

FOR PUBLICATION

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UniCredit response to the ESAs discussion paper on the “Use of Big Data by Financial Institutions”

UniCredit is a strong pan-European Group with a simple commercial banking model and a fully plugged in Corporate & Investment Bank, delivering its unique Western, Central and Eastern European network to its extensive client franchise.

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Introduction

UniCredit welcomes the opportunity to comment on the use of Big Data by Financial Institutions. Not only in Europe, but also in the world, digital data has become an essential resource for economic growth, competitiveness, innovation, job creation and societal progress in general. In the digital era, data should be accessible and reusable in the most optimal ways. The use of newly Big Data applications are becoming important instruments that firms can leverage on to meet the new challenges.

There are already necessary rules that control the use of data in Europe – such as the upcoming General Data Protection Regulation, which is the world’s most advanced framework in data protection. Hence, as the main component of Big Data is the data itself, there is no need of a regulation targeting only this new technology. In fact, regulation targeting a specific type of technology would be detrimental to economic growth both in the real and in the digital economy.

In view of the European Commission’s effort to build a Data Economy and the Digital Single Market in Europe, the opportunities that Big Data brings into the European Financial system should be properly seized.

Answers to Questions

1. Do you agree with the above description of the Big Data phenomenon? If not, please explain why. Please also mention whether you consider that other characteristics are relevant to understanding the use of Big Data.

Overall, we agree with the definition of Big Data provided in the Discussion Paper. However we believe that the given description could be complemented with the following additional insights:

- On **paragraph 1**: we agree that Big Data is often described with the three “Vs”. However, recently a fourth letter “V” has been added: VALUE. Therefore, we suggest to add “VALUE” into the description due to the big “value” that available data, internal or external, could bring into the big data process.

Furthermore, some other important “features” that should be considered within the description are: (i) “Variability”, which refers to the possible inconsistency of analyzed data; (ii) “Complexity”, which is directly proportional to the size of available data; and (iii) “Authenticity”, which refers to the informational content that can be extracted from data.

- On **paragraph 2**: the words “Big Data” are often associated with the concept of “putting the data inside and generate predictions”. However, we disagree with such a concept. The technology itself enables data storage (even at a lower cost than using other type of technology), however, in order

to produce reliable insights and predictions, several activities have to be performed to be sure that data is being used properly.

- On **paragraph 4**: we suggest allowing the possibility of using Big Data to create new products and services, based on bank data that is not strictly related to its core business.
- On **paragraph 5**: we agree on the message. In fact, Big Data is a phenomenon where the entire organization is involved, from the business areas to the technology partner.
- On **paragraphs 8 and 9**: in our view, new IT tech players, by nature, leverage on this type of technology, while in the meantime “old” players are moving fast into it. Financial institutions are already approaching and using Big Data, but the real value of it will be reached once real integration of several private and public sources takes place.
- On **paragraph 11**: in our view the “real-time” feature could be a critical key factor to boost the creation of effective Big Data-based products and services.
- On **paragraph 12**: as data sources are increasing day by day, new data could be potentially moved and loaded into a Big Data environment. However, the challenge is to understand what of the ingested data is really relevant. It is not to be thought that it will be easy to ingest any kind of data and any data available online.
- On **paragraph 13**: Financial institutions are expert in managing relational data, but are currently less skilled in managing semi-structured and unstructured data. Therefore, it should be considered that Financial Institutions will have to review their internal technical skills.
- On **paragraph 14**: in our view, Chief Data Officers (CDOs) will have to include into their agenda (1) how to properly manage Big Data, since this is a powerful instrument; and (2) the need to monitor how data is stored along with a flexible metadata management tool.
- On **paragraph 15**: we are of the view that the knowledge acquired through Big Data has to be facilitated by reducing or avoiding the lack of access to external or internal data sources. In any case, a proper solution to integrate such external data with internal data has to be identified.

Finally we would like to suggest some other useful points that would allow a more encompassing description of the Big Data phenomenon, such as:

- **New and Multiple Data Sources**: IoT (Internet of Things), interconnected devices, social network, etc.
- **New and Multiple Technologies**: Big Data native technologies, innovative storage solutions, cloud, new analytical framework, etc., enabling new ways to explore the data, yet implying new challenges in terms of security.
- **New Intra-Industry Opportunities**, both within the same organization (meaning cross-selling opportunities, customized products, even more customized services) and among organizations of the same industry (in terms of opportunities from data exchange/customer data portability).
- **New Cross-Industry Opportunities**, by selling-out data to or partnering with other third players (FinTech, BigTech) leveraging on the value of customer information held, and opportunities given by the possibility to exploit the insights of Big Data for diversifying the bank business and selling non-financial products/services.
- **Augmented Competition**: for the reasons explained above, banks are not only competing among each other, but also with other non-financial companies.

