies for different international organisations including the EU Parliament and the United Nations. He is founder and Executive Director of the Centre for Blockchain Technologies (UCL CBT) at University College London. Prior to this, he was Lead Economist on digital currencies and P2P financial systems at Deutsche Bundesbank, Frankfurt working on digital currencies and P2P lending. He is author of various scientific papers about blockchain, which have been published by prestigious international scientific journals, such as the Harvard Business Review. As Executive Director of the UCL CBT, Paolo is also directly involved in various research projects concerning different application fields of blockchain technologies, among which the P2P-IoET Project (The Internet of Energy Things: Supporting peer-to-peer energy trading and demand side management through blockchains) supported by Lloyds Register Foundation.

Dr. Geoffrey Goodell (male) PhD, CFA, CAIA, serves as the Chief Investment Officer at PhaseCapital LP. Dr. Goodell led research and management of several of the Investment Manager's proprietary investment strategies, whose scope includes equities, futures, and exchange-traded funds. He served as Strategist at Goldman, Sachs & Co. He was a Strategist

in the corporate credit trading and structured products groups within the Fixed Income, Currency, and Commodities Division at Goldman, Sachs & Co., where he analyzed and evaluated new products and strategies, including credit and equity derivatives, structured products, and index methodology. He held NASD Series 7 and 63 designations. He is a Member of the Chartered Alternative Investment Analyst Association and the Boston Security Analysts Society. He is a Chartered Financial Analyst and CAIA Charterholder. Dr. Goodell holds a Ph.D. in Computer Science from Harvard University and a S.B. in Mathematics from MIT and he is currently a research fellow at University College London.

Participant Number	5	Organisation official name	ACADEMIA DE STUDII ECONOMICE DIN BUCURESTI
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Partner presentation

Partner entity description and relevance:

The **Bucharest University of Economic Studies (BUES)** is the best positioned Romanian university in Top Shanghai 2017 – Shanghai Ranking's Global Ranking of Academic Subjects 2017, being no. 151-200 in its specific domain - Economics, which includes 300 higher education institutions from all over the world. BUES is the Romanian university with the best employer reputation, according to QS World University Rankings 2018. Organizing Bachelor`s, Master`s and Doctoral programs in Romanian, English, French and German, BUES undertakes the complex role of Central and South-Eastern European regional hub in education and advanced scientific research. The Faculty of Cybernetics, Statistics and Informatics (CSIE) offers bachelor, master and PhD programs in Economic Informatics, Economic Cybernetics and Statistics, through its departments: Statistics and Econometrics, Mathematics, Informatics and Economic Cybernetics. The Department of Statistics and Econometrics conducts research in quantitative models for economics and the Department of Cybernetics and Economic Informatics conducts research in the fields of Informatics and its applications in economy. The Centre for Sampling Research (CSA) and the INFOREC Centre are two research units established under the Bucharest University of Economic Studies. Both Centres conduct fundamental and applied scientific research in the field of statistics, econometrics and informatics, developing interdisciplinary research in the economic and social field based on the use of informatics and statistical and econometric methods and models.

Main roles:

BUES will be a local coordinator of the project across Romania. Specifically, BUES will be in charge of conducting the training hub sessions for the Financial Supervisory Authority of Romania. Furthermore, BUES will be in charge of organizing a mid-term workshop where all partners, supporters and advisory board members will participate.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

Daniel Traian Pele was a Guest Researcher at Research Data Center from Department of Statistics, Humboldt University from Berlin (2014). The aim of this research stage was to develop the platform Quantlet (<http://quantlet.de>) using SAS programs for Statistics of Financial Markets, under the coordination of prof. dr. Wolfgang Härdle. In 2011 he was a postdoctoral researcher at Reading University, ICMA Centre, (United Kingdom), where he developed the topic *Modelling stock market uncertainty using information entropy*. In this research stage he developed a new measure of stock market risk using the entropy of distribution function of intraday returns. Daniel Traian Pele is also the co-founder of SAS

Centre of Excellence in Bucharest University of Economic Studies (2009), aiming to use SAS a platform for data analytics with applications in economy and finance. He is also introduced the first undergraduate course called Statistics of Financial Markets in BUES (2009). He is also a World Bank consultant in Romania and he was in a trainer in Statistics, Econometrics and SAS for the employees of the Romanian National Bank (BNR), Romanian Commercial Bank (BCR) and National Statistical Institute (INS). He also is a member of the EURO Working Group for Commodities and Financial Modelling.

Vasile Alecsandru Strat was a member of the team of several research projects financed from national research budgets (one of them being: *Development of statistical and econometric tools for analyzing the localization process of FDI in the development regions of Romania*). Vasile is working as an expert in international team providing assistance for several central level Romanian Institutions (Ministry of European Funds, Ministry of Regional development and Ministry of Rural development) and evaluation for several EU funded programmes. He was also a member of other research/consultancy projects conducted by the university with partners as EY Romania, Kaufland Romania and Arabesque Romania. Together with prof. Wolfgang Haerdle from Humboldt Berlin he will co-chair a mini-track covering topics like Data science and Cryptocurrencies at ICBE 2018, held in Bucharest.

Smaranda Cimpoeru has a PhD in the field of Cybernetics and Statistics, with the main theme of using neural networks in and stochastic process in credit risk modeling. PhD studies included a research scholarship at Paris Dauphine University. Postdoctoral studies were focused on the econometric techniques used to measure financial instability and systemic risk. Smaranda Cimpoeru has expertise as a specialist Risk analyst at Raiffeisen Bank, Romania (2008 – 2013) having been involved also in the development, test and implementation of multiple statistical tools used in the bank. Moreover, she worked as a Data Analyst Consultant for the World Bank.

Cristian Valeriu Toma has graduated from the BRIE master program in 2005, with 24 months scholarship and 7 months practical stage at University of Bremen, Germany and PhD stage, in 2008. Also, he was SA - Solution Architect & SDE - Software Development Engineer consultant @ RADCOM company since 2003 to 2014 and now is SW Dev Engineer consultant @ Oracle / Sun Microsystems, since 2014. Starting with May 2014, he has joined Oracle / Sun Microsystems within Java Card and Internet of Things organisation/department and he is member of Global Platform consortium, therefore he is involved in the development team for various secure solutions for EMV - Payment, the Java Card Reference Implementation and IoT - Internet of Things. He is the author and co-author of books, papers and proceedings of international conferences, symposiums and workshops, organised in Austria, Germany, Italy, Romania, Turkey, United Kingdom and United States of America. His work focuses on the analysis of the software architectures and design patterns, eMbedded and IoT - Internet of Things application development, distributed and parallel computing/HPC - High Performance Computing and HTC - High Throughput Computing / Cloud computing, mobile applications and computing, smart cards programming, e-payment solutions / blockchain technologies for the crypto currencies, networks app security development, computer anti-viruses and viruses, and computational cryptography - Cyber Security.

Marius POPA is the author and co-author of books, articles and papers presented and published in journals and proceedings of national and international conferences, symposiums and workshops, research and management stages organised in Australia, Austria, Bulgaria, Germany, Ireland, Italy, Republic of Moldavia, Norway, Portugal, Romania, Turkey, United Kingdom and United States of America. His work focuses on the Software Engineering, Cyber Security, Data Quality, Software Quality, IT Audit, IT Project Management.

Tanase Stamule is leading the joint meetings between the representatives of the Bucharest University of Economic Studies and the National Bank of Romania. He is also involved in

managing the Start-up incubator of the university which supports businesses in the creative industries and particularly in the IT sector.

Infrastructure and equipment:

The Bucharest University of Economic Studies has the required infrastructure (rooms with all required audio/video WIFI infrastructure) for hosting workshops and training sessions. The University also has the required servers for hosting decentralized platforms and several laboratories (IBM/SAS/Vodafone) with the needed facilities for working with large datasets.

The five most relevant publications:

1. (2017) Pele Daniel Traian, Lazar Emese, Dufour Alfonso, Information Entropy and Measures of Market Risk, Entropy, Vol. 19, Nr. 5, pp. 226 – 245.
2. (2017) Marius POPA, Cristian TOMA, Cătălin BOJA, Alin ZAMFIROIU – Privacy and Security in Connected Vehicles Ecosystems, in „Informatica Economică”, vol. 21, no. 4, pp. 29 – 40, ISSN 1453-1305, EISSN 1842-8088.
3. (2016) Strat, V.A., Davidescu, A.A.M., Grosu, R.M. and Zgură, I.D., Regional Development Fueled by Entrepreneurial Ventures Providing KIBS – Case Study on Romania. Amfiteatrul Economic, 18(41), pp. 55-72.
4. (2015) Pele Daniel Traian, Stănciulescu Vasile Nicolae, On a Class of Alpha-stable Distributions and Its Applications in Estimating Market Risk, The Review of Finance and Banking, Vol. 7, Nr. 2 , pp. 7 – 15.
5. (2014) Pele Daniel Traian, A SAS Approach for Estimating the Parameters of an Alpha-stable Distribution, Procedia Economics and Finance, Vol. 10, Nr. 0, pp. 68 – 77.

Key Personnel:

Prof. Daniel Traian Pele (male), PhD in Statistics (2007), graduated in mathematics from the University of Bucharest, Msc in Statistics from University of Bucharest. He is an Associate Professor of Statistics at Department of Statistics and Econometrics, Bucharest University of Economic Studies, Romania, teaching Statistics of Financial Markets and Time Series. He is academic supervisor of about 50 Master students; most of them currently work in the financial industry, in IT/consulting companies or as academic researchers. He is an author of 29 scientific publications in internationally refereed journals. The corresponding research profile is that of a data scientist, focused on statistical modelling of financial markets. Area of research/work: statistical data science models for economics and finance. He will co-manage the project at the level of the institution within the team that follows.

Assoc Prof. Vasile Alecsandru Strat (male), PhD in Statistics (2012), graduated in statistics and economic forecasting from the University of Bucharest. He is an Associate Professor of Statistics at Department of Statistics and Econometrics, Bucharest University of Economic Studies, Romania, teaching Statistics and Basics of Econometrics. He is the author of over 22 research paper in international peer review journals. He Area of research/work: applied statistical modelling (mostly regional development). He will co-manage the project at the level of institution.

Lecturer Smaranda Cimpoeru (female), PhD in Cybernetics and Statistics. Lecturer of Econometrics and Statistics at the Department of Statistics and Econometrics, Bucharest University of Economic Studies, Romania, teaching Econometrics and Statistics, both in Romanian and English. Area of research/work: econometric techniques used to measure financial instability and systemic risk. She teaches Statistics and Econometrics.

Assoc. Prof. Cristian Valeriu Toma (male), PhD in Informatics is Associate Professor of the Department of Economic Informatics and Cybernetics, The Bucharest University of Economic Studies, Romania and he started the teaching activities since 2003, as Teacher Assistant. He

has graduated from the Faculty of Cybernetics, Statistics and Economic Informatics, with bachelor of Economic Informatics, within Academy of Economic Studies Bucharest, in 2003. He Area of research/work: his work focuses on software architectures and design patterns, eMbedded and IoT - Internet of Things application development, distributed and parallel computing/HPC - High Performance Computing and HTC - High Throughput Computing / Cloud computing, mobile applications and computing, smart cards programming, e-payment solutions / blockchain technologies for the crypto currencies, networks app security development, computer anti-viruses and viruses, and computational cryptography - Cyber Security.

Assoc. Prof. Marius POPA (male), PhD in Informatics is Associate Professor of the Department of Economic Informatics and Cybernetics, The Bucharest University of Economic Studies, Romania. In November 2005 he has received, from the Academy of Economic Studies of Bucharest, his PhD diploma in the Cybernetics and Statistics field with a paper on Data Quality. Area of research/work: his work focuses on Software Engineering, Cyber Security, Data Quality, Software Quality, IT Audit, IT Project Management, Mobile, Embedded and Distributed Systems.

Assoc. Prof. Tanase Stamule (male) is an Associate Professor at the UNESCO Chair of the Bucharest University of Economic Studies, Romania, teaching Strategic Management and Leadership. He is the author of over 10 research paper in international peer review journals.

Participant Number	6	Organisation official name	modeFinance SRL
Partner presentation			
Partner entity description and relevance:			
<p>modeFinance (MF) is an established FinTech company specialised in credit risk evaluation of corporates through the application of fundamental financial information technology. modeFinance started in 2010 as an official spin off from the University of Trieste, having developed innovative analysis methodology for quick and accurate credit rating evaluations. modeFinance technology evaluates the credit ratings of more than 1 million companies quarterly, having recently generated over 2 million financial reports for its end-user customers. With the innovative MORE methodology, modeFinance provides the credit risk analysis of the more than 25 million companies based in Europe, as well as companies from 189 countries around the world. modeFinance has been prized as best Italian Fintech Company, and has been certified as both a Credit Rating Agency and External Credit Assessment Institution by the EC's European Securities and Markets Authority. modeFinance has seen substantial growth over the past 4 years, currently staffed with 20 employees, with an annual turnover of €1.5 million for year 2017. Proprietary MORE Technology: modeFinance uses for the rating evalautation the proprietary MORE (Multi Objective Rating Evaluation) numerical and financial methodology for rating evaluation. MORE utilizes multi-dimensional and multi-objective algorithms, used to aggregate the various aspects of a company. The key algorithms used for calculating are:</p> <ul style="list-style-type: none"> • Ratios definition & choice (ratios that are predictive of debt defaults and financial/economical behaviour of a company); • Fuzzy logic (translation of quantitative ratio data into qualitative classes); • Multi Criteria Decision Making (Based on a company's equilibrium of: profitability, liquidity, solvency, interest coverage, and efficiency), and • Big Data and Artificial Intelligence modules; which capture the Big Data analysis carried out over the last 10 years on all 25 million EU companies by traditional analyst. This 			

ensures robust iterative learning that is fed into our in-house AI system, improving our accuracy and speed of assessments by ~3% and growing.

As a result, ModeFinance's proprietary technology makes it one of the most objective, and all-encompassing, credit rating tools available – ensuring reliable results every time.

Main roles:

modeFinance will be one of the key contributors of content for the training and coding sessions in big data analytics for credit risk evaluation. It will be responsible for organizing and hosting a coding session at the premises of the Italian FinTech associations and hubs.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

- Today modeFinance is the only Fintech Credit Rating Agency official registered and certified by ESMA.
- modeFinance won Phase1 Horizon2020 SME Instrument with its product s-peek, which permits to all the EU SME to have a credit risk management platform exactly similar as big corporates ([link](#)).
- In 2017 modeFinance performed the biggest big data and artificial intelligence study on credit risk management, developing a new model and product which permits the evaluation of more than 250 million of corporates, worldwide, even without financial data.
- In 2017 modeFinance enhanced its ESMA certification becoming one of the few worldwide Credit Rating Agency able to evaluate the rating of every bank in the world: more than 65'000 worldwide banks.
- In 2017 modeFinance launched a new product: Credit Risk Application Service which permits to investment funds, banks, family officers to check, optimize and monitor the risk investment both on public and private entities.

Infrastructure and equipment:

modeFinance yearly evaluates around 100 million of rating thanks to its cloud farm and IT technology. All modeFinance products are 100% internal developed thanks to its fintech organization. Integrative Approach: modeFinance unique approach, where different sciences and professionals in algorithm development, numerical model management, financial concepts, & software engineering, are heavily integrated, from the diverse skills team members, encapsulated within lean company organisational principles. This technical expertise is complemented by deep industry experience of operating in the credit analysis and FinTech space, taking into account entrepreneurship and commercialisation strategies to be adopted for sustainable, and scalable business practice.

The five most relevant publications:

1. P. Dilek, M. Ciprian, V. Pediroda "The More Rating: New Model -a comparative analysis of different companies from different countries" Advances in Machine Learning for Computational Finance International Workshop, 20-21 July '09 London, U.K.
2. M. Ciprian, V. Pediroda, C. Poloni "Multi Criteria Decision Aiding Techniques to Select Designs After Robust Design Optimization". Evolutionary Multi-Criterion Optimization. Book Series: Lecture Notes in Computer Science. Volume 4403/2007, Springer Berlin Editor. ISBN 978-3-540-70927-5.
3. M. Ciprian, S. d'Addona "Time varying sensitivities on a GRID architecture". International Journal for Theoretical and Applied Finance. Vol. 10, No. 2 (2007) 307–329.
4. F. Bernè, M. Ciprian, N. Fanni, D. Marassi, V. Pediroda "Multi criteria credit rating (MCCR): A credit rating assignment process for Italian enterprises according to BASEL II". The Journal of Financial Decision Making. Volume 2, Number 2, December 2006.

5. M. Ciprian, M. Kaucic, G. Nogherotto, V. Pediroda, D. Di Stefano "Multiattribute Methodologies in Financial Decision Aid" - Handbook of Research on Nature Inspired Computing for Economics and Management. Edited by: Jean-Philippe Rennard, September 2006- ISBN 1591409845

Key Personnel:

Dr. Valentino Pediroda (male) is a founder and CEO of modeFinance. He gained a degree in Mechanical Engineering from the University of Trieste and a Phd in Energetics from the University of Udine. Since then Valentino has worked for several engineering companies and undertaken extensive research activities, including being the author of more than 90 scientific papers. In particular, Valentino has been heavily involved in developing numerical models for the credit rating assessment of international companies. From February 2003 to December 2007, he was a consultant for numerical models and IT systems for an Italian Rating Agency. In addition to ModeFinance, Valentino Pediroda is an Associate Professor in Fluid Machines at the Università di Trieste. He will manage the project assigned tasks within the team that follows or new resources if needed

Dr. Mattia Cipriani (male) is the founder and President of modeFinance. He gained a degree in Mechanical Engineering followed by a Phd in Corporate Finance, both from University of Trieste. Before founding ModeFinance, he was as a technical advisor and researcher at the University of Trieste authoring more than 10 international papers in the fields of multi-criterion optimization in finance and engineering. He also worked as a consultant and Quant manager in two Italian Credit Rating Agencies, during which he developed innovative credit scoring models "Basel II compliant" aiming ECAI recognition. Mattia is an expert in non-linear methodologies as Design of Experiments (DOE), Multi Objective Genetic Algorithms (MOGA) and other optimisation instruments, Neural Networks (NN), Self-Organising Maps (SOM), Fuzzy Logic, clustering Methods, and he has deepened theory and applications of Multi Criteria Decision Support Methods (MCDM).

Dr. Simone Ziraldo (male) is the CTO of modeFinance. Ziraldo has amassed over a decade worth of research in physic and numerical models. He has contributed to publications revolving around Quantum quench distributions with weighted Wang-Landau Monte Carlo, and Relaxation and thermalisation after a Quantum Quench behing the highlights of investigations of Statistical Mechanics and Physics. Ziraldo comleted his Doctorate in Theory and Numerical Simulations from the Scuola Internazionale Superiore di Studi Avanzati. His experience in programming includes Development of a new input/output by means of XML technologies, relational algebra and optimisations of SQL queries management, C#, Python, Ruby, Fortran 90, C, C++, JavaScript, HTML, CSS, and PHP technologies. He currently serves as ModeFinance's Lead for IT and Quantitative methodology.

Dr. Andrea Sorrentino (male) is the overall manager of integrating financial and technological elements of the ModeFinance company, into coherent and logical application. His responsibilities include developing mathematical models for default probability assessments; analysis, application, and enhancement of VK model for assessing default probability; statistical analysis of economic sectors, and development of pricing methodologies. He now specialises in all things Credit Risk that the company encounters. Andrea received his PhD in Insurance Finance, and Mathematics and Management from the University of Trieste, completing his dissertation on CDS price modelling for European SMEs, which have been pivotal in application on the S-PEEK platform. Prior to that, he also completed his master's degree in mechanical engineering, also from the University Trieste.

Participant Number	7	Organisation official name	Firamis UG
Partner presentation			
Partner entity description and relevance:			
<p>Firamis is a Frankfurt-based B2B FinTech-AI-Startup, providing its own software platform for analysing financial data sets for their clients in the financial service industry. Firamis is already serving some of the largest and well-known financial institutions. It was established by Dr. Jochen Papenbrock in 2012 near Frankfurt, with the objective of transferring scientific knowledge regarding network and graph theory into market applications and fintech solutions. Based on the founder's scientific publications, Firamis has developed a unique, license-based software platform for intelligent financial applications over the past 6 years. The different software modules, which form the Firamis platform, are based on machine intelligence and advanced analytics. Firamis applications refer to cutting-edge scientific research. Their methodology is rooted in Complexity and Network Science in order to improve scale, scope and speed in understanding high-dimensional, complex, dynamic financial data sets. In order to create transparency while analysing financial data sets, the Firamis software also includes various applications for visualisations and animations. Firamis's clients are banks, asset managers, insurance companies and other financial institutions. Solution types include InvestTech, WealthTech, RiskTech and RegTech. The Firamis software supports quantitative investment and advisory processes for digital asset & wealth management including portfolio health checks and monitoring services. It also enables bank applications in risk management, fraud detection and surveillance as well as compliance. Firamis is part of the fintech inception programs of the technology and data companies IBM, NVIDIA and Thomson Reuters. Part of Firamis' offices are located at Techquartier (www.techquartier.com) in the heart of Frankfurt's fintech ecosystem. In order to further shape Frankfurt's fintech ecosystem, Firamis co-organises the special conference on Artificial Intelligence, Big Data and Network Analysis in Financial Services (www.network-analysis-summit.com). Firamis is already supported by the EU, being part of the "Horizon 2020"-program. Winning a Marie-Curie-Scholarship together with a top researcher, Firamis will be hosting him, researching on "Backreaction of Financial Networks: Risk Estimation and Asset-Management".</p>			
Main roles: Firamis is the leader of the coding lab work package and of the dissemination work packages (WP6, WP7). In these roles Firamis will be responsible for creating a coding technical infrastructure that is scalable and extendable in a modular approach, and for developing the external dissemination technical infrastructure of the project. It will also be responsible for organizing coding sessions, at the premises of the German FinTech hub.			
A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal: <p>During Jochen Papenbrock's doctorate thesis "Asset Clusters and Asset Networks in Financial Risk Management and Portfolio Optimization" he established contact to Banks and Asset Managers for data and joint research projects in the domains "insights in risks", "insights in markets" and "insights in customers". These activities were successful and later became the basis to found the startup Firamis.</p> <p>One of the projects was called "top big data innovation project" by a leading German bank. This project is still ongoing. It uses the data of the bank's credit loan portfolio and the payment transaction data for the following use cases: portfolio risk management, risk concentration and contagion analysis, systemic risk analysis, fraud detection, credit workout processing and</p>			

financial supply chain analysis. Firamis was involved in quant modelling based on graph theory and machine learning, as well as in IT implementation and constructing dashboard visualisations like this screenshot from the project: In 2017, Firamis gathered a team from Frankfurt University (Center for Financial Studies) and other companies active in the field of network analysis and graph theory to organise the 1st Summit on Network Analysis in Financial Services (<http://www.network-analysis-summit.com/>). The event took place in the same year in Frankfurt and there were more than 130 guests from the financial service industry attending. Media coverage and feedback was very positive. There were companies and speakers coming from London and USA. Also, many key parties from the Frankfurt FinTech ecosystem were involved, including Frankfurt Main Finance (group to support the Frankfurt financial market place), European Enterprise Network, the silicon valley technology company NVIDIA (known for their hardware for machine learning), Megware (provider of super computers for research institutions) and TechQuartier (<https://techquartier.com/>) – the Frankfurt FinTech central hub supported by government, universities and financial industry.

The three scientific advisors of Firamis, Prof. Brühl, Dr. Biedermann and Prof. Schwendner also got involved. The created summit format is unique across the world to the best of our knowledge. Due to the success this 1st summit is going to be a yearly event and Firamis is already in the middle of organising the 2nd summit. For this purposes Firamis has connected to most local universities and business schools where joint projects have been started. This project shows that Firamis is a real FinTech ecosystem shaper and networker that is able to organise technology summits where all key groups of an ecosystem are connected: universities, industry, and government with attendees ranging from bank executive directors to machine learning experts, data scientists and students. Firamis has developed a proprietary, open-source-based cloud software platform for quantitative financial modelling and machine learning that is already licensed to a leading German asset management firm. Latest research in network science and machine learning for asset management is digitalised in this software. Also, the software visualises all the modelling steps in intuitive interactive dashboards. This offering is unique worldwide as an independent analysis confirmed. There is a programmatic approach behind a number of the publications of Jochen Papenbrock as they are pioneering papers applied in financial network science. For example, his research was mentioned as part of the co-authorship network based on Professor Rosario Mantegna's seminal paper: "Hierarchical Structure in Financial Markets" (<https://arxiv.org/abs/cond-mat/9802256>) as shown in this co-authorship network from "A review of two decades of correlations, hierarchies, networks and clustering in financial markets" (<https://arxiv.org/abs/1703.00485>):

Similar research is currently taken up by leading academic and practical journals like Journal of Portfolio Management (e.g. "Building Diversified Portfolios that Outperform Out-of-Sample", https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2708678). Also, the financial industry is catching up on these topics like in J.P. Morgan's comprehensive guide on "Big Data and AI Strategies: Machine Learning and Alternative Data Approach to Investing" by the bank's quantitative investing and derivatives strategy team.

Infrastructure and equipment:

- Financial modelling infrastructure using network science and machine learning;
- Open-Source-based cloud server platform for prototyping, production and teaching for the financial service industry and their regulators;
- Cloud server-based architecture;
- Firamis is active part of the Frankfurt FinTech and AI ecosystem and is part of a European research network.

The five most relevant publications:

- Packham, Natalie; Papenbrock, Jochen; Schwendner, Peter; Wöbbeking, Fabian: Tail-risk protection strategies. *Quantitative Finance*, 17, 5. 729-744, 2017.
- Papenbrock, Jochen; Schwendner, Peter: Handling Risk On/Risk Off Dynamics with Correlation Regimes and Correlation Networks. *Financial Markets and Portfolio Management*, 29, 2. 125-147, 2015.
- Papenbrock, J.; Rachev, Svetlozar T.; Hoechstoetter, M.; Fabozzi, F. J. Price. . (2009, Advanced Analytics): Calibration and Hedging of Correlation Dependent Credit Derivatives using a Structural Model with Alpha-Stable Distributions, *Applied Financial Economics*, Volume 19, Issue 17.
- Baitinger, E.; Papenbrock, Interconnectedness risk and active portfolio management, *Journal of Investment Strategies, Risk.net*, Volume 6, Number 2.
- Papenbrock, J., 2017: Graph-based AI in Wealth&Asset Management.

Key Personnel:

Dr. Jochen Papenbrock (male) is a German FinTech entrepreneur and scientist. He is Founder and CEO of Firamis. Jochen has a degree in business engineering and a doctorate from Karlsruhe Institute of Technology (KIT). Jochen has more than 10 years' experience of management and technology consulting as well as quantitative modelling in the financial industry. Before Jochen established Firamis, he worked for different consulting and software companies, always focusing on analysing financial data sets with new technologies and also aligning financial services companies with regulation (like Basel). In this context, he has invented, developed and operationalised several innovative financial technologies. He is author, consultant, data scientist, entrepreneur, financial engineer, fintech enthusiast, inventor, programmer, quant, researcher, risk management expert, and FinTech ecosystem shaper. He will manage the project assigned tasks within the team that follows or new resources if needed

Dr. Alexander Deierling (male) is a German lawyer and FinTech entrepreneur. In the last years he has built up his own lawyer' office which also consults start-ups. Alex has a Master in Law & Economics. Accompanying Firamis since its first moments, he is responsible for all legal issues, business development/strategy, partner/client relationship management and more.

Dr. Dimitri Marinelli (male) is a researcher who applies mathematical methods (mostly geometric and topological) in cross-disciplinary contexts. Recently, he focused on machine learning and data science as postdoc at the Romanian Institute of Science and Technology. There, he works for understanding how Information Geometry can shed new light on the training process of Deep Neural Networks and how it connects with second-order optimisation methods. The study also has the aim of increasing efficiency of the learning algorithms maximising the extraction of information from data. Dimitri got a PhD in the mathematical physics group at the University of Pavia, Italy in the Physics department. Newly, he has been awarded the Marie-Curie Individual Fellowship to work on the backreaction of the financial market to risk propagation, together with Firamis. He will join Firamis for at least 2 years full time.

Our academic advisory board:

Prof. Dr. Volker Brühl (male) is Managing Director of the Center for Financial Studies since October 2013. Furthermore, he is Professor for Banking and Finance at the University of Applied Sciences for Economics and Management. He has many years of experience as a top manager in banking. In addition, he has received awards for his research from the McKinsey Global Institute and MIT. Volker Brühl also advises Senior Executives from leading Financial Institutions on strategic topics with a particular focus on digital transformation and advanced analytics.

