Introduction to Risk Management

CFI

Course Introduction

Course Instructor – Ryan

Ryan Spendelow

VP, Content

About Ryan…

Prior to joining CFI, Ryan taught financial modeling and capital markets to students in the world's leading investment banks and asset managers. Ryan spent a large part of his career teaching in London, New York and Hong Kong and is passionate about making learning about the finance markets as accessible as possible.

Ryan loves sports, both watching and participating, and will quite happily spend hours grilling on the BBQ.

Course Introduction

Risk management in the financial services industry

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Risks must be managed and mitigated to protect the organization, its customers, and the ongoing stability of the global financial and economic system.

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Without effective risk management, banks are at risk of failing.

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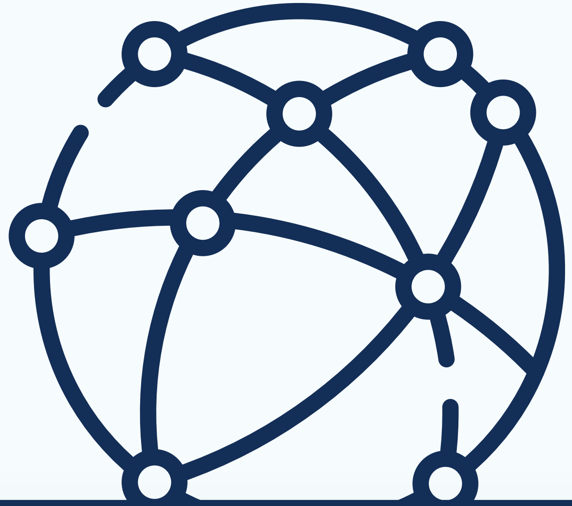


Consequences experienced at a global level

Learning Objectives

Give real life and recent examples of what happens when banks do not manage risk well

Review the evolution of risk management for a better perspective on the risk management landscape

Identify and define the risks that banks and financial service organizations are exposed to

Give background to understand why risk management is important and how particular risk may manifest should a company not manage it well

Explore the importance of enterprise risk management and describe the steps of an effective Enterprise Risk Management framework

Introduction to Risk

Risk Management Failures

Definition of risk

Risk
The possibility an event leads to a negative outcome, such as a financial loss or reputational damage

Risk management
The process of managing these risky events to minimize their negative impacts

Risk management failures
Real-life examples where risk management failures have led to the downfall of the bank

Risk Management Failures

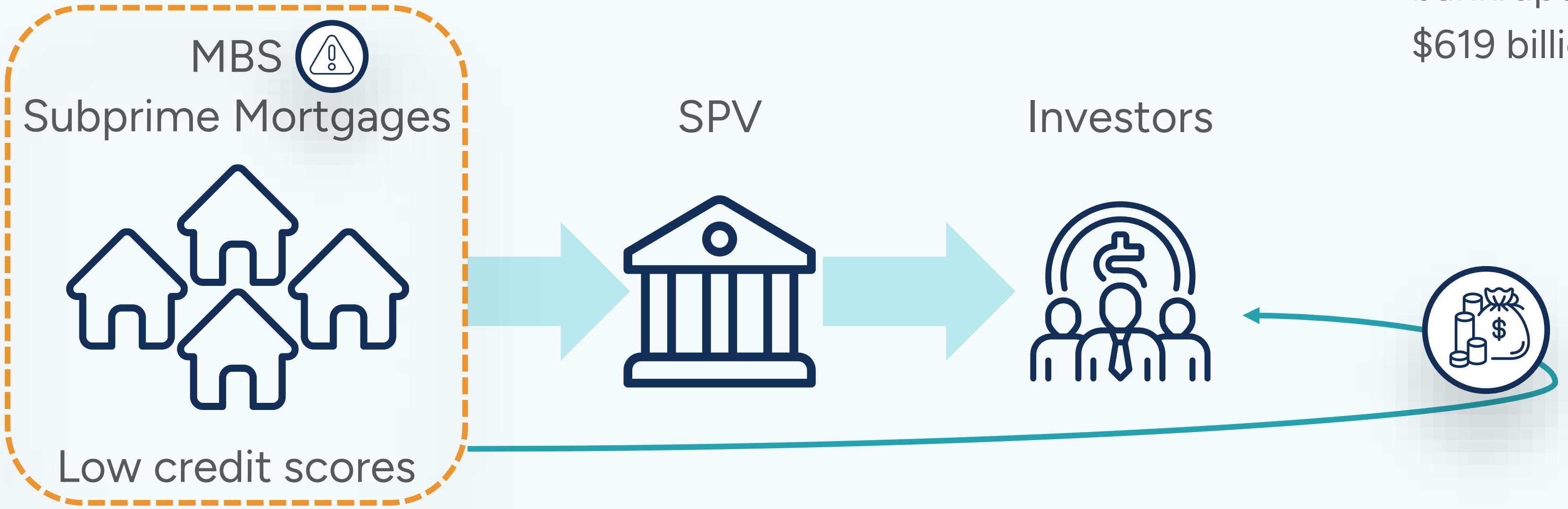
LEHMAN BROTHERS → Recorded assets on their balance sheet

2006
US Housing Crash started, largely ignored by banks initially

2007
Bank booked a record profit of >$4 billion

2008
January
Lehman Brothers was one of the largest investment banks in the USA

2008
September
Forced to file for bankruptcy with $619 billion in debts



Risk Management Failures

LEHMAN BROTHERS

Took on too much risk through its MBSs exposure

Excessive risk enabled by management who encouraged inappropriate risk-taking culture within the bank

"Risk management at the bank was repeatedly overruled."

CRO
Lehman Brothers
2002 – 2007

Risk Management Failures

LEHMAN BROTHERS

BEAR STEARNS

Investment bank
in the USA

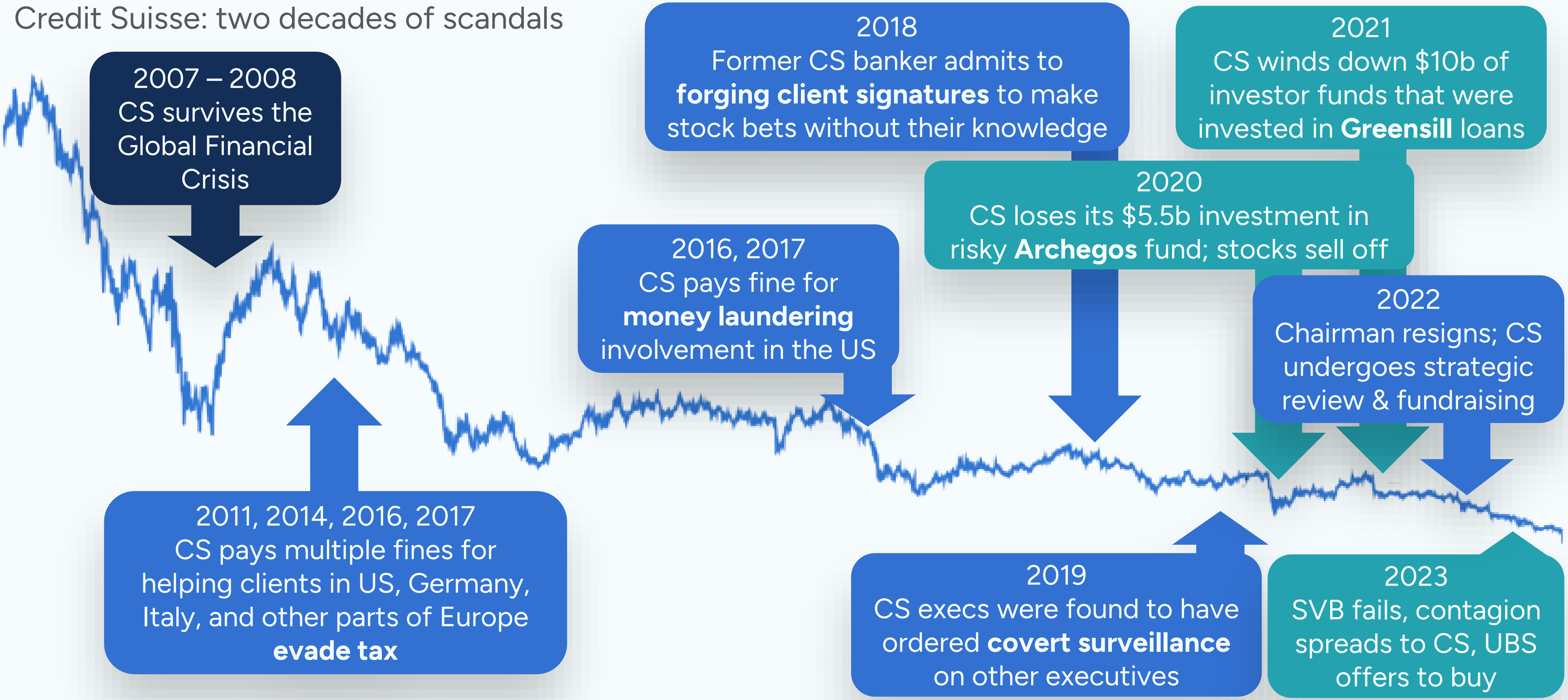
northern rock

Savings and
mortgage bank
in the UK

Global Financial Crisis of 2008

Risk Management Failures

Credit Suisse: two decades of scandals



The Evolution of Risk Management

1940s
Banks use insurance for protection

1950s
Basic risk management policies put in place

1970s
International banking and derivatives needed better risk management

1980s
Growth in derivatives led to enhanced risk management

1987
First dedicated risk management department in a bank (Merrill Lynch)

1988
Basel I is the first global regulatory framework

1990s
Risk management becomes bank-wide issue. CROs appear

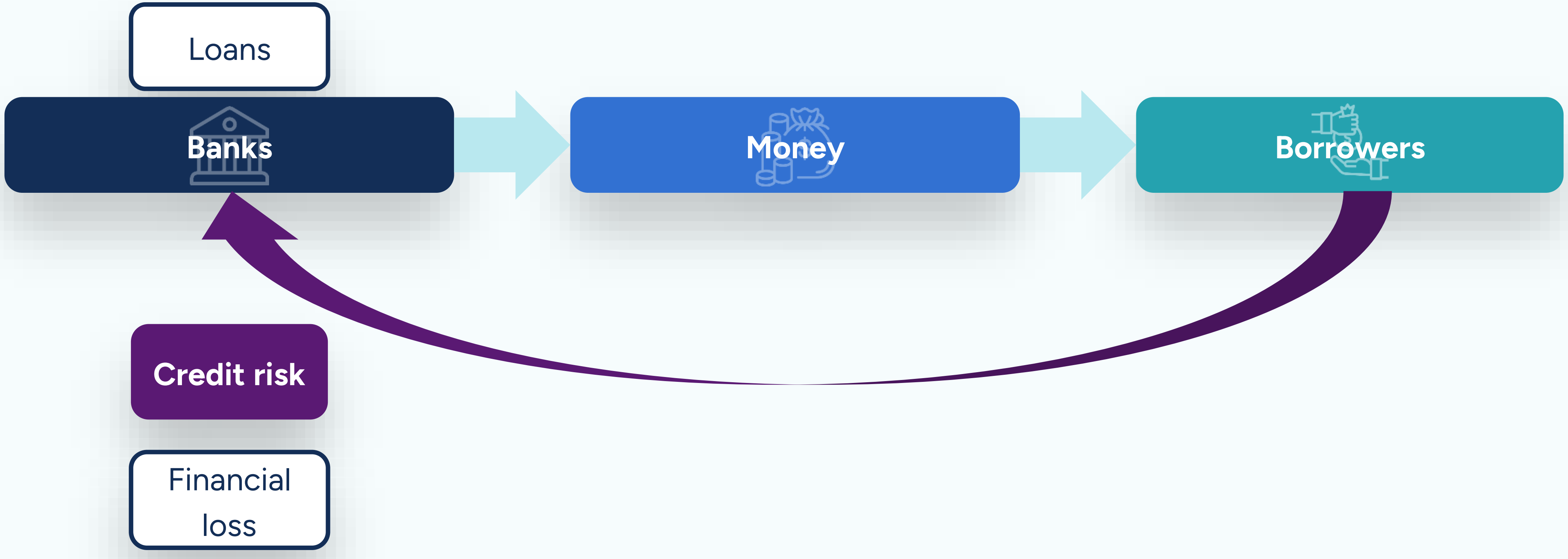
2004
Basel II introduced and fully implemented in 2008

2010
Basel III introduced and fully implemented in 2023

What is Risk?

Defining Risk

Risk is the uncertainty of future expected outcomes.



Defining Risk

Risk is the uncertainty of future expected outcomes.

Financial loss

- Losing money when a borrower defaults
- Bank fines if there were broken laws/regulations leading to the risky event
- Business restriction impacting future earnings

Defining Risk

Risk is the uncertainty of future expected outcomes.

Failure in managing risk

Reputational damage

Financial loss

Employees found guilty of unlawful or unethical behavior

Rogue trading in the investment banking division

Selling inappropriate insurance products through its retail bank

Defining Risk

Risk is the uncertainty of future expected outcomes.

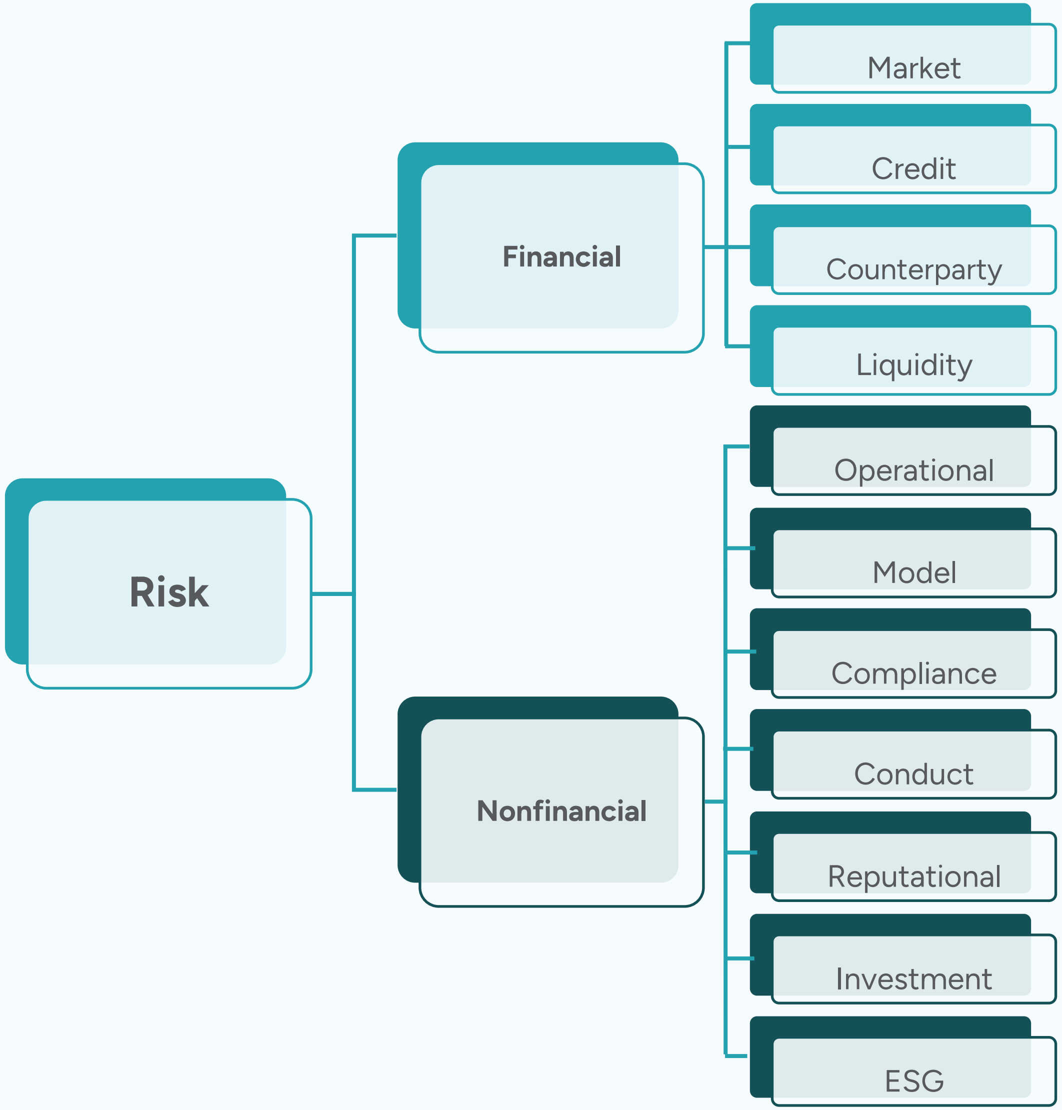
Financial loss

Damaged reputation

- Customer leaves the bank and uses a competitor
- Future clients avoid doing business with the bank
- The bank faces tougher scrutiny from regulators
- Shareholders decide not to invest in the bank

