Cybersecurity Competence Building Trends

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Context

Challenges

- Threats to institutions, business, CI
- Multidisciplinary area (technology, law, diplomacy, economy, management, psychology, media)
- Fast-changing environment

Opportunities

- Driver for employment
- Economic growth
- Global competitiveness

Context

Developing national capacities and competences

BY

Transforming the national labour market to meet the changing environment

BUT

Building qualified labour goes beyond traditional education and one-off training courses

Research

- *Inquiry*: FDFA inquiry on ‘Promote cybersecurity competence building in Switzerland through lessons learned abroad’
- *Objective*: contribute to strengthening cybersecurity skills and competences in Switzerland (especially re. CI)
- *Task*: Review of trends and policy instruments of 10 OECD countries on cyber competence building that could feed into NCS

Methodology

- *Problem:* developing human skills and competences through training and education for technological and organisational measures to counter cyber-threats
- *Methodology*: Qualitative research (July-October 2015) based on review of the literature, content analysis of (open) documents, secondary analysis and statistics
- *Case selection*:
  - *Pre-set countries*: Estonia, Israel, Republic of Korea, the Netherlands, UK and US
  - *Added countries*: Austria, Finland, France and Germany

Key findings

- Countries observe both **risks and opportunities**: cyber-preparedness and global industry competitiveness
- Combination of **long-term and short-term** approaches to transforming labour markets
- Trends heavily based on **PPP** (development of curricula, certification, capabilities, regional hubs):
  - strategic lead and incentives by **government**
  - funds and cutting-edge technology by **private sector**
  - knowledge, outreach and research potential by **academia**

Lead trends

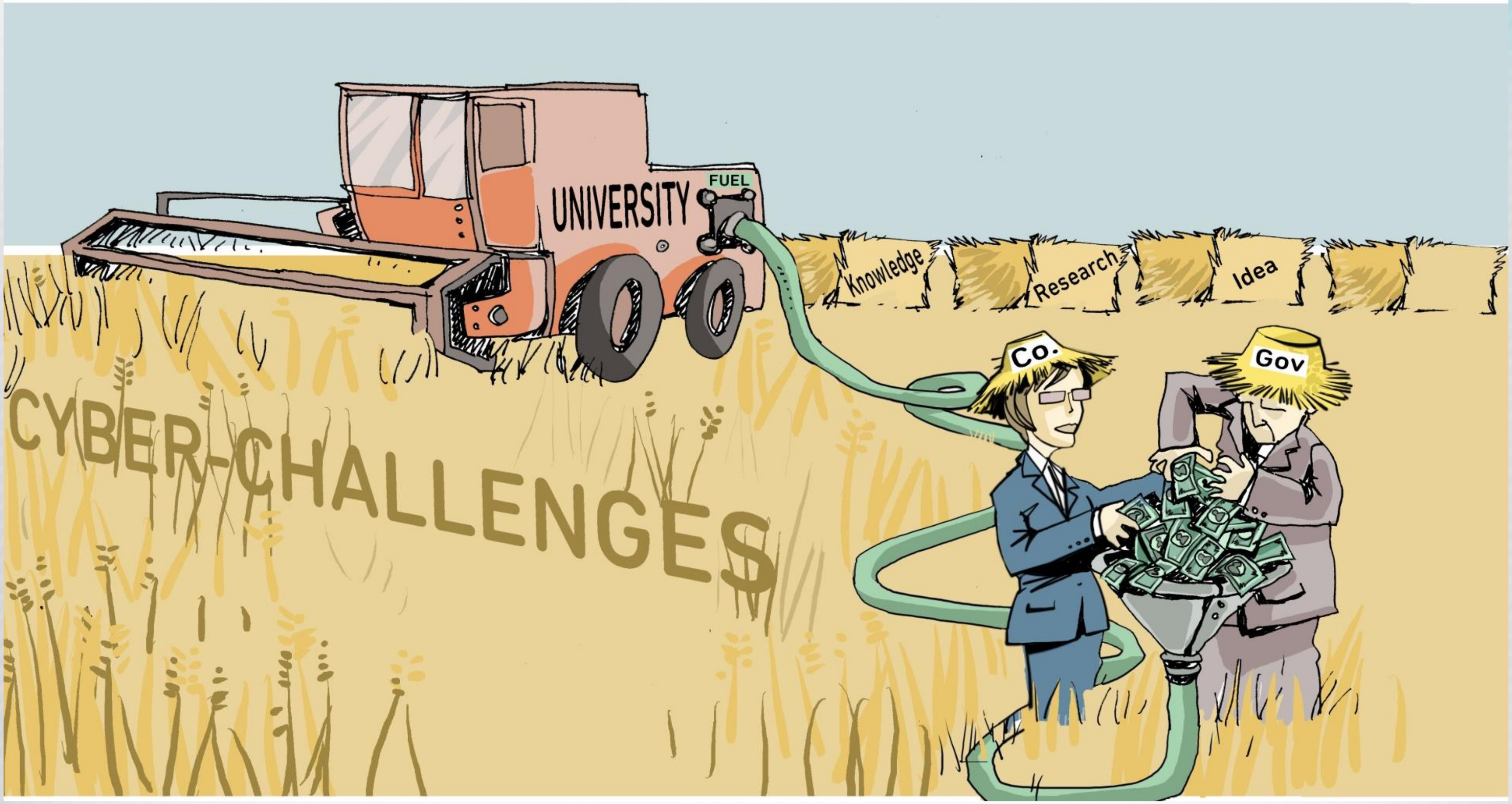
Promoting competence building at universities		
University programs supported by the government	Labelling of universities	Regional development