Prof. Dr. Peter Schwendner (male). His profile can be found in the contribution of Zurich

University of Applied Sciences (ZHAW).

Dr. Jochen Biedermann (male) is an experienced consultant in the financial industry and beyond. Based in Frankfurt and Hong Kong, he supports financial centres, stock exchanges, regulatory authorities and corporates in Europe, Asia and the Middle East. Jochen holds a diploma in mathematics & computer science from the University of Göttingen and a Ph.D. in mathematics from the University of Cottbus, Germany. He is Research Professor for FinTech & Blockchain at the International Innovation Center of Hankou University, Wuhan, China.

Participant Number	8	Organisation official name	PANTEIO PANEPISTIMIO KOINONIKON KAPOLITIKON EPISTIMON
Partner presentation			

Partner entity description and relevance:

The Department of Economic and Regional Development of **Panteion University (Panteion)** founded in 1989 is the only Department within the Greek university system offering undergraduate and graduate courses in Economics and Regional Science. Development constitutes the core issue in the Department; economy and space are seen as closely interrelated issues, which significantly influence the development process and are also influenced by it. The functioning and the analysis of the economic system, microeconomic behaviour, public policy, and the functioning of cities and regions within a globalised economic system – along with the relevant economic and spatial analysis techniques – constitute the core interests of the Department. What distinguishes the teaching and research activity of the Department is its modern analysis of the development phenomenon through an interdisciplinary approach. This approach enters the broader spheres of the social sciences and employs methods and instruments from the hard sciences. Thus, the dimensions of economic development, ecologically sustainable development, public policy, social prosperity and social solidarity, democracy, equality and freedom, in addition to the right to partake in material and cultural goods, constitute the basis upon which the teaching and research of the academic fields of the Department are based. With this theoretical and normative nexus at its core, the Departmental Programme is based upon two equally important and interrelated subject areas – Political Economy and Regional Science.

Main roles:

Panteion will be the local coordinator of project across both Greece and Cyprus. Panteion will be in charge of conducting the training hub sessions for the regulator in Cyprus: Cyprus Security and Exchange Commission; and the regulators in Greece: Bank of Greece and Capital Market Commission.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

Veni Arakelian was member of the the Greek Team of the SYRTO Project. SYRTO explored the relationships between Sovereigns – Banks and other Financial Intermediaries (BFIs) – Corporations of the European Union focusing firstly on the identification of the common (fundamental) and the sector-specific (idiosyncratic) risks, and assemble a web-based Early Warnings System (EWS) and secondly on the exploration of monetary policy and macro-prudential issues relative to systemic risk developing a “SYRTO Code” in order to detect a series

of recommendations, also expressed in terms of EWS prescriptions, on (i) the appropriate governance structures for EU to prevent and minimise systemic risks; (ii) the best mechanisms for ensuring an effective interplay between, and coordination of, macro and micro-prudential responsibilities. The two projects are interrelated in the context of the new regulation imposed to financial markets due to the challenges which markets face either to events that are characterized as crises or to the new technological developments. Both not only change the functionality of the markets but also market participants themselves as they have to be informed about the new regulatory rules.

Infrastructure and equipment:

The Department operates a Laboratory of Economic Research and Geographic Information Systems, which serves educational and research needs in the fields of economic research, regional analysis and geographic information systems. The workshop has as its mission:

- Covering undergraduate and postgraduate level of teaching and research needs of the department, as well as other departments of the University.
- All forms of cooperation with other research centers in a spirit of reciprocity and collective work.
- The organization of seminars, symposia, conferences and the publication of publications and publications.
- The cooperation with relevant public services, municipalities and other social and scientific institutions and the contribution of the laboratory to the study of the country's development problems.

The five most relevant publications:

1. (2016) Inflation convergence in the EMU, M Karanasos, P Koutroumpis, Y Karavias, A Kartsaklas, V Arakelian, Journal of Empirical Finance 39, 241-253.
2. (2014) Clustering dependencies via mixtures of copulas V Arakelian, D Karlis Communications in Statistics-Simulation and Computation 43 (7), 1644-1661.
3. (2012) Contagion determination via copula and volatility threshold models. V Arakelian, P Dellaportas Quantitative Finance 12 (2), 295-310.
4. (2008) Modeling pairwise convergence: A Bayesian approach with an application to Greek inflation. V Arakelian, D Moschos, Economics Letters 99 (2), 340-344.

Key Personnel:

Veni Arakelian (female) is a lecturer of Econometrics at the Department of Economic and Regional Development at Panteion University of Social and Political Sciences. She holds an undergraduate degree in Mathematics from University of Athens and a Ph.D. in Econometrics from Athens University of Economics and Business. Her main area is financial econometrics. Previously she has worked as senior economist and derivatives trader for institutional and private clients. She will manage the project assigned tasks within her internal team or with new resources if needed.

Participant Number	9	Organisation official name	INESC TEC - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, TECNOLOGIA E CIENCIA
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Partner presentation

Partner entity description and relevance:

INESC Technology and Science (Inesc Tec) is an Associate Laboratory with 30 years of experience in R&D and technology transfer, is a private non-profit research institution having as associates the University of Porto, INESC and the Polytechnic Institute of Porto. With around 800 researchers (350 PhD), working in the interface between the academic world and the industrial and service companies, as well as the public administration, the activity at INESC TEC runs under the paradigm of the knowledge to value production chain: Knowledge and results generated at basic research are typically injected in technology transfer projects and therefore they receive added social relevance. The existence of an Innovation and Technology Transfer Unit assures the effectiveness of this model.

Main roles:

INESC TEC will be the local coordinator of project across Portugal. INESC TEC will be in charge of conducting the training hub sessions for the local market regulator (CMVM - Portuguese Securities Market Commission).

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

INESC TEC has a large experience in EU funded projects participating in 40 FP7 R&D Projects and coordinating 3 of them:

- EXPLORE - Extended Exploitation of European Research Projects Knowledge and Results;
- FOCUS - Advances in Forestry Control and automation Systems in Europe;
- Net-Challenge - Innovative networks of SMEs for complex products manufacturing.

In H2020 INESC TEC participates already in 37 projects coordinating 6 of them (AnyPLACE - Adaptable Platform for Active Services Exchange; SafeCloud - Secure and Resilient Cloud Architecture; ScalABLE4.0 - Scalable automation for flexible production systems; STRONGMAR - STREngthening MARitime Technology Research Center; FASTEN - Flexible and Autonomous Manufacturing Systems for Custom-Designed Products and Feedback-Fostering Energy Efficiency and BehAvioural Change through ICT).

Infrastructure and equipment:

INESC TEC has an extensive research infrastructure adapted to its diversified areas of activity:

- Immersive and augmented reality laboratory;
- Microgeneration and Electrical Vehicles Laboratory, composed by simulators of smart networks and simulators of integration of electrical vehicles into the power grid;
- Robotics Laboratory, composed by tanks for testing submarine robotics and soccer field for testing football robots;
- Optoelectronics Laboratory, composed by optical and electronic test equipment for R&D in optical sensors and optical and broadband communications;
- Data processing infrastructure, composed by an extensive array of servers and dedicated software for big data research.

The five most relevant publications:

1. Brito, P. (2014) Symbolic Data Analysis: another look at the interaction of Data Mining and Statistics. WIREs Data Mining and Knowledge Discovery, 4 (4), 281-295.
2. Alves, C. (2014). Evidence for the seasonality of European equity fund performance. Applied Economic Letters, 21 (16), 1156-1160.
3. Alves, C. & Mendes, V. (2010). Mutual Funds Biased Preference for the Parent's Stock:

- Evidence and Explanation. Applied Financial Economics, 20 (16), 1309-1320.
4. Dias, A., Campos, P., & Garrido, P. (2015). An agent based propagation model of bank failures. In: Advances in Artificial Economics, 119-130. Springer, Cham.
 5. Amorim, P., Costa, A. M., & Almada-Lobo, B. (2015). A hybrid path-relinking method for solving two-stage stochastic integer problems. International Transactions in Operational Research, 22(1), 113-127.

Key Personnel:

Assoc. Prof. Maria Paula Brito (female) is Associate Professor at the Faculty of Economics of the University of Porto, and member of the Artificial Intelligence and Decision Support Research Group (LIAAD) of INESC TEC, Portugal. She holds a doctorate degree in Applied Mathematics from the University Paris Dauphine. Her current research focuses on the analysis of multidimensional complex data, known as symbolic data, for which she develops statistical approaches and multivariate analysis methodologies. In this context, she has been involved in two European research projects. Paula Brito was president of the International Association for Statistical Computing (IASC) in 2013-2015. She has been invited speaker at several international conferences, is regularly member of international program committees, and has been chair of COMPSTAT 2008. She will manage the project assigned tasks within the team that follows or new resources if needed.

Assoc. Prof. Carlos Alves (male) Carlos Francisco F. Alves is Graduate, Master and Doctor (Ph.D.) in Economics by the University of Porto. He is associate professor of finance at Faculty of Economics of University of Porto and professor at Porto Business School. He is the Chair of the Academic Council of Porto Business School. He is also a researcher member of CEF.UP (the Research Center in Economics and Finance of University of Porto). Carlos Alves is author and co-author of more than 70 scientific publications, including papers published in academic journals, books, book-chapters and others. Corporate Governance is one of his main research fields. In the recent past, Carlos Alves was: Member of the Board of Directors of CMVM - the Portuguese Securities Markets Commission; Member and Chair of the Portuguese Audit Oversight Board; Chairman of the Committee for Economic Analysis and Markets of ESMA (CEMA). Previously, Carlos Alves was: Researcher of the Research Department of the Porto Stock Exchange and the Director of Capital Markets Institute; Advisor for the Secretary of State for Treasury and Finance of the XIII Constitutional Portuguese Government; Chairman of the Audit Committee of the National Institute of Statistics; Member and Vice-Chairman of the Management Committee of the Euronext PSI; Member of the commission that had written the White Paper on Corporate Governance in Portugal; Member of the commission that had written the Portuguese Securities Code; Member of Board of Directors of CMVM; Member of the General and Supervisory Board of Porto Business School; Member of the board of Directors of the Portuguese Institute of Corporate Governance; Member of the board of Directors of the Portuguese Association of Financial Analysts.

Assist. Prof. Pedro Campos (male) Pedro Campos is an assistant professor at the Faculty of Economics of the University of Porto (UP), with a PhD in Management Sciences by U. Porto. He is a member of LIAAD (Laboratory of Artificial Intelligence and Decision Support), which is a research group belonging to INESC TEC. He coordinates the Post-Graduate Programme in of Business Intelligence and Analytics of Porto Business School. Pedro is actually Deputy Director of the international Statistical Literacy Project (ISLP) and Vice-President of IASE, the International Association for Statistical Education. His main research interests are Statistics (Data Analysis, Sampling Techniques, Statistical Education) and Artificial Intelligence (including Multi-Agent Systems). The main areas of applications are Demography and Organizational Networks. Pedro has published more than 50 publications in scientific

journals, book-chapters and peer-reviewed conferences.

Assist. Prof. Pedro Amorim (male) Pedro Amorim is Assistant Professor at the Industrial Engineering and Management Department at the Faculty of Engineering of University of Porto and also teaches at the Porto Business School. He is the head of the Research Center for Industrial Engineering and Management from INESC TEC – Associate Laboratory. Pedro Amorim is Co-Founder of LTPlabs, which is a boutique management consultancy company that applies advanced analytical methods to help make better complex decisions. Pedro Amorim was a FCT and Carnegie Mellon-Portugal scholar and has held visiting appointments at Carnegie Mellon, Technical University of Berlin, Ingolstadt School of Management, University of São Paulo and Technical University of Lisbon.

In recent years, Pedro Amorim has been supervising and conducting numerous national and European funded projects, co-authoring more than 20 research papers in the fields of optimization, management science and supply chain management. He received his undergraduate education and the Ph.D. degree in Industrial Engineering and Management from the Universidade do Porto, Portugal.

Participant Number	10	Organisation official name	UNIVERSITE SORBONNE	PARIS	I	PANTHEON-
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Partner presentation

Partner entity description and relevance:

The **Pantheon-Sorbonne University (Paris I)** established by professors in law, economics and humanities of the historical University of Paris which emerged around 1150 in Paris. All international rankings reveal that The Pantheon-Sorbonne University is often placed in the first position among the top French Universities in many subjects as Laws and Economics, and among the best universities in Computer Sciences and Mathematics. The Pantheon-Sorbonne University represents the LabEx-ReFi for this proposal. The Laboratory of Excellence for Financial Regulation (LabEx-ReFi) is a research centre dedicated to the evaluation of regulation policies. It aims to improve the understanding of financial systems and regulations' implications, and to provide public authorities with independent academic expertise and guidelines for action. The LabEx-ReFi has been created as an initiative of Pantheon-Sorbonne University, CNAM, ENA, and ESCP Europe. The CNAM (*Conservatoire national des arts et métiers*: National Conservatory of Arts and Crafts) is a doctoral degree-granting higher education establishment in engineering, operated by the French government since 1794, dedicated to providing education and conducting research for the promotion of science and industry. The ENA (*École nationale d'administration*: National School of Administration) is a French higher education establishment, created in 1945 to democratise access to the senior civil service. ESCP Europe (*École supérieure de commerce de Paris*) is a French-European business school, accredited by the Paris Chamber of Commerce and is one of the 76 schools in the world to have obtained the triple accreditation of AACSB, EQUIS and AMBA. Together with ESSEC and HEC Paris, it forms the informal group commonly referred as the most selective French *grandes écoles*.

Main roles:

Paris 1 will be the one of key contributors of content for the training sessions in blockchain. Specifically, Paris 1 will be responsible of Blockchain work package (WP4), which will establish the state of art concerning blockchain technology, its application in finance, the related main risk concerns and the risk management tools which will enable automated compliance by FinTech companies and increased efficiency of the supervisory activities.

Furthremore, Paris 1 will be a local coordinator of the project across France. Specifically, Paris 1 will be in charge of conducting the training hub sessions for the national market regulator (AMF). Moreover Paris I will organize and host a coding session with French fintech associations and hubs.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

Christophe Henot is Assistant Professor of Finance at the School of Management of the Pantheon-Sorbonne University Paris 1 and a researcher at the PRISM (*Pôle de Recherches Interdisciplinaires en Sciences du Management*: Interdisciplinary Research Cluster in Management Sciences). He is also a consultant on Blockchain protocol and crypto-currencies for Fintech since 2013 and an associate researcher at the Labex ReFi. His domains of research are Corporate Finance, Market Finance and Blockchain technology. Currently, his research projects are mostly about the scalability of various blockchains and their evidential value. He published 2 books in accounting management and finance, participate for chapters in 2 books and translates et adapts the best seller “Options, futures et autres dérivés”, John C. Hull. He will manage the project assigned tasks within the team that follows or new resources if needed.

Dominique Guégan is currently Emeritus Professor of Mathematics at the University Paris1 Panthéon – Sorbonne inside the CNRS Research Laboratory CES (Centre d’Economie de la Sorbonne). Her domains of research are: Financial regulation – Fintech technology (Blockchain, big data, HFT) - non-linear econometrics modelling - Extreme value theory and risk measures in finance - pricing theory in incomplete markets- Deterministic dynamical systems. She belongs to the LaBex ReFi (Financial regulation). She is an associate researcher to University Ca’Foscari in Venezia, and to IPAG Business School. She has already supervised 37 PhD in economics and mathematics. She currently supervised 3 thesis. She has already published 11 books in statistics theory, time series and finance, participate for chapters in 30 books, and published more than 130 academic papers. She is regularly invited in universities around the world to give seminars or lectures for long stays in Italy (Venezia , Firenze, Padova), in Danemark (Arrhus), in The Netherlands (Rotterdam), in Belgium (Louvain), in Germany (Berlin), in Great Britain (London, Warwick), in Russia (HCE Moscou), in Hong Kong University, in China (Shanghai , Beijing, Tianjin), in Manilla, in Japan (Tokyo), in India (Calcutta, New Delhi), in Australia (Sydney, Brisbane, Melbourne), in New Zealand, in Canada (Montreal), in Brazil (Porto Alegre, Rio). She also participates to several international projects supported by French government, or European Commission, or International institutions. These projects focus on the financial regulation, the measures of risks and the decisions of Basel committee in Europe, the Fintech industry, the development of long term risks and the way to take them into account both for bankers, insurance companies and individuals, the importance of systemic risks with the actual financial crisis and the globalization of the markets. These projects link the research and the works of several academic teams inside French universities, European universities, North American Universities, and also enterprises.

Catherine Bruneau is Professor of Economics at the University of Paris 1 Panthéon-Sorbonne, researcher at the CES and associate researcher at the Labex ReFi. She has been consultant at Bank of France, and is presently consultant at France Stratégie. She is expert in theoretical econometrics, macroeconometrics, financial econometrics and in risk analysis and management, with a specific topic to extreme risk in finance and insurance. Her publications are notably in Journal of Econometrics, Oxford Bulletin of Economics and Statistics, Journal of Forecasting, Journal of Risk and Insurance, Journal of Macroeconomics, Journal of Banking and Finance, Journal of Property Research and other academic journals. She has been

teaching in different French and foreign academic institutions and has supervised around 20 PhD theses of French and foreign students who have developed an academic or professional career in banks insurance companies or consulting firms.

Olena Havrylchyk is Professor of Economics at the University of Paris 1 Panthéon-Sorbonne and a researcher at the CES. She is also a consultant at the OECD on financial regulation and Fintech and an associate researcher at the Labex ReFi, CEPPII and EconomiX. She has been a frequent visiting scholar at the Bank of England and other central banks, foreign universities and research centers. Olena has published in the Review of Finance, Journal of Banking and Finance and other academic journals. Her paper on P2P lending won the Best Paper Award at the First Toronto FinTech Conference. She is also the winner of the Trophée SAB 2013 for sustainable finance and Olga Radzyner Award 2011 for scientific work on the European economic integration, bestowed by the Central Bank of Austria. Originally from Ukraine, Olena holds PhD in Economics from the European University Viadrina (Germany). Currently, her research projects are mostly about P2P/marketplace lending. First, she applies the theory of financial intermediation to understand why platforms have been created and what is their value added in comparison to banks. Second, she uses the French credit registry data to analyse why SMEs borrow via P2P/marketplace lending platforms and what is the impact of such credit on their performance. She's also analysing lending strategies of retail investors that lend via platforms. In 2017, together with the University of Paris 2 Assas, University of Lille and Labex ReFi, Olena has organized a conference on the P2P lending and equity crowdfunding. She is currently creating a master programme 'Finance Technology Data'.

Iryna Veryzhenko is an Assistant Professor in Conservatoire National des Arts et Métiers. She is also researcher and a member of executive committee of the Laboratory of Excellence for Financial Regulation (LabEx-ReFi). Her research interests are mainly focused on the impact of technology on market organization, its quality and regulation. She is an author of a series of papers on the effect of high-frequency trading algorithms on market quality and the possibility to regulate them. Iryna is a member of the project running by Labex Refi, University of Nice and University of Lille on High Frequency Trading regulation. The purpose of this project is to study the effectiveness of different rules implemented by market regulator, such as French high-frequency trading cancel order tax or Italian Order-to-Trade ratio tax, to slow down the manipulation trading activities. This project tries also to shed some new light on the detection of HFT manipulations like spoofing and momentum ignition. It emphasizes the importance of stress test to evaluate the robustness of the market to potential technological problems, like HFT's algorithm failure. Artificial stock market using in this projet is the perfect framework to assess to effectiveness of the rules designed to slow the trading process. This project is a part of RegTech or algorithmic market supervision. Iryna Veryzhenko is a co-supervisor of a PhD Thesis "Blockchain technology and the evolution of the banking system" of Stanislav Minaev. This thesis aims in particular to understand the stakes for the financial markets and solve the problems related to the application of this technology. The first part of the work concerns the analysis of compatibilities and incompatibilities with the current banking system, the study of the evolution of the sectors and different trades with the implementation of the protocol. The second deals with the advantages of this technology, its risks and the potential axes of development.

Infrastructure and equipment:

The Pantheon Sorbonne University benefits from 40 training centres in Paris and greats amphitheatres in Sorbonne, an historical place for hosting workshops and training sessions. It regroups 48 unities of research and the numeric services provide all required servers for technological research and applications.

The five most relevant publications:

- Addo P., Guégan D., Hassani B. (2018) Credit Risk Analysis using Machine and Deep learning models, to appear Journal of Risks.
- D. Guégan, A. Soritopoulou (2017) Bitcoin and the challenge for financial regulation, Capital Markets law Journal, Issue 4.
- D. Guégan, B. Hassani, K. Li (2017) Measuring risks in the extreme tail: the extreme VaR and its confidence interval, Journal of Risk and Decision Analysis, 6, 213-234.
- Guegan D. , Hassani.B. (2017) Regulatory Learning: how to supervise machine learning models? An application to credit scoring. to appear in Journal of Finance and Data Science
- Garcin M. , Guégan D. (2016) Wavelet shrinkage of a noisy dynamical system with non-linear noise impact, Physica D, 325, 126 – 145.

Key Personnel:

Christophe Henot (male) PhD in Finance, graduated from the Pantheon-Sorbonne University Paris 1, MSc in Finance from the same University. Area of research/work: Finance, Blockchain, Cryptocurrency and FinTechs. He will be in charge of the French group coordination for the project. He will manage the project assigned tasks within the team that follows or new resources if needed.

Dominique Guégan (female) PhD in Mathematics, graduated from the Paris-Sud University, Area of research/work: Financial regulation – Fintech technology (Blockchain, big data, HFT) - non-linear econometrics modelling - Extreme value theory and risk measures in finance - pricing theory in incomplete markets- Deterministic dynamical systems.

Catherine Bruneau (female) PhD in Economics, graduated from the University Paris X (France). In addition to the general topics indicated before, the areas of her current research/work are Risk Analysis and Control of Financial Institutions - Financial Cycles and Crises.

Olena Havrylchyk (female) PhD in Economics, graduated from the European University Viadrina (Germany). MSc in Economics from Ivan Franko Lviv National University (Ukraine). Area of research/work: P2P lending, empirical banking, Fintech regulation and taxation.

Iryna Veryzhenko (female), PhD in Computed Science from Lille 1 University, PhD in Finance from Pantheon-Sorbonne University Paris 1, MSc in Applied Mathematics from Taras Shevchenko National University of Kyiv (Ukraine). Area of research/work: high-frequency trading algorithms, financial market regulation, asset management and agent-based modeling.

Stephane Blemus (male), PhD student in Law (Financial and Digital Law) from Pantheon-Sorbonne University Paris 1, MSc Law and Economics from Pantheon-Assas University Paris 2 and MSc Financial Law from Pantheon-Sorbonne University Paris 1. Legal consultant and Legal Project Manager. Area of research/work: Regulation of Blockchain, Smart-Contracts DAOs & Virtual Currencies, FinTech regulation, systemic risk regulation.

Participant Number	11	Organisation official name	Politecnico di Milano
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Partner presentation**Partner entity description and relevance:**

Politecnico di Milano (Polimi) is a world-leading university, it is the largest technical university in Italy. It offers undergraduate, graduate and higher education courses in engineering, architecture and design. Politecnico di Milano is ranked as the best university in Italy by the latest QS World University Ranking 2018: it is ranked among the top 20 technical

universities of all its subjects (17° in Engineering, 9° in Architecture and 5° in Design). It is a very interesting environment in which to do research. Our location in Milan gives us access to many Italian financial institutions and regulators. As a matter of fact, Milan is the Italian financial center. Since 2005, the Quantitative Finance group of the Department of Mathematics (QFINLAB) is active on all area of quantitative methods applied finance. Methodologies mostly belong to stochastic analysis, statistics, computational methods. Areas of application include: pricing of financial derivatives, asset management, risk management. The group is active on FinTech (with specific attention to blockchain and cryptocurrencies) and financial education with initiatives such as seminars, workshops (Polimi fintech journey), innovative education (first MOOC on financial education in Italy) and work in cooperation with the Italian Financial markets Authority (CONSOB). Most of the above activities are carried out in collaboration with the main Italian financial institutions and with international consulting firms. The Quantitative Finance group collaborates with the Department of Computer Science at Politecnico di Milano on the impact of Blockchain technologies on the trading and post trading market, as well as on the insurance market. The Department of Computer Science at Politecnico di Milano has particular strengths in big data analytics, machine learning, computer networking and distributed systems, bio-informatics, programming languages and software systems engineering. The Group also collaborates with the Department of Management Studies which has a strong expertise on peer to peer platforms and on cryptocurrencies.

Main roles:

Politecnico di Milano will be local coordinator of project across Italy. Polimi will be in charge of conducting the training hub sessions for the local market regulator (CONSOB).

Previous experience relevant to those tasks:

The Quantitative Finance group of the Department of Mathematics at Politecnico di Milano has a long-standing experience in the FinTech area. Here we present a list of relevant projects or activities, connected to the subject of this proposal:

DLTs and securities markets: the aim of this project was to write a White Paper on the how Distributed Ledger Technologies (DLT) could affect the post-trading securities market, designing possible scenarios. The project was carried out by a large group of academics of Italian universities from different fields (economics, law, finance, engineering), assisted by CONSOB staff members. The QFINLAB group had a leading role, with Professor Emilio Barucci as the academic leader of the project, and an important role on explaining the financial and technical aspects of DLTs.

Big Datas in insurance contracts: in collaboration with one of the most important European insurance company, the QFINLAB group is studying the effect of lapse rate in the insurance market, i.e., the rate at which life insurance policies terminate because of failure to pay the premiums. The aim of this study is to consider the large amount of data available from insurance contracts to better understand –and thus predict- the phenomenon.

Digital payments and Crypto-currencies: this research project addresses issues in the context of the creation, acceptance, dissemination, and potentially demise of crypto-currencies. Digital payments are becoming pervasive in our life. The most tangible implication is fast transfer of funds with little constraints. Yet, the combination of electronic networks and cryptography has opened opportunities that go far beyond the reduction of transaction costs. In particular, the emergence of crypto-currencies has created new and decentralized media of

exchange. Like fiat money, crypto-currencies provide no claim to any physical asset, but circulate on the basis of trust and credibility. Like all new technologies, money by cryptographic convention comes with costs, risks and opportunities. In this framework, the research project aims at investigating how to model price dynamics of a crypto-currency, what factors affect crypto-currency returns, how we should quantify the value of their liquidity, and which risks for financial stability must be faced and managed.

Infrastructure and equipment:

Politecnico di Milano is committed to achieving excellence in research. The path towards excellence is developed along the following actions: support advanced and fundamental research activities; develop strategic partnerships with academia and industry around the world to make significant contributions to society; develop new interdisciplinary research lines to tackle societal challenges; embed scientific developments and research results into university education. The Departments of Politecnico di Milano are responsible for the implementation of the mission in their scientific domains.

Politecnico di Milano is Host Institution (HI) and partner of several ERCs. Politecnico di Milano is the top Italian university for projects funded by the European Commission in the context of the Seventh Framework Programme for Research and Development, which illustrates its capacity for planning and attracting funds to Lombardy.

The results are summarised as follows:

- number of funded projects: 281;
- success rate: 25,6%;
- EU funding: 90 million euro.

The University boasts a success rate above the European average of 21% and above the Italian average of 18.3%. In particular, in the context of the ERC Subprogramme, the University won, as Host Institution, 5 Advanced Grants, 2 Consolidator Grants and 1 Starting Grant, plus 1 Advanced Grant as Partner.

The Department of Mathematics provides several High Performing Computer (HPC) resources: in fact it makes use of the most advanced technology to carry out its research. It hosts in-house HPC facilities and has access to CINECA top-end supercomputers. Both sequential and parallel codes can be developed and executed on our resources, which include MPI, SMP and GPU programming paradigms.

The five most relevant publications:

1. E.Barucci, D.Marazzina (2016) Asset Management, High Water Mark and Flow of Funds, Operations Research Letters, Vol. 44-5:607-611.
2. R.Cerqueti, D.Marazzina, M.Ventura (2016) Optimal Investment in Research and Development Under Uncertainty, Journal of Optimization Theory and Applications, Vol. 168-1: 296-309.
3. E.Barucci, D.Marazzina (2015) Risk Seeking, Non Convex Remuneration and Regime Switching, International Journal of Theoretical and Applied Finance, Vol. 18-2: 1550009.1-25.
4. Pagani, F. Bruschi, V. Rana, M. Restelli (2016) Reconstruction of public transport state. IEEE 19th International Conference on Intelligent Transportation: 2285-2292.
5. V. Rana, I. Beretta, F. Bruschi, A. Nacci, D. Atienza, D. Sciuto (2016) Efficient Hardware Design of Iterative Stencil Loops. IEEE Trans. on CAD of Integrated Circuits and Systems 35(12): 2018-2031.

