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REFORM/GA2020/028
Further development of internal control system and internal audit in the public sector

Analysis tools and result visualisations in internal auditing

Conference: One World, One Future

Advanced Management and internal Audit in the Public Sector

Output IV.2

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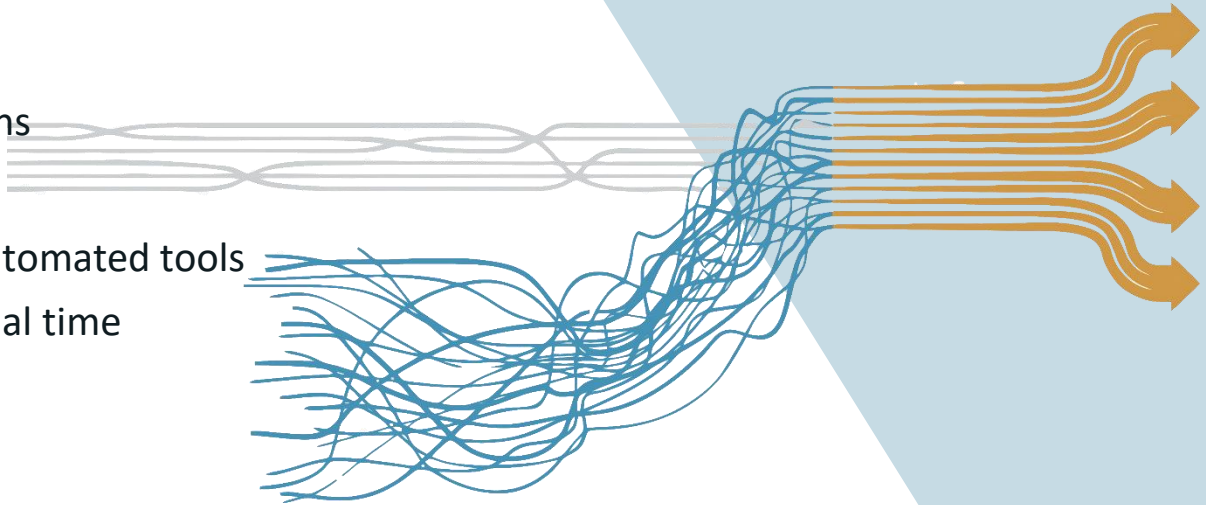
Agenda

- Importance of data analysis in internal auditing
- Application and value of data analysis in internal audit
- Challenges in data analysis
- Analysis tools overview
- Possible applications of analytical tools in revision processes.
- Integration and synergies of the analytical tools
- The future of data analysis in internal audit
- Visualisation of audit results
- Supporting visualisation with tools

Importance of data analysis in internal auditing

- **Value of data:**
  - Basis for relevant decisions
  - Identifying risks and patterns
- **Evolution of data analysis:**
  - From manual analysis to automated tools
  - Enabling deep insights in real time
- **Core of data analytics:**
  - Pattern recognition
  - Identifying risk factors and value enhancement options



Application and value of data analysis in internal audit

- **Application areas of data analysis**
  - Fraud detection: Identify irregularities.
  - Risk management: Identifying risk factors and vulnerabilities
  - Process optimisation: Increasing efficiency through improved processes

- **Value of data analysis**
  - Identifying potential savings
  - Uncovering hidden patterns and trends
  - Illuminating optimisation opportunities

- **Data-driven decision-making:**
  - Data as a basis for proactive strategy development
  - Support in prioritising audit issues

