Smart City Governance – AI Ethics in a Spatial Context

Selected Essays from 2024/2025

Larsson, Stefan; Blom Lussi, Ellinor; White, James; Tanqueray, Laetitia

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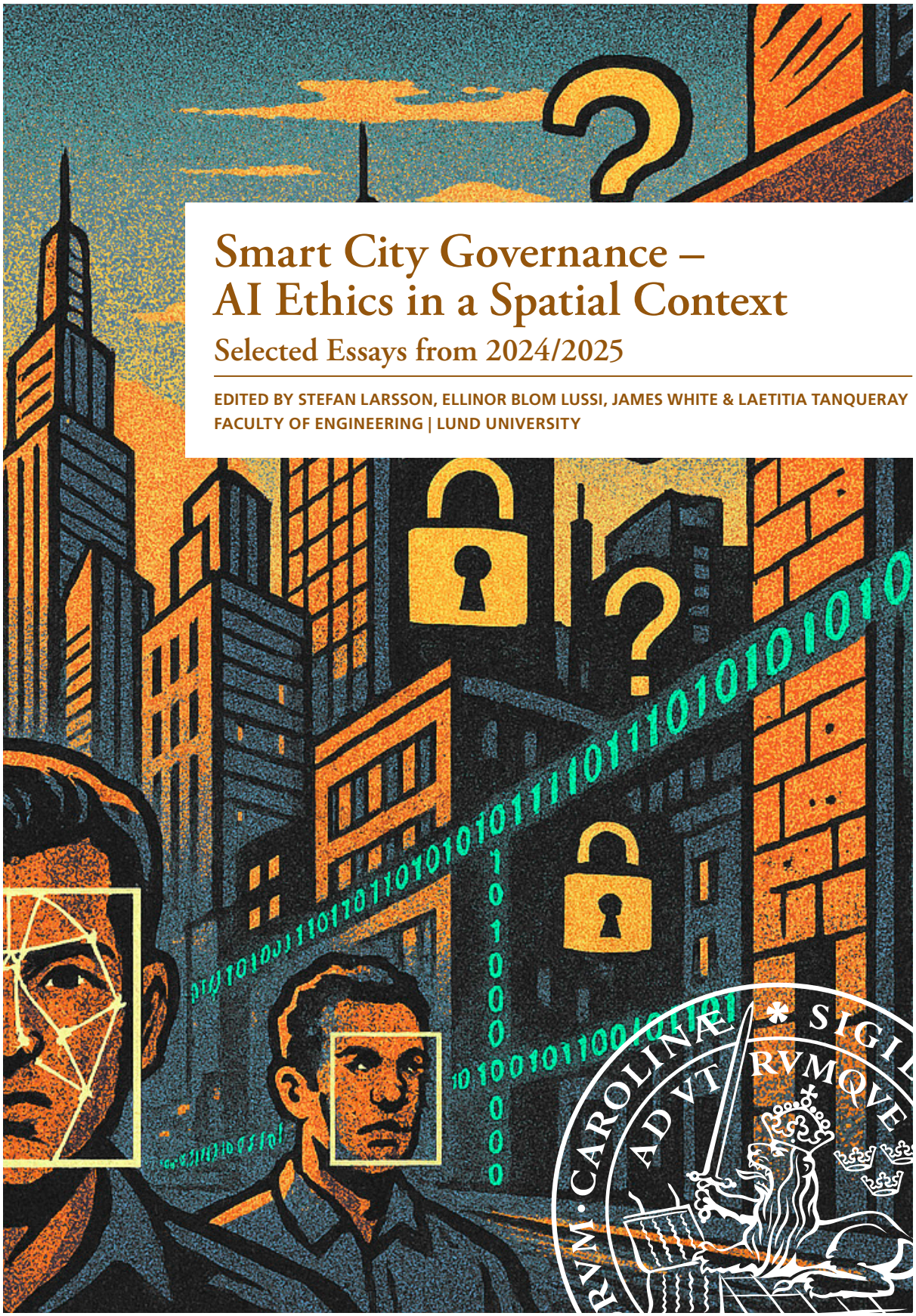

Smart City Governance – AI Ethics in a Spatial Context

Selected Essays from 2024/2025

EDITED BY STEFAN LARSSON, ELLINOR BLOM LUSSI, JAMES WHITE & LAETITIA TANQUERAY
FACULTY OF ENGINEERING | LUND UNIVERSITY

Smart City Governance – AI Ethics in a Spatial Context

Selected Essays from 2024/2025

Edited by Stefan Larsson, Ellinor Blom Lussi,
James White and Laetitia Tanqueray,
LTH, Lund University

Head of course is **Stefan Larsson**, a senior lecturer and Associate Professor in Technology and Social Change at Lund University (LU), Sweden, Department of Technology and Society. He is a lawyer and socio-legal researcher that holds a PhD in Sociology of Law as well as a PhD in Spatial Planning and leads the AI and Society Research Group.

Ellinor Blom Lussi is a Teaching Assistant on this course. Ellinor is a doctoral student in the AI and Society Research Group at the Department of Technology and Society at LTH, LU, and her research is focused on automated decision-making in the public sector.

James White is a teacher on this course. James is currently doing a postdoc in the AI and Society Research Group at the Department of Technology and Society, LTH, LU, and does research in the field of Science and Technology Studies with a focus on the role of knowledge, ignorance and expertise in governance.

Laetitia Tanqueray is a Teaching Assistant on this course, and canvas coordinator. She is a doctoral student in the AI and Society Research Group at the Department of Technology and Society at LTH, LU, investigating questions related to socio-legal issues for social robotics.

Smart City Governance – AI Ethics in a Spatial Context: Selected Essays from 2024/2025

Course Codes: VFTN75, TFRP60

LTH, Lund University 2025

Cover Photo: The cover image has been prompted from M365 Copilot, November 4, 2025. After probing various prompts and receiving advice on prompts, this was used:.

Please provide a picture based on the following course syllabus from a course on Smart City Governance: AI Ethics in a Spatial Context, see below. Make sure that it is in comic-book style, retro vintage aesthetic, halftone texture, bold black outlines, vibrant contrasting colors, dynamic perspective, cinematic lighting, landscape format, futuristic smart city scene, skyscrapers, streets, surveillance cameras, facial recognition overlays (digital grids and bounding boxes on faces), glowing data streams (binary code flowing between sensors and buildings), ethical dilemma symbols (scales of justice, lock icons, question marks) integrated into the cityscape, clear empty space at top and center for title and author text, no text in the image.

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Foreword

This volume presents select papers written by students in the 2024/2025 version of the course on *Smart City Governance: AI Ethics in a Spatial Context* at LTH, Lund University, Sweden. The purpose of this volume is to describe the framework of the course and showcase interdisciplinary student group essays on the topic of smart cities.

Stemming from the interface between the Division of Real Estate at the Department of Technology and Society and my own research on governance issues relating to autonomous and AI-driven technologies, the course had its inaugural semester starting the fall of 2020. Writing this in October 2025, I'm looking back at a highly interdisciplinary course with many invited guest experts, touching on topics ranging from human rights, standards and the European AI Act to urban AI, participatory approaches and issues of transparency.

2024/2025 was the fifth year the course has been given. The first year combined students from three different civic engineering programs; on data, land surveying and ICT. In an effort to develop it into a more fully cross-disciplinary and critically informed take on technologies in cities, the course ¬now also invites students from the architectural program, as well as students from outside the engineering faculty, from the humanities and the social sciences. On top of this, we are always keen on seeing what the additional exchange students from various parts of the world will bring to the course.

The interdisciplinary aspects form a core part of the course, particularly in how the main assignments and the final essays are written in groups of three or four, where the student groups are randomly collected with the students' diversity in training as the main guiding principle — the less similar, the better. So, a student from computer science will collaborate with a student from land surveying and an anthropologist, for example. This can admittedly create friction but also lead to splendid contributions and fruitful learning.

I'd like to thank the inquisitive students for reaffirming my belief in the need for more interdisciplinary and critical teaching on applied technologies. Furthermore, the team effort with James White, Laetitia Tanqueray and Ellinor Blom Lussi has been invaluable. Lastly, I'd like to thank all the excellent guest teachers for their superb contributions.

