



## Digital Society Initiative

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# DSI Roadmap 2021

The DSI Roadmap contains formal explanations of the structure and thematic orientation of the DSI. It summarizes the medium- and long-term goals as well as the future vision of the UZH Digital Society Initiative. This document, which is generally updated every two years, is based on the first versions of 2017 and 2019; the introduction has been substantially revised for this edition.

Version May 2021 (after feedback from the Network, Managing Office & Board of Directors): This version will be submitted to the General Assembly 2021 for approval. This document is the English translation of the official German version of the Roadmap.

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## 1 Introduction

### 1.1 Background

Digitalization challenges existing paradigms, enables new forms of research and teaching, and requires new skills in a rapidly changing social reality. The UZH Digital Society Initiative (DSI) aims to help shape the digital transformation of society and science. It seeks to position the UZH nationally and internationally as a center of excellence for critical reflection on all aspects of the digital society.

The DSI was conceived in 2015 and has developed as a bottom-up initiative by a working group of professors from all seven faculties of UZH. After the creation of the concept, the DSI was launched at an official ceremony in September 2016 in the presence of the Director of Education of the Canton of Zurich, Silvia Steiner, and the President of the Swiss Confederation, Johann Schneider-Ammann.

In the first year (2016), the DSI focused on working out the formal aspects, and in the second year (2017) on setting up the associated structures. During this early phase, the DSI's rules of procedure, structure, and thematic focus were established, and the various committees were set up. At the same time, the

DSI network had grown to a size of more than 180 researchers from UZH (as of October 2017). Finally, on May 17, 2017, the DSI was officially established by the Executive Board of the University.

In the following three years (2018 to 2020), the activities of the DSI increasingly focused on reflection and research on issues related to the digitalization of society. The focus was on interdisciplinary and interfaculty structures and projects. These had the goal of generating new synergies within the UZH. During this time, the Digitalization Initiative of the Zurich Higher Education Institutions (DIZH) was initiated and implemented. The DIZH was officially launched in 2020, and the DSI contributes significantly to the UZH activities within the DIZH.

As of 2021, the activities of the DSI were consolidated, which was also reflected in an updated agreement on objectives with the Executive Board of the University as of May 2021. Activities were consolidated in the central areas of research (alignment of funding activities with communities), education (implementation of the Studium Digitale and the PhD Excellence Program), communication (new concept), and strategy (various ongoing projects). The DSI also coordinates most of the UZH activities of the DIZH research cluster (including the DIZH Postdoc Call and the DIZH Infrastructure/Lab Call). The current roadmap presented here outlines the planned activities based on the now solidified foundation. The DSI has been formally affiliated with the Office of the Vice President Faculty Affairs and Scientific Information since August 1, 2018, and thus exists as a faculty-independent and cross-faculty unit; from summer 2021, the DSI will be affiliated with the Office of the Vice President Research. The organizational form of the DSI as a cross-faculty unit allows for the flexible advancement of innovative projects.

All seven faculties of the UZH and the Executive Board of the University are represented in the steering committee of the DSI. Currently, more than 500 UZH researchers participate in the DSI (as of March 2021).

## 1.2 Motto

The motto of the DSI is, in a nutshell, to *help shape the digital transformation of society and science*.

## 1.3 Main objectives

The starting point for the DSI is the rapid pace of digitalization, which is subjecting society, the economy, and science to fundamental change. Digitalization challenges existing patterns of thought and action, enables new forms of research and teaching, and requires new competencies in a rapidly-changing social reality. The concern of the DSI is to accompany these processes critically, to recognize the associated risks and opportunities, and to shape the digital transformation in a future-oriented manner. In this way, UZH is to be positioned nationally and internationally as a center of excellence for questions of digitalization.

To achieve this, the DSI works in the following four areas:

- **Research:** The Challenge Areas and Cross Cutting Topics defined in the DSI Roadmap define the key research topics of the DSI. Specific research topics are addressed in currently (2021) nine DSI Communities. In addition, the DSI contributes to the design of research topics by being involved in selection processes for DSI professorships and postdocs, DSI infrastructures/labs, and PhD Excellence Program students.
- **Teaching:** The DSI currently (2021) offers the Studium Digitale for undergraduate students and the PhD Excellence Program for graduate students. Studium Digitale is an online course and has been incorporated into the teaching program of the School for Transdisciplinary Studies at

UZH. It teaches basic digital skills from an interdisciplinary perspective. The DSI Excellence Program for doctoral students is a complementary curriculum to doctoral studies at UZH and prepares students from all disciplines for a world in which interdisciplinary collaboration on digitalization topics is a top priority. Starting in 2021, a Digital Skills Minor for Master's students will be developed.