The Catalog of Risks

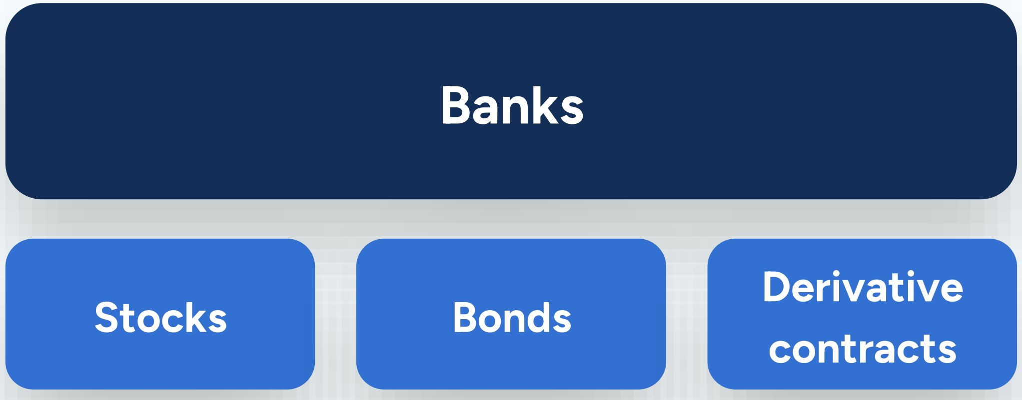
The Catalog of Risks



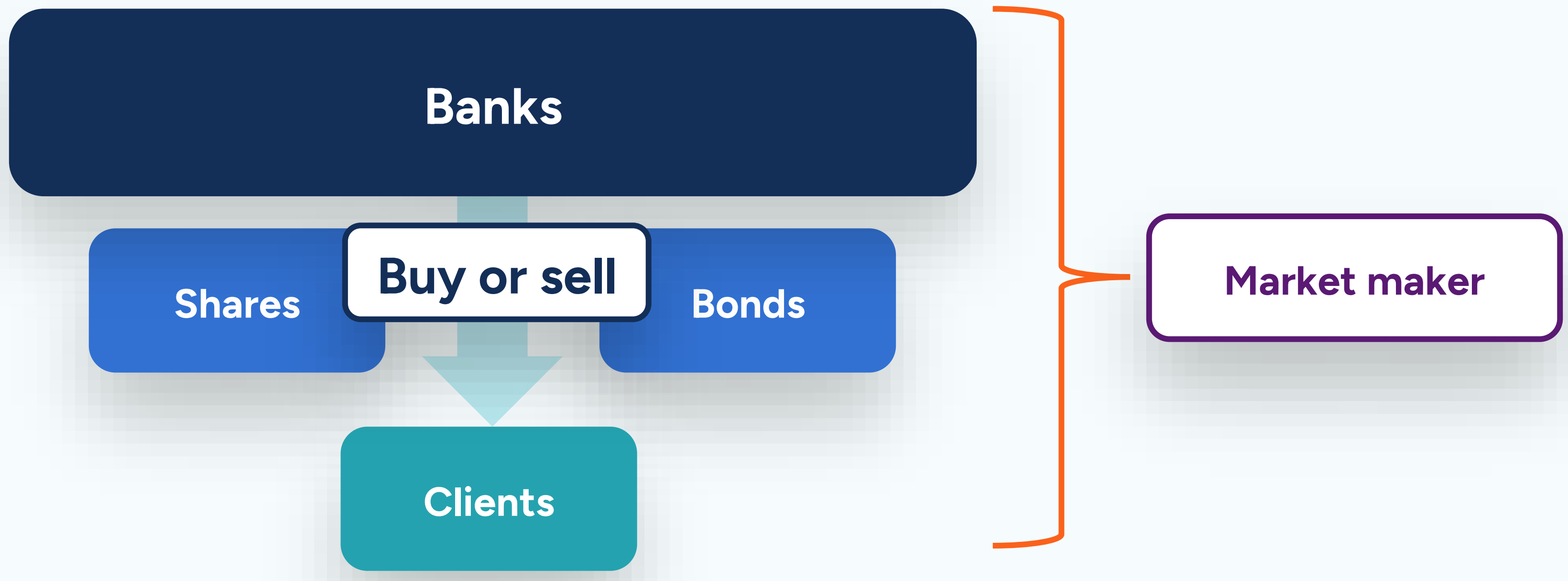
An event leads directly to a financial loss, usually related to the bank's financial activities

Immediate impact is not financial but can ultimately still result in financial losses

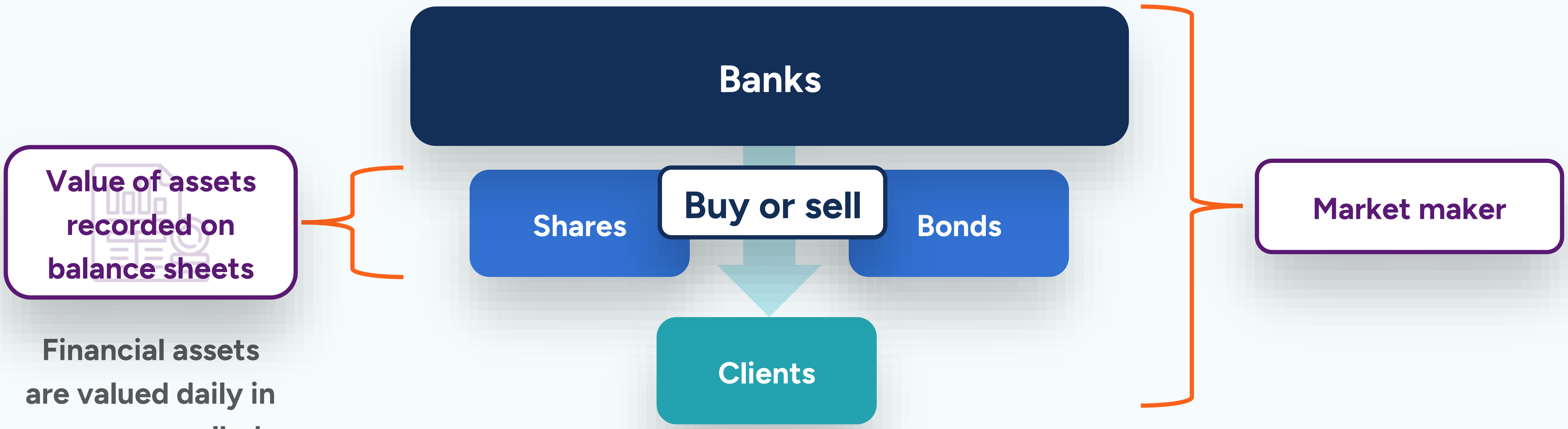
Market Risk



Market Risk

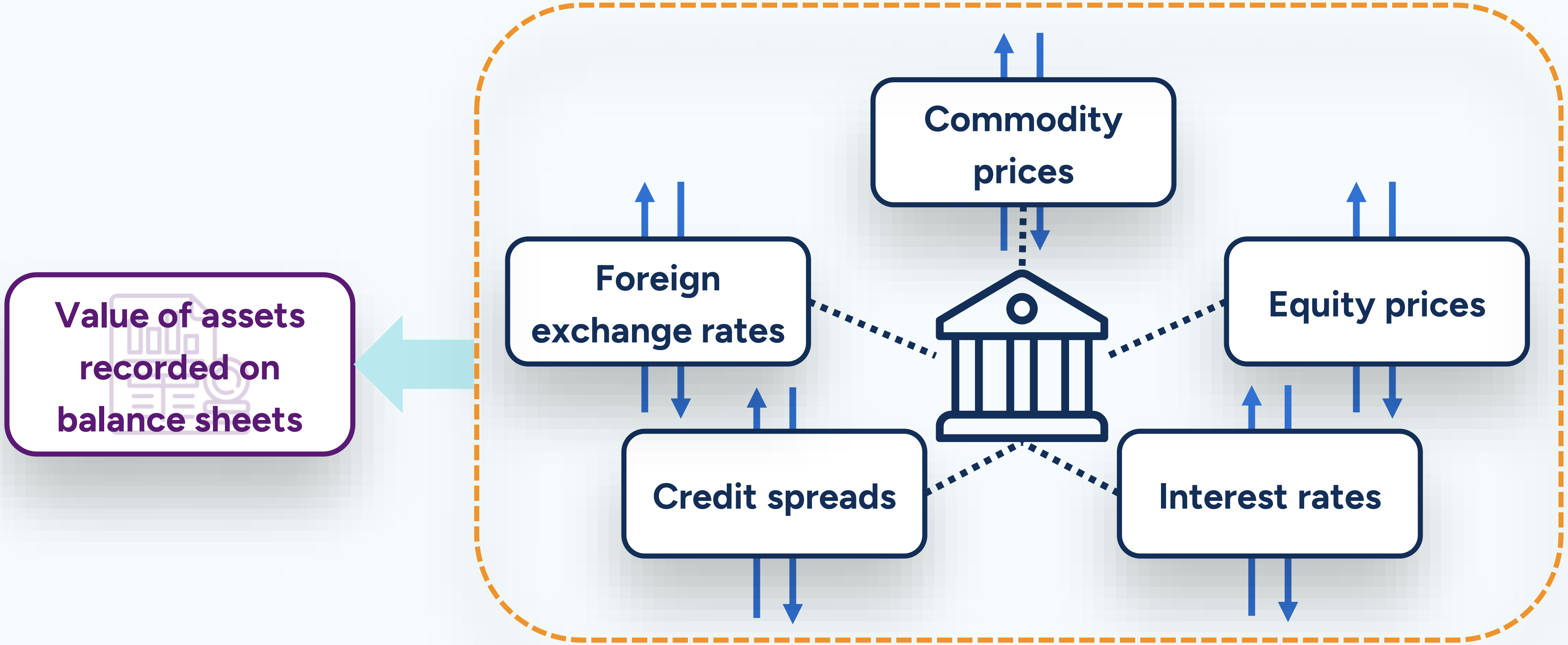


Market Risk



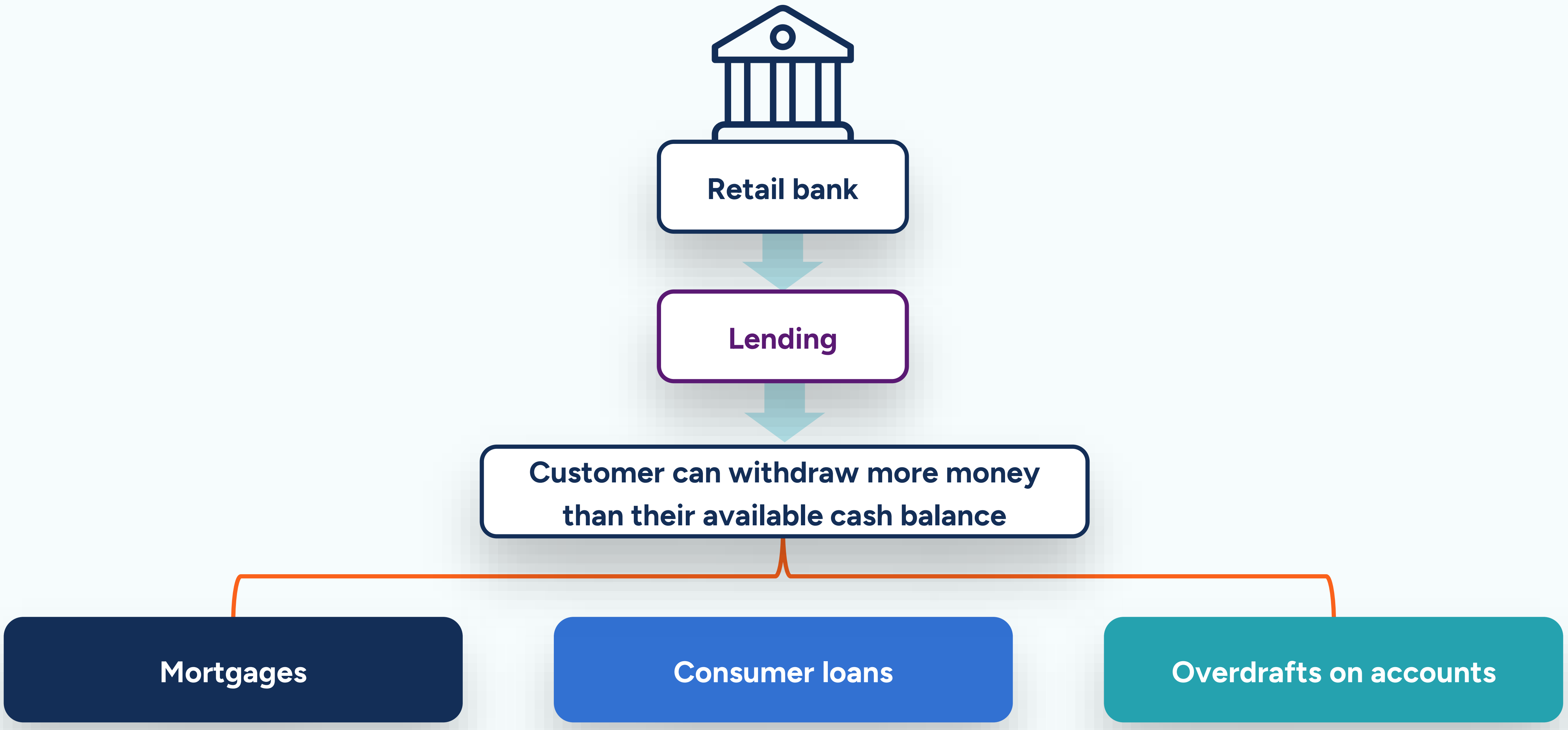
Financial assets are valued daily in a process called marketing to market

Market Risk

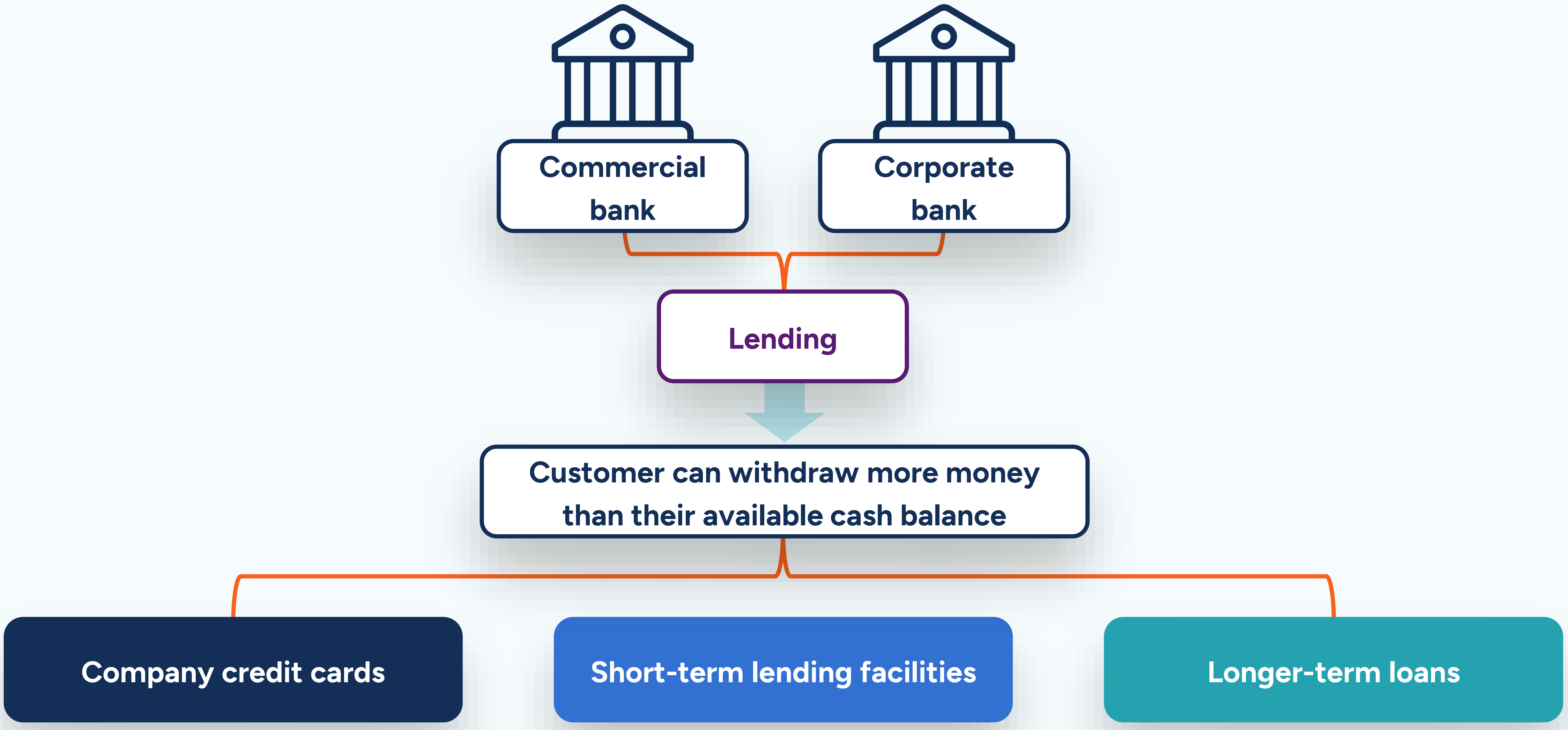


The future value of a financial asset is harder to predict.
This is referred to as **volatility.**

