Concordia Workshop - CS Consultant
Learning Objectives – Economics and Business

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Agenda

- Introduction and Basics
- New Approaches
  - SEConomy Framework
- Discussion and Conclusions
- Hands-on Exercise

Introduction and Basics

Introduction

- As businesses and governments go digital, they are exposed to increasing number of threats
  - ⇨Governance, risk assessment, security assessment, and operations management are critical for digital era
- Cybersecurity is no longer “just” a technology perspective
  - ⇨ Societal and economic impacts equally important

Technology Intelligence

WannaCry cyber attack cost the NHS £92m as 19,000 appointments cancelled [Telegraph, 2018]

Cybersecurity Facts

Frequency of **DDoS attacks** increased more than 2.5 times between 2014 and 2017 [Kaspersky 2018]

DDoS attacks averaged between **$ 20,000 - $ 40,000 per hour** [Kaspersky 2018]

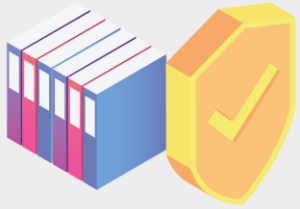
Cyber threats are increasing

Financial losses

34% of businesses hit with **Ransomware** took a week or more to regain access to their data [Symantec 2018]

The global Ransomware damage costs are **totaling around $ 11.5 billion** [Cybersecurity Ventures 2019]

CYBER SECURITY



Education, Prevention

Monitoring, Maintenance

Remediation, Insurance

Cybersecurity Economics' Basics

- Many problems plaguing cybersecurity are economic in nature
  - Systems fail because the organizations often fail to assess the risks of failure
  - Regulatory interventions may be necessary to strengthen cybersecurity measures, hardening, or awareness (the least)
    - *E.g.*, based on ENISA, ISO, and NIST
- Different costs have to be considered during the planning on cybersecurity support measures

$$\underbrace{Risks}_{\substack{\text{financial loss} \\ \text{reputation loss}}} \rightarrow CAPEX + OPEX$$

