Autonomous machines
Impacts, risks & opportunities for re/insurance

A new Position Paper from the CRO Forum Emerging Risks Initiative

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Autonomous machines
Impacts, risks & opportunities for re/insurance

AGENDA

1 Background information about the Emerging Risks Initiative

2 What is an ‘autonomous machine’?

3 Impact on the insurance corporate risk landscape

4 Risks and opportunities for re/insurers

5 Key takeaways
Meet the CRO Forum Emerging Risks Initiative

12 member companies

A yearly position paper

- 2014 – Pushing the limits
- 2015 – The Smart Factory
- 2016 – Water Risks
- 2017 – Autonomous Machines

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Focus of the paper

Physical machines…

… that are autonomous

- An autonomous machine is able to:
  - Treat and react to information about its surroundings;
  - Self-manage over an extended period of time with little or no human intervention; and
  - Take decisions.
Mechanisms of autonomy

Perception
- **Sensors** to ‘perceive’ the environment

Understanding
- Context **data** processed through **algorithms**

Decision making
- Choice of response behavior(s)

Action
- Movements of the machine or activation of mechanisms.

- **Connectivity** to share information
- **Artificial intelligence** to simulate the intelligence of humans.
- **Machine learning** to learn from past experience

Enablers of the autonomous machines’ technology

- Artificial intelligence
- Connectivity
- New technologies
- Sensors
- Big Data
- Machine learning
The social impact will be substantial: employment & health

- All sectors of activity are impacted, with a variable automation potential.
- New jobs will be created.
- However, between 9% to 50% of the current labor force could be automated.

### Example: Medical & social care

- The use of robotics (e.g. autonomous nurses) will:
  - Enable remote medical care;
  - Alleviate difficulties such as lack of staff.

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And for re/insurance?

- **Lower likelihood of accidents:**
  Human errors eliminated.

- **Betterment of life:**
  Life expectancy, general health into old age and human wellbeing improved.
Regulations on data privacy

- Autonomous machines will generate massive amounts of data.
- New laws and regulations will emerge.

The end of privacy

- Data from autonomous machines will mostly be personal;

Regulations on personal data & data portability

- GDPR
  May 2018: European General Data Protection Regulation
- Individuals are empowered to manage their own personal data.

And for re/insurance?

- **Access, appropriation, treatment of data:**
  Risk selection and pricing.
- **Enhanced decision making:**
  Autonomous wearables, genetic testing, claims assessment.

Impact on re/insurance own operations
Ethical controversy

- Major ethical concerns and societal implications will arise.
- Ethics are related to the cultural background.

**Example: Driverless cars**
- “Trolley dilemma” & different ethical principles:
  - Utilitarian vs relativism.

**Example: Lethal Autonomous Weapons (LAWs)**
- Major concerns if LAWs make life and death decisions out of human control;
- “Killer robots” have no capacity to make moral judgements.

And for re/insurance?

- **A new liability regime:**
  Can autonomous machines get the same legal responsibility as humans.

Ethics are different from law
And some more impacts developed in the paper

**Enhanced efficiency and productivity will boost growth**

On re/insurance operational activities:
- **Competitive advantage**

**Social acceptance and the human-machine ecosystem**

For governments:
- **Challenge of finding the optimal balance between efficiency and equity**

For the re/insurance business:
- **New consumer behaviors and expectations**
Shift in liability regimes

- Assigning liability will be more challenging.
- Traditional insurance covers will be revisited and new products will emerge.

Establishing liability

- Autonomous machines are complex products
- Will the accident come from product defect, user error, poor maintenance, communicating error … ?

Example: Driverless cars

- Who is responsible?
  - Manufacturers, telecommunications, global positioning, software vendors, hardware vendors, owners, repairers, ‘operatives’, users …?

And for re/insurance?

- Dedicated liability covers:
  Product liability for manufacturers, personal liability for owners/users, professional liability for programmers.
- No-fault liability scheme:
  The insured is covered whoever is at the origin of the claim.

