Cyber risk and insurance

Dr. Katsiaryna (Kate) Labunets

Safety and Security Sciences group
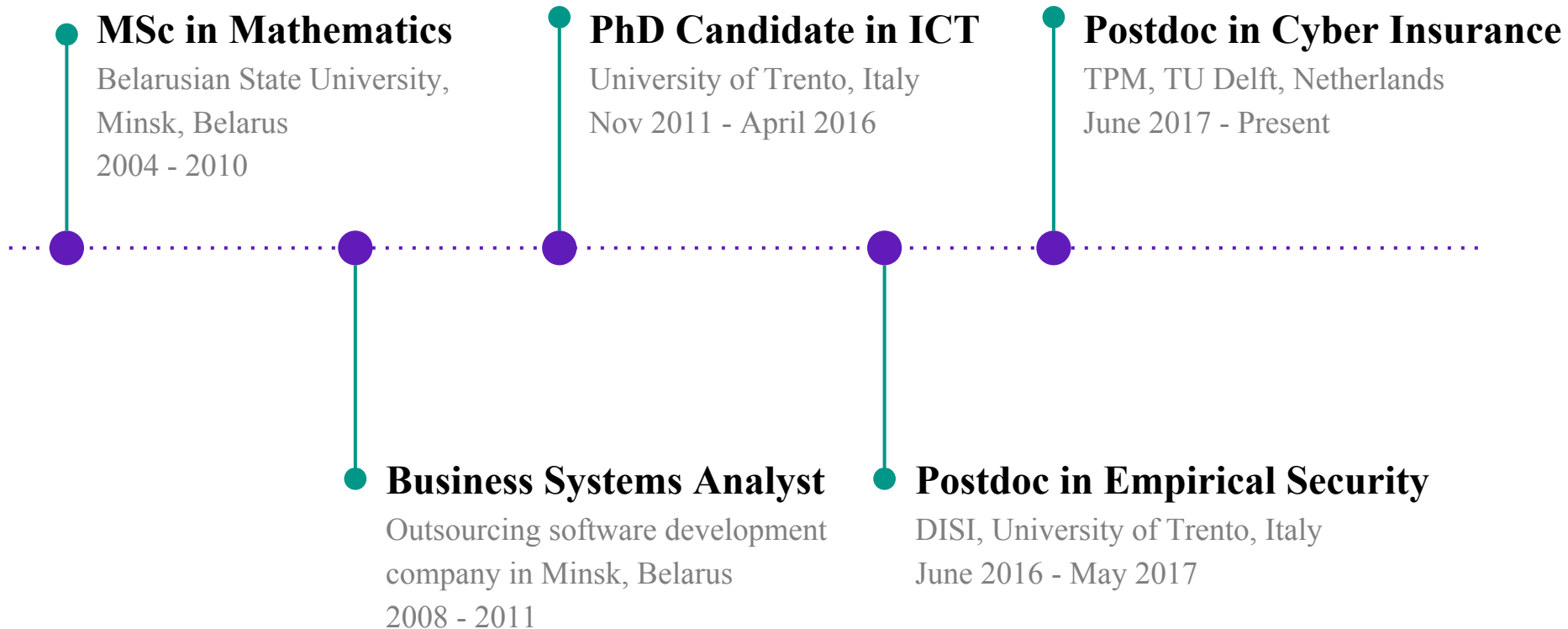TPM, TU Delft
E: k.labunets@tudelft.nl

Outline

- Who am I?
- Definitions
- Motivation
- Cyber insurance market: Current practice
  - Questions to audience
- Challenges for cyber insurance
- CYBECO project

Dr. Katsiaryna (Kate) Labunets

MSc in Mathematics

Belarusian State University, Minsk, Belarus
2004 - 2010

PhD Candidate in ICT

University of Trento, Italy
Nov 2011 - April 2016

Postdoc in Cyber Insurance

TPM, TU Delft, Netherlands
June 2017 - Present

Business Systems Analyst

Outsourcing software development company in Minsk, Belarus
2008 - 2011

Postdoc in Empirical Security

DISI, University of Trento, Italy
June 2016 - May 2017

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Definitions

Definitions [1/2]

- **Risk** is the likelihood of an incident and its impact for an asset (e.g., organizational processes, functions, reputation).
- **Cyberspace** is the complex environment resulting from the interaction of people, software and services on the Internet, supported by worldwide distributed physical information and communications technology (ICT) devices and connected networks. [ISO 27032]

