

Discipline: [Business & Information Systems Engineering]

1. Language

Deutsch / English (course will be given in person, either in German or English)

2. Title

Blockchain in Business Research

3. Lecturer

Prof. Roman Beck, IT University of Copenhagen
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4. Date and Location

16. – 19. October 2023

Goethe University, House of Finance, Westend Campus, Frankfurt am Main (room to be announced)

5. Course Description

5.1 Abstract and Learning Objectives

Blockchain, or more accurately, Distributed Ledger Technology (DLT) build the fundamental infrastructure layer for creation and capturing of digital value in decentralized environments. Start-ups, large corporations, governments, and the European Union work on blockchain-based innovations, making the technology a key driver of the next generation Internet, the Internet of values, where even market failures of the past can be addressed and solved, such as in the case of protecting global public goods.

While cryptocurrencies and their exchanges have seen several setbacks, scandals and even fraud recently, blockchain-based applications flourish and are a vital part of Web3.0, Metaverse, Decentralized Finance, Regenerative Finance, among others. However, understanding and designing of DLT-based systems requires research in various areas, as well as mindful consideration of larger economic and societal dimensions. These objectives provide the starting point for this VHB Pro-Dok PhD seminar.

This course will focus on educating students about DLT systems enabling them to develop conceptual as well as practical solutions, as well as will learn how to generate new theoretical insights based upon their research. The participants will learn how blockchain systems work and how they may disrupt or transform existing business models. They will gain insights into paradigmatic changes occurring from economic, organizational, and computer science viewpoints. As learning outcomes, the participants will receive insights how to conduct information systems research on blockchain that is innovative, rigorous, and relevant.

What are the learning outcomes of the course for PhD students? Course participants will be able to:

- identify research opportunities in the context of blockchain and DLT systems,
- analyse how blockchain systems are engineered,
- combine insights from an interdisciplinary perspective to research DLT systems in a socio-technical context,
- reflect critically on their own PhD projects in the light of blockchain research trend to generate academically sound, theoretical insights themselves,
- design and conduct research DLT and blockchain systems.

5.2 Content

The course comprises sessions on the economics of blockchain, on blockchain governance, and on design-oriented blockchain research, in which cutting-edge research in these areas is presented and discussed. In the session on the economics of blockchain, students will learn how blockchain changes how we think about value creation and value capture, as well as economic theory more broadly. In the session on blockchain governance, participants will find out what blockchain governance is and how their research could contribute to advancing this field. Once basic blockchain elements have been introduced, participants will work on their own blockchain research projects. The outcome will be working papers that are geared toward conference or journal publications.

The course will conclude with a makeathon, where participants depending on their interest can either work on blockchain artifacts following a design science paradigm, or alternatively on other scientific methods for research papers on DLT systems. Participants are encouraged to either work on projects that are already ongoing (e.g., their own thesis project) or start new projects.

The objective is to empower participants to develop promising research projects, and to network so that they can facilitate new research collaborations.

5.3 Schedule (including start and end time)

Monday, October 16th	Tuesday, October 17th	Wednesday, October 18th	Thursday, October 19th
<i>09:00 – 10:30</i> Welcome and introduction round, housekeeping	<i>09:00 – 10:30</i> Paper presentation session 1 – (student assignments)	<i>09:00 – 10:30</i> Paper presentation session 5 – (student assignments)	<i>09:00 – 10:30</i> Mini paper-a-thon (group work)
<i>10:30 – 11:00</i> Coffee break	<i>10:30 – 11:00</i> Coffee break	<i>10:30 – 11:00</i> Coffee break	<i>10:30 – 11:00</i> Coffee break
<i>11:00 – 13:00</i> Introduction to Blockchain foundations (lecture style)	<i>11:00 – 12:30</i> Paper presentation session 2 – (student assignments)	<i>11:00 – 12:30</i> Paper presentation session 6 – (student assignments)	<i>11:00 – 12:30</i> Mini paper-a-thon (group work)