CAPEX: Capital Expenditures, OPEX: Operational Expenditures

New Approaches

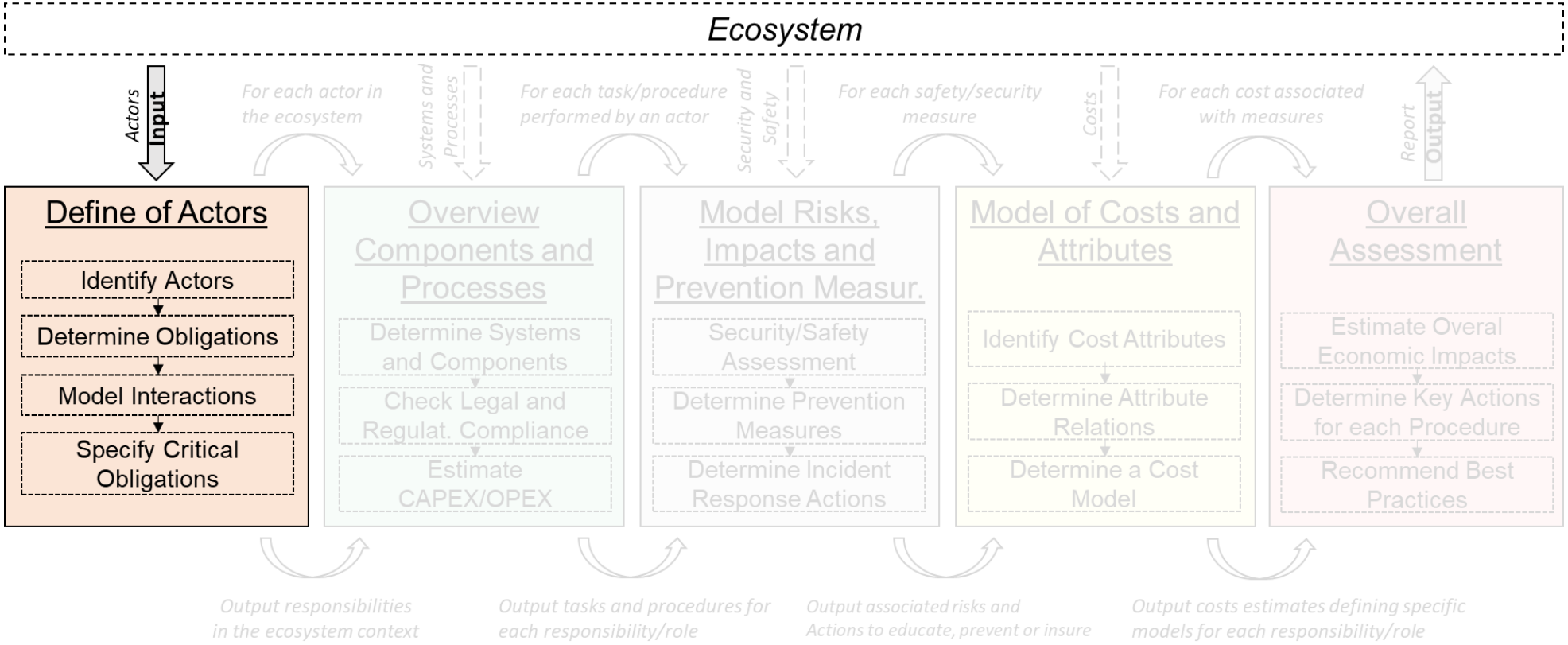
SEConomy Framework

SEConomy Framework Overview

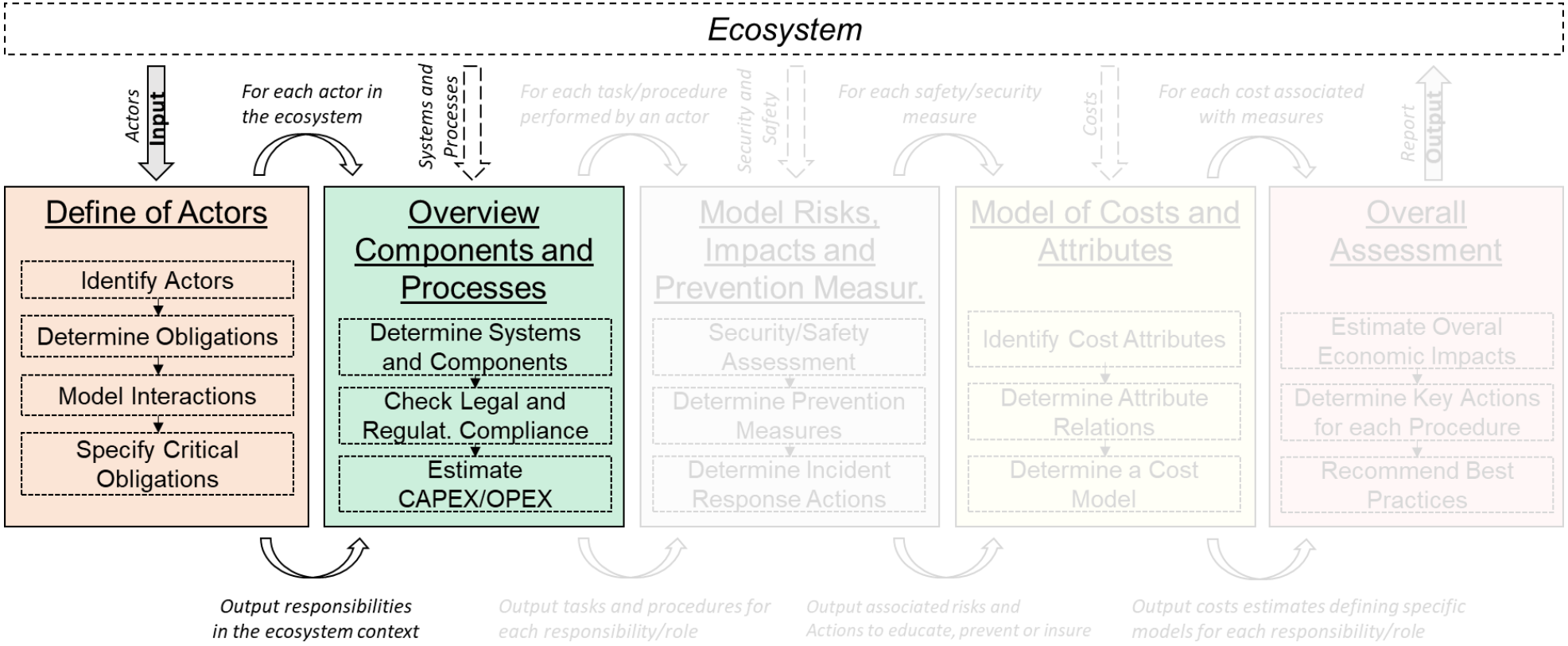
- Identify security risks and associated costs
  - Mapping/modelling specific attributes and their relation
- Determine impacts of cyber (in)security in the economy
  - Education, prevention, remediation, insurance