2. Which financial products/activities are (likely to be) the most impacted by the use of Big Data and which type of entities (e.g. large, small, traditional financial institutions, Fintechs, etc.) are making more use of Big Data technologies? In light of ESAs’ objective to contribute to the stability and effectiveness of the financial system, to prevent regulatory arbitrage, do you consider that there is a

level playing field between financial institutions using Big Data processes and those not using them (e.g. because they do not have access to data or the (IT) resources needed to implement Big Data processes) or between established financial institutions and potential new entrants (e.g. Fintechs) using Big Data processes? Please explain.

The banking sector is among the top industries by IT expenditure and Big Data is going to have a significant impact on Financial Institutions. In our view, the financial products/activities that will be the most impacted are those where traditionally customer data has already been used intensively: customer identification/proof, AML-fraud detection, customer profiling, cross-selling opportunities, regulatory compliance (e.g. FATCA¹, KYC, etc.), and product/service customization.

Among the business opportunities offered by Big Data, we would like to mention the following:

- the ability of a financial institution to become a data provider for an external third party. The financial institution could differentiate itself from traditional banking business, by creating a new business model based on data, of course always in compliance with privacy and data protection rules, e.g. General Data Protection Regulation (GDPR).
- the analysis of human-trends and patterns (which may not be strictly financial in nature), in order to predict and meet certain needs relevant for the financial institution.

As a consequence of the rising of the Big data phenomenon, the challenge for Financial Institutions is to overcome successfully the new competitive arena. We believe that Financial Institutions could leverage on Big Data for all types of business processes. As a consequence, this will increase the efficiency in internal processes.

In our view, the Financial Institutions which are not going to adopt the use of Big Data will fall behind in the competitive arena. In fact Financial Institutions need to adapt to a new scenario where challenges and business opportunities (e.g. partnerships) are coming from outside the banking industry (e.g. Fintechs).

Due to their perimeter of action, Fintechs are creating disrupting services by using innovative technologies which may not be under the scope of the same financial regulations applied to Financial Institutions, thus creating un-level playing field.

3. Do you offer/are you considering using Big Data tools as part of your business model? If so, please briefly describe: i) what type of entity you are, e.g., long established, start-up, a product provider, an intermediary; ii) the service you provide; iii) the nature of your clients; iv) your business model; v) whether the Big Data tools/strategy were developed by an external company or internally and whether you have related agreements with other entities (including non-financial entities); vi) what are the types of data used (personal, anonymised, user data, statistical data etc.) sources of data; and vii) the size of your Big Data related activity and/or forecast activity (e.g. to what extent are business decisions already taken on the basis of Big Data analysis; what other business actions could be based on Big Data in the future)?

Yes, UniCredit is definitely taking steps towards the adoption of Big Data to take advantage of new business opportunities and as part of its business model. Big Data is currently being used for commercial effectiveness, data centralization, internal technology improvements and decommissioning².

UniCredit Group is a well-established pan-European Financial Institution, which uses intensively several types of data, such as personal data, anonymized data, technical data, identification data, transactional data, credit/risk data, contact history data, customer preference data (e.g. contact preference, contact

¹ The Foreign Account Tax Compliance Act (FATCA) is a 2010 United States federal law to enforce the requirement for United States persons including those living outside the U.S. to file yearly reports on their non-U.S. financial accounts to the Financial Crimes Enforcement Network (FINCEN). It requires all non-U.S. (foreign) financial institutions (FFIs) to search their records for indicia indicating U.S. person-status and to report the assets and identities of such persons to the U.S. Department of the Treasury.

² The process through which applications are substituted when they are out of maintenance and /or obsolete.

details, beneficiary/contact lists), and behavioral data (e.g. browsing history). The data sources are mainly internal (i.e. credit and personal data), but UniCredit is integrating some external sources (structured and unstructured data) as well, in order to increase the accuracy of the developed solutions.

Regarding the use of “social data”, at this moment we are not using this type of data, however it could become interesting to use them for certain banking processes. For instance, fast customer on-boarding by using social media profile and customer social data can be used to improve and enhance the quality of Anti-Money Laundering (ALM) checks through better customer profiling. For all these reasons, we are of the view that any discussions concerning customer data usage by financial institutions should address also this specific data.