Competence building through professional training				
State personnel training	Collaboration w/ professional certification bodies	Improving the competences of the private sector (SME and CI)	Manager and decision-making level training	Knowledge frameworks, job descriptions and professionalization

University programs supported by the government

- Strong PPP element
- Supported by government (specific Ministry)
- Economic growth is aimed
- Long term development
- Research Lab & Network development

University programs supported by the government

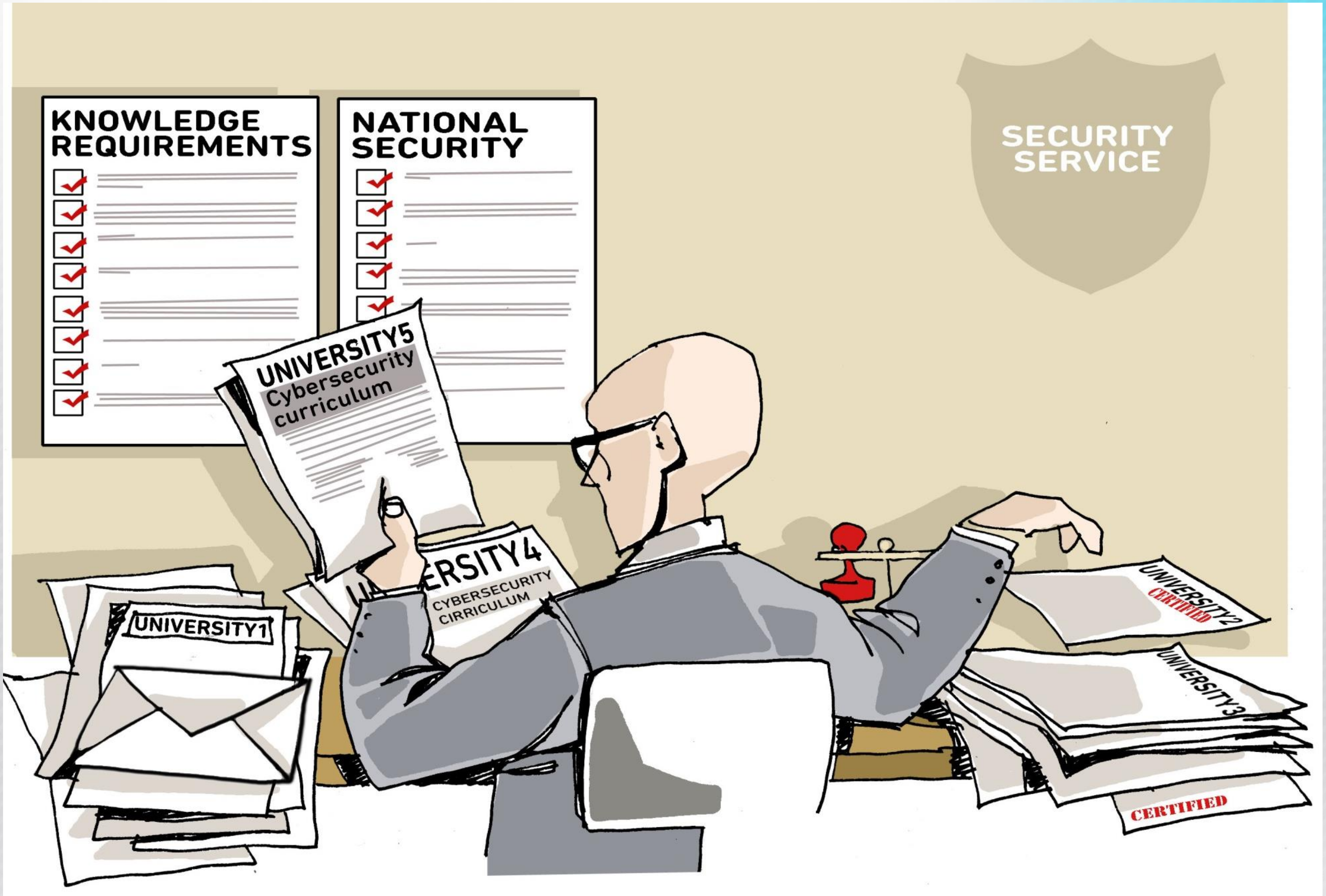


Labelling of universities

- Student advantage (tuition fees)
- University advantage (attract new students with image, potential facilitated research funding, research network, establishing programs)
- Government advantage (training for future employees, screening of future employees, potential say to research directions)
- Disadvantage: potential loss of independence and link with politics (real and/or reputational loss)

Example: Center for Academic Excellence in Defense Education (CAE-CD) (US)

