

The Economics of Enterprise Risk Management (ERM): Application in Insurance Markets

Jordan Al-ZuBi, Ph.D.

Insurance Economist, The National Association of Insurance Commissioners (NAIC)

Visiting Scholar, Goizueta Business School, Emory University

Visiting Professor, National Taiwan University (NTU)

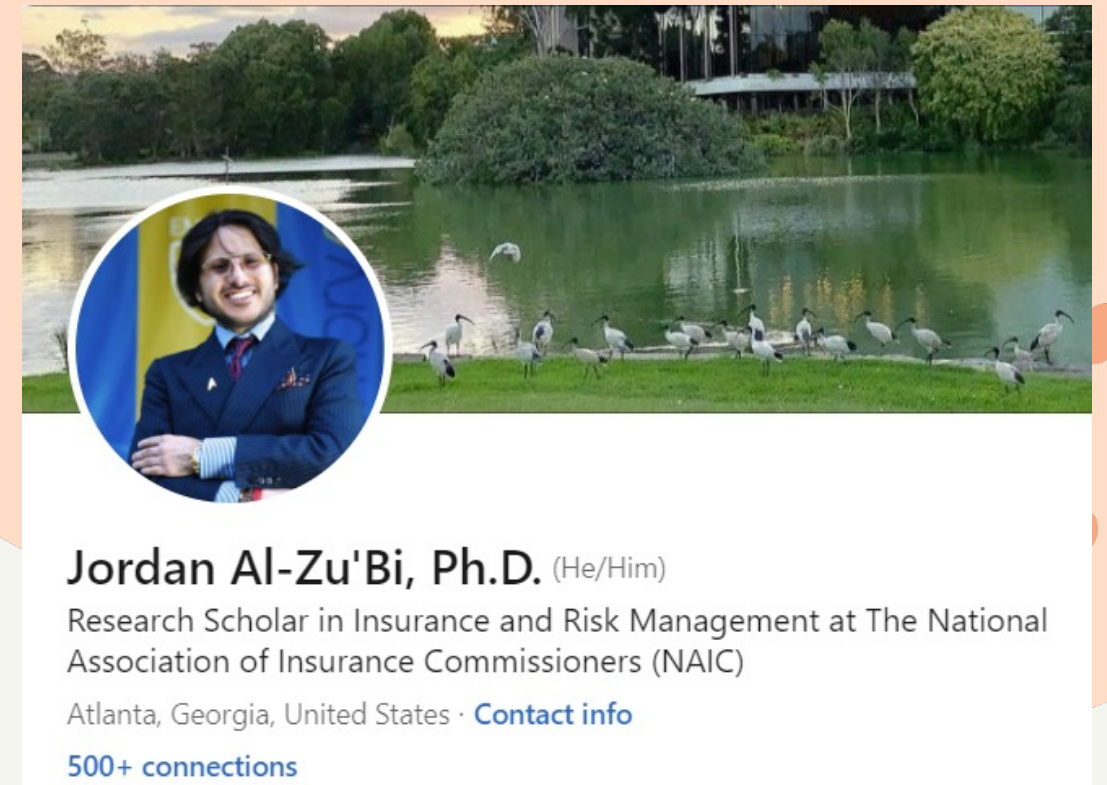
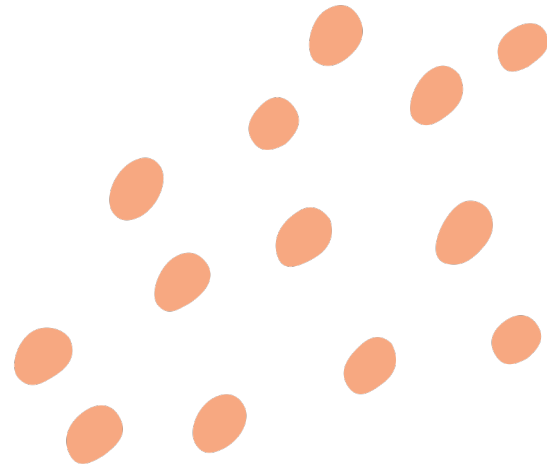


Table of Contents

1. Introduction
2. What factors affect ERM adoption across countries
3. Economic implications of ERM on insurance markets
5. Application of ERM in insurance markets
6. Real life example of ERM application in the insurance industry
7. Main Takeaways





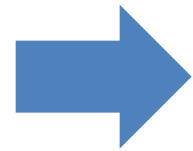
1.

Introduction

1. Introduction

Definition of ERM

ERM : Enterprise Risk Management



"a holistic approach to managing risks that integrates risk management into an organization's strategic decision-making process."

- Berry-Stölzle, T. R., Xu, J. (2018)

Including :

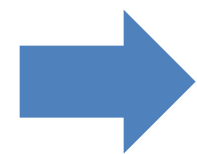
- Identifying potential risks
- Evaluating their likelihood and impact
- Developing strategies to mitigate or manage risks



1. Introduction

Definition of ERM

ERM : Enterprise Risk Management



The ultimate goal of ERM is to provide a holistic view of an organization's risks

Goal :

- Enhance decision-making
- Improve operational efficiency
- Increase stakeholder confidence and trust in the organization
- Comprehensive framework that aligns risk management with an organization's overall strategy and goals.

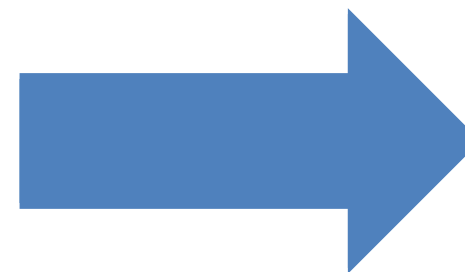


1. Introduction

Definition of ERM

A.M. Best ERM Score as a proxy for ERM adoption

- . ERM committee
- . Chief Risk Officer (CRO)
- . Risk management function
- . ERM framework
- . ERM policy



Berry-Stölzle, T. R., Xu, J. (2018)

"Enterprise Risk Management and the Cost of Capital-"

A score assigned by A.M. Best that assesses insurers' ERM capabilities based on their risk management policies and practices.

Higher ERM score



Higher financial strength

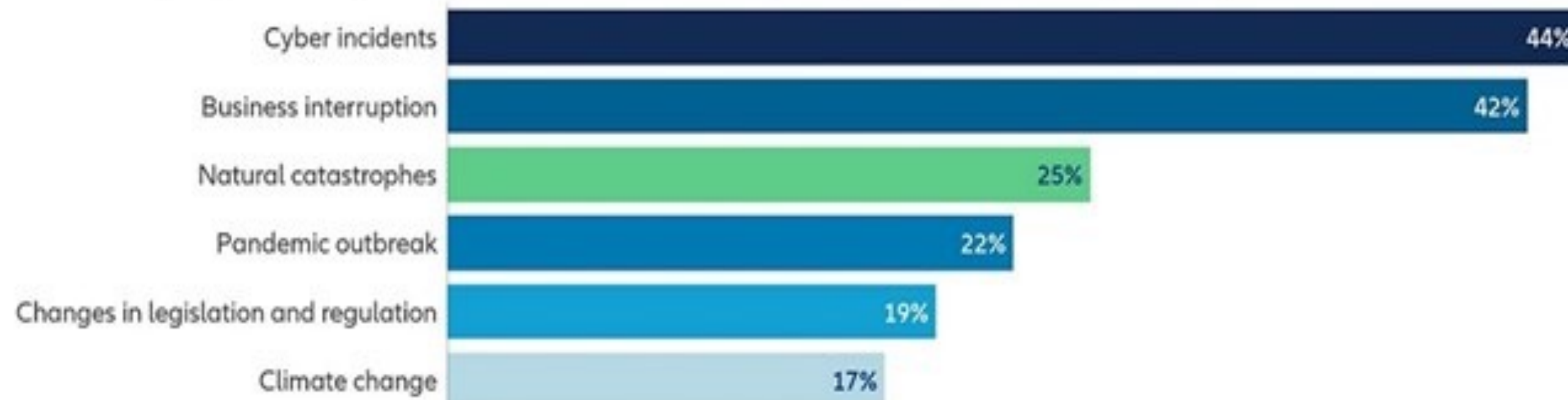
1. Introduction



The most important global business risks for 2022

Allianz Risk Barometer 2022

Based on the insight of 2,650 risk management experts from 89 countries and territories (% of responses). Figures do not add up to 100% as up to three risks could be selected



1. Introduction

Quotes

"Enterprise Risk Management is about creating a culture of risk management in which everyone takes responsibility for managing risk, both individually and collectively."