October 2025, Lund, Sweden

Stefan Larsson

The Balancing of Urban Technologies

The course at the important intersection of multidisciplinary perspectives on technological solutions, see Fig. 1. The figure illustrates the various themes that are combined in the course. The technological part includes artificial intelligence (AI), prediction methodologies, along with controversial methods of biometric image-recognition, data collection practises and other aspects of digitisation and digital platforms. The second bubble focuses the spatial component, particularly the urban environment, with a focus on existing "smart" city applications and technology use in prospective "smart" international cities. The final bubble refers to issues of governance, as in law and ethics, and should be understood as a wide critical frame to conceptualise and theorise on the other two. It covers questions such as:

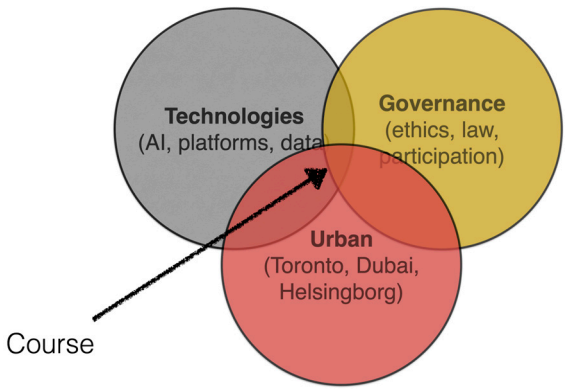

Figure 1: Components of smart city governance.

- How are urban technologies, including AI, governed?
- How are theoretical and regulatory concepts like privacy, participation and transparency relevant for technological implementations in cities?
- What ideas, techniques and strategies of AI governance have emerged in recent years (in terms of ethics, new regulation and standards), and how do they relate to an urban or spatial context?

The course's ambition is to treat these areas as a related whole, to enable students to critically appreciate the balance interests and innovations involved in smart city governance.

As expressed by the syllabus, AI is "increasingly being used to change our cities and manage traffic and movement, meet the needs of commerce, combat crime, monitor individuals and improve our everyday lives. At the same time, legal, democratic and ethical interests need to be balanced against technical needs for optimization". The course intends to develop reflection on balances between different interests and values, rather than uncritically reinforce notions of technological optimisation or offer a truly "correct" answer. That is, as stated in the syllabus:

> How may individuals' privacy and rights to codetermination be balanced against development and employment of digital technologies and AI, dependent on large quantities of data? What are the main legal frameworks and what ethical guidelines should be adhered to? What degree of explainability and transparency is reasonable towards citizens, and in what ways do expectations and perceived benefits differ in different parts of the world?

To address these types of questions, the course utilises both a range of invited guest lecturers from various fields, as well as literature offering critical views on the interface between new technologies, society and governance, for example on participation (cf. Cardullo & Kitchin, 2019) and "platformisation" (cf. Andersson Schwarz, 2017; Barns, 2020).

Smart Cities and Digital Urbanism

Within the collective term "smart cities", one finds several technologically grounded ideas about how data collection and its analysis can assist with the city's challenges. The promises offered by the smart city have been expressed as "technological solutions to urban problems" (Kitchin, Cardullo, & Di Feliciantonio, 2019), which calls for reflection and perhaps a reframing of how we understand smart cities from the citizens' perspectives. At the same time, there is of course less sensitive sensor-based data collection involved too, for example in traffic management, the maintenance of sewage infrastructure, and other areas.

The difficulty of balancing interest can be seen in traditional surveillance practices that are played out with newer technologies – not the least biometrical identification through face recognition for use in public cameras. There are also a range of critical insights in the literature on challenges with discrimination and bias that risks being reproduced in predictive data-driven policing tools, so-called predictive policing (cf. Shapiro, 2019). These types of high-risk uses, including facial recognition in public spaces, are also amongst the most debated topics in the European AI Act.

The governance perspective may also include private/public complexities, including aspects of who has access to what data, for what purpose, and ultimately how we should understand public management in digitised times. This is related to control, issues of infrastructural development and maintenance, and not the least relevant for legal questions of data protection and enforcement of AI legislation (Söderlund & Larsson, 2024), even competition policy (cf. Larsson, 2021). For example, in relation to a commercial development of the publicly controlled urban planning and management of cities, exemplified by the Toronto Sidewalks project (Goodman & Powles, 2019). The concept of *the platform* has been highlighted in relation to a large-scale tech companies involved in urban development (Barns, 2020; Goodman & Powles, 2019; White & Larsson, 2023), which also relates to the privatisation of city administration (Cardullo & Kitchin, 2019). The value and importance of big data is emphasised and problematised in research on smart cities (cf. Green, 2019; Sadowski, 2020), including the lack of transparency and accountability of algorithmic processes (Brauneis & Goodman, 2018; Larsson et al., 2023). Additional critical interfaces concern the tensions between citizenship and consumerism, and what this would entail in terms of civic rights and public participation (Cardullo & Kitchin, 2019). All of these conceptual issues can be used to better reflect upon and analyse implications of smart city initiatives from a governance perspective.

Lecturers in 2024/2025

To ensure a truly interdisciplinary perspective, we invited several guest lecturers in addition to the course representatives. In total, the involved lecturers as they appeared in the course are listed here:

- **Stefan Larsson**, Associate Professor in Technology and Social Change at Lund University, Head of course, introduced and lectured on participation and transparency in smart cities, that is, spatial planning and AI governance.
- **James Merricks White,** Postdoctoral researcher at Lund University with a PhD in Sociology. Lectured on city standards and platform urbanism.
- **Laetitia Tanqueray**, Doctoral Student in Technology and Society at Lund University, focusing on social robots for health care, was a TA in the course.
- **Ellinor Blom Lussi,** Doctoral Student in Department of Technology and Society at Lund University. Ellinor was a teaching assistant on this course and lectured on automated decision-making (ADM) in the public sector.
- **Kasia Söderlund**, Doctoral student in Technology and Society at Lund University, focusing on the legal aspect of AI transparency and trust.
- **Andrew Karvonen**, Professor of Urban Design and Planning in the Department of Architecture and the Built Environment at Lund University. Andrew gave a lecture on AI and Cities.
- **Dalia Mukhtar-Landgren**, Associate Professor and senior lecturer in Political Science at Lund University. Dalia held a lecture based on her research in urban mobility.
- **Katherine Harrison**, Associate Professor at the Department of Thematic Studies (TEMA) at Linköping University. Her work sits at the intersection of Science & Technology Studies, media studies, and feminist theory, studying smart cities and companion (ro)bots, which was also central themes for Katherine's lecture.
- **Darcy Park**, Assistant Professor at Linköping University, whose current research focuses on new business models in electricity markets. Accordingly, Darcy held a lecture on Climate, Smart Cities and Governance by using Malmö as a case study.
- **Adriana de la Peña,** Doctoral Student at Malmö University, part of the *Smart Cities for City Officials* project. Adriana held a lecture on Smart Cities in South America.

- **Lars Harrie**, Professor, researcher and lecturer in geographic information science, Lund University. Lars gave a lecture on how to visualise geographic data, including on digital twins.

Overview of the Students' Essays

While the students undertake individual tasks in the course, and participate in seminars and exercise classes, the most tangible outcome of their work is the essays they write in groups of three or four. For the 2024/2025 course these groups were supervised by Laetitia Tanqueray and Ellinor Blom Lussi.

In the beginning of the course the students are divided into groups based on diversity in training. That is, course participants work collaboratively with peers from other programs or with academic training other than their own. Guided by supervisors and labs on how to frame questions, scope a problem and to get started, they write one essay per group that relates to a specific technology used in an urban or spatial context, analysed from a specific theoretical or governance perspective. The students present their essays and oppose and critically assess another group's essay and presentation.

For this anthology, we have selected three essays that encapsulate the course aim and learning objectives. These are:

- *Analyzing the level of citizen participation in public projects related to the car-free city concept in Lund, Sweden* by Alf Rodin Christensen, Marcus Fröberg, Yao Li
- *Transparency in AI Surveillance and its effect on behaviour in ICA Brösarp* by Philip Olsson, Hien Truong, Georg Hanö Ivarsson
- *University AI Policy in Nordic Smart Cities. Investigating thematic structures of university AI policy documents, using unsupervised machine learning methods* by Özgür Ak, Klara Wiklundh, & Daniel Jóhannsson

These essays bring different perspectives to the relationship between smart technologies and their social and environmental settings and consequences.

Finally, a big thank you to all the students who took this course. As course coordinator, teachers and teaching assistants, we enjoyed teaching you and your contributions!

References

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Goodman, E. P., & Powles, J. (2019). Urbanism under google: Lessons from sidewalk Toronto. *Fordham L. Rev*., 88, 457.

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Larsson, S. (2021) Putting Trust into Antitrust? Competition Policy and Data-Driven Platforms, *European Journal of Communication*, special issue. 36(4): 391-403.

Larsson, S., Haresamudram, K., Högberg, C., Lao, Y., Nyström, A., Söderlund, K., & Heintz, F. (2023) "Four Facets of AI Transparency." In Lindgren, S., (ed.) *Handbook of Critical Studies in Artificial Intelligence*, Edward Elgar Publishing

Sadowski, J. (2020). Cyberspace and cityscapes: on the emergence of platform urbanism. *Urban Geography*, 1-5.