Labelling of universities

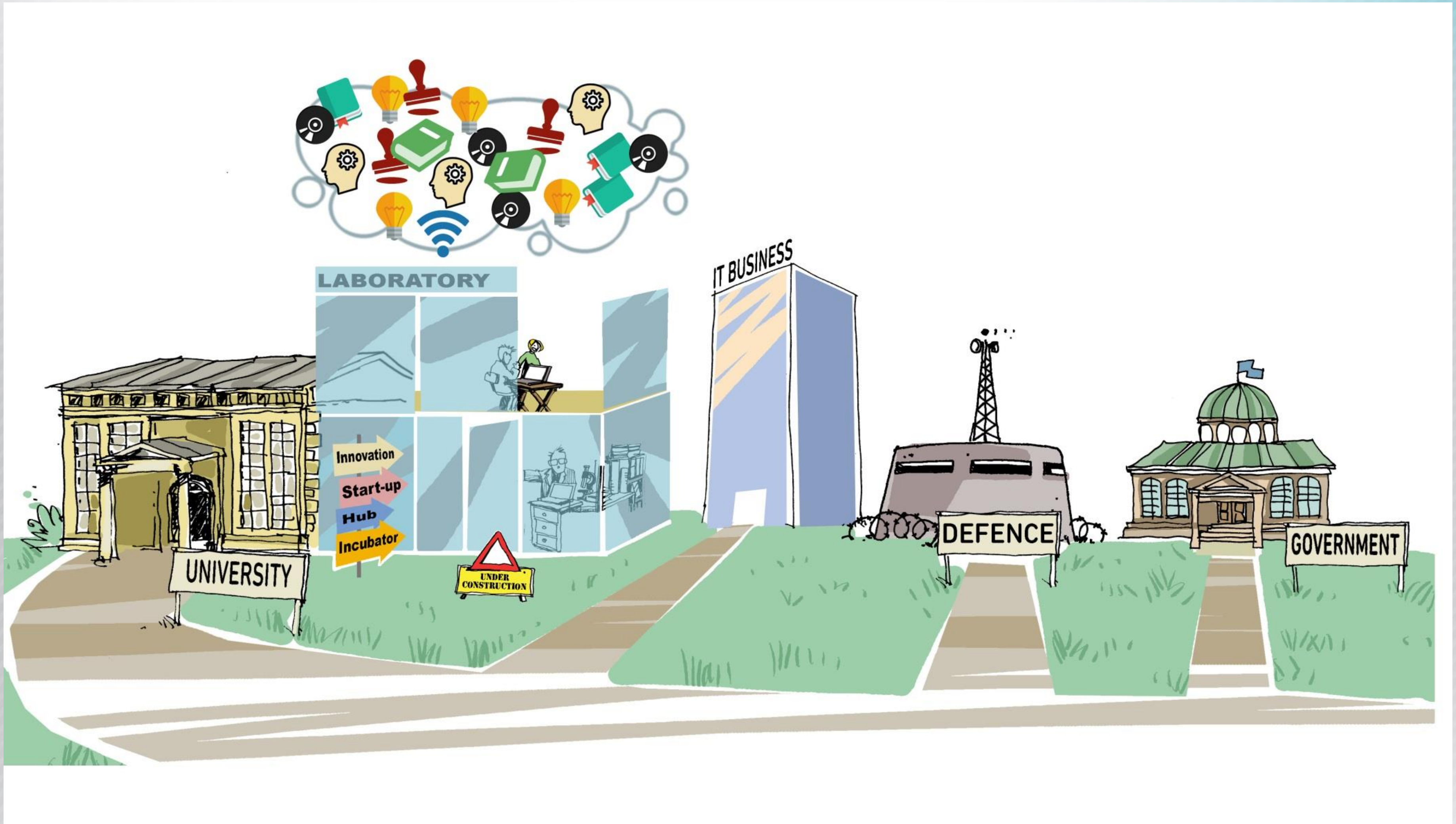


Regional development

- Developing universities, research labs, innovation hubs, labs, joint ventures
- Need for funding: regional development and use of national and supra-national and/or research funding (especially private sector)
- Never a ‘totally’ new place: located in regions with lead universities and political and economic relevance
- Depends on context and geopolitical situation