- Paul J. VanderMarck, former Chief Risk Officer at the American International Group (AIG)

"Risk management is not just a matter of compliance, it's a strategic imperative. Enterprise Risk Management provides a framework for managing risks and capitalizing on opportunities."

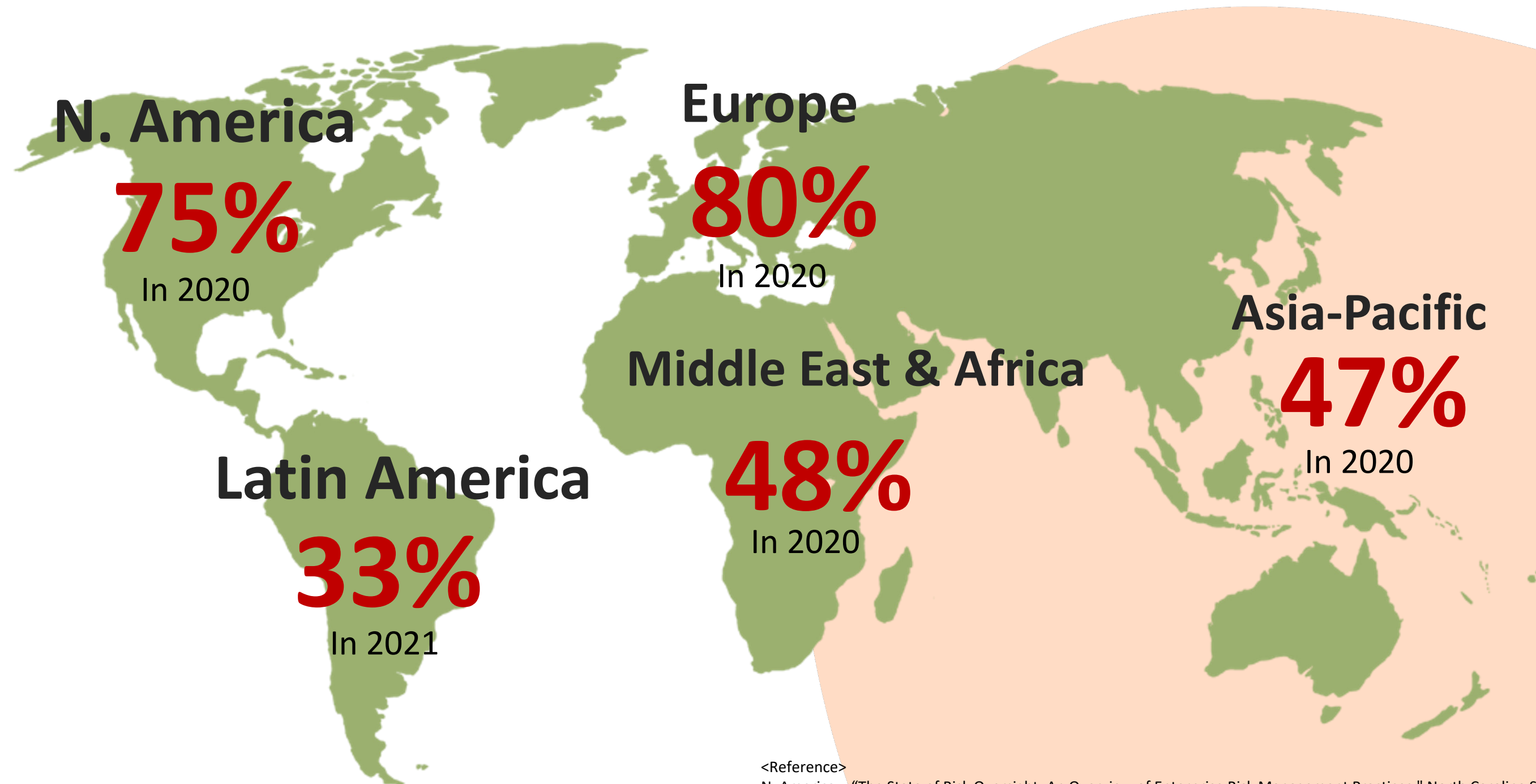
- Brian Duperreault, CEO of the American International Group (AIG)

"The future of risk management lies in the integration of risk management into the strategic decision-making process. Enterprise Risk Management provides a framework for achieving this integration."

- William R. Berkley, founder and CEO of W.R. Berkley Corporation.

1. Introduction

Statistics about adoption rate of ERM across continents



<Reference>

N. America – "The State of Risk Oversight: An Overview of Enterprise Risk Management Practices," North Carolina State University's Enterprise Risk Management Initiative, 2020.

Latin America - "The Adoption of Enterprise Risk Management in the Latin American Insurance Industry," AM Best, 2021.

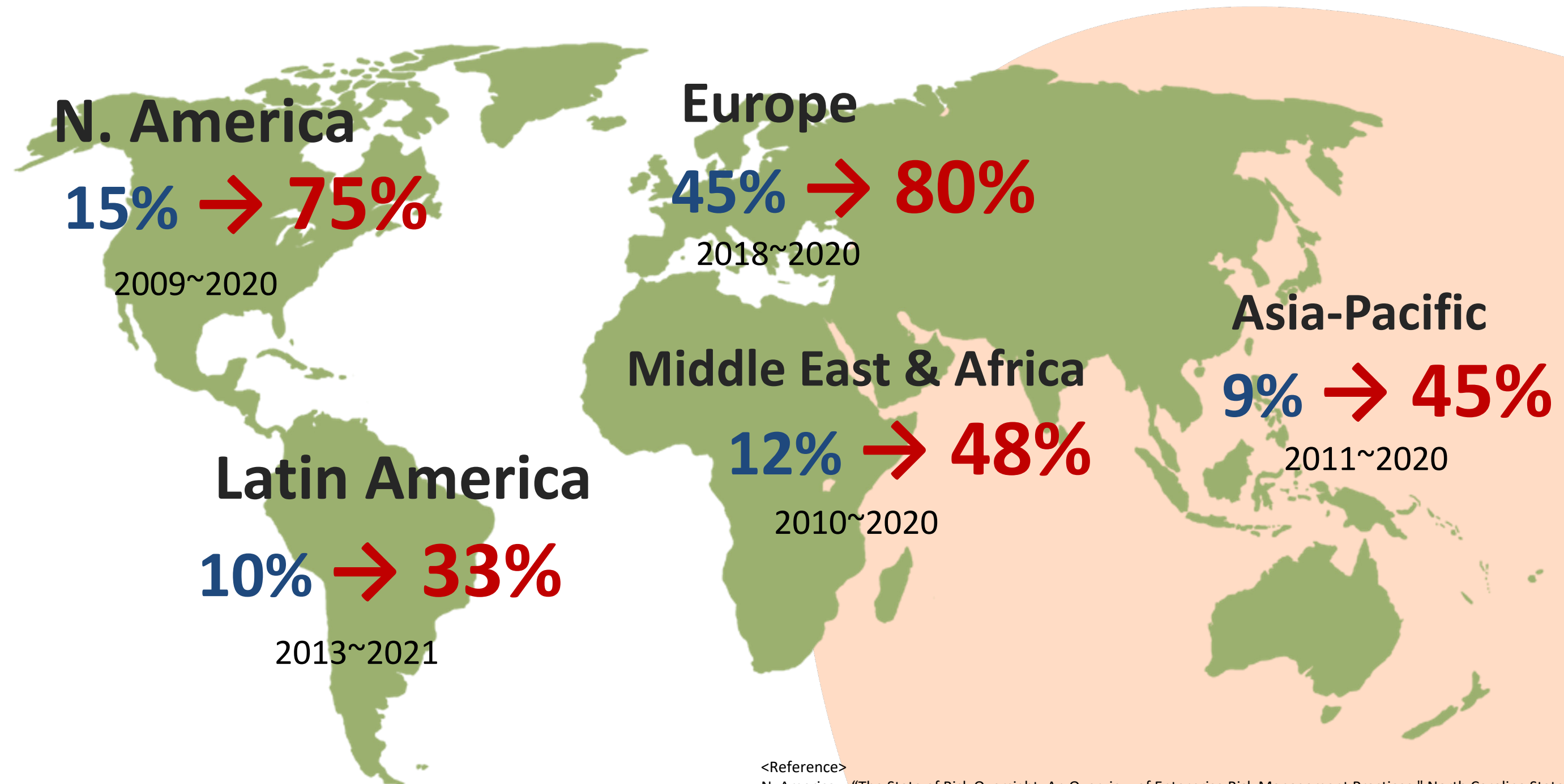
Europe - "Global Risk Management Survey, 14th Edition," Deloitte, 2020.

