Outsourcing in data science and AI

Opportunities and risks

Bertrand Loison

Vice-Director at Swiss Federal Statistical Office

Head of Data Science, AI & Statistical Methods Division

IT-Beschaffungskonferenz 2022 - «Make or Buy? Make and Buy!», Bern, 24 August 2022
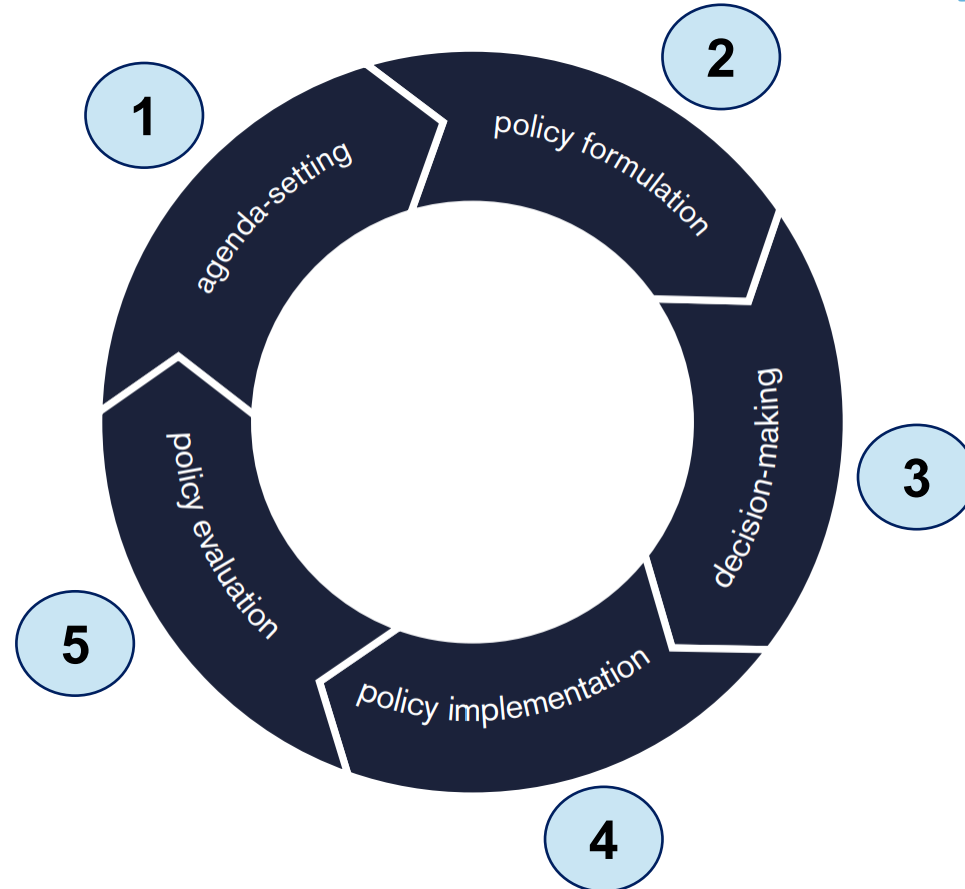
Agenda

1. **The potential of data science and AI in the public sector**

2. **Opportunities and Risks of data science and AI in the public sector**

3. **Make or Buy Decision?**

4. **Responses from the Federal Administration**

Schweizerische Eidgenossenschaft
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Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Bundesamt für Statistik BFS
Office fédéral de la statistique OFS
Ufficio federale di statistica UST
Uffizi federal da statistica UST
Federal Statistical Office FSO

Data Science
Competence Center DSCC

The Use of Data Science and AI by the Public Sector - #1

Source: The five stages of the policymaking process or cycle (from Howlett & Giest, 2015)

Public Policies

- Public transport
- Energy
- Migration
- Finance
- Education
- Health
- Social security
- Justice
- Telecommunication
- Customs
- Defense
- ...

The Use of Data Science and AI by the Public Sector - #2

Evidence-based policy

- Estimating and assessing the impact of policies
- Improved weather forecasts
- Prediction of the evolution of trends
- Higher resolution statistics
- Real time statistics and monitoring
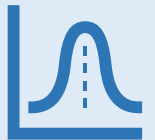
AI/ML assisted tools

- Anomaly and fraud detection
- Chatbots
- Data matching
- Data preparation
- Data plausibility checks
- Satellite image classification

Data science and AI are based on statistical models.

