This is a repository copy of *Motivation to use big data and big data analytics in external auditing*.

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Version: Supplemental Material

Table 1. Sample description

Cases/companies	Duration of recorded interviews in minutes	Transcript pages	Number of interviews
Big 4 (1)	41,48	7	1
Big 4 (2)	43,04	8	1
Big 4 (3)	36,45	7	1
Big 4 (4)	42,32	7	1
International audit network	130,05	27	3
National audit network	47,37	11	1
Audit companies	**340,71**	**67**	**8**
Global financial services and IT company	105,53	24	5
Financial institution operating worldwide	90,41	20	2
National energy company	25,59	5	1
Business companies (clients)	**221,53**	**49**	**8**
Tax analytics	141,58	32	4
Audit controller	39,14	8	1
Regulators	**180,72**	**40**	**5**
Total	**742,96**	**156**	**21**

Table 2. Position of respondents

Cases/companies	Auditors		Big data analytics	
	Senior	Partner	Field expert	Head
Audit companies	4	3	-	1
Business client companies	1	-	3	4
Regulators	1	-	-	4
Total	**9**		**12**	

Table 3. Open codes derived from different interview transcripts

Open codes	Definition	Audit companies	Business companies	Tax and audit regulators
Experience	Information relating to the concept, understanding and duration of using BD / BDA in a company	Disclosed [1]	Disclosed	Disclosed with an orientation towards the future
Strategic decision	Information related to the corporate strategy and top management's attitude / commitment to using BD and modern data analytic tools.	High importance[3]	High importance	Not disclosed [2]
Governance structure	Information related to top management – government, foreign management, national shareholders, global networking company	High importance	High importance	Not disclosed
Information system	Information related to the overall corporate information system, including the internal control system, financial accounting programmes and non-financial data programmes, databases and software used, level of computerisation of business processes.	Disclosed	Disclosed	Disclosed
Benefits	Information related to the benefits of BDA, including advantages received, time efficiency, money savings and value for society by providing data that are more reliable.	Disclosed	Disclosed	Disclosed
Financial resources	Information related to costs of creating and implementing BDA, including the financial resources needed.	Disclosed	Disclosed	Disclosed with an orientation towards the future
Size	Information related to the conditions needed to collect and to be able to have BD, such as the audit company's size and the client's size.	High importance, audit company's size.	High importance, the size of the audit company's client.	Not disclosed

Planning	Information related to the development of planning and forecasting performance, processes and activities by using BDA.	Not disclosed	Disclosed	Not disclosed
Understanding the client's company	Information related to understanding the client's company and its environment, better evaluation of inherent risks and control thereof before the audit.	Disclosed	Not disclosed	Not disclosed
Audit planning	Information related to the planning activities, preparation of the audit plan and audit programmes by using BDA.	Disclosed	Not disclosed	Not disclosed
Audit performance and conclusion	Information related to performing the audit, the application of analytical procedures and control tests, providing the auditor's opinion, conclusion, continuous auditing instead of on a sample basis.	Disclosed	Not disclosed	Not disclosed
Reporting	Information related to providing results about the company in the report to management, external stakeholders, and the like.	Disclosed, audit conclusion	Disclosed, report to management, and so on.	Not disclosed
Audit quality	Information related to higher audit quality by employing BDA and analysing/checking 100 per cent of corporate data.	Disclosed	Not disclosed	Disclosed with an orientation towards the future
Control of audit quality	Information related to the control of audit quality inside the audit company, as well as external public control.	Disclosed	Not disclosed	Disclosed with an orientation towards the future
Management	Information related to improvements in control and decision-making functions by using BD and BDA.	Not disclosed	Disclosed	Not disclosed
Audit team	Information related to the effective management of the audit team by using BD and BDA.	Disclosed	Not disclosed	Not disclosed

Audit fee	Information relating to audit prices, which could be more competitive and easily managed by using BDA in audit companies.	Disclosed	Not disclosed	Not disclosed
Regulation system	Information related to the national regulative bodies and legal acts influence on the use of BD.	Disclosed as how much the audit regulator is strict and requires additional reliability tests, analytical procedures, etc.	Disclosed, because different sectors have different regulations.	Disclosed, by disclosing how much national tax regulator requires online data, level of accounting computerizations
Market structure	Information related to the market structure (competition, oligopoly or monopoly) in the industry (both the audit company and the client), competitor's action influence for usage of BD.	Disclosed	Disclosed	Not disclosed
Competent team	Information related to the competent audit team, employees and competence needed to work and use / analyse BD in a client's company, being able to apply BDA.	High importance	High importance	Not disclosed
Internal capabilities	Information related to the activities, capabilities and internal processes needed to prepare and use / analyse BD in a company such as IT, infrastructure.	Disclosed	Disclosed	Not disclosed
Increasing trend	Information related to the increasing role and influence of BDA for different purposes in companies globally, as well as political decisions.	Disclosed	Disclosed	Disclosed

Education	Information relating to the increasing need for competent employees with business, IT and mathematical competence globally.	Disclosed	High importance	Disclosed

[1] *Disclosed* means that the open code was mentioned and discussed during the interview.

