

‘THE CONTINUUM PARADIGM’

29TH JUNE 2022 (2 PM – 3 PM)

14th Edition of eKNOW (2022)



Keynote speaker:



Dr. Eric J.H.J. Mantelaers RA AA CISA C|CISO

- Head Department of Professional Practices RSM Accountants;
- Professor of Applied Sciences. Zuyd University of Applied Sciences (Future-proof Auditor);
- Teacher Auditing Maastricht University;
- Teacher Research Nyenrode Business University;
- Teacher Research and Accounting FHR Business School (Suriname).

RSM organization

RSM Financial Year 2021 GLOBAL HIGHLIGHTS



Revenue growth of 15.8% from \$6.3bn to **\$7.26bn**



860+
offices



123 countries



51,000+
people
internationally



Zuyd University
of Applied Sciences



Dr. Eric Mantelaers RA

eric.mantelaers@zuyd.nl

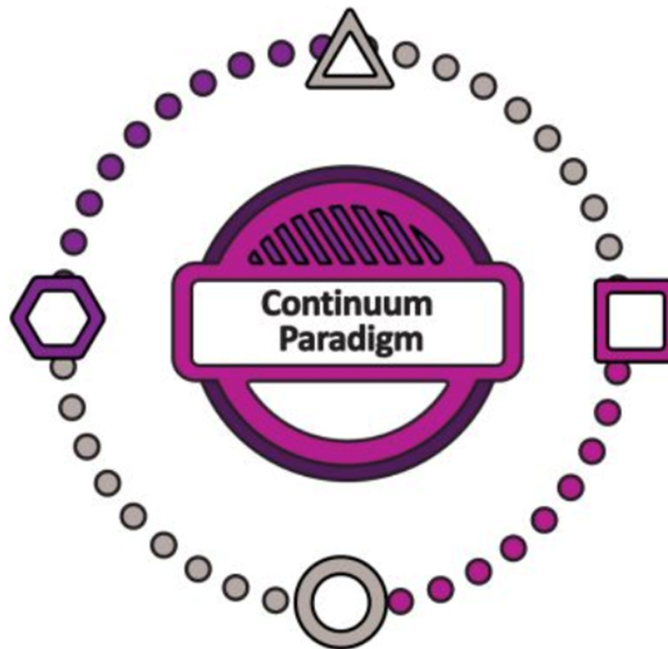
emantelaers@rsm.nl



Minor: Data Driven Decision Making



Future-proof Auditor & Future-proof Financial





FROM HISTORIAN TO SENSOR

Continuum Paradigm (Reality or Fiction?)

From historian to sensor (1)

“Historian” vs “Sensor”

Double-entry bookkeeping, Pacioli, 1494



A citizen registers with the sensor, 433 years B.C.

From historian to sensor (2)

“Historian”

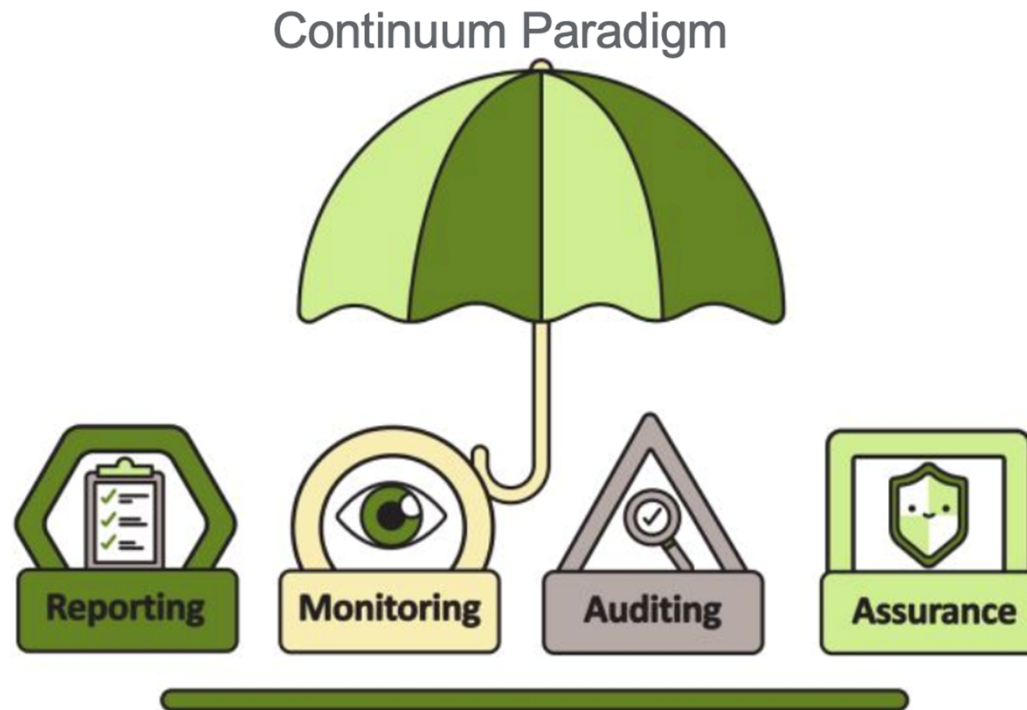
- Auditor checks figures afterwards and especially looks into the rear-view mirror.
- Auditor usually does his job after the end of the financial year.
- Auditor is often accused of looking mainly backwards and hardly forwards.

From historian to sensor (3)

“Sensor”

- By monitoring very shortly after the event, deviations are more likely to be noticed.
- Suppose a bank is about to transfer a large sum of money to someone. Through Continuous Monitoring, it is possible to detect any irregularities before the completion of this transaction.

Components of the Continuum Paradigm





Most of you are not accountants, and often
not even a financial

Today's challenge!

The Origin of Accountancy

- 1929 Stock Market Crash
- Pincoff's affair in the late 1870s

What means 'Auditing'?

Testing reality against a standard

- Collecting data
- Confronting this data with the standard
- Report on the outcome

What means 'Continuous'?

- **Continuous:** Within the normative maximum lead time after the event...
- **Reporting:** Automated reporting within the normative maximum lead time after the event...
- **Monitoring:** The automated identification of the deviation within the normative maximum lead time after the event...
- **Auditing:** The automated assignment of a judgment on the deviation within the normative maximum lead time after the event...
- **Assurance:** The automated granting of assurance certificate within the normative maximum lead time after the event...