Safe and scalable computing and storage infrastructures

The Use of Data Science and AI by the Public Sector - #3

Transport (e.g. use of **sensors on highways** to evaluate traffic in real-time.)

Prices (e.g. producing **consumer price indices** using Scanner data and web scraping)

Agriculture (e.g. producing **crop statistics** from Earth Observations and data pipelines)
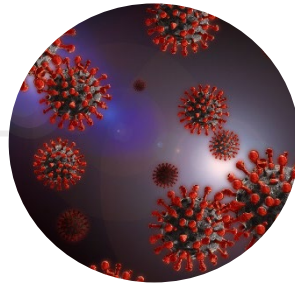
Statistics (e.g. producing **tourism, migration, population, and transport** statistics using mobile phone data)

The Use of Data Science and AI by the Public Sector - #4

Education (e.g. using data science **to mitigate student dropout**)

Health (e.g. using data science **to predict pandemic situation**)

Environment (e.g. using data science **to reduce carbon footprint**)

Tax Policy (e.g. using data science **for fraud detection**)

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Opportunities and Risks of AI in the Federal Administration

Data Science and AI Literacy

Data

Trust, Ethics, and Transparency

Algorithms

Training, Competencies, and Capacity Development

Technology / Infrastructure / Security
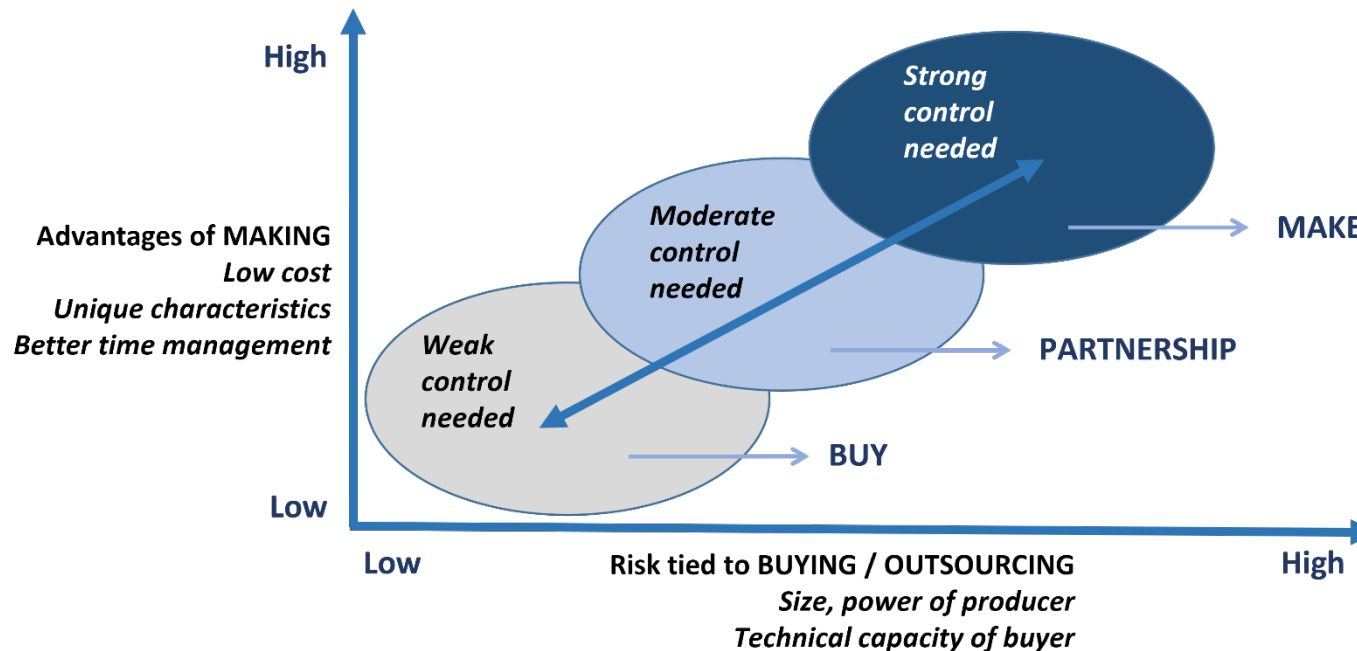
Community