4. If you are a consumer or a consumer organisation, do you witness any of the uses of Big Data? In what fields?

No answer

5. Do you consider there are (non-regulatory) barriers preventing you (or which could prevent you in the future) from collecting and processing data? Are there barriers preventing you from offering/developing Big Data tools in the banking, insurance and securities sectors? If so, which barriers?

No answer

6. Do you agree with the above short, non-exhaustive, presentation of some of the main applicable requirements? If not, please explain why. Please also mention whether you consider that other legal requirements are essential and should be mentioned

Yes, we agree with the majority of the rules mentioned in the Discussion Paper as Big Data is certainly a new technology, which is impacted by several rules.

In fact, we suggest considering also the Competition law framework. This is confirmed by the most recent competition concerns³ thrown up by Big Data. For example:

- the collection and use of Big Data may raise entry barriers and can be a source of market power;
- data pooling might result in a coordinated behavior among competitors.

In order to allow a correct application and use of Big Data, we suggest a light approach to harmonize some national requirements via guidelines on data and consumer protection requirements.

7. Do you consider any of these regulatory requirements as unjustified barriers preventing you from using Big Data technologies? If so, please explain why. Please also explain whether you consider that further regulation (including soft law/guidance, etc. and insofar as it falls within the scope/remit of the ESAs) should be introduced to facilitate the use of Big Data technologies.

We believe that local regulations are the ones putting the main obstacles to the use of Big Data.

Data decentralization comes along with the technology evolution of Big Data. Massive processing capabilities, along with the difficulty to find highly-skilled professionals and other factors implied by the use of Big Data, lead to a natural data delocalization (e.g. cloud solution or externalization of some business intelligence/insight capabilities). The physical delocalization of data should be considered as a

³ In November 2016, the OECD held a hearing discussion on Big Data to explore the implications on competition authorities' work and whether competition law is the appropriate tool for dealing with issues arising from the use Big Data. Also the European Competition Commissioner in September suggested a new EU Directive to ensure the consistent application of competition law on Big Data issues throughout EU.

business opportunity and should be regulated by EU law - under a global perspective - in order to rectify and discipline decentralization scenarios.

In addition, it is fundamental to align at EU level the data protection and security rules, to avoid misalignment of regulations among the different countries: data management rules harmonization is a key to a widespread use Big Data.

We believe that in the case where Financial Institutions and other “players” (e.g. other industries using Big Data) guarantee the compliance of all the points listed in paragraphs 29 and 30, then they should have the possibility to fully leverage on the stored data into their own systems and should be able to move it into a Big Data environment. For instance, German law does not allow Financial Institutions to manage data that is not strictly connected to the application that uses such data. This means that a “player” cannot move all of the managed data into a Big Data platform and analyze it in order to find new ideas or a pattern or to create a new product based on such data. This is a great disadvantage when compared to a real “data driven company”.

None of the requirements included in the discussion paper represents unjustified barriers, but (as mentioned before) there is a lack of guidance at the EU level for Big Data.

Indeed, **it would be appreciated** if all these regulations were harmonized, providing recommendations or a soft law aimed at **clarifying the application of the existing rules related to the use of Big Data, as well as at enabling the correct application of Big Data within the organizations**. Only a clear Regulatory framework allows companies to fully exploit their Big Data potential.

8. Do you consider the potential benefits for consumers and respectively financial institutions to be accurately described? Have you observed any of them in practice? If so, please provide examples. If not, please explain whether you are aware of any barriers that may prevent the above potential benefits from materializing?

Customer categorization, clusterization and profiling (according to the Regulation on Data Protection) have been part of the Financial Institution tools for years. Big Data brings this approach a further step forward, allowing analysis of a huge quantity of data not available before. In this respect, in the last few years, UniCredit has performed some tests, with the lawful authorisation of the data subjects involved in such experiments.

As highlighted in the discussion paper, the barriers are mainly related to the possibility to use the entire available datasets. We would also add an additional and critical issue, which can be perceived as a barrier, which is the shortage of business and technical skills in using Big Data in Financial Institutions.

Finally, an additional effort has to be made by Financial Institutions when using Big Data technology, since their “business areas” have to understand properly how they can leverage on Big Data, while their “data technical side” has to be inclined to train people for a proper/better use of this new technology.