Mandatory Obligation to Audit

Independent Audit

Financial Audit

Non-Financial Audit

Audit Objective

Audit Methodology

Human Bla Bla

Audit Technology

Vasarhelyi

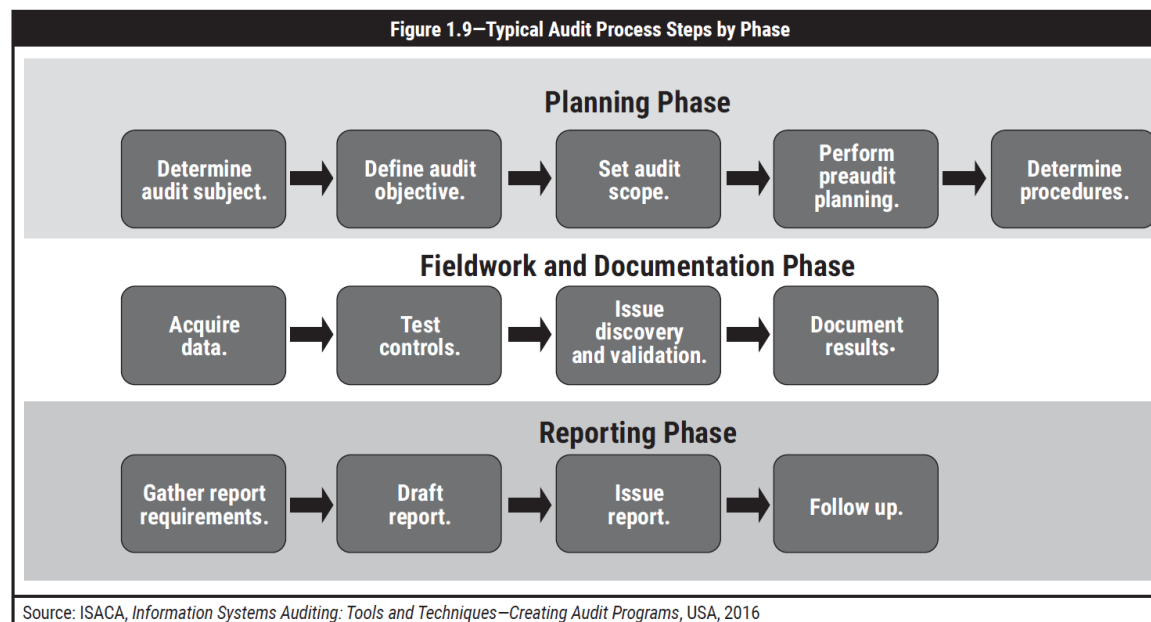
Traditional		Continuous
1. Frequency: • Periodic	➔	1. Frequency: • Continuous or more frequent
2. Approach: • Reactive	➔	2. Approach: • Proactive
3. Procedures: • Manual	➔	3. Procedures: • Automated
4. Work and role of auditors • Bulk of the work performed is centered around labor and time intensive audit procedures • Independent roles of the internal and external auditor	➔	4. Work and role of auditors • Bulk of the work performed is centered around handling exceptions and audit procedures requiring human judgement • External auditor role becomes the certifier of the continuous auditing system
5. Nature, timing, and extent: • Testing consists of analytical review procedures and substantive details testing (nature) • Controls testing and detailed testing occur independently (timing) • Sampling in testing (extent)	➔	5. Nature, timing, and extent: • Testing consist of continuous controls monitoring and continuous data assurance (nature) • Controls monitoring and detailed testing occur simultaneously (timing) • Whole population is considered in testing (extent)
6. Testing: • Humans perform testing	➔	6. Testing: • Data modeling and data analytics are used for monitoring and testing
7. Reporting • Periodic	➔	7. Reporting: • Continuous or more frequent

Maturity Model Vasarhelyi

	Stage 1	Stage 2	Stage 3	Stage 4
	<i>Traditional Audit</i>	<i>Emerging</i>	<i>Maturing</i>	<i>Continuous Audit</i>
Audit and management sharing	•Independent and Adversarial	•Independent with some core monitoring shared	•Shared systems and resources where natural process synergies allow	•Purposeful Parallel systems and common infrastructures
Management of audit functions	•Financial organization supervises audit and matrix to Board of director	•Some degree of coordination between the areas of risk, auditing and compliance IT audit works independently	•IA and IT audit coordinate risk management and share automatic audit processes •Auditing links financial to operational processes	•Centralized and integrates with risk management, compliance and SOX/ layer with external audit.
Analytic methods	•Financial ratios	•Financial ratios at sector level/account level	•KPI level monitoring •Structural continuity equations •Monitoring at transaction level	•Corporate models of the main sectors of the business •Early warning system

Rutgers Business School

Audit Phases

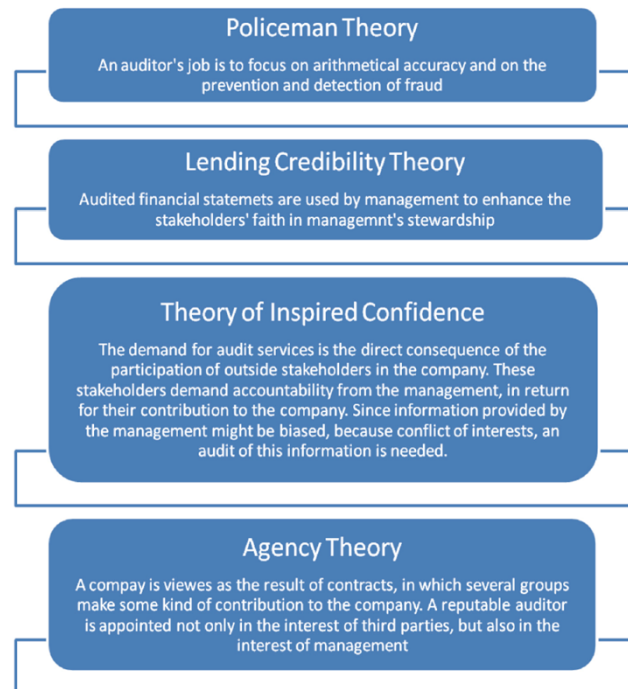


Demand for Audit & Assurance

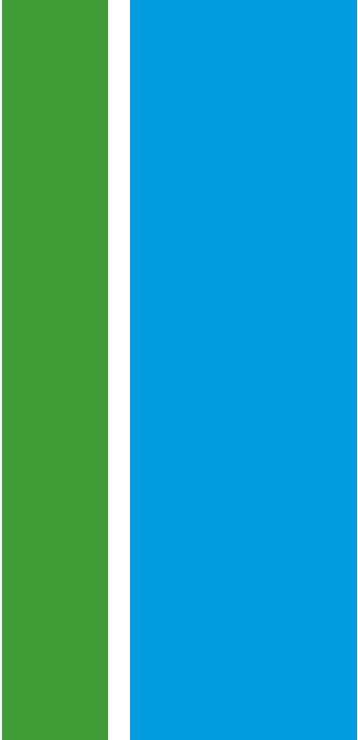


Figure 4. Third parties demanding financial statement information (e.g. Soltani 2007)

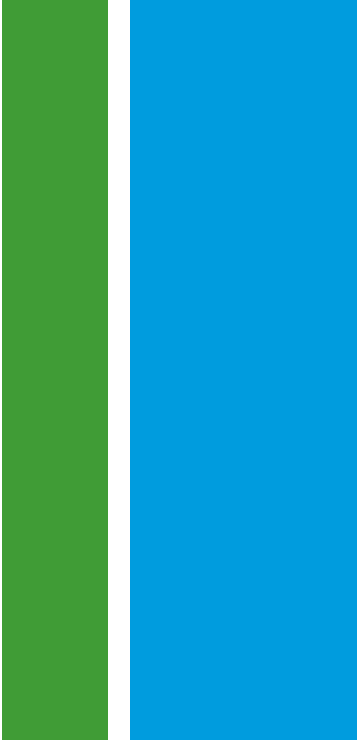
Theories: Hayes et al. (2005)



Audit Quality: two main items

- 
- Continuity, Going-concern Assessment
 - Fraud detection

What can go wrong?