- **Strategy:** The DSI sees itself as a think tank that addresses and discusses developments in digital transformation that are relevant to society and science. On the one hand, this means that the DSI contributes to the social discussion with strategy papers and media contributions. In recent years, many policy-related articles have been published in the media (e.g., opinion articles in the NZZ). Starting in 2021, the DSI will work on at least one current socially and particularly relevant digitalization topic each year as part of the "DSI Strategy Lab" and publish a policy paper on this topic. On the other hand, the DSI identifies the strategic needs of UZH researchers in connection with the digital transformation and develops solutions up to the prototype stage. Examples of such strategic projects are the "Data Protection & Ethics Self-Assessment Tool" (DESAT) and the survey of UZH researchers' needs around the Data Life Cycle. The latter led to the conception of the "Z-Pool-Tool", a tool for building and managing test persons for (online) research. DESAT is to be integrated into the new UZH standard process for third-party funding management in 2021, and the Z-Pool-Tool is to be implemented in 2022.
- **Communication:** The DSI supports the reflective dialogue on all issues of digital transformation in society. Through communication activities, especially the organization of and participation in public events, the DSI ensures that stakeholders from research, society, politics, and business perceive the DSI as a center of excellence for digitalization. Internal communication activities aim to strengthen the interdisciplinary exchange between researchers. Details on the communicative orientation (including events), the goals and the approach will be mapped separately in the DSI's communication concept (this will be revised in 2021).

In addition to these activities, the DSI strengthens cooperation with other UZH units with comparable objectives in the context of the digital transformation:

- **UZH Innovation Hub:** The DSI and the UZH Innovation Hub contribute to mutual support and joint projects to ensure that innovative research and teaching in the DSI vessels find their way more quickly into the economy and society. The division of tasks provides that all activities for promoting innovations are located at the UZH Innovation Hub, including corresponding communication measures concerning the target groups of companies/start-ups. If the focus is on the social or scientific aspect, the responsibility lies with the DSI. Accordingly, politics, administration, NGOs, and similar are the primary communicative target groups of the DSI; however, the business community is also addressed if social/scientific topics are in the foreground. In particular, the DSI also supports the creation of the Digital Innovation Cluster, which is being established under the auspices of the UZH Innovation Hub. In 2021, both organizations will formulate cooperation in concrete vessels such as the Digital Entrepreneurship Program in a separate document.
- **Digital teaching / School for Transdisciplinary Studies (STS):** In the area of digital teaching, the School for Transdisciplinary Studies (STS) and the DSI work together. The DSI supports the activities of the UZH in the area of digital teaching, especially within the framework of the Digital Skills for You (DISK4U) of the current P8 program of swissuniversities.

## 2 Structure of the Digital Society Initiative

### 2.1 Vessels

The thematic areas in which the DSI is active are structured by the following vessels:

- **DSI Challenge Areas** are clusters of research topics in different societal challenge areas arising from digitalization. There are a limited number of Challenge Areas to prioritize research. Currently, these are: Communication, Democracy, Health, Mobility, and Work. The challenge areas are broad, allowing research into a wide range of questions. Challenge Areas can change if research priorities - represented by the activities of the communities - change in the long term. Appropriate decisions are made at the DSI General Assembly.
- **DSI Cross Cutting Topics** address both methodological issues and topics relevant to all Challenge Areas. In order to interact with the other structural elements, Cross Cutting Topics must provide some benefit to other researchers (e.g., technical expertise, access to data). The number of Cross Cutting Topics is flexible and intended to meet the methodological needs of DSI researchers.
- **DSI Communities** are organized groups of DSI researchers related to the DSI Challenge Areas or DSI Cross Cutting Topics. They organize themselves and are given access to DSI space and funds to initiate or implement research projects, invite fellows, or organize events. These funds are allocated annually by the board of directors based on appropriate proposals from the communities; there is no entitlement to funding. Currently (2021), there are nine communities: Communication, Cybersecurity, Democracy, Digital Learning, Ethics, Health, Mobility, Visual Information Design, and Work.

