

Big data meets artificial intelligence –

accompanying questionnaire for consultation on BaFin study

BaFin has recently published its report "**Big data meets artificial intelligence – challenges and implications for the supervision and regulation of financial services**". We would like to build on this report to engage in discussions about big data and artificial intelligence. This is why we are calling on all stakeholders to critically examine the scenarios and findings in the report as part of the consultation process and to share the expertise available within their respective institutions.

We kindly ask you to answer the questions below for this purpose. These questions relate to the relevant information contained in the report and should not be viewed in isolation but within the context of this study. In addition, we kindly ask you to answer the questions using the boxes provided. You are also welcome to supplement our questions with your own views and findings; when doing so, please use the separate boxes provided in each case. Of course, you are free to answer some questions only – i.e. you do not have to fill in each box. The purpose of these questions is to structure the consultation process and not to impede the discussions we are seeking to engage in. You can provide relevant further information and comments in relation to the study under point 4 if you consider that there are areas that have not or insufficiently been reflected in the questionnaire.

We are planning to evaluate the submitted responses; afterwards, an anonymised and aggregated evaluation is to be published online. BaFin will decide whether and which questions it will follow up also based on these findings. However, the submitted responses will not be published individually. Only those submitted in the required format will be considered for evaluation. Please send the completed Word document by 30 September 2018 as an e-mail attachment to the following address:
Consultation.BDAI@BaFin.de.

This questionnaire is meant to initiate a discussion and does not imply that the use of BDAI technologies per se could jeopardise financial stability, market and firm supervision or collective consumer protection.

It is essential that you specify the information below first. Any responses that do not contain the information requested will unfortunately not be considered for evaluation.

Institution (company, representative/association, supervisor/regulator, etc.): Name: Trade Association

Name: Association for Financial Markets in Europe (AFME)

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1. Financial stability and market supervision

1.1 Emergence of new business models and companies

- Which business models that are not adequately covered by the current regulatory framework need to be observed at the moment or are to be expected in the near future?
 - Which analysis methods, e.g. from market research, could help to identify such business models at an early stage?
- How should the growing competitive and margin pressures be reflected in the assessments of the medium- to long-term solvency? Are the existing tools sufficient?

Your answers to the questions above:

AFME and its members welcome increased focus on, and understanding of, Big Data and AI within the capital markets industry by all market participants. The applications are diverse and are already transforming many aspects of business, from trading and client interaction to risk management and operational processing.

As with any new and developing technologies, it is important that the risks are considered and actively managed. However, AFME believes that, as under the current regulatory framework, regulation should not be directed at use of particular technologies but at the activities in which firms engage. This approach will allow the technology to develop to the maximum benefit of all market participants, while safeguarding clients and market stability.

We note that the BaFIN, together with other market supervisors, may be best placed to observe where new risks are emerging, due to changing business models or market pressures and encourage continued dialogues with supervisors across the EU and third countries in this regard.

Is there any other relevant information that you would like to provide in this context?

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1.2 Connecting markets and market participants

- How can we ensure that the structure of this dynamic market and the resulting risks are transparent in the long term?
 - Could supervisory authorities use graph analysis or topological methods, for instance, in the long term in order to identify market structures?

- Could such findings be used to calibrate macroprudential buffers, e.g. by directly taking into account the degree of interconnectedness in the same way as SIFIs¹ are determined?
- What can be done to identify risks that are outside the organisational structure of supervised market participants and that can only be partially identified or managed by both the market participants themselves and the supervisory authorities (e.g. risks resulting from a dependency on external ratings)?

Your answers to the questions above:

BDAI may in time provide new tools for analysis that assist in the supervision of firms. However, given the breadth and diversity of participants in Europe's capital markets, we believe that such supervision should continue to be principles-based and make use of expert judgement, rather than BDAI tools becoming a way to 'hard-code' supervisory principles in a way that removes flexibility and impedes consideration of individual models.

As in our response to Question 1.1, AFME believes that, as under the current regulatory framework, regulation should not be directed at use of particular technologies but at the activities in which firms engage. This approach will allow the technology to develop to the maximum benefit of all market participants, while safeguarding clients and market stability. We are therefore supportive of a continuation in the existing supervisory approach in the EU.

Is there any other relevant information that you would like to provide in this context?

This question has intentionally been left blank.

1.3 Using technology to limit undesirable developments

- Would safeguards for limiting domino effects in the context of BDAI be necessary and useful even outside of trading venues?
- How could existing protective measures, such as volatility interruptions, speed bumps and circuit breakers, be optimised or improved specifically for this purpose? How could innovative protective measures be advanced, for instance, through experiments conducted in test environments?