Key Personnel:

Prof. Emilio Barucci (male) is a full professor of Financial Mathematics at the Department of Mathematics – Politecnico di Milano. He previously taught at the University of Pisa and of Florence. He will be reference person responsible for carrying out the proposed research/training project. He is the director of the Quantitative Finance Group, director of the executive program on quantitative finance. He is the author of more than sixties scientific publications in leading journals on topics such as asset management, risk management, banking, and of eight books including the advanced textbook Financial Market Theory (2017, Springer). He will manage the project assigned tasks within the team that follows or new resources if needed.

Prof. Daniele Marazzina (male) is associate professor of Financial Mathematics at the Department of Mathematics – Politecnico di Milano. His research interests include financial modelling, financial derivative pricing and hedging, optimal asset allocation, and application of blockchain technologies to domain beyond digital currencies. Marazzina received a PhD in Mathematics from University of Pavia. He is member of the Quantitative Finance (QFINLAB) group of Politecnico di Milano.

Dr. Francesco Bruschi (male) is Assistant Professor of Information Processing Systems at Politecnico di Milano since 2003. Bruschi got a M.Sc. in Electrical Engineering and then a PhD in Information Engineering at Politecnico di Milano. His current research interests include intelligent transport systems, internet of things, smart contracts and blockchains.

Participant Number	12	Organisation official name	University College Dublin
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Partner presentation

Partner entity description and relevance:

University Colledge Dublin (UCD) is one of Europe's leading research-intensive universities; an environment where undergraduate education, masters and PhD training, research, innovation and community engagement form a dynamic spectrum of activity. The international standing of UCD has grown in recent years; it is currently ranked within the top 1% of institutions world-wide. UCD is also Ireland's most globally engaged university with over 30,000 students drawn from over 120 countries and includes 5,500 students based at locations outside of Ireland. Each year QS publishes rankings by subject areas. 46 subjects are categorised. UCD offers 43 of these and is ranked number 1 in Ireland in 40. The 46 subjects are grouped into 5 areas and UCD is ranked number 1 in Ireland in each of these 5 areas.

UCD hosts two business schools. **UCD Lochlann Quinn School of Business** is the leading undergraduate business school in Ireland. It combines the excitement of university life with the most progressive education programmes in the world. Students enjoy a stimulating learning environment – one which greatly contrasts to their secondary learning – where they are encouraged to become skilled decision-makers for professional careers. We invest heavily in continuous innovation in what we teach and how we teach, with a strong emphasis on the independent thought.

UCD Michael Smurfit Graduate Business School is the only business school in Ireland and one of an elite group of schools worldwide to hold the “triple crown” of accreditation from the three centres of business and academic excellence, EQUIS, AACSB and AMBA. For the past fifteen years, the programmes have been consistently ranked by the prestigious global Top 100 Financial Times and Economist Rankings. Our success is down to an unwavering commitment to excellence. Highly engaged locally, nationally and internationally, UCD’s vision is to be known around the world as Ireland’s Global University; in terms of our comprehensive range

of disciplines, in the reach and impact of our research and innovation, in our holistic educational experience, in the diversity of our community and in our engagement with all sectors of society and with all regions of the world.

The Office of the Vice-President for Research, Innovation and Impact provides support for researchers and scholars and is responsible for developing and meeting UCD's strategic objectives for research specifically for:

- Governance and development of research in UCD
- Strategic management of major research programmes and institutes
- Research support services
- Industry partnerships
- International programmes
- Infrastructural development
- Commercialisation of research through UCD Innovation

Main roles:

UCD will be local coordinator of project in Ireland. UCD will be in charge of conducting the training hub sessions for the local market regulator (Central Bank of Ireland).

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

1. **UCD's Centre for Business Analytics** is located in Management Information Systems at UCD School of Business. UCD's CBA (previously known as the Centre for Management Science and Systems) incorporates a cross-section of disciplines associated with Management Science, Operations Research, Systems Science and Decision Support Systems. Our main aim is to facilitate the development of, and provide ongoing support for, an internationally recognised, UCD-based community of researchers whose work focuses on Decision-Making: its Structures, Modelling, and Realisation in Practice. The CBA aims to lead research in management science, decision science, decision support systems and systems science in Ireland. One exemplary study from 2013 comprises the creation for early warning system for company liquidations. There has been a significant increase in companies entering liquidation due to the economic downturn. As a consequence of substantial losses, there was an increased need for an accurate prediction model and better understanding of companies' behaviour when they enter the liquidation process. A novel Artificial Immune System approach, a survival analysis and more standard modelling methods were compared in predicting liquidation.
2. At the **Insight Centre**, we process and use information to enable better decision making for individuals, society and industry. We are in a unique position at the interface of academia and industry. With Insight, businesses can work with the finest minds in academia to come up with solutions to problems they encounter. As a research institute, Insight also conducts blue sky research in exciting fields such as the semantic web and linked data, areas that have the potential to transform society. The organisation's key areas of priority research include machine learning & statistics, semantic web, linked data, media analytics, optimisation & decision analysis, personal sensing as well as recommender systems.
3. There are a number of projects conducted at the **UCD Centre for Cybersecurity & Cybercrime Investigation (CCI)**. It is a world-class education and research centre with strong and well-established collaborative relationships with law enforcement and industry. Cybercrimes are growing in number and severity. What used to be the task of specialist

national police squads is becoming the routine work of regional police forces and even individual districts. To effectively investigate cybercrimes, the investigator needs a set of special skills, such as methods of classic computer forensics, live computer forensics, and specific tactics of cybercrime investigation.

One of our recent projects is called 2CENTRE, which established a network of Cybercrime Centres of Excellence for Training, Research & Education around Europe. Project contributors included partners from industry, academia and law enforcement, working together to propose and develop solutions designed to address cybercrime. Using CCI as the model, the project explored options for a sustainable network framework and structure. Over 25 separate activities were completed, including the development of forensic tools, the creation of a range of cybercrime training programmes and practical research into issues affecting Europe's citizens, such as online financial crime, telecoms fraud and cybersecurity for critical national infrastructures.

4. Research activity is critical to University College Dublin's reputation as a leading international university. Many of the day-to-day costs of research activity are not covered by research grants. In recognition of this, UCD has developed the **Output-Based Research Support Scheme (OBRSS)** to disburse research support funds to faculty based on their research outputs, as captured in UCD's Research Management System. The project is led by our principal investigator Alessia Paccagnini. The output-based research support scheme makes use of publication and PhD supervision records to allocate research funding to academic staff. Allocation is based on a point system including factors such as number of publications or PhD supervisions. Due to numerous publications and projects in various areas such as Fintech, Management Information Systems, Big Data etc., a big portion of all grants is provided to conduct this project.
5. The **Seed Funding Scheme** provides practical 'seed' support for projects and ideas that are challenging and ambitious, as well as those that lead to new knowledge and capabilities. The Scheme is funded through the Overhead Investment Plan (OIP) and offers the UCD research community the opportunity to apply for internal funding to enhance their research activity in the University. Seed Funding is a competitive Scheme covering all disciplines which aims to:

- enhance UCD's research profile, reputation and impact nationally and internationally
- support early career researchers in their initial steps to develop their independent research careers
- support the transformation of new ideas from early concepts into viable research projects
- support the development of a research project in its early stages, to a point where it is considered ready for competitive submission to an external national/international funding agency.

Currently, there are five programmes under the Seed Funding Scheme. The programmes comprise Dissemination and Outputs; Horizon Scanning; Career Development Award; Equality, Diversity and Inclusion and Visiting Professors. In relation to this project, the Seed Funding Scheme helps to provide seed support enabling us to have the needed capabilities on premise.

Infrastructure and equipment:

We intend to use data aggregator services such as Datasift or GNIP. These data sets keep track of historical social data. Through search queries data can be automatically obtained. Datasift offers the possibility to integrate social media, blogs and news in just one place. Furthermore, it provides regular updates in real-time. GNIP is an API platform providing real-time and historical social data from Twitter. Manual data collection as well as automated queries from Crunchbase and Solocheck enable us to gain insight into the current Irish Fintech ecosystem.

UCD worked with Bloomberg to obtain daily data from all financial markets around the world enhancing the university's strong research capabilities. The Data Analytics Lab in the Quinn School is equipped with 12 Bloomberg terminals for accessing financial data. The Smurfit Graduate School also has 4 terminals which are housed in the Data Room. UCD IT Services provide access for students to a range of data analysis software packages, including NVivo, SPSS and Stata. Last but not least, students and faculty can access a wide range of financial data from Compustat and CRSP at the Blackrock campus.

The five most relevant publications:

1. Consolo, A., Favero, C.A. and Paccagnini, A., 2009. On the statistical identification of DSGE models. *Journal of Econometrics*, 150(1), pp.99-115.
2. Hoepner, A. G. F. (2016), Financial Data Science for Responsible Investors', Forthcoming in M. Mansley and F. Ward (eds.) 10-4-10 Anniversary Book, Bristol: Environmental Agency Pension Fund.
3. Hoepner, A. G. F.; Dimatteo, S.; Schaul, J.; Yu, P.-S. and Musolesi, M. (2017), Tweeting about Sustainability: can Emotional Nowcasting discourage Greenwashing?", *Corporate Finance* 8 (3&4): 90-94.
4. Haider Mshalia, Tayeb Lemloumab, Maria Moloney, Damien Magoni, "A survey on health monitoring systems for health smart homes" (2018), *International Journal of Industrial Ergonomics*, Vol 66, Pages 26–56.
5. Post, T. and V. Potì (2016) 'Portfolio Analysis Using Stochastic Dominance, Relative Entropy, and Empirical Likelihood'. *Management Science*, 63 (1), 153-165.

Key Personnel:

Prof. Andreas Hoepner (male) is Full Professor of Operational Risk, Banking & Finance at the Michael Smurfit Graduate Business School and the Lochlann Quinn School of Business of University College Dublin (UCD). Andreas is also heading the 'Practical Tools' research group of the Mistra Financial Systems (MFS) research consortium (5 groups, total funding: SEK 58 million ~ about US\$ 7 million), which aims to support Scandinavian and global asset owners with evidence-based tools for investment decision making. Before joining UCD in June 2017, Andreas was Associate Professor of Finance at the ICMA Centre of Henley Business School, where he remained subsequently as Visiting Professor of Finance teaching FCA staff on Ethics, Governance & Accountability. He is also Visiting Professor in Financial Data Science at the University of Hamburg, serves as a board member of the Financial Data Science Association (having been its inaugural chair in 2015-16) and educates investment professional in financial data science as Scientific Co-Director of the Certificate in Financial Data Science of the German Investment Association (DVFA). Andreas received his PhD from St. Andrews in June 2010, where he was on faculty from 02/2009 to 09/2013. Andreas is the sole inventor of a US patent titled 'Investment Performance Measurement' (No. US8751357 B1). He also won several awards including a 2015 PRI/Sycomore Best Quantitative Paper, a 2012 Academy of Management Best Paper Proceeding, a 2010 PRI Academic Research Award, and 2011 and 2012 PRI/FIR Research Grant Awards. He will manage the project assigned tasks within the team that follows or new resources if needed.

Dr. Maria Moloney (female) is currently Research Centre Strategy Manager at University College Dublin and Adjunct Lecturer in Computer Science at Trinity College Dublin. Prior to these appointments, she was consultant in the area of Data Protection and Information Privacy at Privacy Watch Ireland. She earned her Ph. D. in Information Systems at Trinity College Dublin. Her research interests are related to Data Protection Consulting, Informational Privacy Research, Privacy by Design, Design Science Research, and Action Design Research. Her work has been published in international prestigious journals such as Journal of Internet Technology and Secured Systems, International Journal of Industrial Ergonomics, and Postal

and Delivery Innovation in the Digital Economy. She is also author of book chapters in Security, Privacy, Trust, and Resource Management in Mobile and Wireless Communications and The Role of the Postal and Delivery Sector in a Digital Age.

Dr. Alessia Paccagnini (female) is currently permanent Lecturer/Assistant Professor at the at the University College Dublin School of Business. Previously, she was Lecturer at the School of Economics at the University College Dublin, Assistant Professor at the University of Milan - Bicocca and Max Weber Fellow at the European University Institute She earned her Ph.D. in Economics and Econometrics from Bocconi University. During her career, she has been research visitor at the European Central Bank, University of Pennsylvania, Universitat Pompeu Fabra, Bank of England, National Bank of Poland, and visiting professor at IMT Lucca. Her research includes Time Series Analysis, Forecasting, Factor Models, Classical and Bayesian Econometrics, Applied Macroeconomics, DSGE Model Estimation, and Monetary Policy. Her work has been published in international prestigious journals such as Journal of Econometrics, Macroeconomic Dynamics, Computational Statistics and Data Analysis, Economics Letters, Journal of Forecasting, Journal of Empirical Finance, Journal of Economics Dynamics and Control, and Journal of Financial Stability among others. Dr. Alessia Paccagnini has taught a variety of courses in Econometrics, Applied Econometrics, Financial Econometrics, and Macroeconomics to both undergraduate and postgraduate students at Bocconi University, Catholic University in Milan, University of Varese - Insubria, University of Milan - Bicocca, IMT Lucca, and University College Dublin. She currently teaches Financial Econometrics for Master student at Smurfit Business Graduate School and Econometrics of Financial Markets for bachelor students in Economics & Finance.

Prof. Valerio Poti (male) is Professor of Finance in the Business School of University College Dublin, where he teaches portfolio and risk management as well as MBA corporate finance. He was previously in Dublin City University, where he taught courses on quantitative finance and risk modelling, led the development of the renewed M.Sc. in Finance and was head of Economics, Finance and Entrepreneurship. He graduated in Banking and Finance from Bocconi University Milan, gained a PhD in Finance from Trinity College Dublin, and subsequently conducted post-doctoral research in the Finance department of New York University Stern Business School as an International Visiting Research Scholar, under the mentoring of Professor Richard Levich. His research interests include asset pricing, performance attribution, market efficiency, behavioural finance, financial econometrics. His papers have been published or are forthcoming in International peer reviewed journals such as Management Science, the International Journal of Forecasting, the Journal of Banking and Finance, the Journal of International Money and Finance, European Financial Management, and he has contributed to practitioner-oriented books on portfolio and risk management. He also engages in consulting activities on risk and performance attribution and on issues related to the usage of derivatives to generate economic value. In the past, he taught International Finance at Queen's University Belfast and, before moving to academia, he worked as an equity option market maker on the Milan derivatives exchange and was the head of the Financial Engineering desk of the Dublin subsidiary of Banca Monte dei Paschi di Siena.

Participant Number	13	Organisation official name	Universite de Luxembourg
Partner presentation			
Partner entity description and relevance:			
Founded in 2003, University of Luxembourg (LU) ranks among the 58 THE best universities in computer science (21 in Europe). The Interdisciplinary Centre for Security, Reliability and			

Trust (SnT) is one of three research centers at UL and a major contributor to this ranking. With 4 out of 6 authors with highest h-index in Luxembourg and two ERC Advanced Grant holders, SnT is on the road towards a European centre of excellence and innovation for secure, reliable, and trustworthy ICT systems and services. SnT targets research and PhD education in national and European projects and in collaboration between university researchers and external partners through its Partnership Program and Technology Transfer Office. To date, SnT participated or actively works in more than 60 European projects and launched 4 spin-offs. By end of 2017, some 286 people (among which 99 PhD candidates) were active at the Centre including also 25 faculty members who are formally employed by the faculty and who are carrying SnT research responsibilities or duties.

Main roles:

UL will be the local coordinator in Luxembourg. UL will be in charge of conducting the training hub sessions for the local market regulator - Commission de Surveillance du Secrétaire Financier.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

- Ethical Finance with DLT. The project started in 2017 and aims at developing an analytical framework and blockchain based architecture for Ethical Finance.
- Big Data analytics for fraud detection: This project has started in 2015 and is done in partnership with Choice Intelligence (Luxembourg). External funding is 600k Euros until end of 2017.
- Mining in-app purchases. This project is done with Ola-Mobile (Luxembourg) and amounts to 200k Euros over the next three years. Start Date: May 2015.
- Personal Financial Data Management. This project is done with the BCEEE (Luxembourg) and amounts to 160k Euros. Start Date: May 2016.
- Cybersecurity project done in collaboration with the army in Luxembourg. This project started in 2017 and amounts to 160K over the next 4 years.

Infrastructure and equipment:

The SEDAN research group is the technical lead of the nationwide regulated blockchain infrastructure Infrachain (<https://infrachain.com>) and hosts the experimental Fintech lab at SnT

The five most recent publications:

1. Alexander Yakubov, Wazen Shbair, Anders Wallbom, David Sanda, Radu State. A Blockchain-Based PKI Management Framework. To appear in NOMS 2018 - IEEE/IFIP Man2Block
2. Wazen Shbair, Mathis Steichen, Jérôme François, Radu State. Blockchain Orchestration and Experimentation Framework: A Case Study of KYC. To appear in NOMS 2018 - IEEE/IFIP Man2Block
3. Nida Khan, Abdelkader Lahmadi, Jérôme François, Radu State. Towards a Management Plane for Smart Contracts: Ethereum Case Study. To appear in NOMS 2018 - IEEE/IFIP Man2Block
4. Robert Norvill, Beltran Borja Fiz Pontiveros, Radu State. Visual Emulation for Ethereum's Virtual Machine. To appear in NOMS 2018 - IEEE/IFIP Man2Block
5. Beltran Borja Fiz Pontiveros, Robert Norvill, Radu State. Monitoring the Transaction Selection Policy of Bitcoin Mining Pools. To appear in NOMS 2018 - IEEE/IFIP Man2Block

Key Personnel:

Radu State (male) has done his graduate studies in France and the USA. He obtained the Master of Science Degree at the Johns Hopkins University (USA), followed in 2001 by a PhD degree at INRIA (France). He holds an HDR (**Habilitation à diriger des recherches**) since 2009 from University of Lorraine (France). Starting with 2016 he is heading the research group SEDAN (Service and Data Management in Distributed Systems) at SnT at the University of Luxembourg/SnT. He had held also a full professorship position “**professeur des universités**” in Nancy at the University of Lorraine. Before joining the university, he was a senior researcher (Chargé de recherche première classe) with INRIA (Institut de Recherche en Informatique), France. Currently, the SEDAN research group at SnT, addresses research challenges related to Blockchain Systems, Big Data systems and Cybersecurity. For an updated list of publications (<https://wwwen.uni.lu/snt/research/sedan/publications>). In the last years, Radu State has been actively involved in the conception, management and research of several EU funded projects like Butler, Gen6 and Outsmart, which were run within the Netlab team at SnT. More recently he worked on increasing the industry impact and industry funded projects at SnT and has acquired an currently acting as Principal Investigator on the previous projects (1-8).

He will be in charge of the project, managing the tasks within the project.

Participant Number	14	Organisation official name	INSTITUT JOZEF STEFAN
Partner presentation			
Partner entity description and relevance:			
<p>Jožef Stefan Institute (JSI - www.ijs.si) is the leading research institution for natural sciences in Slovenia with over 900 researchers within 25 departments working in the areas of computer science, physics, chemistry and biology.</p> <p>The Artificial Intelligence Laboratory (ailab.ijs.si), with approximately 40 researchers, is one of the largest European research groups working in the areas of machine learning, data mining, language technologies, semantic technologies and sensor networks. Its key research direction is combining modern statistical data analytic techniques with more semantic/logic based knowledge representations and reasoning techniques as a method in solving complex problems such as text understanding, large scale probabilistic reasoning, building broad coverage knowledge bases and dealing with scale.</p> <p>The Centre for Knowledge Transfer in Information Technologies (http://ct3.ijs.si/) has approximately ten researchers and technical staff working in the areas of research results dissemination and eLearning and covers management, training and dissemination activities of various EU projects. In particular, the Centre is well known through its portal http://videolectures.net/ with multimedia materials of numerous scientific events, on-line training materials, and a collection of tutorials in various scientific fields. The portal aims at promoting science, exchanging ideas and fostering knowledge sharing by providing high quality didactic contents not only to the scientific community but also to the general public. The Centre has also developed http://scienceatlas.ijs.si/ and http://www.ist-world.org/ for the analysis and visualization of large bibliographic and project databases. The Centre for Knowledge Transfer in Information Technologies acts as the UNESCO Chair for Open Technologies for Open Educational Resources and Open Learning.</p>			
<p>Main roles:</p> <p>JSI will be the local coordinator of project for Slovenia. JSI will be in charge of conducting the training hub sessions for the local market regulator - Banka Slovenija.</p>			
A list of up to 5 relevant previous projects, or activities, connected to the subject of this			

proposal:

1. x5Gon-H2020 Innovation Action: Cross Modal, Cross Cultural, Cross Lingual, Cross Domain, and Cross Site Global OER Network (H2020-ICT-761758) (2017-2020)
2. **EDSA** - H2020 Coordination and support Action: European Data Science Academy (H2020-ICT-643937)(2015-2017)
3. BigDataFinance-H2020 MSCA-ITN-ETN: Training for Big Data in Financial Research and Risk Management (H2020-MSCA-ITN-675044)(2015-2019)
4. euBusinessGraph-H2020 Big Data PPP: Enabling the European Business Graph for Innovative Data Products and Services (H2020-ICT-732006)(2017-2019)
5. EW-Shopp-H2020 Big Data PPP: Supporting Event and Weather-based Data Analytics and Marketing along the Shopper Journey (H2020-ICT-732590)(2017-2019)

Infrastructure and equipment:

JSI Artificial Intelligence Laboratory operates with state of the art servers which includes two 512GB memory machines for development and uses the latest development tools. The laboratory closely collaborates with the Centre for Knowledge Transfer in Information Technologies (CT3) where we are developing the VideoLectures.NET, a portal for sharing scientific and educational videos, which covers more than 16,000 scientific lectures from various scientific fields, with emphasis on computer science.

JSI's disruptive technologies developed by the AILAB at present include:

Qminer.ijs.si - a data analytics platform for processing large-scale real-time streams containing structured and unstructured data

VideoLectures.NET – multimedia materials of numerous scientific events, on-line training materials, and collection of tutorials on different scientific fields

ScienceAtlas.ijs.si / IST-World.org – exploratory analysis and visualization of large bibliographic and project databases (national and European level)

Enrycher.ijs.si – linguistic and semantic enrichment of textual data

EventRegistry.Org – global media observatory

The five most relevant publications:

1. RUPNIK, Jan, MUHIČ, Andrej, LEBAN, Gregor, ŠKRABA, Primož, FORTUNA, Blaž, GROBELNIK, Marko. News across languages - cross-lingual document similarity and event tracking. *The journal of artificial intelligence research*, ISSN 1076-9757, 2016, vol. 55, pg. 283-316
2. KAŽIČ, Blaž, RUPNIK, Jan, ŠKRABA, Primož, BRADEŠKO, Luka, MLADENIĆ, Dunja. Predicting users' mobility using Monte Carlo simulations. *IEEE access*, [in press] 2017
3. TOMAŠEV, Nenad, BUZA, Krisztian, MLADENIĆ, Dunja. Correcting the hub occurrence prediction bias in many dimensions. *Computer science and information systems*, 2016, vol. 13, no. 1, pgs. 1-21.
4. BOBROWSKI, Omer, KAHLE, Matthew, ŠKRABA, Primož. Maximally persistent cycles in random geometric complexes. *Annals of applied probability*, ISSN 1050-5164, 2017, vol. 27, no. 4, pg. 2032-2060
5. CHAZAL, Frédéric, GUIBAS, Leonidas J., OUDOT, Steve, ŠKRABA, Primož. Persistence-based clustering in riemannian manifolds. *Journal of the ACM*, 2013, vol. 60, no. 6, pg. 41-1-41-10.

Key Personnel:

Prof. Dr. Dunja Mladenić (female) is head of the Artificial Intelligence Laboratory at JSI, serving on the Institute's Scientific Council and working on research projects mainly in the area of machine learning, data and text mining and big data analytics. She graduated in Computer Science from the University of Ljubljana and continued as a PhD student focused on Artificial Intelligence receiving her MSc and PhD in Computer Science from the University of Ljubljana in 1995 and 1998 respectively. Among others, Dunja was a long-term visitor at the School of Computer Science, Carnegie Mellon University/USA in 1996/1977 and in 2000/2001. She is the author and editor of several books and numerous scientific papers. Dunja has experience in coordinating EU projects and acting on project management boards. She was a program co-chair of ECML 2007 and a general chair of ECMLPKDD 2009. Dunja Mladenić is the Slovenian representative in the EC Enwise STRATA ETAN Expert Group and serves as a project evaluator and reviewer for various EC programs including ERC panels.

Marko Grobelnik (male) is an expert in the areas of analysis and knowledge discovery in large complex databases. He collaborates with major European and US academic institutions and consults for industries such as British Telecom, Microsoft Research, Nature, New York Times, Bloomberg and Accenture. Marko is the author of several books in the area of machine learning, data mining, text mining and semantic technologies and author of many scientific papers. Marko is the National representative for digitalization, CEO of the company Quintelligence and co-founder of the company Cycorp Europe. He also served as a program chair for the European Machine Learning conference (ECMLPKDD 2009) and for the European Semantic Web Conference (ESWC 2011). In terms of project experience, Marko served as the technical coordinator for the projects FP6 IST-World and FP7 VIDI and as scientific coordinator for the FP7 project X-LIKE; he was on the project management board of several EU projects. He will manage the project assigned tasks within the team that follows or new resources if needed.

Mitja Jermol (male) is the holder of UNESCO Chair on Open Technologies for Open Educational Resources and Open Education and a head of the Centre for Knowledge Transfer at Jozef Stefan Institute in Slovenia. Center has setup and is being running one of the world's top open scientific video portal <http://videolectures.net>. Besides e-learning Mitja's research include Artificial Intelligence in the context of Business Intelligence, Personalised Learning, Smart Cities and Factories of the Future. Mitja has been active in more than 20 H2020, FP7 and FP6 projects. Together with his team he has initiated a national wide initiative on open education called "Opening Up Slovenia". He is one of the directors of Knowledge4All foundation and a member of the European Complex System Society, Open Education Consortium, Opencast and European current research information systems (CRIS) community. Mitja is a co-founder of the two institute spin-outs, Quintelligence and Cycorp RER.

Participant Number	15	Organisation official name	UNIWERSYTET WARSZAWSKI
Partner presentation			
Partner entity description and relevance:			
<p>The University of Warsaw (Warsaw) is the largest university in Poland and best research centre in the country. Its academic community comprises 7 200 employees, more than 44 400 undergraduate and graduate students, 3 200 doctoral students and 3 000 postgraduate students. Besides 21 faculties, UW has also 30 academic and research centres. According to national and international rankings, it also is the best university in Poland and one of the leading ones in this region of Europe. Almost one third of the university budget, equal to 330 million euro, is devoted to research. In the present financial framework, UW scholars have won ca. 50</p>			

grants from the Horizon 2020 programme, COSME programme and SESAR Joint Undertaking. Researchers from UW have received 14 from 28 grants given to Polish institutions from the most prestigious European competitions of the European Research Council (ERC). Research potential of the University is reflected in the results of the 2016 Nature Index of Rising Stars. The University of Warsaw was ranked 3rd among the institutions of South East Europe in that ranking. Globally it occupied 96th place. Since 2016, UW has used the 'HR Excellence in Research' logo, which is granted by the European Commission. It confirms that the university fulfils the requirements of the European Charter for Researchers. The University works together with 800 international partners, 400 of which represent 73 countries which have signed a bilateral cooperation agreement.

The **Faculty of Economic Sciences (FES)** of the University of Warsaw in 2017 received (again) the highest category (A+) in the parametric assessment of scientific units carried out by the Committee for the Evaluation of Scientific Units at the request of the Polish Ministry of Science and Higher Education. FES is one of the 2 units that have this category among all the 88 economic universities/faculties in Poland. Only five faculties of the University of Warsaw were granted this highest evaluation. Since 2010 FES offers a four-semester Quantitative Finance (QF) master programme that provides students with outstanding knowledge of modern quantitative finance. In 2016 the programme was ranked as the 19th best QF programme in the world according to Eduniversal in the Financial Markets Ranking. On the other side the Quantitative Finance Research Group is a place where research is conducted and experience is exchanged between practitioners and academics who deal with quantitative finance, especially topics related to automated transaction systems, the process of their creation as well as implementation also on markets for cryptocurrencies.

Main roles:

FES UW will be local coordinator of project across Poland. FES UW will be in charge of conducting the training hub sessions for the local market regulator - Komisja Nadzoru Finansowego.