Example: CyberSpark Industry Initiative at Ben-Gurion University in Be’er Sheva (Israel)

Regional development



State personnel training

Extremes: state training vs private training

- Government regulatory institution trains specialists:
  Example: ESSI certificate by ANSSI- CFSSI (France)

  + control, highly specialized

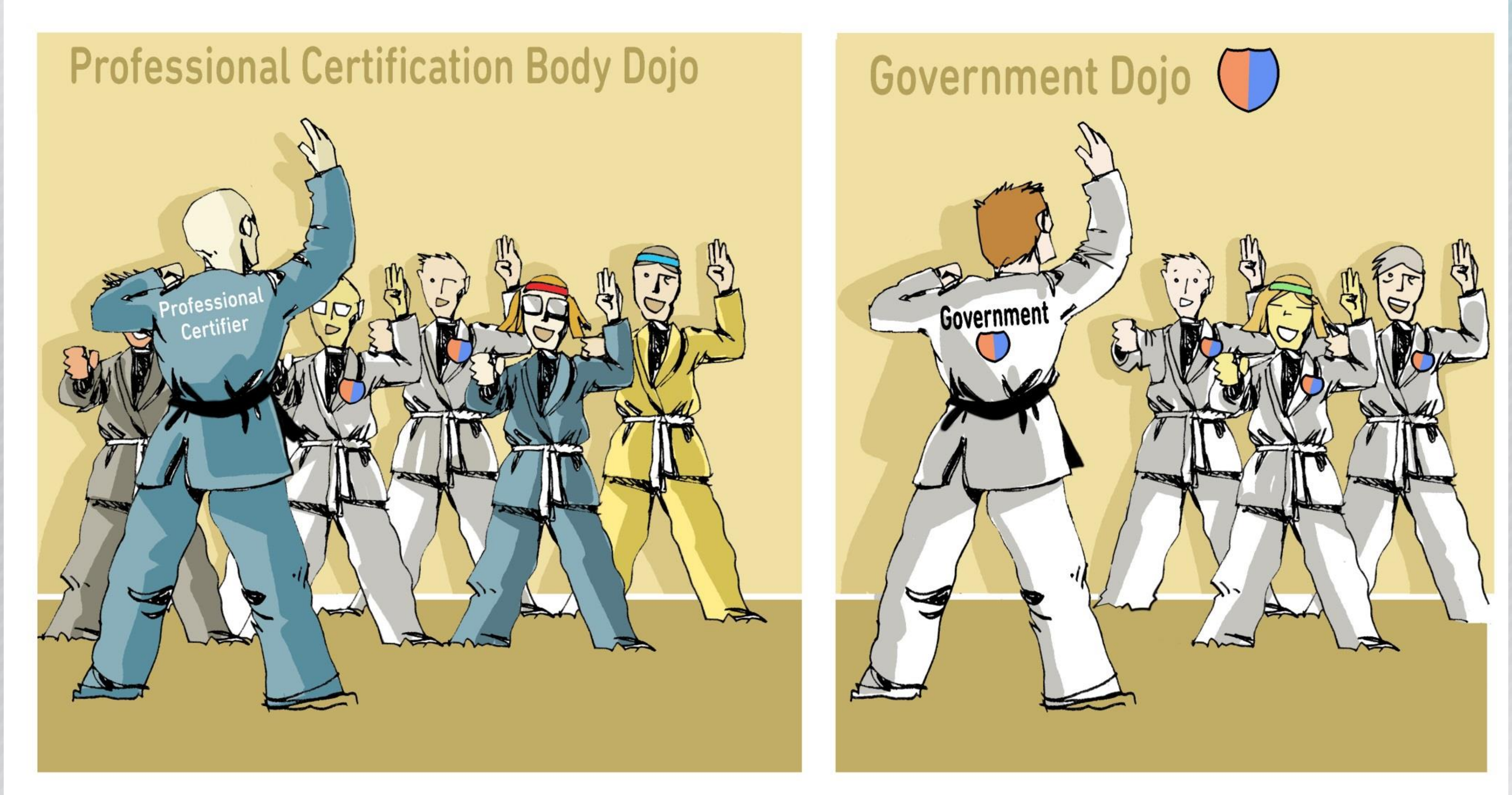
  – costly, high labor toll on regulatory institution, potentially longer to adapt, workforce mobility