Credit Risk – Lending



Credit Risk – Lending

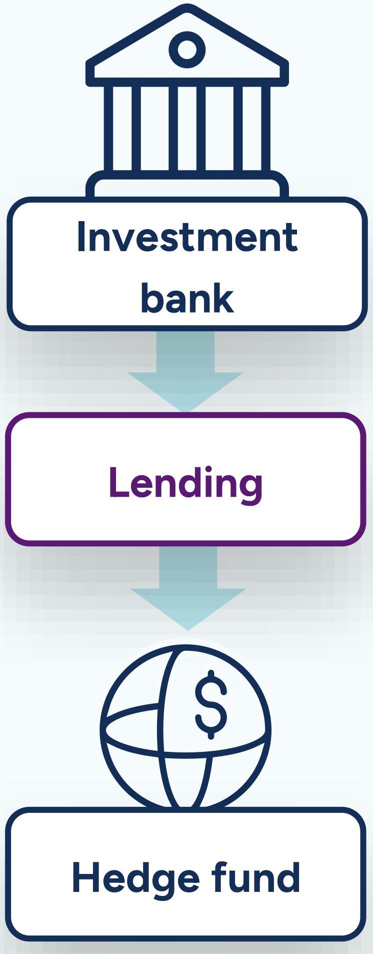


Credit Risk – Lending

Syndication

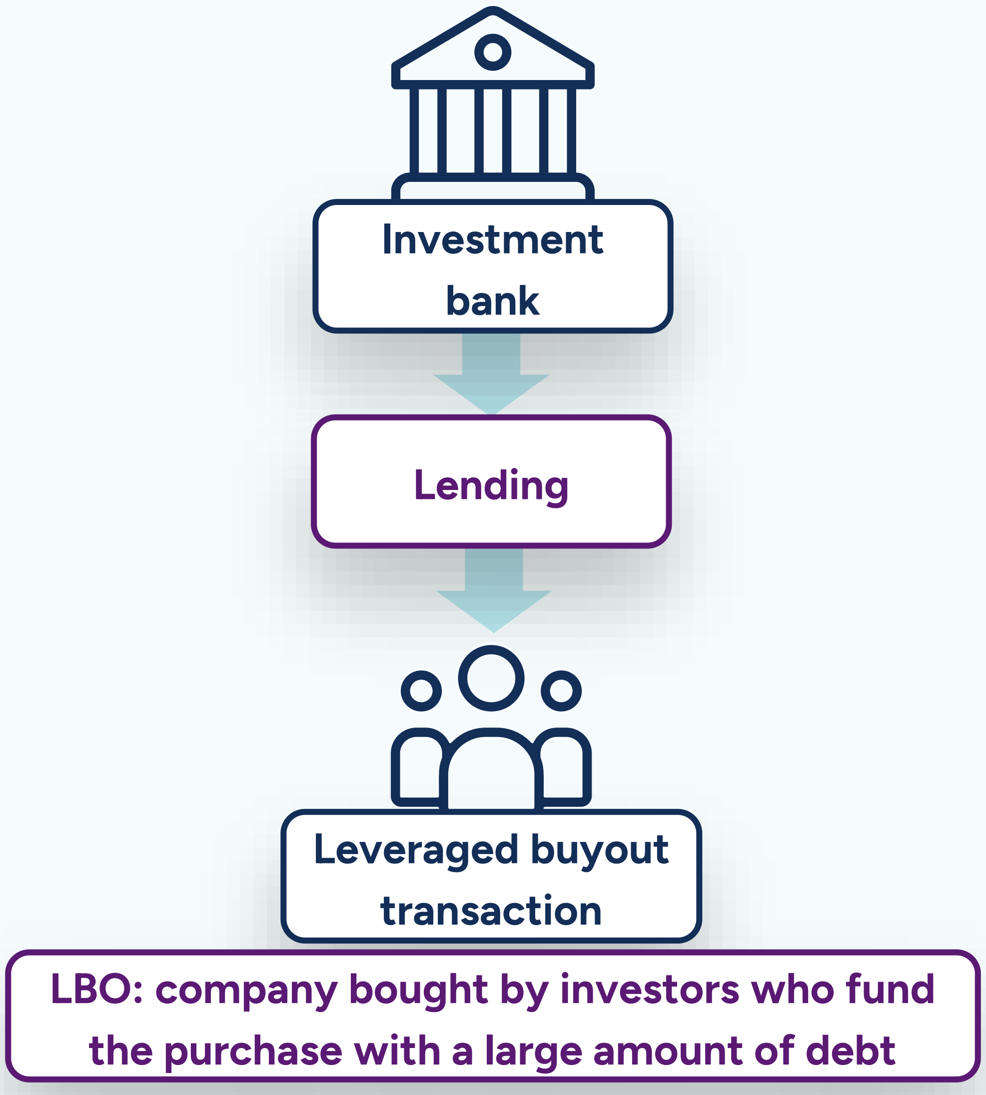
Commercial and corporate banks may team up with other lenders to support large infrastructure projects in a process called syndication

Credit Risk – Lending



CFI

Credit Risk – Lending



Credit Risk – Lending

Credit (Default) Risk – Lending

Credit (Default) Risk – Lending

This type of credit risk is often the largest risk a bank is exposed to

Credit Risk – Counterparty

Another type of credit risk: counterparty risk

Issue for banks engaged in financial market transactions with other banks

Chance that a bank's **counterparty** in a transaction, like **derivative transactions**, does not meet their financial obligations.

- Investment banks
- Asset managers and hedge funds
- Universal banks with investment banking
- Investment management divisions

This failure can lead to a financial loss for the bank.

Operational Risk

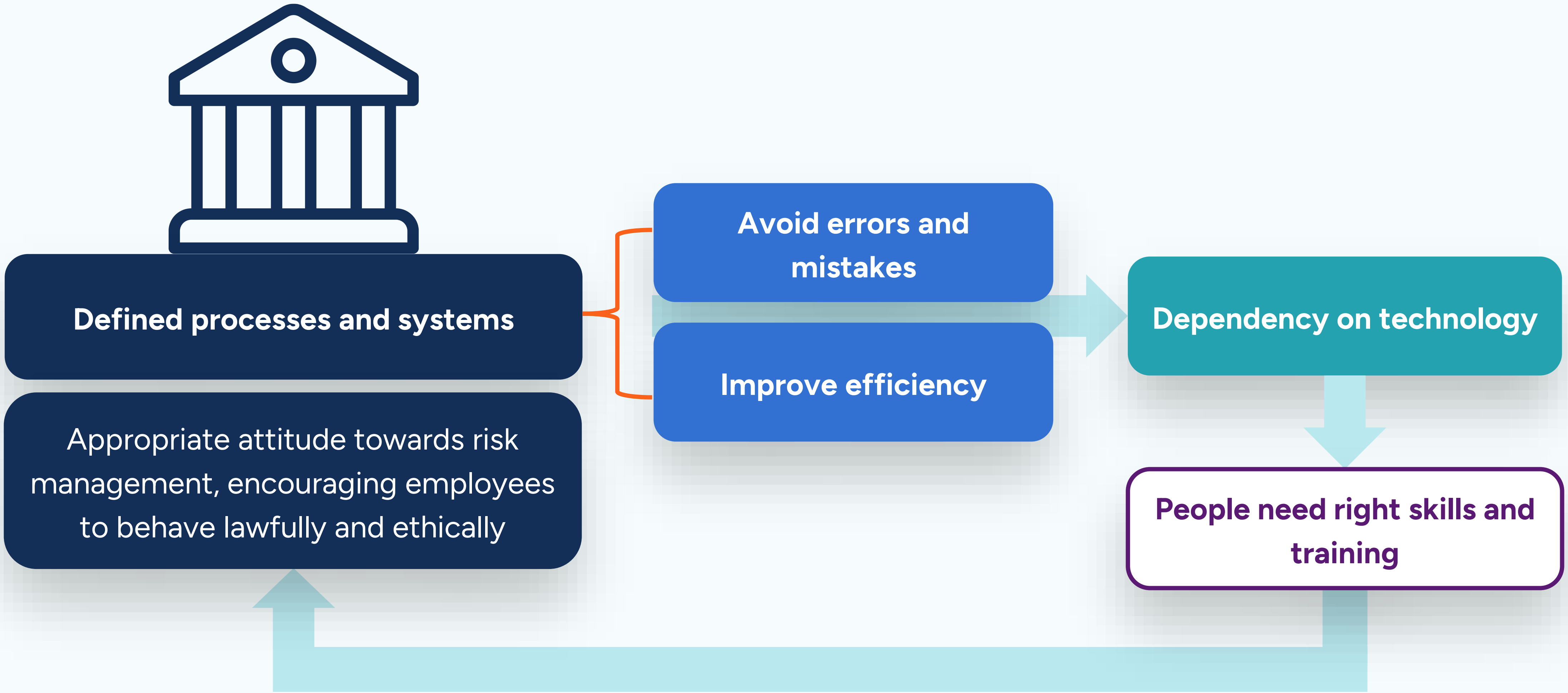
Large universal banks

- Operations in many countries
- Offering range of products

Large global investment banks

- Offering range of solutions
- Serving a range of clients

Operational Risk



Operational Risk

Manage internal issues

Manage external events that may disrupt their daily business

Operational Risk

Broad category of risk resulting in a financial loss due to failed or inadequate processes, systems, people, or external events.

Financial loss due to failure or inadequacy

Processes	People
Systems	External events

Operational Risk

Smaller bank = less complex and smaller operational risk

Larger bank = more complex and greater operational risk

Significant fines imposed on banks are due to operational risk management failure

Operational Risk

Smaller bank = less complex and smaller operational risk

Larger bank = more complex and greater operational risk

Massively impacting bank's financial results and causing irreputable harm to its reputation

Liquidity Risk

Reliable access to funds

Day-to-day operations

Salaries

Assets

Debt

Liquidity Risk

Reliable access to funds

Right place, right time

Resources

Effort

Liquidity Risk

Funding for banks comes from different sources

Key source is customer deposits

- Borrowing from other banks
- Issuing bonds
- Trading liabilities
  - Derivative contracts
    - They are the party that owes money to their counterparty
- Equity

Liquidity Risk

Liquidity management is the process of managing the funding of the bank. If its liquidity is mismanaged, it is called liquidity risk.

Sources

When a bank can't access the funding it needs for its daily operations (liquidity)

svb Silicon Valley Bank

Liquidity Risk

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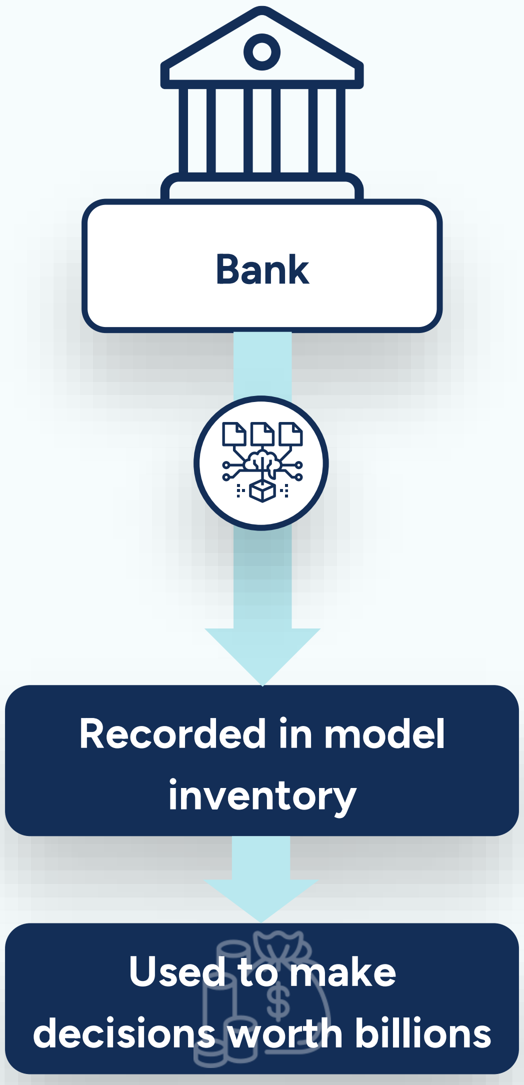
Sources

When a bank can't access the funding it needs for its daily operations (liquidity)

Cost of funding has become very expensive

Model Risk


Bank
Recorded in model inventory
Used to make decisions worth billions

Model Risk

A model applies statistical, economic, financial, or mathematical theories, techniques, or assumptions to transform input data into outputs or results.

Created from various technologies

- C++
- Excel spreadsheet
- Matlab
- Python
- R
- SAS
- SQL

Model Risk

A model applies statistical, economic, financial, or mathematical theories, techniques, or assumptions to transform input data into outputs or results.

Model use in banking

Valuation and pricing models	Help traders determine what price a security should be, to compare it to the actual market price
Market and liquidity risk models	Help risk managers forecast what future risk exposures could be
Credit and counterparty risk models	Help ascertain the likelihood a customer or client may default in future
Finance models	Help banks project future revenues, cash flows, and profitability

Model Risk

A model applies statistical, economic, financial, or mathematical theories, techniques, or assumptions to transform input data into outputs or results.

Primary sources of model use

Potential for something bad to happen from decisions based on an incorrect or misused model

A model may be used incorrectly or inappropriately, or there may be misunderstandings about its limitations and assumptions

Example: a model designed for pricing short-term debt instruments might be used for calculating the price of other securities

Compliance Risk

Risk of incurring fines, restrictions on doing business, or damage to its reputation from not following or breaking the laws and regulations in the countries where it does business.

A couple of important and closely related types of risks

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Risk of incurring fines, restrictions on doing business, or damage to its reputation from not following or breaking the laws and regulations in the countries where it does business.