Middle East & Africa - "PwC's 2020 Risk in Review Study," PwC, 2020.

Asia-Pacific - "The State of Risk Management in Asia Pacific," Protiviti, 2020.

1. Introduction

Statistics about growth rate of ERM adoption across continents



<Reference>

N. America – "The State of Risk Oversight: An Overview of Enterprise Risk Management Practices," North Carolina State University's Enterprise Risk Management Initiative, 2020.

Latin America - "The Adoption of Enterprise Risk Management in the Latin American Insurance Industry," AM Best, 2021.

Europe - "Global Risk Management Survey, 14th Edition," Deloitte, 2020.

Middle East & Africa - "PwC's 2020 Risk in Review Study," PwC, 2020.

Asia-Pacific - "The State of Risk Management in Asia Pacific," Protiviti, 2020.

1. Introduction

ERM regulation across continents

United States

The National Association of Insurance Commissioners (NAIC) requires insurers to implement an ERM program that includes a risk management framework, risk identification and assessment, risk management and monitoring, and internal controls.



2.

What factors Affect ERM Adoption Across Countries

Wiley Online Library

Search

Risk Management and Insurance Review

The Determinants of Enterprise Risk Management: Evidence From the Appointment of Chief Risk Officers

André P. Liebenberg, Robert E. Hoyt

First published: 10 June 2003 | <https://doi.org/10.1111/1098-1616.00019> | Citations: 315

✉ André Liebenberg is with the Terry College of Business, University of Georgia; phone: 706-542-2167; fax: 706-542-4295; e-mail: alieben@terry.uga.edu. Robert Hoyt is also with the Terry College of Business, University of Georgia; phone: 706-542-4290; fax: 706-542-4295; or e-mail: rhoyt@terry.uga.edu.

Read the full text >

 PDF  TOOLS  SHARE

Wiley Online Library

Search

Risk Management and Insurance Review

Perspectives

Risk Culture: What It Is and How It Affects an Insurer's Risk Management

Angela Zeier Roeschmann

First published: 15 September 2014 | <https://doi.org/10.1111/rmir.12025> | Citations: 27

This article was subject to double-blind peer review.

Read the full text >

 PDF  TOOLS  SHARE

2. What factors affect ERM adoption across countries

Regulatory environment

Firms operating in heavily regulated industries or regions are more likely to adopt enterprise risk management practices (e.g., **Blue states** versus **red states**)

- "The impact of regulatory regimes on enterprise risk management: A study of UK and European Union firms" by Sajid Anwar and Kamran Ahmed (2018)

Industry

Firms in industries with higher risk exposure, such as finance and healthcare, are more likely to adopt enterprise risk management practices

- "Enterprise risk management adoption in different industries: Evidence from the USA" by Li Li and Patricia T. Warrington (2018)

Organizational culture

Organizational culture can affect ERM adoption, as an organization's culture can influence its willingness to adopt risk management practices.

- "Organizational culture and enterprise risk management adoption: Evidence from Spanish firms" by Carmen Caba-Pérez, Antonio Arreola-Risa, and Francisco Liébana-Cabanillas (2020)

2. What factors affect ERM adoption across countries

Size of organization

Larger organizations may have more resources to dedicate to risk management.

- "Enterprise risk management and the size of firms: Evidence from Italian listed companies" by Elio Borgonovo, Alessandra Cillo, and Fabrizio Durante (2018)

Perception of risk

Some countries or organizations may view certain risks as more significant than others, and this perception can influence the adoption of ERM frameworks.

- How the behavior of (risk-averse) CEOs within the firm can actually explain corporate demand for (e.g. Catastrophe) insurance.
- Do CEOs of a firm treat low-probability, high-consequence risks (e.g., natural disasters, terrorism) very differently than non-catastrophe risks (e.g., fire) when they purchase insurance against those respective risks, and if so how?

- "The impact of national culture on enterprise risk management: Evidence from Europe" by Mohammad Hudaib, Saidatulakmal Mohd, and James O'Shea (2019)

2. What factors affect ERM adoption across countries

Education and awareness

Organizations that are more educated and aware of the benefits of ERM may be more likely to adopt ERM frameworks **(Risk Financial Literacy)**

- "Factors affecting enterprise risk management adoption: Evidence from the public sector in North America" by Edward Asare and Kwaku Ohene-Asare (2019)

Economic factors

Countries with stronger economies may have more resources available to devote to ERM, while countries with weaker economies may struggle to invest in ERM frameworks.

Factors affect ERM adoption across countries

- ❑ **CEO characteristics:** CEOs with higher tenure and a background in risk management or insurance are more likely to adopt enterprise risk management practices.
 - Overconfidence lead to lower ERM adoption (CEOs with fluctuating relative beliefs)
 - Culture: Firms led by immigrant CEOs have higher ERM adoption (Positively related to Uncertainty avoidance)
 - Material status: Single CEOs take more risk (weaker for older CEOs), and more likely to adopt ERM.
 - CEOs with pilot licenses are more likely to adopt ERM, and less likely if (have done risky activities such as skydiving and bungee jumping).
 - CEO experience earthquakes, volcanic eruptions, tsunamis, and floods, are more likely to adopt (without negative consequences lowers risk aversion, with **negative consequences increases risk aversion**).
- ❑ **Board characteristics:** Firms with more independent directors and board members with risk management expertise are more likely to adopt enterprise risk management practices.
 - Board with more **women involved** are more likely to adopt ERM.



3.

Economic Implications of ERM in Insurance Markets



3. Economic implications of ERM in insurance industry

ERM adoption can help insurers lower their cost of capital, which can translate into higher profitability and financial performance.



1. **Berry-Stölzle and Xu (2018)** found that ERM adoption was associated with a **lower cost of capital for insurers, as measured by the cost of equity capital.**
2. **Cummins et al. (2016)** found that ERM adoption was associated with a lower cost of capital for insurers in the U.S. property and casualty insurance industry, as measured by the cost of equity capital.
3. **Grace et al. (2010)** found that ERM adoption was associated with a lower cost of capital for insurers in the U.S. property and casualty insurance industry, as measured by the cost of debt.
4. **Gatzert and Schmit (2017)** found that ERM adoption was associated with a lower cost of equity capital for insurers in the German insurance industry.

3. Economic implication of ERM in insurance industry

Grace et al. (2014) found that ERM adoption was associated with **reduced underwriting and investment risk and better financial performance** in the U.S. property and casualty insurance industry.

Eling and Luhnen (2012) found that **insurers with higher ERM scores had lower volatility in their earnings** and higher financial performance than insurers with lower ERM scores in the European insurance industry.

Kroll et al. (2014) found that **insurers with higher ERM scores had lower underwriting and asset risk**, and higher financial performance than insurers with lower ERM scores.

3. Economic implication of ERM in insurance industry

Improve underwriting

Use ERM to analyze data on policyholders and their risks, insurance companies can make more informed decisions about policy pricing and coverage

- "The impact of enterprise risk management on property-casualty insurer reserve adequacy" by Mary A. Weiss and Carol A. Marklund (2013).

Reduce claims costs

Use ERM to manage claims risks, insurance companies can detect and prevent fraudulent claims

- "The influence of enterprise risk management on the cost of equity capital in the property and casualty insurance industry" by Gopal V. Krishnan, Wei Yu, and Michael W. Toffel (2016).