Shapiro, A. (2019). Predictive policing for reform? Indeterminacy and intervention in big data policing. *Surveillance & Society*, 17(3/4): 456-472.

Söderlund, K. & Larsson, S. (2024) Enforcement Design Patterns in EU Law: An Analysis of the AI Act, *Digital Society*, Special issue on Legal Design Patterns.

White, J., & Larsson, S. (2023) Disruptive data: historicising the platformisation of Dublin's taxi industry. *Buildings and Cities*, 4(1), 838–850.

Course syllabus

Smart City Governance: AI Ethics in a Spatial Context Den smarta stadens styrning: AI och etik i en spatial kontext

VFTN75, 7.5 credits, A (Second Cycle)

Valid for: 2024/25
Faculty: Faculty of Engineering LTH
Decided by: PLED L
Date of Decision: 2024-02-19
Effective: 2024-05-08

General Information

Depth of study relative to the degree requirements: Second cycle, in-depth level of the course cannot be classified
Elective for: A5, C5-pvs, D5-mai, L4-fr, L4-gi
Language of instruction: The course will be given in English

Aim

Artificial intelligence (AI) is increasingly being used to change our cities and manage traffic and movement, meet the needs of commerce, combat crime, monitor individuals and improve our everyday lives. At the same time, legal, democratic and ethical interests need to be balanced against technical needs for optimization. How may individuals' privacy and rights to codetermination be balanced against development and employment of digital technologies and AI, dependent on large quantities of data? What are the main legal frameworks and what ethical guidelines should be adhered to? What degree of explainability and transparency is reasonable towards citizens, and in what ways do expectations and perceived benefits differ in different parts of the world?

In line with the need for responsible design and ethical reflection on digitalisation, this course aims to give an understanding of the

role of datafication, automation, platformisation and artificial intelligence (AI) in an urban and spatial context. By looking at concrete national and international cases of development and control of so-called smart cities, including applications such as facial recognition in public environments or how "the city as a platform" has had an impact in urban planning, knowledge can be gained about what interests need to be balanced and what level of governance is reasonable for managing the digital technologies in an urban context.

The course will thus, in a general sense, provide insights into the importance of digitalisation and the societal significance of new technologies with a focus on legal and ethical challenges in an urban and spatial context. It includes phenomena such as data capture and collection of large individual-based data sets, the growth and importance of digital platforms, and autonomous and self-learning technologies in the AI field - and the forces operating therein between private and international as well as public and national actors. The course is thus intended to give the students an in-depth knowledge of the consequences of how technology is applied in, and interacts with, society - with a focus on smart cities, governance and ethics.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- be able to explain theoretical frameworks on smart cities, urban platforms and urban AI
- master basic English terminology in critical social science research on smart cities, datafication, and artificial intelligence
- demonstrate a basic understanding of digital and data-driven business models and their significance for design and technology development
- demonstrate a basic understanding of the important legal and policy considerations in urban data collection and the use of AI in a spatial context

Competences and skills
For a passing grade the student must

- be able to describe the basic content and importance of relevant European and international laws for a spatial context
- be able to describe key benefits, but also conflict areas that a development towards smart cities brings
- understand, analyze and describe potential challenges in the light of ethical and legal governance of smart cities in the European context
- be able to present their project work (thesis) both in writing, orally, and as opponents to another thesis.

Judgement and approach
For a passing grade the student must

- demonstrate a critical, independent and multidisciplinary approach to data collection and automation in urban environments.
- be able to identify the different stakeholders and interests involved in smart city development and governance, with a particular focus on legal and ethical approaches.

Contents

The course is designed as a lecture and seminar series, as well as independent written work in a smaller group based on concrete development projects / cases where datafication, automatisation and AI affect special planning. The course offers guest lectures from multidisciplinary as well as practical fields, where eg. city representatives present their work and their challenges with digitization and the use of autonomous and self-learning technologies.

The following steps are addressed:

- The uses of data-dependent AI-technologies, and what the technology application to urban environments looks like
- The basics of trustworthy artificial intelligence, e.g. transparency, fairness, accountability, and explainability
- Digital platforms and platformisation: what does a data-driven organizational form mean in general, and for a spatial context in particular?
- The basics of legal frameworks relevant for smart city development and governance, in particular the European regulations concerning the fundamental rights (the Charter of Fundamental Rights of the EU), personal data protection (GDPR) and the AI Act
- International, European and national examples of smart city projects, are presented and problematised.

Examination details

Grading scale: UG - (U, G) - (Fail, Pass)
Assessment:

Participation in the course seminars is compulsory (although a maximum of two exercises may be completed by make-up assignments). Understanding of the lecture material and course readings will be examined orally. The main assessment is a written essay and group presentation. At the final presentation, students are expected to oppose and critically assess another essay / presentation.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Modules
Code: 0120. **Name:** Smart City Governance.
Credits: 7.5. **Grading scale:** UG - (U, G).

Admission

Admission requirements:

- ASBF05 The Fundamentals of Urban Design **or** ASBF10 Sustainable Urban Design **or** ETSF25 The Business of Software **or** FMIF45 Sustainability and Resource Use with

Perspectives on Information and Communication Technology
or VFTF10 Real Property Formation

The number of participants is limited to: 28
Selection: The course has 7 places for applicants from each of the programs A, C, D and L. Selection within each program is based on the number of higher education credits achieved within the program. In case there are places left after regular selection, these are distributed, according to the same selection principle, to the remaining applicants.

Reading list

- High-Level Expert Group on Artificial Intelligence: Ethics Guidelines for Trustworthy AI. 2019. Brussels: European Commission.
- Kitchin, R., Cardullo, P., and Di Feliciantonio, C: Citizenship, Justice, and the Right to the Smart City. Bingley, UK: Emerald Publishing, 2019. In Paolo Cardullo, Cesare Di Felicaiantonio, & Rob Kitchin (Eds.), The right to the smart city (First edition.) (pp. 1–24).
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- Wernick, A. & Artyushina, A: Future-proofing the city: A human rights-based approach to governing algorithmic, biometric and smart city technologies. 2023. Internet Policy Review, 12(1). https://doi.org/10.14763/2023.1.1695

- White, James, & Larsson, Stefan: Disruptive data: historicising the platformisation of Dublin's taxi industry. 2023. Buildings and Cities, 4(1), 838–850.
- Additional reading will be provided during the course.

Contact

Course coordinator: Stefan Larsson, stefan.larsson@lth.lu.se
Course homepage: www.lantm.lth.se

Essay 1 – Analyzing the level of citizen participation in public projects related to the car-free city concept in Lund, Sweden

Alf Rodin Christensen, Marcus Fröberg, Yao Li

Analyzing the level of citizen participation in public projects related to the car-free city concept in Lund, Sweden

Alf Rodin Christensen, Marcus Fröberg, Yao Li

December 2024

Abstract

This paper analyzed the level of citizen participation present in public projects related to the car-free city in the municipality of Lund, Sweden. Publicly available documents about citizen participation initiatives were analyzed and compared to a scientific citizen participation framework. Results showed that the municipality had organized several participation initiatives, in which the citizens demonstrated clear interest in having the municipality transition closer to the car-free city concept. Many of the citizens wishes were included in the final project plans, which indicated a high level of citizen participation. However, this participation largely operated at the level of tokenism—focused on consultation and placation. While citizens' voices were acknowledged, ultimate decision-making authority remained with city officials. Though these initiatives encouraged collaboration under favorable conditions, they lacked structural mechanisms to consistently empower citizens beyond a consultative role.

1 Introduction and research plan

This paper will present the importance of a high level of citizen participation when a city is to implement substantial changes to traffic systems. By examining documents from public projects and analyzing them from a citizen participation perspective, we aim to label the level of participation in the public projects related to the car-free city concept in Lunds Kommun. Understanding the level of participation in public projects is important for citizens, who can become more aware of the structures that either allow them to, or prevent them from shaping the place where they live. It is also important for city officials as the success of projects can be heavily influenced by the way in which citizens are involved in them.

1.1 Research Problem

The need for Conventional Private Vehicles (CPVs) is increasing in phase with the technical and societal evolution. This has brought several environmental and socioeconomic problems to urban systems (Li et al., 2024). These problems include noise and air pollution, traffic accidents, road congestion and excessive land waste due to parking lots (Li et al., 2024; Doheim et al., 2020). This has led to an increased number of cities becoming interested in the idea of transitioning to a car free alternative. However, this transition presents its own problems and challenges. In (Nieuwenhuijsen et al., 2019), nine prerequisites for transitioning to a car-free city are presented. One of these prerequisites is *"Strong citizen and business support is crucial in the creation of car-free cities"*, and it highlights the importance of both public and business participation when it comes to ensuring the success of transitions to car-free cities.