- Use of professional certification bodies:
  Example: US DoD Policy 8570.1 – 8410 requirements (US)

  + low cost of adaption certification (technical experts), ‘soft’ standardization (public-private, national-international), workforce mobility, workforce reallocation time

  – takes time to decide on providers and/or certificates, costly for trainees (financial)

State personnel training



Collaboration with professional certification bodies

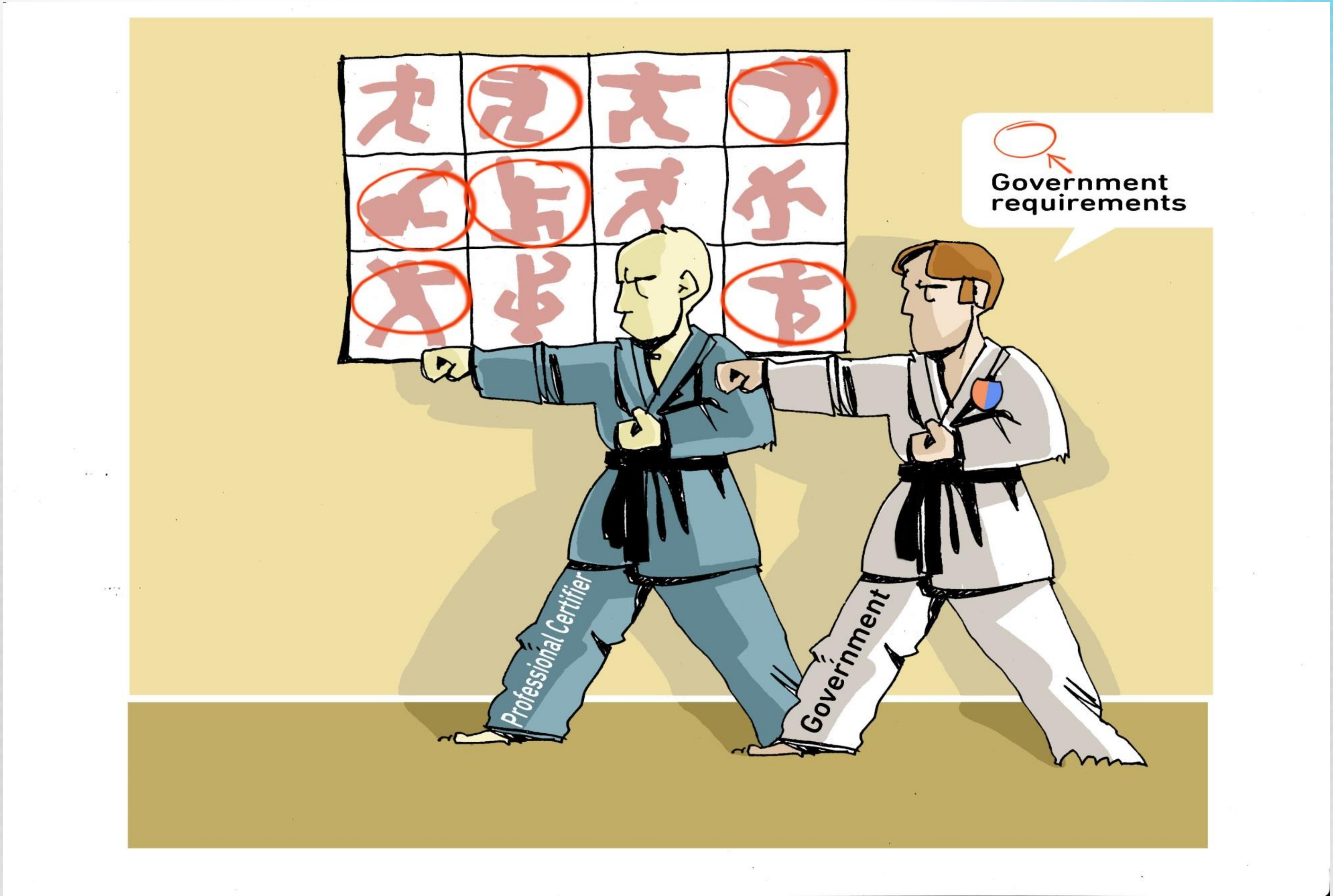
Creating a certificate for national needs