Better investment management

Use ERM to manage investment risks, insurance companies can develop strategies to manage market risk, credit risk, and interest rate risk

- "Enterprise risk management and the cost of equity capital in the property-casualty insurance industry" by Thomas R. Berry-Stölzle and Jing Xu (2018).

3. Economic implication of ERM in insurance industry

Enhance financial stability

Use to manage risks across their operations, insurance companies can improve their overall financial stability

- "Enterprise Risk Management and Firm Performance: A Comprehensive Review and Research Agenda" by Kristina Narvaez, Brian Shapiro, and Jim Wanserski (2019)

Improve customer satisfaction

Use ERM to develop new products and services to improve customer satisfaction and loyalty

- "The Impact of Enterprise Risk Management on Customer Satisfaction in the Insurance Industry" by Kristen Leighton and Lynn McKeown (2017)

ERM and D&O liability risks

ERM and D&O (Directors and Officers) liability risks overlap in several ways.

1. ERM identifies D&O liability risk as one of the many risks faced by an organization.
2. ERM helps organizations mitigate D&O liability risks by implementing governance and compliance programs, and identifying potential exposures.
3. ERM facilitates the transfer of D&O liability risks through insurance, which protects directors and officers from financial losses and the organization from reputational harm.

9. ERM and D&O liability risks

Empirical Evidence

“Effective ERM practices can help organizations to identify and mitigate D&O liability risks. ”

National Association of Corporate Directors. (2019). 2019–2020 NACD Directorship Survey: Global Outlook and Trends. Retrieved from <https://www.nacdonline.org/directorship-survey/>

“Insurance companies with more sophisticated ERM programs were better able to manage D&O liability risks.”

Kunreuther, H., & Pauly, M. (2013). Insurance and behavioral economics: Improving decisions in the most misunderstood industry. *Journal of Risk and Uncertainty*, 47(1), 1-10.
<https://doi.org/10.1007/s11166-013-9164-5>

“Companies with strong ERM programs were better able to manage D&O liability risks and secure favorable insurance coverage.”

Aon Risk Solutions. (2013). Global Risk Management Survey: Aon Risk Solutions 2013 Global Risk Management Survey. Retrieved from <https://www.aon.com/resources/global-risk-management-survey.jsp>

3. Economic implication of ERM insurance industry

- ❑ **Wang and Lu (2014)** found that ERM adoption was associated with improved risk management and better financial performance in the Chinese insurance industry.
- ❑ **Wang and Lu (2015)** found that ERM adoption was positively associated with insurers' investment efficiency in the Chinese insurance industry.
- ❑ **Chen et al. (2016)** found that insurers with higher ERM scores had better financial performance and lower credit risk than insurers with lower ERM scores in the Chinese insurance industry.
- ❑ **Li et al. (2018)** found that insurers with higher ERM scores had better financial performance and lower risk than insurers with lower ERM scores in the Chinese insurance industry.
- ❑ **Kroll and Wende (2019)** found that ERM adoption was positively associated with insurers' financial performance and stock returns in the German insurance industry.

5. Application of ERM in insurance market

ERM can be implemented on various areas



Telematics and self-driving cars



Healthcare insurance industry



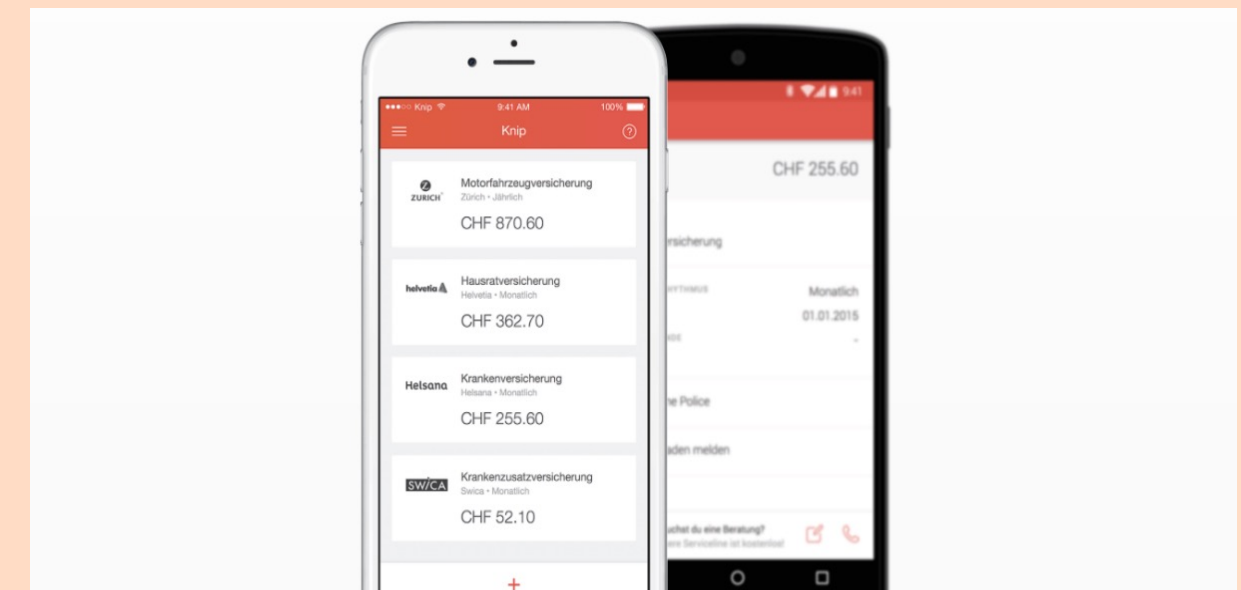
ESG and climate risk



Cyber insurance



Global pandemics



Insurtech

ERM and Auto “Autonomous” Insurance Underwriting

- ❑ Future of autonomous" or "self-driving" vehicles?
 - KPMG Study predicts that self-driving cars may become a commercial reality in the next five years.
 - 75% of cars on the roads in the world will be autonomous by 2040.
 - Google believes that self-driving cars can make driving more efficient and safer by eliminating distracted driving and other human error.
 - According to the NAIIC, the adoption of autonomous vehicle technology could reduce the frequency of accidents by almost 90%

ERM and Auto “Autonomous” Insurance Underwriting

- ❑ ERM enhances the role of Central Banks and insurance companies to address the following issues before autonomous vehicles take the road.
 1. For example: What happens if a self-driving car gets into an accident?
 2. Who is liable for the damages?
 3. Will the human be at fault or will the car's manufacturer?
 4. Will the 'driver' have to maintain a constant vigil (stay a wake) on the road ahead at all times?
 5. What are they allowed to do inside the vehicle... can they nap, read a book or text message while the car does all the navigating?
 6. Will they even need a driver's license?

Insurance Underwriting

❑ The main rating factors for auto insurance are:

- Age, Gender, and Marital status
- Driving experience
- Driving record
- Claims history
- Previous insurance coverage
- Vehicle type
- Vehicle use
- Miles driven
- Coverages and deductibles

❑ What else?

- Credit history (Why? What are the economic implications)
- Drivers with low credit score have high risk profile, tend to file more claims, and more likely to commit fraud

ERM Addresses Regulatory Implications of Telematics

Telematics insurance is called usage-based insurance, pay-as-you-drive insurance or pay-per-mile insurance.

Data Collection and Processing

- How is the Data Recorded, Transmitted, Received and Reported?
- How is the Data Formatted, Stored and Protected?
- Consumer Privacy Protection

Technology Solutions

- Do All Devices Record the Same Data in the Same Way?
- Are All Discounts Made Available to All Consumers Based on Directly Comparable Data?

Need for Transparency

- What Constitutes *Good Driving Behavior*?
- Rating and Pricing Model Identifying Each Factor and How It Is Measured

Claims Management

- Establishment of Protocols for Consistency and Uniformity with Respect to Data Usage in Claims Investigations

ERM Addresses Policyholder Concerns with Telematics

Competitive Advantage for Companies

- Rewarding Safe Drivers
- Penalizing All Others

Data Ownership

- Establishment of Data Ownership Standards
- Availability to Consumers for Claims Settlements
- Data Portability

Data Privacy

- How will Data be Used? Establish Privacy Standards
- How will Data be Protected? Establish Standards for Permitted and Prohibited Uses
- Who Has Access?
- Will Drivers' Data be Shared with law enforcement?