Previous experience relevant to those tasks:

Members of the Chair of Quantitative Finance in the Faculty of Economic Sciences were involved in the following activities:

Research project financed by the Polish National Science Center: "Analysis of the term structure of futures contracts for volatility (VIX index). Impact of fluctuations in volatility on the behavior of other asset classes." (2012-2014, funding 300 000 PLN, principal investigator – prof. Ryszard Kokoszczyński)

Research project financed by the Polish National Science Center: "Analysis of factors affecting the risk premium for stock indices using switching models" (2015-2016, funding 139 000 PLN, principal investigator – dr Robert Ślepaczuk)

Internal QFRG project "Algorithmic Trading on Cryptocurrencies 2017"

Infrastructure and equipment:

In October 2013 the Trading Lab was opened on Faculty of Economic Sciences as a joint project of OSTC and University of Warsaw. It is coordinated by the Quantitative Finance graduate program chairman, dr Paweł Sakowski. The Trading Lab is equipped with high-end computers and world-class software provided by OSTC partners, who are supporting FES in this effort: Stellar Trading Systems and CQG. Also world's largest derivatives exchanges, including CME Group, Liffe, the InterContinental Exchange and the Montreal Exchange have contributed to making the Labs unique: the market data is provided in real time. This gives our students who are passionate about financial market an exceptional opportunity to experience

real, global markets at their university premises.

The five most relevant publications:

1. Kokoszczyński Ryszard (red.), Jabłecki Juliusz, Sakowski Paweł, Ślepaczuk Robert, Wójcik Piotr (2015), Volatility as an Asset Class. Obvious Benefits and Hidden Risks, Peter Lang, Frankfurt am Mein.
2. Jabłecki Juliusz, Kokoszczyński Ryszard, Sakowski Paweł, Ślepaczuk Robert, Wójcik Piotr (2012), Pomiar i modelowanie zmienności - przegląd literatury (English title: Measurement and modeling of variability - literature review), Ekonomia, nr 31, pp. 22-55.
3. Jabłecki Juliusz, Kokoszczyński Ryszard, Sakowski Paweł, Ślepaczuk Robert, Wójcik Piotr (2013), Struktura czasowa zmienności kontraktów terminowych na VIX – modelowanie i własności prognostyczne (English title: Term structure of volatility of futures contracts on VIX - modeling and prognostic properties), Zarządzanie i Finanse (Prace i Materiały Wydziału Zarządzania Uniwersytetu Gdańskiego), nr 2, issue 4, pp. 181-192.
4. Jabłecki Juliusz, Kokoszczyński Ryszard, Sakowski Paweł, Ślepaczuk Robert, Wójcik Piotr (2015), Instrumenty pochodne na zmienność - nowa klasa aktywów? (English title: Volatility Derivatives - A New Class of Financial Assets), Ekonomista, nr 6, pp. 830-856.
5. Jabłecki Juliusz, Kokoszczyński Ryszard, Sakowski Paweł, Ślepaczuk Robert, Wójcik Piotr (2014), Does historical VIX term structure contain valuable information for predicting VIX futures?, Dynamic Econometric Models, volume 14, pp. 5-28.

Key Personnel:

Dr Piotr Wójcik (male), PhD in Economics (2008), graduated from the University of Warsaw (Poland), MSc in Quantitative Methods from University of Warsaw, MSc in Economics from Katholieke Universiteit Leuven (Belgium). Area of research/work: application of statistical data science tools for regional economics and finance. He teaches Quantitative Strategies on High-Frequency data, Machine Learning, Advanced R programming and Time Series Analysis. Experience as a quantitative researcher in a hedge fund (4.5 years). He will be in charge of the project managing the tasks within the team that follows.

Dr Paweł Sakowski (male), PhD in Economics (2011), graduated from the University of Warsaw (Poland). MSc in Quantitative Methods from University of Warsaw. Area of research/work: volatility modeling, derivatives pricing and financial time-series analysis. Head of Master in Quantitative Finance programme, Head of Quantitative Finance Research Group. He teaches VBA/C++ in Quantitative Finance, Time-Series Analysis, and Econometric Data Analysis with SAS.

Dr Robert Ślepaczuk (male), PhD in Economics (2006), graduated from the University of Warsaw (Poland). MSc in Quantitative Methods from University of Warsaw. Area of research/work: pricing and risk of derivatives, modelling and forecasting financial markets, technical and fundamental analysis, asset management, designing of automatic investment systems. Co-founder of start-up Labyrinth HF, algorithmic hedge fund focused on regulated markets and cryptocurrencies. Formerly. He was Investment Director of Quantitative Fund Management at Union Investment TFI S.A.

Participant Number	16	Organisation official name	SVEUCILISTE U RIJECI EKONOMSKI FAKULTET - University of Rijeka
Partner presentation			
Partner entity description and relevance:			

The **University of Rijeka (UNIRI)** is a state-funded university under the direct authority of the Ministry of Science, Education and Sport. The University of Rijeka was founded in 1973 and it has undergone a series of transformations which were for the most part the result of changes brought on by the national higher education policies. The University is actively engaged in international networking in the area of Education for Sustainability. Today the University mission is dedicated to making strategic and development-oriented decisions on numerous issues regarding the functioning of the academic community and continued facilitation of international competitiveness in all areas of scientific, artistic and professional activities. Through active collaboration with the economic and business sector along with partnerships for community development the University endeavours to contribute toward the socio-cultural transition into a knowledge-based society. Its vision targets the inclusion of the University of Rijeka within the top 500 European Universities, thus it has committed itself to dynamic development which systematically facilitates mobility and the development of research careers while providing each individual with an opportunity to express their talents and entrepreneurial energy. The strongest regional supercomputer BURA is located at the University of Rijeka and is among the 500 most powerful supercomputers in the world. It is used for research in technology, biomedicine and biotechnology, and aside from scientists and students of the University, Bura is also be used by international institutions and companies.

Main roles:

UNIRI will be the local coordinator of project for Croatia. UNIRI will be in charge of conducting the training hub sessions for the local market regulator - Croatian Financial Services Supervisory Agency.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

Saša Žiković is a project leader at the scientific project "Financial and Social Aspects of Developments and Liberalization in EU Energy Markets" sponsored by University of Rijeka (2017-2019); researcher at a scientific project "Business and Personal Insolvency - the Ways to Overcome Excessive Indebtedness" sponsored by Croatian Science Foundation (2013 - 2018); researcher at a scientific project "Economic and social effects of energy sector reforms on sustainable economic growth" sponsored by Croatian Science Foundation (2013 - 2018). He was a researcher at the scientific project „CoVaR estimation and multicriteria evaluation in quantile regression supported by Collaborative Research Center 649 "Economic Risk" funded by Humboldt-Universität zu Berlin (2013-2015) and a project leader for a project “Setting up KPI - key performance indicators”, for Croatian Energy Market Operator (2015-2016). In these projects great emphasis is/was given on working with big data and the use of machine learning for forecasting purposes. Through the project for Croatian Energy Market Operator he gained experience related to working with regulators.

Ante Đerek worked at the Stanford University in California for 5 years as Teaching and Research Assistant in the Computer Science Department. After obtaining his Ph.D., he worked in Google as a Senior Software Engineer in Applied Security Group for 6 years, where he was in charge for design, implementation and deployment of robust, scalable and distributed security systems. He is currently Manager and sole researcher for the NEWFELPRO project: "New methods for verification of security and privacy mechanisms in e-commerce and e-government systems". Experience gained through his education and professional work is extremely useful in further development of the project.

Ivan Gržeta, MBA is a researcher at two scientific projects: "Financial and social aspects of

developments and liberalization in EU energy markets" led by prof. Saša Žiković, and "Economic and social effects of energy sector reforms on sustainable economic growth" sponsored by Croatian Science Foundation. Through his work on modelling big data he has gained experience that might be useful in further development of the project.

Ivana Tomas Žiković is a researcher on scientific projects: "Business and Personal Insolvency – the Ways to Overcome Excessive Indebtedness" supported by Croatian Science Foundation and project "Approaches and Methods of Cost Accounting in Croatian Public Sector" supported by Ministry of Science, Education and Sports. Through her work on financial and statistical modelling she has gained experience that might be useful in further development of the project.

Ines Bašić delivered over twenty Croatian National Bank - ECB integration projects using innovative data design solutions. Other projects include: IFRS9, business analysis and building of Profit and Loss statement reports, more than 1000 KPI's using FINREP, COREP and national legislative data for Supervision, Balance of payments data and Monetary interest rate statistics for Statistics department. Recently published a paper "Supervisory and statistical granular data modelling at the Croatian National Bank" under ECB Statistics Paper Series. Experience gained by working for a regulator is extremely useful in further development of the project.

Infrastructure and equipment:

University of Rijeka is among the leading universities in the SEE region. It is home of the largest super computer in the region (ranked 32nd in the world among the supercomputers used for scientific research). The Bura supercomputer is based on Bull DLC B720 water-cooled servers. It consists of 288 nodes, each node containing two Intel Xeon E5-2690 v3 processors, for a system with a total of 6912 processor cores, and a total output of 239.64 Teraflops (Rmax). The supercomputer has over 18 terabytes of RAM and disk systems capacities of 850 terabytes. The Mellanox InfiniBand FDR 56GB network system ensures rapid communication between components of the Bura supercomputer cluster. Rijeka University's new datacentre is the only one of its kind in the region that offers a direct water-cooling system with warm water up to 40°C. The BURA is a "green" computer according to testing performed by Green 500, placing it at the 175th position worldwide. UNIRI has also has access to the world's best and biggest bibliographical and data bases as well as software solutions that allows it to deal with today complex issues.

The five most relevant publications:

1. Čeperić Ervin, Žiković Saša, Čeperić Vladimir: "Short-Term Forecasting of Natural Gas Prices using Support Vector Regression Machines", Energy (Oxford), 140, 1, 2017, p. 893-900.
2. Žiković Saša: "Measuring Financial Risk in Energy Markets" in Applied Quantitative Finance 3rd edition, edited by Chen, C., Härdle W.K. and Overbeck, L., Springer, Berlin, Heidelberg, 2017, p. 295-308.
3. Valentić Vladimir, Žiković Saša, Alfredo Višković: "Can CCS save the Coal Fired Power Plants – European Perspective", International Journal of Greenhouse Gas Control, 47, 2016, p. 266-278.
4. Tomas Žiković, Ivana: "Challenges in Predicting Financial Distress in Emerging Economies: The Case of Croatia", Eastern European economics, 56 (2018), 1; 1-27.
5. Arnab Roy, Anupam Datta, Ante Derek, and John C. Mitchell. Inductive trace properties for computational security. J. Comput. Secur., 18:1035–1073, September 2010.

Key Personnel:

Assoc. Prof. Saša Žiković (male) holds PhD in Economics (Quantitative finance) (2007) from University of Ljubljana, Slovenia. MSc in Economics (2005) from University of Ljubljana, Slovenia. His current appointment is the Associate professor of finance at the Faculty of Economics University of Rijeka. For the last eight years he has also been a Vice Dean, first for Undergraduate studies and then for Scientific Research and Postgraduate studies. He is also a cofounder and secretary of a multidisciplinary MBA programme Energy Economics. He published 87 scientific papers in international and domestic academic journals. His research interests are: Energy economics, Financial management and Risk management. Since 2011 he is a member of the editorial board on the following academic research journals: Qualitative Research in Financial Markets, Emerald Group Publishing, UK; International Journal of Economics and Financial Issues, EconJournals, UK; Journal of Economics and Business, Faculty of Economics Rijeka, Croatia. Currently, he is a researcher on three scientific projects sponsored by Humboldt-Universität zu Berlin and Croatian Ministry of Science). He will be in charge of the project managing the tasks within the team that follows.

Assist. Prof. Ante Đerek (male) an assistant professor at the Faculty of Electric Engineering and Computing. He holds Ph.D. degree in Computer Science (2006) from Stanford University in California, where he worked as Teaching and Research Assistant for 5 years. After obtaining Ph.D., he worked in Google as a Senior Software Engineer in Applied Security Group for 6 years. He is currently Manager and sole researcher for the NEWFELPRO project: "New methods for verification of security and privacy mechanisms in e-commerce and e-government systems". His research interests are in the field of theoretical computer science and include foundations of security, cryptography, formal methods, logic and distributed systems.

Assist. Prof. Ivana Tomas Žiković (female) holds Ph.D. degree in Economics (2013) from Faculty of Economics, University of Split, Croatia. Currently she works as an Assistant Professor in the Department of Finance at the Faculty of Economics University of Rijeka. Educational activities: Corporate finance, Corporate Restructuring, Econometrics I (undergraduate courses), Financial management (graduate course). Research interests: corporate finance, econometrics, credit risk and corporate distress analysis. Participated in several international scientific conferences, seminars and courses. Published 17 scientific papers, mainly on problems of corporate finance and corporate distress. Researcher on scientific projects: "Business and Personal Insolvency – the Ways to Overcome Excessive Indebtedness" supported by Croatian Science Foundation. Project ID 6558 and project "Approaches and Methods of Cost Accounting in Croatian Public Sector" supported by Ministry of Science, Education and Sports. Project ID: 081-0811272-1276.

Ivan Gržeta (male) finished his Master degree and Postgraduate specialist studies on Faculty of Economics in Rijeka, where he also started and is currently enrolled in Postgraduate doctoral study in Economics and Business Economics. He works as a Teaching and research assistant since 2014 on Faculty of Economics Rijeka at the courses: Banking, Bank Policy and Risk Management. Prior this job, he was Risk Controller in Primorska Banka Rijeka. His field of interest is Banking and Energetics. As a co-author, his latest published paper are: "Competitiveness of Renewable Energy Sources on the Liberalized Electricity Market in South Eastern Europe Countries" published in International Journal of Energy Economics and Policy, "Viability of biomass-fired power plants in Croatia" and "Empirical analysis of wind power generation profitability in Croatia", both published in conference proceedings with international review. He is also a researcher at two scientific projects: "Financial and social aspects of developments and liberalization in EU energy markets" led by prof. Saša Žiković, and "Economic and social effects of energy sector reforms on sustainable economic growth" led by prof. Nela Vlahinić Lenz.

Ines Bašić (female) holds Master of Electrical Engineering (minor Automatics), graduated from University of Zagreb, Faculty of Electrical Engineering and Computing, 1993 and Master of Business Administration, graduated from Zagreb School of Economics and management, 2011. She is a project leadership experience in Data Warehouse (DWH) and Business Intelligence projects for central banking. Expertise in providing cost effective solutions and consolidated data for dynamic reporting of medium and high-level management as well as tools and data for advanced analytics for Statistics and Research (on counterparty and instrument by instrument basis for legal entities and non-residents, aggregated for Households). Delivered many Croatian National Bank - ECB integration projects on time and budget using innovative data design solutions. Other projects include: IFRS9, business analysis and building of Profit and Loss statement reports, more than 1000 KPI's using FINREP, COREP and national legislative data for Supervision, Balance of payments data and Monetary interest rate statistics for Statistics. Strong analytical skills, strategic and operational, complemented with knowledge of global analytical trends & tools. 10+ years of telecommunication industry experience, 9 in middle management positions. Expertise in designing and implementing enterprise Data Warehouse & different segmentations i.e. revenue and value segmentation as well as analytical CRM (churn prediction and segmentation models).

Participant Number	17	ORGANISATION OFFICIAL NAME	UNIVERSIDAD COMPLUTENSE DE MADRID
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Partner presentation

Partner entity description and relevance:

Universidad Complutense de Madrid (UCM) is the largest university in Spain (with 85,000 students), second largest non-distance university in Europe, and one of the oldest European universities, with its origin traced back to 1293. The UCM hosts a wide diversity of research institutes and more than 180 departments. UCM technological scientific infrastructure (with an annual budget exceeding 500M€), together with the quality of its researchers (more than 6000), has established some of its laboratories among the best all around Europe.

The **GRASIA-UCM** research group (Group of Agent-based, Social and Interdisciplinary Applications), founded in 1998, has a strong experience in building free/libre/open source software (FLOSS) tools with a focus on distributed systems and interdisciplinary applications. The group has developed several FLOSS tools with decentralized/distributed architectures for:

- Digital Social Innovation communities (<http://teem.works>), for collaborative writing (<http://jetpad.net>)
- Development of federated collaborative apps (<http://swellrt.org>),
- for the fast development of distributed intelligent systems (<http://ingenias.sf.net>), distributed energy (<http://grasia.fdi.ucm.es/energy/>), or ubiquitous computing (<http://grasia.fdi.ucm.es/sociaal/>).

The research of GRASIA-UCM is usually focused on problems dealing, modelling or understanding complexity and distributed systems. Application fields include sociology (social relationship simulation), economics (financial markets and collaborative economy), organisational science (work team formation), ambient assisted living (Parkinson's disease), environmental science (ecosystem surveillance) and online communities (peer production).

Main role:

GRASIA-UCM will be local coordinator of project across Spain. More precisely, GRASIA-UCM will coordinate the training of the Financial Services Authority Staff. The research of the group will focus on data analysis and the use of Blockchain technology in distributed financial systems. UCM will organize a coding session through the Spanish FinTech association.

Previous experience relevant to those tasks:

The group has been involved in a large range of ICT research projects funded by the Spanish R&D Program, the Spanish Technology Transfer Program, Educational institutions, Private companies and EU. They include:

- Decentralized Blockchain-based Organizations for Bootstrapping the Collaborative Economy, ERC Starting Grant 2017 of Samer Hassan, funded by H2020.
- Techno-social platform for sustainable models and value generation in commons-based peer production in the Future Internet (P2Pvalue), funded by the 7th Framework, European Commission, 2013-2016.
- Real-time fraud detection intelligent system knowledge transference projects funded by Stonework Solutions S.L. 2014-2016.
- Juan de la Cierva. Post-doctoral research grant on analysis and simulation of complex systems granted to Javier Arroyo funded by the Spanish Ministry of Science & Innovation. 2009-2012.
- Agent-based Modelling and Simulation of Complex Social Systems (SiCoSSys), funded by the Spanish Ministry of Science & Innovation. 2009-2011.

Infrastructure and equipment:

UCM technological scientific infrastructure has an annual budget exceeding 500M€. In the Computer Science Faculty there are available both offices for staff and meeting rooms for workshops. There is also server infrastructure ready to host web services in production or provide a development environment and full node of Ethereum will be available in 2019.

The five most relevant publications:

The aim of the selection is to show the competence of the research group of publishing research on complex systems and distributed technologies, including implications, modelling, analysis, exploitation and software development.

1. De Filippi, P., Hassan, S. (2016) "Blockchain Technology as a Regulatory Technology: From Code is Law to Law is Code". First Monday, 21(12) #7113-5657.
2. Jacynycz, V., Calvo, A., Hassan, S., Sánchez-Ruiz, A. A. (2016) "Betfunding: A Distributed Bounty-Based Crowdfunding Platform over Ethereum". Distributed Computing and Artificial Intelligence, 13th International Conference, (474):403–411. Springer.
3. González-Rivera, G., Arroyo, J. (2012). "Time series modeling of histogram-valued data: The daily histogram time series of S&P500 intradaily returns". International Journal of Forecasting 28 (1), 20-33
4. Hassan, S., Arroyo, J., Galán, J.M., Antunes, L., Pavón, J. (2013). "Asking the oracle: Introducing forecasting principles into agent-based modelling". Journal of Artificial Societies and Social Simulation 16 (3), 13
5. SwellRT- <https://github.com/Grasia/swellrt>. A backend-as-a-service programming tool for building distributed and federated apps with real time collaboration.

Key Personnel:

Dr. Javier Arroyo (male), PhD, is Associate Professor in the Department of Software Engineering and Artificial Intelligence of the Universidad Complutense de Madrid (Spain). He was visiting scholar of the Economics Departament of University of California Riverside in 2009 and 2014. He is a data scientist with experience in forecasting, analysis and simulation of complex systems. He has been member of more than 10 research projects, PI of a knowledge transference project on fraud detection, and was awarded with a 3-years Spanish Post-Doctoral Research Grant. He has coauthored more than 30 research publications, including more than 10 JCR journals, and his research has received three awards in international conferences and workshops. He also received the “Chikio Hayashi Award 2009” as young researcher in data analysis awarded by the International Federation of Classification Societies.). He will be in charge of the project managing the tasks within the team that follows or new resources if needed.

Samer Hassan (male), PhD is Faculty Associate at the Berkman Klein Center for Internet & Society (Harvard University) and Associate Professor at the Universidad Complutense de Madrid (Spain). Focused on decentralized collaboration, he received a 1.5M€ ERC grant to build blockchain-based organizations for the collaborative economy. Coming from a multidisciplinary background in Computer Science and Social Sciences, he has more than 45 publications in those fields. In the FPI P2Pvalue project, he was PI and coordinated building decentralized web-tools for collaborative communities, such as SwellRT and Jetpad. He has multiple works on blockchain-based projects, and won, together with Primavera De Filippi, a Triple Canopy 2014 commission on the blockchain-based crowdfunding project Artonomous.

Participant Number	18	Organisation official name	EKONOMICKA BRATISLAVE	UNIVERZITA	V
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Partner presentation

Partner entity description and relevance:

University of Economics in Bratislava (EUBA) is the oldest and the biggest higher educational institution in the field of Economics and Business in Slovakia. Seven faculties cover finance and economics (Faculty of National Economy), marketing (Faculty of Commerce), Management (Faculty of Business Management), Applied Informatics (Faculty of Economic Informatics), economic relations (Faculty of International Relations, intercultural communication (Faculty of Applied Languages) and business (Faculty of entrepreneurship in Kosice). There are currently 8 000 students studying in 65 study programs on all 3 levels of education and 1000 faculty members and other staff members in 37 departments. University supports business academia cooperation in education and research.

University of Economics reached 100 000 graduates in year 2018, they belong to the most wanted graduates on job market. The university's strategic goal is to improve quality in all activities with emphasis on research and education. The university participates in a broad spectrum of research projects and is involved in long-term collaboration with a large number of research institutes and public administration institutions (like H2020 project “eMobilita - Electromobility in urban transport: a multi-dimensional innovation (socio-economic and environmental effects)” - H2020-MSCA-RISE-2016 No. 734459 or “EDGE - Environmental Diplomacy and Geopolitics” H2020-TWINN-2015 No. 692413; BARCOM project Improving expertise in the field of industrial relations; Interreg Central Europe).

The Faculty of National Economy offers education in Finance bachelor, master and doctoral programs, master program in International Finance and in Banking, for which it holds international level cooperation in Double Degrees and several courses are accepted by ACCA

(The Association of Chartered Certified Accountants).

The research team within the project will be created from academics of Faculty of National Economy and Faculty of Economic Informatics.

The very advantage regarding the quality of research is a potential to use the equipment and services by the Faculty of Economic Informatics.

Main roles:

University of Economics in Bratislava will be a local coordinator of the project in the Slovak Republic. The main objective will be the training of the employees of the local financial market regulator –National Bank of Slovakia. In addition, the group will focus research on BigData, AI and Blockchain related finance issues.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

The UEBA is currently involved in several COST projects, BARCOM, two H2020 projects numerous national and institutional research projects, three of them are highly relevant to this project.

European Social Fund funded project Creating an excellent workplace for economic research to address civilization challenges in the 21st century. The main aim of the project was to concentrate top researchers and infrastructure into the Center of Excellence at the Faculty of national Economy. The second goal was development of technical infrastructure and research potential for exploration of civilization challenges associated with the knowledge economy and economic growth. Within this project was created seven laboratories of excellence and we will use Laboratory for Financial Analysis in current project.

H2020 project “eMobilita - Electromobility in urban transport: a multi-dimensional innovation (socio-economic and environmental effects). Different EU countries implement different methodological and business approaches to investigate the possibilities for the acceleration of electromobility integration in urban transport. Studies on these approaches to be shared within the project consortium and with different stakeholders (local authorities, producers of electric vehicles and recharging stations) will provide the basis of the initiative for increasing the interest in electromobility integration in urban transport as a multi-dimensional innovation. The thin red line of electromobility practical integration passes through the sharing of innovative ideas with relevant stakeholders. Experience from the project will be shared as a good practice on cooperation and training of regulatory bodies and promotion of innovation practices to enhance market competition.

Department of Finance is currently carry out research supported by Slovak Grant Agency Competitiveness, economic growth and business survival. The project based on the synthesis of the latest theoretical knowledge as well as on the basis of the current research will develop and empirically test the model apparatus for explaining the sources of competitiveness of the national economies, their growth, competitiveness of companies and their survival in globalized economic competition. Experience in methodology and application gained here might be useful in further development of the project.

Infrastructure and equipment:

Faculty of National Economics research facilities include the Laboratory for Financial Analysis. Lab is learning room created and equipped with support of European Social Fund project. Creating an excellent workplace for economic research to address civilization

challenges in the 21st century.

The five most relevant publications:

1. GERTLER, L. 2015. Interactions of unconventional monetary policy measures with the Euro Area yield curve. *Finance a úvěr : Czech journal of economics and finance*. 65 (2), pp. 106-126.
2. GERTLER, L. - SIVÁK, R. - KISEL'ÁKOVÁ, D. 2017. Assessing explanatory power of household debt for house prices. *Ekonomický časopis*. 65 (4), pp. 355-369.
3. OCHOTNICKÝ, P. - KÁČER, M. - WILSON, N. 2014. Sovereign credit ratings and the new European union member states. *Journal of Credit Risk*. 10(4), pp. 3-43.
4. BROKEŠOVÁ, Z. - DECK, C. - PÉLIOVÁ, J. 2017. Comparing a risky choice in the field and across lab procedures. *Journal of economic psychology*. vol. 61, pp. 203-212.
5. ALEXY, M. - GEORGANTZIS, N. - KÁČER, M. - PÉLIOVÁ, J. 2016. Risk attitude elicitation methods: Do they tell similar stories? *Ekonomický časopis*. 64 (9), pp. 847-877.

Key Personnel:

Lubomíra Gertler (female) is an Associate Professor at the Department of Finance. She previously undertook research fellowships and courses at several universities, she was Fulbright research fellow at the George Washington University School of Business. She teaches courses in risk management and in valuation of financial assets. Her research focuses on risk analysis and management, She has also experiences from risk management position in banking sector. She has published 17 papers in national and internationally refereed journals.

Jana Pélová (female) is an Associate Professor at the Department of Finance of Faculty of National Economy as well as Vice Rector for Management of Academic Projects. She is a fellow of the Slovak Economic Association. Her research interest include behavioural risk analysis and risk management. She conducted several research fellowships and courses she was Fulbright research fellow at the Economic Science Institute, Chapman University. She has published in 14 scientific reviewed journals (e.g. International Journal of Industrial Organization, Journal of Economic Psychology). Current managerial position as well as leading positions in national research projects as well as EU funded projects gives her experiences valuable for the project's goal fulfilment. She will be in charge of the project managing the tasks within the internal team.

Eva Rakovská, PhD. (female) graduated Mathematical analysis at Comenius University, Bratislava, Slovakia. She started as programmer of process automatization in engineering. Later she joined University of Economics, Bratislava, where she received PhD in Applied informatics in 2010. She is a member of Department of Applied Informatics, Faculty of Economic Informatics. Her main interest is in Knowledge technologies, mainly Knowledge and Expert systems in practice, which are part of Artificial Intelligence. Her research is usually interdisciplinary and focused on knowledge engineering, knowledge management and process automatization in organizations. She participated several national and international projects and she serves as member of Program Committee for International Conference on Information and Software Technologies, Lithuania, Federated Conference on Computer Science and Information systems. Her current research is dealing with datamining technologies in large volumes of data. She did short-time research and teaching stays in Lithuania, Poland and Czech Republic. She teaches Artificial Intelligence, Operation systems, IS Security and Formal languages and automata.

Researcher in the area of cryptography from the Faculty of Informatics.

