

# Economics of Cybersecurity

Geneva Cybersecurity Law & Policy Conference

21 June 2018

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## Economics of cybersecurity

### **93% of attacks are preventable**

- Known vulnerabilities
- Social engineering (e.g. phishing for a password)

### **Non-preventable ones could still be mitigated**

- Keep less data
- Encrypt what is kept

### **But costs are high and growing**

- Estimates of \$500 billion per year for breaches
- Loss of customers, jobs, privacy

Question: Why is more not done to prevent or mitigate, given the costs of an attack?

## Inaction is not uncommon

### Seat belt use was slow

- 1950s patented
- 1960s standard in cars
- 1970s (United States)
  - Study showed 60% safer in accident
  - 80% did not use
- 1980s seat belt legislation



### Air bag adoption was similar

- Low demand and supply
- Adoption was mandated

3

## Password security as an example of economic challenges

### Password issues

- Simple passwords
- Commonly reused across services (personal and work)
- Easy entry point for hackers

### Solutions exist including password managers
















- Create, store, and use complex passwords
- In one survey, only 12% use password managers
- Most remember them or write them down



A password manager only increases security if it is secure

4

## How to choose a password manager?

Product								
	Dashlane - 1 year plan	Special Offer	LastPass	Password Boss	Zoho	Keeper Security	LogMeOnce	RoboForm
Lowest Price	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>	<a href="#">SEE IT</a>
Editors' Rating								
Import From Browsers	✓	✓	✓	✓	—	✓	✓	✓
Two-Factor Authentication	✓	✓	✓	✓	✓	✓	✓	✓
Fill Web Forms	✓	✓	✓	✓	—	✓	✓	✓
Multiple Form-Filling Identities	✓	✓	✓	✓	—	✓	✓	✓
Actionable Password Strength Report	✓	—	✓	✓	✓	✓	✓	✓
Browser Menu Of Logins	✓	✓	✓	✓	✓	✓	✓	✓
Application Passwords	—	✓	✓	—	—	✓	—	✓
Secure Sharing	✓	—	✓	✓	✓	✓	✓	✓
Digital Legacy	✓	—	✓	✓	✓	✓	✓	✓

Ranking usage features, but not underlying security

## What are safeguards if there is a problem?

### 9. Limitation of Liability

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## Compare this with car safety today

Make & Model ▲	Safety Equipment ▼	Overall rating ▼				
 Alfa Romeo Giulietta	Standard	★★★★☆	72%	56%	59%	25%
 BMW 6 Series GT	Standard	★★★★★	86%	85%	81%	59%
 Dacia Duster	Standard					

*Takata, Unable to Overcome Airbag Crisis, Files for Bankruptcy Protection*



7

## Cybersecurity Market Failures

### Negative externalities

- *Consequence of economic activity impacting a third-party; e.g. pollution*
- Organisations do not bear all the costs of a data breach
- Leads to lower spending to prevent breaches, since the cost is spread around

### Asymmetric information

- *One party to an economic transaction knows more than the other; e.g. used car quality*
- Hard for customers to assess level of cybersecurity
- Less willing to compete on cybersecurity spending, since it cannot be proven to customers

This helps explain why organisations do not always upgrade their systems; train their employees; properly evaluate connected vendors; minimize data storage or encrypt what is stored

## Market failures require external solutions

### Technology designed around human behaviour

- Automatic security updates on operating systems
- Password complexity prompts
- Default password managers

### Non-regulatory solutions

- Security testing and ratings
  - Consumer Reports or Which?
  - Starting for cyberinsurance
- Certification
  - As with UL for electricity
  - Set standards for cybersecurity

### Regulations to address market failures

- Externality
  - Internalise costs of breaches
  - Increased liability on breach (mandatory disclosure, consumer protection, etc.)
- Asymmetric information
  - Mandates on features which consumers cannot verify or assess
  - For instance, require encryption of stored data; limits on how long kept

9

## New issues arising

### Jeep Chrysler

- Introduced Internet-enabled entertainment system
- Researchers could take over brakes and transmission wirelessly

### Reaction

- Jeep recalled with security update through USB
- But, Jeep claimed it was not a defect, like a bad airbag, but rather an act of vandalism
- Regulatory liability for such attacks still not established



10

## What's next?



Who is responsible for deciding whether such a vehicle would be allowed on the streets?

11

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12