### 2.2 Content structures

DSI topics are addressed in the following structures within the DSI:

- **DSI professorships** in disciplines relevant to the DSI are fed into the UZH development and financial plan and guarantee independent reflection and research capacity. The DSI supports the faculties in positioning new professorships that are aligned with the general goals of the DSI. New professorships are associated with Challenge Areas and/or Cross Cutting Topics of the DSI. Currently, eight DSI professorships have been or are being filled, and an additional five DSI professorships, as well as three "bridge professorships" are being planned as part of the DIZH in cooperation with the Zurich higher education institutions PHZH, ZHAW and ZHdK. These professorships aim to support newly emerging research areas that are opening up through digitalization.
- **DSI Assistant Professorships** in disciplines relevant to the DSI are created based on agreements between the faculties and the DSI. Currently, this program consists of nine professorships, with an additional ten professorships planned within the DIZH. The aim of these assistant professorships, funded proportionally by the DSI, is to anticipate and develop new research topics in the field of digitization and to establish independent reflection and research capacity.
- **Independent interdisciplinary DSI research groups** will be assigned to individual DSI Challenge Areas and/or Cross Cutting Topics. The research groups will be realized mainly

through the Postdoc Program funded by the DIZH. This is to give young scientists the opportunity to lead a research group. The goal is to establish the first research groups in the next two years.

- **DSI Labs** consist of several DSI network researchers and are mostly organized within communities that aim at stronger collaboration (e.g., joint research projects). The DSI supports these Labs with various means (for example, with start-up funding); Labs can also be funded by the new DSI/DIZH Infrastructure/Lab Program. There are currently three Labs: the Digital Democracy Lab, the Digital Ethics Lab, and the Digital History Lab.
- **DSI teaching programs** have been developed at BSc and PhD levels. They include courses on digital literacy development and critical reflection on digital transformation. The first pilot courses at BSc level were conducted in the fall semester of 2020 and rolled out university-wide in the spring semester of 2021. The PhD program was launched as a pilot in 2020.
- **DSI partnerships** are formal agreements between the DSI and other UZH or external organizations. Currently, there are four agreements: one each with the Citizen Science Center, the Center for Information Technology, Society, and Law (ITSL), the UZH Blockchain Center, and the UZH Science Lab. The DSI also aims to partner with other universities.
- **DSI Fellows** are either UZH scientists or invited external fellows who are temporarily associated with specific DSI communities and collaborate on a DSI-supported project of the respective community.

The organizational structures of the DSI are described in the DSI Rules of Procedure.

### 2.3 Development of the thematic focus

#### 2.3.1 DSI Roadmap 2017

At the beginning of 2017, the thematic orientation of the DSI was defined together with the representatives of the DSI network (Figure 1).

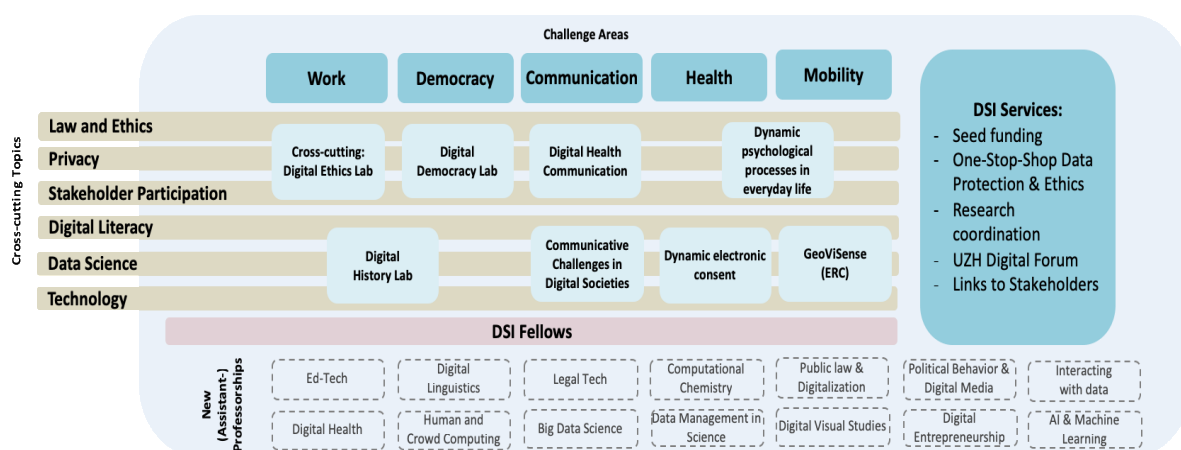


Figure 1: Structural elements of the DSI (as of 2017).