Governance

Agenda

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Make or Buy Decision? - #1

Advantages of MAKING
Low cost
Unique characteristics
Better time management

High

Low

Low   Risk tied to BUYING / OUTSOURCING   High
       Size, power of producer
       Technical capacity of buyer

Weak control needed

Moderate control needed

Strong control needed

MAKE

PARTNERSHIP

BUY

Source: Entrepreneurial Insights

- When you buy an AI-System you are buying a technology... but not only. You are buying a technology...

- ... that will very quickly be able to learn from its algorithms and your data.

- ... that will make business recommendations for decision-makers or even make decisions by itself.

- ... that will increase efficiency in your organization by having the capacity to replace the work that has been previously done by workers.

- ... that you will have in one way or another to assess, to evaluate because finally you will have to trust it. If you don't, you spent money for nothing.

Make or Buy Decision? - #2

- In a world where decisions are made by algorithms, it is especially crucial for the public sector to ==maintain control over not only the algorithms used within the government but also the quality of the data used to feed those algorithms==.

- Understanding how algorithms work and ==how the AI-System has been designed== will be one of the crucial aspects of buying AI-Systems now and in the future.

- By making the Make and Buy decision concerning an AI-System, you decide how far you want to trust your provider (insourcing or outsourcing). At the end of the day if the provided AI-System has bias you will have ==to clarify the responsibility== for that.

- The algorithms used by an AI-System need to be ==maintained over time==. People are changing jobs, enterprises can fall into bankruptcy or be redeemed.

- In the case of developing AI Systems, relaying on a ==trusted partner or labels== that can assess the quality of an algorithm or the trustworthiness of a partner will be necessary.

- ==Edge Computing and edge analytics== are on their way and will complexify the question of ==digital sovereignty==.

- Generalized AI-Models are already offered through APIs (e.g. translation). Is the future of AI-Systems following the rules of off-the shelf software where you buy ==subscription== (license) for having access to trained models?

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Opportunities and Risks of AI in the Federal Administration

📚 **Data Science and AI Literacy**

🧭 **Trust, Ethics, and Transparency**

🎓 Training, Competencies, and Capacity Development

🕸 Community

Data

Algorithms

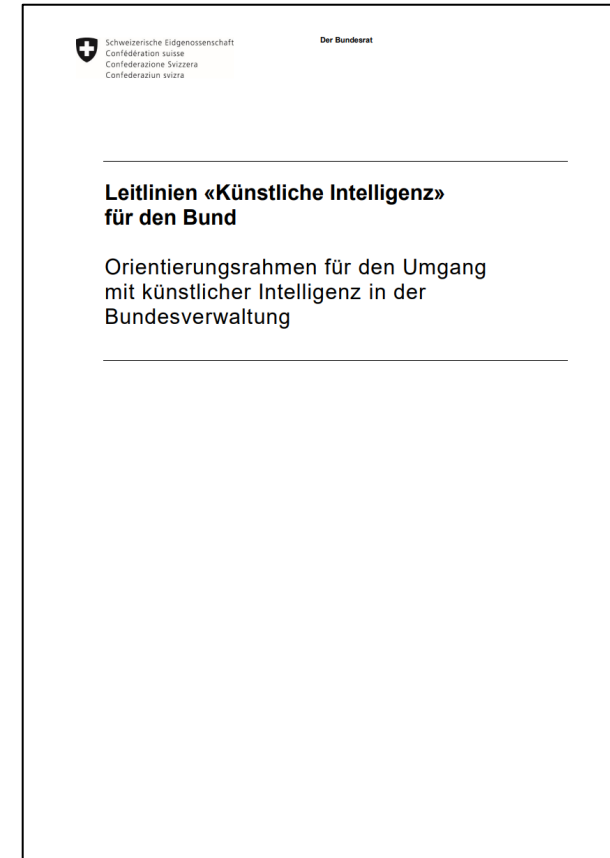**Technology / Infrastructure / Security**

Governance

Data Science, AI and Public Trust - #1

"Support for government use of AI correlates moderately with ==trust in government==. ==Trust in institutions is essential== if governments are to gain the support needed to roll out AI capabilities."