Challenges in data analysis

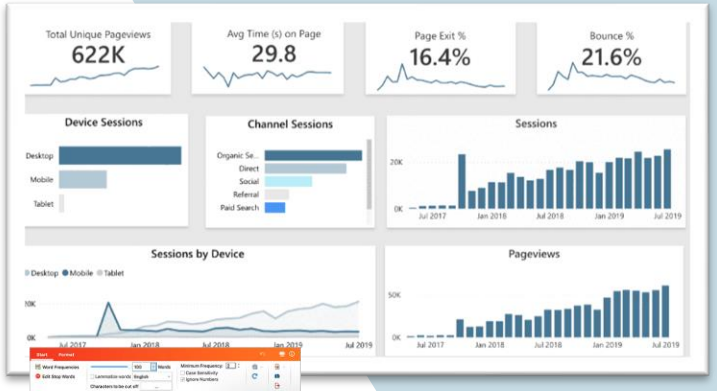
- **Data quality and integrity:**
  - Ensuring the accuracy and reliability of data
  - Consistent data formats and standards
- **Data privacy and security:**
  - Compliance with data protection regulations
  - Secure storage and transmission of data
- **Data accessibility and availability:**
  - Ensuring access to required data
  - Management of data silos and integrated data flows

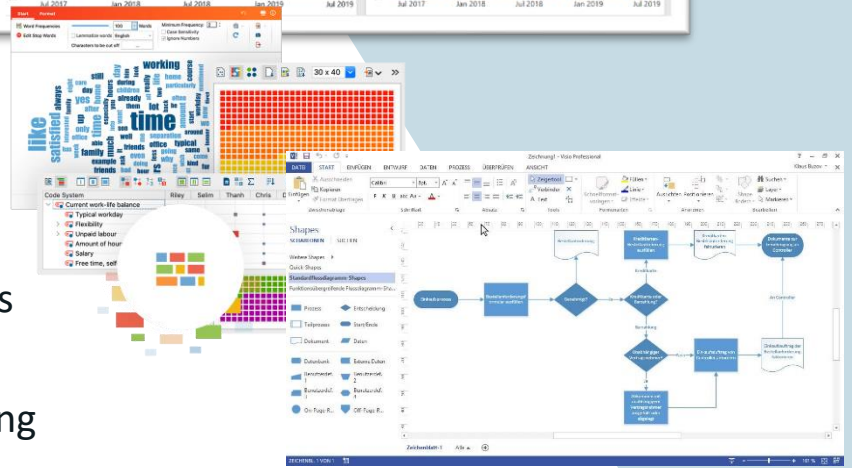
Challenges in data analysis

- **Complexity of data:**
  - Dealing with large amounts of data (Big Data)
  - Processing and analysing different data formats and sources
- **Tool and technology selection:**
  - Selection of the appropriate analysis tool
  - Integration of analysis tools into existing system landscapes
- **Skills and know-how:**
  - Skills in the use of analysis tools and methods
  - Understanding of data structures and analysis methods

Analysis tools overview

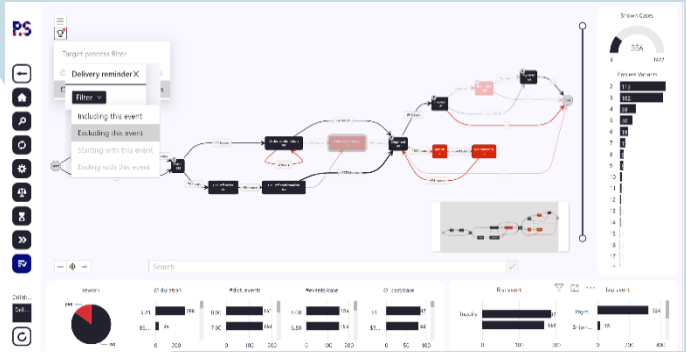
- **PowerBI:**
  - Visual data analysis and reporting
  - Dashboard creation
- **ACL:**
  - Data extraction and preparation
  - Audit-specific analysis functions
- **MaxQDA:**
  - Qualitative data analysis
  - Coding and categorisation of texts
- **Microsoft Visio:**
  - Process visualisation and modelling
  - Flowchart creation