ERM and diversity, equity, and inclusion(DEI)

ERM and the impact of gender diversity on financial performance

NAIC identifies gender diversity as a criterion for better ERM score

- According to the NAIC, companies with more women in leadership positions (i.e., ERM) tend to have better financial performance, and less financial misconduct.
- Female team leaders are supporting their teams by providing emotional support, checking in on overall well-being, and ensuring manageable workloads than the average male manager
- Promoting gender diversity in the insurance industry help improving overall financial performance.

THE MIDDLE EAST'S

100 Most Powerful Businesswomen 2023



5. Application of ERM in insurance market

ERM and diversity equity inclusion(DEI)



85. Manal Jarrar

National Insurance Company (Watania)

85. Manal Jarrar

Company: National Insurance Company (Watania)

Title: CEO

Nationality: Jordanian

Sector: Insurance

Jarrar joined National Insurance Company (Watania) in 2012 and was appointed general manager in 2014. Among the company's major clients are Hikma, SGBL, Bank Audi, Middle East Telecommunications, and the University of Jordan, among others. Before taking her current role, she was deputy general manager at Watania and deputy general manager at Jordan International Insurance (Newton).

- Insurance—including life, home, and auto insurance—is more gender diverse but less racially diverse than the average industry in North America (Not the case in the MENA insurance industry)
- Overall, women are underrepresented among executives, making up only 29% of senior leaders.
- Women are highly loyal to their companies (stay at a company for longer periods of time than men)
- However, they are employed in less-senior roles and generally found at lower salary levels than their male counterparts.

ERM Addresses Health Insurance Fraud Schemes



Health Fraud

- ❑ Unique setting (Unlike auto or homeowner insurance).
 - ❑ Policyholders are not generally able to submit a claim without the action of a health care provider.
 - ❑ Healthcare fraud can be initiated by multiple parties, and healthcare providers are more involved compared to PHs. (provide medical services, and control/file medical claims to insurers).
- ❑ Healthcare spending is costly: approximately \$3.5 trillion (18% of GDP) of the U.S. economy
- ❑ 6-10% of all healthcare spending (\$210 billion to \$350 billion) that is potentially fraudulent
 - Health-related fraud increased during the COVID-19 pandemic.

Healthcare Fraud Schemes

❑ Upcoding (What is it?)

- Upcoding is a serious issue in the healthcare insurance market, in which HCPs change the codes of provided services into more intensive and expensive services to gain from insurance companies.
- HCPs are experienced with coding (e.g., ICD-9, and ICD-10), and can always game the system.

❑ Economic implications to consider via ERM:

- How does the transition from ICD-9 (International classification of diseases) to ICD-10 affect the accuracy of coding (upcoding) medical services?
- And to what extent such transition influence healthcare providers (HCP) fraud in insurance market?
- Fraud rate is extremally high during the transaction. Increases by approximately 20%.


ERM and Cybersecurity attack : The Challenges of Cyber Risk Insurance



Estimated global cost
of cyber crime
900 billion USD
(McAfee, 2021)

Estimated global premium volume
for cyber insurance
9 billion USD

To compare:
NatCat losses 2021
280 billion USD
(Munich Re, 2022)

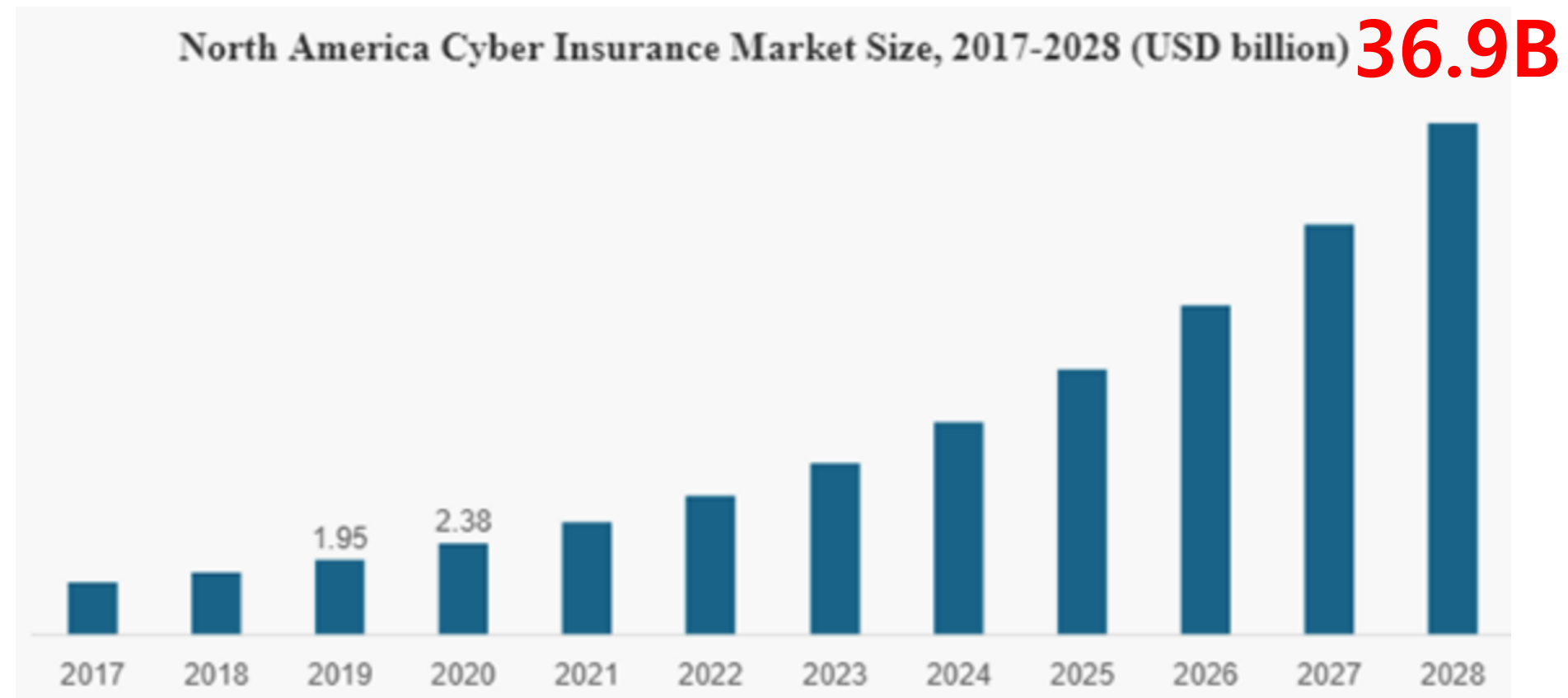


... and already here we talk about a
«global protection gap»