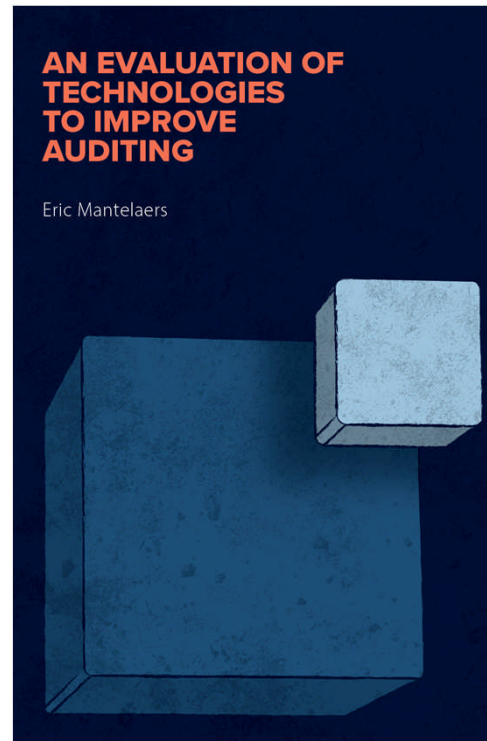
- 
- Two vertical bars, one green and one blue, are positioned on the left side of the slide.
- Accountant checks the annual accounts 2021 of a transport company
 - Bookkeeper commits fraud by transferring money from debtor
 - Auditor performs audit procedures during the year in October (2021) and after the end of the year in January (2022), but also in January 2021
 - During the months of February to September 2021, the accountant has the opportunity to disguise his fraud
 - The accountant does not uncover this fraud
 - Why not?

How to solve these challenges: Technology

Two dimensions

- Technology as an Audit Tool
- Technology as part of the Audit Client (environment)

PhD Dissertation



Audit Technologies

- 
- Two vertical bars, one green and one blue, are positioned to the left of the list.
- Blockchain
 - Reinforcement learning
 - Process Mining

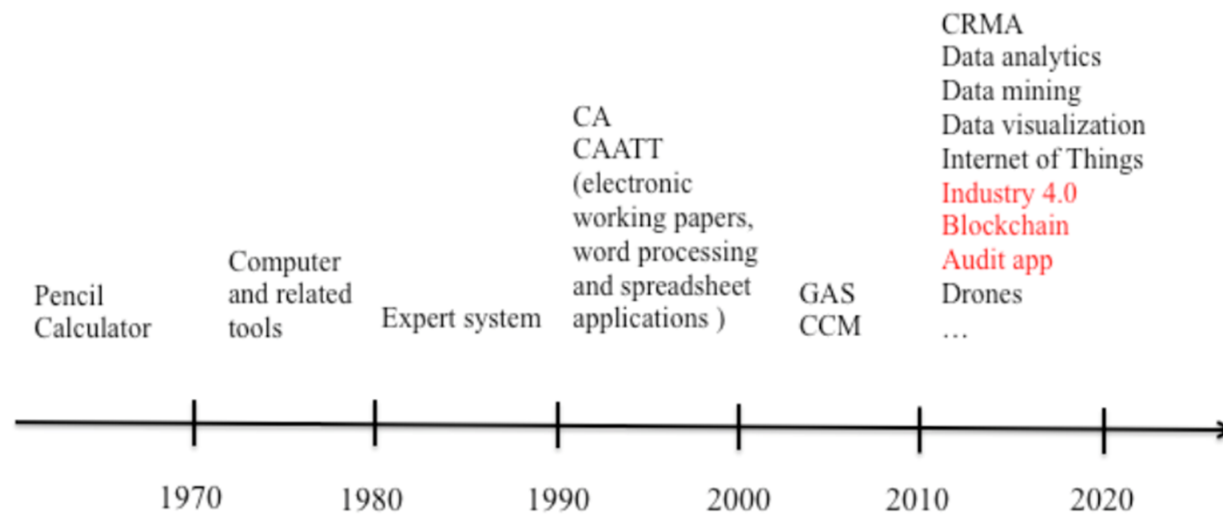
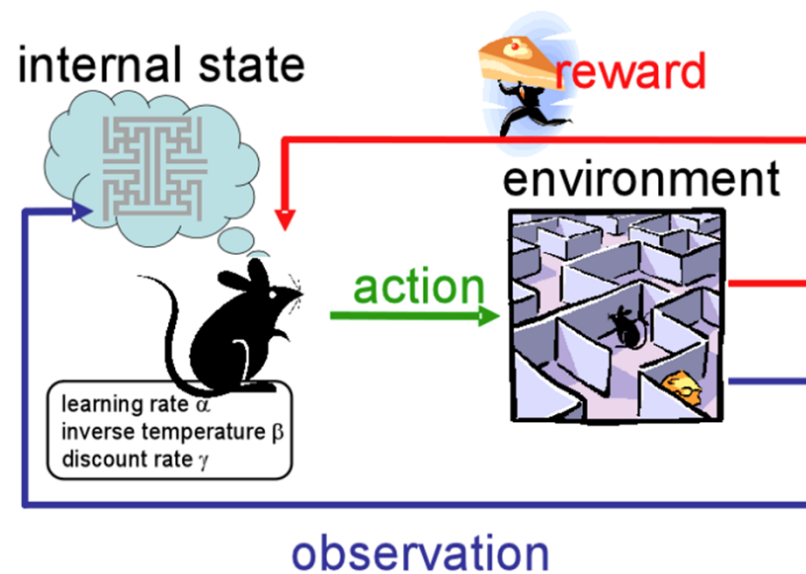


Figure 1: The timeline of the use of audit-oriented technologies

Reinforcement Learning

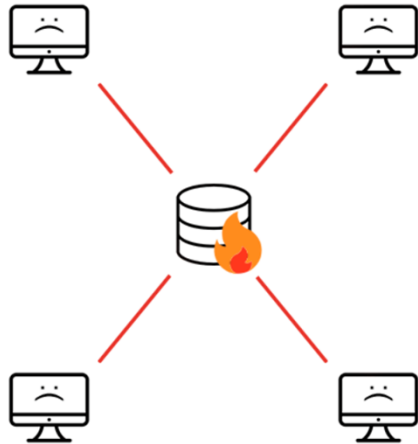
Doolhof.....



Reinforcement Learning

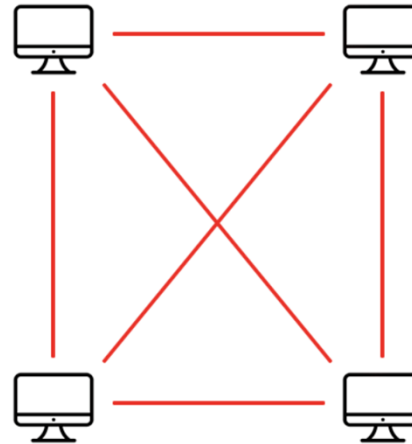
Decentralized....

