Process Mining for Risk Management and Internal Audit

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Setting the Scene

Evolving Threat Landscape
- Disruption and Transformation
- Global Risks
- Digital
- Regulatory Complexity

Disruption and Transformation
- New startups are more agile and dynamic than existing firms
- Cutting down on bloated business processes, focus on efficiency vs. size
- Social governance, not just corporate

Global Risks
- Cybersecurity and hacking
- Uncertain political climates
- Environmental accountability
- Business without boundaries

Digital
- Ever increasing connectivity across devices (IoT)
- Physical space more expensive than digital space – business processes need reengineering
- Wider customer base and information than ever before

Regulatory Complexity
- Regulators are scrutinising risk management with more rigour
- Audit rotation regulations
- Global business face multiple regulation jurisdictions
- Wider customer base and information than ever before

Where in the As-Is processes are
- The bottlenecks and efficiency improvement areas
- The unexpected deviations
- We over-or-under controlling a process
- Security or fraud vulnerabilities

Process Evolution Needed to
- Automate to increase performance
- Automate to reduce costs
- Increase connectivity to outside world
- Cope with increased regulatory burden
Changing risk management landscape

The arms race has begun
- Audit firms, like EY, are investing heavily in analytic technologies with a view to doing two main things:
  - Better risk identification and rigour
  - Consistent application or methodology
  - Optimising audit delivery
- Organisations are seeking to keep one step ahead

Pressure from regulators
- Evolution of SOx and proliferation of similar regulation around the globe
- Increasing discussions on shift of position from regulators on use of analytics for testing controls

Expectations of the business
- Organisations expect their control functions to help them understand risk and aggressively target areas of higher impact
- Shift from traditional assurance provider to a strategic and valued advisor
- Shift to real-time or near real-time risk management and identification
Overview of risk: lines of defence

1st LoD
The first line of defence is considered to be the end business users and delivery teams, who have accountability for operating controls and mitigating risks.

2nd LoD
The second line of defence refers to the monitoring of risk management practices. These are the teams which develop and implement the risk management policies.

3rd LoD
The third line of defence is independent assurance gained from internal functions e.g. Internal Audit. These teams usually report to an audit committee on the risk management activities being performed and how effectively the risks are being addressed.

4th LoD
The fourth line is the assurance provided by external bodies such as external auditors, governments and other regulatory authorities.

1st
Mgmt
Do we understand the risks in the process and are we / can we monitor them?

2nd
Internal Control
Do we have an appropriate control framework in place and can we communicate?

3rd
Internal Audit
Use of process mining

4th
External Audit
Responsibility for monitoring

Wide remit across the business to identify and query risk across the business to identify areas of improvement

Independent review and investigation of the processes for documentation and understanding and control assurance.
What is REALLY happening?

**Approach**

**Step 1**
Find out how the process is executed in reality

**Step 2**
Identify (and eliminate) weak spots and inefficiencies. Use proactive insights to prioritize actions leading to process improvement or risk targeted investigations

**Step 3**
Identify (and eliminate) Find “happy path” and ensure continuous process efficiency, compliance, and quality.

**“Textbook” process:**
Most simplified version of a process 20%

- Check received invoice
- Final check of invoice
- Approve invoice
- Pay invoice

**What people think**
Most commonly displayed and simplified process 40%

- Received invoice
- Check received invoice
- Request data
- Check contract conditions
- Pay invoice

**The reality:**
Actual complexity un-manageable without Data Mining 100%

The reality shows a much more complex process with numerous steps and interconnections, indicating that the actual process is more intricate than what people think it is.
At EY, we integrate Process Mining into our approach to auditing internal processes and controls in order to:

► obtain an efficient and fact-based view on internal processes - removing the need to perform extensive inquiries of personnel and reducing the inherent bias of those inquiries,

► assess the quality of the KPIs used in monitoring procedures and include Process Performance Indicators (PPIs),

► deliver a more precise conclusion on the effectiveness of your internal controls – giving your stakeholders and investors greater confidence,

► assess weaknesses and bottlenecks in processes to enable management to prioritize actions based on risk, and

► predict process errors in order to support you in designing preventive controls rather than responding to damage already incurred.
**Key Use Cases**

### AUDIT
- Process discovery
- Control optimisation
- Process Walkthroughs
- Root cause analysis
- Process conformance
- Exception quantification

### INTERNAL AUDIT
- Risk Management
- Segregation of Duties
- Control Performance
- Claims Handling
- Manual Changes
- Invoice without PO
- Credit Note Analysis

### FORENSIC
- eDiscovery
- GDPR
- Master Data Management
- Fraud
- Money Laundering
- Payment Behavior
- Account Openings

### Processes
- Robotic Process Automation
- Operational Excellence
- Process or OP Model Redesign
- Internal Audit
- Internal Audit
- Internal Audit
How will IA work in the future?
A dynamic approach is pivotal — operating model, use of technology and talent infuse

Digitally confident, dynamic and trusted function
What will the IA mandate be?
The mandate does not need to change but there will be a better balancing of focus