Participant Number	19	Organisation official name	Kaunas University of Technology
Partner presentation			
Partner entity description and relevance:			
<p>Kaunas University of Technology (KTU) is one the largest technological universities in the Baltics. Known for its linkages with business, leadership in scientific research, flexible interdisciplinary study programmes and unforgettable study experience, KTU is fast forwarding to becoming an internationally acknowledged institution of higher education.</p> <p>KTU having a community about 10 thousand of students and 1 thousand of academic staff makes a regional impact by hosting two Integrated science, studies and business valleys (Santaka and Nemunas), as well as 27 business start-ups (in 2017). Up to now, KTU participation in international research programmes adds up to 90 projects (7FP, COST, EUREKA, etc.) Funds from international research programmes comprise 25 percent of KTU's annual research budget; 46 percent of R&D capital comes from foreign companies. University hosts Startup Space in the different fields of science where start-ups can make their business ideas come true (managed mostly by University graduates).</p> <p>Faculty of Mathematics and Natural sciences in 2015 has launched the Master's degree programme "Big Data Analytics in Business" and it is currently coordinated by three faculties (Mathematics and Natural Sciences, Informatics, and School of Economics and Business). Research group "Mathematical models for stochastic, financial and medical systems" focuses its scientific research in analysis of financial markets, risk assessment, fraud detection, pension accrual, anomaly detection, high performance and distributed computing etc. Some of mentioned research activities are performed in partnership with State Tax Inspectorate, Bank of Lithuania, other financial institutions and Fintech companies as well. Research group "Identification and cryptographic methods creation and analysis" focuses its research in analysis of symmetric and asymmetric algorithms, their application in e-government and e-business environments.</p>			
<p>Main roles:</p> <p>Kaunas University of Technology (KTU) will be the local coordinator of project across all Baltic States (Lithuania, Latvia and Estonia). Specifically, the local financial market regulators are: Bank of Lithuania, Latvian Financial and Capital Market Commission, and Estonian Financial Supervision Authority.</p>			
<p>A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:</p> <ul style="list-style-type: none"> • Audrius Kabašinskas, Kristina Šutienė and Kęstutis Lukšys are researchers at the EU funds project "Development of Excellence Centre for the Analysis, Modelling and Risk management (i.MAMC)" in partnership with State Tax Inspectorate Under the Ministry of Finance of the Republic of Lithuania. 2016 – 2019. No. 10.1.1-ESFA-V-912-01-0001. The main aim of it is to give support in modern analysis of tax payers data and to train governmental institutions (mainly State Tax Inspectorate). The outcomes of the project above and outcomes of proposed project are similar and they'll fulfil each other, moreover, experience gained during i.MAMC project will be shared as a good practice. • Audrius Kabašinskas is a senior researcher at Research Council of Lithuania funded project "Micro-foundations of Family Business: dynamic managerial capabilities and innovation performance". 2017 – 2020, No. MIP-17-467. The main aim of this project is to find linkage between R&D spending in family business and their competitiveness. As 			

the preliminary results show, some of Fintech companies in Lithuania are managed by family members and they spend fewer than the others. Experience gained here might be useful in further development of the project.

- Audrius Kabašinskas is a chair while Kristina Šutienė is a member of application committee for grant of COST TD1409 action (MI-NET) (received 10 000€) for organizing European Study Group with Industry (ESGI) in Lithuania, 11-15 May 2018. Some of participating companies are from finance and Fintech sectors. Experience gained in organizing such events is invaluable because of relations and contacts established with Fintech and other companies.
- Kristina Šutienė and Evaldas Vaičiukynas were working on implementation of short-term interdisciplinary project “Data Analytics Solution for marketing and customer loyalty detection”, funded by Kaunas University of Technology R&D and Innovation Fund (2016). Collaborating with pharmacy retail company, interdisciplinary project was carried out that focus on the application of large-scale analytical methods for marketing and customer loyalty. The project joined mathematics, informatics and economics knowledge in order to accomplish company presents specific tasks raised by a company.

Infrastructure and equipment:

Kaunas University of Technology is a leading technology university in the Baltic States. In 2014, KTU worked with Bloomberg to launch the region's first-ever Financial Markets Lab to provide real, practical experience in the day-to-day challenges and opportunities of working in the financial markets and enhance the university's strong research capabilities. By adding Bloomberg to its classroom, KTU is equipped with easy access to the data, information and analytics that can illuminate the mechanics of some of the world's thorniest issues. At the moment, the Lab contains 12 terminals that can be used by university community.

KTU Santaka Valley is a state-of-the-art science and innovations centre. It has become a local catalyst for innovations connecting science, technologies and business for joint activities. The Valley is the hub accommodating the University's most advanced scientific potential and cutting-edge equipment that enables timely and efficient research and development services for business, leading to creation of new products, thus serves as a bridge between research and business. Santaka Valley coordinates production of technologies and their commercialisation, while also starts-up and develops businesses, attracts necessary investments.

The five most relevant publications:

1. (2017) Kabašinskas, Audrius; Šutienė, Kristina; Kopa, Miloš; Valakevičius, Eimutis. The risk–return profile of Lithuanian private pension funds // Economic Research-Ekonomska Istraživanja. 2017, vol. 30, iss. 1, p. 1611-1630
2. (2017) Minelga, Jonas; Verikas, Antanas; Vaičiukynas, Evaldas; Gelžinis, Adas; Bačauskienė, Marija. A transparent decision support tool in screening for laryngeal disorders using voice and query data // Applied sciences. Basel : MDPI AG. ISSN 2076-3417. 2017, vol. 7, iss. 10, article 1096, p. 1-15.
3. (2015) Vaičiukynas, Evaldas; Verikas, Antanas; Gelžinis, Adas; Bačauskienė, Marija; Minelga, Jonas; Hållanderb, Magnus; Padervinskis, Evaldas; Ulozas, Virgilijus. Fusing voice and query data for non-invasive detection of laryngeal disorders // Expert systems with applications. Elmsford, N.Y : Pergamon. ISSN 0957-4174. 2015, vol. 42, iss. 22, p. 8445-8453
4. (2015) Kabašinskas, Audrius; Vaičiulytė, Ingrida; Vasiliauskaitė, Asta. Accounting and governance risk forecasting in the health care industry // Economic research-Ekonomska istraživanja. 2015, vol. 28, iss. 1, p. 487-501.

5. (2012) Lukšys, Kęstutis; Sakalauskas, Eligijus. Matrix power cipher // Information technology and control. Kaunas : Technologija. ISSN 1392-124X. 2012, Vol. 41, No. 4, p. 349-355.

Key Personnel:

Assoc. Prof. Audrius Kabašinskas (male) PhD in Informatics (2008) graduated from Vytautas Magnus University together with Institute of Mathematics and Informatics, MSc in applied Mathematics at Kaunas University of Technology. Area of research/work: fat tails in economics and finance, risk assessment and management, stochastic programing, high performance computing, fraud detection, artificial intelligence and neural networks, big data analytics. During visits to main HPC hubs in Europe (CINECA and EPCC) under FR7 project HPC-Europa2 he gained experience on high performance and distributed computing. Audrius Kabašinskas 2013-2016 was the only one science and research representative in the working group of Bank of Lithuania when the Pension Law reform has been prepared. He also is a member of the EURO Working Group for Commodities and Financial Modelling and member of the EURO working group on Stochastic Optimization. Has published 37 papers in international refereed conference proceedings and journal. He will be in charge of the project managing the tasks within the team that follows.

Assoc. Prof. Kristina Sutiene (female) hold Ph.D. degree in Informatics (2009) and M.S. degree in Applied Mathematics from Kaunas University of Technology. Currently she works as an Associate Professor in the Department of Mathematical Modelling at the same University and as a specialist in the EU funds project “Development of Excellence Centre for the Analysis, Modelling and Risk management” carried out by the State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania. Her research / work activity relates to the application of mathematics and informatics in the field of finance, economics and insurance. She has published 8 papers in international refereed journals. She teaches Methodology of Risk Analysis in Business, Insurance Mathematics, Project of Business External Data Analytics, and Business Risk and Uncertainty Analytics.

Evaldas Vaičiukynas (male) received the M.S. degree in informatics engineering in 2006 and Ph.D. degree in informatics in 2013 from Kaunas University of Technology (KTU). Main scientific interests: statistical data analysis, pattern recognition, computational intelligence, machine learning, mathematical optimization. An author of 35 scientific publications, having Google Scholar estimated h-index of 7. Participated in COST 2103 activities during Ph.D., held research internship in speech technologies team of IBM Haifa lab in Israel (2011), won KTU annual contest of the most active junior scientist (2015), and researched big data from Volvo at Halmstad university in Sweden (2016). Since 2011 lectures at ISM University of Management and Economics on the following topics: econometrics, forecasting, multivariate statistics, data management, data mining for business intelligence. Previously had and currently supervises master students, delivered presentations and posters in international conferences, participates in scientific projects, reviews submissions to scientific journals (for example, 'outstanding reviewer' nomination by Applied Soft Computing in September 2015).

Kęstutis Lukšys (female) hold Ph.D. degree in Informatics (2013) and M.S. degree in Applied Mathematics from Kaunas University of Technology. Currently he works as a lecturer in the Department of Applied Mathematics at the same University and teaches Cryptology, Cryptographic systems, Algebraic structures, Discrete mathematic, Applied mathematics and other courses for undergraduate and graduate students. He is also a supervisor of the first cycle study programme Applied mathematics. His research activity relates to the analysis of cryptographic algorithms', creation of new methods and their application, data analysis and machine learning technics. He has published 14 papers in conference proceedings and refereed

journals. Currently he also works as a specialist in the EU funds project “Development of Excellence Centre for the Analysis, Modelling and Risk management” carried out by the State Tax Inspectorate under the Ministry of Finance of the Republic of Lithuania.

Participant Number	20	Organisation official name	Masarykova Univerzita
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Partner presentation

Partner entity description and relevance:

Masaryk University (MU) is the second largest public university in the Czech Republic. At present it comprises nine faculties with over 200 departments, institutes and clinics and it is recognized as one of the most important teaching and research institutions in the Czech Republic and the South Moravian Region. There are more than 35 thousand students currently studying in 542 educational programs. The university largely supports cooperation between the scientific community and the industry through the Technology Transfer Office by helping with patent applications, licensing contracts and spin-off/start-ups training.

The Faculty of Economics and Administration is one of the largest faculties of Masaryk University. The faculty's primary objective is to further education and research in economics, management and finance. The faculty participates in a broad spectrum of research projects and is involved in long-term collaboration with a large number of research institutes and public administration institutions (like H2020 project “Governance of the Interoperability Framework for Rail and Intermodal Mobility” - H2020-S2RJU-2016-01, No. 730844 or “Resource-efficient Circular Product-Service Systems” - H2020-CIRC-2017TwoStage, No. 776577-2). The Faculty facilitates education in Finance bachelor, master and doctoral programs and holds international level certification from ACCA (The Association of Chartered Certified Accountants) and CFA (Chartered Financial Analyst Institute).

The research team within the project will be based with the Institute of Financial Complex Systems (established in December 2017). The Institute develops a multidisciplinary pole of expertise to propose both fundamental and applied research on risk analysis, financial market development, investment decisions, economic and financial fragility. The mission of the Institute is to advance research and education in quantitative models and methods for risk analysis and management, investment strategies, and analysis of financial markets through the prism of complexity science.

The very advantage regarding the quality of research is a potential to use the equipment and services by the Faculty of Informatics, such as modelling of big data using advance computer technology and capacity (CERIT – Scientific Clouds).

Main roles:

Masaryk University will be a local coordinator of the project in the Czech Republic. The main objective will be the training of the local financial market regulator – Czech National Bank.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

The faculty is currently involved in two H2020 projects on innovation policies and legislative initiatives both relevant to this project. The Industrial Innovation in Transition (H2020) project will gather data from 800 companies ranging from innovation leaders to moderate innovators in multiple industries across the member states to provide an evidence base for reviewing how well the current innovation policies support the adoption of new innovation processes. The project will produce a number of recommendations on how the innovation systems and policies in Europe should be developed to bridge the gap between Europe and its main

competitors and develop an innovation practice toolbox for Member States and the EC for bridging the innovation gap and promote economic and social inclusion in Europe. The toolbox will provide an end to end methodology for checking the current state of new innovation process adoption and for analyzing how the current innovation promotion portfolios could be developed to improve the level of how current needs of industrial innovation are being met on a national level. The project results are disseminated broadly among the European industrial players and policy makers. The Federated eParticipation Systems for Cross-Societal Deliberation on Environmental and Energy Issues (H2020) project is an eParticipation initiative focused on environmental and energy issues, to promote the development and use of information and communication technologies in the legislative and decision-making processes, in parliamentary and government environments, aiming at enhancing the participation of citizens and contributing to better legislation. Experience from the both projects will be shared as a good practice on cooperation and training of regulatory bodies and promotion of innovation practices to enhance market competition.

The Institute of Financial Complex System is currently undertaking research within the Czech Science Foundation grant GA18-05829S Forecasting Volatility in Emerging Financial Markets. This project designs procedures for forecasting market volatility for financial markets, where high-frequency data are available for short periods, are not available, or are of poor quality. We use a battery of forecasting models based on range-based volatility estimators and compare their performance against same models using realized volatility estimators. Experience in methodology and application gained here might be useful in further development of the project.

Infrastructure and equipment:

Faculty of Economics research facilities include the Bloomberg Lab and the Masaryk University Experimental Economics Laboratory. Bloomberg Lab is a data learning room equipped with 12 Bloomberg terminals to access worldwide financial and accountancy data. The Experimental Economics Laboratory provide computer facilities to study consumer and client behaviour in different designed environments.

Laboratory of Data Intensive Systems and Applications at the Faculty of Informatics provides modern techniques for effective and efficient data management. The Laboratory mainly focuses on the problems of big data indexing and searching that is based on similarity and develops techniques for the traditional client-server approach as well as for modern distributed and cloud-computing infrastructures.

The five most relevant publications:

1. Lyócsa, Š., Molnár, P. 2016. Volatility forecasting of strategically linked commodity ETFs: gold-silver. *Quantitative Finance*, 16(1), 1809-1822.
2. Výrost, T., Lyócsa, Š., Baumöhl, E. 2015. Granger causality stock market networks: Temporal proximity and preferential attachment. *Physica A: Statistical Mechanics and its Applications*, 427(C), 262-276.
3. Baumöhl, E., Lyócsa, Š. 2014. Volatility and dynamic conditional correlations of worldwide emerging and frontier markets. *Economic Modelling*, 38, 175-183.
4. Deev, O., Hodula, M., 2016. Sovereign default risk and state-owned bank fragility in emerging markets: evidence from China and Russia. *Post-Communist Economies*, 28(2), 232-248.
5. Deev, O., Kajurová, K., Stavárek, D., 2014. Rational Speculative Bubbles in Central European Emerging Stock Markets. *Eastern European Economics*, 52(4), 47-91.
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Key Personnel:

Oleg Deev (male) is an Assistant Professor at the Department of Finance and director of the Institute of Financial Complex Systems. He previously undertook research internships and courses at Shanghai University of Finance and Economics, University of Copenhagen, University of Ljubljana, Barcelona Graduate School of Economics and ENSAE. He teaches courses in banking, insurance, risk management and international finance. His research focuses on network analysis, systemic risk analysis, application of machine learning techniques in risk management. He has published 6 papers in internationally refereed journals. He will be in charge of the project managing the tasks within the team that follows.

Štefan Lyócsa (male) is an Associate Professor at the Department of Finance of Masaryk University as well as a senior researcher at the Institute of Financial Complex Systems. He is a fellow of the Slovak Economic Association and holds a position as a researcher at the Slovak Academy of Sciences. His research interests include complex market relationships, network analysis, risk modelling with high-frequency data and financial market contagion. He has published in over 25 scientific reviewed journals (e.g. Quantitative Finance, Journal of International Financial Markets, Institutions and Money, Open Economies Review, Physica A: Statistical Mechanics with Applications). In his recent research he is interested in how complex relationships that are emerging from big data can be evaluated in a statistically sound manner.

Eduard Baumöhl (male) is a senior researcher at the Institute of Financial Complex Systems. He serves as a Board member of the Slovak Economic Association. His research interests include bankruptcy models, blockchain, network analysis and financial market modelling. He has published in over 20 internationally refereed journals (e.g. Economic Modelling, The European Journal of Finance, Physica A: Statistical Mechanics with Applications).

Tomáš Výrost (male) is a senior researcher at the Institute of Financial Complex Systems. His research interests include financial markets, applied financial econometrics and application of graph theory. He has published in over 20 internationally refereed journals (e.g. Applied Economics Letters, Economic Modelling, Physica A: Statistical Mechanics with Applications).

Participant Number	21	Organisation official name	B-Hive Europe
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Partner presentation

Partner entity description and relevance:

B-Hive is a European collaborative innovation fintech platform that brings together major banks, insurers and market infrastructure players. Together, they work on common innovation challenges and build bridges to the startup and scale-up community. It aims to put Brussels on the map as the smart gateway to Europe and leverage on the opportunities offered by the digital transformation for the financial services industry. Building bridges between important fintech hubs and the Eurozone enables both European and non-European companies to grow and expand.

To deal with the impact of digital technology on the financial system, B-Hive aims to build a strong international ecosystem where knowledge and experience, innovations and technology can be shared.

B-Hive has a broad and diverse network of financial services players, dynamic startups and government actors that actively share knowledge and expertise with each other. Shareholders include major local and international financial institutions within banking (e.g. KBC, BNP Paribas Fortis, ING), insurance (e.g. Baloise, AXA) and market infrastructure (e.g. SWIFT, MasterCard) industries, as well as the Belgian federal government through its investment fund,

FPIM. Furthermore, B-Hive partners also include the regulatory bodies FSMA (whose chair Mr Jean-Paul Servais is also the chair of the Innovation Committee at ESMA and vice-chair at IOSCO) and the central bank, NBB. B-Hive also works closely with the Belgian ministries of Finance and Digital Agenda and is in close contact with the European Commission. It has a structural collaboration agreement with the Flanders Investment and Trade Agency (FIT), Flanders' agency for international enterprise.

Through its programs, B-Hive brings together financial services players and technology companies to co-create innovative technology solutions for the financial services industry within selected areas including cybersecurity (CyberHive), distributed ledger technology (TrustHive), AI and big data (DigiHive), open banking (OpenHive). In addition, through our program TalentHive it focuses with fintechs and financial institutions on 'future proofing' staff skills sets.

B-Hive has set up international hubs in London, Tel Aviv and New York, with a foot on the ground in Singapore, to provide foreign tech companies a smart gateway to Europe - access to our global network and unlock business opportunities in Europe, to provide member scaleups that want to expand to those regions with a foothold, and to keep an eye on the latest fintech developments in those regions.

B-Hive strongly believes in the future of fintech in Europe and actively seeks extending partnerships with other fintech hubs in Europe. Having started initially with partnership agreements with leading fintech hubs in the Netherlands (Holland Fintech), Luxembourg (LHOFT) and the UK (Innovate Finance) it has extended scope today with 27 fintech hubs from the Baltics to Southern Europe and Central Europe up to Israel, supported by concrete initiatives such as our European roadshow where our partners and members meet up with local fintech hubs and are stimulated to exchange know how and experiences as well as matchmaking.

Together with the European Banking Federation B-Hive organizes on 26 September 2018 a high-profile conference focused on fintech: Digital Finance Europe. Digital Finance Europe 2018 is a new conference committed to bringing together European financial services and financial technology players to discuss digital transformation, technology and innovation within the industry, making Europe an even stronger region through collaboration.

B-Hive will subcontract the evaluation lab of the project to ABI Lab, which will run it with the European Banking Federation. ABI Lab is the Research and Innovation Centre founded on the initiative of the Italian Banking Association (ABI) with the aim of creating a network between banks and ICT companies. Today, ABI Lab is an important centre of research and professional training on technology and innovation for the banking sector, carrying out research on technologies applied to banking processes, producing analyses and models, developing pilot projects and case studies and representing a communication channel between banks and ICT companies to increase the knowledge of innovation and creating better market conditions.

Main roles:

B-Hive will be project coordinator for Belgium, The Netherlands and Denmark and will leverage its network with European fintech start-ups and scale-ups as well as with established financial institutions, not limited to those named in this proposal, either directly or indirectly through its active partnerships with other European fintech hubs to the benefit of the programme.

It will be in charge of conducting the training hub sessions for the Belgian, Danish and Dutch regulator. B-Hive will be responsible for the final workshop of the project in which all partners, supporters and advisory board members will participate. It will also manage the

evaluation lab, an overall evaluation with the banking sector in collaboration with ABI Lab at the European banking federation premises.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

- B-Hive organises on a monthly basis networking and information events where innovative fintech startups and scaleups meet up with financial institutions and our other partners around specific themes. In the past the topics of these events included discussions on regulation such as PSD2 and GDPR, as well as AI, distributed ledger technology, ICOs and cryptocurrencies and cybersecurity, with local and international speakers and attendees.
- We work closely with our regulatory partners (NBB, FSMA) to stimulate fintech and regulatory awareness and have organised Open Office Hours in the past where our fintech startup members could freely book a time slot on a dedicated date for detailed Q&A discussions with fintech staff of the central bank (NBB) at our office in Brussels. We have a dedicated track where together with our members and partners we focus on the latest developments and trends within regtech which we kicked-off in November 2017 with a dedicated workshop supported by legal and regulatory experts.
- B-Hive organises and supports leading industry conferences in fintech in Belgium and abroad. In the past these included our annual Fintech Belgium Summit where last year we had a regulatory panel discussing the Belgian and European regulatory landscape relevant for fintechs, along with over 60 speakers and 16 pitching FinTech Startups and Scale-ups and more than 500 participants.
- B-Hive was also a major partner of the Paris Fintech Forum in January 2018 which featured specific tracks on Regulation as well as speakers such as the Secretary General of the French regulator AFM and the Belgian minister of finance in a debate with ministerial colleagues of France, Luxembourg and Lithuania on the future of European fintech.
- Together with the Vlerick Business School in Brussels, B-Hive has organised last year a series of seminars called Fintech Futures where with topics around PSD2, blockchain technology, AI and deep learning and insurtech.

Infrastructure and equipment:

B-Hive is based in Brussels with state of the art meeting and co-working facilities and also has offices in London, Tel Aviv and New York.

Key Personnel:

Wim De Waele, CEO (male)

Mr. Wim De Waele previously served as Chief Executive Officer at iMinds vzw, which was ranked at his time in 2015 as the world's fourth best business accelerator by the UBI Global Ranking for its success in launching sustainable start-ups. He started his career as scientific researcher at the university in the area of artificial intelligence in industrial applications. Mr. De Waele has over 15 years of technology experience. He served as Chief Technology Officer at RealDolmen NV until November 2001. He continued this work at Siemens R&D in Belgium and München. After that he built the European consulting organisation of the Canadian software company Numetrix, specialized in planning software for the consumer packaged goods and process industry. In 1994 Wim joined i2 Technologies as Services Director for Europa, where he also built the European organisation from zero. He then was promoted to vice-president of consumer goods and retail and moved to i2 headquarters in Dallas. Upon his return to Europe in 2001, he became Chief Technology Officer of the distressed Real Software Group. He served as a Director at iMinds vzw. Wim obtained his master degrees in Economic Sciences and Computer Sciences at the University of Ghent in 1987. He will commit 5% of his time to the project.

Fabian Vandenreydt, Executive Chairman (male). Fabian previously led SWIFT's securities business worldwide and was responsible for driving thought leadership and innovation initiatives across the company. Fabian was also Head of Innotribe. Fabian brings more than 20 years' of financial services experience to B-Hive. He joined SWIFT in 2004 from Capco, a consultancy, where he was involved in large front-to-back automation programs. Previously, he was a Vice President at JPMorgan/Euroclear, in charge of product management for communications services. In the last three years, Fabian was named one of the 35 leaders in FinTech Finance by Institutional Investor. In recent years, he was named one of the 40 leaders of FinTech by Financial News and recognized by Global Custodian as one of the most influential leaders in securities services over the last 25 years.

Ellen Thijs (female) is a key contact at B-Hive for this project. Ellen Thijs is COO of SmartFin Capital and the lead for TalentHive as well as the coordinator for the fintech roadshow where B-Hive connects with other European fintech hubs through dedicated sessions. She is an experienced executive program lead, and has acquired an in-depth vertical and horizontal business acumen. Her strengths lie in a working environment that fosters teamwork, self-learning, entrepreneurship, creativity and requires agility in strategy and execution. Prior to B-Hive and SmartFin Capital, Ms. Thijs worked for Clear2Pay, Projective, Start People and Accenture. She holds an MBA from Antwerp Management School.

Dave Remue (male) is the main contact at B-Hive for this project. He leads the TrustHive program portfolio at B-Hive, a collaborative fintech platform that brings together major financial institutions to work on common innovation challenges with the start-up community. He is always on the lookout for innovative start-ups, new trends and tangible enterprise applications of technology in financial services and beyond.

Over the past 20 years he served as a senior manager or as a management consulting director top-tier international financial institutions and technology providers with optimising operations, developing new markets and product lines, and defining strategic roadmaps. Dave graduated in engineering and business from the universities of Leuven, Houston and Oxford.

Participant Number	22	Organisation official name	University of economics - Varna
Partner presentation			
Partner entity description and relevance:			
The University of Economics - Varna (UEV) founded in 1920, is one of the oldest higher education institutions in the field of economics on the Balkan Peninsula. During its 96-year-long history, UE-Varna has trained more than 112 000 professional economists currently working in Bulgaria and abroad. Today, there are more than 12 000 domestic and foreign degree-seeking students at UE-Varna. UE-Varna participates in various European programmes and projects providing numerous opportunities to its students, faculty members and administrative staff.			
UE-Varna has established an innovative and dynamic high-tech environment for young people headed for careers in business, economics, management, and computer science worldwide. The University resources and facilities provide its academic community a pleasant and inspiring learning experience which fosters the students' numerous talents as well.			
The infrastructure of the university is constantly modernized. The three university buildings house more than 130 lecture halls for training and research. The investments in these directions continue during this year.			
Faculty members and students enjoy spacious lecture halls, a new university hall, a conference room, a large reading room, a well-stocked library and a modern sports centre. Computer rooms, laboratories and reading rooms are available for students in seminars and for self-study.			
Over the years University of Economics – Varna academic and research facilities have been			

continually improved and modernized. This university governing bodies consider investing in facilities a prerequisite for an enhanced academic environment for faculty members and students. University of Economics – Varna offers its students a huge range of cultural events such as theatre performances, music concerts, movie screenings and dance performances in its new and modern university hall, built in 2011.

University of Economics – Varna takes pride in its heritage and heralds the future of the prominent European university it is with its high academic quality, competent professors, and educational documentation that complies with European educational standards and incorporates best educational expertise and business practices.

Main roles:

UE-Varna is going to be the Bulgarian partner with its main responsibility to train the local financial market regulator and policy makers. It will also focus on research in Big Data, AI and Blockchain risk management.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

1. Project for a Scientific Forum with International Participation "The World Financial Crisis and Lessons for the Financial Sector of Bulgaria" (jointly with the Department of Finance at UNWE - Sofia), 2010
2. Project "Competitiveness and Stability of the Banking System in Bulgaria" (USP 132/2014)
3. Project "Strategy for Security and Protection of Virtual Web Systems in Banking", 2008-2010
4. Project "Competitiveness and Stability of the Banking System in Bulgaria", Varna University (Project NI 132 / 2014-2016).
5. International project under the Administrative Capacity Operational Program ("Municipal Administration Varna - Transparent, Competent and Interactive Business Partner"), 2009.

Infrastructure and equipment:

The Research Institute in the structure of University of economics -Varna was opened with a decision of the Council of Ministers of the Republic of Bulgaria on October 21, 2015. The Research Institute brings together the existing research centers of UE-Varna into one structure. These are:

Research and Application of New Information and Communication Technologies Center (RANICTC) Center for Financial Research and Development (CFRD), Center for Social Research (CSR), Research Centre on Globalization and Foreign Direct Investments (RCGFDI), Center Innovation and development (CID).

Strategic objectives of the Institute encompass directing research to important economic and social problems, strengthening the cooperation between UE-Varna and business, encouraging the participation of the academic staff of UE-Varna in national and international scientific programs and projects.

One of the leading priorities of the scientific activity in Research Institute will be the development of regional economy. Following this goal, the Institute will seek to develop closer relations and cooperation with the local authorities, business, other research centers, non-profit organizations and other in the region of Varna.

By creating the Research Institute UE-Varna meets the challenges of the dynamically changing socio-economic environment and answers to key documents such as the National strategy for development of higher education in Bulgaria (2014-2020), the National strategy for development of scientific research 2020, the Innovation strategy from smart specialization of Bulgaria (2014-2020), and others.

The five most relevant publications:

1. Vachkov, St. (2017). Digital Reflections Upon Banking Organization. // Yearbook of UE-Varna, Vol. 88, Varna: Science and Economics
2. Valkanov, N. Through Compliance Management Toward Regulatory Efficiency in Financial Sector. // Vachkov, St. et al. (2016). Financial Science – Between Dogma and Reality, Varna: Science and Economics, pp. 400-445.
3. Karadimova, Dimitriya, Bispectral analysis of the interdependence of revenues in the national budget and selected indicators of economic activity in Bulgaria. // Izvestiya, journal of University of Economics - Varna, vol. 1/2009, Varna: Science and Economics, 2009
4. Parusheva, S., Atanasova, T. Card Fraud Prevention Capabilities with Intelligent Methods. 16th International Multidisciplinary Scientific Geoconference SGEM, SGEM, 2016, 1, Book 2, 117-124.
5. Parusheva, S. Social media banking models: A case study of a practical implementation in banking sector. Ikonicheski Izsledvania (Economic Studies), Sofia: Bulgarian Academy of Science, 2017, 3, 125 - 141.

Key Personnel:

Prof. Stefan Vachkov, PhD (male)

PhD in Economics (1989), specialization in banking (bank management) at the Swiss Banking Institute, Zurich University, Switzerland (1994-1995).