1.2 Importance of public participation in society

To give an idea of how this issue can present itself in reality, we will look at some historical examples of when citizen participation or non-participation enabled or prevented the success of public traffic related projects.

1.2.1 Leidsebuurt

In Nederveen et al. (1999), they present a case study for the car-free city that was done in Leidsebuurt, a district in Amsterdam, Netherlands. Leidsebuurt had a problem with overflow of cars in the early 1990s. This district is about ten minutes away from the downtown shopping center of Amsterdam, which made it an attractive spot for visitors to park their cars. Because of this, the streets of Leidsebuurt were completely full during business hours, which made it hard for the residents to park their own vehicles. This led to protests in 1992, where residents objected to cars that did not belong to the neighborhood. Parked cars that, according to the residents, looked suspicious received red and yellow warning tickets, in an attempt to discourage them from parking in

Leidsebuurt. This type of protest was effective, but found illegal and therefore terminated by the local government. As a consequence of the opposed opinions, the government decided to initiate paid-permit parking in Leidsebuurt, which the residents again disagreed with. Because of the continued opposition between the two parties, it delayed the process of initiating paid-permit parking for a long time. According to Nederveen et al. (1999), a major cause for the lack of support was the insufficient communication between the parties. The people of Leidsebuurt did not feel included and involved in the local decision making. In this example it is clear that public participation could have expedited a change in a local community.

1.2.2 Oslo

In 2017 in Oslo, Norway, the political alliance that had the power in Oslo at the time, tried to ban cars from the city centre almost overnight. This would have made Oslo the first major European city to have a complete car-free zone. They motivated their choice by presenting a vision of a greener and more livable environment in the city (Cathcart-Keys, 2017), claiming that "The city becomes more enjoyable and more accessible without car traffic.." (Arbeiderpartiet et al., 2015). However, the idea received backlash from certain parties. According to a conservative party politician, it was "A Berlin wall against motorists" (Bjarne Johnsen et al., 2015). The loudest backlash, nevertheless, came from the city's trade association, Oslo Handelsstands Forening (OHF), that claimed that this could result in a dead city centre and a "poorer city [with] less life" (Løken and Moskvil Huisman, 2015). The OHF communications manager stated that a lot of the specialty or niche shops in the city centre are dependent on people coming from far away, and could lose a lot if people do not bother to visit, given a complex commute. This quick and revolutionary change was too hasty and the local residents and shop owners did not have the time needed to adapt to the situation. This led to an almost year long back and forth discussion between the OHF and the city's council, resulting in a more gradual transition into car-free zones. The goal from the city council side was also modified from the ambitious "no-car-zone" to the more achievable "fewest vehicle possible".

1.3 Research Questions

Lund focuses on sustainability and has implemented projects to build eco-friendly and low-carbon living such as realizing a car-free city. Given that the transportation is closely related to residents, they are involved in the planning process whether it's gathering the community's needs during the program design phase, or evaluating the community during the program modification phase. Under this situation, our main question is what is the level of participation for the citizens in the projects related to the concept of the car-free city in Lund?

2 Background and theory

Our research mainly focuses on the level of public participation in the realization of a car free city in Lund. Therefore it is necessary to introduce some basic information about Lund and the concept of a car-free city. When it comes to participation, we do some research about Aenstein's ladder of participation and Cardullo and Kitchin's representation of scaffold theory. Correspondingly, we also study the process about how Lund implements relevant policies.

2.1 Lunds Kommun

Situated in the province of Skåne in southern Sweden, Lund has approximately 91,940 residents (2018), with a significant portion being students because of Lund University. The university and its buildings dominate much of the centre of the city, and have led to Lund becoming a regional centre for high-tech industry. With cobblestone streets, cozy cafes and lush parks, Lund is highly walkable and bike-friendly with excellent public transport connecting it to other cities in the region such as 15 minutes train to Malmo, Sweden and 45 minutes train to Copenhagen, Danmark. There is also the tram line that links the Lund Center to many of the largest work-places in the city. The city's focus on sustainability makes it an attractive destination for environmentally conscious individuals. Projects like Brunnshög, an eco-friendly neighborhood currently under development, showcase Lund's commitment to low-carbon living. Brunnshög aims to be energy-efficient, feature green roofs, and integrate renewable energy sources like wind and solar.

2.2 What is a car-free city?

The concept may be called the car-free city, but in reality these projects rarely remove all cars from the city. Cities often instead focus on reducing the number of cars as much as possible, using measures such as investing in public transport, building more and better bike lanes, and reducing the number of parking lots in the city center. Hamburg, Oslo, Helsinki, and Madrid have recently announced their plans to become (partly) private car free cities. Other cities like Paris, Milan, Chengdu, Masdar, Dublin, Brussels, Copenhagen, Bogota, and Hyderabad have measures that aim at reducing motorized traffic including implementing car free days, investing in cycling infrastructure and pedestrianization, restricting parking spaces and making considerable increases in public transport provision (Nieuwenhuijsen and Khreis, 2016).

2.3 Ladder of Participation

Arnstein's ladder (Arnstein, 1969) categorizes citizen participation into eight rungs, ranging from nonparticipation (manipulation, therapy) to tokenism (informing, consultation, placation) and full citizen power (partnership, delegated power, citizen control). With increasing levels for the participation, citizens

have more ability to play roles in urban planning and decisions making. In non-participation phase, they are under the control of a top-down framework, which means the policy makers are the domain sectors in this process. For tokenism, people could have voice and some degree of autonomy to participate in such a process although they rarely able to change directly the decisions and plans. In the citizen power level, there are more potentials such as partnership in which citizens can take an active participative and share decision- making with dominant power-holders and delegated power where they are full actors and have a dominant decision-making role.

In transitioning to car-free cities, participation can appear on all different levels. It often starts at lower levels, such as informing the citizens about new bike paths or sharing plans about what they are doing, and could lead to higher levels such as consultation by seeking feedback through surveys or public forums. Effective public participation means moving up the ladder and allowing citizens to perhaps even co-design policies, control certain aspects of planning, or even take specific leadership roles in the process.

2.4 Scaffold of Smart Citizen Participation

The theory of a scaffold representing public participation expands on Arnstein's work by focusing on dynamic and iterative ways of participation (Cardullo and Kitchin, 2019). It recognizes that participation might differ between levels based on different variables, such as resource availability, political climate, or urgency. The ninth rung, consumerism, is often where citizens are placed when it comes to solutions that relate to the car-free city, especially when the solutions are technology based. Mobility services such as electric scooters or autonomous taxis are often ride-hailing or subscription based solutions that turn citizens from owners into consumers. In Sweden this is also true for public transport systems. Privatization has led to rises in ticket costs, disproportionately affecting low-income citizens (Alexandersson and Pyddoke, 2010). The needs of citizens who do not have access to the required capital are deemed less important. Children, pensioners and newcomers are among the groups who get low priority. These effects highlight the need for all citizens to be able to participate when cities begin the transition to being car-free.

<table>
<tr><th colspan="2">Form and Level of Participation</th><th>Role</th><th>Citizen Involvement</th><th>Political discourse/ framing</th><th>Modality</th><th>Dublin Examples</th></tr>
<tr><td rowspan="3">Citizen Power</td><td>Citizen Control</td><td>Leader/ Member</td><td rowspan="3">Ideas, Vision, Leadership, Ownership, Create</td><td rowspan="3">Rights, Social/Political Citizenship, Deliberative Democracy, Commons</td><td rowspan="3">Inclusive, Bottom-up, Collective, Autonomy, Experimental</td><td>Code for Ireland, Tog</td></tr>
<tr><td>Delegated Power</td><td>Decision-maker, Maker</td><td rowspan="2">Civic Hacking, Hackathons, Living Labs, Dublin Beta</td></tr>
<tr><td>Partnership</td><td>Co-creator</td><td>Negotiate, Produce</td></tr>
<tr><td rowspan="3">Tokenism</td><td>Placation</td><td>Proposer</td><td>Suggest</td><td rowspan="2">Participation, Co-creation</td><td rowspan="6">Top-down, Civic Paternalism, Stewardship, Bound-to-succeed</td><td>Fix-Your-Street, Smart Dublin Advisory Network</td></tr>
<tr><td>Consultation</td><td>Participant, Tester</td><td>Feedback</td><td rowspan="2">Civic Engagement</td><td>CIVIQ, Smart Stadium</td></tr>
<tr><td>Information</td><td>Recipient</td><td rowspan="4">Browse, Consume, Act</td><td>Dublinked, Dublin Dashboard, RTPI</td></tr>
<tr><td rowspan="3">Consumerism</td><td rowspan="3">Choice</td><td>Resident</td><td rowspan="3">Capitalism, Market, Neoliberalism</td><td>Smart building/ Smart district</td></tr>
<tr><td>Consumer</td><td>Smart meters</td></tr>
<tr><td>Product</td><td>Personal data generated by tech</td></tr>
<tr><td rowspan="2">Non-Participation</td><td>Therapy</td><td rowspan="2">Patient, Learner, User, Data-point</td><td rowspan="2">Steered, Nudged, Controlled</td><td rowspan="2">Stewardship, Technocracy, Paternalism</td><td>Smart Dublin, Dublin Bikes</td></tr>
<tr><td>Manipulation</td><td>Traffic control</td></tr>
</table>

Figure 1: Public Participation Scaffold

2.5 The Planning and Building Act

The planning and building act (Plan och Byggnadslagen, PBL) is a central legislation that manages physical planning, land usage and construction in Sweden (Plan- och bygglag (2010:900)). The law first became effective in 1987 but has had several refinements during the years, lastly in 2010/2011. The goal with the law is to create sustainable community development and provide clear guidelines for both private persons, companies and governing bodies.
The three key principles of the planning and building act are:

- **Municipal Self Governance:** Municipalities themselves have a monopoly over their land, meaning they decide how to land and water are to be used within their borders.
- **Sustainable Development:** The planning should take ecological, economic and social aspects into account.
- **Public Participation:** Citizens have the right to be a part of the development process, for example through consultation processes or town hall meetings.