New insurance covers
## Claims frequency and severity

- **Overall a shift from loss frequency to severity might take place.**
- **The human/machine transition period will likely be a period of intensified risk.**

### Accident patterns

<table>
<thead>
<tr>
<th>Frequency down:</th>
<th>Severity up:</th>
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<tbody>
<tr>
<td>Number of human errors reduced;</td>
<td>More expensive parts (advanced technologies).</td>
</tr>
<tr>
<td>Enhanced safety.</td>
<td>More complicated repairs;</td>
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<tr>
<td></td>
<td>Possible greater impact, due to the repetitiveness of an automated activity.</td>
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### Example: Aircraft

- Air France 447 crash disaster:
  - Combination of automated systems and human actions.
  - Pilots lacked understanding of the real state of the aircraft.

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### And for re/insurance?

- **Shift from attritional to tail risks (e.g. for Motor)**
- **A key role to enable development:**
  - By managing risks, insurance allows individuals and companies to take risks and to innovate.

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**Anticipation and adaptation to technological advances**

- Shift from attritional to tail risks (e.g. for Motor)
- A key role to enable development:
  - By managing risks, insurance allows individuals and companies to take risks and to innovate.
Claims handling

- Enhanced risk management, prevention and disaster investigation.

Disaster prevention & risk evaluation

- Unmanned vehicles and robotics are used for disaster relief, to enhance the effectiveness of incidence response.

- Software agents that work with a degree of autonomy can:
  - Gather data from affected areas;
  - Draw a picture of the situation;
  - Support the response team.

Example: Unmanned Aircraft Systems (UAS)

- UAS are cheaper, smaller and easier to use.

- Tianjin (China) in 2015:
  - High resolution images taken by UAS in inaccessible areas after the blasts were compared with previous photographs to determine how many vehicles had been destroyed.

- Floods:
  - UAS provide a visual overview helping to quickly assess damage and victims' distress.

And for re/insurance?

- Severity assessment of damages and claim adjustment
- Efficiency and quality of claims handling and fulfilment

Better claims handling

Speedy and cost effective estimates of the losses, deployment on inaccessible areas, reduced time for claim settlements and improved customer experience.
New competitive landscape

- New technologies are likely to create new competition for traditional re/insurers.

**New business models & sharing economy**

- Traditional industries are being disrupted:
  - New players (e.g. FinTech & HealthTech companies) are massively created;
  - Software to support machine autonomy likely to be held by a small number of major companies.

- The ‘Sharing Economy’ will contribute to the concept of machine as a service, with an expectable shift from “just in case” ownership to “just in time” rental.

**Example: Public transportation**

- Mobility will become more complex:
  - Automated taxis / trains, shared cars, pay-as-you-ride;
  - Machine-to-machine communication, remote sensing tools and appropriate infrastructure.

And for re/insurance?

- Shift from traditional physical covers to more liability and business interruption covers: To meet the changing needs of manufacturers and clients.
- New kinds of partnerships: Between re/insurers and new Tech companies (e.g. InsurTech).
And some more risks & opportunities developed in the paper

- **Criminal activities and malicious acts**
  - For re/insurance:
  - Cyber to consider in BI/CBI, marine and motor insurance

- **Exacerbated cyber risks and hacking**
  - For re/insurance:
  - Impact on claim costs, customer service and product design

- **Accumulation of risks and large scale failures**
  - For re/insurance:
  - Significant concentration & larger tail risks
To recap

Contents of the publication

- Enablers of the autonomous machines technology;
- Eight selected examples of autonomous machines;
- Outputs for society and impacts for re/insurance of the development of autonomous machines:
  - Bottom part: outputs detailed in Chapter 2 – Impacts on Re/Insurance Underwriting Risks.
Key Takeaways

Uncertainties in terms of timescale and magnitude of impact.

Shifting in claims:
- Increased severity
- Lower frequency

Many opportunities, if correctly assessed and sufficiently prepared.

Re/insurance can remain an enabler of development.
Thank you for your attention!

For further information, the new ERI Position Paper on Autonomous Machines is now available.

Link to page on CROF website
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