+ creates certificate adapted to national legal framework, advantages of professional certification bodies,

– needs national legal framework (takes time, commitment), suited for national not international, and need for ‘critical size’

Example: BSI Cybersecurity Practitioner (Germany)

Collaboration with professional certification bodies

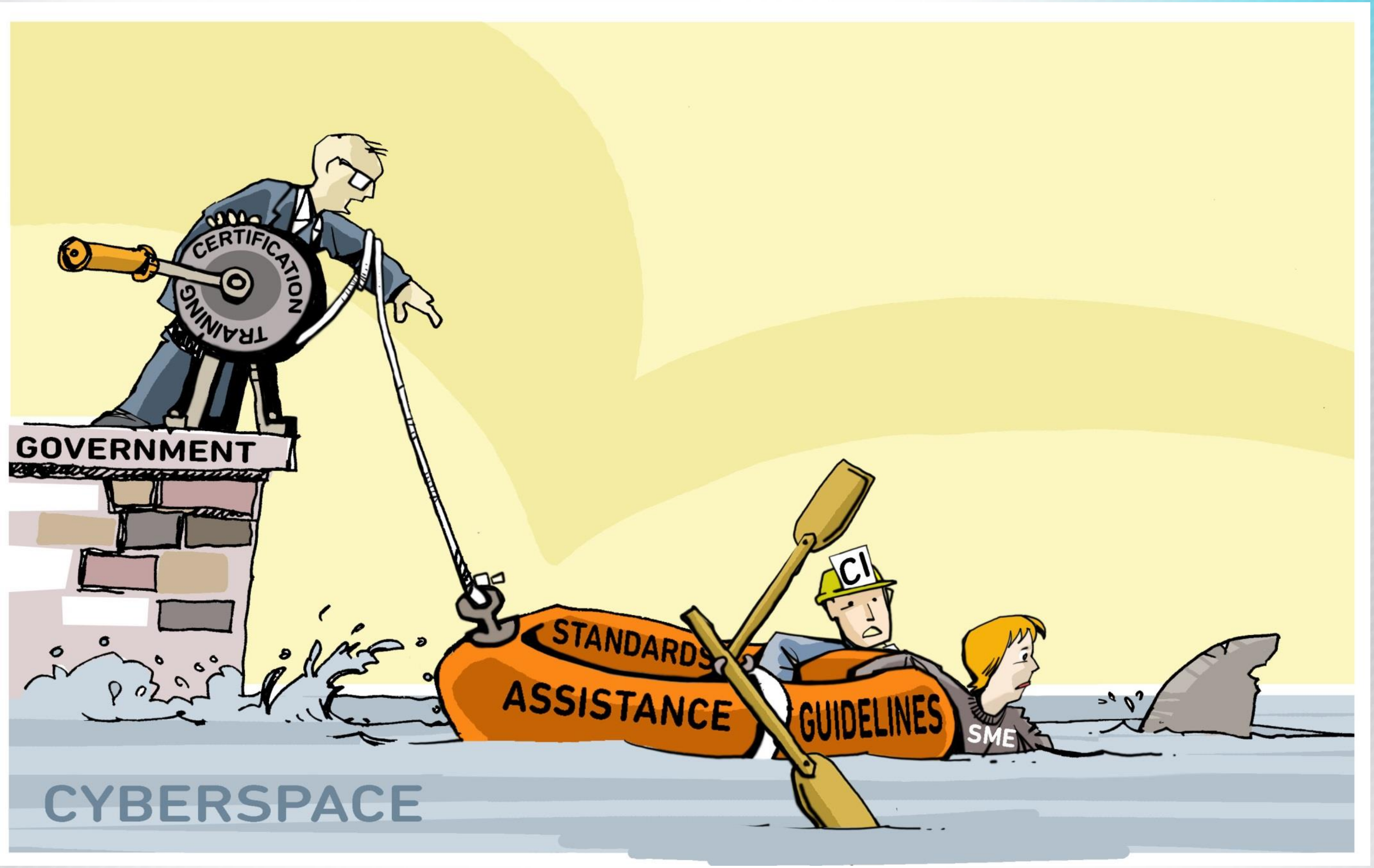


Improving the competences of the private sector

- Especially for SME and CI
- Incident handling and prevention framework (using professional certification bodies)
- Frameworks and standards for private sector
- Government subcontractors mandated to implement
- Securing the chain
- Awareness training