9. Do you agree with the description of the risks identified for consumers and respectively financial institutions? Have you observed any of these risks (including other risks that you are aware of) causing detriment to consumers and respectively financial institutions? If so, in what way? If not, please explain why. Please also mention whether certain risks for consumers and financial institutions have not manifested yet but have the potential of developing in the future and hence need to be closely monitored by Supervisory Authorities.

Overall, UniCredit agrees with the description of the risks identified for consumers in the Discussion Paper.

However it is worth highlighting that there is a lack of harmonization and guidance at EU level for data processing that falls under bank secrecy definition. Bank secrecy definition is not harmonized within the legislation of the EU Members (for example in case of cross-border data processing), contrary to the GDPR and Consumer Protection. Therefore, it is necessary to find a proper solution to harmonize bank secrecy

law or give additional guidance or recommendations aimed at enabling fully compliant and correct application of Big Data, especially for multinational companies such as UniCredit.

10. Is the regulatory framework adequately addressing the risks mentioned above? Bearing in mind the constant evolution of technologies/IT developments and that some of the above mentioned regulatory requirements are not specific to the financial services sector (e.g. GDPR), do you think further regulation is needed to preserve the rights of consumers of financial services in a Big Data context? Please explain why.

As described in the Discussion Paper, the EU Regulatory Framework is twofold: a horizontal framework targeting data protection and consumer protection, and a sectorial financial legislation (e.g. MiFID, EMIR, AML), which becomes critical when it comes to Financial Institutions using Big Data technologies.

We do notice that with reference to the horizontal framework, the rights of consumers of financial services are sufficiently preserved.

Furthermore, we believe that further regulation targeting exclusively Big Data is unnecessary.

However, we do agree that in order to allow innovation, the application of new technologies/IT developments and new business models (i.e. FinTechs) must be taken into consideration by revising when appropriate the existing legal framework and every time a new EU Regulation is going to be drawn up. It is important to recall that a level playing field among traditional and new players is a fundamental factor for a fair competitive environment.

In our view, Financial Institutions should have the right to use data available, internally and externally, to offer even better services to their customers, without prejudice of customers' rights, in compliance with the law and regulations (i.e. a customer must have given his consent for her/his profiling).

In line with GDPR requirements as stated in paragraph 19, it is important to underline that "Consumers have also the right to know the logic involved in the automatic processing". This means that the service providers are obliged to explain their business logic to the customers providing important internal information, if required by them.

11. Do you agree that Big Data will have implications on the availability and affordability of financial products and services for some consumers? How could regulatory/supervisory authorities assist those consumers having difficulties to access financial services products?

No answer

12. Do you believe that Big Data processes may enable financial institutions to predict more accurately (and act accordingly) the behavior of consumers (e.g. predicting which consumers are more likely to shop around, or to lodge a complaint or to accept claims settlement offers) and could therefore compromise the overarching obligations of financial institutions to treat their customers in a fair manner? Please explain your response.

Yes, we do believe that Big Data enables a better predictive capability. Also, we believe that currently there are enough rules that regulate and protect customers from unfair usage of data. In fact, customers should also have the possibility to identify and decide which data is (or is not) usable/sharable by/with the banks. This is already happening in other non-EU countries (e.g. USA), where customers can decide if to "monetize" their choice in terms of data usage. This could have a significant positive consequence for the Financial Institution (which can expand the knowledge of his client) and the customer (who can receive even more bespoke offers).

Regulators should be aware of this customer-centricity concept and allow exceptions to data protection and privacy laws, in case the usage of certain data is authorized by the customer itself.

13. Do you agree that Big Data increases the exposure of financial institutions to cyber risks? If yes, what type of measures has your institution adopted or is going to adopt to prevent such risks? What could supervisory/regulatory authorities do in this area?

As the Big Data technology, and the concept in general, was not born in Banking, when Financial Institutions decide to use Big Data they need to adapt their IT systems, in order to comply with their regulatory requirements from a cyber-security point of view. These requirements are strict and severe (i.e. in terms of sanctions, reporting and notifications) in terms of customer data-usage and privacy.

Hence, in our view, the use of Big Data by Financial Institutions does not increase exponentially the exposure to cyber-risks in comparison with the use of more traditional technologies to analyse their own internal data.

However, we believe that the existing regulatory framework does not consider, nor capture certain implications for international Financial Institutions, such as reporting and notification requirements envisaged in different regulations (NIS Directive, PSD2, Data Protection Regulation).