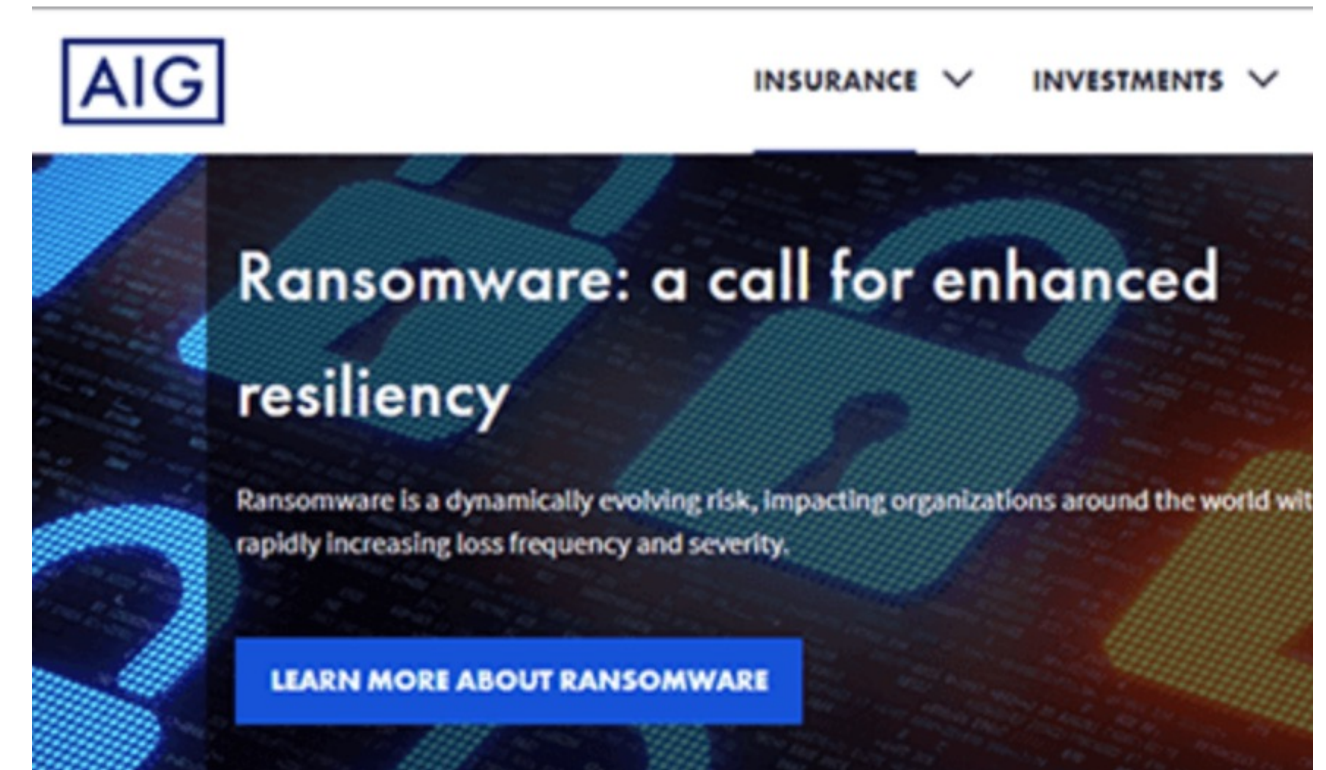
«Cyber risk insurance will be the largest market in p/c
insurance in the North American/European countries
in 2030»



6. Cyber Insurance is Becoming Major Insurance Product



Fortune Business Insights

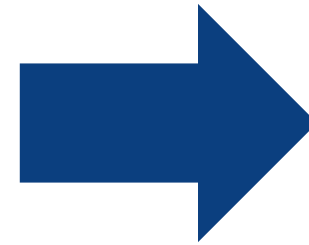


Cyber insurance market has advanced from a very niche risk transfer tool to a critical requirement for enterprise risk management.

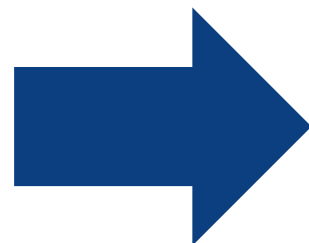
5. Developments of Cyber Insurance in Pandemic



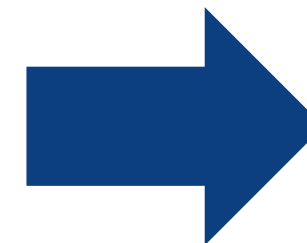
Work at Home



Vulnerable Security



**Increased need for
Cyber Insurance**



**Cost and Limitation
has been increased**

ERM addresses Misconceptions

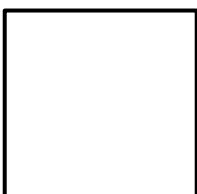
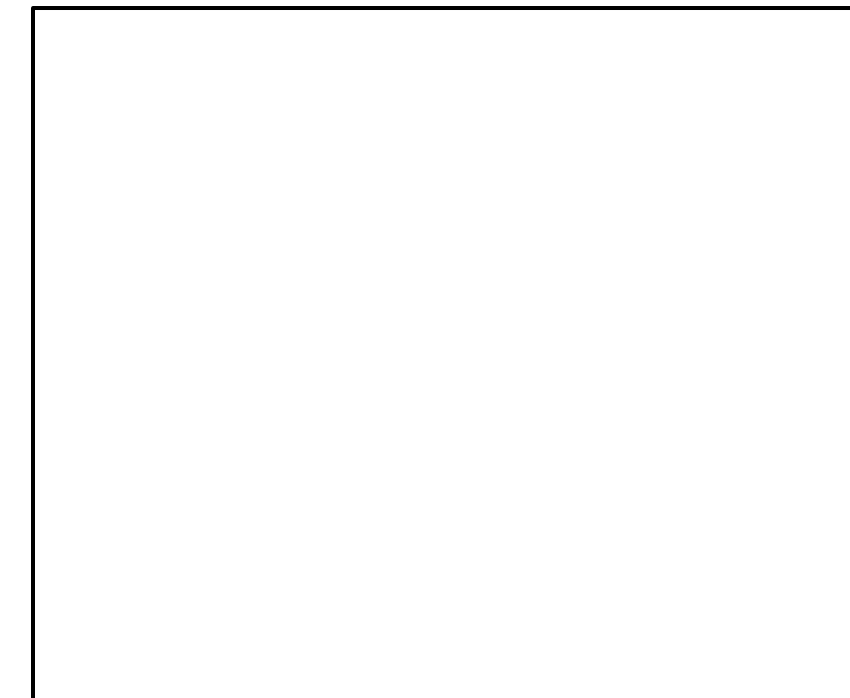


Challenges



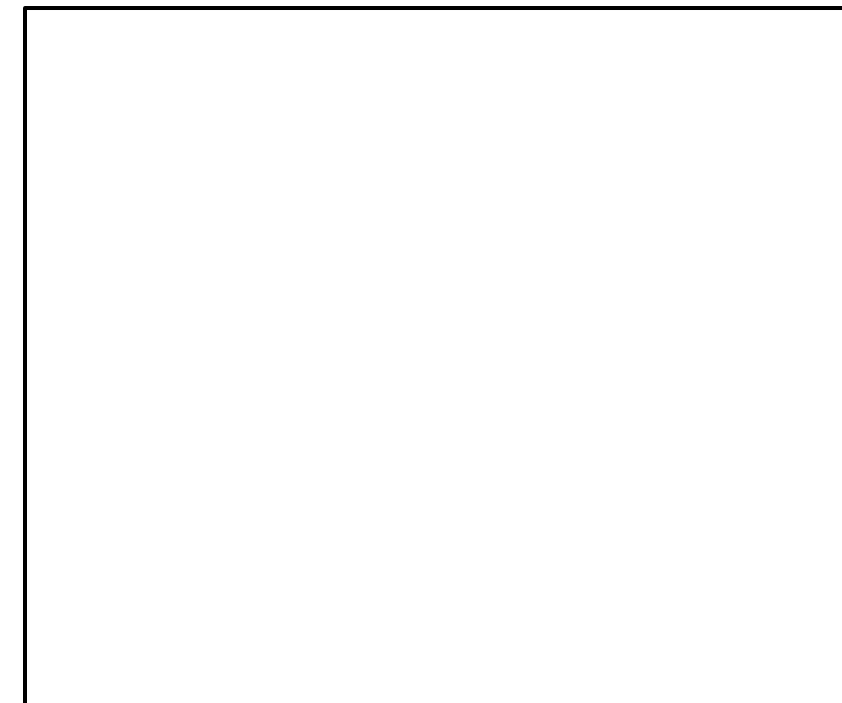
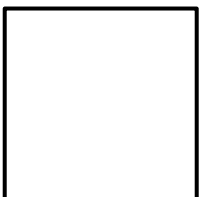
Yesterday's risks may not be tomorrow's risks:

- Types of bad actors and criminals keep growing
- Types of targets and types of attacks keep changing.
- More work from home brings additional risks and vulnerabilities



Challenges ...