Example: 'Cyber Essentials' - standards/ requirements and Certification for SME (UK) & 'Référent en cybersécurité' guide with standards by ANSSI (France)

Improving the competences of the private sector

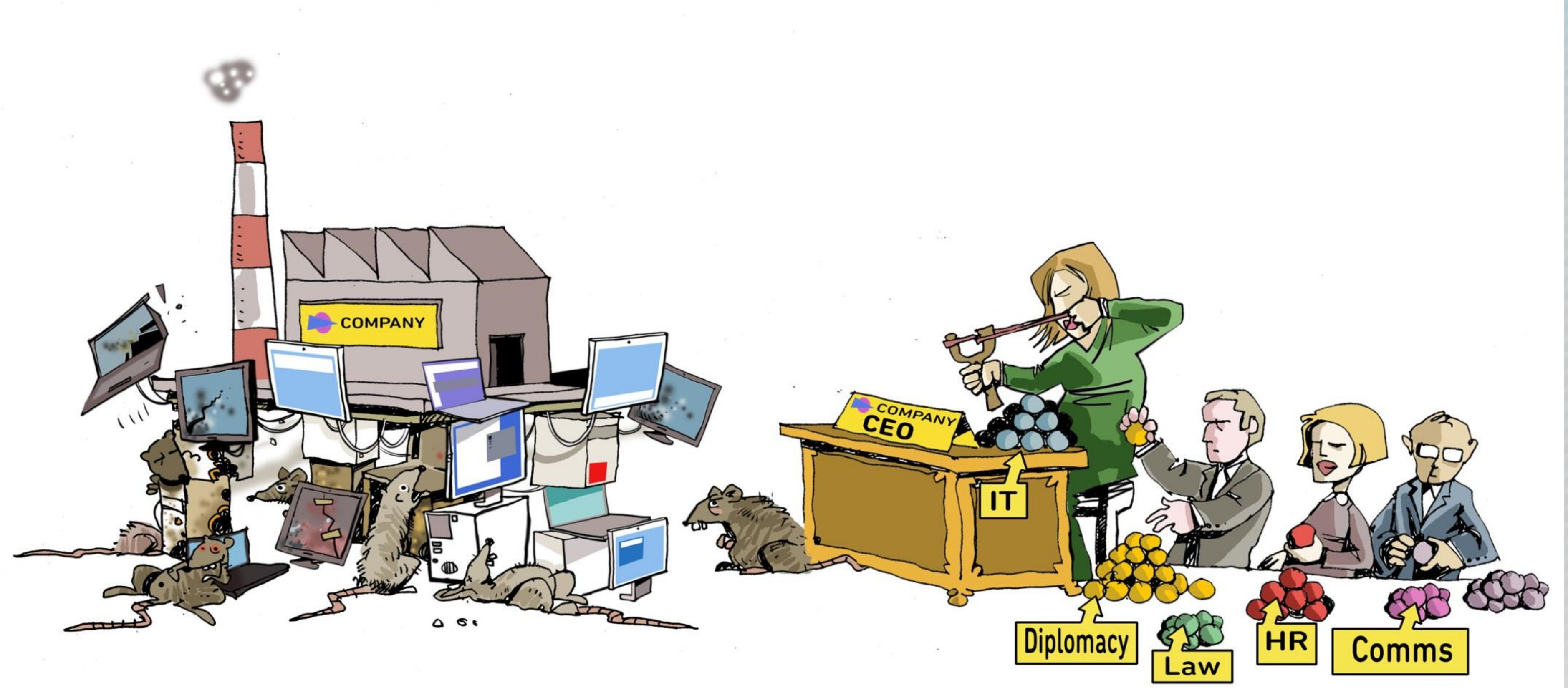


Manager and decision-making level training

- Addressing awareness among CEO & decision-makers
- Multidisciplinary: politics, regulation, business management
- Helps deciding on investments in IT and cybersecurity sectors in institutions
- Need for quick and applied training

Example: Executive Academy within CyberSpark (Israel) & Master's degree in Cybersecurity at JyvSecTec (Finland)