**Proactive**
- Business counselor
  - Focus on strategic topics and actively engaged in strategic discussions and problem solving
  - Anticipating the future/industry trends and the impact on the business
  - Fostering change and best practice development and sharing
- Analytics and robotics:
  - Prescriptive and trends
  - Strategic and Innovative view

**Policing**
- Anticipative monitor
  - Focus on future topics (e.g., missing controls, policies and procedures)
  - Future impact of recommendations
  - Anticipating how the business model is changing
- Analytics and robotics:
  - Predictive and real time
  - Strategic view

**Partner**
- Change agent
  - Focus on trends on why things fail systematically and audit against “unknown” rules
  - Deep dive in root-cause and internal best practices for recommendations
  - Initiating change
- Analytics and robotics:
  - Descriptive and internal/external data driven
  - Current and change view

**Reactive**
- Assurance factory
  - Focus on non-negotiable assurance and base level of trust and current/past topics
  - Current impact of recommendations
  - Raising awareness on current/past topics
- Analytics and robotics:
  - Descriptive and internal data driven
  - Current view

- Proactive
- Business counselor
- Analytics and robotics:
  - Prescriptive and trends
  - Strategic and Innovative view
Who is involved? – Stakeholder Universe

**Data Scientist**
- Machine learning
- Statistical modelling
- Experiment design
- Supervised learning, decision trees, random forests, logistic regressions
- Clustering
- Optimization

**ERP Expert**
- Process expert
- Data model knowledge
- Control design knowledge
- Process deviation awareness
- ERP Optimization
- Participation in the script creation
- Quality review

**IT Architect**
- Database management
- IT architecture
- Data extraction
- Script creation
- Visualization expert
- Good understanding of the processes
- Provide pre-analysis of the results to the audit team

**Auditor**
- Audit Methodology Expert
- Client process awareness
- Define risks
- Proactiveness on development of new scripts and testing
- Leading the analysis with the client and the audit team
- Proactivity in business development for analytics
The journey has started
What some IA functions are doing as they kick-start their transformation

### Audit Needs Assessment

1. **Identify and assess risks beyond today’s scope** by leveraging predictive, historical and external data.

2. **Be flexible and agile** around internal audit planning and responses based on changing assurance and reporting needs.

### Execute IA Plan

4. **Digitize IA evidence and fieldwork** in an integrated, digital platform to drive more insight around themes and trends.

5. **Use automation** to deliver large volumes of transactional and compliance internal audit areas, enhancing risk coverage and improving efficiency.

### Develop IA Plan

3. Deliver through **advanced data analytics** and **visualization** enabling efficient resourcing of audit/risk resources.

### Communicate Results

6. **Re-think ‘traditional’ reporting** content and format to communicate messages in new ways.

7. **Automate internal audit reporting** leveraging digitized IA evidence and fieldwork.
Case Studies
Case Study 1: Internal Audit Process

Context
Natural language processing was used together with process mining capability in order to analyse a sample of 10 open audits through a combination of audit reports and event log data. A model was created in order to observe whether the system was being used as intended and additionally to identify areas where themes within the audit reports did not match with what was recorded in the audit tracking system.

Observations from this piece of work included identification of:

- Inefficiencies and bottlenecks in the internal audit process
- Control deficiencies in the process
- Gold-plating of audit files
- Most common deviations from the standard expected process and attributes contributing to this deviation
- Audit reports showing no issues whilst event log data showed multiple rounds of testing and approval
Case Study 2: New system deployment (Internal Audit)

Context
A large media organisation was implementing a new bespoke ERP system. The Head of Internal Audit wanted some way to identify if the processes in the new ERP were operating in line with designed flows and with business expectations. EY built and deployed a custom set of analysis across each of the key business processes to understand transaction flows in the new ERP.

The review identified several areas of interest which were subsequently fed back to deployment team for resolution before more countries were onboarded. A new control framework was also designed.

Observations from this piece of work included identification of:

► Actual process flows significantly different from expectations
► Extensive evidence of end users bypassing key control points
► Large number of different process variations indicating users were not being consistently trained
► Large degree of rework and manual adjustments being posted near or at end of process flows indicating inefficient, broken, or misunderstood processes
Case Study 3: Employee Shift Process (Internal Audit)

**Context**

Process Mining was deployed in order to support the internal audit of the implementation of a new workforce management system which offers time and attendance tracking, colleague scheduling and forecasting. Data surrounding the time recording process for employees was analysed.

**Observations from this piece of work included identification of:**

- Users carrying out manual overrides to deviate from the expected process
- Employees recording multiple shifts within a single day
- Most common deviations from the expected process
- Influence/root cause analysis identified supervisors responsible for unexpected steps in the process
Case Study 4: Order to Cash Process (Internal Control)

**Context**

Process mining was used to enable controls operation and testing to ensure that revenue arising from goods despatched are recognised in the correct accounting period.

The following metrics were built for controls operations and testing:

- Overall dispatches which will not be delivered with in the month/quarter end based on the scheduled timelines. (This can be then segmented into the correct ERP, Sales Organisation and Company Code, Customer etc.)
- Provide a view of the dispatches which have happened within specified date before month end
- Check if any deviation in the process related to this control e.g. an invoice recorded prior to goods issue