Your answers to the questions above:

AFME believes that these measures are suited to trading venues and therefore has no comments in response to this question.

¹ SIFI stands for „Systemically Important Financial Institution“, cf. FSB – „Reducing the moral hazard posed by systemically important financial institutions“, Available online: http://www.fsb.org/wp-content/uploads/r_101111a.pdf, accessed on 10 July 2018.

Is there any other relevant information that you would like to provide in this context?

This question has intentionally been left blank.

1.4 Redefining and addressing systemic importance

- Does the concept of systemic importance need to be redefined as market structures are changing? If so, how can this be done?
 - Could the methods used to identify structures, such as topological methods as mentioned in the previous chapter, be used here as well?
- Do current risk mitigation strategies need to be readjusted in order to take into account potentially new systemically important companies and structures?

Your answers to the questions above:

As in our response to Question 1.1, AFME believes that, as under the current regulatory framework, regulation should not be directed at use of particular technologies but at the activities in which firms engage. This approach will allow the technology to develop to the maximum benefit of all market participants, while safeguarding clients and market stability. We are therefore supportive of a continuation in the existing supervisory approach in the EU.

BDAI may in time provide new tools for analysis of market structure. However, given the breadth and diversity of participants in Europe's capital markets, we believe that supervision of firms should continue to be principles-based and make use of expert judgement, rather than BDAI tools becoming a way to 'hard-code' supervisory principles in a way that removes flexibility and impedes consideration of individual models.

We further note that the BaFIN, together with other market supervisors, may be best placed to observe centrally where new risks are developing, such as changes in market composition or the emergence of new systemically important firms.

Is there any other relevant information that you would like to provide in this context?

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2. Firm supervision

2.1 BDAI governance

- Does the scope of existing supervisory practices and the corresponding legal requirements governing proper business organisation need to be expanded as the use of BDAI increases?
 - Could additional technical safeguards such as those used in aviation be necessary and suitable for the appropriate management of particularly risky BDAI applications as part of a proper business organisation?

- Which BDAI applications would be considered for such special treatment? Should, for instance, a chatbot and a model for liquidity management be treated differently?
- Is it necessary to extend the scope of existing requirements governing the evaluation of processes for BDAI-driven applications beyond the documentation requirements that currently apply?
 - Does it make sense, for instance, to also focus on examining actual results when complex processes are evaluated, required documentation aside?
 - How can a minimum standard be established to govern the explainability/traceability of the algorithms used, potentially with different levels depending on the areas in which they are each used?
- Is it necessary to define additional eligibility requirements for senior management as the use of BDAI increases?

Your answers to the questions above:

Both as an existing technology and via its underlying processes, we believe that BDAI is already included in current and forthcoming regulations in the EU and does not require new regulatory requirements at this time. This is part of a wider framework of outcomes-based requirements, covering numerous aspects of business, from a duty of care for customers to the obligations to detect and prevent market abuse. These requirements apply to institutions regardless of the processes used internally, which increasingly involve BDAI. Specific examples include:

- MiFID II/MiFIR (Directive 2014/65 and Regulation 600/2014), effective January 2018, which established closer regulation and monitoring of algorithmic trading, which can involve AI, by introducing requirements for effective system controls and resiliency; and
- The General Data Protection Regulation (Regulation 2016/679 – “GDPR”), effective May 2018, which introduced the right for individuals to understand how automated decisions have been made based on their data.

In addition, the European Banking Authority (EBA) Internal Governance Guidelines, September 2017, contain extensive requirements for risk management and control functions within firms, as well as the responsibilities of senior management, which should also apply to firms’ use of technology. The governance processes for the use of technology within firms can be adapted as innovations emerge, taking into account the particular features and risks of each. For BDAI, these processes should already evaluate particular uses of the technology throughout their lifecycles (e.g. design, data inputs, outputs, modifications). They should also include assessments of appropriate levels of transparency for each application.

Is there any other relevant information that you would like to provide in this context?

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- What steps can be taken to prevent undesirable or criminal activity from moving to firms where money-laundering detection processes are less developed in terms of BDAI?
- What explainability and documentation requirements must algorithms meet in order to ensure that their results can be used for official sanctions and intervention measures aimed at preventing or prosecuting crimes?
- Should general standards be defined for the effectiveness of the methods used when applying BDAI technologies, particularly in order to identify money laundering activities?