Cyberspace + **Risk** = Cyber Risk

- **Risk mitigation strategies:** reduce; avoid; transfer; accept the risk.
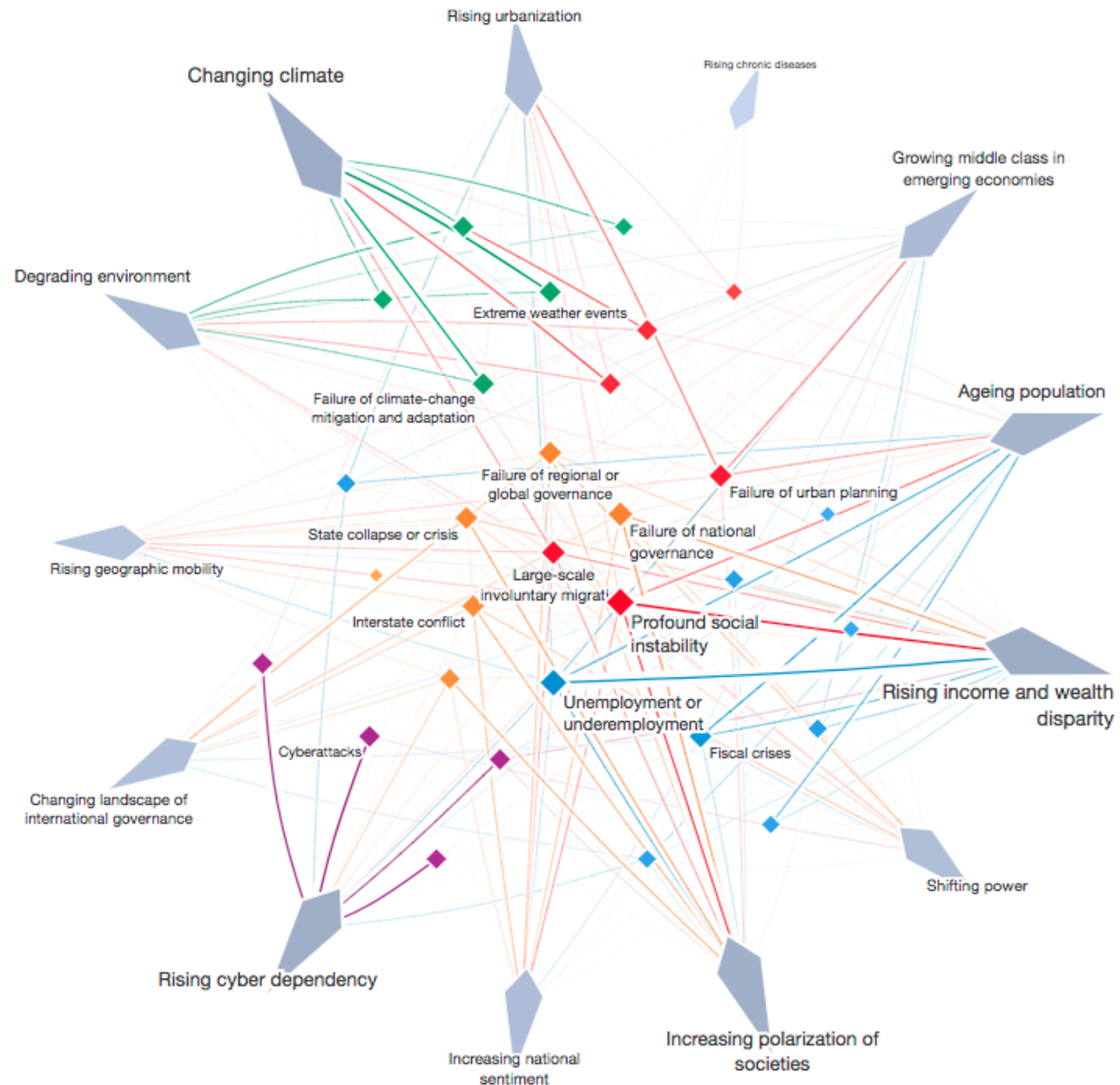
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Definitions [2/2]

- **Cyber insurance (CI)** is "<u>protection against losses related to cyber risks</u>, such as data theft/loss, business interruption caused by a computer malfunction or virus, <u>and fines or lost income</u> because of system downtime, network intrusion and/or information security breaches" [Gartner, 2015].