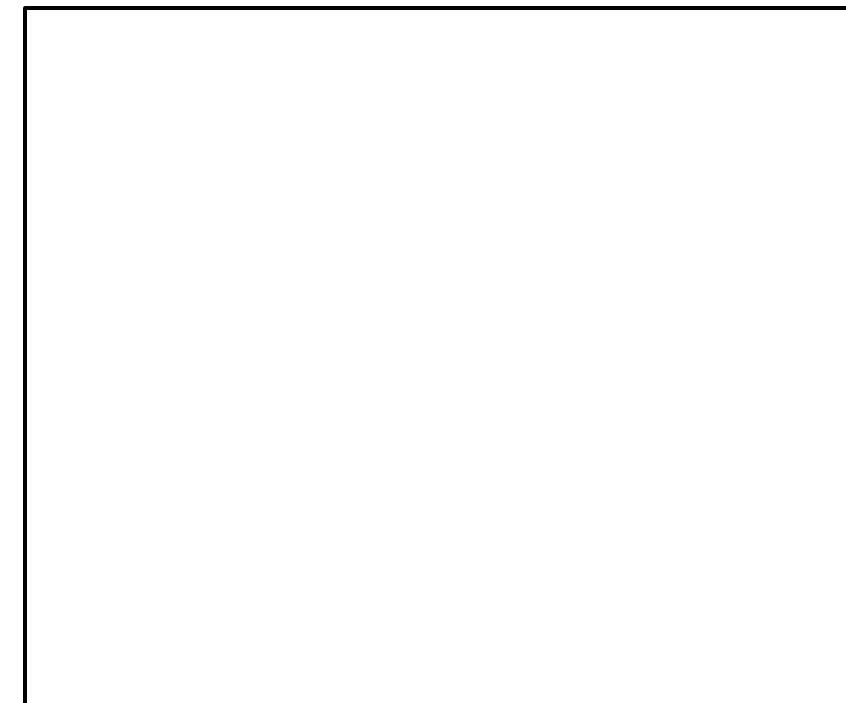
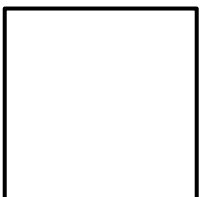
- ❑ Historical events are likely not to be indicative of the future.
- ❑ Limited data.
- ❑ Continuously changing landscape.
- ❑ Data privacy laws add a new layer of costs.



Challenges ...

Other issues:

- ❑ Insurers' legacy systems may not be sufficient for cyber risks and required data.
- ❑ Not all losses may be reflected in data (for instance ransomware attack victims may be concerned about reputational damage).



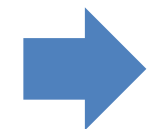
ERM Developments in Insurtech



5. Application of ERM in insurance market

ERM and insureTech

InsurTech



The use of technology to innovate and improve the insurance industry

Use of

- Artificial intelligence
- Machine learning
- Big data analytics

To improve risk assessment and underwriting



ERM implementation

- Uses technology to improve risk management processes
- InsurTech companies can also provide risk management tools and platforms that help insurance companies to better understand and manage their risks.
- InsurTech companies themselves may face risks that need to be managed through ERM processes

Simplifying claims expenses



- ▶ Bauxy, Claim Di, Snapshot – create app to enhance customer engagement and enable them to settle a claim completely virtually.
- ▶ Claims adjusters obtain the tools to enjoy an automated experience.
- ▶ The solution simplifies claims, reduces the operation costs and **increases touch points between insurer and customer, leading to better satisfaction.**

Shuidihuzhu

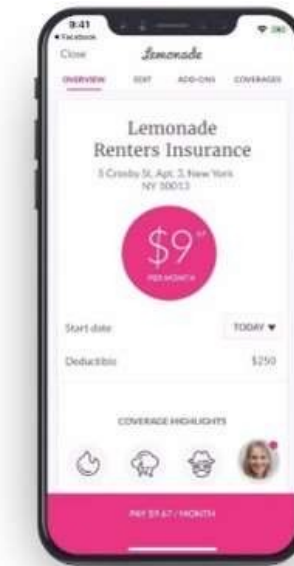


- ▶ **Shuidihuzhu (水滴互助) is an insurance platform that solves the problem of high medical fees faced by most patients, especially those with a critical illness.**
- ▶ **When a user is diagnosed with a serious disease like cancer, the platform will crowdfund the medical fees from all of its users.**
- ▶ **Shuidihuzhu features two products on its app, cancer mutual aid, which has scaled more than 1 million users in less than half a year.**

P2P insurance model



Lemonade
Get insurance in 90 seconds
with Lemonade's app



- ▶ Friendsurance and Lemonade - using a sharing economy approach, users are invited to form groups of policyholders and pay partial premium into a pool to use for small claims.
- ▶ Policyholders can get back the remaining pool of money at the end of the year, after claims.
- ▶ Claims-free policyholders can obtain higher cash back (**reduces Moral Hazard when it comes to misusing insurance, and committing fraud**)



5.

**Real life example of application ERM in
the insurance industry**

5. Real life example of application ERM in the insurance industry

When Hurricane Katrina hit in 2005



Companies that had implemented **ERM** were better prepared to manage the financial impact of the disaster



- When Hurricane Katrina hit, Entergy was able to quickly assess the risks and potential impact of the storm on its operations, activate its crisis management plan, and coordinate with emergency responders and government agencies to restore essential services as quickly as possible.



- Used ERM to identify the potential risks of natural disasters and invested in catastrophe bonds to spread risk among multiple investors.
- As a result, Swiss Re was able to minimize losses and remain financially stable after Hurricane Katrina.

Thank You!!!!

Feel free to reach out:

Email: aalzubi45@gmail.com

Phones: +1 (404) 304-2925

WhatsApp: +61-412-846-257



Jordan Al-Zu'Bi, Ph.D. (He/Him)

Research Scholar in Insurance and Risk Management at The National Association of Insurance Commissioners (NAIC)

Atlanta, Georgia, United States · [Contact info](#)

[500+ connections](#)



THANK
YOU

Main takeaways

1. ERM adoption in each continents is continuously growing
2. ERM adoption can be affected by many factors such as regulatory environment and organizational culture.
3. ERM is a proactive and comprehensive approach to managing risks that can help organizations identify, assess, and manage a wide range of risks.
4. ERM can help organizations to improve their overall risk management practices and enhance their resilience to unexpected events.
5. Many kinds of softwares are being used for adopting ERM such as Riskonnect and LogicManager.
6. ERM can be impletmented on various area such as healthcare insuarncce, Life insurance and P&C insurance industry.

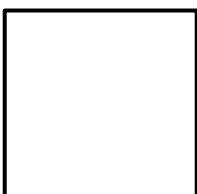
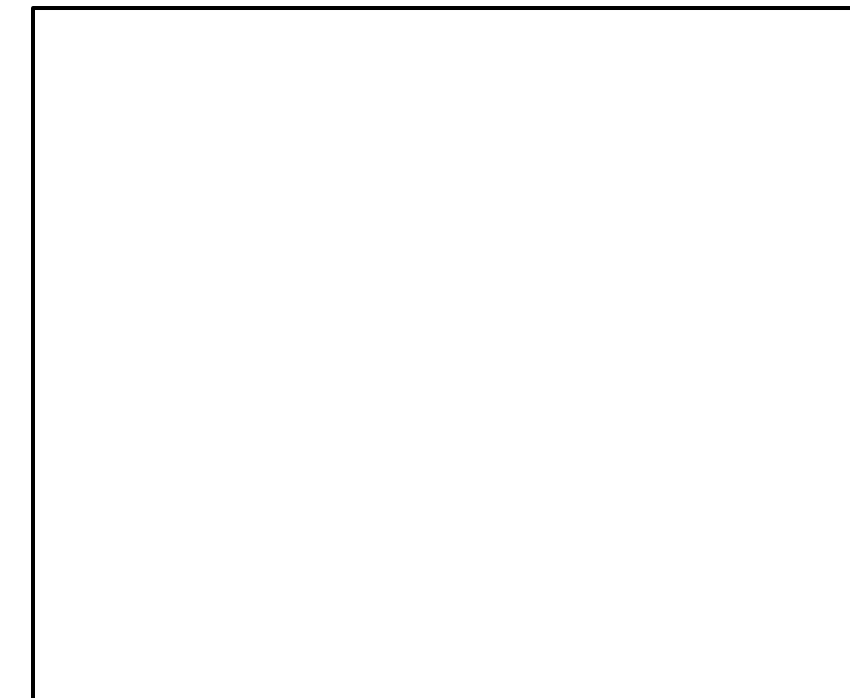
Breach Reporting Requirements:

