

Project Risk Management

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PMG 510
Project Risk Management

Lecture 10



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Using Artificial Intelligence in Enterprise Risk Management

Lecture Organization

- **The Role of AI in Identifying, Assessing, Monitoring, and Managing Enterprise Risks.**
- **Artificial Intelligence and Risk Management.**
- **From Traditional Risk Management to Intelligent.**
- **ERM Opportunities, Challenges, Governance, and Future Trends**

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Learning Objectives

By the end of this lecture, students should be able to:

- Explain the concept and main characteristics of Artificial Intelligence (AI).
- Explain the role and objectives of Enterprise Risk Management (ERM).
- Identify how AI can support different stages of the risk management process.
- Discuss AI applications in credit, market, operational, cyber, liquidity, and reputational risk.
- Evaluate the benefits and limitations of using AI in risk management.
- Explain the major risks associated with AI itself.
- Understand the importance of AI governance, ethics, transparency, and human oversight.
- Discuss future trends in AI-enabled risk management.

What Is Artificial Intelligence?

Artificial Intelligence (AI) refers to technologies that enable computer systems to perform tasks that normally require human intelligence.

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What Is Artificial Intelligence?

AI systems can:

- Analyze large volumes of data.
- Recognize patterns and relationships.
- Learn from historical information.
- Make predictions and classifications.
- Generate recommendations.
- Detect unusual or suspicious behavior.
- Process natural language.
- Support or automate decision-making.

From Traditional Analytics to AI

Traditional risk management has often depended on:

- Historical data.
- Manual analysis.
- Periodic reporting.
- Static risk models.
- Expert judgment.
- Rule-based systems.
- Spreadsheet-based monitoring.

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From Traditional Analytics to AI

AI introduces additional capabilities:

- Real-time data analysis.
- Automated pattern recognition.
- Predictive analytics.
- Machine learning.
- Continuous monitoring.
- Anomaly detection.
- Natural language processing.
- Scenario generation and simulation.

What Is Enterprise Risk Management?

- Enterprise Risk Management (ERM) is an integrated approach to identifying, assessing, responding to, monitoring, and reporting risks that may affect an organization's ability to achieve its objectives. ERM considers risks across the entire organization rather than managing each risk independently.

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What Is Enterprise Risk Management?

It seeks to:

- Protect organizational value.
- Support strategic objectives.
- Improve decision-making.
- Manage uncertainty.
- Optimize risk-taking.
- Strengthen resilience.
- Create sustainable value.

Why AI Is Important for ERM

Organizations today face:

- Increasing volumes of data.
- Faster-changing risk environments.
- Greater cyber threats.
- Complex financial markets.
- Global supply-chain disruptions.
- Regulatory changes.
- Emerging technologies.
- Increasing reputational risks.
- New forms of fraud.
- Climate and sustainability risks.

AI and the Risk Management Cycle

AI can support the complete risk management cycle:

1. Identify → 2. Analyze → 3. Assess → 4. Respond → 5. Monitor → 6. Report → 7. Learn

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AI and the Risk Management Cycle

Examples:

- AI identifies emerging risks.
- Machine learning analyzes risk drivers.
- Predictive models estimate potential outcomes.
- AI recommends risk responses.
- Automated systems continuously monitor indicators.
- Generative AI supports risk reporting.
- Machine learning learns from new data.

AI in Risk Identification

AI can identify risks by analyzing:

- Internal organizational data.
- Transaction data.
- Customer behavior.
- Social media.
- News articles.
- Regulatory publications.
- Market information.
- Operational incidents.
- Cybersecurity events.
- Supplier information.

AI can identify relationships and patterns that may not be easily detected through manual analysis.

AI in Risk Identification

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Example:

An AI system may identify a sudden increase in negative customer comments combined with operational delays and media coverage, indicating a potential emerging reputational risk.

AI and Emerging Risk Identification

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One of the major advantages of AI is its ability to detect early signals of emerging risks.

AI can continuously scan:

- News.
- Social media.
- Regulatory developments.
- Market movements.
- Industry reports.
- Economic indicators.
- Internal incidents.

AI and Emerging Risk Identification

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The system can identify changes in patterns and alert risk managers before the risk becomes a major event.

AI therefore supports a shift from reactive risk management toward proactive risk management.

Risk assessment involves determining:

- Likelihood.
- Impact.
- Exposure.
- Risk drivers.
- Potential scenarios.
- Risk correlations.

AI in Risk Assessment

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AI can improve assessment by:

- Processing large datasets.
- Identifying nonlinear relationships.
- Detecting hidden patterns.
- Producing probability estimates.
- Generating predictive risk scores.

However, AI outputs should be reviewed by qualified risk professionals.

AI in Risk Measurement

AI can support the measurement of:

- Probability of default.
- Expected losses.
- Fraud probability.
- Operational risk frequency.
- Market movements.
- Liquidity stress.
- Cyberattack probability.
- Customer churn.
- Supply-chain disruption.

AI models can combine many variables simultaneously and update predictions as new information becomes available.

AI in Risk Monitoring

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Traditional risk monitoring may depend on periodic reports.

AI enables **continuous risk monitoring**.

AI systems can:

- Monitor key risk indicators.
- Identify unusual patterns.
- Compare actual performance with risk appetite.

AI in Risk Monitoring

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- Detect threshold breaches.
- Generate alerts.
- Prioritize high-risk events.
- Escalate significant issues.

This allows risk management to become more dynamic and responsive.

AI and Key Risk Indicators

AI can enhance Key Risk Indicators (KRIs) by:

- Automatically collecting data.
- Calculating indicators.
- Detecting abnormal movements.
- Identifying relationships between indicators.
- Predicting future threshold breaches.
- Ranking risks according to severity.