Gartner, "*Five Tips for Companies Considering Cyber Insurance,*" 2015. Available: http://blogs.gartner.com/john-wheeler/five-tips-for-companies- considering-cyber-insurance/
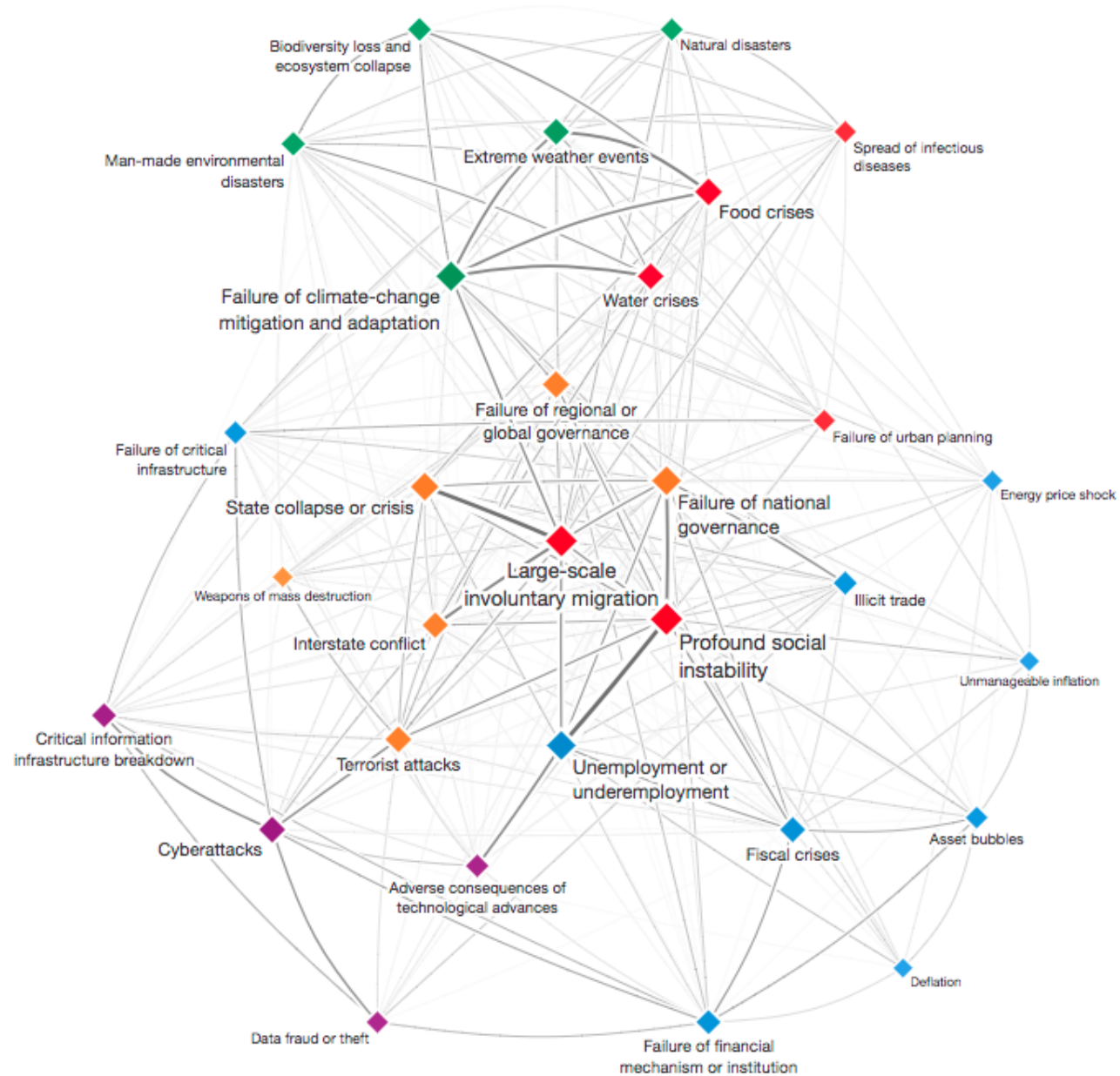
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The Risks-Trends Interconnections Map 2017