Your answers to the questions above:

AFME strongly supports the BaFIN's efforts in the fight against financial crime, in particular in seeking to ensure that its supervisory approach remains responsive to evolving financial market risks and concerns, and to ensure that it assists firms in their continued development of effective and risk-based financial crime controls. The aim to strengthen our collective ability to detect, disrupt and prevent organised criminals and terrorist financing is something that has to be a high priority for all market participants.

AFME's members use a wide range of tools to prevent and detect financial crime, within which BDAI is increasingly important, for the reasons set out within BaFIN's report. However, as a firm's financial crime controls improve, those seeking to commit undesirable activity will seek out a different routes, including moving to firms where money-laundering detection processes are less developed. As such, we suggest that the regulator may consider a focus on firms where less mature money-laundering detection processes are in place.

AFME is therefore supportive of industry standards that are broadly applicable across all market participants and coordinated at a regional and/or global level. These standards should be principles-based, rather than prescriptive, allowing firms to tailor them to individual business structures and to keep up with evolutions in technology and criminal activities. In conjunction, we would be supportive of any attempt to increase and improve the information flow between market participants and regulators, in order to stay ahead of trends in money laundering, for example.

We recommend that further clarity is provided with reference to "standards...for the effectiveness of the methods used". It is difficult to measure the effectiveness of tools that combat financial crime and money laundering without knowing the activity that the tools were not able to detect or prevent.

Is there any other relevant information that you would like to provide in this context?

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2.3 Internal models subject to supervisory approval

- How would the use of BDAI change model development, monitoring and approval process requirements, particularly with respect to the increasingly dynamic pace of change for data and algorithms?

- From a supervisory perspective, what general modifications would constitute a model change that would need to be reported by supervised firms and would potentially be subject to approval?
- Does the scope of the existing legal (minimum) requirements governing the explainability of the models and data need to be extended to cover the use of BDAI?
- Are all BDAI methods equally suitable for using them in internal models subject to supervisory approval? How can this be determined?
- Could an increased use of data help reduce the algorithmic complexity of models while still improving explainability?

Your answers to the questions above:

As in our response to Question 1.1, AFME believes that, as under the current regulatory framework, regulation should not be directed at use of particular technologies but at the activities in which firms engage. This approach will allow the technology to develop to the maximum benefit of all market participants, while safeguarding clients and market stability. We are therefore supportive of a continuation in the existing supervisory approach in the EU.

BDAI may in time provide new tools for analysis that assist in the supervision of firms. However, given the breadth and diversity of participants in Europe's capital markets, we believe that such supervision should continue to be principles-based, rather than BDAI tools becoming a way to 'hard-code' supervisory principles in a way that removes flexibility and impedes consideration of individual models.

Is there any other relevant information that you would like to provide in this context?

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2.4 Handling information security risks

- Which specific standards – also with regard to algorithm-specific risks – are appropriate and suitable for mitigating information security risks?
 - Should existing, principle-based supervisory requirements or rule-based control measures be adapted for BDAI-specific matters?
- Which specific BDAI or encryption systems could be suitable for preventing information security risks?

Your answers to the questions above:

AFME believes that security is one of the key pillars for building and integrating BDAI into technology. This is partly due to particular features of BDAI as a technology, such as the growing connectivity between market participants and market data, but also results from the increased risk of adversarial attacks on firms' use of BDAI technology (for example through attacks on the input data used by a BDAI application).

However, it should also be noted that the increased data processing capabilities enabled by BDAI technology have the potential to help firms detect and respond to cyber attacks more quickly, for instance by identifying anomalies within data or deviation from existing patterns. This could deliver significant benefits for firms and for the overall security of the financial services sector.

To mitigate potential information security risks, AFME believe that a principle and risk-based approach is most appropriate. This is because risks related to information security are likely to evolve in regard to specific technological developments that are, as yet, unknown. This means that it is important that any approach remains technology neutral and flexible in design, in order that it can be adapted to changing technological capabilities.

There are a number of existing standards on information security that should be considered in this context. For example, but not limited to:

- CPMI-IOSCO guidance on cyber resilience for financial market infrastructures (<https://www.bis.org/cpmi/publ/d146.pdf>)
- G7 fundamental elements of cybersecurity in the financial sector (https://ec.europa.eu/info/publications/g7-fundamental-elements-cybersecurity-financial-sector_en)
- NIST cybersecurity framework (<https://www.nist.gov/cyberframework>)
- ISO/IEC 27000 (<https://www.iso.org/isoiec-27001-information-security.html>)
- COBIT (<https://www.isaca.org/cobit/pages/default.aspx>)

Furthermore, we note that GDPR Article 32 on "Security of processing" requires data processors to take into account "the nature, scope, context and purposes of processing as well as the risk of varying likelihood and severity for the rights and freedoms of natural persons", and put in place appropriate controls, such as encryption.