Source: Boston Consulting Group (BCG), The Citizen's Perspective on the Use of AI in Government

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Der Bundesrat

Leitlinien «Künstliche Intelligenz» für den Bund

Orientierungsrahmen für den Umgang mit künstlicher Intelligenz in der Bundesverwaltung

Bern, 25.11.2020 - Der Bundesrat hat am 25 November 2020 die Leitlinien für den Umgang mit der künstlichen Intelligenz durch die Bundesverwaltung verabschiedet. Die Leitlinien sollen als Orientierungsrahmen dienen. Sie wurden von der interdepartementalen Arbeitsgruppe künstliche Intelligenz unter Federführung des Eidgenössischen Departements für Wirtschaft, Bildung und Forschung WBF ausgearbeitet.

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Data Science, AI and Public Trust - #2

- **Den Menschen in den Mittelpunkt stellen:** Bei Entwicklung und Einsatz von KI sollen Würde und Wohl des Menschen sowie das Gemeinwohl an vorderster Stelle stehen. Besondere Bedeutung kommt dem Schutz der Grundrechte zu.

- **Rahmenbedingungen für Entwicklung und Anwendung von KI:** Der Bund gewährleistet weiterhin bestmögliche Rahmenbedingungen, so dass die Chancen der KI für eine Stärkung von Wertschöpfung und nachhaltiger Entwicklung genutzt werden können. [...]

- **Transparenz, Nachvollziehbarkeit und Erklärbarkeit:** Auf KI gestützte Entscheidungsprozesse sollten so gestaltet sein, dass sie überprüfbar und nachvollziehbar sind.

- **Verantwortlichkeit:** Um im Falle eines Schadens, eines Unfalls oder einer Gesetzeswidrigkeit die Verantwortlichkeiten klären zu können, muss beim Einsatz von KI die Haftung klar definiert sein. Die Verantwortlichkeit darf nicht an Maschinen delegiert werden können.

- **Sicherheit:** KI-Systeme müssen sicher, robust und resilient konzipiert sein, um eine positive Wirkung zu entfalten und nicht anfällig für Missbrauch oder Fehlanwendungen zu sein.

- **Aktive Mitgestaltung der Gouvernanz von KI:** [...]

- **Einbezug aller betroffenen nationalen und internationalen Akteure:** [...]
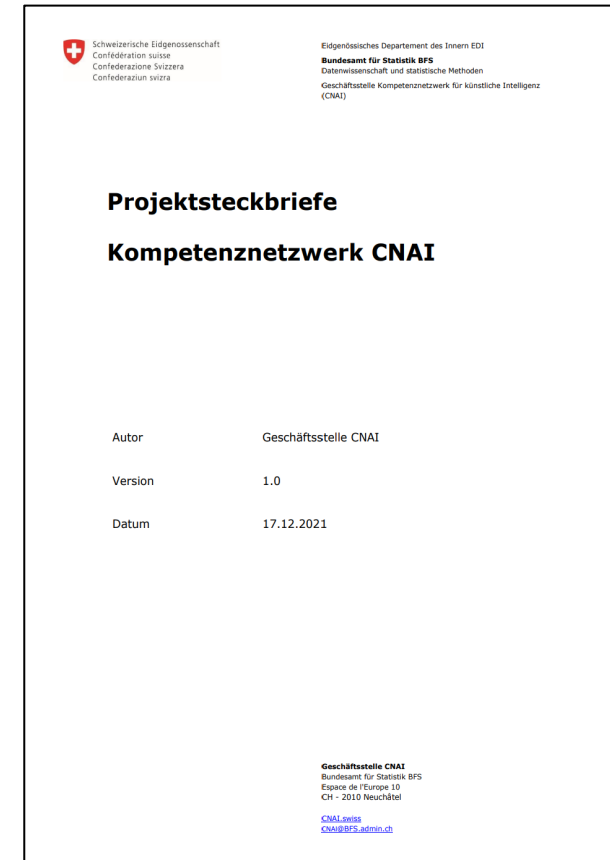
Trust, Ethics, and Transparency - #3

21.4645 **POSTULAT**

Für mehr Neutralität der Algorithmen sorgen

21.3239 **INTERPELLATION**

Braucht es eine unabhängige Kontrollinstanz für Algorithmen (Anwendungen künstlicher Intelligenz)?