### 2.3.2 DSI Roadmap 2019+

In March 2019, the then 330-strong network members were asked to submit ideas for research topics to be addressed within the DSI. The aim was to adapt the orientation of the DSI to current needs. This resulted in the following:

The Challenge Areas "Communication", "Democracy", "Health", "Mobility" and "Work" and the Cross Cutting Topics "Data Science", "Digital Literacy", "Ethics", "Law & Privacy", "Participation & Stakeholder Involvement" and "Technology" were confirmed. All the current projects, structures and DSI professorships could be located in the intersection of these Challenge Areas and Cross Cutting Topics as follows:

- **Challenge Areas:** Based on extensive dialogue, the following five challenge areas were defined by DSI members:
  - **Communication:** research related to the impact of digitalization on human social interaction through various media.
  - **Democracy:** research related to the impact of digitalization on the political system, democracy, and related issues.
  - **Health:** research related to digital changes in healthcare, digital tools for understanding and treating disease, and improving health.
  - **Mobility:** research on the impact of digitalization on mobility, smart cities, and related topics such as sustainability.
  - **Work:** research on the impact of digitalization on business, innovation, work, and related societal changes.

Challenge Area topics should be broad enough to ensure maximum flexibility in gaining support for new positions, research groups, and others vis-à-vis decision-makers.
- **Cross Cutting Topics:** Some additional suggestions were made regarding Cross Cutting Topics. The DSI groups these into the following topics:
  - **Data Science:** building big data management, processing, analysis, and visualization skills.
  - **Digital Literacy:** building new teaching programs (the "Studium Digitale") and continuing education programs.
  - **Ethics:** empirical and normative research on ethical issues and provision of expertise in ethics for internal and external partners.
  - **Law & Privacy:** research on regulatory frameworks and data protection issues with a focus on fundamentals ("Rethink Privacy") and on data protection challenges for research.
  - **Stakeholder Participation:** involvement of stakeholders, especially representatives of civil society, but also of knowledge and technology transfer as well as start-up and innovation promotion.
  - **Technology:** development of new digital methods and technological devices (e.g., apps or sensors) that are essential for digital research.
- **DSI thematic areas**
  - The DSI professorships address the topic areas of "Educational Technology", "Digital Linguistics", "Legal Tech", "Computational Science", "Digital Chemistry", "Digital and Mobile Health", "Human and Crowd Computing", "Machine Learning in Precision Medicine", and "Big Data Science". Further demand exists in the areas of "Digital (Mental) Health", "Computational Health Science", "Computational Social Science",

- "Digital Literary Studies", "Digital Visual Studies", "Digital Religions", "Dynamic System Analytics", "Digital Creativity", "Computational Modeling of Mind and Brain", and "Digital Edition Analytics".
- With the assistant professorships supported by the DSI, the topics "Public/Health Law & Digitalization", "Digital Visual Studies", "Political Behavior and Digital Media", "Digitalized Communication Spaces", "Managing Digital Transformation", "Interacting with Data", "AI & Machine Learning", "Digital Geographies", as well as "Digital Ethics", are addressed. There is further demand in the areas of "Historic Software Emulation", "Digital Endpoint Design", "Technical Aspects of Legal Tech", and "Analytical/Semantic Computing".
  - Corresponding labs have been launched for the topics "Digital Democracy", "Digital Ethics", and "Digital History". There is further demand in areas such as "Contextualized Adaptive Health Communications and Interventions" or "Digital Scientific Collections Analytics".
  - For the topics "Participatory Citizen Science", "Information Technology, Society and Law", "Data & Service", and "Blockchain Technologies", partnerships have been agreed with the corresponding competence centers at UZH or national organizations which could be expanded.