Is there any other relevant information that you would like to provide in this context?

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3. Collective consumer protection

3.1 Risk of discrimination

- How should supervisory or regulatory authorities respond to companies using BDAI to extract the most consumer surplus?
 - How could consumers be made more aware of the significance and value of their financial data?
- Should it be guaranteed via a supervisory and regulatory approach that, in addition to the advantages of better risk assessment thanks to BDAI, those customer groups "filtered out by an algorithm" still have sufficient access to affordable financial products? How could such an approach look like?

- Should supervisory authorities ensure that customers who are unwilling or unable to provide more data than is legally required will continue to have access to financial services in the future? How could this be ensured?
- What monitoring and transparency mechanisms could help financial services providers prevent the discrimination of groups of consumers?
 - How could existing methods to prevent discrimination be applied to (partially) automated processes?
 - What technical measures should financial services providers take to prevent discrimination, e.g. discrimination based on unauthorised differentiating factors (cf. Chapter 3.5.5 on non-discriminatory data analysis)?
 - How can BDAI algorithms be prevented from unintentionally using characteristics – that the financial services provider is unaware of or is legally prohibited from requesting – for de facto discrimination by approximating such characteristics?

Your answers to the questions above:

AFME's members are committed to protecting consumers and are aware of the ethical risks that must be addressed in designing and implementing new technologies. In relation to BDAI, for instance, it is critically important that firms have in place suitable controls on the data that is used, particularly in relation to whether it is representative, or to the existence of potential bias. Firms should also assess the process to which BDAI is being applied and the design of the BDAI application to ensure that consumer protection is taken into account at every stage. This should be done in accordance with existing technology strategies and governance processes within firms.

From a regulatory perspective, we note that the GDPR contains particular safeguards for clients, such as Article 22 on "Automated individual decision-making, including profiling". This article protects data subjects from inappropriately being subject to a decision based solely on automated processing, including profiling, which produces legal effects concerning him or her or similarly significantly affects him or her. It also provides for the opportunity to appeal to human intervention by the data controller to justify or challenge the decision. In addition, Article 9 protects data subjects against "Processing of personal data revealing racial or ethnic origin, political opinions, religious or philosophical beliefs, or trade union membership, and the processing of genetic data, biometric data for the purpose of uniquely identifying a natural person, data concerning health or data concerning a natural person's sex life or sexual orientation".

Is there any other relevant information that you would like to provide in this context?

This question has intentionally been left blank.

3.2 Consumer sovereignty

- How can technical data protection measures – such as privacy-preserving data mining – best contribute to reinforcing consumer trust while exploiting the full potential of BDAI?
- Should supervisory and regulatory authorities ensure financial services that are economical with personal data/conventional are offered as alternatives? How should "economical with personal data/conventional" be defined in this context and which financial services are to be considered?

Your answers to the questions above:

The GDPR requires firms to embed data protection at the heart of all activities they undertake that involve the processing of data. In particular, Article 25 on "Data protection by design and by default" and Article 35 on "Data protection impact assessment" require firms to consider the risks that data processing might pose to natural persons and implement suitable controls. Controls may include tools such as encryption, or pseudonymization.

Furthermore, as a fundamental requirement, Article 5 of GDPR requires those processing data to ensure that the personal data they use is "adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed" and that the data is processed "processed lawfully, fairly and in a transparent manner in relation to the data subject". This should ensure that all processing is as "economical with data" as possible.

Is there any other relevant information that you would like to provide in this context?

This question has intentionally been left blank.

4. Finally, we invite you to share your thoughts, experiences and approaches regarding BDAI-related issues if they are relevant to supervision and regulation and have not been sufficiently covered in the questions above.

Your answers to the questions above:

AFME and its members welcome increased focus on, and understanding of, AI within the capital markets industry by all market participants. The commitment from the policymakers, supervisors and regulators to support, understand and invest in new technologies such as BDAI is extremely important to the capital markets industry and the economy as a whole. In particular, we note the European Commission's establishment of a High-Level Expert Group on AI as key and look forward to engaging with its work over the coming year.

We would welcome the opportunity to discuss this response and our work on BDAI related initiatives.