Project database

- The CNAI (FSO) maintains a list of AI-relevant projects in the Federal Administration to create an overview of possible topics and methods and also to facilitate the exchange of experience.

- The project overview also creates transparency about AI projects available in the Federal Administration.
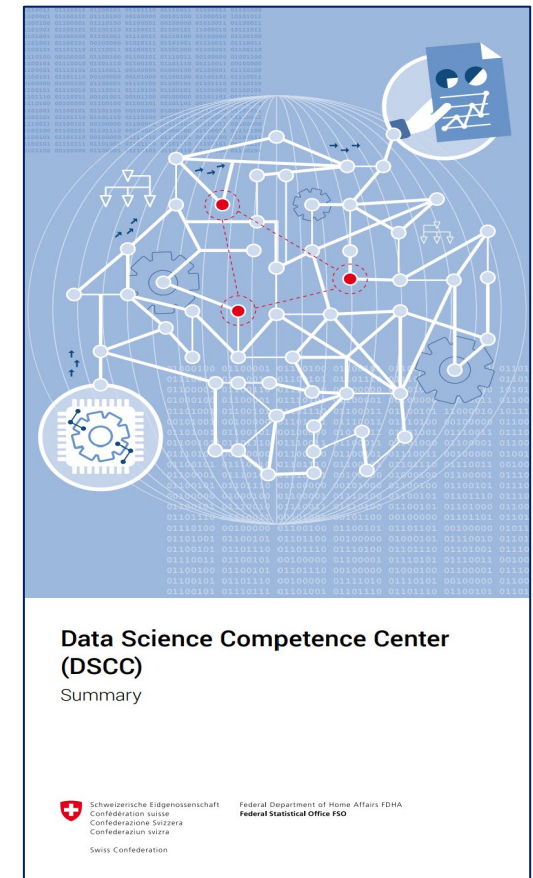

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Eidgenössisches Departement des Innern EDI
Bundesamt für Statistik BFS
Datenwissenschaft und statistische Methoden
Geschäftsstelle Kompetenznetzwerk für künstliche Intelligenz (CNAI)

Projektsteckbriefe

Kompetenznetzwerk CNAI

Autor	Geschäftsstelle CNAI
Version	1.0
Datum	17.12.2021

Geschäftsstelle CNAI
Bundesamt für Statistik BFS
Espace de l'Europe 10
CH - 2010 Neuchâtel

CNAI.swiss
CNAI@BFS.admin.ch

Algorithms – Explainable Data Science and AI - #4

Data Science Competence Center (DSCC) at FSO

- The Data Science Competence Center (DSCC) is a service provider within the federal administration and as such, provides data science services and expertise to the entire Swiss public sector and administration.

- The competence center builds on the existing synergies of an interconnected network of academic partners, in close collaboration with the public research and development sector, to provide state-of-the-art data science expertise.

- The Data Science Competence Center (DSCC) is an international team of 28 scientists with an excellent academic background in various areas of data science and AI, such as mathematics, statistics, data engineering, computer science, software development, business analytics, and decision-making.

Data Science Competence Center (DSCC)
Summary

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of Home Affairs FDHA
Federal Statistical Office FSO

Swiss Confederation

Data Science Competence Center DSCC

Business Model Canvas

Key partners

Affiliation
Federal Statistical Office (FSO)

Infrastructure
Office of Information Technology, Systems and Telecommunication (FOITT)

Universities
EPFL
ETHZ
University of Neuchâtel

Network
Competence Network for Artificial Intelligence (CNAI)

Data Science for public good

Respect for the values of the Rule of Law

Data governance
Data protection
Ethical data analysis
Explainability of algorithms
Neutral and objective approach
Public trust
Reproducibility
Respect for the principles of non-discrimination
Security of information
Transparency

Community building

Multiple public channels
Public website in French, German, Italian and English
Blog posts
Newsletter
Social media presence

FSO internal community
Data Innovation

FSO external community
Data Science for Public Good
Seminars and special interest groups