Legal risk

Risk of potential legal actions against a bank

Lawsuits

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Legal risk

Risk of potential legal actions against a bank

- Lawsuits

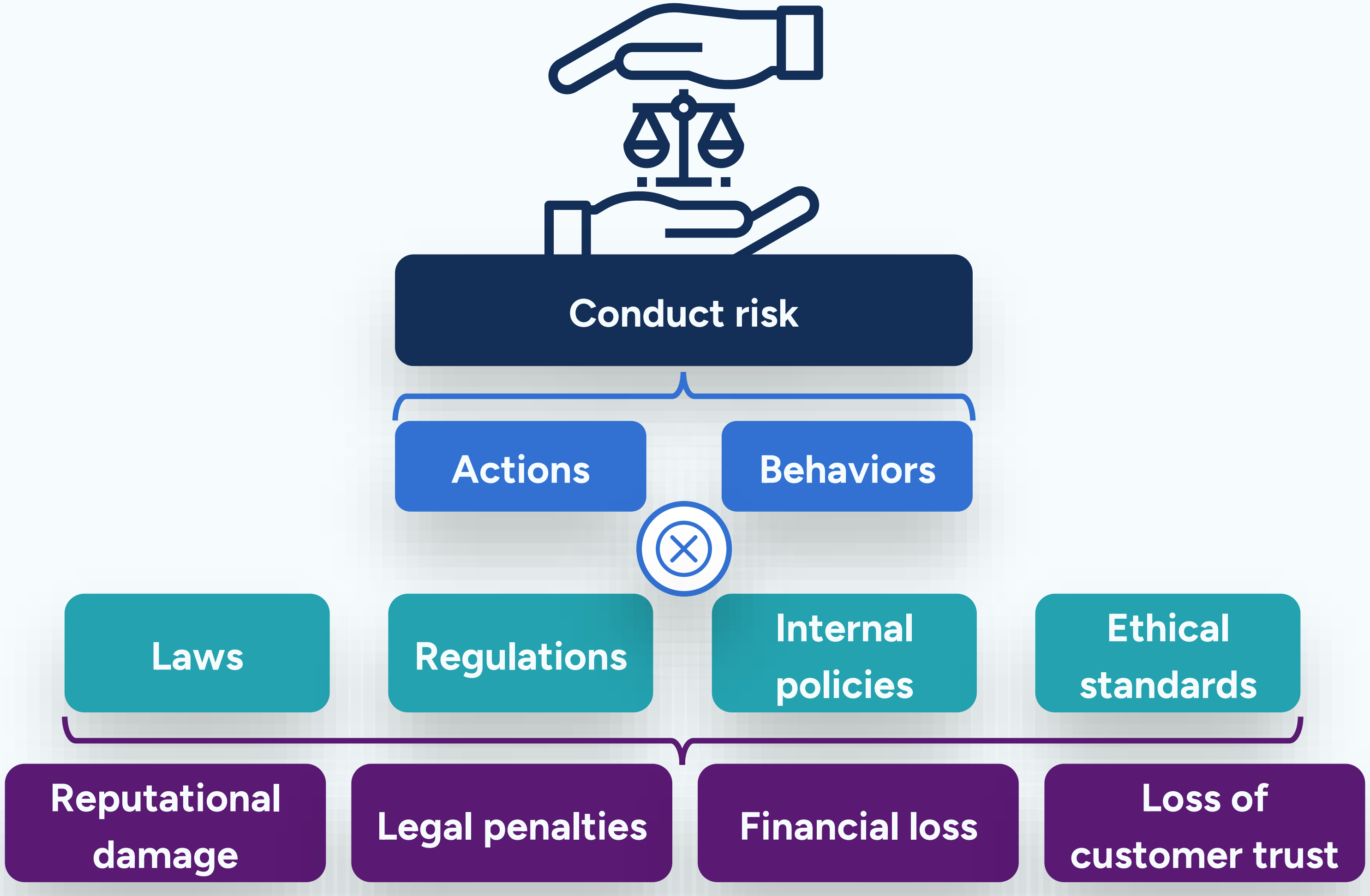
Regulatory risk

Risk that a new regulation or law will be implemented

- Increasing compliance costs
- Causing disruptions to day-to-day business

Conduct Risk

Potential risk arising from inappropriate or unethical behavior within an organization that may harm its customers, stakeholders, or the broader market.



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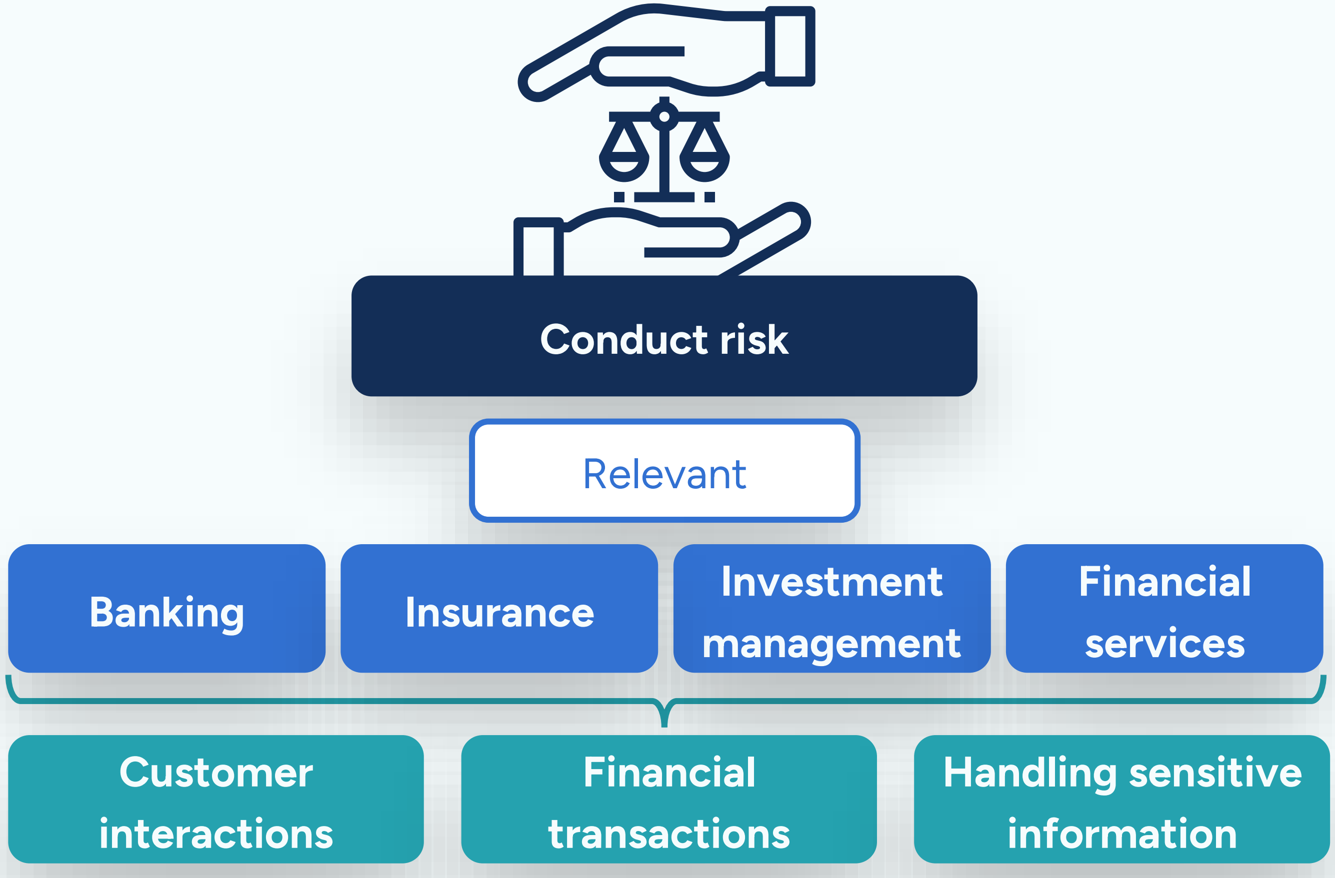

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Conduct risk

- Selling products or services to customers that are unsuitable
- Engaging in activities to manipulate prices
- Breaching client confidentiality
- Exploiting privileged inside information for personal gain
- Engaging in fraudulent activities within an organization

Conduct Risk

Potential risk arising from inappropriate or unethical behavior within an organization that may harm its customers, stakeholders, or the broader market.

Conduct risk

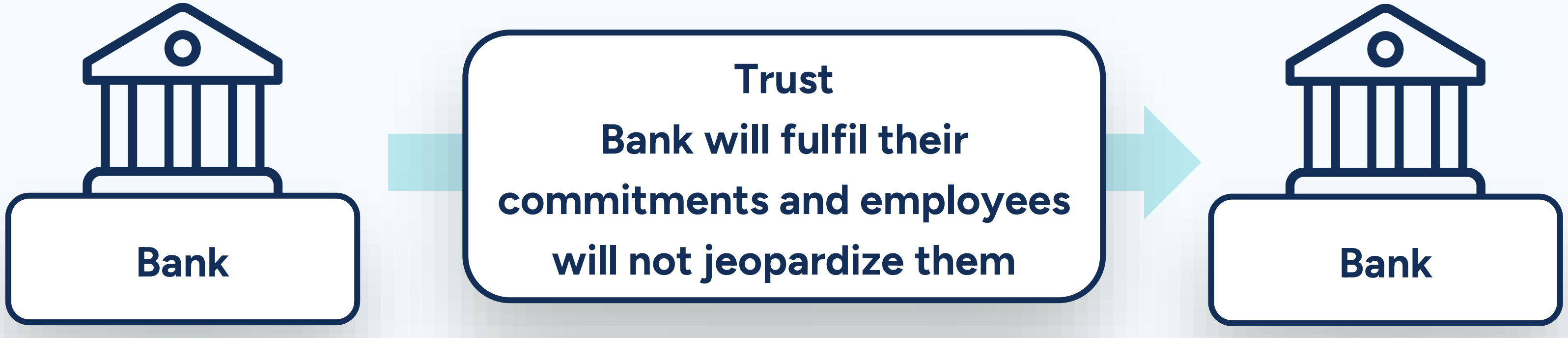
- Compliance programs
- Ethical codes of conduct
- Governance structures

- Integrity
- Transparency
- Accountability
- Provide training and education on ethical behavior
- Establish mechanisms for reporting and addressing misconduct

Reputational Risk

Reputational Risk

Reputational Risk



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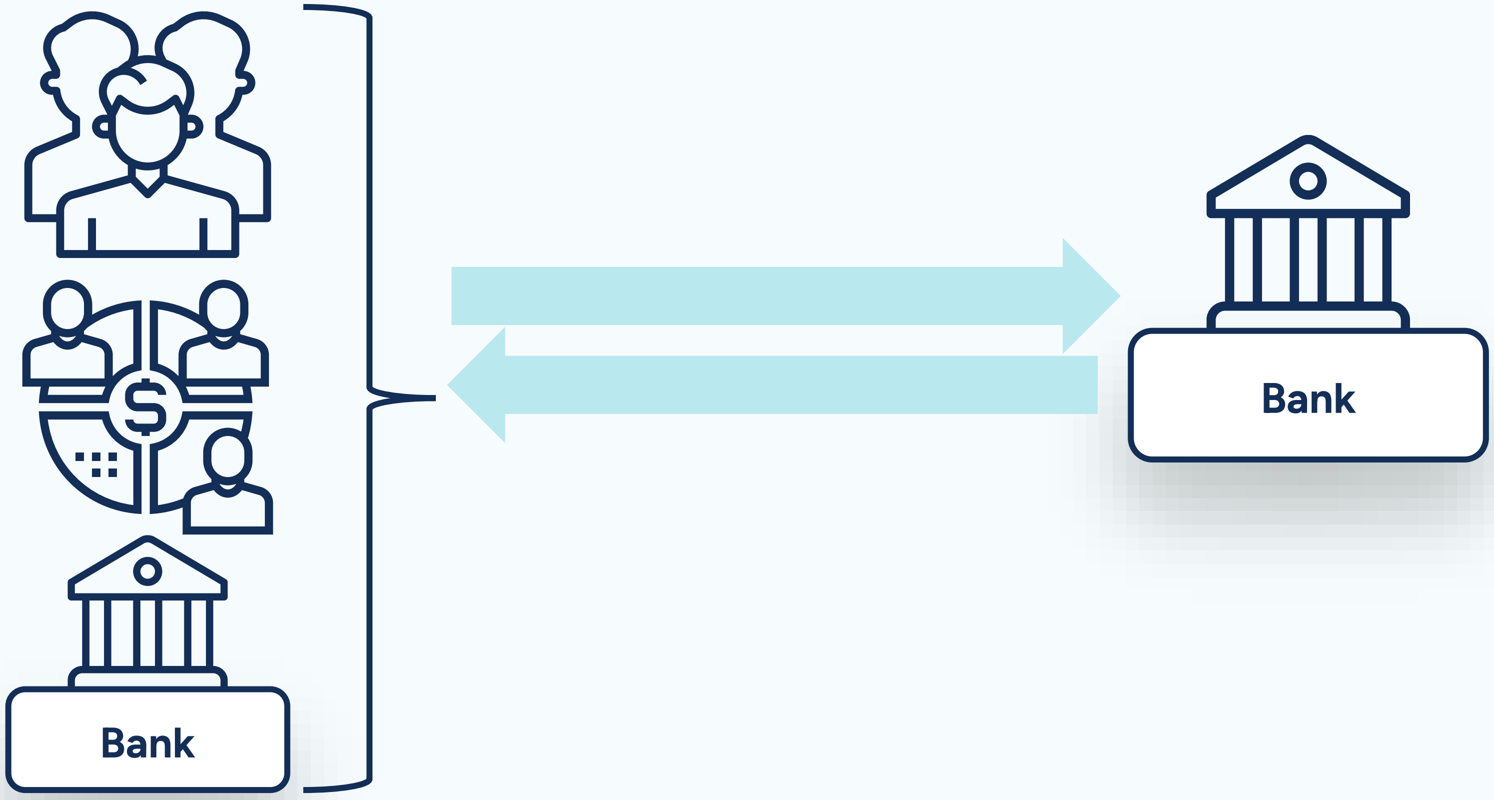