CENTRALE DATABASE



Blockchain
Now!

BLOCKCHAIN



Icon made by Smashicons from www.flaticon.com

An Example of An Event Log of an Invoice

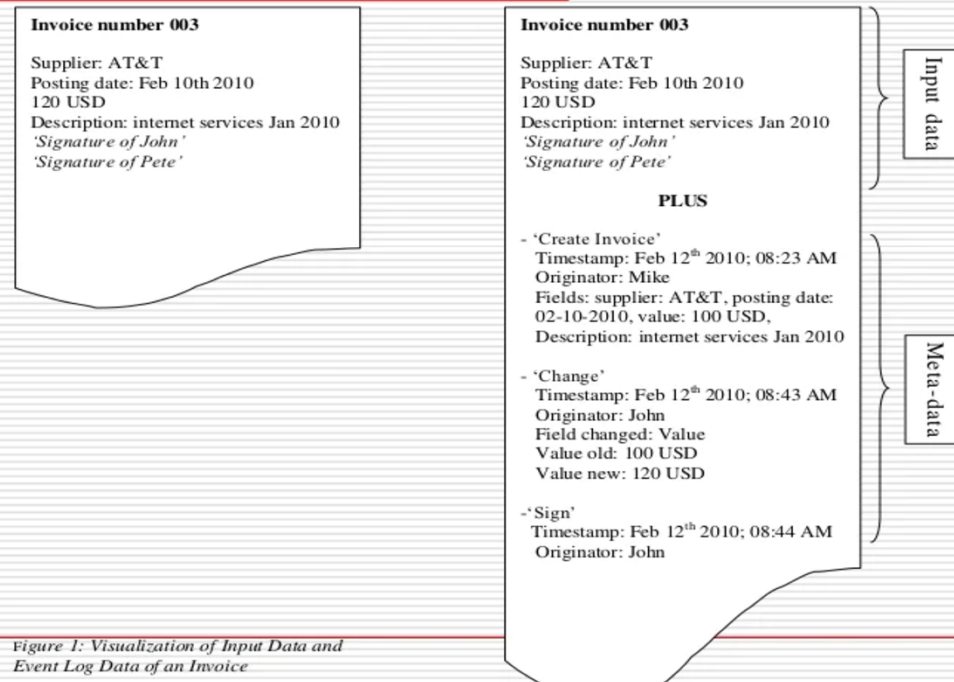
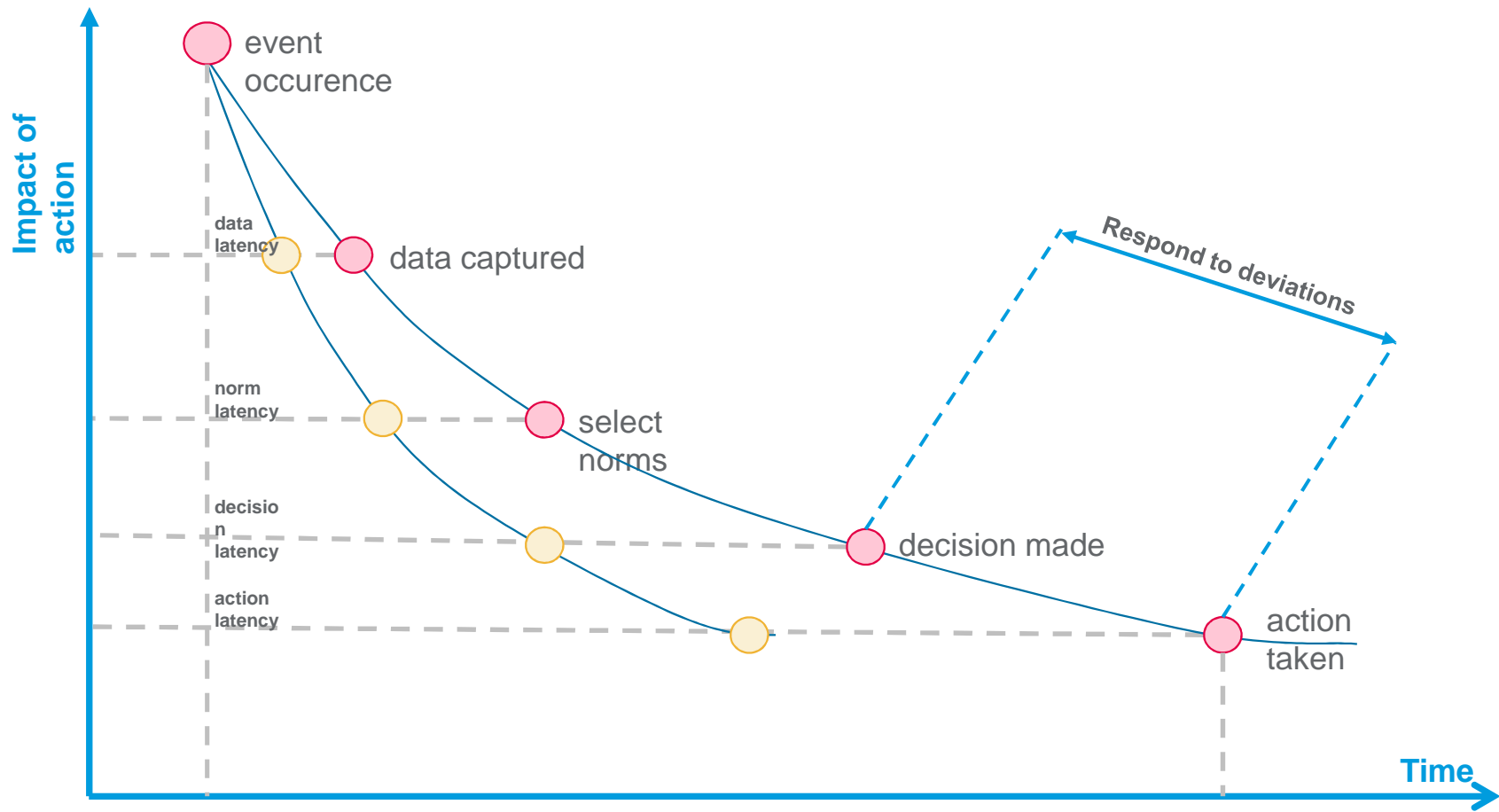
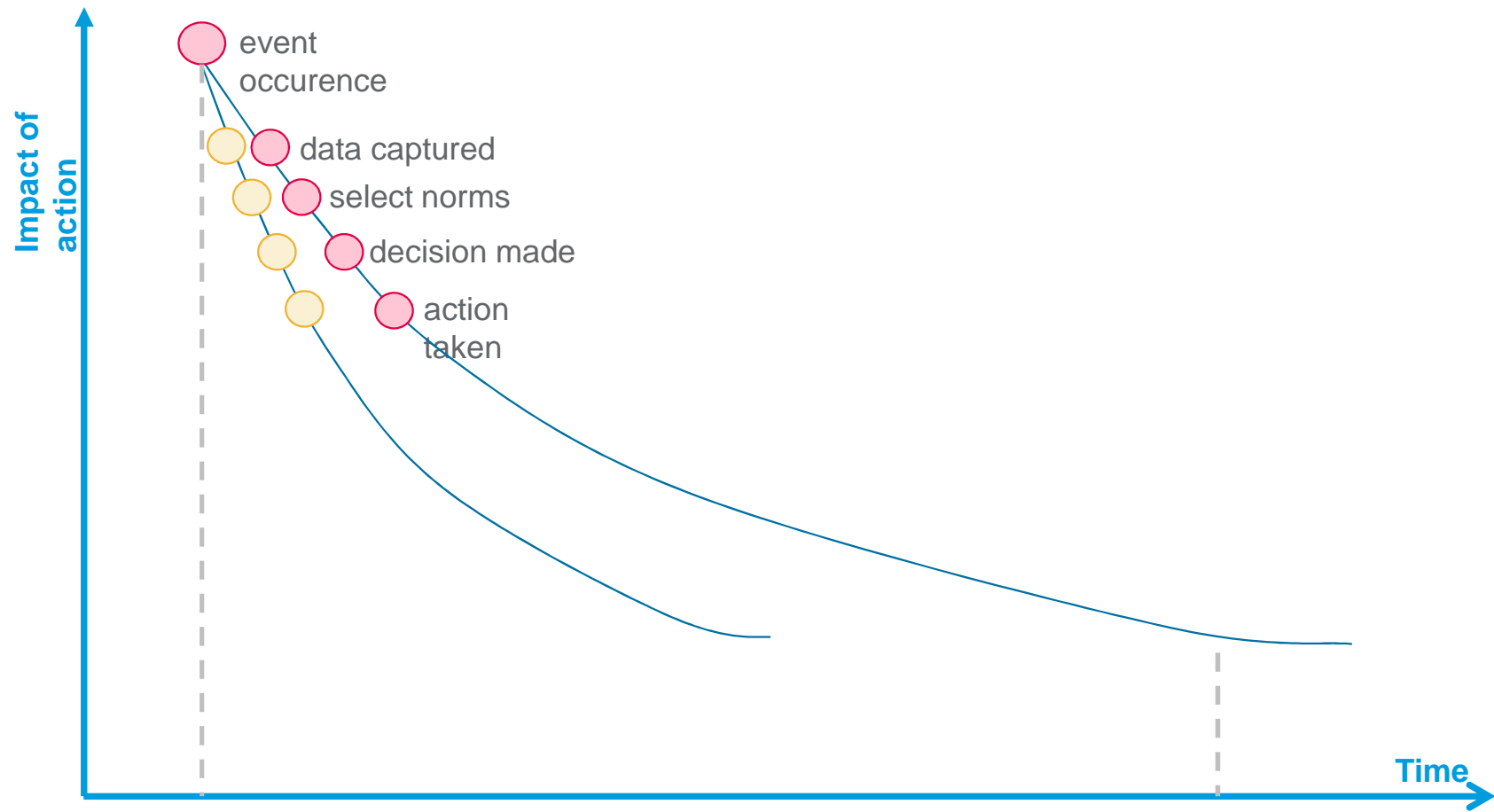
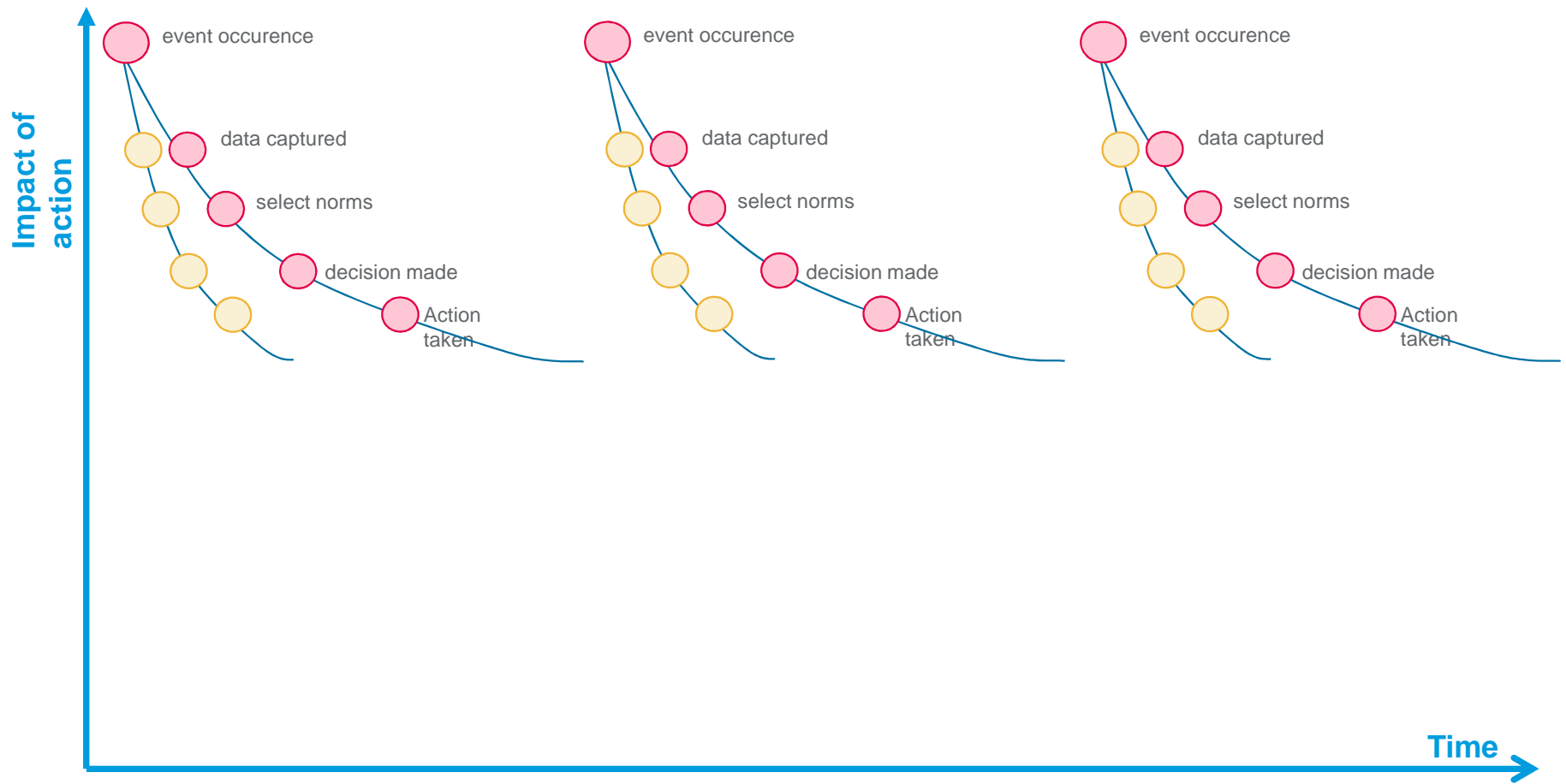


Figure 1: Visualization of Input Data and Event Log Data of an Invoice







Level on which assurance can be provided	Examples	Technologies
Financial Statements	Banco de Portugal	
Organisation	IT-organisation	
Processes	Sales Process	
Items	Accounts Receivable	
Data	Price per Product	

Financial vs. Non-financial



- Sustainability Reporting
- CSRD
- ESG (Environmental, Social, Governance)
- SDG (Sustainable Development Goals)

Assurance

Different levels



In an audit engagement, the auditor provides a *high*, but *not absolute*, level of assurance that the information subject to audit is free of material misstatement. This is expressed in the audit report as **reasonable** assurance.