Area of research/work: theory of banking, strategic bank management, innovations in banking. Prof. Vachkov is a chairman of Varna Scientific and Technical Unions (VSTU) and member of the Board of the Federation of the Scientific and Technical Unions in Bulgaria (FSTU). He has published 90 papers in area of finance, banking and innovations.

Prof. Stefan Vachkov will manage the projects tasks within the team listed below.

Assoc. Prof. Silvia Stoyanova Parusheva (female)

PhD in Statistics (2001) graduated from University of Economics – Varna, MSc in Informatics at University of Economics – Varna.

Area of research/work: Information and Communication Technologies in the financial area, E-business, E-finance, Fraud detection, Security. Silvia Parusheva has participated in several scientific projects. Currently, she runs a scientific project on the use of social media in business and education titled “Social Media in Business and Education - Innovative Models, Opportunities and Challenges” (2017-2019) and participates in a scientific project “Research of the mobile and web technologies implementation in publicly available services offered by the banking sector in EU countries” (2017-2019). She serves as a reviewer for several journals and for various conferences in the field of Information Technologies and Computer Sciences and is a member of Varna Scientific and Technical Unions. She has published 35 papers in international refereed conference proceedings and journal.

Ch. Asst. Prof. Dimitriya Karadimova, PhD (female)

PhD in Economics, scientific specialty Statistics and Demography (2010) graduated from University of Economics – Varna, MSc in Statistics and Econometrics at University of Economics – Varna.

Area of research/work: econometric modeling of economic processes, statistical analysis of processes in the economic and social spheres, business statistics. During her work as an expert in Business Statistics Department at Territorial Statistical Bureau Varna she acquired knowledge and skills for collecting and analyzing data. She has published 10 papers.

Chief Assist. Prof. Yanka Georgieva Aleksandrova (female)

PhD in Informatics (2016) graduated from University of Economics Varna.

Area of research/work: business intelligence and analytics, customer analytics, data mining and machine learning, application of social media in education and business, digital marketing technologies. In 2016 she acquired her PhD with a dissertation “Architecture of analytical customer relationship management system”. Yanka Aleksandrova has participated in several scientific projects,

most recent of which are “Intelligent Analysis of Students Data (2016-2017)” and “Social Media in Business and Education - Innovative Models, Opportunities and Challenges (2017-2019)”. She has more than 15 years of experience in teaching in bachelor and master degree programs in University of Economics. She also is a member of Varna Scientific and Technical Unions and she has published 15 papers in international refereed conference proceedings and journal.

Chief Assist. Prof. Nedyalko Valkanov, PhD (female)

PhD in Economics (2012) and MSc in Bank Management (2007) from the University of Economics in Varna.

Area of research/work: compliance activities in banking, anti-money laundering, prevention of bank frauds. Dr. Valkanov has experience in the field of banking where, between 2004 and 2007, he worked as internal auditor and compliance officer for Societe Generale Expressbank – Bulgaria. He is a Certified Fraud Examiner and member of the Association for Counteraction to Economic Frauds (ACEF) – Sofia, Bulgaria. Has published 20 papers in area of compliance and anti-money laundering activities in banking.

Ch. Asst. Prof. Lyubomir Lyubenov (male)

PhD in Statistics and Demography (2013) graduated from University of Economics - Varna.

Area of research/work: econometrics modelling in economics and finance, time series analysis, big data analytics, technical analysis of the financial markets, international trade. Expert in various scientific fields such as mathematics, statistics, economics, informatics and computer sciences.

Petar Dimitrov PhD(c) (female)

PhD student in University of Economics – Varna, department “Informatics” (2018), graduated master-degree in Business Information Systems in University of Economics – Varna.

Area of research/work: Head of software development department in RANICTC (Research and Application of New Information and Communication Technologies Center) at the University of Economics – Varna. He gained experience at the field of software development, database management and server administration.

Participant Number	23	Organisation official name	TAMPEREEN YLIOPISTO
Partner presentation			
Partner entity description and relevance: The University of Tampere (UTA) is a culturally-committed higher education institution with the social mission of educating visionaries who understand the world and change it. With its six faculties and some 15,000-degree students, UTA is one of the largest and most popular universities in Finland. In 2016, the university received 17,482 applications of whom 1,418 were enrolled for an admission rate of 8.1. The university was ranked 201–250 on the Times Higher Education World University Rankings 2018. Likewise, it ranked 551-600 on the QS World University Rankings 2018 and 101-150 on its Communication and Media Studies category. The Tampere University School of Management combines three fields of study: administration, business and politics. We are determined to cross borders both in teaching and research. We educate young professionals who are able to understand the continuously changing world and are willing to change it. School of Management is among the largest schools in the University of Tampere. It consists of three closely affiliated degree programmes: Administrative Studies, Business Studies, and Politics. Specialisation program includes Insurance and risk management . TAUCHI (Tampere Unit for Computer-Human Interaction) carries out a wide range of multidisciplinary research into technology-mediated novel ways of multimodal interaction with devices, environments and people. Its expertise covers new technologies such as smart objects and environments, gestural interfaces, gaze tracking, haptics, mixed reality, computer vision, speech-, context- or emotion-based			

interaction, virtual avatars, user experience and usability.

Main roles:

UTA will be the local coordinator of the project in Finland and Sweden, and will be training the Finland and Sweden market regulators; specifically the Financial Supervisory Authority (Finland) and FinansInspektionen (Sweden).

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

- In 2013-2014 we designed and conducted an educational program for the executive board members of a large Finnish insurance company ‘LocalTapiola Pirkanmaa’. The program consisted numerous educational modules ranging from marketing and strategy to well-being at work. Duration of the program was one year. Program was conducted under Research and Education Center Synergos and its’ coordinator was mr. Antti Talonen.
- Koskinen, Luoma and Puustelli studied (2009-2012) special issues emerging from insurance companies’ risk management. The three main topics were financial guarantee insurance, equity-linked life insurance contracts, and mortality modelling. The project served the needs arising from the new regulatory framework for the European Union insurance industry, known as Solvency II.
- In 2015-2017 we conducted a Tekes (Finnish Innovation fund) funded research and development project studying the creation of shared value. Shared value is a concept that emphasizes the facilitation and creation of social and economic well-being of the community as the competitive advantage and core business opportunity of the company. One of the main company partners in the project was a large Finnish insurance company ‘LocalTapiola Pirkanmaa’. Thus, the project had a major focus in the financial and insurance sector. Project was conducted under Research and Education center Synergos, project manager being mr. Antti Talonen. Program director was dr. Timo Rintamäki from the Research and Education Center Synergos.
- Incentive based insurance (often called smart insurance), where the insured can affect the premium level and receive other benefits by her behaviour and choices, is currently subject to considerable interest and product design activities by insurers. In 2016 Voutilainen and Koskinen studied the opinions of Finnish customers on incentive based insurances we set up a survey. They found that successful development of incentive based insurance products requires that insurers study and test carefully their potential customers’ opinions. This emphasises the role of experiments and inquiries. As part of the master’s studies in insurance science and risk management, Talonen and Koskinen have conducted a course on artificial intelligence in the field of insurance. During the course, students were provided with lectures on the themes. After this, they formed teams for developing their own AI applications. Altogether four different applications were built. By positioning in the intersection of theory and practice the course was co-organized with IBM providing technological tools via BlueMix and Watson artificial intelligence, as well as the Master’s Degree Programme in Human-Technology Interaction (University of Tampere). After the course, students were familiar with the application possibilities of AI in the field of insurance and had learned to work in a multi-disciplinary teams in developing applications. The first time for the course was in the autumn 2017, and will be followed-up by the next one in 2018.

Infrastructure and equipment:

In 2014-2015 we conducted a Tekes (Finnish innovation fund) funded project that developed a new crowdsourcing & -funding platform for co-operatives. The platform consists altogether

four service elements. These are ‘webstore’, ‘meet & greet areena’, ‘crowdfunding arena’, and ‘information services’. At the moment, the platform is available in the Internet in Finnish and English under address tyoosuuskunta.fi. While all other service elements are already in use, ‘crowdfunding arena’ will emerge in the near future. The platform has generated a lot of interest among Finnish co-operatives and many of them have established their own profile in the service. The project was conducted under Research and Education Center Synergos and the project manager was mr. Antti Talonen.

The five most relevant publications:

1. Kasimir Kaliva and Lasse Koskinen: "Stock market bubbles, inflation and investment risk", *International Review of Financial Analysis* 17 (4), p. 592-603, 2008;
2. Arto Luoma, Anne Puustelli and Lasse Koskinen: "A Bayesian smoothing spline method for mortality modeling", *Annals of Actuarial Science*, 6, p. 284-306, 2012;
3. Raimo Voutilainen and Lasse Koskinen: "Customers' Opinions on Incentive Based Insurance" *Journal of Insurance and Financial Management*, 3, Issue1, 30-52, 2017.
4. Talonen, A., Jussila, I., Saarijärvi, H., & Rintamäki, T. (2016). Consumer cooperatives: uncovering the value potential of customer ownership. *AMS review*, 6(3-4), 142-156.
5. Talonen, A., Kulmala, J., & Ruuskanen, O. P. (2016, September). Co-Operative Platforms: Harnessing the Full Potential of Crowdfunding. In *European Conference on Innovation and Entrepreneurship* (p. 810). Academic Conferences International Limited.

Key Personnel:

Lasse Koskinen (male) is Professor of Insurance Science at the School of Management in University of Tampere (UTA). Koskinen holds doctoral degree (Mathematics) from the University of Tampere and Title of Docent (Quantitative Methods of Economics and Management Science) from Aalto University School of Business (Finland). Koskinen has published papers in international refereed journals in several fields. His current research interests include risk and investments management, insurance regulation, and pension systems. Formerly Koskinen has done research in signal processing. Koskinen has been a member of Internal Model Committee of European Insurance and Occupational Pensions Authority (EIOPA) and education committee of Actuarial Association of Europa. He will co - manage the project assigned tasks within Mr. Talonen.

Antti Talonen (male) acts as the Ph.D. researcher of Insurance Science at the School of Management in University of Tampere. His doctoral dissertation and areas of interest focus on customer-owned business models as well as the technological disruption in the field of insurance and finance. He holds Masters of science in business and economics from Lappeenranta University of Technology. His major was international marketing focusing specifically in high-technology markets. Talonen has published altogether three refereed scientific journal articles as well as two refereed conference articles. In addition, Talonen has been the responsible person of university courses related to artificial intelligence in the field of insurance as well as modern risk management. Before his post as a Ph.D. researcher Talonen worked in numerous research and development projects at the Research and Education Center Synergos in University of Tampere. As a project manager Talonen planned and conducted projects related to crowdfunding, insurance sector, retail, and tourism

Participant Number	24	Organisation official name	WIRTSCHAFTSUNIVERSITAT WIEN
Partner presentation			
Partner entity description and relevance:			

The **WU Vienna University (WU)** of Economics and Business is a public university committed to excellence in research and research-led teaching. WU's triple accreditation by EQUIS, AACSB, and AMBA - the three foremost international accreditations for business and economics universities - is a testimonial of WU's high quality standards. Fewer than 1% of universities world-wide can claim triple accreditation by EQUIS, AACSB, and AMBA. WU Vienna is one of only two universities in the German-speaking world to belong to this exclusive group of schools. With just under 23.000 students originating from 110 countries the WU is the biggest place for education in economic and social sciences.

The WU Vienna is actively teaching AI, Machine Learning and Data Science at various levels. There is a Data Science specialization within the Bachelor Business studies as well as a dedicated MBA course. The variety of didactic systems is one key issue WU Vienna will provide. Furthermore, Data Science is taught at different Master programs including Information Systems, Marketing and especially Quantitative Finance. Quantitative Finance, Computational Finance as well as Algorithmic Finance is one of the main specialities of WU and will be in the centre of the expertise that WU Vienna will provide to the project.

Furthermore, the WU Vienna hosts the Research Institute for Crypto-Economics with the aim to bundle the interdisciplinary competence with partner institutions to investigate Blockchain technologies, their crypto-economic incentive mechanisms and other relevant research questions. The research institute consists of WU professors from the fields of business administration, business informatics, economics, taxation and law. The research institute will produce research outputs (publications, lectures) as well as develop best practices for application. Furthermore, the institute is a platform for the relevant community as well as a point of contact and advisory for politics. It will also actively promote blockchain education and network with the international scientific community and standardization bodies.

Main roles

WU VIENNA will be the local coordinator of project in Austria. It will train the national regulator- Austrian Financial Market Authority (Austria). It will also be in charge of organizing one coding session meeting at the premises of the R software foundation.

A list of up to 5 relevant previous projects, or activities, connected to the subject of this proposal:

- WU Vienna Research Institute for Crypto-Economics.
- WU Vienna Research Institute for Computational Methods employing a High Performance Computing Infrastructure.
- EU TEMPUS Project on creating a Master curriculum in Applied Statistics (2012-2014).
- EU ERASMUS+ Project on creating a Master curriculum in Business Analytics and AI (2018-).

Infrastructure and equipment:

WU Vienna operates the Research Institute for Computational Methods which researchers from different WU Departments. Using a high-performance computing infrastructure, researchers develop advanced computational methods in the areas of finance, information systems, and marketing. The Institute's primary goal is to foster interdisciplinary research. The Research Institute operates both a Cluster as well as a Cloud infrastructure which has been heavily funded by the Austrian government. Recently, scores of GPUs are added to the core infrastructure to accommodate the computational necessities of Deep Learning and AI.

The five most relevant publications:

1. L. Vana, P. Hofmarcher, B. Grün, and K. Hornik. Identifying key factors in accounting-based models of credit risk based on a predictive model averaging approach. *Advances in Quantitative Analysis of Finance and Accounting*. To appear. 2017.
2. A. Eisl, R. Jankowitsch, M.G. Subrahmanyam. The Manipulation Potential of Libor and Euribor. *European Financial Management* 23(4): 604-647. 2017.
3. R. Hochreiter. Modeling multi-stage decision optimization problems. *Lecture Notes in Economics and Mathematical Systems* 682: 209-214. 2016.
4. R. Hochreiter. Computing trading strategies based on financial sentiment data using evolutionary optimization. *Advances in Intelligent Systems and Computing* 378: 181-191. 2015.
5. P. Hofmarcher, J. Crespo Cuaresma, B. Grün and K. Hornik. Last Night a Shrinkage Saved My Life: Economic Growth, Model Uncertainty and Correlated Regressors. *Journal of Forecasting* 34: 133-144. 2015.

Key Personnel:

Prof. Dr. Kurt Hornik (male) has been a full professor at the WU Vienna University of Economics and Business since 2003. He chairs the Institute for Statistics and Mathematics, and heads the Research Institute for Computational Methods. Hornik's *venia docendi* is in statistics and its mathematical foundations. His research includes statistical machine learning, data mining, statistical computing, and a variety of application domains for quantitative data analysis. As a core member of the R development team (open source implementation of an award-winning language for data analysis and graphics), Kurt Hornik has co-authored packages for computing on cluster ensembles, interfaces to machine learning and data mining algorithms in Java, mining association rules, component and latent class analysis, support vector machines, advanced time series analysis, and visualisations of categorical data. Furthermore, he is program director of the MSc program Quantitative Finance at WU Vienna.

PD Dr. Ronald Hochreiter (male), will be the main project partner and is Docent at the Department of Finance, Accounting and Statistics at the WU Vienna University of Economics and Business. Furthermore he is permanent Guest Professor at the University of Bergamo since 2011. He currently acts as the Principal Investigator of the project ReKlaSat 3D - Reconstruction and Classification of Satellite Images in three dimensions funded by the Austrian Space Application Program. In this project, Deep Learning techniques are applied to classifying satellite images which have been pre-processed to 3D point clouds. His research generally considers the combination between Data Science and Decision Science. He is actively teaching Data Science to a heterogeneous group of students. He is co-organizer of the Data Science specialization of the Bachelor program. Furthermore, he is teaching Data Science to Masters students of Information Systems, Marketing and Quantitative Finance. In addition he is teaching Data Science as well as Data Based Management to MBA students at the WU Executive Academy - both at the Executive MBA as well as the Professional MBA Level. Finally, he is consulting Investment Management companies in the field of Machine Learning and Optimization. He will manage the project tasks within his internal team and listed here.

Dr. Alexander Eisl (male), is Assistant Professor (Non-Tenure-Track) at the Institute of Finance, Banking and Insurance of WU Vienna. He is also the Co-Founder of a FinTech Start-Up that focuses on innovative ways to provide credit checks for selected business cases. He has founding member of the Academy of Data Science in Finance and is currently organizing a conference to be held in Vienna later this year. After finishing a BSc in Computer Science and a degree program in Business Administration, Alexander received his PhD in Finance from

WU Vienna in 2013. His research interests are in the area of credit risk, sovereign bond markets and crypto economics. He is a member of the research institute for crypto economics at WU Wien and works on research projects focusing on the economic aspects of cryptocurrencies and blockchain technology.

4.1.2 Current Advisory Board of the consortium (M0)

- 1. Bihong Huang (Asian Development Bank Institute)** holds degrees in economics from Xiamen University (MA and BA) in China, and Nanyang Technological University (PhD) in Singapore. She is the research economist of Asian Development Bank Institute (ADBI). Previously, she was the academic staff of Renmin University of China and University of Macau. Her research interests include environment, development, and financial economics. She is now the task managers for several ADBI projects, including Fintech and Financial Inclusion, Fintech and Financial Stability, etc. Her research work has been published in books and refereed journals, including *China Economic Review*, *Economic Modelling*, *Energy Economics*, *Global Economic Review*, *Journal of Banking and Finance*, *Journal of Corporate Finance*, *Review of Development Economics*, and *World Economy*, etc.
- 2. Shatha Qamhieh Hashem (An-Najah National University, Palestine)** holds a Bachelor of Arts degree in Architectural Engineering, a Master degree in Business Administration, both from An-Najah National University (Palestine), and a Ph.D. in Economics and Management of Technology, from a joint program offered by the University of Pavia & Bergamo University (Italy). Shatha has served in different positions, within the governmental, non- profit, and educational sectors. She is currently an Assistant Professor at An-Najah National University, Faculty of Economics & Administrative Sciences, Department of Finance. Her research focus is on financial risk analysis, economic forecasting, financial network applications, specifically for the Islamic and conventional banking sectors, within the MENA region, Gulf area, and Far East. She has offered key contributions to the field through her publications, teaching, and ongoing research projects.
- 3. Gabriel Aparici Cardozo (Central Bank of Chile)** is an agricultural engineer and economist who also holds a Master in Business Administration from the Catholic University of Chile. Since 2010 he serves as a Manager of Regulatory and Policy at the Central Bank of Chile (BCCH), Financial Policy Division. In the last 5 years he has followed many projects, among which: assessment of main links between Fintech and financial stability (ongoing), assessment of financial infrastructures for implementation of PFMI in Chile (2015-17), development and modernization of retail payments regulation (2016-17), development of bank liquidity management regulation (2013-14), development of netting derivative regulations (2012). Previously to his current engagement, he served as Professor of Corporate Finance at Gabriela Mistral University (2008-2010), Professor of Banking Economics at the G. Subercaseaux Banking Studies Institute (2004-2008), Financial analyst at the Banks and Financial Institutions Superintendence (SBIF), Research Department Financial analyst.
- 4. Ugo Bechis (Blockchain and e-payments advisor, Italy)** has an MBA (1976) in Finance, Organizational Behavior - U.C.L.A University of California Los Angeles (1976) and a MSc in

Economics, Monetary Policy, EU Affairs at Turin University (1974). He has an extensive financial and regulatory experience. Currently he is Co-Chairman at The Lafferty Brexit Council and Lecturer at The Finance University under the Government of Russian federation. He is also Adviser to the Board of HighCastle Ltd - Blockchain trading platform for regulated and crypto securities; Adviser to the Board of Nexo-Blockchain lending platform on crypto-assets. Previously he has been Adviser to Polybius ICO for a Blockchain powered e-Money Institution; a Community Member of the European Electronic Cybercrime Task Force (Europol, US SecretService, Polizia); member of the EPC - European Payment Council; President of Payment Systems Commission of the Italian Banking Association; Board Member of CTSPPR, Clearing and Settlement Services Committee, Consorzio Bancomat, ACBI, Corporate Payments Association; Chairman of the Board - EAPS - European Alliance of Payment Schemes; Member of the Board of Directors of IWBank SpA, UBIBanca on-line bank , SIA SpA, Cartasi S.p.A , KCCS SpA - Key Client Management.

5. Chen Ying (National University of Singapore) is a financial statistician and data scientist. She develops statistical modelling and machine learning methods for nonstationary, high frequency and large dimensional complex data such as cryptocurrency, limit order book, and renewable energy. She also works on business intelligence, forecasting, text mining and sentiment analysis, and network analysis. Chen is Associate Professor in Department of Statistics and Applied Probability, and Department of Economics (Courtesy appointment) at the National University of Singapore. She is also Faculty member in NUS Graduate School for Integrative Sciences and Engineering since July 2016. Chen is Associate Editor of Statistica Sinica (August 1, 2017 to July 31, 2020), Statistics and Its Interface, Computational Statistics and the Journal Operations Research and Decisions. Chen is ISI Elected Member since March 2016. She is Scientific Secretary and member of Executive Committee of the International Association for Statistical Computing (IASC) from July 2017 to June 2019 and Board of Director ordinary member of the Asian Regional Section (ARS) of IASC. She is regular member of the Advisory Board of Institute of Statistical Mathematics, Japan from 1 April 2018 to 31 March 2020.

6. MeiKei Ieong (ASTRI, Hong Kong) joined ASTRI, the Hong Kong Applied Science and Technology Research Institute as Chief Technology Officer in January 2016. Before his appointment, he held various leadership positions in Taiwan Semiconductor Manufacturing Company and IBM Research. He holds a PhD degree in Electrical and Computer Engineering from the University of Massachusetts, Amherst and an MBA degree from the MIT Sloan Fellows Program at the MIT School of Management. Dr Ieong has had rich international experience of managing large and complex R&D projects including marketing, commercialisation. He has published more than 100 papers in journals and conference proceedings and more than 80 patents. He has received more than 2,000 citations. Dr Ieong has received many awards over his career such as IBM Master Inventor Award, IBM Outstanding Technical Achievement Award, and IBM Corporate Award. He is an IEEE Fellow in recognition of his leadership and contributions to Complementary Metal-Oxide-Semiconductor (CMOS) Device Technology.

7. Michael Junemann (Bird and Bird, Germany) heads the Banking and Finance practice in the Frankfurt office of Bird and Bird and is a member of the international Banking and Finance practice group. Before joining Bird and Bird, he was based in the Frankfurt office of a global US law firm. Michael mainly advises in the areas of national and international financial and capital markets law, as well as banking, payment services and insurance regulation. He has many years of experience of advising on the implementation and restructuring of transactions,

both in Germany and internationally. Michael has also corresponded and liaised with lawyers on finance transactions and restructurings in over 50 jurisdictions worldwide. He advises international and national companies, incumbents and start-ups, in all fields of regulatory law and its interdependence with digitalisation. Michael has remarkable knowledge on new and disruptive technologies and the legal issues the respective business models face. The scope of support ranges from early steps in the lobbying process of new legislation to the comprehensive application of regulatory law to all sorts of FinTech, InsurTech, RegTech and other related business models with the result of practical solutions for the client. For example, he advised Mastercard on the effective lobbying efforts in the course of new anti-money laundering laws in Germany and Europe. On a regular basis, he gives presentations at conferences regarding the future of banking and the financial services industry. Michael is frequently asked to provide expert opinions and interviews for the daily and specialised press. In this course, he spoke to the UK's Financial Conduct Authority about technology's impact on compliance and regulatory reporting (RegTech) or to German Handelsblatt regarding change on card payments and other payment methods due to PSD II implementation.

8. Daniel Heller (Washington DC, USA) is a blockchain and FinTech advisor. He is also a research fellow at the UCL Center for Blockchain Technologies and a visiting fellow at Peterson Institute for International Economic. He has an extensive financial and regulatory experience. Daniel has been an executive director of the International Monetray Fund specifically for the following countries: Azerbaijan, Poland, Kazakhstan, Kyrgyz Republic, Serbia, Switzerland, Tajikistan and Turkmenistan. Previously, he has worked for the Swiss National Bank in several roles: monetary cooperation, financial stability and payment systems. Daniel obtained a Master and PhD degree in Economics from Bern University and has been a visiting scholar at Stanford University.

9. Jurgen Ingels (SmartFin Capital, Belgium), is a Founding Partner and Managing Partner of SmartFin Capital. He is the Founder of [scale-ups.eu](#) an organization that unites growing companies and experienced entrepreneurs in an ecosystem to share knowledge and know-how to make time-squeezing possible. Scale-ups.eu organizes in September 2018 the first festival for scale-ups: SuperNova 2018 that brings together the 55 most promising European scale-ups to exchange knowledge and +150 deep pocket VCs. Mr Ingels is a co-founder of B-Hive. Mr. Ingels is a Co-Founder at Minos Capital and Enqio NV. He is also a Founder of The Glue. In addition, he is Founder and Chairman at [start-ups.be](#) and a Venture Partner at Volta Ventures. He Co-founded Clear2Pay NV/SA in 2001 and served as its Chief Financial Officer until November 2014. He founded NGDATA in 2011. Mr. Ingels served as Senior Investment Manager at Dexia Private Equity. At Dexia Bank, he focused on investing in early stage and start-up companies and taking a pro-active role in their business strategy, product launches and financial management. In addition, he was involved in setting up a private equity fund within Dexia Bank. He started his career in private equity in 1997 at Dexia. He has been Director at Itiviti Group Holding AB since August 12, 2017. Mr. Ingels serves as a Director of Zappware, NGDATA and D square N.V. He has been a Director of Itiviti AB since June 16, 2016. He serves as a Director for Projective, The Glue N.V., Itineris, Rightbrain and Citymesh. He serves as a Member of Supervisory Board of ASWEBO SA. He serves as a Member of Supervisory Board of Willemen Groep NV. Mr. Ingels has been an Independent Director of Materialise NV since November 2013. He served as a Director at Clear2Pay NV/SA until November 2014. He served as Non-Executive Independent Director of Option NV from May 29, 2015 to January 26, 2016. He served as a Director of numerous companies, including Nikon Metrology NV, Metris NV (BE), Smart Energy Inc., Equipnet [direct.com](#) (US), EquipNet, Inc., Smartenergy (US), SmartEnergy Holdings, LLC, Xenics nv, Q-star Test and R.E.D. Laboratories N.V./S.A. He served as a Director/Member of Advisory Board of Proseed

capital Holding CVA. Mr. Ingels holds a Master's degree in Political and Social Sciences and an MBA from the University of Antwerp. He has a Postgraduate Degree in Corporate Finance.

10. Walter Verbeke (Euroclear, Belgium) is Director and Global Head of Strategic Planning for the Euroclear group. As such, he is a senior executive in the PSI division at Euroclear (Product, Strategy, Innovation). He is responsible for the analysis of market and regulatory trends, identification of strategic business and innovation dynamics, and the recommendations with regard to the business development opportunities and strategic positioning of the Euroclear group, providing guidance to the group's overall strategic and innovation direction. Walter joined Euroclear in 2004 from McKinsey & Co. where he was a strategic business consultant, leveraging 20 years of prior professional experience in the finance, payments, transport and telecommunications industries. Walter holds a Masters' degree in Law, specialising in Law and Economics, and European, international, and Administrative Law, in addition to complementary Bachelors' studies in Applied Economics.

4.1.3 Institutions supporting the consortium

The following table presents all the institutions outside of the consortium which support the FIN-TECH project and have agreed to take on an active role.