13:00 – 14:00 Lunch break	12:30 – 14:00 Lunch break	12:30 – 14:00 Lunch break	12:30 – 14:00 Lunch break
14:00 – 15:30 Introduction to Blockchain foundations (lecture style)	14:00 – 15:30 Paper presentation session 3 – (student assignments)	14:00 – 15:30 Introduction into scientific writing (lecture style)	14:00 – 15:30 Mini paper-a-thon (group work)
15:30 – 16:00 Coffee break	15:30 – 16:00 Coffee break	15:30 – 16:00 Coffee break	15:30 – 16:00 Coffee break
16:00 – 17:30 Introduction to Blockchain foundations (lecture style)	16:00 – 17:30 Paper presentation session 4 – (student assignments)	16:00 – 17:30 Introduction into scientific writing (lecture style)	16:00 – 17:30 Wrap-up (summing up and farewell)

5.4 Course format

The course is structure into **plenary sessions** (lecture style, given by the lecturer), **paper presentation sessions** (given by the students), and **group work** (mini paper-a-thon). The combination of different learning activities will intensify the outcome and help either students to develop their own research ideas further or allow to form co-author networks around ideas to write papers in the aftermath of the course. Participating students are encouraged to develop full research projects and papers after the course based on the paper-a-thon and the compendium of literature reviews.

Please keep in mind that handing in a literature review paper before, and a draft paper after the VHB ProDok course is mandatory if you seek to receive ECTS points for your work!

6. Preparation and Literature

6.1 Prerequisites

Students interested in participating in the course must be enrolled as PhD student in an information systems, business administration, computer science, economics, or other cognate program.

6.2 Essential Reading Material

Andersen, J. V., & Bogusz, C. I. (2019). Self-Organizing in Blockchain Infrastructures: Generativity Through Shifting Objectives and Forking. *Journal of the Association for Information Systems*, 20(9), 11.

Beck R., C. Müller-Bloch, J.L. King (2018) Governance in the blockchain economy: A framework and research agenda. *Journal of the Association for Information Systems* 19(10), 1.

- Biais, B., Bisiere, C., Bouvard, M., & Casamatta, C. (2019). The blockchain folk theorem. *The Review of Financial Studies*, 32(5), 1662-1715.
- Böhme R., N. Christin, B. Edelman, T. Moore (2015) Bitcoin: Economics, technology, and governance. *J. Econ. Perspect.* 29(2):213-238.
- Catalini C., J.S. Gans (2016) Some simple economics of the blockchain. Working paper, National Bureau of Economic Research, Cambridge: MA.
- Chanson, Mathieu; Bogner, Andreas; Bilgeri, Dominik; Fleisch, Elgar; and Wortmann, Felix (2019) "Blockchain for the IoT: Privacy-Preserving Protection of Sensor Data," *Journal of the Association for Information Systems*, 20(9), 10.
- Chiu, J., & Koepl, T. V. (2019). Blockchain-based settlement for asset trading. *The Review of Financial Studies*, 32(5), 1716-1753.
- Chong, Alain Yee Loong; Lim, Eric T. K.; Hua, Xiuping; Zheng, Shuning; and Tan, Chee-Wee (2019) "Business on Chain: A Comparative Case Study of Five Blockchain-Inspired Business Models," *Journal of the Association for Information Systems*, 20(9), 9.
- Cong, L. W., & He, Z. (2019). Blockchain disruption and smart contracts. *The Review of Financial Studies*, 32(5), 1754-1797.
- Davidson S., P. De Filippi, J. Potts (2018) Blockchains and the economic institutions of capitalism. *J. Institu. Econom.*, ePub ahead of print January 18.
- Du, W. D., Pan, S. L., Leidner, D. E., & Ying, W. (2019). Affordances, experimentation and actualization of FinTech: A blockchain implementation study. *The Journal of Strategic Information Systems*, 28(1), 50-65.
- DuPont Q. (2018) Experiments in algorithmic governance: A history and ethnography of 'The DAO,' a failed decentralized autonomous organization. M. Campbell-Verduyn, ed. *Bitcoin and Beyond: Cryptocurrencies, Blockchains, and Global Governance*, Routledge, Abingdon, UK, 157-177.
- Li X., C.A. Wang (2017) The technology and economic determinants of cryptocurrency exchange rates: The case of Bitcoin. *Decision Support Syst.* 95:49-60.
- Miscione, G., Goerke, T., Klein, S., Schwabe, G., & Ziolkowski, R. (2019). *Hanseatic Governance: Understanding Blockchain as Organizational Technology*. ICIS 2019 Proceedings.
- Nakamoto S. (2008) Bitcoin: A Peer-to-Peer Electronic Cash System. White paper, available at <https://bitcoin.org/bitcoin.pdf>.
- Notheisen, B., Cholewa, J. B., & Shanmugam, A. P. (2017). Trading Real-World Assets on Blockchain. *Business & Information Systems Engineering*, 59(6), 425-440.
- Risius M., K. Spohrer (2017) A blockchain research framework. *Bus. Inform. Syst. Engrg.* 59(6):385-409.
- Rossi, M., Mueller-Bloch, C., Thatcher, J. B., & Beck, R. (2019). Blockchain Research in Information Systems: Current Trends and an Inclusive Future Research Agenda. *Journal of the Association for Information Systems*, 20(9), 14.