PBL also contains several regulations regarding how information should be communicated to relevant parties during the planning and construction pro-

cess. The goal is to create a transparent, open and involved relationship with affected stakeholders. This means that parties immediately affected by a decision, through PBL, have the right to gain relevant information regarding said decision in suitable time.

2.6 The participation prerequisites for transitioning to the car-free city

According to Nieuwenhuijsen et al. there are nine prerequisites to have in mind before starting the transition to a car-free city (Nieuwenhuijsen et al., 2019). These prerequisites are shown in figure 2, and start with *Political vision and leadership*. This ingredient is essential for transitioning into a car-free city, because the leadership of city mayors and political support across the political spectrum, represents the shared view of the majority. On top of that, the city mayors and political parties often recognize and acknowledge the key challenges with the overdependence of cars, and are motivated to dedicate fundings for possible solutions. Cities also play an important role in the change and innovation of new environmental initiatives (Gouldson et al., 2015). Nieuwenhuijsen et al. notes that cities like New York and Paris have been able to lay the foundation for sustainable mobility through determined and clear leadership of their city representatives. Which could motivate other cities to follow in their footsteps.

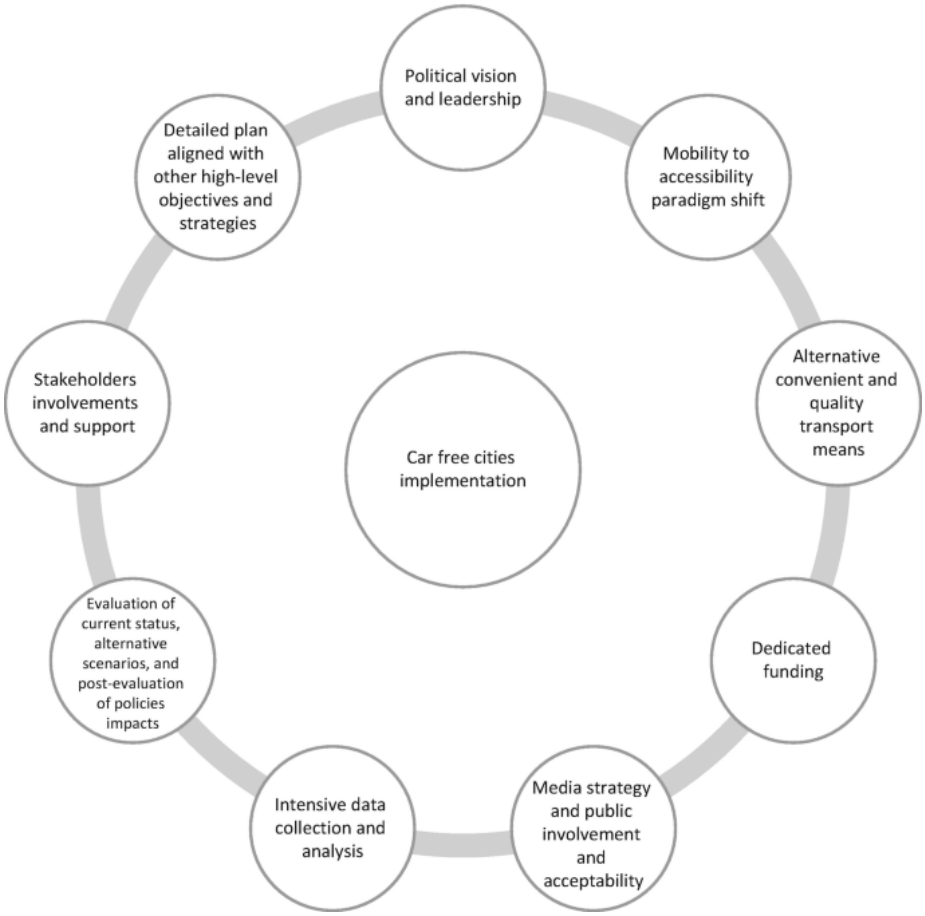

Figure 2: Nine Prerequisites for Transitioning to a Car-Free City

The second prerequisite is the *Mobility to accessibility paradigm shift*, which states that transport policies should change their focus from supporting mobility as a purpose in itself, to ensure ample levels of accessibility. In this case, ample levels of accessibility means it gives people access to important key destinations/services and secures one's participation in a society.

Next up is the third and forth requirements, *Alternative convenient and quality transportation means and dedicated funding*. Considering that many of the high-interest points are already accessible by cars, there needs to be a budget and policy switch to invest in qualitative public-linkage. This could for example mean, public transportation services that run not only during peak hours, and provide an in essence near-complete coverage. These changes are essential to accommodate shift workers, night workers and people who work in non-central parts of a city.

The fifth prerequisite is *Media strategy and public involvement and accept-*

ability. As previously mentioned, citizens' needs are highly related to the level of acceptance. This means that having a public centered planning and policy-making process will likely enhance the possibility of public acceptance. To achieve comprehensive changes within a community, public acceptability is paramount for successful implementation (Banister, 2009).

Following that is the sixth condition, *Intensive data collection and analysis.* To transition into a car-free city, one needs to collect a substantial amount of data regarding for example the following (Nieuwenhuijsen et al., 2019):

- Land use
  - Population
  - Services
  - Jobs
  - Amenities
- Demographics
  - Age
  - Gender
  - Employment status
- Mobility Patterns
  - Travel distances
  - Mode of transportation
  - Parking demands
- Environmental pollutants
  - Air
  - Noise
- Health
- Social preferences

Gathering all this information is necessary to gain an understanding of the current status and the relationship between different factors, and is needed to further develop and concretize a plan. It is needed to gain a better understanding of what people actually lives in the city, how they travel, and maybe what these citizens might lose if the transitioning is complete. This condition also helpful for the next requirement, requirement seven, *Evaluation of current status, alternative scenarios, and post-evaluation of policies impacts.* Where the goal is to analyze scenarios in the present and hopefully evaluate the positive impact the transitioning makes.

Second to last is *Stakeholders involvements and support.* As discussed in the Oslo section, stakeholders support in the form of businesses, are proven essential in the transitioning to car-free cities. Removing them from the discussion and decision-making can lead to severe repercussions.

The last condition brought up by Nieuwenhuijsen et. al is *Detailed plan aligned with other high-level objectives and strategies.* The purpose of this requirement is that the transitioning plan should align with other high-level and context-specific strategies such as economic development and climate change. Having a detailed plan, related to other high-level priorities is essential for consultation, implementation and presentation of said plan.

3 Methods and materials

Our approach is to perform a document analysis of publicly available documents from Lunds Kommun.

3.1 Data collection

Lunds Kommun has several available documents about its city planning procedures available on its website and their public E-archives. We will explore these to find documents about projects related to the car-free city. The Freedom of Information Act (offentlighetsprincipen) gives citizens the right to request access to information about public projects and actions. We are going to use this to obtain more detailed information about citizen participation in the projects related to the car-free city.

3.2 Analysis

Our goal is to identify how Lunds Kommun allows citizens to participate in the projects. The information gathered will be analyzed using the participation scaffold proposed by (Cardullo and Kitchin, 2019) to label the level of participation on the public participation initiatives found. We will also look at how these initiatives relate to the participation prerequisite for the transition to the car-free city in (Nieuwenhuijsen et al., 2019). We will also try to find out how the information gathered during the citizen participation initiatives is used in the implementation phase. Which opinions, goals and visions brought forward by the citizens are actually included in the final project plan?