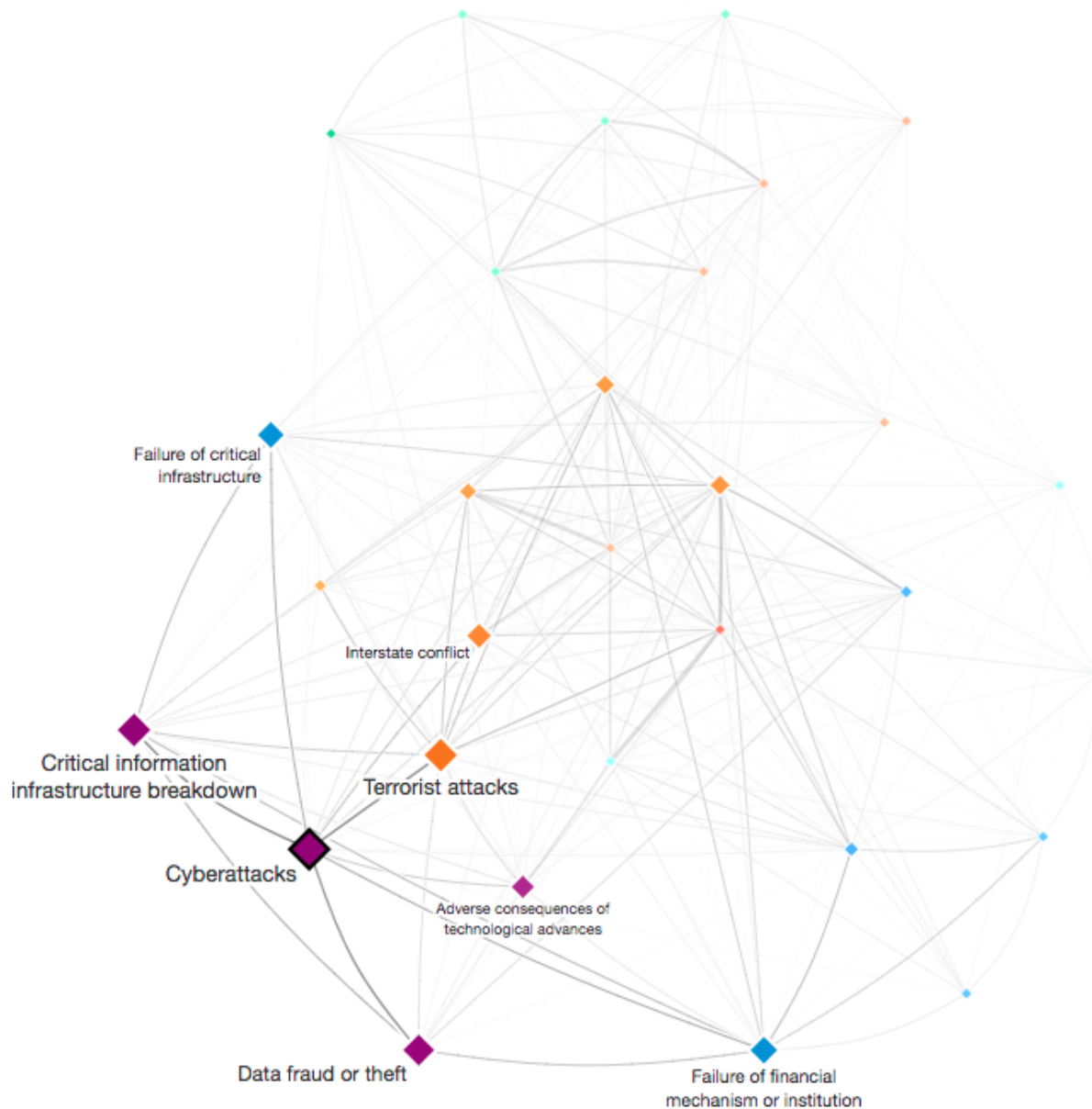How are global trends connected to global risks?

Rising urbanization

Rising chronic diseases

Changing climate

Growing middle class in emerging economies

Degrading environment

Extreme weather events

Ageing population

Failure of climate-change mitigation and adaptation

Failure of regional or global governance

Failure of urban planning

State collapse or crisis

Failure of national governance

Rising geographic mobility

Large-scale involuntary migration

Interstate conflict

Profound social instability

Rising income and wealth disparity

Unemployment or underemployment

Cyberattacks

Fiscal crises

Changing landscape of international governance

Shifting power

Rising cyber dependency

Increasing national sentiment

Increasing polarization of societies

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WEF, "Global Risks Interconnections Map 2017", https://goo.gl/P5bkrk

The Global Risks Interconnections Map 2017

How are global risks interconnected?