Further topics for which different structures are possible are listed in Appendix A.1.

### 2.3.3 DSI Roadmap 2021+

Adjustments to the detailed 2019+ roadmap result from the self-organization of new communities in 2020, strategic decisions by the board of directors, and consultation among DSI members conducted in early 2021.

The main adjustments can be paraphrased as follows:

- The **cybersecurity** topic area is to be expanded. On the one hand, the DSI is thus responding to a wish of the Executive Board of the University to strengthen the position of UZH in non-technical aspects of cybersecurity; on the other hand, a group with an interest in technical and non-technical aspects of cybersecurity has also been formed within UZH. On behalf of the board of directors, a project has also been solicited under NRP-77 on cybersecurity. This builds on previous experience, especially since the DSI coordinated a Horizon 2020 project on this topic from 2016 to 2019. Structurally, this topic can be understood as a new cross-cutting topic, especially since cybersecurity is typically cross-cutting.
- Through the new community **Digital Learning**, the focus of the Cross Cutting Topic *Digital Literacy* is changing toward the development of new forms of digital learning; especially with regard to the use of serious games for research and teaching.
- Through the new community **Visual Information Design**, the Cross Cutting Topic *Technology* profile will be sharpened.
- The **Community Communication** wants to promote its research in connection with the effects of digitalization on private and public communication, which accordingly sharpens the thematic orientation of the Challenge Area *Communication*.
- The **Community Democracy** aims to strengthen its research on the impact of digitalization on the political system, democracy, and related topics.

- In the consultation process, it was suggested that the cross-cutting topic of *Data Science* should be enriched with the topic of **Computational Social Science**.

## 2.4 Funding of the thematic priorities

Up to and including 2020, the DSI funds for the promotion of projects and outreach activities were available to all DSI network members. From 2021 onward, only DSI Communities have access to these funds. DSI Communities apply annually for financial support through a program. The DSI managing office supports the functioning of the communities with appropriate resources. The DSI has defined criteria that must be met to be eligible for funding for DSI strategic projects. The criteria are located on the DSI website. The Board of Directors decides annually on the allocation of funds based on the total funds available at any given time.

In addition to the DSI funds, the calls published by the DIZH (Innovation Program, DIZH Infrastructure/Lab Call, DIZH Postdoc Call) will provide funding for the DSI funding priorities in the coming years. These funds will be awarded in a competitive process.

## 2.5 Services provided by the DSI managing office

The DSI managing office supports the goals of the DSI with the following activities:

- **Community support:** the DSI managing office supports the DSI Communities and the DSI partnerships in preparing successful funding proposals on digitalization topics, in the management of research projects, and in the organization of events.
- **Research coordination:** The DSI managing office facilitates and supports the collaboration of researchers of the DSI network with various activities (speed dating events, coordination of research groups, organization of internal colloquia, etc.).
- **Communication & Events:** The DSI managing office implements DSI outreach activities according to a separate communication concept; this will be revised in 2021. The communication channels of the DSI are adapted as needed; for example, the DSI website was relaunched in 2020. In 2020, the visual identity of the DSI was further developed with regard to the image brand. The new DSI image concept includes the redesign of documents, presentation templates, and the DSI website.
- **Stakeholder interface:** The DSI managing office mediates between scientists and journalists, companies, politicians, NGOs, and instances of public administration. It organizes contacts, is present on various committees with stakeholder representatives, and also takes on specific assignments from stakeholders (e.g., AlgorithmWatch), provided that these fit within the general DSI activity profile. A new instrument in this context is the "MasterClass", which will be offered to and implemented in the Swiss Parliament in 2021. Similar offerings for other stakeholders (e.g., cantonal parliament) are being planned for subsequent years.
- **Implementation of support projects:** The DSI designs and accompanies targeted projects that are intended to support the activities of UZH researchers. Examples are the Data Protection & Ethics Self-Assessment Tool (DESAT) and the Z-Pool Tool for the development and management of test persons for (online) research.



## Appendix A

### A.1 Research topics

In March 2019, the 330 network members were asked to submit their ideas for research topics to be addressed within the DSI.

In February 2021, the 500 DSI network members were again asked to submit inputs for the DSI Roadmap as well as ideas for research topics. The newly proposed research topics are added in **red** in the list below.