4 Results

In this chapter we put forward some of the documents we found about projects relating to the car-free city. We present the participation initiatives included in these projects and how they were structured. Then we look at the representation in these initiatives. Finally, the citizen opinions brought forward in these initiatives are presented, along with information about which of these were included in the final project plans.

4.1 Participation initiatives

4.1.1 Development strategy for Lund's city center (Strategi för utveckling av Lunds stadskärna)

In this document from 2024 the Lund City Council presents its strategy for the future development of the city center in Lund. Mentioned in this documents are the ways in which they have included stakeholders into the planning of the strategy.

4.1.2 Master Plan 2025 (översiktsplan 2025)

Lunds Kommun have been in the process of developing a new master plan for the future of Lund to be deployed in 2025. On Lunds Kommun's website a master plan is described as follows:

"A master plan tells the municipality how it wants land, water and the existing urban environment to be used, preserved and developed in the longer term. It is one of the municipality's most important planning tools" (Lunds Kommun, 2024c).

The development of this plan has involved some initiatives focused on citizen participation. One initiative focused on young people in Lund. In "Rapport om dialog med barn och unga 2022 - 2023" (Lunds Kommun, 2023) the initiative is summarized. Additionally, Lunds Kommun held dialogues with over 500 people in 2022 about the development of the new master plan.

4.2 Initiative structures

4.2.1 Development strategy for Lund's city center

The participation initiatives for this project included idea generation and discussion by citizens during workshops and "Kulturnatten" (the culture night), theme-walks with dialogue between politicians and interested parties, and finally interviews with experts in city life, mobility, public spaces, culture and events. A request for access to the corresponding documents for each of these sessions were sent to Lunds Kommun. This request was not answered at the time of analysis and these documents are therefore not included in this paper.

4.2.2 Master Plan 2025

The youth participation initiative consisted of two parts. The first one was a dialogue with pupils in the municipality. Lunds Kommun approached all education coordinators in the muncipality with an invitation to participate in the dialogue. In the report the explain the dialogue as follows:

"The task distributed to the school classes consisted of two parts and aimed to get children's perspectives on places in their environment. In the first part of the task children had to start by choosing one to three places they wanted to work on. Then they had to think about what the chosen places look like, what can be done there or how they are used and what they like and dislike about the places. In the second part of the task they had to suggest how the place could be improved. Additionally in the second part of the task, children from the age of 11 were asked to think of improvements based on different challenges facing the municipality. For example:

- Densification linked to the ambition to meet a growing population and to preserve agricultural land.

- Reducing climate impact and adapting to a changing climate.
- Create good, pleasant and equal conditions throughout the municipality.

Both parts of the assignment were then to be freely presented on a board using model building, photographs, paintings, collages, etc. Students were also given the option to supplement the presentation with a movie recording." (Lunds Kommun, 2023).

The second part of the youth participation initiative was a survey that was sent out to all schools, high schools and preschools in Lunds Kommun. The survey targeted people up to the age of 19 and 1162 people answered. The survey asked for the participants opinions about mobility, safety and well-being in Lunds Kommun. It also asked them to estimate what they felt was most important in Lund, as well as things they like and things they think could be improved in the municipality (Lunds Kommun, 2023).

In the workshop conducted in 2022, 13 student spent a day with city officials from Lunds Kommun to share their most important tips regarding the physical planning of Lunds Kommun up until the year 2050 (Lunds Kommun, 2023).

In the dialogues Lunds Kommun held in 2022 they received input from citizens, associations, interest groups and companies. The input was mainly obtained through a survey, but also through meetings in person and e-mail (Lunds Kommun, 2024a).

4.3 Representation

Some pieces of information that are important when making sure the all citizens are represented in project that will affect them are prohibited from being disclosed by Swedish law. These include socioeconomic status, race, ethnicity and sexual orientation. The information that is allowed to be shared has to be made anonymous.

4.3.1 Children's dialogue

A total of 8 schools and about 220 children participated in the dialogue. The children who participated were between the ages of 5-13 (Lunds Kommun, 2023).

4.3.2 School survey

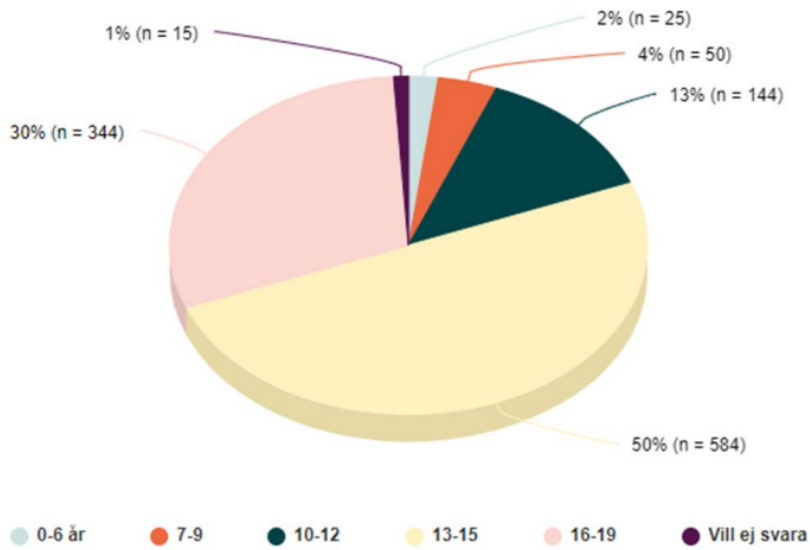

Figure 3: Age distribution (Lunds Kommun, 2023).

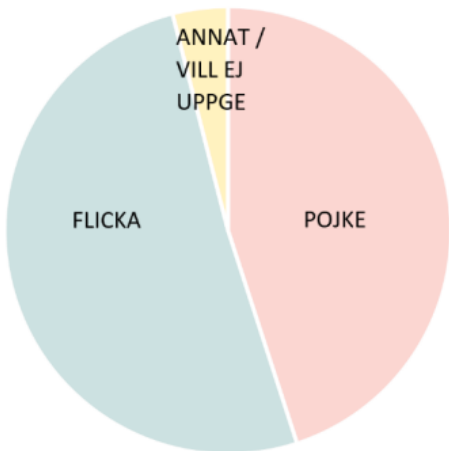

Figure 4: Gender distribution (blue = girl, pink = boy, yellow = other/no answer) (Lunds Kommun, 2023).

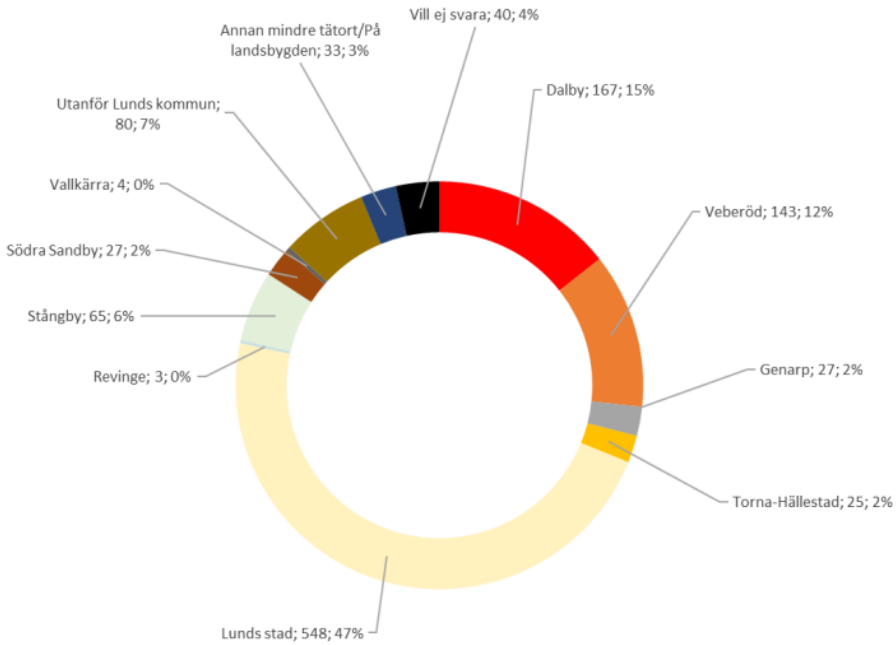

Figure 5: Province distribution (Lunds Kommun, 2023).

4.3.3 Workshop 2022

The workshop included 13 students from Lunds Kommun in the ages 13-19.