An Analysis of Laws Across the US



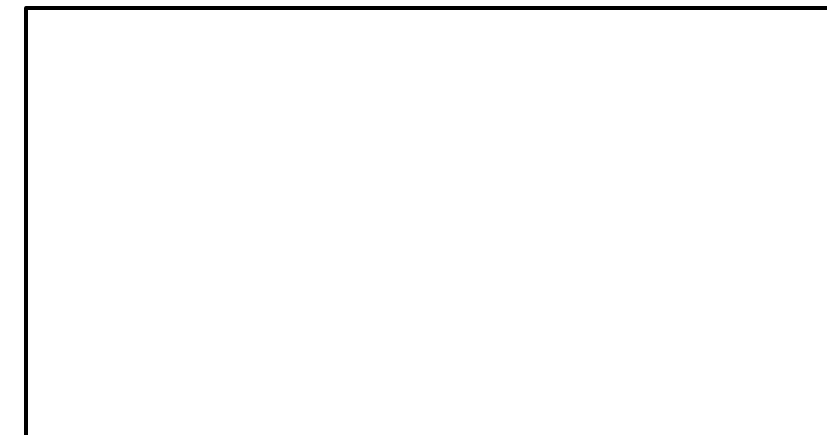
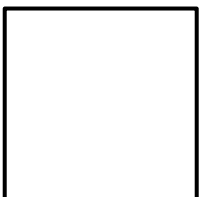
Background

- ❑ Reducing and managing risk efficiently requires information, including that drawn from compliance with laws regulating reporting of cyber breaches.
- ❑ No uniform national standards exist for notifying consumers and authorities of data breaches.
- ❑ Each state and territory has its own statute(s) with notification requirements.



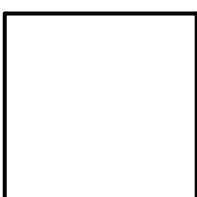
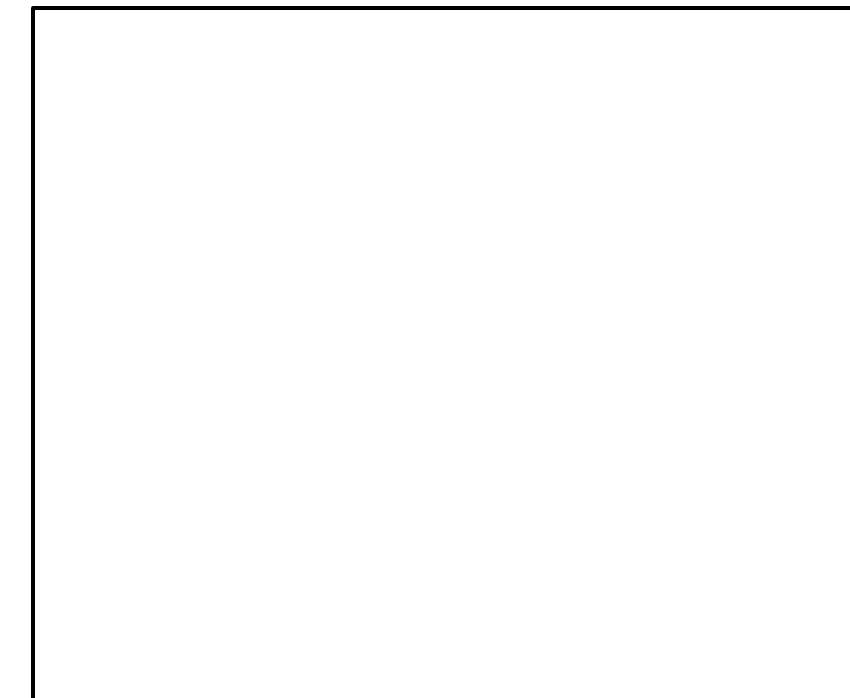
Background ...

- In 2017 NAIC adopted the Insurance Data Security Model Law
 - ▣ To establish common data security and breach notification standards
 - ▣ States encouraged to adopt by the NAIC and U.S. Department of the Treasury
- In 2018, a U.S. Department of the Treasury report concluded:
 - ▣ Differences in state laws can make compliance overly burdensome for companies doing business in more than one state
 - ▣ U.S. Congress should enact data security and breach notification legislation that supersedes state law and applies uniform standards across the states



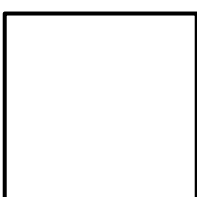
Academy Paper

- Academy Cyber Risk Task Force examined the current status of state reporting requirements (Cyber Breach Reporting Requirements: An Analysis of Laws Across the United States; November 2020):
 - ▣ Summarize essential aspects of each jurisdiction's relevant statute(s) in a consistent manner for comparison
 - ▣ Compare statutes across jurisdictions and report key metrics
 - ▣ Contrast current statutes with NAIC Model Law



Key Takeaways

- Typical statute creates issues due to arbitrary threshold and vague language.
- Variability creates uncertainty for pricing and designing cyber coverage and may require higher margin components in premiums.
- Variability may also make mitigation and prevention more difficult, raising losses due to cyber risk.
- Actuaries, insurers, regulators, and public may benefit from increased harmonization.



Reference

Leighton, K., & McKeown, L. (2017). The impact of enterprise risk management on customer satisfaction in the insurance industry. *Journal of Financial Service Professionals*, 71(3), 41-50.

Narvaez, K., Shapiro, B., & Wanserski, J. (2019). Enterprise risk management and firm performance: A comprehensive review and research agenda. *Journal of Risk and Financial Management*, 12(3), 128. <https://doi.org/10.3390/jrfm12030128>

Berry-Stölzle, T. R., & Xu, J. (2018). Enterprise risk management and the cost of equity capital in the property-casualty insurance industry. *Journal of Risk and Insurance*, 85(2), 397-424. <https://doi.org/10.1111/jori.12172>

Krishnan, G. V., Yu, W., & Toffel, M. W. (2016). The influence of enterprise risk management on the cost of equity capital in the property and casualty insurance industry. *Journal of Banking & Finance*, 68, 69-88. doi: 10.1016/j.jbankfin.2016.02.007

Weiss, M. A., & Marklund, C. A. (2013). The impact of enterprise risk management on property-casualty insurer reserve adequacy. *Journal of Risk and Insurance*, 80(1), 195-223.

Roufagalas, J., & Frantz, T. L. (2019). Economic factors influencing enterprise risk management: A systematic literature review. *Journal of Risk and Financial Management*, 12(1), 2. <https://doi.org/10.3390/jrfm12010002>

Asare, E., & Ohene-Asare, K. (2019). Factors affecting enterprise risk management adoption: Evidence from the public sector in Ghana. *International Journal of Public Sector Management*, 32(5), 502-515. doi: 10.1108/IJPSM-03-2018-0085

Hudaib, M., Mohd, S., & O'Shea, J. (2019). The impact of national culture on enterprise risk management: Evidence from Europe. *European Journal of International Management*, 13(2), 259-282.

Borgonovo, E., Cillo, A., & Durante, F. (2018). Enterprise risk management and the size of firms: Evidence from Italian listed companies. *Journal of Risk Research*, 21(9), 1087-1101. doi:10.1080/13669877.2017.1372272

Caba-Pérez, C., Arreola-Risa, A., & Liébana-Cabanillas, F. (2020). Organizational culture and enterprise risk management adoption: Evidence from Spanish firms. *Journal of Business Research*, 110, 299-310. doi: 10.1016/j.jbusres.2019.12.031

Li, L., & Warrington, P. T. (2018). Enterprise risk management adoption in different industries: Evidence from the USA. *Journal of Risk Research*, 21(7), 849-869. <https://doi.org/10.1080/13669877.2017.1393537>

Anwar, S., & Ahmed, K. (2018). The impact of regulatory regimes on enterprise risk management: A study of UK and European Union firms. *Journal of Risk and Financial Management*, 11(3), 46. <https://doi.org/10.3390/jrfm11030046>



THANK
YOU