- SEConomy is a framework to assess cybersecurity economics
  - Structured view on critical actors, roles and processes, and their associated critical tasks
  - Map of risk-dependencies between systems and related systems/subsystems
  - Associate time-dynamics with classes of costs

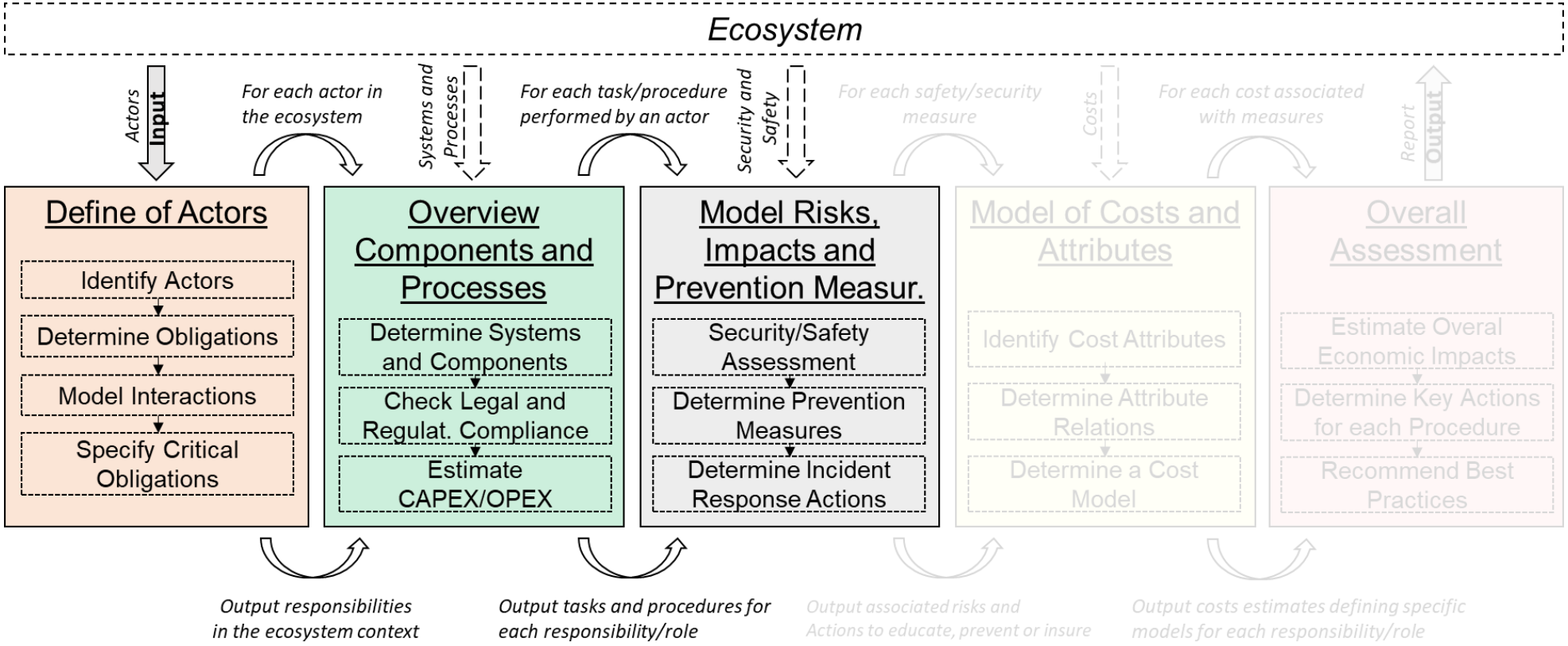
Step-based Approach



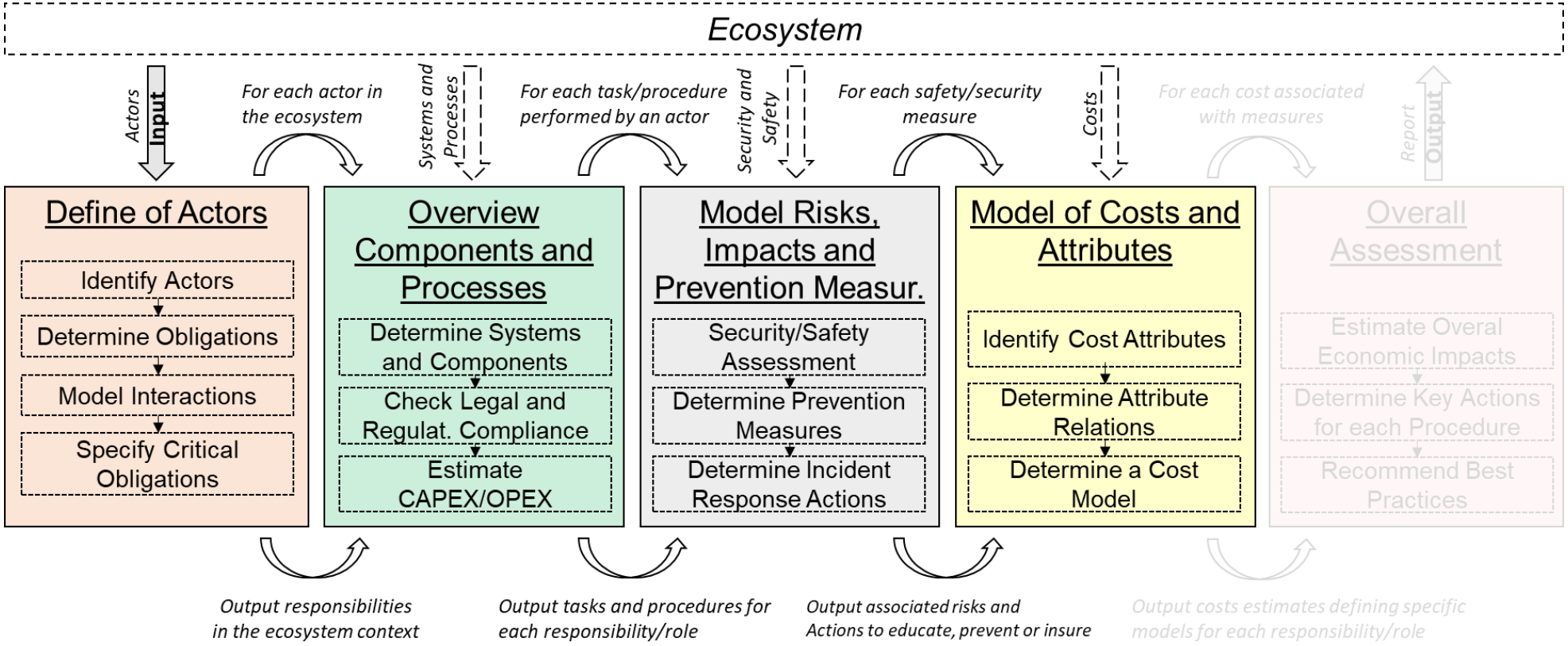
Step-based Approach



Step-based Approach



Step-based Approach



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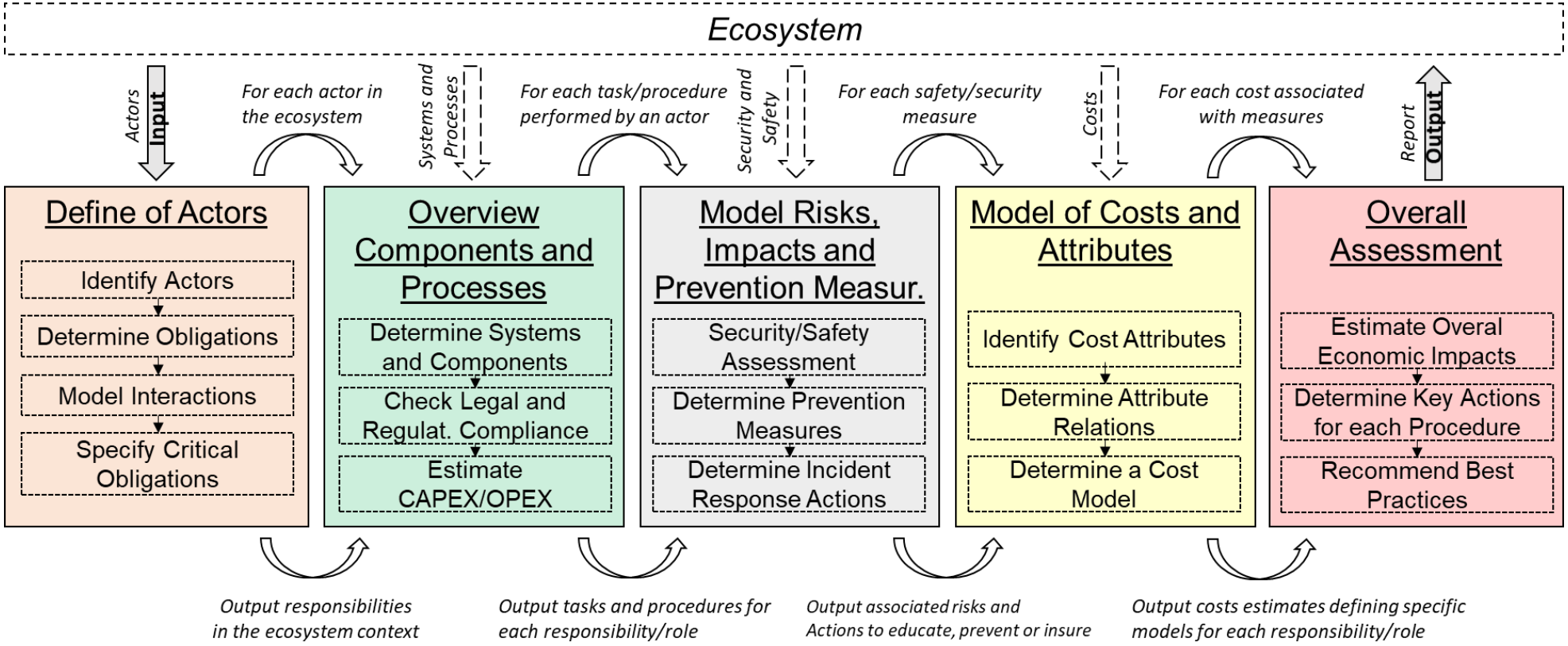

Overall Cost Assessment

Algorithm 1: Overall Economic Assessment (OEA)

```
1  begin
2      for each Actor ∈ Ecosystem:
3          for each Role ∈ Actor:
4              for each System ∈ Role:
                   /* Correlation between linked systems in Equation 1  */