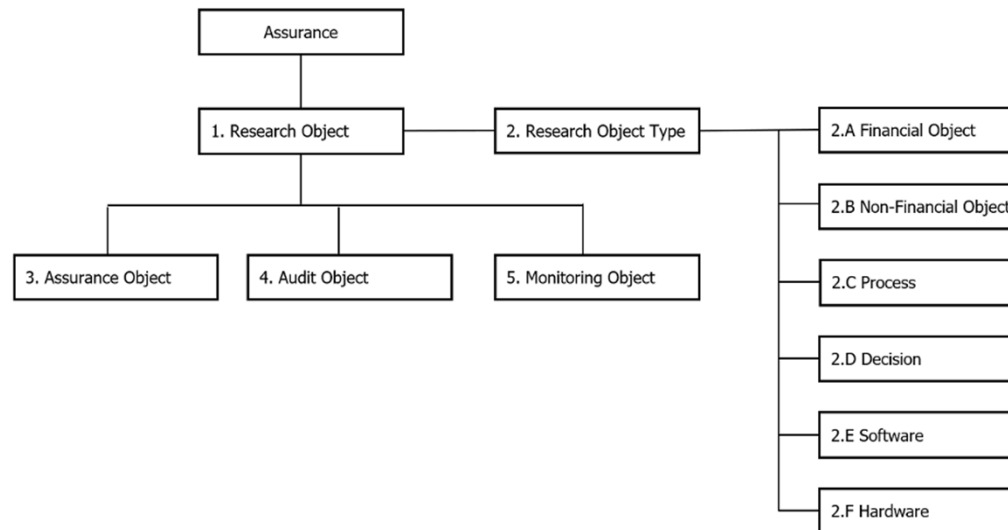


Limited Assurance



Non-Assurance

Levels on which assurance can be provided



Comprehensive Relationship Model

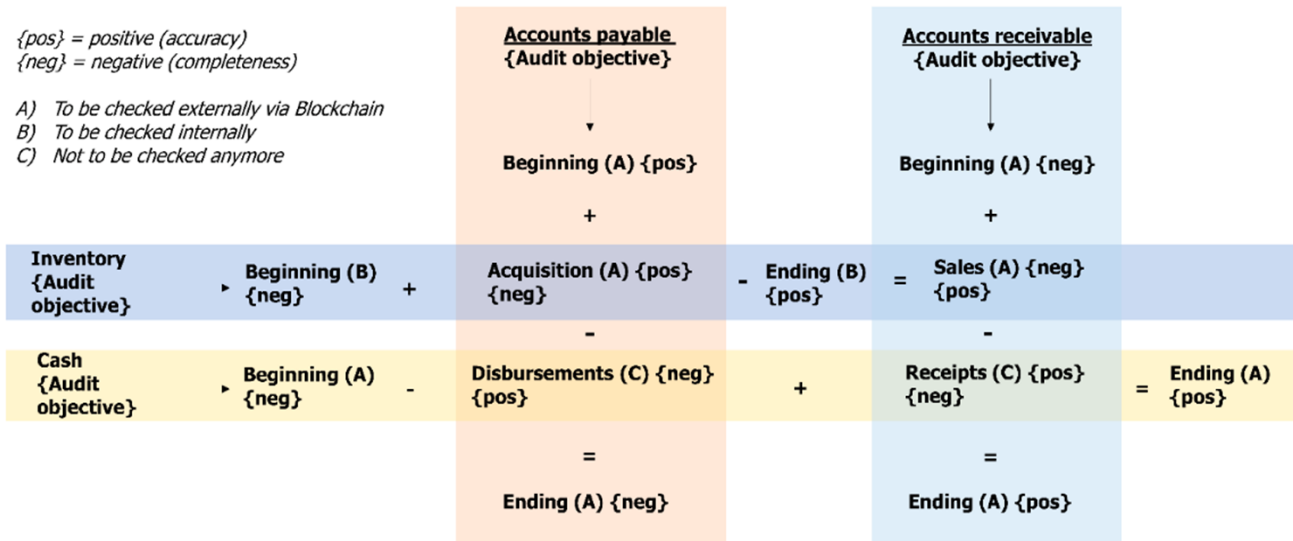


Figure 1. Representation of comprehensive relationship model

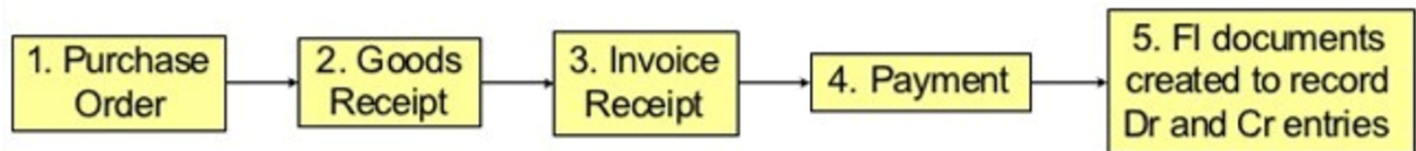
What should be equal?

3-Way Match

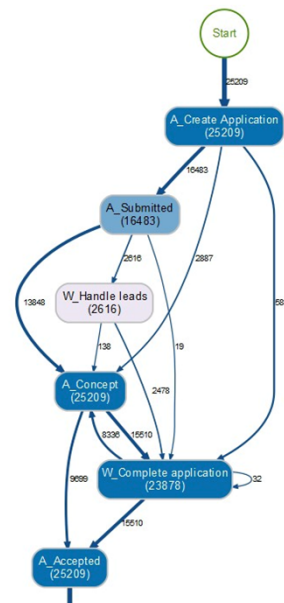


Three-way Match

3 Way Match Concept



Process Mining



Example 1: Audit of Financial Statements [a]

4 Report and Opinion of the Board of Auditors



BANCO DE PORTUGAL
EUROSISTEMA

ANNUAL REPORT

ACTIVITIES AND FINANCIAL STATEMENTS 2021

Report and Opinion of the Board of Auditors
2021



Example 1: Audit of Financial Statements [b]

2 Financial Statements and Notes

Financial Statements

Table II.2.1 • Balance sheet of Banco de Portugal | EUR thousands

Assets	Notes	31 Dec. 2021		31 Dec. 2020
		Gross assets	Depreciation, amortisation and impairment	Net Assets
1 Gold and gold receivables	2	19,796,309		18,988,763
2 Claims on non-euro area residents denominated in foreign currency		8,961,267		5,030,600
2.1 Receivables from the IMF	3	3,902,084		1,196,478
2.2 Balances with banks and security investments, external loans and other external assets	4	5,059,183		3,834,122
3 Claims on euro area residents denominated in foreign currency	4	148,992		54,383

Example 2: 'Audit' of Non-financial information [a]



Assurance report of the independent auditor

To: The General Members' Council and Supervisory Board of Coöperatieve Rabobank U.A.