Therefore, in line with the position of the European Banking Federation⁴, we recommend the supervisory and regulatory authorities to take into consideration the following measures that could prevent cyber-security risk within the Financial Industry:

- Reporting:
 - to harmonize the format and procedures for security (IT) incident reporting to avoid overlap and redundancy in reporting to multiple competent authorities. In this case, the aggregation of incident notification in a single point of contact would be very much supported.
 - to establish a constant dialogue between the European Central Bank in the context of the Single Supervisory Mechanism (ECB/SSM) and the relevant stakeholders (banks, banking associations, European Banking Federation, etc.) on methodologies/processes for incident reporting and cyber risk assessment.
 - to establish a proper mechanism able to extract and distribute among banks the lessons learnt from incident reporting, in order to support incident and fraud prevention and early warning.
- Information Sharing:
 - to allow the banking industry to share among its participants sensitive information related to fraud and cyber-attacks at national and cross-border level.

14. Would you see merit in prohibiting the use of Big Data for certain types of financial products and or services, or certain types of customers, or in any other circumstances?

No, we do not.

15. Do you agree that Big Data may reduce the capacity of consumers to compare between financial products/services? Please explain your response.

We believe that Big Data will support Financial Institutions in providing even better services. In fact, one of the main purposes of using Big Data is to improve the ability of the industry to offer products and services, in line with the consumer preferences.

Today a customer is already able to compare a product or a service provided by a specific Financial Institution and see if it satisfies her/his needs better than other products provided by a competitor. That is

⁴ The EBF Vision for Banking in the Digital Single Market: INNOVATE, COLLABORATE, DEPLOY (November 2016)

why we do not see Big Data to significantly reduce consumers' capability to compare different financial products/services.

Nevertheless, there is a small risk of a reduced comparability that can be perceived from a customers' side. In this case, the customer has the right, in line with our answer to question 10 above, to ask the Financial Institution that offered or provided him with the product or service the rationales used to select such products for him. In this way, consumers will be fully aware about the selection process and might even verify its correctness.

16. How do you believe that Big Data could impact the provision of advice to consumers of financial products? Please explain your response.

We believe that new data sources, new technology enabling real-time data and advanced statistics/math algorithms applied to Big Data create a strong foundation for a more accurate and predictive-behavior analysis. Accuracy should be one of the greatest advantages provided by using Big Data. The use of wider and older datasets could further allow to further increase precision when targeting customers.

17. How do you believe Big Data tools will impact the implementation of product governance requirements? Please explain your response.

Big Data tools could impact the implementation of product governance requirements. In fact, the product governance requirements to safeguard financial institutions' customers are mostly included in the MiFID/MiFID II and the "Guidelines on Product Oversight and Governance Arrangements for Retail Banking Products (POG)".

For instance, the MiFID II lays down a number of product governance requirements (see Art. 16(3) and 24(2) predominantly) and states that the requirements on product governance apply without prejudice to any assessment of the appropriateness or suitability of a product.

Specific Big Data tools could be developed to be compliant with the requirement to identify the target market. For instance, Big Data tools could be used when a distributor needs to collect a series of information such as a summary of the types of clients, to identify the proportion of sales made outside the target market, etc.

18. How do you believe Big Data tools will impact know-your-customer processes? Please explain your response.

The development of Big Data technology can help institutions to improve their Anti-Money Laundering and Combating the Financing of Terrorism (AML/CFT) policy and their KYC procedures.

Big Data can be used to collect, share and process a vast quantity of multi-structured data. Big Data tools make it possible for the banking sector to quickly analyze transactions and to cross-check them, for example with geolocation data. Also, Big data tools can increase the reliability of customer data analysis by using the technology to find absent data or data that has not been updated in a customer's records. In addition, such tools also make possible to link data with no common key, so that data from different management systems within the bank can be compared or merged almost instantly.

A thorough predictive analysis of customer behavior can be used to anticipate customer's behavior and to enrich the profiling tools. Behavioral analysis over a long period will provide perspective on the observation of facts and expose correlations, or identify lead indicators or inconsistencies. This technology is particularly valuable to the banking sector, because of the substantial volume of customers, transactions and available data history.

Another example is the integration of available data with multiple and different sources for customer data (e.g. social networks). This could represent an opportunity for financial institutions to cross-check data

provided by the customer (e.g. addresses, contacts) and discover additional information that may be relevant for certain banking processes.

Moreover, in the future, Financial Institutions could collect additional data generated through the IoT (Internet of Things). This data will contain customers' behavior elements and patterns, and could be considered accurate. This type of data will be useful to timely address the "latent" or "expressed" needs of customers. Thus, financial institutions would be able to offer the most appropriate product or services in line with their behavioral patterns.