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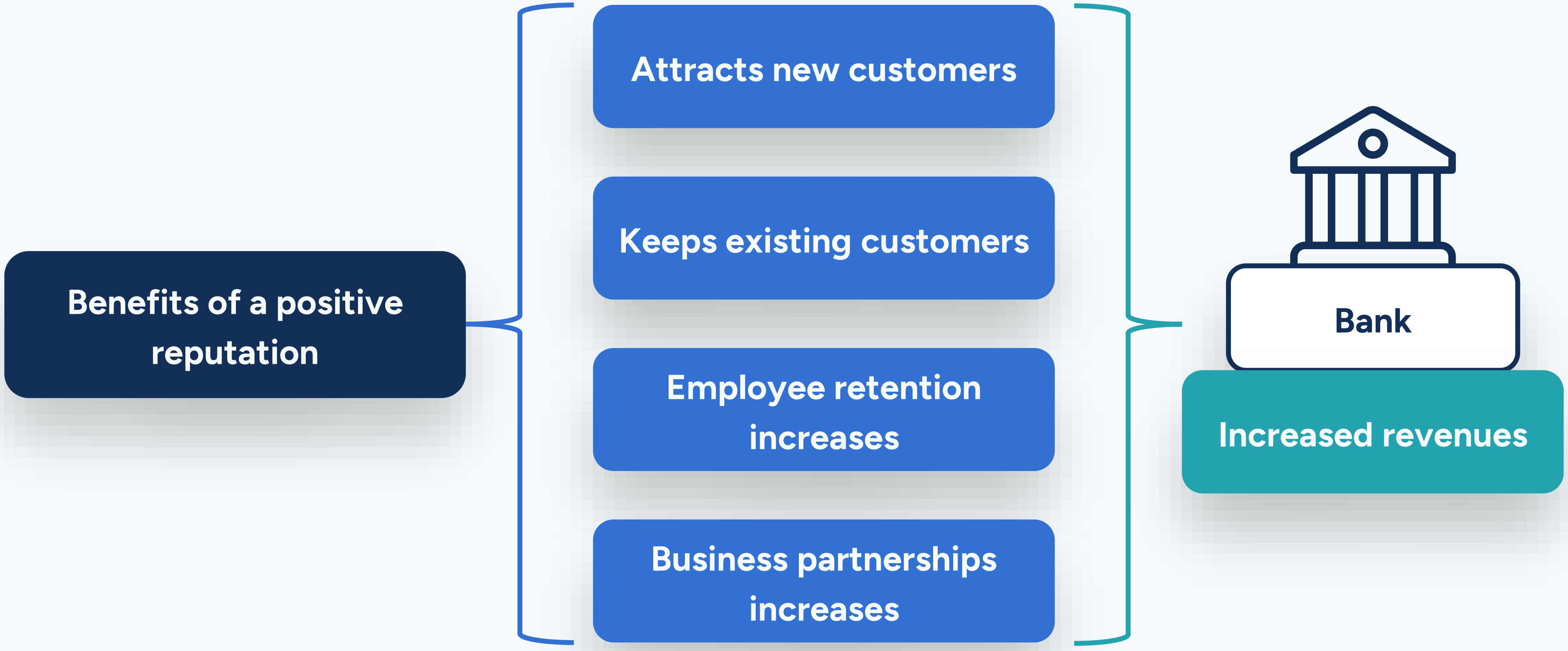
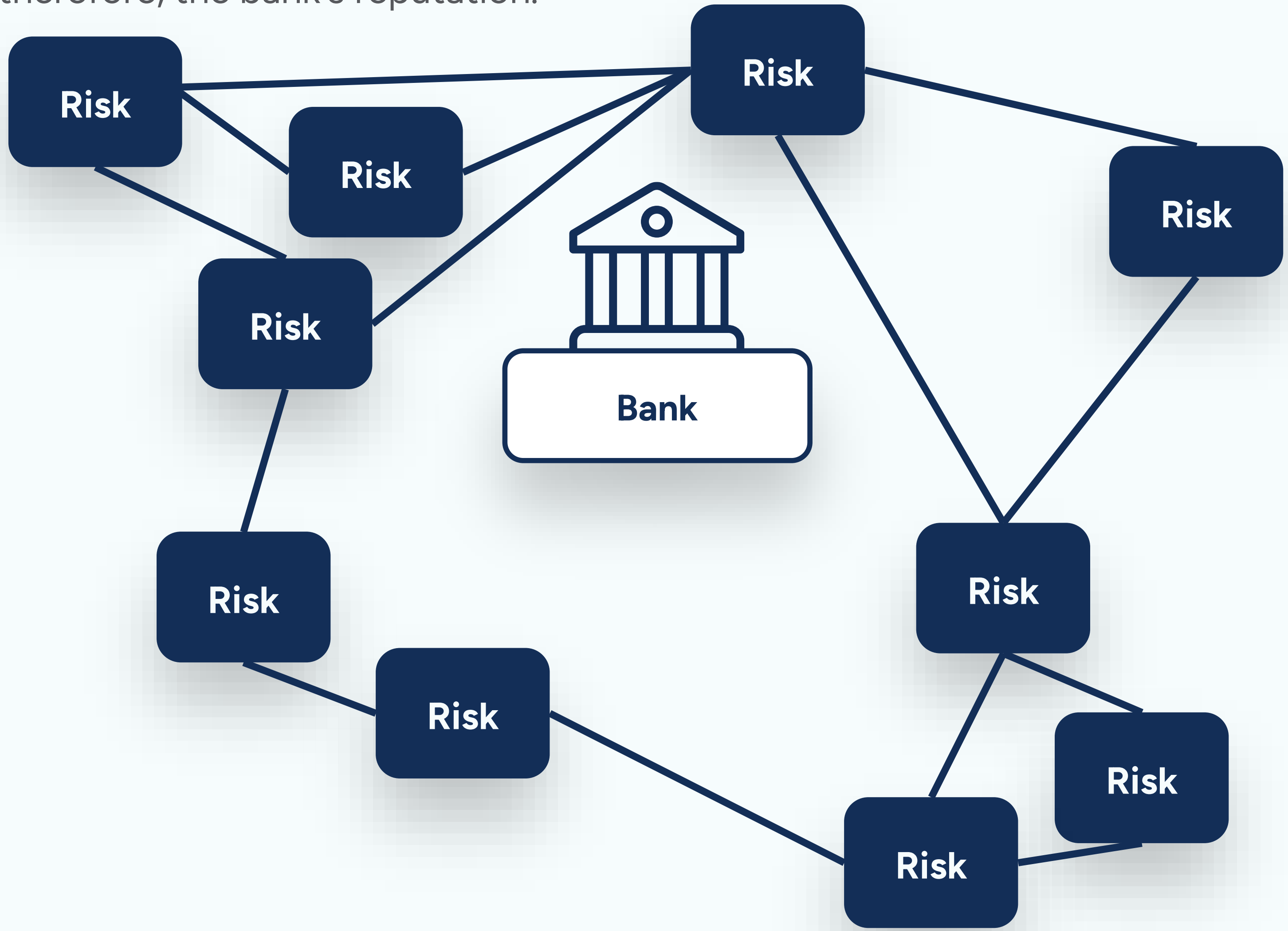


Reputational Risk

Describes the risk that actions by an employee or groups of employees, a transaction, or an investment the bank makes that damages the trust and, therefore, the bank's reputation.



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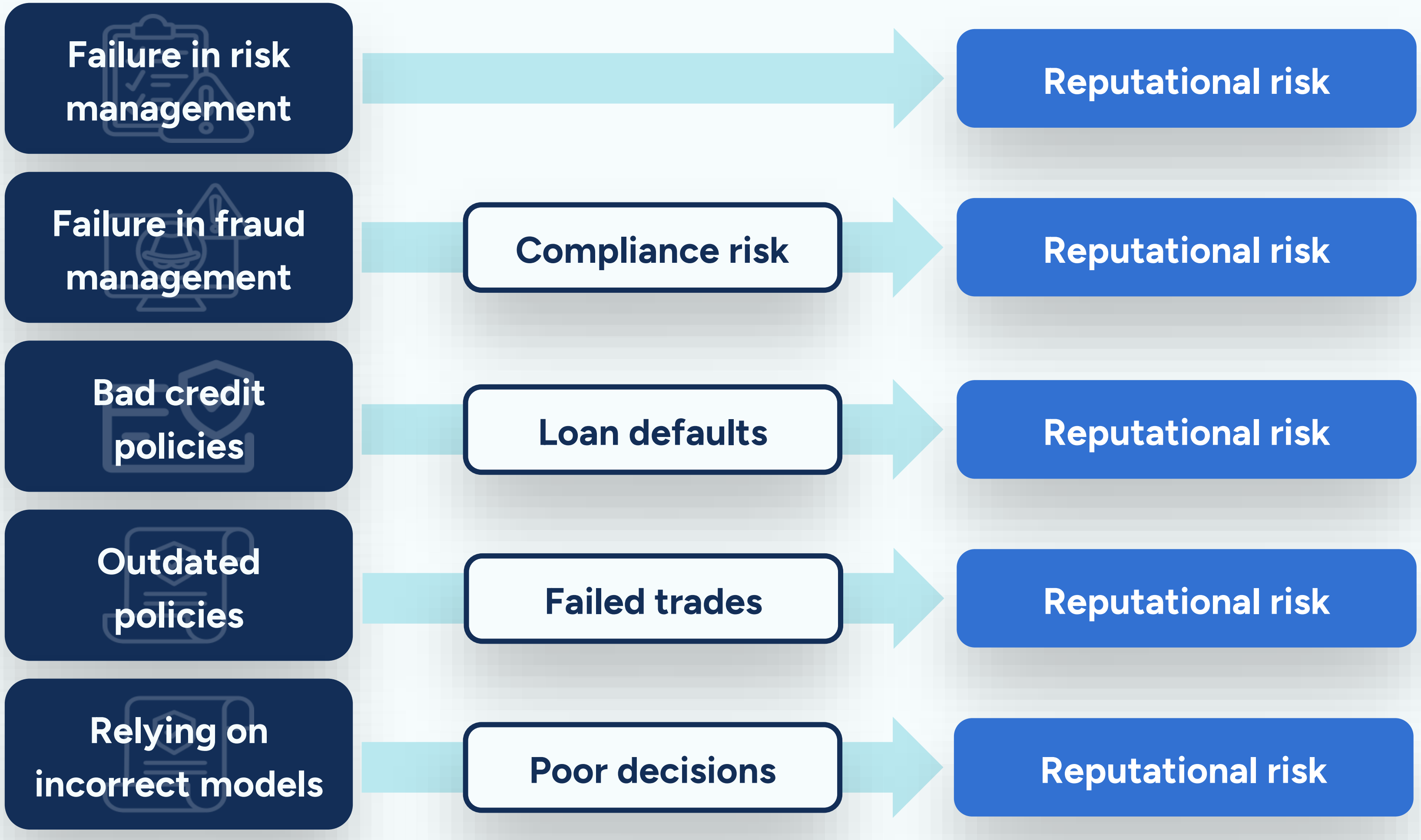

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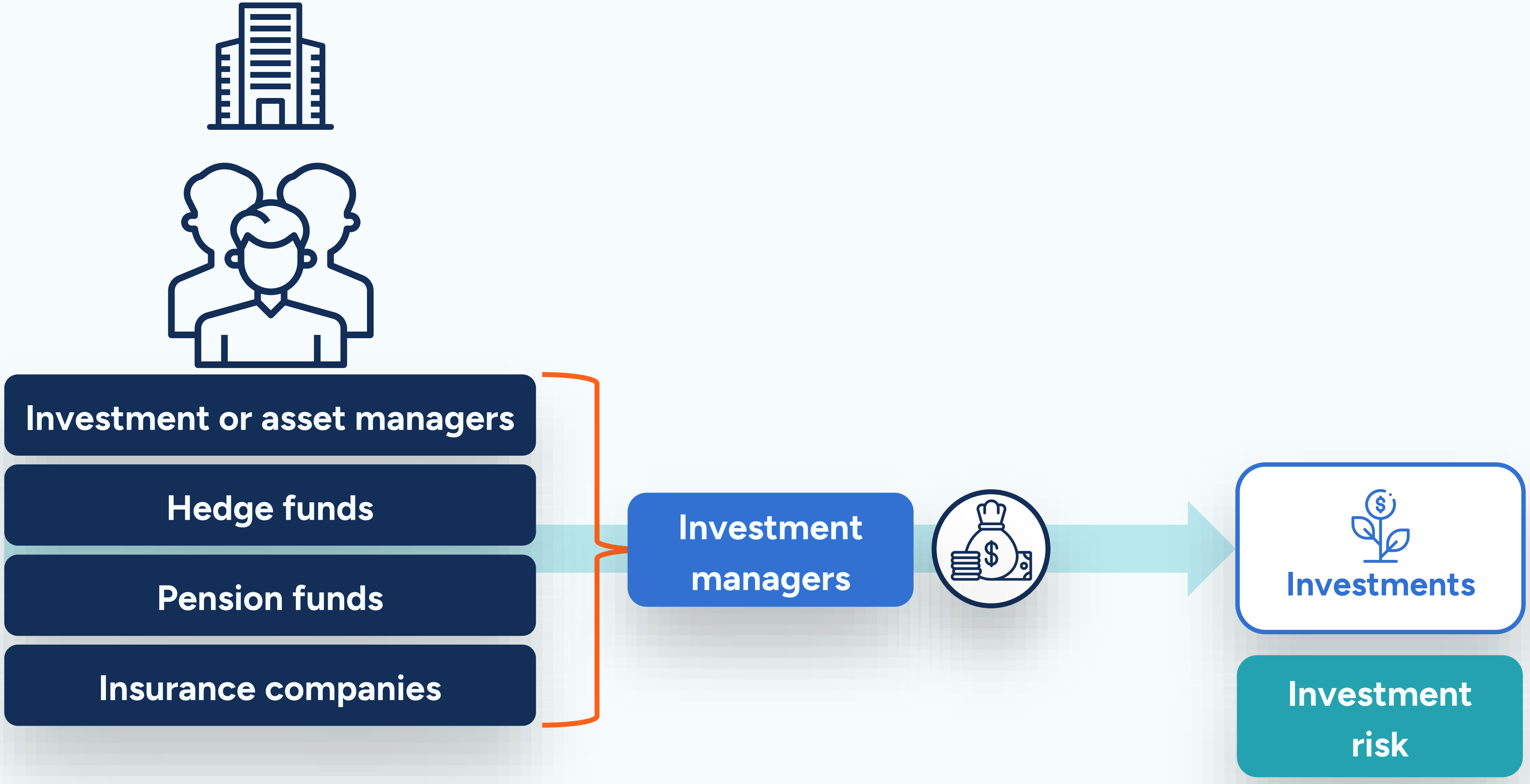
Investment Risk

The risk the value of an investment might fall in value, resulting in the investor losing part, or even all, of their investment.



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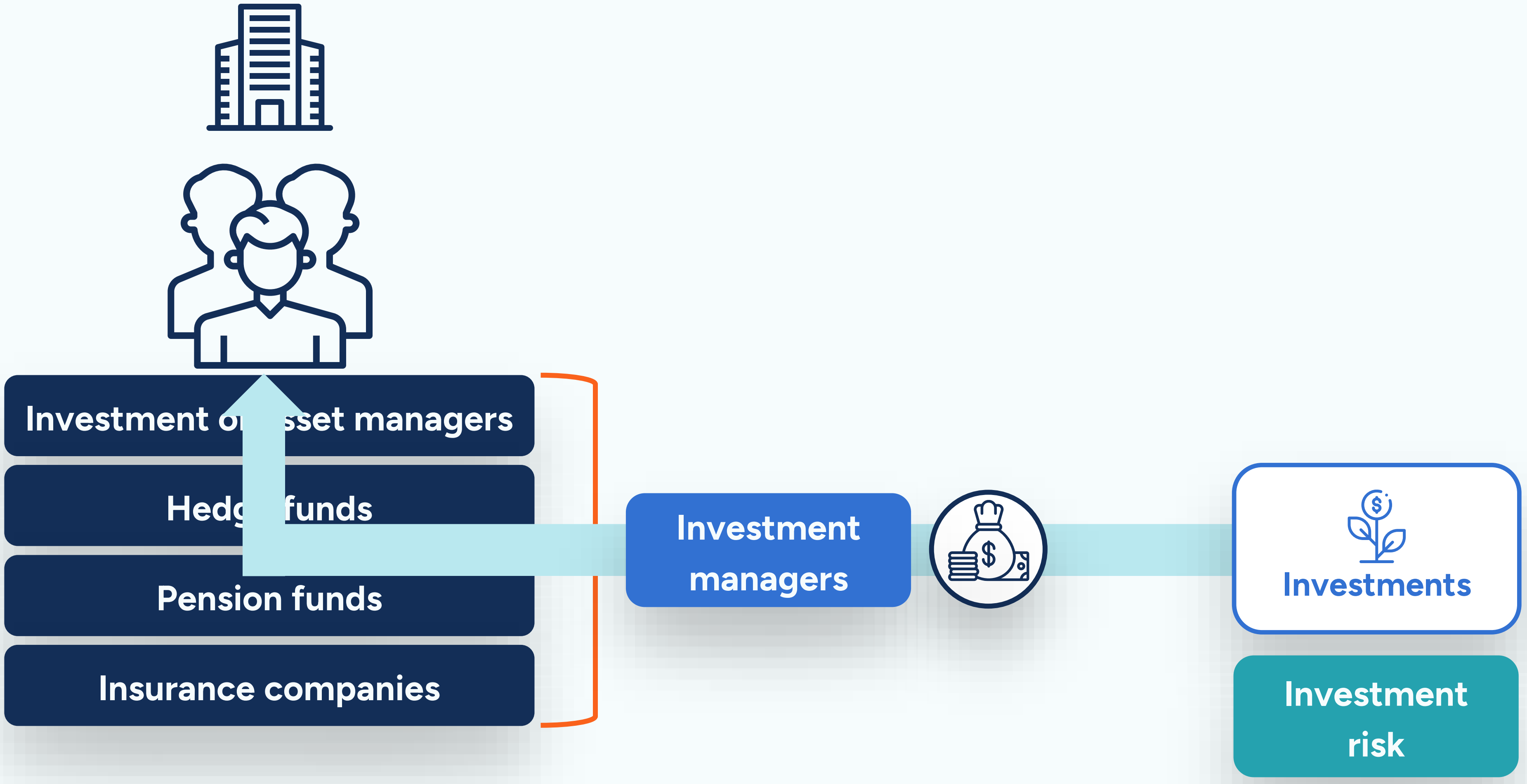

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Investment managers

Active fund managers	**Passive fund managers**
Measure their fund's performance against an index's performance	Track index closely by replicating an investment portfolio similar to the index
Investment risk is the risk the performance of their fund **underperforms** the performance of the index they are being measured against	Investment risk is the risk the performance of their fund **deviates** from the index's performance

Investment Risk

The risk the value of an investment might fall in value, resulting in the investor losing part, or even all, of their investment.

It's **not** beneficial long term if a **passive investment manager** happens to **outperform** the index because this indicates a problem in their **replication** approach.

This problem might cause the fund to **fall by more than the index falls** in a certain period = unhappy investors.

ESG Risk

ESG is a management framework for addressing both the risks and opportunities associated with a changing environment, society, and economy.