Assurance report on the non-financial information 2021

Our conclusion

Based on our review nothing has come to our attention that causes us to believe that the non-financial information, specified in the section 'Wat we have reviewed', as included in the Annual Report 2021 of Coöperatieve Rabobank U.A. does not present, in all material respects, a reliable and adequate view of:

- the policy and business operations with regard to corporate social responsibility and sustainability; and
- the thereto related events and achievements for the year ended 31 December 2021, in accordance with the International Integrated Reporting Framework (hereafter: the International <IR> Framework) of the International Integrated Reporting Council (hereafter: the IIRC) and the supplemental reporting criteria applied as included in the section 'Reporting criteria'.

Example 2: 'Audit' of Non-financial information [b]

Reporting criteria

The non-financial information needs to be read and understood together with the reporting criteria. The reporting criteria used for the preparation of the non-financial information are the International <IR> Framework of the IIRC and the applied supplemental reporting criteria, as disclosed in Appendix 1: 'About this Report' and Appendix 2: 'Methodology & Definitions of Non-Financial Key Figures 2021' of the Annual Report.

The absence of an established practice on which to draw, to evaluate and measure non-financial information allows for different, but acceptable, measurement techniques and can affect comparability between entities, and over time.

Example 2: ‘Audit’ of Non-financial information [c]

What we have reviewed

We have reviewed the non-financial information included in the following sections of the Annual Report for the year ended 31 December 2021 (hereafter: “the non-financial information”):

- About Us;
- Creating Value;
- Excellent Customer Focus;
- Meaningful Cooperative;
- Rock-Solid Bank;
- Empowered Employees; and
- Appendices
 - Appendix 1: About this Report
 - Appendix 2: Methodology & Definitions of Non-Financial Key Figures 2021

This review is aimed at obtaining a limited level of assurance.



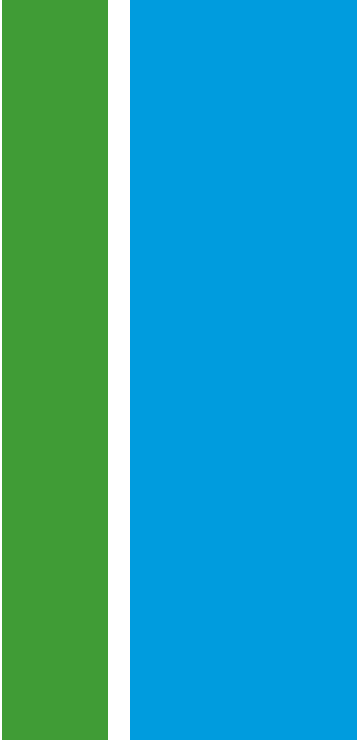
Just one example...

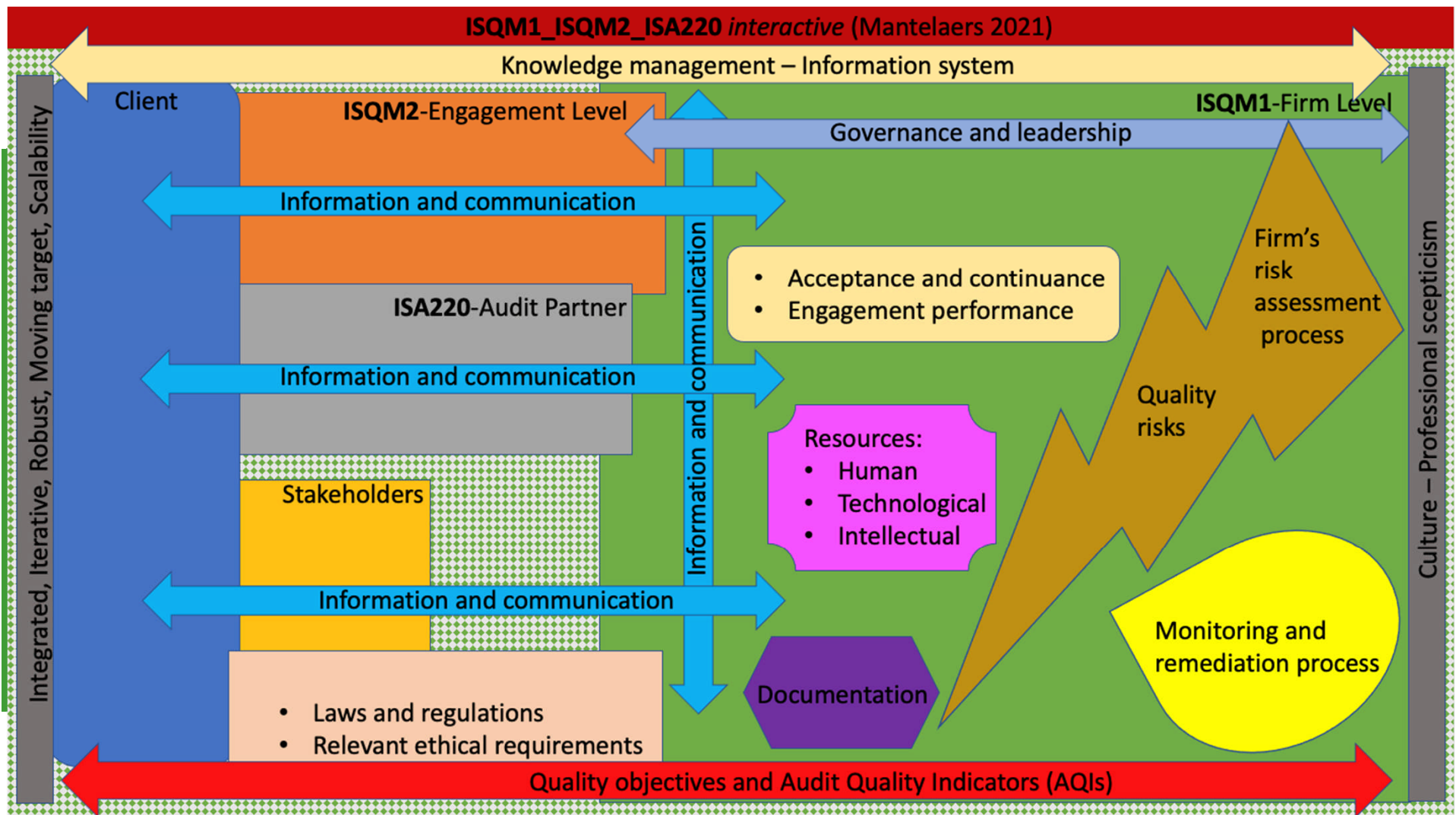
Ex-Deloitte Auditor Faces Disciplinary Action for Improper Audit of S. Africa's Steinhoff