Biodiversity loss and ecosystem collapse
Natural disasters
Spread of infectious diseases
Man-made environmental disasters
Extreme weather events
Food crises
Failure of climate-change mitigation and adaptation
Water crises
Failure of regional or global governance
Failure of urban planning
Failure of critical infrastructure
State collapse or crisis
Failure of national governance
Energy price shock
Large-scale involuntary migration
Weapons of mass destruction
Illicit trade
Interstate conflict
Profound social instability
Unmanageable inflation
Critical information infrastructure breakdown
Terrorist attacks
Unemployment or underemployment
Cyberattacks
Adverse consequences of technological advances
Fiscal crises
Asset bubbles
Data fraud or theft
Failure of financial mechanism or institution
Deflation

WEF, "Global Risks Interconnections Map 2017", https://goo.gl/P5bkrk

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The Global Risks Interconnections Map 2017

Which global risks are most connected to Cyberattacks?

WEF, "Global Risks Interconnections Map 2017", https://goo.gl/P5bkrk

Cost of cyber incidents

Extreme cyber-attack could cost as much as Superstorm Sandy in 2012: $53bn of economic losses

Table 13: Estimated coverage for the modelled scenarios (US Dollars)

Event	Overall losses		Insured losses		% loss covered	
	Large loss	Extreme loss	Large loss	Extreme loss	Large loss	Extreme loss
Cyber CSP interruption	$4.60bn	$53.05bn	$620m	$8.14bn	13%	17%
Cyber mass vulnerability	$9.68bn	$28.72bn	$762m	$2.07bn	7%	7%

Lloyd's, "Counting the cost: cyber exposure decoded", 2017. https://goo.gl/fSFq9B

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Equifax hack

Equifax's Historic Hack May Have Exposed Almost Half of U.S.

Bloomberg Technology

Levin Report | **EQUIFAX'S MASSIVE HACKING SCANDAL COULD COST $70 BILLION**

Mere hours after Equifax decided to let the public know what had happened, lawyers for **Mary McHill** and **Brook Reinhard,** who had their personal information stored by the company, filed a complaint in federal court, saying that "In an attempt to increase profits, Equifax negligently failed to maintain adequate technological safeguards to protect Ms. McHill and Mr. Reinhard's information from unauthorized access by hackers." One of McHill and Reinhard's attorney's, **Ben Meiselas,** said the class plans to seek up to $70 billion in damages. That's exactly four times as much as the entire company is worth, after Equifax stock plummeted about 14 percent.

Ransomware attacks

- **Wanna Cry** (2017): within a day 230 000 Microsoft computers were infected in 150 countries (ransom to be paid in bitcoin crypto currency)
- **Petya/notPetya** (2016-2017): container terminal of Maersk in port of Rotterdam stopped to function among others

NotPetya Ransomware Attack Cost Shipping Giant Maersk Over $200 Million

Forbes

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Cyber insurance market: Current practice

- How insurers underwrite cyber risks?

- How many people actually read policies?

- What are the selling points for customers?

- When would you advise client to buy a cyber insurance?

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Cyber insurance challenges [1/2]

- Dealing with intelligent adversaries and intentionality
  - Not well covered in standard cyber risk management

- Lack of data about cyber attacks
  - new regulations are coming (in 2018)
    - General Data Protection Regulation (GDPR)
    - Directive on security of network and information systems (NIS)
  - alleviate by using Structured Expert Judgment

- Difficult to quantify cyber risk
  - There are too many factors
  - Dynamic nature of cyber risk

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Cyber insurance challenges [2/2]

- Cyber insurance fraud
  - It is hard to discover the origin of cyber attack
- Interdependent security
  - A majority of clients in an insurer's portfolio could be affected by the same attack
  - Cyber insurance catastrophe
- Moral hazard
  - Insured companies may change their behaviour regarding investments in company's security

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CYBECO project

Project details

- Title: Supporting Cyberinsurance from a Behavioural Choice Perspective
- Duration: May 2017 - April 2019 (2 years)
- Program: H2020
- 7 partners: Greece, Netherlands (TU Delft), UK, Spain, Luxembourg, France (AXA)

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How CYBECO helps? [1/2]

- Understand better how the CI ecosystem works in practice
  - key driver behind decision making process when insureds buy CI,
  - behavioural aspects in CI ecosystem (e.g., how company's behaviour changes when they have a CI) .

- Identify possible gaps in the key directives, standards and services in order to improve CI practice.

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How CYBECO helps? [2/2]

- Provide a tool support for security risk management with
    - new mathematical models that incorporate CI,
    - behavioural nudges in cyber security and insurance.

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Want to join us?

- We are looking for collaboration
- More information:

  www.cybeco.eu

  k.labunets@tudelft.nl

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