- Environmental Systems
- Social Systems
- Economic Systems

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Risks are broad in nature and can influence companies based on the unique characteristics of the business

- Industry
- Markets they operate in
- Expectations of key stakeholders

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Risks are broad in nature and can influence companies based on the unique characteristics of the business

- Industry
- Markets they operate in
- Expectations of key stakeholders

- Regulatory and compliance
- Operational
- Financial
- Reputational

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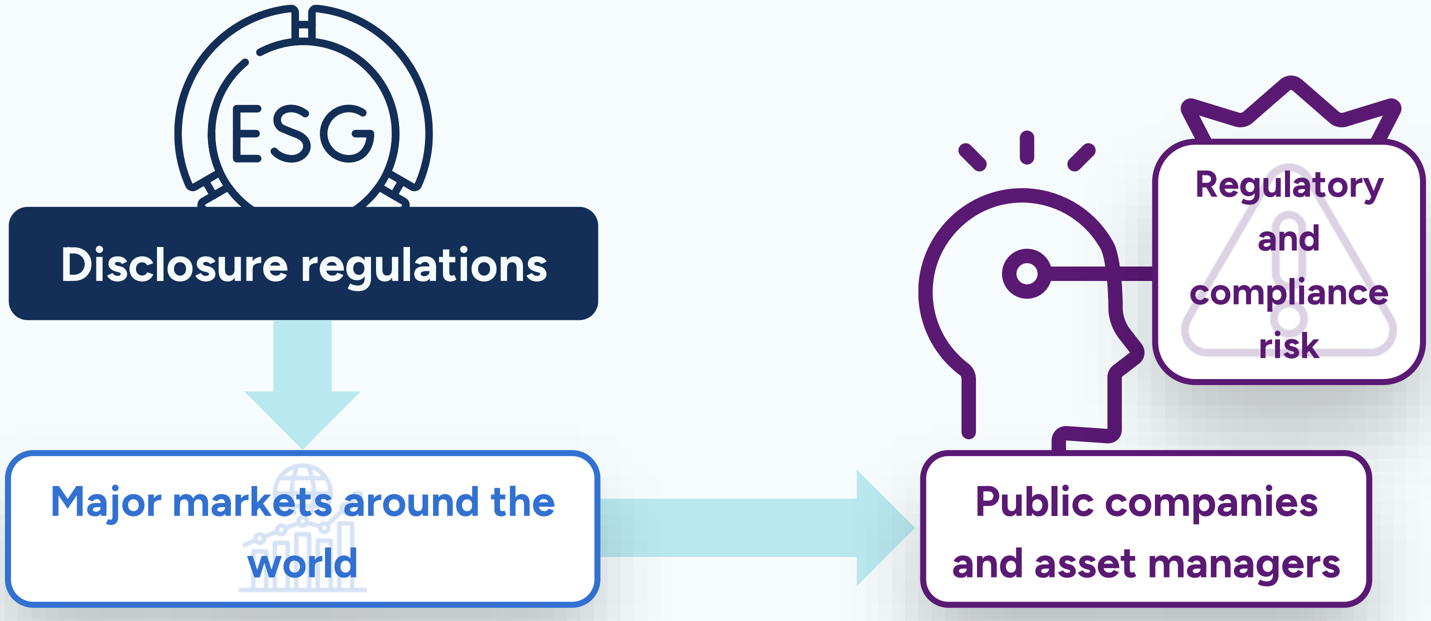

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Presenting a range of operational risks for companies across industries and each node in the global value chain

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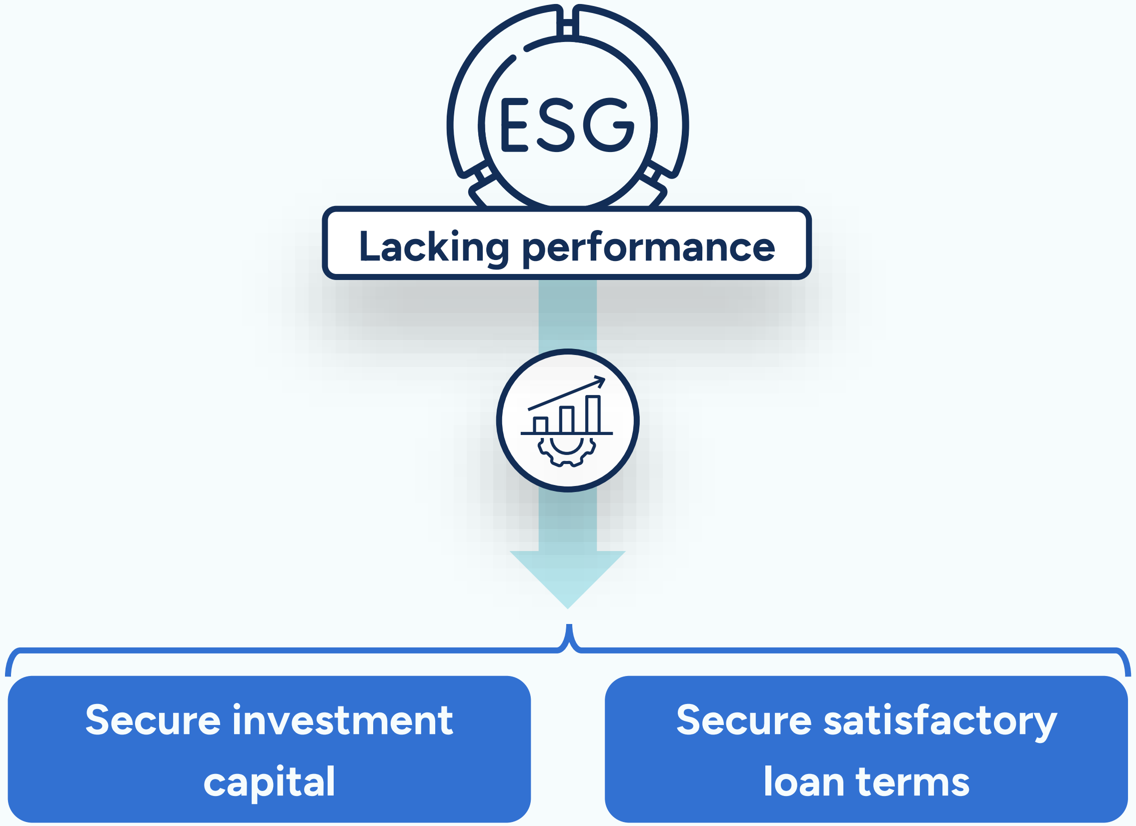

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Enterprise Risk Management

Managing Risk in an Enterprise

Risk impacts every activity a bank undertakes

- Divisions
- Lines of business
- Teams

Cannot be left to develop their risk management frameworks and approaches independently of other groups within a bank

Managing Risk in an Enterprise

Managing Risk in an Enterprise

Developing a risk management framework at the enterprise level is known as Enterprise Risk Management (ERM).

ERM Framework ensures the bank can manage risk effectively across the organization

ERM Framework Objectives

- Promote a strong risk culture within a bank so all employees understand their roles and responsibilities in protecting the bank from risk
- Support the bank's strategy by embedding risk considerations into the bank's planning (day-to-day, operationally and longer-term, or strategically)
- Develop an appropriate risk governance structure. Risk governance describes a bank's general rules and standards for risk management
- Protect the bank's reputation
- Comply with the laws and regulations in the bank's jurisdictions

Managing Risk in an Enterprise

Developing a risk management framework at the enterprise level is known as Enterprise Risk Management (ERM).

ERM Framework ensures the bank can manage risk effectively across the organization

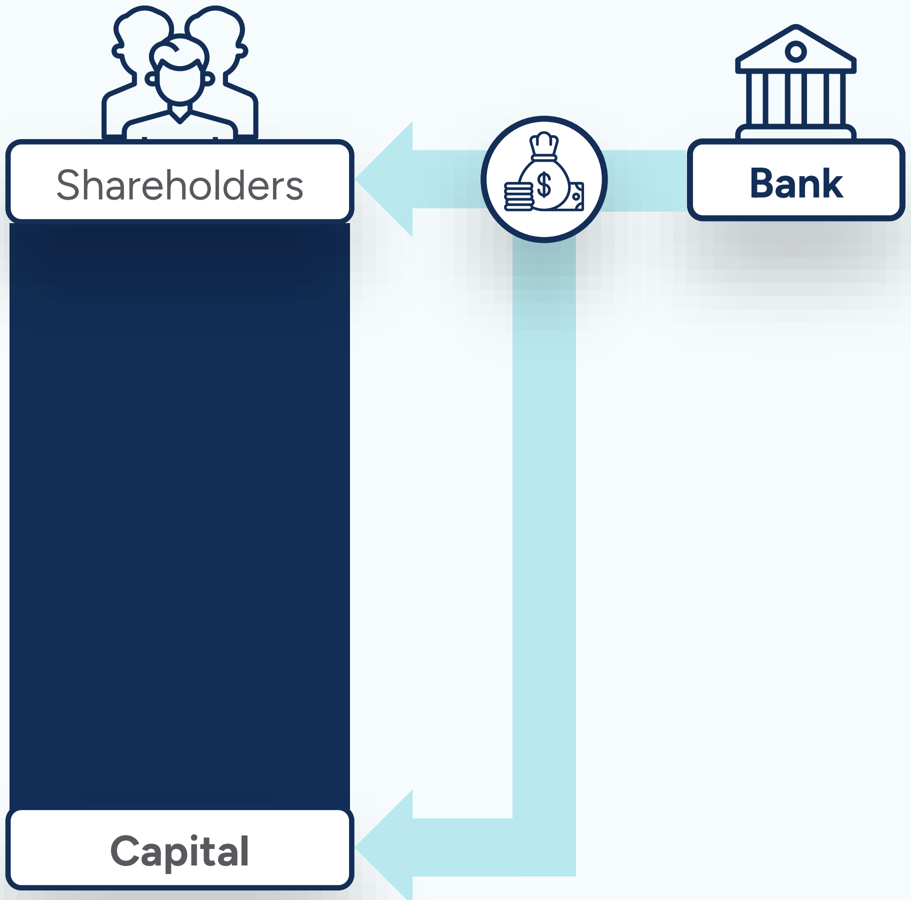
ERM Framework Steps

1. Establish risk appetite
2. Identify risks
3. Assess risks
4. Respond to risks
5. Monitor risks

ERM Framework is iterative: once the process is completed, it starts again

Risk Capacity and Risk Appetite

1. **Establish risk appetite**
2. Identify risks
3. Assess risks
4. Respond to risk
5. Monitor risk



Risk Capacity and Risk Appetite

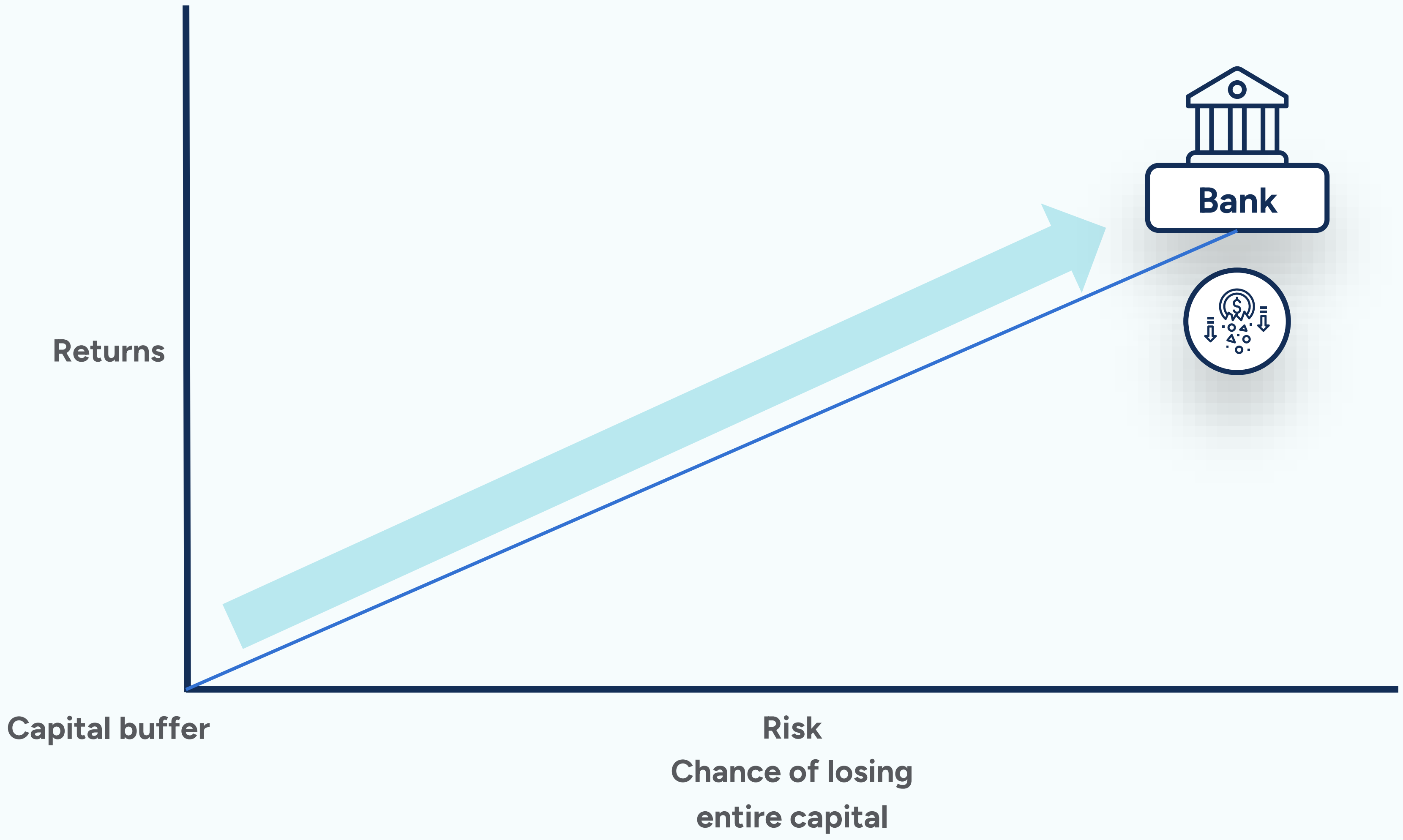
Establish risk appetite 1

Identify risks 2

Assess risks 3

Respond to risk 4

Monitor risk 5



Risk Capacity and Risk Appetite

Risk capacity is the amount of risk a bank can take on without potentially wiping out the capital buffer.

- **Establish risk appetite** 1
- Identify risks 2
- Assess risks 3
- Respond to risk 4
- Monitor risk 5

Capital buffer is finite and limits the amount of risk a bank can take → **Risk capacity**

A bank that exceeds its risk capacity could lose its entire capital buffer if things go wrong

Risk Capacity and Risk Appetite

Risk appetite is the amount of risk a bank is prepared to take on over a given time period. It is not a fixed concept, as it can change for different risks or different times.