[2] *Not disclosed* means that the open code was not mentioned or discussed during the interview.

[3] *High importance* means that the open code was mentioned and discussed very strongly during the interview.

Table 4. Axial codes derived from second-order codes

Second-order codes	Description	Axial codes
Current practices	Arguments and descriptions related to the current situation, experience and motivation to use BD / BDA in companies.	Current practices
Strategy-related company factors	Different levels of the intensity of factors influencing and motivating the level of BD / BDA use from the internal environment of companies.	Company factors
Resource-related company factors		
External factors	Factors regulating, influencing and motivating the level of BD / BDA use from the external environment of companies.	Institutional factors
Internal control	The main areas that are influenced by the use of BD / BDA in business and audit companies.	Outcomes
Audit process		
Quality		

Table 5. The highlighted motivating factors and circumstances

Motivating factors		Motivating circumstances
COMPANY RELATED	**Size** Audit company's size Business client's size	Audit companies with large international audit networks have more capacity. Large business clients may have more BD.
	Strategic orientation Data-driven strategy Client's selected business model Relationship between the audit company and business clients	Data-driven strategy of the audit company. Usually Business to Consumer (B2C) experience more BD. In the case of a long-term contract, additional costs for initial harmonisation and the correlation of different data sources.
	Structure Audit company's structure Business client's ownership structure Sector	Global audit networks. In the case of a business company, public procurement has to be organised for a state-owned company and, in most cases, only for one year. Specific sectors in which BD is inherent, such as financial intermediation or telecommunications.
	Technology Digitalisation of the business process accounting software used by business clients Professionals with BDA experience	High degree of IT usage by audit companies and business clients. Technological level of accounting software. Usually BDA are not well adapted for working with national accounting software, as there are particular difficulties such as the extraction of data in the necessary format, and initial processing to receive such data. Member of audit team/ outsourced professional / internal training.
INSTITU-TIONAL	**Audit market environment** Audit market competition National audit regulator's policy Education	High audit market competition. Strong price competition is prevalent in the Baltic region. Help/support to acquire BDA or AA, provide training about analytics in auditing.

		Higher education institutions to provide professionals with interdisciplinary data analytic skills.

Annex 1. Interview guide

Questions to ensure maintenance	Enquiries
Why do you (not) use Big Data Analytics?	
• What is the motivation behind this decision?	• What is the corporate strategy regarding the use of modern data analytics (Big 4)? • How long has the company been using Big Data Analytics and other data analytic tools? • What are the benefits/costs of Big Data Analytics?
What internal factors drive your company to use Big Data Analytics?	

• What are internal factors influencing the use of Big Data Analytics?	• What is the influence of the company's size and the client's size?
	• What is the influence on the auditing process in terms of:
	  o Understanding the client and its environment,
	  o Audit planning,
	  o Sampling methods,
	  o Other auditing techniques,
	  o Auditing conclusion/reports?

What external factors drive your company to use Big Data Analytics?	
• Has external pressure influenced the use of Big Data Analytics?	• What is the influence of the national regulative body? • What is the influence of the audit market's size/competitors? • Which external groups - competitors, clients, and other regulative authorities have the biggest influence on the use of Big Data Analytics?
How is (or how could) Big Data Analytics be implemented in the auditing process?	
• Who is involved in the process of Big Data Analytics?	• Who prepares the Big Data? Who analyses the Big Data? • How do Big Data Analytics help to integrate non-traditional sources of data with financial data?
How did your company create and implement Big Data Analytics?	
• Who created the Big Data Analytics tools?	• Do you use the services of IT consultancy companies? • Do you use your own capabilities?
Which changes do you expect in auditing?	
• Do you think Big Data Analytics is a growing trend? • Do you expect any changes in the regulatory framework?	• What changes could there be concerning auditors' competence? • Could there be a change from sample-based auditing to continuous auditing?

	• What changes could there be for professional and educational institutions?