	Supporting Institutions
1	Malta Financial Services Authority (Malta)
2	Deutsche Bundesbank (Germany)
3	State Secretariat for International Financial Matters (Switzerland)
4	Financial Conduct Authority (UK)
5	Autoritatea de Supraveghere Financiara (Romania)
6	Bank of Greece (Greece) Capital Market Commission (Greece)
7	Capital Market Commission (Greece)
8	Cyprus Security and Exchange Commission (Cyprus)
9	Ministry of Digital Affairs (France)
10	Autorité des Marchés Financiers (France)
11	Commissione Nazionale per le Società e la Borsa (Italy)
12	Central Bank of Ireland (Ireland)
13	Commission de Surveillance du Secrétaire Financier (Luxembourg)
14	Banka Slovenija (Slovenia)
15	Komisja Nadzoru Finansowego (Poland)
16	Croatian Financial Services Supervisory Agency (Croatia)
17	Comisión Nacional del Mercado de Valores (Spain)
18	Národná Banka Slovenska (Slovakia)
19	The Central Bank of Hungary (Hungary)
20	Lietuvos Bankas (Lithuania)
21	Finanšu un Kapitāla Tirgus Komisija (Latvia)
22	Czech National Bank (Czech Republic)
23	Financial Services and Market Authority (Belgium)
24	European Banking Federation (Belgium)
25	Financial Supervision Commission (Bulgaria)
26	Financial Supervisory Authority (Finland)

27	FinansInspektionen (Sweden)
28	Austrian Financial Market Authority (Austria)
29	Portuguese Securities Market Commission (CMVM)(Portugal)
30	Finantsinspektsioon (Estonia)
31	R Foundation (Austria)
32	Spanish Fintech and Insurtech Association (Spain)
33	France Fintech (France)
34	Association Française pour la Gestion de Cybermonnaies - AFGC (France)
35	Fintech Community Frankfurt GmbH (Germany)
36	Digital Magics (Italy)
37	Italia Fintech (Italy)
38	Fintech District S32 (Italy)
39	AssoFintech (Italy)
40	Swiss Fintech Association (Switzerland)
41	Swiss Fintech Innovations (Switzerland)
42	EIOPA jointly with EBA and ESMA
43	National Bank of Belgium (Belgium)
44	Danish Financial Supervisory Authority (Denmark)
45	Caroline NAGTEGAAL, Member of the ECON Committee: Economic and Monetary Affairs, of the European Parliament
46	Christine Revault d'Allonnes-Bonnefoy, Deputy of the European Parliament
47	Erich BOTHOREL, Member of the Economic Affairs Committee of the French National Assembly
48	Laure de LA RAUDIÈRE, Member of the Economic Affairs Committee of the French National Assembly
49	Bruno BONNELL, Member of the Foreign Affairs Committee of the French National Assembly
50	Typhannie DEGOIS, Member of the French National Assembly

Please find enclosed below copies of all letters of intent and support provided by the institutions or members listed above. The original versions are available with the consortium's partners.

MFSA
MALTA FINANCIAL SERVICES AUTHORITY

5th March, 2018

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

**Letter of support for -FIN-TECH:
A FINancial TECHnology training platform –Proposal**

Dear Sirs/Madams,

We have been approached by researchers from the Univrsity of Pavia (led by Prof. Paolo Giudici), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your Organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research-based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,



Marianne Scicluna
Director General



Dr. Emanuel Mönch
Head of Research

Frankfurt am Main, 8 February 2018

Letter of support for FIN-TECH: A FINancial TECHnology training platform

To: European Commission, Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

With this letter the Research Centre of the Deutsche Bundesbank would like to support a training platform project on the regulatory issues of the FinTechs, BigData and Cryptocurrencies.

This project was initiated by Professor Paolo Giudici in response to a 2-year European call for projects (European research funding horizon 2020: Coordinated and Support Action: H2020-ICT-2018-2020, on Fintech theme: Support to experimentation frameworks and regulatory compliance, ICT-35-2018).

The proposed education programme will be developed on demand and delivered on-site by the Humboldt- Universität zu Berlin (LvB Chair of statistics, led by Prof. Dr. Wolfgang Karl Hardle), funded by the call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Deutsche Bundesbank, Zentrale
Wilhelm-Epstein-Straße 14, 60431 Frankfurt am Main, Telefon: +49 (0)69 9550-2312, Telefax: +49 (0)69 9550-4026
emanuel.moench@bundesbank.de, www.bundesbank.de

28 February 2018

Horizon 2020, Coordination and Support Action (CSA), Call ICT-35-2018

FinTech: Support to Experimentation Frameworks and Regulatory Compliance

Dear Sir or Madam,

We have been approached by researchers from the Zurich University of Applied Sciences (ZHAW) who are submitting, together with other 24 European research centres and FinTech partners, a project proposal in response to the Coordination and Support Action (CSA) Call ICT-35-2018.

We understand that the project is intended to bring together European regulatory bodies, FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as cryptocurrencies, blockchain, robo advice, RegTech, financial data science and artificial intelligence. Staff from regulators will be invited to participate free of charge.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area.

Sincerely yours,



Patrick Winstörfer

Deputy Head Banking
State Secretariat for
International Finance SIF



Samuel Schenker

Economist
State Secretariat for
International Finance SIF

21 February 2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform - proposal

To: European Commission, Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

We have been approached by Professor Tomaso Aste from University College London who, together with 24 other European research centres and FinTech partners, is submitting a project proposal entitled 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018.

We understand that the main deliverable of the project is a "standardised" training platform, common to all European countries, containing a set menu of training classes for regulators and FinTech hubs, to be aligned with state-of-the art R&D in Financial Technology. The training platform will be developed by a group of independent experts from proponent Universities that have leading research expertise in the field.

As expected, we are interested in such projects that seek to transfer knowledge from established academic centres of excellence to start up FinTech companies and public service organisations such as us. We can also confirm that we are interested in participating and benefiting from the proposed educational program. We expect this educational program will enhance our knowledge and the resulting ability to serve the public, and accordingly would recommend you call for research on this subject matter.

We would also expect to participate in project related workshops where resources are available, and the topics are regulatory-related ones.

Yours sincerely,



PP Nick Cook
Head of RegTech & Advanced Analytics



Letter of support for FIN-TECH: A FINancial TECHnology training platform

To: European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

The Financial Supervisory Authority has been approached by researchers from the Bucharest University of Economic Studies (led by Conf. univ. dr. Vasile Strat and Conf. univ. dr. Daniel Traian Pele), who are submitting, together with other 24 European research centers and fintech partners, a project proposal on '*FIN-TECH: A FINancial TECHnology training platform*' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018, launched by your institution.

The objective is to develop a state-of-the-art innovative and research based education program covering the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory.

The program is dedicated to the training of Regulatory authorities and FinTech companies. According to the proposal, ASF will not provide finance for the project, all the activities that will be developed on demand and delivered on-site will funded by the project.

We highly endorse such knowledge transfer program provided by highly reputed academic centers with a sound track record in Fintech. We can confirm that we are very interested in participating and having our staff benefiting from the proposed educational program, during the entire period of the project (two years).

We expect this educational program to enhance our knowledge and capabilities in the field. We hereby confirm that, in case the program is approved, we would be happy to participate to the proposed education program and the related workshops, when possible.

Yours sincerely,

Leonardo Badea
President

Financial Supervisory Authority, 15 Splaiul Independenței, District 5, Bucharest, 050092
Tel: +40-21-65.96.102; Fax: +40-21-65.96.400
www.asf.ro office@asf.ro
ASF is personal data operator nr. 33477



BANK OF GREECE

EUROSYSTEM

THE GOVERNOR

Athens, February 14, 2018

Ref. N. 3902

European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Subject: Declaration of interest concerning the European Commission's call for proposals, Fintech: Support to experimentation frameworks and regulatory compliance, ICT-35-2018

Dear Sir/Madam,

The Bank of Greece has been approached by Prof. Veni Arakelian, as a representative from Panteion University, regarding the project proposal 'FIN-TECH: A FINancial TECHnology training platform' that will be submitted by 27 Universities and FinTech companies (along with Panteion University) in response to the European Commission's Call for proposals on Fintech: Support to experimentation frameworks and regulatory compliance, ICT-35-2018.

To our understanding, the aforementioned team of Universities and FinTech companies is proposing the development of a research based educational program in the areas of Cyber risk management, Machine Learning, Distributed Ledger Technology, Cryptoassets, Artificial Intelligence, that the staff of the Bank of Greece (BoG) could take free of charge. The technological areas mentioned are of interest to BoG.

We thus endorse such knowledge transfer, from academic institutions and FinTech companies to public service entities, like BoG, and confirm that we would be interested in participating and benefiting from the proposed educational program.

We hereby confirm that we will assign the necessary time in the proposed education program, and participate in the project related workshops whenever possible.

Yours sincerely,

Yannis Stournaras



HELLENIC REPUBLIC
CAPITAL MARKET COMMISSION

VICE- CHAIRMAN

Athens, 5 March 2018

Ref. No: 1115

European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

Subject: Letter of support for -FIN-TECH: A FINancial TECHnology training platform-proposal

The Hellenic Capital Market Commission (hereinafter HCMC) has been approached by Prof. Veni Arakelian from Panteion University, who submits, together with other 24 European Universities and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organization.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based educational program in the areas of Robot Advisory, Big Data, RegTech, Artificial Intelligence, Algorithmic Trading, Blockchain, and/or Cryptocurrencies, that our staff and staff from supervised investment firms possibly invited by us could attend free of charge. Said educational programme will be developed on demand and delivered on-site by our respective network of partners, funded by the Call. Ms. Eleftheria Apostolidou, Director of Research (e.apostolidou@cmc.gov.gr) will be the contact person at the HCMC for this project.

We thus endorse such knowledge transfer, from established academic institutions to public service bodies like the HCMC and can confirm that we are very interested in participating and benefiting from the proposed educational program. Since we expect it to enhance our knowledge and resulting ability to serve the public, we express our support for this research proposal. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and participate in the project related workshops when possible.

Yours sincerely,

Xenophon Avlonitis

01.13.001.003

7 March 2018

European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

Subject: FIN-TECH: A FINancial TECHnology training platform-proposal

We have been approached by Prof. Veni Arakelian from Panteion University, who submits, together with other 24 European Universities and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organization.

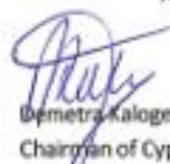
We understand that the research team is proposing the development of a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity Fraud detection, Marketplace lending, Peer to Peer Lending, RegTech and/or Robot Advisory., that our staff and staff from FinTech companies or any other market participant invited by us, could take free of charge. According to the proposal CySEC will not provide any finance for the project and the education programme will be developed on demand, delivered on site by your respective network of partners and will be fully funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We understand also that any media or other public relations contacts or communications of the program will not make reference to CySEC unless CySEC has given its explicit written consent.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and participate in the project related workshops when possible.

Yours sincerely,



Demetra Kalogerou

Chairman of Cyprus Securities and Exchange Commission

Z/00017.18 Έγγρα Επικοινωνίας, Από: Κυβόλινθος/17.1.01.Γεωργίδης/αλέκη



PREMIER MINISTRE

SECRÉTARIAT D'ÉTAT CHARGÉ DU NUMÉRIQUE

Secretary of State for Digital Affairs

Paris, le 12 février 2018

Dear Sir, dear Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from companies invited by us could take free of charge. This education programme will be developed on demand and delivered on-site by our respective network of partners, funded by the CSA Call Horizon 2020 ICT-35-2018.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also to participate in the project-related workshops when possible.

Sincerely yours,

Mounir MAHJOUBI

Réf. : 2018000324
N° AMF

Le Secrétaire général

Monsieur Christophe Henot
Bureau F602
Université Paris 1 Panthéon-Sorbonne
Centre Sorbonne
17, rue de la Sorbonne
75005 Paris

Paris, le 09 janvier 2018

Objet : Déclaration d'intérêt concernant l'appel à projet de la Commission européenne : *Fintech : Support to experimentation frameworks and regulatory compliance*, ICT-35-2018

Monsieur,

Vous avez sollicité l'appui de l'Autorité des marchés financiers pour un projet de plate-forme de référence sur les problématiques de régulation des *Fintechs*, du *BigData* et des *Crypto-monnaies*.

Ce projet a été initié par le Professeur Paolo Giudici en réponse à un appel à projet européen sur 2 ans (*European research funding horizon 2020 : Coordinated and Support Action : H2020-ICT-2018-2020*, autour du thème *Fintech : Support to experimentation frameworks and regulatory compliance*, ICT-35-2018).

L'appel à projet de la Commission européenne nous semble particulièrement pertinent dans le contexte actuel. Il concourt aux objectifs de l'Autorité des marchés financiers qui suivra avec intérêt les résultats du processus de sélection.

Je vous prie d'agrérer, Monsieur, l'expression de mes cordiales salutations.

Benoît de Juvigny
Secrétaire général



Milan, 7 March 2018

To: European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Subject: Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sirs/Madams,

Consob, the Italian securities and markets authority, has been approached by researchers from Politecnico di Milano (led by Prof. Emilio Barucci) who are submitting, together with other 24 European research centers and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project aims to develop a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies could take free of charge. This education program that will be developed on demand and delivered on-site, is funded by the Call.

We endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and authorities and we confirm that we are very interested in participating and benefiting from the proposed educational program.

A handwritten signature in black ink, appearing to read "Giuseppe Martini".

00198 ROMA: VIA G.B. MARTINI, 3 – TEL. 0684771 – FAX 068416703 – 068417707
20121 MILANO: VIA BROLETTO, 7 – TEL. 02724201

CONSOB

We expect this educational program to enhance our knowledge and capability to serve our duties. We are hereby confirming that we are happy to assign the necessary time in the proposed education program, and also to participate in the project related workshops.

Yours sincerely,



Giuseppe D'Agostino
Deputy General Manager

Central Bank of Ireland - UNRESTRICTED

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

We have been approached by researchers from UCD (led by Prof. Valerio Poiti and Prof Andreas Hopner), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory. This potentially opens up training to our staff free of charge. This education programme will be developed on demand and delivered on-site by our respective network of partners, funded by the Call.

We commend the initiative as it embodies knowledge transfer as well as sound research foundations, carried out by established academic centers of excellence. We confirm that we are very interested in participating and benefiting from the proposed educational program, should the applicants be successful.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and commend you for your call for research on this subject matter. We are hereby confirming that we will engage with it.

Yours sincerely,



Trevor Fitzpatrick

Head of Function,
Cross-Sector Risk and Data Analytics
Banking Supervision
Central Bank of Ireland



*Commission de Surveillance
du Secteur Financier*

Luxembourg, le 7 mars 2018

Université de Luxembourg
A l'attention de M. Radu State
29 avenue JF Kennedy
L-1855 Luxembourg

N/Référence : IPIG.18/035-MEK/EDE
V/Référence :
Acheminement: Courrier

Personne de contact: Nadia Manzari
Ligne directe : (+352) 26 251 -2394

Concerne: Lettre de soutien concernant l'appel de votre candidature au projet de la Commission européenne intitulé FinTech : support to experimentation frameworks and regulatory compliance (ICT-35-2018)

Monsieur,

En référence à votre demande en date du 30 janvier 2018, vous avez sollicité l'appui de la CSSF concernant votre candidature au projet de la Commission européenne intitulé *FinTech / support to experimentation frameworks and regulatory compliance (ICT-35-2018)*.

Au vu des explications données, nous apportons notre soutien concernant votre candidature et soutenons particulièrement l'élaboration d'une plateforme de formation sur les problématiques de régulation des FinTechs, BigData, Intelligence artificielle, Blockchain, pilotée par un consortium de 24 centres de recherches européens et de partenaires impliqués dans les FinTech.

Nous manifestons par ailleurs notre intérêt et espérons recevoir les programmes de formation initiés par cette plateforme.

Veuillez recevoir, Monsieur, l'assurance de nos salutations distinguées.

COMMISSION de SURVEILLANCE du SECTEUR FINANCIER

Nadia MANZARI
Conseiller

Françoise KAUTHEN
Directeur

Warsaw, 01.03.2018

To:

European Commission,
Horizon 2020 ICT-35-2018
CSA Call

Letter of support for FIN-TECH: A FINancial TECHnology training platform

Dear Sir/Madam,

We have been approached by researchers from the University of Warsaw (led by dr Piotr Wójcik), who are submitting, together with other 24 European research centers and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to develop a state-of-the-art innovative and research based education programme in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could use free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer from established academic centers of excellence to start-up FinTech companies and public service bodies like us, and are pleased to confirm that the KNF is interested in participating in and benefiting from the proposed educational programme.

We expect this educational programme to broaden our knowledge and result in enhanced ability to serve the public and comment you for your call for research on this subject matter. We hereby confirm that we are ready to dedicate the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Endorser 

Piąc Powstańców Warszawy 1, skrytka pocztowa nr 419, 00-950 Warszawa 1, tel. +48 22 262 41 11, faks +48 22 262 51 95, www.knf.gov.pl



REPUBLIC OF CROATIA
CROATIAN FINANCIAL SERVICES
SUPERVISORY AGENCY
CLASS: 900-02/18-02/05
REF. NO.: 326-01-13-18-2
Zagreb, 28 February 2018

European Commission
Horizon 2020
ICT-35-2018
CSA Call

SUBJECT: Letter of support for FIN-TECH: A FINancial TECHnology training platform

Dear Sirs/Madams,

We have been approached by researchers from the Faculty of Economics, University of Rijeka (led by Prof. Saša Žiković), who are submitting, together with other 24 European research centres and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018.

We understand that the purpose of this project is to bring together regulatory and supervisory authorities for financial services and FinTech firms where one of the essential aspects of the project is to build capacity and expertise regarding the new technologies and to support early understanding for regulatory and supervisory authorities.

For this purpose, the research team proposes to develop a state-of-the-art innovative and research-based education programme in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that could be free of charge for our staff and the staff from FinTech companies that we would invite. This education programme that will be developed on demand, and delivered on-site by our respective network of partners, funded the CSA Call Horizon 2020 ICT-35-2018.

We highly endorse such knowledge transfer between* established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the project. We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

With kind regards,

PRESIDENT OF THE BOARD
Ante Žigman, PhD



Croatian Financial Services Supervisory Agency, 10000 Zagreb, Miramarska 24b, p.p. 164, Croatia
Phone: +385 1 6173 200, Fax: +385 1 4811 507, e-mail: info@hanfa.hr, OIB: 49376181407, MB: 02016419, www.hanfa.hr



DIRECCIÓN GENERAL DE POLÍTICA
ESTRÁTÉGICA Y ASUNTOS
INTERNACIONALES

Edison, 4
28006 Madrid, España

T +34 915 851 509
www.cnmv.es

European Commission
Horizon 2020- ICT-35-2018 CSA Call

February, 2nd 2018

Subject: Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir(s)/Madam(s),

The CNMV (Comisión Nacional del Mercado de Valores, the securities markets supervisory agency in Spain) have been approached by researchers from the Faculty of Computer Science of the Universidad Complutense of Madrid (led by Professor Javier Arroyo), who are submitting, together with other 24 European research center and fintech partners, a project proposal on '**FIN-TECH: A FINancial TECHnology training platform**' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, *RegTech* and/or Robot Advisory, which our staff and staff from fintech companies invited by us could take free of charge. This education program will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up fintech companies and public service bodies like ours, and can confirm that we are very interested in participating in and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and commend you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time to the proposed education program, and also to participate in the project related workshops when possible.

Yours sincerely,

Víctor Rodríguez Quejido
General Director of Policy and International Affairs



NÁRODNÁ BANKA SLOVENSKA
EUROSYSTÉM

Jozef Makúch

Governor

To:
European Commission
Horizon 2020-ICT-35-2018 CSA Call

Letter of Endorsement

Bratislava, 2 March, 2018

Dear Sir or Madam

We have been approached by researchers from the University of Economics in Bratislava who, together with other European research centre and fintech partners, are submitting a project proposal entitled "FIN-TECH: A FINancial TECHnology training platform" in response to the EC's Coordinated and Support Action Call Horizon 2020 ICT-35-2018.

The research team, led by Assoc. Prof. Jana Péliošová, has asked us to endorse the development of an innovative, state-of-the-art and research-based education programme covering the areas of artificial intelligence, blockchain, cryptocurrencies, cybersecurity, financial data science, marketplace lending, regulatory technology, and robot-advisory. If funded through the Call, the programme will be provided free of charge to employees of Národná banka Slovenska and invited firms. It will be developed on demand and delivered on-site by our respective network of partners.

Národná banka Slovenska strongly supports the principle of such knowledge being transferred from established academic centres of excellence to start-up fintech companies, public sector bodies, and institutions like ours. We are extremely interested in participating in, and benefiting from, the proposed programme.

We commend you for initiating a call for research in this crucial area. The programme proposed to us offers us an opportunity to enhance our knowledge and therefore our ability to serve the public. We have no hesitation in endorsing the proposal and assure you of our commitment to participate fully in the programme.

Yours sincerely



THE CENTRAL BANK OF HUNGARY
SPECIAL SUPERVISORY COMPETENCIES DIRECTORATE

European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Referent: Nora Sljukic
Telephone: + 36-1-489 -95- 06
E-mail: sljukicn@mnb.hu
Reference number: 41863-1/2018
Budapest, 08 February 2018

Subject: Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sirs/Madams,

We have been approached by researchers from almax analytics (led by Mr Balázs Klemm, CFA), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible

Greetings:

MAGYAR NEMZETI BANK


Gergely Gabler, CFA
Director

1013 Budapest, Krisztina krt. 39. | Postal address: 1534 Budapest BNKP Postal code: 777 | Phone: +36 1 4899-100 | Fax: +36 1 1



**LIETUVOS BANKAS
BANK OF LITHUANIA**

To:
European Commission,
Horizon 2020- ICT-35-2018
CSA Call

data No. S 2018/(I.47-0100)-12-688

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sirs/Madams,

We have been approached by researchers from Kaunas University of Technology (led by Prof. Dr. Andrius Kabasinskis), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Endorser

Board Member,
Marius Jurgilas



KUNGU IELA 1 • RĪGA • LV-1050 • TĀLRUNIS +371 6777 4800 • E-PASTS FTK@FKTK.LV • WWW.FTK.LV

Riga, SEE THE DATE IN THE TIME STAMP OF SIGNATURE

Our ref.: SEE OUR REFERENCE NUMBER IN THE NAME OF FILE ATTACHED TO THE DOCUMENT

Aivars Bērziņš
Project director
SIA "Tilde"

Vienības gatve 75a
Rīga, LV-1004

Email: aivars.berzins@tilde.lv

**Support Letter to
Horizon 2020- ICT-35-2018 CSA Call**

Dear Sir/Madam,

We have been approached by SIA "Tilde" (Reg. No. 4000302738, project director Mr Aivars Bērziņš), who are submitting, together with other 24 European research centres and fintech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 (hereinafter – the Call) from the European Commission.

We understand that the research team is proposing us to develop a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory that our staff and staff from FinTech companies invited by us could take free of charge. This education program will be developed on demand and delivered on-site by our respective network of partners, funded by the Call.

We highly endorse such knowledge transfer from established academic centres of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and commend you for your call for research on this subject matter. We are hereby

Page 1 of 2

confirming that we are happy to assign the necessary time in the proposed education program, and also participate in the project related workshops when possible.

Yours sincerely,

**THIS DOCUMENT IS SIGNED ELECTRONICALLY WITH
A SAFE ELECTRONIC SIGNATURE AND CONTAINS A TIME STAMP**

Gunta Razāne
Deputy Chairwoman
Financial and Capital Market Commission

Gunta Janelsīpa
+371 67774823
guna.janelsina@fckl.lv

Letter of support for FIN-TECH: A FINancial TEChnology training platform proposal of the Horizon 2020 project

To: European Commission, Directorate General Research and Innovation (for call Horizon 2020-ICT-35-2018 CSA)

Dear Sirs/Madams,

We have been approached by researchers from Masaryk University (Institute of Financial Complex Systems at the Faculty of Economics and Administration led by Oleg Deev), who are submitting, together with other 24 European research centers and fintech partners, a project proposal on 'FIN-TECH: A FINancial TEChnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organization DG Research and Innovation.

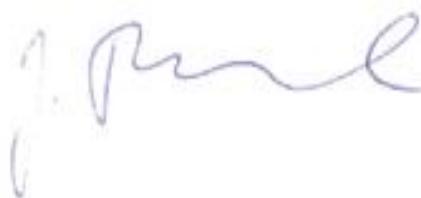
We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Risk Analysis with aim to Cyber Risks, Financial Data Science, RegTech and/or Robot Advisory, that our staff could take free of charge. This education program that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public. We are hereby confirming that we are happy to assign the necessary time in the proposed education program, and participate in the project related workshops when possible.

Yours sincerely,

Endorser





FINANCIAL
SERVICES
AND
MARKETS
AUTHORITY

Policy

Mr. Dave Remue
B-HIVE
De Kleetlaan 4
1831 DIEGEM

PMI_POL

date 1 March 2018
our reference ANALYS-2018-000991
your reference
correspondent R. Spiers
T +32 2 220 54 47
policy@fsma.be

Support letter concerning the European Commission's project *Fintech: Experimentation frameworks and regulatory compliance ICT-35-2018*¹

Dear Sir Remue,

We have been approached by B-Hive, who together with 24 other European research centers, is submitting a project proposal entitled 'FIN-TEC: A FINancial TECHnical training platform, in response to the Coordinated and Support Action Call Horizon ICT-35-2018 from the European Commission (EC).

We understand that the main deliverable of the project is a "standardized" training platform, common to all European countries, containing a set menu of training classes for regulators and FinTech hubs, to be aligned with state-of-the-art R&D in Financial Technology. The training platform will be developed by a group of independent experts from proponent Universities that have leading research expertise in the field.

In the current context of rapid financial innovations, we believe that this call for projects from the EC will definitely create some remarkable added value.

Because the call for projects from the EC seems to fit in our FinTech strategy, we will follow with interest the results of the selection process.

Yours sincerely,

Jean-Paul SERVAIS,
Chairman



To:
European Commission,
Horizon 2020- ICT-35-2018 CSA Call

EBF_031939

Brussels, 12 April 2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir/Madam,

We have been approached by researchers from B-HIVE, led by Dr. Dave Remue, who are submitting, together with other 24 European research centers and fintech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 - Fintech: Support to experimentation frameworks and regulatory compliance", issued by the Commission

We understand that the research team is proposing us to support the development of a state-of-the-art innovative and research-based education programme in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and Banking Organisations like us and can confirm that we are very interested in participating and benefiting from the proposed programme.

The EBF is convinced that the Proposal results can have a significant impact on our respective banking and financial networks, especially when involving its members and associates at national and EU levels.

In particular, in the framework of the collaboration and relation between the EBF and ABI Lab to support EU Project Proposals, the EBF, if the project is funded, EBF will offer its support to the project through ABI Lab in the diffusion of the project work package and by:

European Banking Federation aisbl

Brussels / Avenue des Arts 56, 1000 Brussels, Belgium / +32 2 508 3711 / info@ebf.eu
Frankfurt / Weißfrauenstraße 12-16, 60311 Frankfurt, Germany
EU Transparency Register / ID number: 4722660838-23

◆◆◆
www.ebf.eu

continuously validating the results of the Project and, consequently, giving advice and input on how to improve the project itself;

inviting its network of stakeholders to participate in the project workshops and training sessions and, in particular, in the final event of the workshop, in which a full project evaluation could be undertaken.

Looking forward to working with you in the near future.

Yours sincerely,



Wim Mijs
Chief Executive Officer



REPUBLIC OF BULGARIA
FINANCIAL SUPERVISION COMMISSION

Ref. No. 18-00-12
Sofia, 26.02.2018 2018

To
European Commission
Horizon 2020-ICT-35-2018 CSA Call

Letter of Support

Ref: FIN-TECH (A FINancial TECHnology Training Platform)

Dear Sir/Madam,

We have been approached by researchers from the University of Economics in Varna, Bulgaria, led by Prof. Plamen Iliev, Rector, who together with 24 other European research centers and Fintech partners intend to submit a project proposal called '**FIN-TECH: A FINancial TECHnology Training Platform**' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from EC.

We understand that the research team's proposal is to develop an innovative and research based educational programme in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and the staff of various FinTech companies are invited to use free of charge. This educational programme will be developed and delivered on-site by our respective network of partners, after being funded by the Call.

We highly approve such knowledge transfer, developed by established academic centers of excellence, startup FinTech companies and public service bodies as us and herein confirm that we are interested in participating and benefiting from the proposed educational programme.

We expect this educational programme to enhance our experience and result in further abilities to serve the public with the successful outcomes of the Project.

Hereby we confirm our support for the development of the proposed educational programme.

Yours sincerely,

Karina Karaivanova
Chair of the Financial Supervision Commission



To the European Commission
Horizon 2020 Call

Letter of support for the initiative for A FINancial TECHnology training platform

Dear recipient,

The Finnish Financial Supervisory Authority ("Fin-FSA") has been approached by Professor of Insurance Science from the University of Tampere, Insurance and Risk Management / Business Studies, Faculty of Management, University of Tampere is submitting, together with partner universities a project proposal under the name A FINancial TECHnology training platform. This project would be under the EU's Horizon2020 funding scheme aiming to create a more unified European Fin-Tech environment.

The main deliverable of the project will be a "standardised" training platform, common to all European countries, containing a set menu of training classes needed by regulators and fintech hubs, dynamically updated and aligned with state-of-the art R&D in Financial Technology, and with the evolving Regulation.

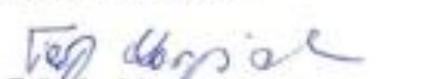
Training will be supplied according to the common platform, but separately to each national regulator and fintech hub, on demand and on-site by the Phd students funded by the project, under the supervision of the corresponding University and/or Fintech.