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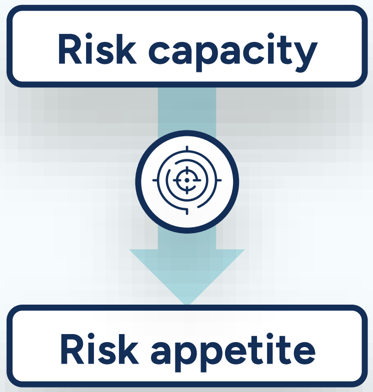

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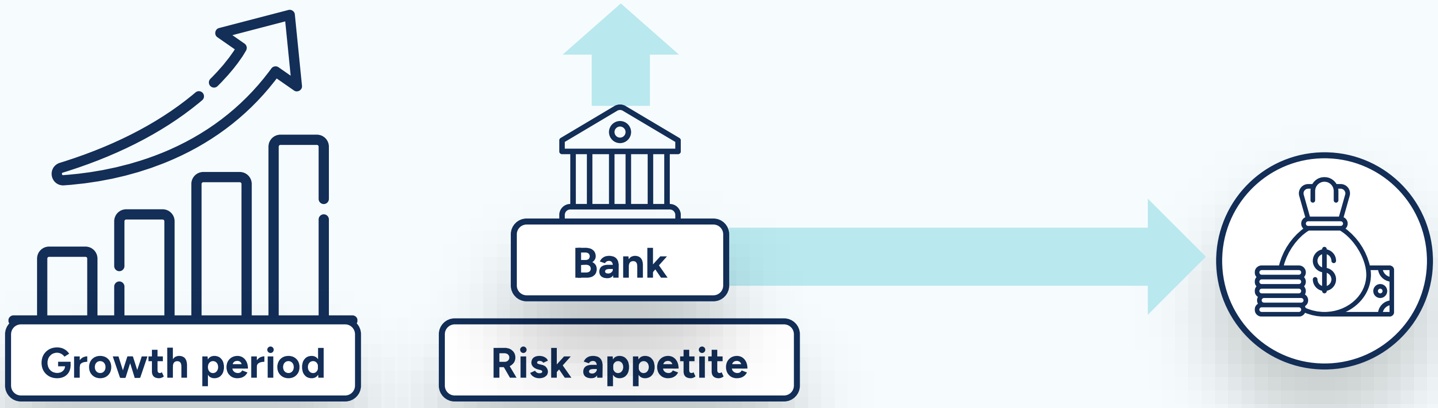

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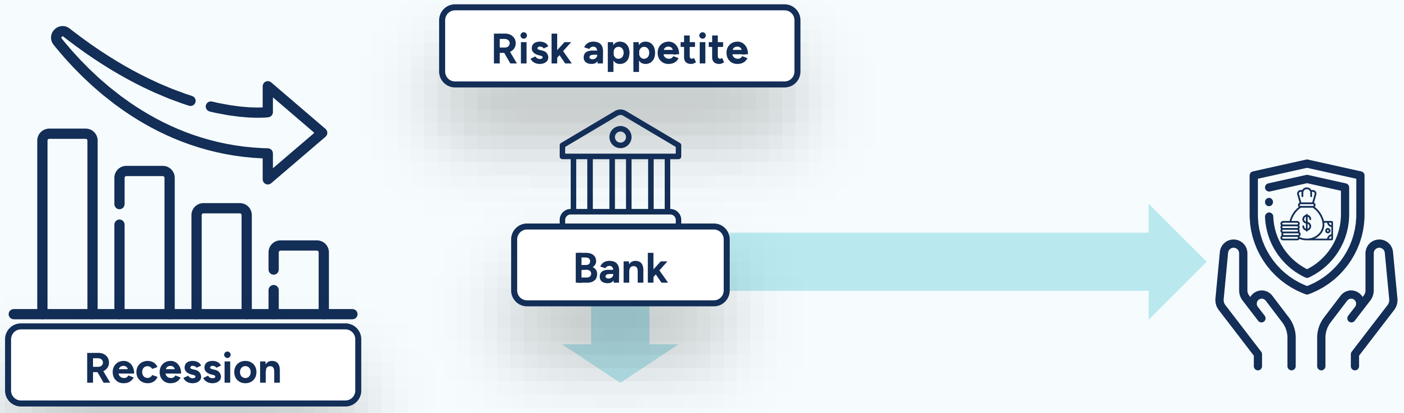

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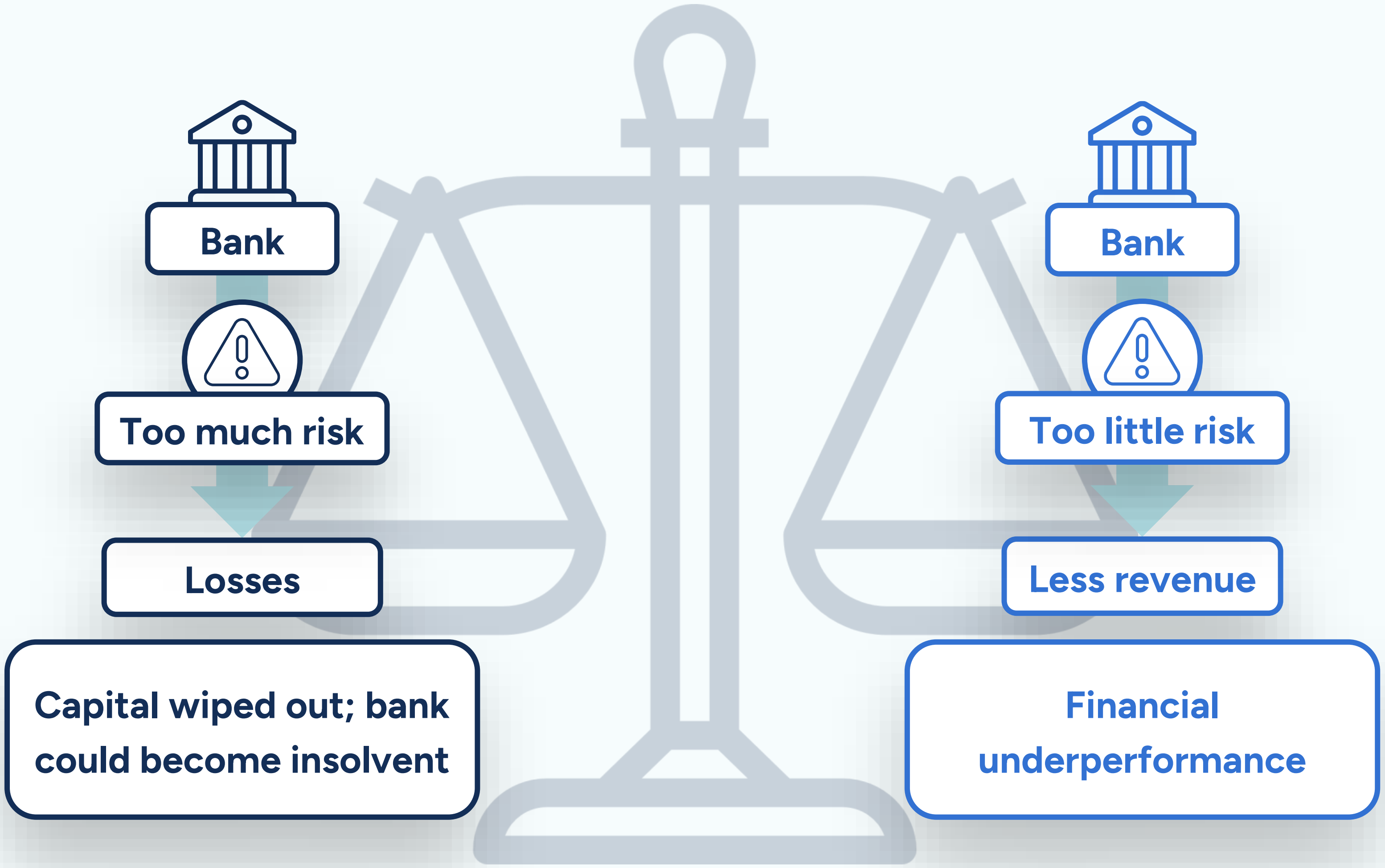

Identifying Risk

Risk identification is the basis of risk management in financial institutions. A bank can only manage risk once it's identified.

1. Establish risk appetite
2. **Identify risks**
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Identifying risks is an ongoing process

Formal identification process happens annually

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5. Monitor risk

Tools to identify risks	Tool description
Internal audits	Find weaknesses and vulnerabilities in a bank's processes, corporate governance, and operations
Internal loss data	Loss incurred by a bank due to risky events, so analysis of internal loss data can highlight risks
Risk Control Self Assessments	RCSAs are usually surveys or workshops where staff and management identify risks and associated controls
Key Risk Indicators	KRIs are metrics used to assess and measure how risky an activity is
Scenario analysis	Expert opinions identify potential risk events and their potential outcomes
Stress test	Computer scenarios measure impact on the bank's capital should certain unlikely but extreme events occur

Identifying Risk

Risk identification is the basis of risk management in financial institutions. A bank can only manage risk once it's identified.

Establish risk appetite 1

Identify risks 2

Assess risks 3

Respond to risk 4

Monitor risk 5

CFI

Risk Assessment

Following a comprehensive risk identification process, the next step in an effective ERM framework is to assess all the risks recorded in the risk register. Risk assessment is necessary to develop an appropriate response to risk.

- Establish risk appetite 1
- Identify risks 2
- **Assess risks 3**
- Respond to risk 4
- Monitor risk 5

Risk Assessment Stages

1. **A bank needs to develop assessment criteria so that risks can be assessed consistently**
2. **A bank assesses risks on a standalone basis by ranking risks based on the criteria**
3. **A bank assesses how risks interact with each other**
4. **Risks need to be prioritized, as relatively ranked risks are easier to assess**
   How likely is a risk to occur and **what is its impact** on the enterprise if it does occur?

Assessing Risk Likelihood

Likelihood is the probability a risk event will occur within the enterprise in a given time period. The higher the likelihood, the more frequently the risky event will materialize.

Establish risk appetite 1

Identify risks 2

Assess risks 3

Respond to risk 4

Monitor risk 5

Rating	Description	Definition
4	Frequent	Up to once every 2 years
3	Likely	Once in 2 years up to 5 years
2	Unlikely	Once in 5 years to 10 years
1	Rare	Once in 10 years to 25 years

Assessing Risk Likelihood

Likelihood is the probability a risk event will occur within the enterprise in a given time period. The higher the likelihood, the more frequently the risky event will materialize.

- Establish risk appetite 1
- Identify risks 2
- **Assess risks 3**
- Respond to risk 4
- Monitor risk 5

Rating	Description	Definition
4	Almost certain	75% chance of occurring in the time period
3	Likely	50% - 75% chance of occurring in the time period
2	Unlikely	10% - 50% chance of occurring in the time period
1	Rare	Less than 10% chance of occurring in the time period

Assessing Risk Impact

Impact describes how much consequence a risk event will have on the enterprise should it occur.

- Establish risk appetite 1
- Identify risks 2
- **Assess risks 3**
- Respond to risk 4
- Monitor risk 5

Low impact

Will not materially harm bank

Assessing Risk Impact

Impact describes how much consequence a risk event will have on the enterprise should it occur.

1. Establish risk appetite
2. Identify risks
3. **Assess risks**
4. Respond to risk
5. Monitor risk

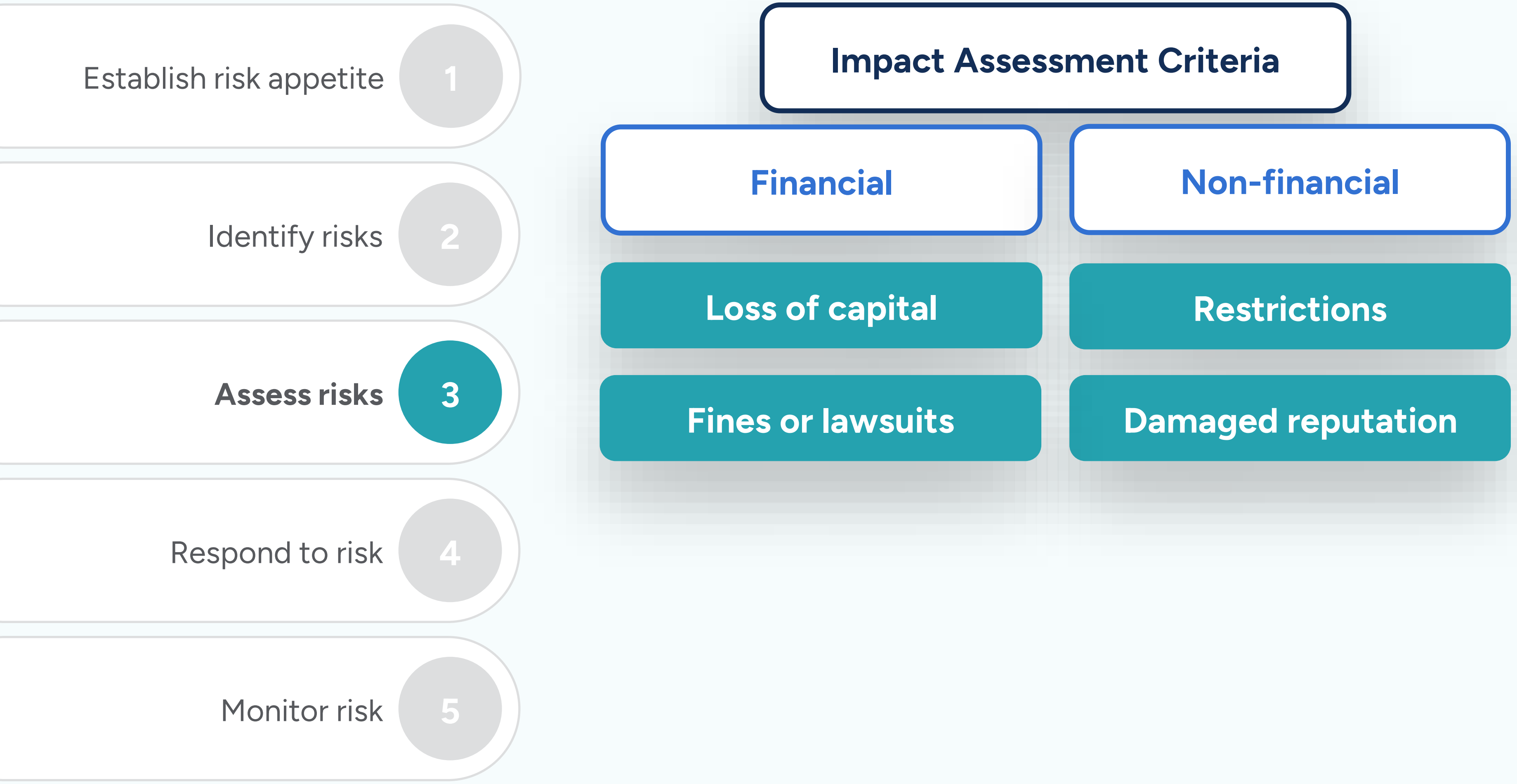
Huge impact

High impact

The losses and fines this could lead to could cause a **material loss to the bank**

Assessing Risk Impact

Impact describes how much consequence a risk event will have on the enterprise should it occur.



Assessing Risk Impact

Impact describes how much consequence a risk event will have on the enterprise should it occur.

- Establish risk appetite 1
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- Monitor risk 5

Rating	Descriptor	Definition
4	Extreme	Financial loss greater than $x International long-term negative media coverage Significant prosecution and fines Significant loss of market share
3	Major	Financial loss between $x and $x National long-term negative media coverage Material regulatory fines Some loss of market share
2	Moderate	Financial loss between $x and $x National short-term media coverage Reportable incident to regulator with no fine Minor loss of market share in limited areas
1	Minor	Financial loss up to $x Little to no local media attention Not reportable to regulator No loss of market share

Assessing Risk Impact

Impact describes how much consequence a risk event will have on the enterprise should it occur.

1. Establish risk appetite
2. Identify risks
3. **Assess risks**
4. Respond to risk
5. Monitor risk

Impact Assessment Criteria

Financial	Non-financial
Loss of capital	Restrictions
Fines or lawsuits	Damaged reputation

If a risk has characteristics relating to more than one level, an effective ERM framework classifies the risk at the highest scale it reaches

Responding to Risk

An enterprise needs to decide on an appropriate response to the risks they have previously identified and assessed.

1. Establish risk appetite
2. Identify risks
3. Assess risks
4. **Respond to risk**
5. Monitor risk

Avoid | Reduce | Transfer | Accept

Avoiding a risk may be appropriate when there is zero risk appetite for it.

Responding to Risk

An enterprise needs to decide on an appropriate response to the risks they have previously identified and assessed.

- Establish risk appetite 1
- Identify risks 2
- Assess risks 3
- **Respond to risk 4**
- Monitor risk 5

Avoid | **Reduce** | Transfer | Accept

Reducing risk could be appropriate if the risk is above a bank's risk appetite but it still wants to accept some exposure to this risk.

Responding to Risk

An enterprise needs to decide on an appropriate response to the risks they have previously identified and assessed.

1. Establish risk appetite
2. Identify risks
3. Assess risks
4. **Respond to risk**
5. Monitor risk

Avoid | Reduce | **Transfer** | Accept

Scenario where the bank moves the responsibility of the risk to a third-party.

Transferring risk does not reduce the likelihood nor impact of an event but means the bank is protected from any negative impact of the risk.

Responding to Risk

An enterprise needs to decide on an appropriate response to the risks they have previously identified and assessed.

1. Establish risk appetite
2. Identify risks
3. Assess risks
4. **Respond to risk**
5. Monitor risk

Avoid | Reduce | Transfer | **Accept**

Banks need to decide which risks they choose to **accept**.

Responding to Risk

An enterprise needs to decide on an appropriate response to the risks they have previously identified and assessed.