Manager and decision-making level training



Knowledge frameworks and job descriptions

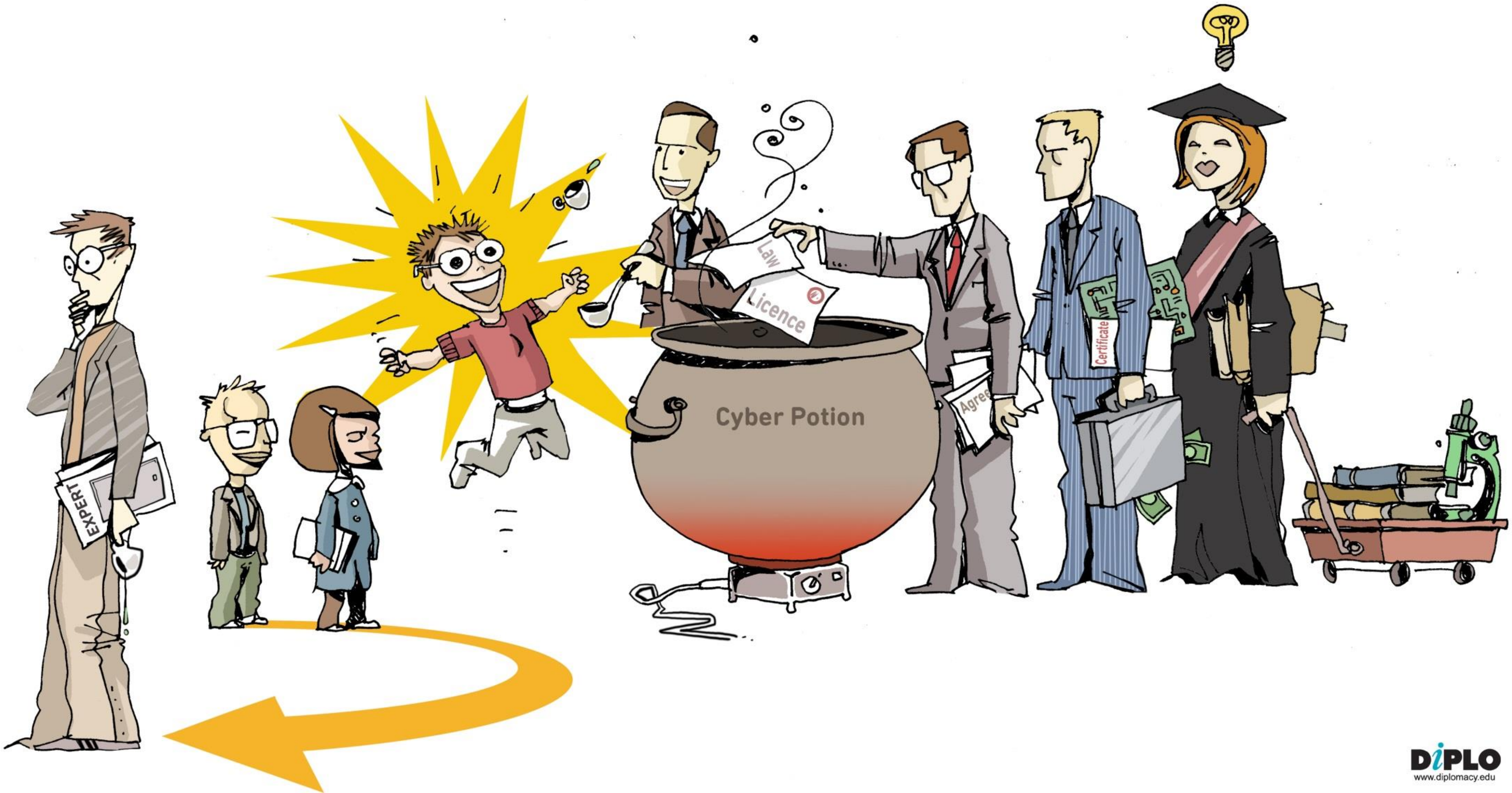
- Lack of understanding of what is and what will become cyber competence
- Defining tasks and required knowledge
- Allowing for recombination and evolution
- Helps employer, employee and HR for training management

Example: 'National Cybersecurity Workforce Framework 2.0' by the National Initiative for Cybersecurity Education (US)

Knowledge frameworks and job descriptions

JOBS
JOB 1
Job description:
3.000 $
Cybersecurity
Job description:
UNKNOWN
36.000 $
JOB 2
Job description:
2.400 $
Graduated

Conclusion



Full paper:
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