#### Digital Health

1. Digital Health Communication Lab
2. Computational Health Science/ Semantic Health Activity Analytics/ Computational Health Activity Analytics
3. Physiological assessments with sensor bracelet in women during different stages
4. Predicting future health outcomes from messy laboratory and real-world data
5. Computational Modelling of Mind and Brain
6. Big Data Dynamic Systems Modeling
7. The digital body: potentials and risks of altered embodiment in the digital society
8. Effectiveness of and access to mobile Health Applications
9. Governance Mechanisms for Access and Use of Data in Public Health Crises

#### Digital Mental Health

10. Digital Behavior Change and Health Promotion
11. Digital Interventions for Emotional Disorders
12. Toward Machine-Based Scoring of Neuropsychological Screening Tests

#### Digital Humanities

13. Historic Software-Emulation
14. Indigenous AI
15. The digital future of the University of Zurich Scientific Collections and Museums
16. Digital Visual Studies / Visual Analytics

#### Communication

17. Digital Voices: Chances and risks in future human-computer interaction
18. Digital media use and its impact on adolescents/young adults' life
19. Shifting from spoken to written communication – perspectives for perception, cognition, social isolation, and mental health
20. Governance of Disinformation in digitalized societies

#### Future of Work

21. People Analytics
22. Management with AI
23. Digital Ethics and Corporate Social Responsibility in the Digital Age
24. Immersive Computing
25. Data Intensive Organizations
26. Design Science / Design Research and Science

#### Future of Mobility

27. Dynamic System Analytics
28. Cyber-physical Systems
29. Ultra-large long-lived Systems Design, Development and Management
30. Urban Analytics
31. Human as Sensors
32. Movement Science
33. The resilient city

### 34. The mobile digital citizen

#### Future of Mobility and Work

- 35. Collective Intelligence
- 36. Internet of Things
- 37. Analytical Computing

#### Digital Individuality

- 38. Digital Individuality
- 39. Trust allocation
- 40. Digital Social Influence

#### Law and Ethics

- 41. DLT and the Law
- 42. Creating an integrative framework for solving ethical and legal dilemmas in cybersecurity
- 43. Meaningful Human Control of Security Systems – Aligning Humanitarian Law with Human Psychology
- 44. Value Sensitive Humanitarian Innovation / **Value Sensitive Social Innovation**
- 45. Socially acceptable AI and fairness trade-offs in predictive analytics
- 46. Serious Moral Game Development
- 47. **Legal tech (technical perspectives)**
- 48. **Data Protection and Research**
- 49. **Regulatory Framework for Artificial Intelligence (AI)**

#### Digital Literacy

- 50. Management of Lifelong Learning
- 51. Learning Design Thinking for Technology-Enhanced Learning in Higher Education (think4tel)
- 52. **Design Thinking**
- 53. **Behavioral security**

#### Digital Democracy

- 54. Digitalization monitor
- 55. **E-Government and Algorithmic Decision Making**
- 56. **Civic Tech and Political Participation / Participatory systems**
- 57. **Political Communications, Public Opinion and Elections**

#### Stakeholder Participation

- 58. Citizen Science as a tool for multi-area research and stakeholder engagement
- 59. **Accessibility in a Digital Society**
- 60. **Communities and Technologies**

#### List of existing DSI Structures

##### DSI Professorships

- A. Educational Technology
- B. Digital Linguistics
- C. Legal Tech
- D. Data Science for Sciences
- E. Digital Bioinorganic Chemistry
- F. Digital and Mobile Health
- G. Social Computing
- H. Data Systems and Theory

##### DSI Assistant Professorships

- I. Public/Health Law and Digitalization
- J. Digital Visual Studies
- K. Political Behavior and Digital Media

- L. Digitalized Communication Rooms
- M. Quantitative Network-Science
- N. Digital Geography
- P. Managing Digital Transformation
- Q. Interacting with Data
- R. AI & Machine Learning

**DSI Labs**

- S. Digital Democracy Lab
- T. Digital Ethics Lab
- U. Digital History Lab

**DSI teaching programs**

- V. Studium Digitale
- W. PhD Digital Skills Program

**DSI-Collaborations**

- X. Citizen Science Center
- Y. ITSL
- Z. Data Innovation Alliance
- AA. Blockchain Center