6.3 To prepare

Participants will have to **read the recommended literature** prior to the course. In addition, a **structured literature review** on the topic assigned to the student has to be conducted, and a **hand-in of 12 pages** (including references) must be submitted prior to the course. The structured literature review should follow some of the existing methods of how to conduct a literature review on scientific, peer-reviewed articles.

A **presentation** of the hand-in is to be prepared prior to the course, to be given at the course. The presentation should be power point slides that have to be sent to the organizer prior to the course.

7. Administration

7.1 Max. number of participants

20 participants

7.2 Assignments

Assignments to present the hand-ins will be made prior to the course. The presentation of the assigned literature reviews will provide the foundation for developing research ideas for the subsequent mini paper-a-thons during the course.

The assignments will be made **available to course participants as compendium** after screening and quality check of the organizer. The assignment topics will be further detailed and discussed with each course participants. The assignment topics are:

- Staking-as-a-Service
- DLT Interoperability and Bridges
- Zero-Knowledge Proof and DLT Systems
- Blockchain-as-a-Service
- Decentralized Finance (DeFi) Business Models
- Regenerative Finance (ReFi) Business Models
- Decentralized Exchanges vs. Centralized Exchanges
- Algorithmic Governance
- Post-Quantum Cryptography and Blockchain
- Ethics, Norms and Values of DLT systems
- Universal Wallets
- DAOs and Decentralized Business Models
- On-Ledger and Off-Ledger Governance Interplay
- Open Strategy and Risk Management in DLT Systems
- Blockchain Data Analytics Methodologies
- Smart Contracts and Smart Contracting
- Power of Three and semi- or fully Autonomous Systems
- Comparison of Consensus Algorithms

25.09.2023: Allocation of topics to the participants by the lecturer.

7.3 Exam

For those seeking ECTS points for their PhD program, a) a **hand-in** has to be submitted **before** the course takes places, as well as a based upon **presentation** has to be given, and b) a **draft research paper** idea based on the paper-a-thon has to be submitted **after** the course, which can be done in groupwork.

7.4 Credits

The course corresponds to a scope of 6 LP/ECTS

8. Working Hours

Working Hours	Stunden
<i>preparations:</i> Preparation of the structured scientific literature review and hand in (70h) and familiarizing with the recommended readings (50h), as well as preparation of the presentation (4h)	124h 24h
<i>active participation:</i> Active participation on during the PhD seminar (24h).	32h
<i>preparation for exam:</i> Preparation of a draft paper based on the paper-a-thon as hand-in after the course (32h).	
SUMME	180 h