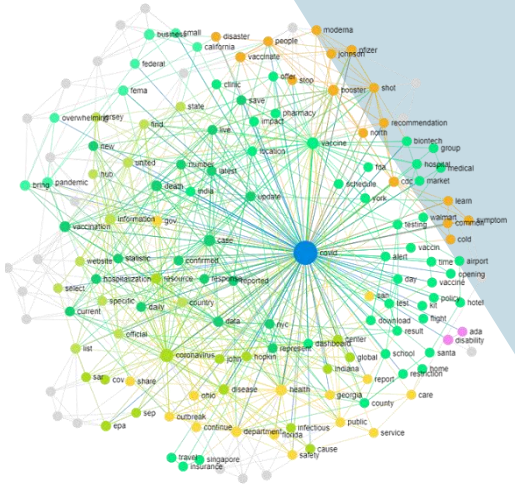
Analysis tools overview

- **Process Science:**
  - Process Mining for deeper process analysis
  - Visualisation of process flows



- **SAS Analytics Pro:**
  - Comprehensive data analyses
  - Creation of predictive models

- **Infranodus:**
  - Text mining and analysis
  - Network analysis and visualisation



Possible applications of analytical tools in audit processes.

- **Risk identification:**
  - Using ACL or PowerBI to find anomalies and deviations
  - Use of SAS Analytics Pro to predict potential risk areas
- **Process Optimisation:**
  - Use of Process Science to identify bottlenecks and inefficiencies in processes
  - Microsoft Visio to visualise "as-is" vs. "to-be" processes
- **Report generation and dashboarding:**
  - PowerBI to create interactive dashboards and reports for stakeholders.
  - Visualisation of text networks with Infranodus to show discourse dynamics

Possible applications of analytical tools in audit processes.

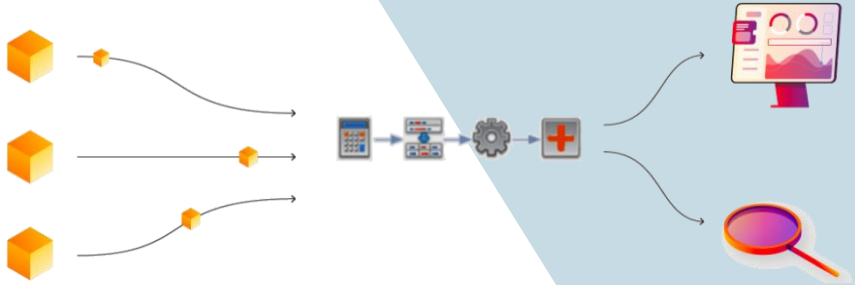
- **Data management and preparation:**
  - Use of ACL for data preparation and cleaning.
  - Use of MaxQDA to structure unstructured data
- **Qualitative data analysis:**
  - MaxQDA for the analysis of interview or survey data
  - Infranodus for visualisation and analysis of text data
- **Data mining for fraud detection:**
  - Using SAS Analytics Pro to identify patterns that may indicate fraudulent activity.

Integration and synergies of the analytical tools

- **Tool Integration:**
  - Linking PowerBI and ACL for efficient reporting
  - Combination of SAS Analytics Pro and Infranodus for comprehensive analysis of structured and unstructured data
- **Combined application for deeper insights:**
  - Linking of process mining (Process Science) and process visualisation (Microsoft Visio) for detailed process analyses
  - Integration of text mining (Infranodus) and qualitative data analysis (MaxQDA) to extend the depth of analysis
- **Synergy effects through combination of methods:**
  - Combination of quantitative and qualitative data analysis methods
  - Use of visualisations (PowerBI) to improve communication of analysis results from different tools

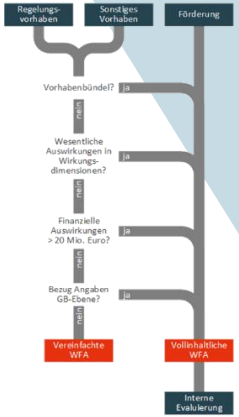
The future of data analysis in internal audit