By Janice Kew | April 23, 2021



Discussion about Audit Quality

- 
- Two vertical bars, one green and one blue, are positioned on the left side of the slide.
- International Standards on Quality Management
 - Audit Quality Indicators



Overview of Audit Quality Indicators Initiatives (1)



AUDIT QUALITY INDICATORS

A global overview of initiatives

Factsheet

Overview of Audit Quality Indicators Initiatives (2)

Owner	Background of the owner	Intended user	Transparency (public or private)	Short overview
IDW – Germany	Professional organisation	Audit committees, oversight body and public	Mainly for reporting to audit committees and oversight body	32 AQIs under four components below and one cross-divisional AQI: Quality culture Workforce quality Process quality Communication
Quartermasters – Netherlands	Independent group of experts assigned by the Minister of Finance	All stakeholders, including public	Subject to adoption by the Ministry of Finance, firms will be obliged to report	11 indicators under three categories: Audit quality Quality control system Context
CMVM – Portugal	Audit oversight body	Oversight body	For the first two years, exclusive reporting to the CMVM	Eight indicators, four of which are at firm-level, one at engagement level and three for both firm and engagement levels
FAOA – Switzerland	Audit oversight body	Oversight body	FAOA presents a summary, including trends, in its annual reports	Nine indicators and three of these are to be reported separately for the Swiss Market Index (SMI) and non-SMI companies
FRC – UK	Audit oversight body	All stakeholders, including public	FRC will consult on AQIs to be included in audit firms' transparency reports	FRC identified 52 AQIs that are monitored by the six largest audit firms in the UK, and these can be grouped into six broad categories
CPAB – Canada	Professional organisation	Audit committees and audit firms	This was a pilot project without any specific requirements, and most participants tracked AQIs	An exemplary list of 20 AQIs is presented along with their definitions and types

Audit Quality Indicators, Netherlands

QUARTERMASTERS, NETHERLANDS

In the Netherlands, the quartermasters, appointed to ensure the audit reform delivery, [proposed](#) (February 2022) 11 quality indicators that were developed upon a public consultation:

Category	AQIs
Audit quality	<ul style="list-style-type: none">▪ involvement of external auditor▪ weaknesses in audits and financial statements▪ contemporary topics: fraud and continuity
Workforce quality	<ul style="list-style-type: none">▪ quality-enhancing measures▪ quality control systems
Context	<ul style="list-style-type: none">▪ culture▪ audit team turnover▪ investments in innovative technology▪ budget overrun▪ training hours for environmental, social and governance (ESG) matters▪ client satisfaction

Overview of Audit Quality Indicators Initiatives (3)

Owner	Background of the owner	Intended user	Transparency (public or private)	Short overview
			in a standalone report, typically produced by the auditor for audit committee	
ICAI – India	Professional organisation	Oversight body and audit firms (for self-evaluation)	No public reporting envisaged	The model suggests scoring criteria for competency bases under three categories: Operations management – Human resource management Strategic/functional management
ACRA – Singapore	Audit oversight body	Audit committees and audit firms	Audit firms are encouraged to share the AQI data privately with audit committees	The Framework comprises seven AQIs, which are to be disclosed at engagement and/or firm-level
IRBA – South Africa	Audit oversight body	Audit committees, audit firms and oversight body	IRBA issued a survey report based on AQI-related information provided by the firms auditing listed companies	The AQIs cover the following thematic areas: independence tenure internal firm quality review processes workload of partners and audit managers span of control technical resources training staff turnover
CAQ – US	Autonomous public policy organization	Audit firms	Firms are encouraged to consider public disclosure	The Framework includes a non-exhaustive list of firm-level AQIs for the six elements of audit quality: leadership, culture, and firm governance ethics and independence acceptance and continuance of clients and engagements engagement team management audit engagement performance monitoring

Session #7 - Thursday, June 30th (9PM – 11PM)

Papers related to the Continuum Paradigm

1. Amy Kitchiner
2. Lotte Verhoeven
3. Ed Curfs
4. Qing Huang
5. Anais Heeren

Paper I

Kitchiner, Ursache, Vlijm, Mantelaers & Zoet

“Variation in job titles within the hospitality workforce: A computation grounded theory approach”

- The **wide spectrum of job titles** worldwide has become the main cause of confusion amongst the general public, organizations, and practitioners of services.
- This study aims to **understand the variation** in job titles in the hospitality industry for management jobs and **propose standardization** to combat disparity.
- A dataset of 1.000 job titles has been collected. This has been analyzed by means of grounded theory and computational grounded theory. The **results show 210 standardized job titles.**

Paper II

Verhoeven, Mantelaers & Zoet

“Towards a going concern assessment pipeline”

- Paper is about the **assessment of the going concern analysis** in the audit process, based on the professional judgment of the auditor. To support this individual and personal judgment of the auditor, a more direct source of information in the form of an automated going concern analysis could provide a solution.
- In this paper **a method to automate the going concern analysis** was set up, using a combination of 16 forecasting algorithms. To build and validate the forecasting algorithms 225 administrations have been divided in a train and test set.
- The results show **a confidence percentage** of 97.45% for Gradient Boosting Regressor, 96.79% for Decision Tree Regressor and 77.72% for AdaBoost Regressor on the basis of the condition current liabilities for Administration 1.

Paper III

Curfs, Mantelaers & Zoet

“How to Plot Current Pilots Results on the Audit Maturity Model? The Continuum Paradigm”

- This paper focuses on the possibilities and challenges of the **Continuum Paradigm**.
- Research question: What is the **actual status** regarding the Continuum Paradigm?
- The **overall conclusion** is that the average maturity level for Continuous Monitoring and Continuous Auditing reaches nearly stage 3: Maturing and no research has been performed based on a holistic and fully integrated continuous process.

Paper IV

Huang, Vasarhelyi & Mantelaers

“Toward a Continuous Measurement Model”

- The business and ERP data for accounting and auditing is **close to continuous**, but the accounting and auditing work is interval-based and loses the close to continuous characteristic of the business measurement process.
- A series of **proxies for more frequent measures** have emerged in the increasingly desperate attempt to have very short time market trading superiority.
- The objective in their paper is to propose a **continuous measurement framework** in critical areas of business.

Paper V

Heeren, Mantelaers & Zoet

“Continuous Monitoring of Counter Accounts in Hospitality”

- **Sustainability reporting** has become common practice in organizations. A factor that is associated with the rise of sustainability reporting is **greenwashing**. In order to counter greenwashing practices, counter-accounting, referring to the use of information produced by actors outside a given organization or industry, aims to help verify statements made by organizations.
- The application of **the system is demonstrated using data from the hospitality sector** regarding the fulfillment of different job titles by male and female executives.
- The presented results shed light on occupational gender segregation and provide a basis from which more **continuous counter-accounting systems** can be developed.

Questions?



"THAT'S THE LAST BOX TICKED - HAS ANYONE
ANYTHING FURTHER TO RAISE?"

Thank you
for your time
and attention