- Establish risk appetite 1
- Identify risks 2
- Assess risks 3
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- Monitor risk 5

Avoid | Reduce | Transfer | **Accept**

Some risks are more acceptable to accept than others.
A risk with a low likelihood of occurring, or a low impact, is more acceptable than a risk with a high likelihood of occurring or having a significant impact.

Monitoring Risk

- Establish risk appetite 1
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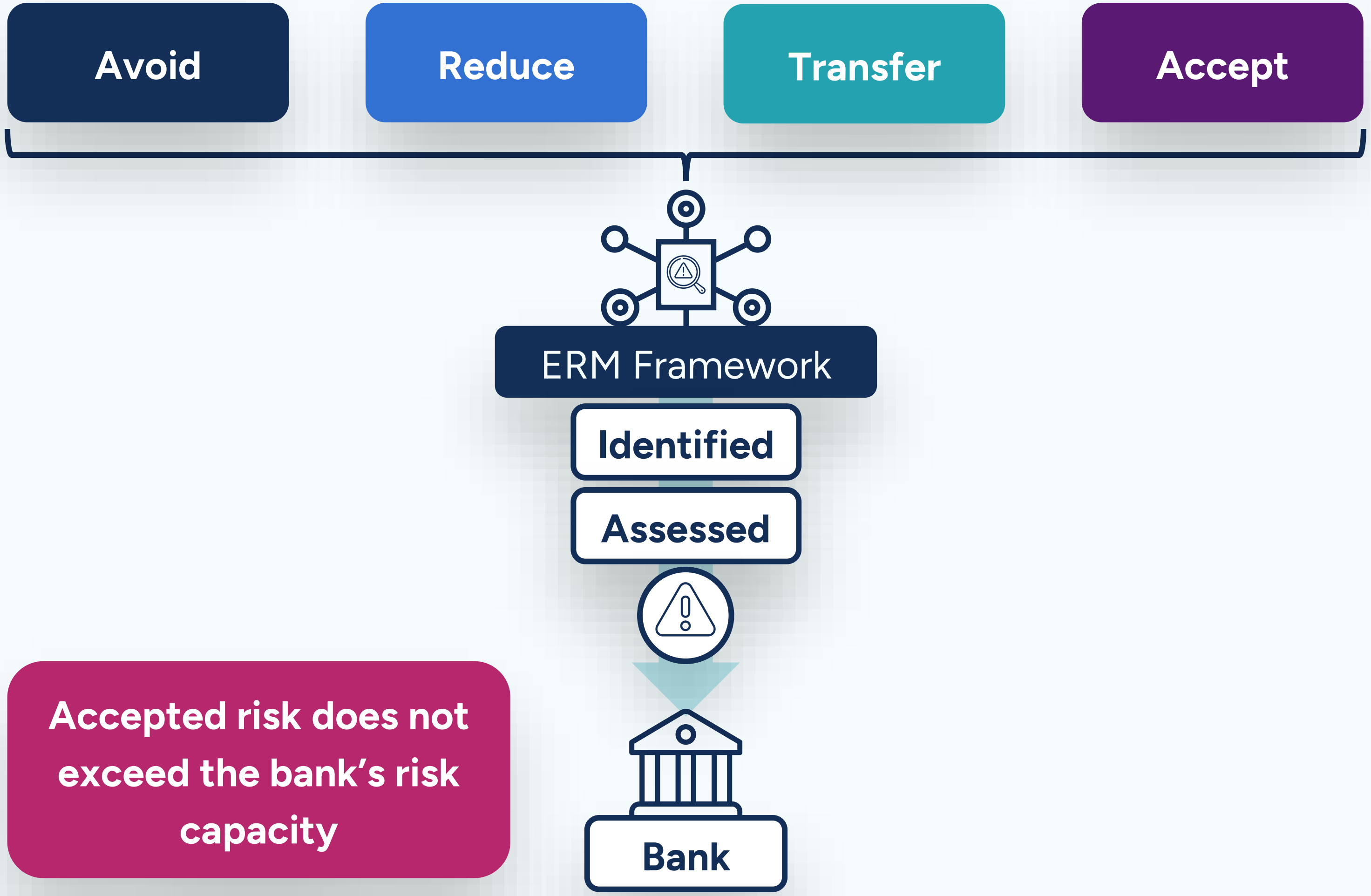
- Assess risks 3
- Respond to risk 4
- **Monitor risk 5**



Accepted risk does not exceed the bank's risk capacity

Monitoring Risk

An effective monitoring process should assure senior management and the board of directors that existing risk controls are in place and employees within the enterprise are following these controls.

- Establish risk appetite 1
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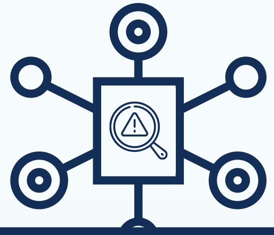

ERM Framework

Reasons risk monitoring is a critical stage of the ERM framework

- **Risks are dynamic and can change quickly**
- **Without proper monitoring, previous steps of identifying, assessing, and responding to risk would be pointless**
- **Collects up-to-date information on risk that can be incorporated into the ERM framework**
- **Allows senior leadership to act appropriately if and when the risk's nature, potential impact, or likelihood exceeds the bank's risk appetite**

Monitoring Risk

An effective monitoring process should assure senior management and the board of directors that existing risk controls are in place and employees within the enterprise are following these controls.

1. Establish risk appetite
2. Identify risks
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4. Respond to risk
5. **Monitor risk**

Corporate Structure and Risk Management

Strong corporate governance within a bank is critical for effective risk management, which includes ensuring the appropriate corporate structure at the bank.

Board of Directors

Board Committees:

- Audit Committee
- Credit Committee
- **Enterprise Risk Committee**
- Corporate Governance Committee
- Compensation and Benefits Committee

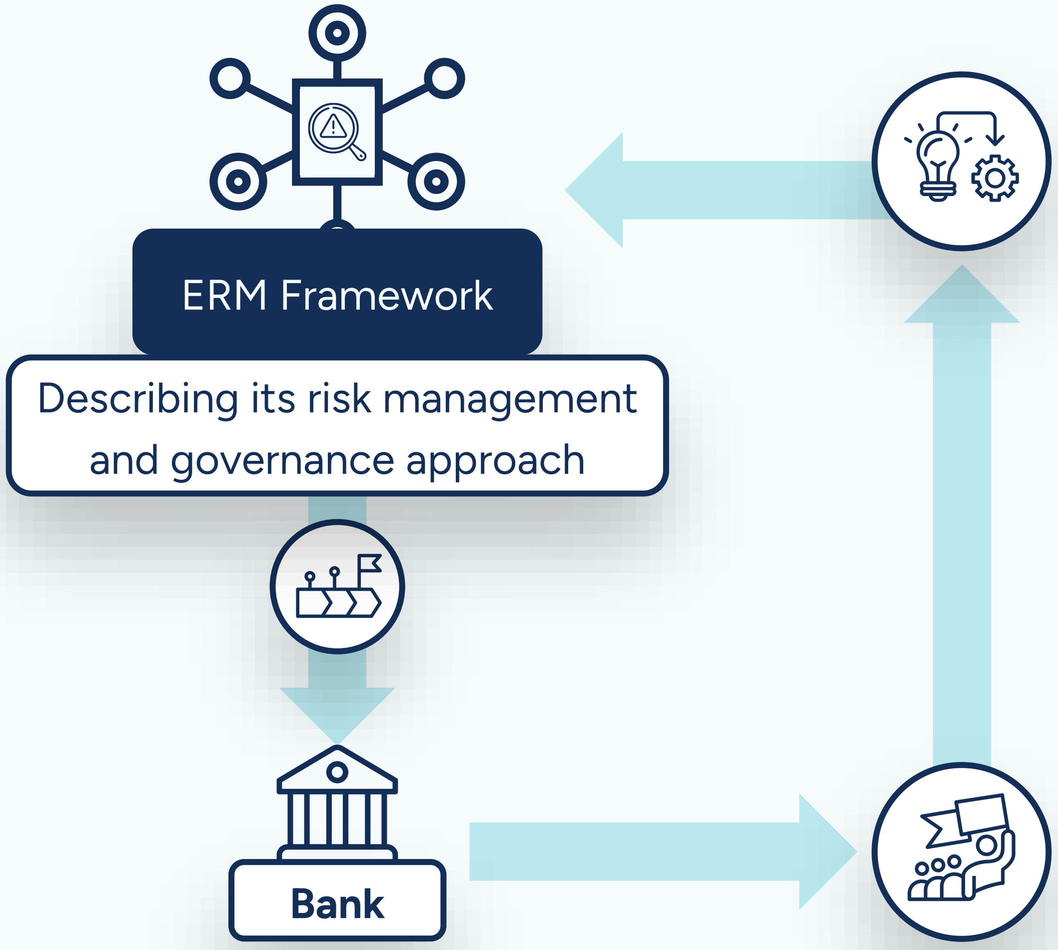
Enterprise Risk Committee:

- **Advise** the board on what they believe is an appropriate risk appetite for the bank
- **Report** on the state of the risk culture at the bank to the board
- **Oversee** the strategies to manage all the bank's risk exposures and make sure these risks are within the defined risk appetite
- **Adjust** the risk management framework as new risks emerge

Corporate Structure and Risk Management

Strong corporate governance within a bank is critical for effective risk management, which includes ensuring the appropriate corporate structure at the bank.

The Chief Risk Officer



The Chief Risk Officer

The Chief Risk Officer (CRO) is the senior executive at the bank responsible for implementing the ERM framework.

Role and responsibilities depend on

The bank's business model

Size

Complexity

Investment banking vs **Retail banking**

The Chief Risk Officer

The Chief Risk Officer (CRO) is the senior executive at the bank responsible for implementing the ERM framework.

Not involved in day-to-day implementation of bank's risk management policies and processes

- Oversee risk management
- Drive development of internal controls to minimize risk

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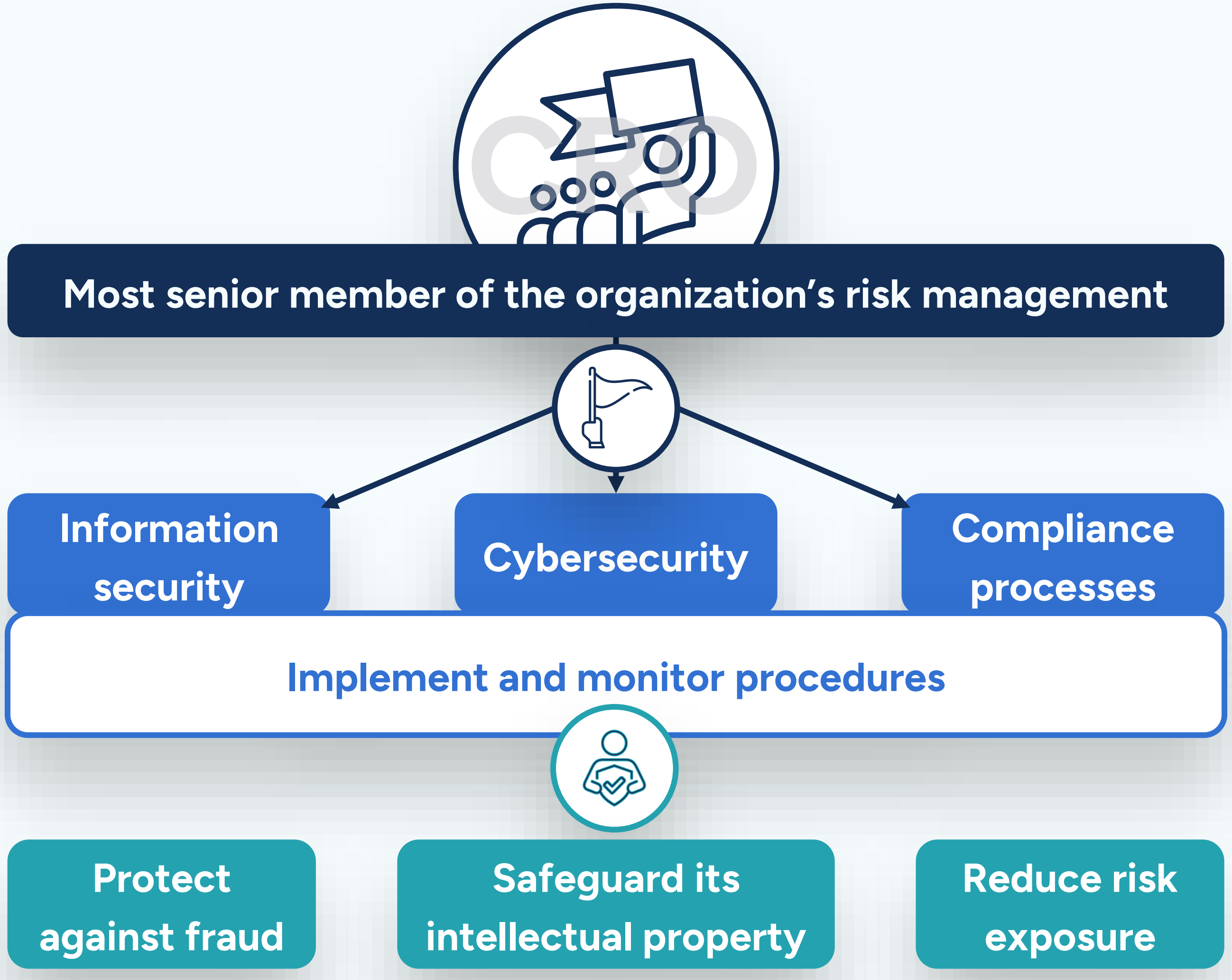

Three Lines of Defense

The Three Lines of Defense was developed as an internal audit model to explain the relationship between front-line business units, the risk management function, and the internal audit function itself.

1

Bank employees

Risk owners

Involved in creating and selling products and services or operationally supporting customers, products, and services

Responsible for identifying and managing risk as part of their accountability for achieving objectives

They should collectively have the necessary knowledge, skills, information, and authority to operate the relevant policies and procedures of risk control

Three Lines of Defense

The Three Lines of Defense was developed as an internal audit model to explain the relationship between front-line business units, the risk management function, and the internal audit function itself.

2 **Risk management function within the bank**

Provides the policies, frameworks, tools, techniques, and support to enable risk and compliance to be managed in the first line

Conducts monitoring to judge how effectively they are doing it

Helps ensure consistency of definitions and measurements of risk

Three Lines of Defense

The Three Lines of Defense was developed as an internal audit model to explain the relationship between front-line business units, the risk management function, and the internal audit function itself.

3

Internal audit function within the bank

Reports directly to the board and board-level audit committee

Acts as an independent function

Ensures the first two lines operate effectively and advising how they could improve their risk management processes

Three Lines of Defense

The Three Lines of Defense was developed as an internal audit model to explain the relationship between front-line business units, the risk management function, and the internal audit function itself.

The Role of Risk Culture

Risk culture refers to the behaviors and attitudes encouraged by senior management toward risk, as well as the discussions and decisions made on risk management.

It incorporates the shared values and goals embedded into a bank's Enterprise Risk Framework.

Regulators

Senior management

No consensus yet on what exactly it is or how it might be managed

Hard to quantify, as it comprises many qualitative elements

The Role of Risk Culture

Risk culture refers to the behaviors and attitudes encouraged by senior management toward risk, as well as the discussions and decisions made on risk management.

It incorporates the shared values and goals embedded into a bank's Enterprise Risk Framework.

There are three critical elements to embed a strong risk culture within a bank.

The tone at the top

Sets a bank's guiding values and ethical climate.

A management team and a board that places importance on managing risks are integral to creating a strong risk culture.

Accountability and ownership

Remuneration schemes

The Role of Risk Culture

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The tone at the top

Accountability and ownership

Clear accountability and ownership includes an effective Three Lines of Defense model, a strong risk management function, and clearly defined processes for escalation when risk owners observe risk limits have been breached.

Remuneration schemes

The Role of Risk Culture

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The tone at the top

Accountability and ownership

Remuneration schemes

Another critical dimension of risk culture.

Bonuses are often based on KPIs and should reward behaviors that are properly aligned with prudent risk-taking.

The Role of Risk Culture

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It incorporates the shared values and goals embedded into a bank's Enterprise Risk Framework.

There are three critical elements to embed a strong risk culture within a bank.

A bank with a strong risk culture protects customers, the bank's reputation, and the bank's bottom line