4.3.4 2022 citizen dialogue

Lunds Kommun received 412 online survey responses from citizens, and met with an additional 35 citizens in open dialogues. The number of men and women who participated were equal. Children and young adults were underrepresented. Adults in the age groups 35-49 and 50-64 were overrepresented. Respondents over the age of 65 accurately represented the number citizens in that age group. The report also states that the number of respondents who live outside of Lunds Kommun are overrepresented (Lunds Kommun, 2024a)

4.4 Participant opinions

4.4.1 Children's dialogue

Lunds Kommun identified nine areas of particular importance to the children. Four of these areas can be related to the car-free city concept: recreation, safety

in traffic, mobility and public transport. When talking about recreation the children put forward their wish for more diverse recreational spaces. They want spaces were they can climb, hide and observe plants and animals. For mobility, they explain the need for good paths for walking and biking to allow them move about freely. Traffic safety came up as a real problem. A lot of children felt unsafe in traffic. Roads with a lot of traffic and the absence of walking and biking paths were mentioned as two problematic points. There was also stated that there is a need to improve safety in traffic for children who have to move between different school buildings during the day (Lunds Kommun, 2024a).

4.4.2 School survey

When asked to name three things in the municipality the participants thought were most important, the most popular answer was well-functioning public transport. Also mentioned were green areas, social areas where its possible to see and meet people, and areas where one can get a sense of calm. Some answers to the question how can Lunds Kommun improve were:

”Better bus routes, more buses going directly from the suburbs into the city center, free bus card for young people...”

”...The most important thing for me is that I don’t want to see car traffic in the inner-city. Buses, taxis and delivery vehicles are of course exceptions but I would really like Lund to mainly be a biking city.”

”Free bus, train and tram travel for young people in Lund.”

”More public transport options during night/early morning. Make it easier to get a bus card to travel to school as a young person.”

4.4.3 Workshop 2022

Results from the workshop show that the participants want Lunds Kommun to be sustainable, have more green spaces, reduce car traffic and improve public transport. They say that removing cars will reduce noise and open up space and they also want parking lots to be moved to the outskirts of the city. The importance of safe and well lit biking paths to reduce car use and emissions was brought forward (Lunds Kommun, 2023).

4.4.4 2022 citizen dialogue

In the summary for the dialogue it says that the citizens want to keep and develop green areas. Importance is put on keeping the character of the city and that it is positive that the car traffic in the city center is limited. They also mention the need for attractive walking paths and efficient public transport to make people move away from car use. They also put an emphasis on the need to reduce the city’s climate footprint by reducing emissions.

4.5 Final project proposal

Here is what the final project proposals said about the topics that relate to the car free city.

4.5.1 Development strategy for Lund's city center

The movements in Lund should be walking friendly and safe through the city center. The goal is to create an attractive and accessible city center over as much of the year as possible. In a dense city center, solutions need to be efficient, multifunctional and inclusive. Over time, space for cars therefore needs to be limited in favor of walking, cycling, commerce and urban life. A lower speed in the city center also provides a safer and more attractive environment with better air quality and less noise (Lunds Kommun, 2024b).

Easy to get to the city center. Arrival to the center from the rest of the city and othe places should be quick and easy with easy transfer from car, bus and train to the city center network. Inside the city centre, priority is given to small-scale, flexible and frequent public transport on pedestrian conditions and with flexible stops. Short-term parking for visitors and accesssibility is offered in direct connection to the central city centre (Lunds Kommun, 2024b).

4.5.2 Master Plan 2025

The master plan states that pedestrians, bikers and public transport travelers should be prioritized ahead of car traffic. Sustainable mobility is to play a significant role in every planning and decision process. Pedestrian safety and experience is to be highly prioritized in central areas and close to schools and preschools. The biking network within and between suburbs is to be continually developed. The public transport system is to be developed and prioritized with a clear route strategy, within and between suburbs Lunds Kommun (2024c). Additionally, it states that the planning has to presume that car traffic will continue to be a part of the transport system even in the long term, especially in situations where public transport or biking is not an option. It also states that electric cars probably will take up a large part of the vehicle fleet in the future Lunds Kommun (2024c).

5 Analysis and discussion

The general themes brought up by the citizens in the different participation initiatives were in line with the idea of transition to a car-free city. The citizens wanted more green spaces, fewer cars, better and more accessible public transport and improved infrastructure for cyclists and pedestrians. These ideas were also present in the final project plans, which is a good sign from a participation perspective, as the citizens could see their wishes become reality. The fact that the master plan stated that the planning should presume that car traffic will continue to be a part of the transport system in the long term, as well as the

statement that electric cars probably will take up a large part of the vehicle fleet in the future might be signs of an approach the citizens could be concerned about. These kinds of statements make the decision makers in the municipality seem more like passive actors that are not as able to sway which path the municipality will take moving forward. Electric vehicles were not mentioned by the citizens in their visions of future Lund, yet the report discusses them as something inevitable.

5.1 Comparison to the participation scaffold

Most of the participation initiatives consisted of measures that would be labeled tokenism. Workshops, dialogues and surveys all makes citizens play the role of proposers. PBL allows citizens to take part in two part of the planning process, consultation and feedback. In the cases we have studied it became clear that a lot of the citizens wishes were incorporated into the final project plans, which might make it seem like the participation level reaches that of citizen power. However, the participation we observed is actually more fragile, as it depends on the city officials embracing the ideas of the citizens. During times of good relations between the citizens and officials this system becomes more bottom-up, but can sway to become more top-down without much notice.

5.2 Comparison to the nine prerequisites of transition to the car-free city

When it comes to Lund's alignment with the nine prerequisites, we identified a few key steps and initiatives that indicate progress in this area. The main ones that we chose to evaluate and focus on are the following four:

- Political Vision and Leadership
- Satisfying Transportation Alternatives to Cars
- Dedicated Funding
- Public Involvement

5.2.1 Political Vision and Leadership

Lunds municipality has a clear and ambitious vision to reduce car dependency within the city. The strategic plans emphasize on creating a more sustainable and livable environment. With this comes prioritization on public transportation, cycling and walking over car-usage. This vision closely aligns with other European Union initiatives for sustainable urban mobility, Union (2020). Leaders within Lund appear to be committed to a long-term transformation which is seen in policy documents and other public statements that outline steps towards these goals.

5.2.2 Satisfying Transportation Alternatives to Cars

Lunds has, and is making, significant progress in offering transportation alternatives to cars. Investments in improved cycling infrastructure, through specific bike lanes and extra parking facilities, support the reputation as a bike-friendly city. Furthermore, the municipality has plans on expanding the public transportation services. This will lead to a greater coverage and higher frequency to satisfy the needs of the citizens.

5.2.3 Dedicated Funding

According to Lunds financial budget of 2025 they are dedicating 5,76%of their yearly budget on Infrastructure and Environment, Kommun (2024). This equals around half a billion SEK (or 45 million USD). This indicates a strong priority towards sustainable urban development, and shows that the city recognizes the substantial investment needed towards this trend. However, more detailed analysis of how these funds are going to be distributed would be needed to better understand their plans.

5.2.4 Public Involvement

The level of citizen participation in Lund seems to be robust, considering the availability and variety of public engagement activities. These surveys, workshops and dialogues with residents appears to be used frequently to gain an understanding of what people want, and to co-create solutions. Efforts like those, suggest that Lund values citizen input and wants to create a sense of partnership with the citizens. In spite of that, it would be valuable to examine the level and inclusiveness of this involvement. For example to understand whether all demographic groups are represented and to see more detailed how feedback is integrated into policy decisions.

6 Conclusions

In the public projects we reviewed, citizen participation played a pivotal role in shaping more citizen-centered and detailed proposals. Through dialogues, workshops, and surveys, residents expressed their aspirations for reduced car traffic, improved public transport, enhanced pedestrian and cycling infrastructure, and the creation of more green spaces. These collaborative efforts ensured that many citizen preferences were integrated into the final project proposals, underscoring their involvement in the urban planning process.

However, this participation largely operated at the level of tokenism—focused on consultation and placation. While citizens' voices were acknowledged, ultimate decision-making authority remained with city officials. Though these initiatives encouraged collaboration under favorable conditions, they lacked structural mechanisms to consistently empower citizens beyond a consultative role.

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Essay 2 – Transparency in AI Surveillance and its effect on behaviour in ICA Brösarp

Philip Olsson, Hien Truong, Georg Hanö Ivarsson

Transparency in AI Surveillance and its effect on behaviour in ICA Brösarp

Philip Olsson, Hien Truong, Georg Hanö Ivarsson

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Introduction and Research Plan

The use of AI in surveillance is a rapidly growing trend due to the possibilities that new technologies give us. With technologies like facial recognition and theft detection, the amount of surveillance that can be performed increases. However, the types of risks that need to be considered also increase. When this technology is used for crime prevention it can implicate the wrong person, be biased, and need access to sensitive data. A scenario outside the EU where this went wrong is a case shared by the BBC in May of 2024 (James Clayton), where a person was misidentified as a thief shortly after entering a store. They were given no information on how they were identified, and no way of defending themselves against the accusations made by a facial-recognition system. This incident raises issues of AI being inaccurate and having the final say without any human input or transparency. Facial recognition requires the system to match a face to one in a database. A person's facial features being biometric data means that adding it to a database can go against the regulations of a region. In the European context, there is a lot of emphasis on transparency through regulations and ethics guidelines. The assumption that these issues could significantly address ethical concerns individuals might have through transparency alone warrants critical evaluation. In the EU, as we will get into, this is highly regulated and mostly prohibited. Although such questionable practices are generally prohibited under laws applied to Sweden, it raises questions of whether individuals directly affected by the system are truly aware of these legal protections. Furthermore, trust is invoked in the discussion as it may affect individuals feelings about AI systems. That is why our case study proved to be interesting in exploring how AI surveillance can be used in Sweden, and what effects transparency as a concept had on the people being surveilled.