The Fin-FSA highly supports this initiative. The Fin-FSA is also interested in participating and having our staff take part in the proposed training program. We see this type of a training program benefitting the entire fintech sector, since it would increase understanding in the changes that are going to take place in the financial sector during the coming years.

Yours sincerely,

THE FINNISH FINANCIAL SUPERVISORY AUTHORITY


Kaisa Forsström
head of department


Teija Korpiaho
head of unit, life and non-life insurance

2018-03-21



European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Finansinspektionen
Box 7821
SE-103 97 Stockholm
[Brunnsgatan 3]
Tel +46 8 408 980 00
Fax +46 8 24 13 35
finansinspektionen@fi.se
www.fi.se

**Letter of support for
FIN-TECH: A FINancial TECHnology training platform**

Dear Sirs/Madams,

We have been approached by researchers from The University of Tampere, led by Prof. Lasse Koskinen, who are submitting, together with 24 other European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing to develop a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education program will be developed on demand and delivered on-site by the respective network of partners, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies and can confirm that the insurance division of the Swedish Financial Supervisory Authority is interested in participating and benefiting from the proposed educational program.

Sincerely,

A handwritten signature in blue ink.

Åsa Larson
Executive Director
Insurance

Executive Board

To
European Commission
Coordination and Support Actions Call
Horizon 2020 ICT-35-2016

Letter of Intent

Vienna, 27 February, 2018

To whom it may concern,

the FMA has been approached by researchers from the WU Vienna University of Economics and Business who are submitting a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordination and Support Actions Call Horizon 2020 ICT-35-2016.

We understand that the research team is proposing to develop a state-of-the-art innovative, research-based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace Lending, RegTech and Robot Advisory. This educational program will be guided by our special requirements and delivered at the premises of the WU or our premises, free of charge for us as well as for selected partners (e.g. public institutions, other regulators, FinTech startups).

We highly endorse such knowledge transfer from established academic centers of excellence and confirm that we are highly interested in participating and benefiting from the proposed educational program. We expect this program to enhance our knowledge and strengthen our ability to give regulatory guidance to financial market participants and pursue technologically-neutral regulation and supervision. We are looking forward to collaborating wherever possible and are pleased to share our practical experience.

Yours sincerely,



Helmut Emmerling



Klaus Kumpfmüller



SAI-OFC/2018/5319
DRIM/66168

CMVM

Investor Relation and Market Development Department

Exma. Senhora Professora Doutora
Paula Brito
Instituto de Engenharia de Sistemas e
Computadores, Tecnologia e Ciéncia
R. Dr. Roberto Frias,
4200 Porto - Portugal

Lisboa, 6 de março de 2018

Financial Technology training proposal

Dear Madam,

The Portuguese Securities Market Commission (CMVM) has been approached by the researcher Prof. Paula Brito from Instituto de Engenharia de Sistemas e Computadores Tecnologia e Ciéncia (INESC TEC) regarding a project to be developed by a group of European universities that aims to create a training programme that will be delivered, free of charge, to EU regulators in the areas of blockchain, cryptocurrencies, cybersecurity, artificial intelligence, robo-advisory and big data. The project is coordinated by Prof. Paolo Giudici of the University of Pavia and Prof. Andreas Hoepner of the University of Dublin and is candidate to the European Commission Horizon 2020 Call "Fintech - Support to experimentation frameworks and regulatory compliance" (reference ICT-35-2018).

A handwritten signature in black ink, appearing to be a stylized 'H' or similar mark.



Finantsinspeksiion

European Commission,
Horizon 2020- ICT-35-2018 CSA Call

12th March 2018 No 6-4/1131

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sirs/Madams,

We have been approached by researchers from University of Pavia, FinTech Laboratory led by Prof. Paolo Giudici, who is working in collaboration with Kaunas University of Technology (Prof. Audrius Kabasinskis) and who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Endorser

Andre Nõmm
Management Board member

Sakala 4, Tallinn
10130 Estonia / Estonia
T: +372 668 0600
E: info@fue.ee
www.fue.ee



www.r-project.org

European Commission
Coordination and Support Actions Call
Horizon 2020 ICT-35-2018

Letter of Intent – FIN-TECH

March 29th, 2018

To whom it may concern,

We have been approached by researchers from the WU Vienna University of Economics and Business who are submitting a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordination and Support Action Call Horizon 2020 ICT-35-2018.

We understand that the research team is proposing to develop a state-of-the-art innovative, research-based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace Lending, RegTech and Robo-Advisory. This educational program will be delivered on-site to all EU member states national financial regulators as well as selected partners and clients (e.g. FinTech startups) free of charge.

The project strives to provide open-source code and tutorials in R. We, the R Foundation for Statistical Computing, strongly endorse this approach.

Yours sincerely,

A handwritten signature in black ink, appearing to read "M. Plummer".

Martyn Plummer
Co-President, The R Foundation



Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

We have been approached by researchers from Universidad Complutense de Madrid led by Prof. Javier Arroyo, who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Sincerely,

President

Spanish Fintech and Insurtech Association AEFI

Rodrigo García de la Cruz



francefintech

Alain Clot
Président de France FinTech
94 rue de la Victoire
75009 Paris
06 85 81 40 87
alain.clot@francefintech.org

European Commission,
Horizon 2020, CSA
Call ICT-35-2018

Paris, February 19th, 2018

**Horizon 2020, Coordinated and Support Action (CSA), Call
ICT-35-2018**

**FinTech: Support to Experimentation Framework and
Regulatory compliance**

Dear Sir or Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.



For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer between established academic centers of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Sincerely yours,

Alain Clot
Président de France FinTech

A handwritten signature in black ink, appearing to read "Alain Clot".

Jean-Benoit Gambet
Association Française pour la Gestion des Cybermonnaies
9 rue Newton
75116 Paris

To: European Commission,
Horizon 2020, CSA
Call ICT-35-2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir, dear Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from companies invited by us could take free of charge. This education programme will be developed on demand and delivered on-site by our respective network of partners, funded by the CSA Call Horizon 2020 ICT-35-2018.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also to participate in the project-related workshops when possible.

Sincerely yours,

Signatory: Jean-Benoît GAMBET
President of the F for the Cryptocurrencies Management
Président de l'Association Française pour la Gestion des Cybermonnaies (AFGC)

About the French Association for the Cryptocurrencies Management : it has been created in June 2017. It has more than 200 members including Deloitte, KPMG, PWC, EY, top french banks (Societe General, Credit Agricole, BNP), lawyers, specialist of blockchain, specialist of cryptocurrency, asset managers and all entities interested in the development of this asset class.



TechQuartier

FinTech Community Frankfurt GmbH

Platz der Einheit 2, 60327 Frankfurt am Main, Germany

www.techquartier.com

Frankfurter Sparkasse, IBAN DE08 5005 0201 0200 6182 10, BIC HELADEF1822

UID DE30 851 7472, AG Frankfurt am Main, Registernummer HRB 106121

TechQuartier

TechQuartier, Platz der Einheit 2, 60327 Frankfurt / Main

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

Frankfurt, den 5. Februar 2018

**Draft Letter of support for -FIN-TECH: A FINancial TECHnology
training platform- proposal**

—
Dear Sirs/Madams,

We have been approached by researchers from the "FinTech district Frankfurt" (led by Dr. Jochen Papenbrock, CEO of the FinTech-Startups FIRAMIS located at Tech-Quartier Frankfurt), who is submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

—
We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,



European Commission,
Horizon 2020- ICT-35-2018 CSA Call

Milan, 06/03/2018

SUBJECT: Draft Letter of support for -FIN-TECH: A FINancial TECHnology training platform-
proposal

Dear Sirs/Madams,

We have been approached by researchers from -University of Pavia- (led by Prof. Paolo Giudici), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Chairman Digital Magics

A handwritten signature in black ink, appearing to read 'Luca Alberoni', is placed over a horizontal line.

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

Milan, March 29th 2018

Dear Sirs/Madams,

We have been approached by researchers from modefinance SRL (led by Prof. Valentino Pediroda and Dr Mattia Ciprian), who are submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TECHnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cybersecurity, Data Science, Cryptocurrencies, Marketplace lending, RegTech and Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. An education programme that will be ergated on demand and on-site, through a Phd student, funded by the Call, and supervised by the proposed network of partners.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up fintech companies and public service bodies like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Endorser



Ignazio Rocco di Torrepidula

Chairman, ItaliaFintech

Letter of support for -FIN-TECH: A FINancial TEChnology training platform- proposal

To: -European Commission, Horizon 2020- ICT-35-2018 CSA Call

Dear Sirs/Madams,

We have been approached by Prof. Paolo Giudici from University of Pavia, who is submitting, together with other 24 European research center and fintech partners, a project proposal on 'FIN-TECH: A FINancial TEChnology training platform' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the research team is proposing us to developing a state-of-the-art innovative and research-based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory, that our staff and staff from FinTech companies invited by us could take free of charge. This education programme that will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We highly endorse such knowledge transfer, from established academic centers of excellence to start up FinTech companies and Fintech Hubs like us and can confirm that we are very interested in participating and benefiting from the proposed educational program.

We expect this educational program to enhance our knowledge and resulting ability to serve the public and comment you for your call for research on this subject matter. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also participate in the project related workshops when possible.

Yours sincerely,

Paolo Zaccardi
CEO Sella Open Fintech Platform
Head of "Fintech District S32" Milan



Milano, Februray 8th, 2018

European Commission

Horizon 2020

ICT-35-2018 CSA Call

RE: *Letter of support for "FIN-TECH: A FINancial TECHnology training platform".*

Dear Sirs/Madams,

We have been approached by Prof. Paolo Giudici from University of Pavia, who is submitting, together with other 24 European research center and fintech partners, a project proposal on '*FIN-TECH: A FINancial TECHnology training platform*' in response to the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from your organization.

The research team is proposing us to develop a state-of-the-art innovative and research based education program in the areas of Artificial Intelligence, Blockchain, Cryptocurrencies, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robot Advisory; our staff and staff from FinTech companies invited by us could participate to the program free of charge. This education program will be developed on demand and delivered on-site by our respective network of partner, funded by the Call.

We are very interested in participating and benefiting from the proposed educational program and therefore we are proud to endorse such knowledge transfer, from established academic centers of excellence to public administrations, authorities and FinTech companies.

We expect this educational program to enhance our knowledge and resulting ability to serve our associates and the public.

We hereby confirm our commitment in dedicating the necessary time and resources to the proposed education program.

Yours sincerely,

Alessandro M. Lerro

Director and Chairman of the Scientific Board





Swiss Finance + Technology Association



1 February 2018

Horizon 2020, Coordinated and Support Action (CSA), Call ICT-35-2018

FinTech: Support to Experimentation Frameworks and Regulatory Compliance

Dear Sir or Madam,

We have been approached by researchers from the Zurich University of Applied Sciences (ZHAW) who are submitting, together with other 24 European research centres and FinTech partners, a project proposal in response to the Coordinated and Support Action (CSA) Call ICT-35-2018.

We understand that the project is intended to bring together European regulatory bodies, FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as cryptocurrencies, blockchain, robo advice, RegTech, financial data science and artificial intelligence. Staff from regulators will be invited to participate free of charge.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area.

Sincerely yours,

A handwritten signature in blue ink.

John Hucker, CFA, MBA
President, Board Member

www.swissfintech.ch

SIHLQUAI 131, 8006, ZURICH, SWITZERLAND / +41 (0)78 890 08 06

5 February 2018

Horizon 2020, Coordinated and Support Action (CSA), Call ICT-35-2018

FinTech: Support to Experimentation Frameworks and Regulatory Compliance

Dear Sir or Madam,

We have been approached by researchers from the Zurich University of Applied Sciences (ZHAW) who are submitting, together with other 24 European research centres and FinTech partners, a project proposal in response to the Coordinated and Support Action (CSA) Call ICT-35-2018.

We understand that the project is intended to bring together European regulatory bodies, FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as cryptocurrencies, blockchain, robo advice, RegTech, financial data science and artificial intelligence. Staff from regulators will be invited to participate free of charge.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area.

Sincerely yours,



Natascha Tummeley

Co-Director Swiss Fintech Innovations

From: [Regina Schueller](mailto:Regina.Schueller@eiopa.europa.eu) <Regina.Schueller@eiopa.europa.eu>
Date: 2018-03-26 19:40 GMT+02:00
Subject: RE: FW: EU project for regulatory authorities offering seminars and workshops on FinTech, AI, Blockchain, Cryptocurrencies etc.
To: Paolo Giudici <paolo.giudici@unipv.it>, Christophe HENOT <Christophe.Henot@univ-paris1.fr>, Dave Remue <dave.remue@b-hive.eu>
Cc: "Jon.Frost@fsb.org" <Jon.Frost@fsb.org>, "Patrick.Armstrong@esma.europa.eu" <Patrick.Armstrong@esma.europa.eu>, "Clement.Boidard@esma.europa.eu" <Clement.Boidard@esma.europa.eu>, "Dominique.Leuenberger@fsb.org" <Dominique.Leuenberger@fsb.org>, Katja Wuertz <Katja.Wuertz@eiopa.europa.eu>, Julian Arevalo <Julian.Arevalo@eiopa.europa.eu>, Kai Kosik <Kai.Kosik@eiopa.europa.eu>, "David Cliffe (david.cliffe@esma.europa.eu)" <david.cliffe@esma.europa.eu>, "FrancaRosa.Congiu@eba.europa.eu" <FrancaRosa.Congiu@eba.europa.eu>

Dear Paolo, Christophe, Dave,

Thanks a lot for your reply of 6 March and please accept my apologise to get back to you only now.

In the meantime having checked with the colleagues from EBA and ESMA – also in copy of this email – we herewith reiterate our position as said earlier in order to manage expectations and to avoid possible misunderstandings:

- All three Authorities are supportive to this initiative.
- We are not in a position to become joint organisers.
- We are able to provide possible speakers for the seminars and workshops from our own Authorities and/or propose potential external speakers.
- We are able to support you in further communication about the seminars in sharing it with the national supervisory authorities within our respective jurisdictions.

We hope this feedback contributes to further clarification as regards the ESAs possible support.

On behalf of the three ESAs with best regards,
Regina

Regina Karoline Schueller
Spokesperson & Communications Manager
EIOPA – European Insurance and Occupational Pensions Authority
Westhafentower - Westhafenplatz 1
D – 60327 Frankfurt am Main
Telephone + 49 69 9511 19 729
Mobile + 49 151 624 25985
regina.schueller@eiopa.europa.eu
www.eiopa.europa.eu

THE GOVERNOR

Confidential

Mr. Dave Remue
B-Hive
De Kleetlaan 4
1831 Diegem

Brussels, 23 March 2018

Dear Mr. Remue,

I refer to your e-mail on the topic of "Fintech: Support to experimentation frameworks and regulatory compliance", within the context of the Coordinated and Support Action Call Horizon 2020 ICT-35-2018 from the European Commission (EC).

We understand that B-Hive, together with other 24 European knowledge centers and business partners, is preparing a proposal ('*FIN-TECH: A FINancial TECHnology training platform*') in response to this call. The proposal would be dedicated to the training of regulatory authorities and fintech companies, fitting with the aim of the Action Call from the EC, namely to facilitate the interactions between innovative companies and supervisors.

Given the importance of fintech developments for the National Bank of Belgium's supervision and monitoring of the financial sector, I will follow the selection process of the EC with great attention and interest.

Yours sincerely,

Jan Smets



Prudential Supervision of Market
Infrastructures and Oversight
National Bank of Belgium Ltd.
boulevard de Berlaimont 14
1000 Brussels
BELGIUM

company's number:
0203.201.340
RLP Brussels
www.nbb.be

Subject: Re: B-Hive - H2020-ICT-2018-2020
Date: Wednesday, 11 April 2018 at 17:19:30 Central European Summer Time
From: Dave Remue
To: Jon Hasling Kyed (FT)
CC: Louise Buchter (FT)
Attachments: image002.jpg, image003.png

Thank you Jon

I will thus include your interest to participate in the rollout of the programme in the group proposal FIN-TECH in which B-Hive participates and which will be submitted in response to the EC H2020 CSA ICT-35-2018.

Best regards
Dave

Dave Remue
B-Hive
dave.remue@b-hive.eu
+32.499.71.61.18

From: Jon Hasling Kyed (FT) <jky@ftnet.dk>
Sent: Wednesday, April 11, 2018 8:59 AM
Subject: SV: B-Hive - H2020-ICT-2018-2020
To: Dave Remue <dave.remue@b-hive.eu>
Cc: Louise Buchter (FT) <lbu@ftnet.dk>

Dear Dave,

Yes, you can include the Danish FSA as a regulator who would be interested.

As previously stated, we are naturally interested to participate in projects that aim to transfer knowledge between established academics centres, fintech knowledge hubs, and regulators.

Kind regards,
Jon Hasling Kyed
Chief Advisor
Fintech, Payment Services and Governance Division
Danish Financial Supervisory Authority



From: NAGTEGAAL Caroline <caroline.nagtegaal@europarl.europa.eu>
Date: 2018-04-12 12:01 GMT+02:00
Subject: FinTech - Horizon2020
To: "paolo.giudici@unipv.it" <paolo.giudici@unipv.it>

Dear Mr Giudici,

As Member of the European Parliament I am committed to bring Europe's Fintech to the next level. I understand that you are, together with numerous research institutes and partners across Europe, submitting a proposal to the Horizon2020 CSA call. I understand this project is intended to bring together European regulators and the private sector to support networking and cooperation within the Union. The research team proposes developing an advanced and modern education program that regulators can use, free of charge. I am highly supportive of this project, since it will enhance the exchange of knowledge and will improve the effectiveness of the European regulation in the Fintech area.

Yours sincerely,

Caroline Nagtegaal - Van Doorn
Member of European Parliament
VVD - ALDE



PARLEMENT EUROPÉEN

Députée au Parlement européen
Christine Revault d'Allonnes-Bonnefoy

European Commission,
Horizon 2020, CSA
Call ICT-35-2018

Bruxelles, le 7 mars 2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir, dear Madam,

I have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors. I highly appreciate initiatives promoting all knowledge transfer between academic centres of excellence and regulators. I hereby would like to give my support to this project.

Sincerely yours,


Christine Revault d'Allonnes-Bonnefoy
Députée européenne d'Ile de France et des Français de l'étranger
Présidente de la Délégation socialiste française

Christine REVAUT D'ALLONNES-BONNEFOY
Députée européenne d'Ile-de-France Français de l'étranger – Présidente de la Délégation socialiste française
Groupe Socialistes & Démocrates

Parlement européen - Rue Wiertz 60, bureau ASP14G 218
– B-1047 Bruxelles /
, avenue du Président Schuman, bureau LOW T 08.084 –
F – 67070 Strasbourg
Tel: +32 2 284 58 53 /+33 3 88 17 58 53
Email: christine.revaultdallonnesbonnefoy@ep.europa.eu

Bureau de la permanence Parlementaire
96, avenue du Général de Gaulle
94000 CRETEIL
01 43 39 22 14
www.crevaultdallonnesbonnefoy.eu
Email: permanence@crevaultdallonnesbonnefoy.eu

To: European Commission,
Horizon 2020, CSA
Call ICT-35-2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir, dear Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from other legislators, public officers or FinTech stakeholders invited by us could take free of charge. This education programme will be developed on demand and delivered on-site by our respective network of partners, funded by the CSA Call Horizon 2020 ICT-35-2018.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also to participate in the project-related workshops when possible.

Sincerely yours,

Signatory:

Eric BOTOREL

French Member of Parliament, Member of the Economic Affairs Committee of the French National Assembly, Member of the National Assembly fact-finding mission on blockchain technology, Co-President of the National Assembly working group on digital economy, data, knowledge and AI

Député français, Membre de la Commission des Affaires Economiques de l'Assemblée Nationale ainsi que de la Mission d'information commune sur les usages des bloc-chaines (blockchains) et autres technologies de certification de registres, Co-Président du Groupe d'études de l'Assemblée Nationale sur l'économie numérique de la donnée, de la connaissance et de l'intelligence artificielle

Laure de La Raudière
Député d'Eure-et-Loir

European Commission
Horizon 2020, CSA
Call ICT-35-2018

Paris, le 6 mars 2018

Références : VRA-2018-3009

Objet : **Letter of support for -FIN-TECH: A FINancial TECHnology training platform-proposal**

Dear Sir, dear Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on “FIN-TECH: A FINancial TECHnology training platform” in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

The research team proposes to develop a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from other legislators, public officers or FinTech stakeholders invited by us, could take free of charge. This education programme will be developed on demand and delivered on-site.

I highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that I am interested in participating and benefiting from the proposed project.

To: European Commission,
Horizon 2020, CSA
Call ICT-35-2018

Letter of support for -FIN-TECH: A FINancial TECHnology training platform- proposal

Dear Sir, dear Madam,

We have been approached by researchers from University Paris 1 Panthéon-Sorbonne (led by Dr Christophe Henot), who are submitting, together with other 24 European research centres and FinTech partners, a project proposal on "FIN-TECH: A FINancial TECHnology training platform" in response to the Coordinated and Support Action (CSA) Call Horizon 2020 ICT-35-2018 from your organisation.

We understand that the project is intended to bring together European regulatory bodies FinTech firms and other relevant organisations, to facilitate the operations of European FinTech firms and to support the cross-border networking of FinTech ecosystems and hubs. One essential aspect is building capacity and expertise regarding the new technologies and models to support early understanding for regulators or supervisors.

For this purpose, the research team proposes developing a state-of-the-art innovative and research-based education program in the area of FinTech, including topics such as Artificial Intelligence, Blockchain, Cybersecurity, Financial Data Science, Marketplace lending, RegTech and/or Robo Advisory, that our staff and staff from other legislators, public officers or FinTech stakeholders invited by us could take free of charge. This education programme will be developed on demand and delivered on-site by our respective network of partners, funded by the CSA Call Horizon 2020 ICT-35-2018.

We highly endorse such knowledge transfer between established academic centres of excellence, FinTech companies and regulators and confirm that we are interested in participating and benefiting from the proposed project. We expect this project to enhance the knowledge and resulting ability to improve and comply with the relevant rules and regulations in the FinTech area. We are hereby confirming that we are happy to assign the necessary time in the proposed education programme, and also to participate in the project-related workshops when possible.

Sincerely yours,



Signatory:

Bruno BONNELL

French Member of Parliament, Member of the Foreign Affairs Committee of the National Assembly
Député français, Membre de la Commission des Affaires Etrangères de l'Assemblée Nationale



ASSEMBLÉE
NATIONALE

Madame Typhanie DEGOIS
Députée de Savoie

RÉPUBLIQUE FRANÇAISE
LIBERTÉ - ÉGALITÉ - FRATERNITÉ

PARIS, le 15 février 2018

Commission européenne
Horizon 2020, CSA
Call ICT-35-2018
1049 BRUXELLES
BELGIQUE

Madame, Monsieur,

Des chercheurs issus de l'Université Panthéon-Sorbonne à PARIS ont attiré mon attention sur le projet "FIN-TECH: A FINancial TECHnology training platform", dirigé par le Docteur Christophe Hénot, qu'ils soumettent en association avec d'autres centres européens de recherche et des partenaires Fintech en réponse à l'appel de projet Horizon 2020 ICT-35-2018.

En tant que membre de la Commission des affaires européennes au sein de l'Assemblée nationale et de la Mission d'information commune sur les usages des bloc-chaînes (blockchains) et autres technologies de certification de registres, je suis sensible aux projets ayant pour but d'étudier plus en détails les conséquences possibles d'une telle révolution, et surtout d'offrir un cadre juridique qui permettrait à l'Europe et à la France de devenir l'un des acteurs majeurs dans ce domaine.

A cette fin, les participants au projet proposent le développement d'un programme d'enseignement innovant, basé sur la recherche, dans le domaine de la FinTech incluant des sujets tels que l'intelligence artificielle, la blockchain, la cyber-sécurité, l'étude des données financières, le marché de prêts, la régulation technologique, le conseil par robots. A terme, la connaissance obtenue dans ces domaines pourrait bénéficier tant aux autorités publiques qu'aux acteurs privés, permettant ainsi de fournir des solutions aux enjeux dans ce domaine.

Permanence
725, boulevard Barrier
73100 AIX LES BAINS
04 79 54 74 64

Assemblée nationale
126, rue de l'Université
75355 PARIS 07
01 40 63 76 65

4.2. Third parties involved in the project (including use of third party resources)

Please complete, for each participant, the following table (or simply state "No third parties involved", if applicable):

	Participant Name	Third Parties involved in the project
1	UNIVERSITA DEGLI STUDI DI PAVIA	No third parties involved
2	HUMBOLDT-UNIVERSITAET ZU BERLIN	No third parties involved
3	ZURCHER HOCHSCHULE FUR ANGEWANDTE WISSENSCHAFTEN	No third parties involved
4	UNIVERSITY COLLEGE LONDON	No third parties involved
5	ACADEMIA DE STUDII ECONOMICE DIN BUCURESTI	No third parties involved
6	MODEFINANCE SRL	No third parties involved
7	FIRAMIS UG	No third parties involved
8	PANTEIO PANEPISTIMIO KOINONIKON KAIPOLITIKON EPISTIMON	No third parties involved
9	INESC TEC - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, TECNOLOGIA E CIENCIA	No third parties involved
10	UNIVERSITE PARIS I PANTHEON-SORBONNE	No third parties involved
11	POLITECNICO DI MILANO	No third parties involved
12	UNIVERSITY COLLEGE DUBLIN, NATIONAL UNIVERSITY OF IRELAND, DUBLIN	No third parties involved
13	UNIVERSITE DU LUXEMBOURG	No third parties involved
14	INSTITUT JOZEF STEFAN	No third parties involved
15	UNIWERSYTET WARSZAWSKI	No third parties involved
16	SVEUCILISTE U RIJECI EKONOMSKI FAKULTET	No third parties involved
17	UNIVERSIDAD COMPLUTENSE DE MADRID	No third parties involved
18	EKONOMICKA UNIVERZITA V BRATISLAVE	No third parties involved
19	KAUNAS UNIVERSITY OF TECHNOLOGY	No third parties involved
20	Masarykova univerzita	No third parties involved

21	B-Hive	ABI LAB *see table below
22	IKONOMICHESKI UNIVERSITET – VARNA	No third parties involved
23	TAMPEREEN YLIOPISTO	No third parties involved
24	WIRTSCHAFTSUNIVERSITAT WIEN	No third parties involved

B-Hive

Does the participant plan to subcontract certain tasks (please note that core tasks of the project should not be sub-contracted)	YES
<i>If yes, please describe and justify the tasks to be subcontracted</i>	
B-Hive will subcontract the evaluation lab of the project, with the European Banking Federation, to ABI Lab. ABI Lab is the Research and Innovation Centre founded on the initiative of the Italian Banking Association (ABI), with the aim of creating a network between banks and ICT companies. The tasks of the evaluation lab will be: i) continuous monitoring of the results of the project by their implementation with established banks, insurance companies and investments funds at the premises of the European Banking Federation. ii) final evaluation of the result of the project from the feedback of the stakeholders during the final conferences.	
Key personnel:	
Teresa Spada (female) – She coordinates the activities of ABI Lab, promoting the implementation of banking innovation projects with a particular impact on institutional stakeholders. She is responsible for designing and organizing the "ABI Banking Innovation Award" and the IBANK Challenge with results dissemination through specific meetings and synthesis reports.	
Does the participant envisage that part of its work is performed by linked third parties ¹	N
<i>If yes, please describe the third party, the link of the participant to the third party, and describe and justify the foreseen tasks to be performed by the third party</i>	
Does the participant envisage the use of contributions in kind provided by third parties (Articles 11 and 12 of the General Model Grant Agreement)	N
<i>If yes, please describe the third party and their contributions</i>	
Does the participant envisage that part of the work is performed by International Partners ² (Article 14a of the General Model Grant Agreement)?	N

¹ A third party that is an affiliated entity or has a legal link to a participant implying a collaboration not limited to the action. (Article 14 of the [Model Grant Agreement](#)).

² 'International Partner' is any legal entity established in a non-associated third country which is not eligible for funding under Article 10 of the Rules for Participation Regulation No 1290/2013.

If yes, please describe the International Partner(s) and their contributions

5. Ethics and Security

We have not entered any ethics issues in the ethical issue table in the administrative proposal form, so this section does not apply.

5.1 Ethics

5.2 Security³

Please indicate if your project will involve:

- activities or results raising security issues: **NO**
- 'EU-classified information' as background or results: **NO**

³ See article 37 of the [Model Grant Agreement](#). For more information on the classification of Information, please refer to the Horizon 2020 guidance: https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/secur/h2020-hi-guide-classif_en.pdf.

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