AI in Risk Reporting

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AI can automate parts of risk reporting by:

- Collecting risk information.
- Consolidating data from multiple systems.
- Generating dashboards.
- Summarizing risk developments.
- Producing management reports.
- Highlighting major changes.
- Explaining significant risk movements.

AI in Risk Dashboards

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An AI-enabled risk dashboard can provide:

- Current risk exposure.
- Risk appetite status.
- KRI movements.
- Emerging risk alerts.
- Predictive risk indicators.
- Scenario results.
- High-risk business areas.
- Recommended management attention.

AI in Credit Risk Management

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Credit risk is one of the major areas where AI can be applied.

AI can support:

- Credit scoring.
- Customer risk classification.
- Probability of default estimation.
- Early warning systems.
- Portfolio monitoring.
- Loan pricing.
- Credit limit decisions.
- Collection strategies.

AI-Based Credit Scoring

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Traditional credit scoring may rely heavily on:

- Income.
- Financial statements.
- Credit history.
- Debt levels.
- Collateral.

AI-Based Credit Scoring

AI can potentially incorporate additional variables such as:

- Transaction behavior.
- Payment patterns.
- Customer relationships.
- Business characteristics.
- Behavioral indicators.

For SMEs, AI may be particularly useful where reliable financial information is limited.

However, the use of alternative data must comply with privacy, fairness, and regulatory requirements.

AI in Market Risk Management

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AI can support market risk management by analyzing:

- Interest rates.
- Foreign exchange rates.
- Equity prices.
- Commodity prices.
- Market volatility.
- Investment portfolios.
- Trading positions.

AI in Market Risk Management

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Potential applications include:

- Volatility forecasting.
- Pattern recognition.
- Scenario analysis.
- Stress testing.
- Portfolio risk monitoring.
- Anomaly detection.

Operational risk includes failures related to:

- People.
- Processes.
- Systems.
- External events.

AI in Operational Risk Management

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AI can analyze:

- Operational incidents.
- Process failures.
- Employee behavior patterns.
- Transaction errors.
- System outages.
- Loss events.

AI can identify recurring patterns and help determine the underlying drivers of operational risk.

AI in Fraud Risk Management

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AI is increasingly relevant to fraud detection.

AI can identify:

- Unusual transactions.
- Suspicious customer behavior.
- Abnormal transaction sequences.
- Identity inconsistencies.
- Unusual payment patterns.
- Potential account takeover behavior.

Machine learning can continuously learn from previously identified fraudulent and legitimate transactions.

AI in Cyber Risk Management

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AI can strengthen cybersecurity risk management by:

- Detecting unusual network activity.
- Identifying anomalous user behavior.
- Detecting malware patterns.
- Monitoring access behavior.
- Prioritizing vulnerabilities.
- Supporting incident detection.
- Predicting potential attack patterns.

AI in Reputational Risk Management

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Reputational risk can emerge rapidly through digital channels.

AI can monitor:

- Social media.
- News.
- Customer reviews.
- Online discussions.
- Public complaints.
- Regulatory announcements.

Natural Language Processing (NLP) can classify information according to:

- Positive sentiment.
- Negative sentiment.
- Topics.
- Complaints.
- Emerging issues.

AI can therefore support early detection of reputational threats.

AI in Compliance Risk Management

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AI can support compliance through:

- Regulatory monitoring.
- Document analysis.
- Policy comparison.
- Transaction monitoring.
- Compliance testing.
- Regulatory reporting.
- Identification of potential breaches.

AI can help organizations monitor regulatory developments and identify changes that may affect internal policies and controls.

AI in AML and Financial Crime Risk

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AI can support Anti-Money Laundering (AML) activities by analyzing:

- Transaction patterns.
- Customer relationships.
- Transaction networks.
- Geographic patterns.
- Unusual activity.
- Behavioral changes.

AI in AML and Financial Crime Risk

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- **Machine learning can help identify complex patterns that may be difficult to detect using simple rules.**
- **Human investigation remains essential before making significant decisions about customers or transactions.**

AI in Supply Chain Risk

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Organizations increasingly depend on complex supply chains.

AI can monitor:

- Supplier performance.
- Delivery delays.
- Geographic risks.
- Financial deterioration.
- Commodity prices.

AI in Supply Chain Risk

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- Political and economic developments.
- Transportation disruptions.

AI can provide early warnings of potential supply-chain disruptions.

AI can support business continuity by:

- Identifying critical processes.
- Analyzing historical disruptions.
- Predicting potential failures.
- Simulating scenarios.
- Supporting resource allocation.
- Monitoring recovery indicators.

AI in Business Continuity and Resilience

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AI can contribute to organizational resilience by helping organizations understand how disruptions could affect interconnected processes.

AI Copilots for Risk Managers

An AI risk-management copilot could help a risk manager answer questions such as:

- What are the highest current risks?
- Which KRIs deteriorated this month?
- Which risks are approaching their appetite limits?
- What new emerging risks have been identified?
- Which controls are underperforming?
- What risks are connected to this business process?
- What happened during previous similar events?

Benefits of AI in ERM

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Major potential benefits include:

1. Speed

- Faster data processing and analysis.

2. Scale

- Ability to analyze large datasets.

3. Early Detection

- Identification of emerging risk signals.

Benefits of AI in ERM

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Major potential benefits include:

4. Accuracy

- Potentially improved prediction and classification.

5. Automation

- Reduction of repetitive manual activities.

6. Integration

- Connecting information across risk categories.

7. Better Decisions

- Providing decision-makers with timely insights.

The Future of AI-Enabled ERM

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The future of ERM is likely to become:

- More predictive.
- More automated.
- More integrated.
- More data-driven.
- More real-time.
- More interconnected.



Thank You