Skills

Methodological skills
Causal analysis (causal inference)
Evidence-based policy making
Machine Learning and Computer Vision
Minimal Viable Product (MVP) development
Privacy-preserving Data Science
Statistical design, analysis and modeling
Tailoring algorithms to fit specific needs

Technical skills
Building tools for data collection and preparation
Building tools for data visualization and publication
R and Python programming

Data Science as a Service (DSaaS)

Services
Consulting services
Methodological support
Project execution
Quality, ethics and coding guidelines development
Training

Standards
Collaborative, reproducible workflows and scalable processes with Renku platform
Knowledge and best practices transfer
Long term collaboration

Customers and partners

Swiss public administration
Federal administration
Cantonal administration
Communal administration

Structure organization

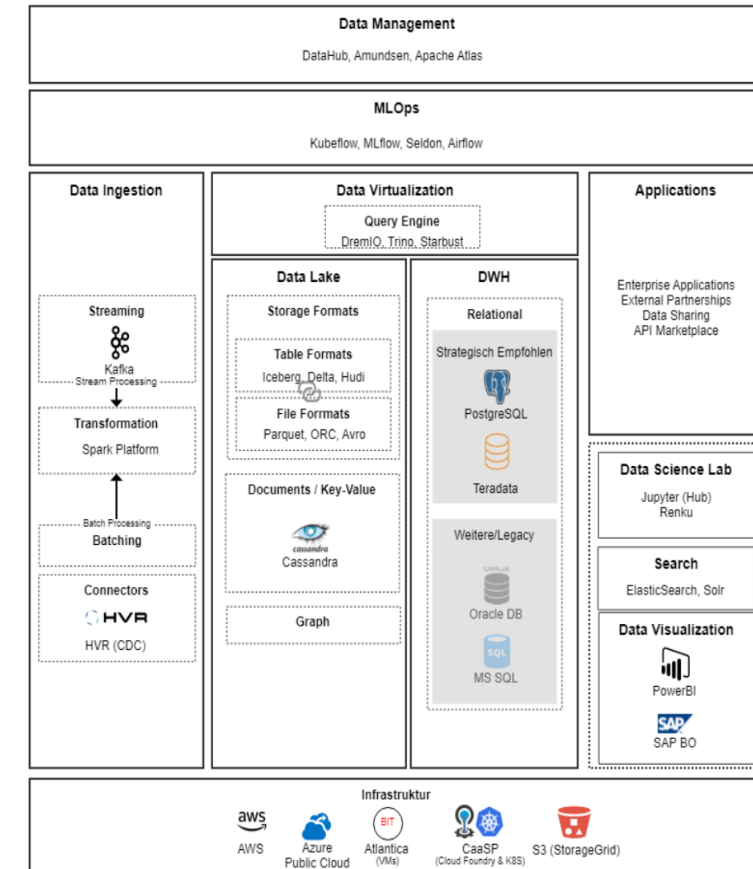Public service organization without economic purpose and with partial cost recovery.

Technology / Infrastructure / Security – FAIR Platform - #6

Federal Office of IT, Systems and Telecommunication (FOITT)

- The FOITT is one of the <mark>internal ICT service providers</mark> in the Federal Administration. It supports the administration by developing and providing efficient, secure, user and public-friendly IT solutions.

- The DSCC is working closely with the FOITT <mark>to set up and operate a modern analytics infrastructure</mark> (Platform) within the federal administration (Data Lab, Data Ingestion, Data Lake, Data Virtualization, Data Visualization, MLOps, Cloud Computing, Tools, IT Security, etc.).

Prof. Dr. Bertrand Loison | Data Science and AI | IT-Beschaffungskonferenz 2022 - «Make or Buy? Make and Buy!», Bern, 24 August 2022

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Diskussionsrunde zu «Make or Buy»

▶ Moderation: Matthias Stürmer, Berner Fachhochschule

▶ Daniel Markwalder, Digitale Transformation und IKT-Lenkung

▶ Prof. Bertrand Loison, Datenwissenschaft und statistische Methoden, Bundesamt für Statistik (BFS)

▶ Dr. Rika Koch, Berner Fachhochschule

«Es ist Zeit für ein Apéro: Prost!»