19. What are key success factors for a Big Data strategy (i.e. the adaptation of the business model/plan towards Big data driven technologies and methods)?

A more comprehensive analysis of how the use of Big Data could support the Financial Industry to its full potential has to be fully assessed. We also believe that some organizational changes within a company should be done at different levels, in order to create a flexible and cross skilled environment.

20. What are the greatest future challenges in the development and implementation of Big Data strategies?

We believe that the greatest challenges in the development of Big Data are:

- To identify the right "use cases" on Big Data which could be implemented in a 2-3 year roadmap.
- To identify and attract skilled talents with the right key competences required to develop Big Data tools within the organizations.
- To breach the gap of regulation between banks and other "third" players, like Fintech or Bigtech (Fintechs specialized in Big Data) in order to allow a real level playing field. Currently there are strict rules and policies on the financial sector, whereas we note the absence (almost) of regulations on the treatment of customer data for IT/customer insight companies.
- To build awareness among regulators and supervisors that Big Data will also bring many opportunities for all players within the Financial Sector . Hence, we expect to obtain support in terms of collaboration from regulators and supervisors to create and test methodologies or specific "use cases".
- To establish reciprocal support and sponsorship between the public and private sector on the use of big data, sharing data, technology and related analytical tools.

21. This Discussion paper refers to a number of measures and tools meant to ensure compliance with conduct and organisational regulatory requirements as well as data and consumer protection rules in the context of big data analytics. Are other measures and tools needed? If so, what are they and what they should cover?

Apart from the example reported in the discussion paper, the use of Big Data can also be helpful for Banks from a regulatory compliance perspective in some other ways. In fact, data analysis tools could support Financial Institutions in providing information to regulators too. For example, with specific reference to trades executed on behalf of clients, financial institutions are able to show that they were performed in the most advantageous way (for customers). Thanks to these tools it should be possible to examine large transaction-related data sets, so that the process of regulatory reporting becomes quicker and even more transparent.

22. How do you see the development of artificial intelligence or blockchain technology in connection with Big Data processes?

Big Data technology can be an enabler of Blockchain. Since storage scalability is a limitation of most of the current Blockchain systems, Big Data can help in case of high transaction volumes. At the same time, the possible proliferation of multiple blockchains in the future can provide a new source of data for analytics

and data mining, which will require Big Data systems. Today, several companies already offer analytics services for public Blockchain transactions and open source analytics frameworks are already in place.

In our view, interaction between Blockchain and Artificial Intelligence (AI) is difficult to be predicted. However it is possible that AI systems could be able to interact and transact with blockchains with a similar or even higher autonomy, when compared to today's machine learning systems for investment purposes (e.g. Robo-advice).

We believe that another interesting development is the use of Blockchain as a foundation service layer⁵ for AI and Big Data analytics systems where blockchain capabilities such as transfer of value, transaction validation and notarization of information can be leveraged.

In addition, we believe that Blockchain could solve some of the main Big Data's challenges such as how to build a universal data exchange. With reference to AI, there are Regulatory Technology firms (RegTechs) that are creating innovative artificial intelligence (AI) solutions with the potential to transform how banks deal with regulatory compliance issues. In this regard, connecting AI and Big Data might create a powerful engine. Indeed, Artificial intelligence leveraging on the three "Vs" of big data (volume, variety and velocity) will improve in terms of timing in providing updated and detailed responses.

Last, AI and machine learning have reached a high level of development so far, and will be increasingly extended to a lot of technology-enabled services and to predictive analysis. This will make these types of technologies more accurate, if connected with Big Data Processes.

23. Are there any other comments you would like to convey on the topic of use of Big Data by financial institutions? In particular, are there other relevant issues that are not covered by this Discussion Paper?

In line with our answer to question 20, it is very important to build awareness among regulators and supervisors that Big Data will create many opportunities within the Financial Sector, including the new entrants (Fintechs). In line with European Banking Federation, we believe that collaboration and support from regulators and supervisors will be highly required to help data driven innovations to be implemented under a level playing field across the European Financial Services Industry.

⁵ Foundation service layer is meant as a basic infrastructure common for Artificial Intelligence and Big Data, for the purposes explained in text for both items

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Please find below the list of the key people involved in this response, whose contribution made possible to coordinate and provide UniCredit answers and contributions to this Consultation. Some other experts have been involved alongside the UniCredit Group, but are not listed below.

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