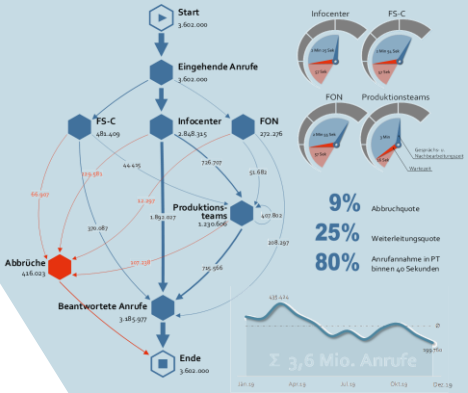
- **Artificial Intelligence (AI):**
  - Automated anomaly detection
  - Predicting risks through deep learning models
- **Real-time analytics:**
  - Continuous monitoring and reporting
  - Immediate detection and response to risks
- **Automated auditing processes:**
  - Integration of bots and automation tools
  - More efficient, AI-driven reviews
- **Ethics and data stewardship:**
  - Growing importance of data protection
  - Ethical guidelines for data analysis in auditing

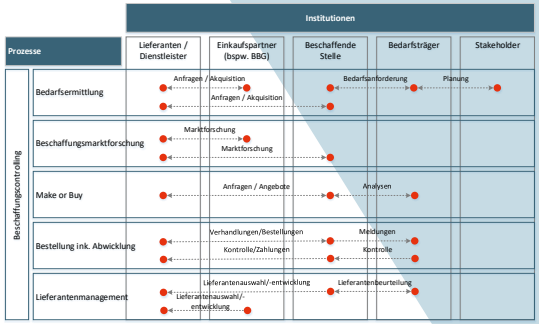


Visualisation of audit results

- **Importance of visualisation:**
  - Increasing the clarity and understanding of data
  - Promoting data-driven decision-making
- **Types of visualisations:**
  - Charts, graphs and heat maps for quantitative data
  - Networks and cluster analyses for qualitative data
- **Data preparation:**
  - Cleaning and structuring raw data
  - Selection of relevant metrics and indicators
- **Stakeholder-adapted visualisation:**
  - Adaptation of visualisation to different target groups
  - Focus on clarity and directness of communication

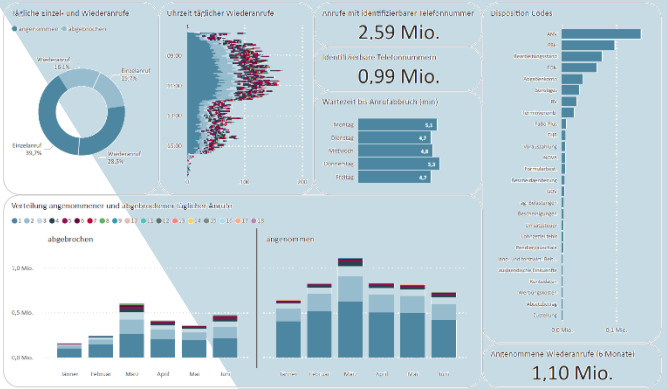


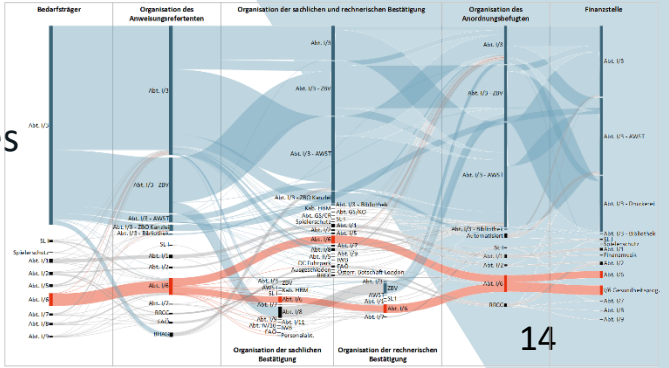




Supporting visualisation with tools

- **PowerBI:**
  - Creation of dashboards and interactive reports
  - Intuitive drag-and-drop interface for non-technical users
- **Microsoft Visio:**
  - Visualisation of process flows and organisational charts
  - Visualisation of system and data architectures
- **Infranodus:**
  - Visualisation of text data and concept networks
  - Revealing and representing relationships within text masses
- **MaxQDA:**
  - Visualisation of qualitative data and codes
  - Generation of code relations and word clouds





Thank you for your attention!

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