5                  p(x) ← dependence(System, ∀ linkedSystems)
                   /* Estimate exposure costs in Equation 2             */
6                  threat_costs ← T_costs(A, p(x))
                   /* Estimate mitigation (Proactive and Reactive) costs
                      in Equation 3                                     */
7                  mitigation_costs ← PMCcosts(A)
8                  mitigation_costs ← RMCcosts(A, p(x))
                   /* Get Overal Economic Assessment (OEA) in Equation 4
                      */
9                  OEA ← ROSI(threat_costs, mitigation_costs, InitSecCost)
```

$$ROSI = \Delta T * \sum_{i=1}^{N_{System}} \frac{(T_{costs} * RMC) - PMC}{PMC}$$

Discussion and Conclusions

Conclusions

- Cybersecurity economics involves a broad of activities
  - Education, prevention, monitoring, maintenance, remediation, insurance
- It is critical to map systems and processes and their correlations as well as related costs
  - Novel frameworks, standardizations, and techniques
  - Training and education focusing on the demands and threats of the different sectors
- Approaches that help during the decision process and planning of cybersecurity are crucial for stakeholders
  - e.g., Customers, companies, and cyber insurers

Hands-on Exercise

Hands-on Exercise

- CONCORDIA internally selected Knowledge and Skills linked to LO3 (Economics and Business)
- Top-20 Knowledge
- Top-10 Skills

- Which LO3 Knowledge and Skills are important for your industry sector?

https://concordia.monitorboard.nl

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