The case of ICA Brösarp

The ICA in Brösarp is a local supermarket in the south of Sweden. The supermarket is located in a rural part of the Swedish south, and the area around the community is mostly known as an area with summer houses. After an armed robbery, the store’s security company installed a system aimed at preventing further robberies. At ICA Brösarp there is a TV-screen in the entrance displaying the customers with a “tracking-square” around their faces and text stating that the recording is active. The screen is placed in a way that you wouldn’t miss it if you walk into the

store (except if you were looking at your feet). Individuals entering the store may be unaware of the extent to which their biometric information is being used, stored and processed. This raises a question around how the customers are surveilled and what sort of system is processing the video feeds. The question is left open in the air if the system is merely recognising the face of the person or just detecting it. Regardless of how the video feed is processed. The customers are not informed about whether or not their biometric information is saved. This makes for an ethical dilemma. It is a case, as we will see, where ordinary surveillance tries to present itself as doing more than it actually does. Why is the store opting for this way of using surveillance disguised as AI? Does the lack of transparency in this situation actually matter?

Image 1. Photo of the tracking screen at ICA brösarp.

Research Plan

Our problem statement seeks to address the implications of the lack of clarity surrounding whether the system employed by the store is recognizing or merely detecting faces. The presence

of facial detection or recognition systems without clear disclosure to individuals raises concerns pertaining to privacy infringement in terms of the collection of biometric data. Individuals entering ICA Brösarp may be unaware of the extent to which their biometric information is being used, stored and processed. The issue around lack of clarity could potentially be addressed through adhering to principles of transparency. This lack of transparency invites debate about the legality, ethical considerations and customers' perception of the system. By evaluating transparency as a dogma advocated by general guidelines for ethical AI systems, it truly holds substantial importance, we assess its significance. Surveillance, whether real or simulated, can infringe on an individual's autonomy by creating a coercive environment where individuals may alter their behavior under the belief that they are being watched (Foucault 1977). We acknowledge that the effect operates on false truths and may affect trust within the general public. Further, we aim to address the impact of perceived surveillance within the context of high-trust and explore the ethical dilemmas it raises due to a lack of transparency.
Our research question is: Does transparency matter in surveillance systems within small, high-trust communities?

Literature Review

AI and Ethics

Before looking at the effects of a surveillance system like the one in ICA Brösarp. It could be helpful to go over what society in the EU deems to be trustworthy AI and ethical AI. A good way to do this is to evaluate the system through the EU legal framework as well as the AI guidelines that are proposed in the EU. A lot of new legislation has had to be introduced due to the rapid rise of AI in smart cities. In trying to accurately assess our case through a legal and ethical framework, it becomes clear that the terminology that is used in legislation and guidelines needs to be defined. Facial detection, identification, verification, and classification are different and do not face the same prohibitions. Facial detection systems are able to discern where a person's face is present in a picture or video feed. It is not able to connect the biometric data that is the face to a specific person. Facial recognition involves the use of facial detection to be able to extract facial features and then compare them to biometric data in a database. Thereby trying to identify

a specific person. Facial verification involves the comparison of a natural person's biometric data with previously provided biometric data to confirm one's identity. Facial categorization like detection does not compare biometric data but instead uses the collected biometric data to assign individuals into categories.

A regulatory framework released in 2020 by the European Commision called WHITE PAPER On Artificial Intelligence - A European approach to excellence and trust. Has tried to balance the freedom of innovation with ethics in the EU. However the need for specific requirements on AI use cases has become evident and in 2021, a proposal for what recently entered into force this August, the AI Act (AIA), was made by the European Commission. The AIA is more specific in what the requirements that different forms of AI need to adhere to are. It is important to consider that the AIA was introduced to build on the Charter of fundamental rights of the EU and General Data Protection Regulation (GDPR) of the EU. The fundamental rights include the right to privacy and protection of personal data. The GDPR is applicable to our case just as the AIA is. However the GDPR applies to all sectors where personal data is processed. It includes the prohibition of processing sensitive personal data such as biometric data, with certain exceptions. It is assumed in the AIA that the GDPR covers facial recognition and that the AIA is there to assess the risks of more unclear cases. It achieves this by creating different risk categories associated with different uses of AI. The tiers of risk include unacceptable, high, limited and minimal risk with unacceptable risk being completely prohibited. Surveillance/Identification systems can easily fall under the unacceptable risk category if biometric identification is used by certain parties such as law enforcement. They can also fall under high and limited risk. What is interesting with the ICA Brösarp situation is that the AI that is being used can easily be perceived as being the type that would be prohibited by the GDPR and AI Act. If the AI used facial identification and stored biometric data from customers. That would clearly be prohibited by Article 5 practice (e) of the EU AI Act, where expanding facial recognition databases with CCTV footage is addressed. In fact the way that the AI in ICA Brösarp actually operates does not include any storage or processing of the biometric data. It only recognizes what in its feed is a face and stops there. It does not identify or categorize biometric data as defined in the AI Act. This would only fall under minimal risk. This is where there is some discrepancy in what the legislation enforces and what ethical concerns the situation creates. Minimal risk does not enforce any type of transparency that could mitigate the deception in the case. Therefore the

effect that it has on behaviour that doesn't lead to immediate harm is not considered by the AIA. Specifically the effect it might have on people's behaviours and autonomy. The GDPR however includes transparency as one of its principles in article 5.1(a), "Personal data should be processed lawfully, fairly and in a transparent manner in relation to the data subject". One must be able to demonstrate compliance with this as per article 5.2. This is where the case becomes interesting as the system clearly avoids transparency until it is required through questioning from either a subject or data protection authority.

To analyze the situation in terms of the ethical aspects we will use the EU concept of trustworthy AI, The EUs High-Level Expert Group on Artificial Intelligence has also released a guide to the use of trustworthy AI. These guidelines include requirements for technical robustness, privacy, transparency, non-discrimination, societal well being and human agency and oversight. In our case the guidelines for human agency and oversight, transparency, and societal well being are relevant. In terms of societal well being, the act of making it known that there is some sort of AI surveillance in the store but not exactly which sort raises questions about the social impact it has and whether it is in accordance with the EU guidelines. The human agency and oversight guidelines mention that an AI system could have an "affect human autonomy by interfering with the (end) user's decision-making process in an unintended way". Which should necessitate consideration on whether this infringes on a person's fundamental rights. Finally transparency is mentioned as one of the main points in the AI Assessment list as well.

We can already answer why ICA has used facial detection or not so smart surveillance rather than actual identification to deter people. The legal frameworks clearly do not regulate detection in the same way as other types of AI surveillance. So to have the desired effect of crime deterrence, without any legal ramifications, ICA framed the system as being smarter than it actually is. By doing this however, they disregard the ethical principle of transparency. This leads into the discussion on the actual need for transparency of surveillance/identification systems if a person cannot distinguish between illegal and legal practices? This also leads into the questions raised by Nguyen (2021) on the problems that transparency introduces. Is it possible for experts to be completely transparent and explain what is happening to non-experts? This has problems regarding whether non-experts can comprehend the reasoning an expert uses, the "*epistemic*

intrusion argument", and also just how feasible it is to always explain what is happening. To answer our research question we need to explore transparency more in depth?

Transparency

Transparency has emerged as an important concept in discourse pertaining to moral philosophy and the ethics of technology. It denotes the extent to which processes, decisions, or systems are open to scrutiny, thereby (with the aim of) fostering understanding and accountability. Hence, the effectiveness of transparency in addressing deception remains a critical question when applied to the incident at ICA Brösarp. Therefore, transparency requires an edifice – clear definitions are necessary as its mere presence does not automatically eliminate deception. Under certain conditions, transparency can inadvertently create new opportunities for dishonesty and misrepresentation. Careful consideration is needed to determine approaches that ensure the legitimacy of surveillance systems and if transparency is an important component to this. These considerations are essential for evaluating both the limits and the potential of transparency.

To comprehensively address transparency and to unpack its conceptual vagueness, we emphasize four key aspects explained in the article *"Four Facets of AI Transparency"* by Larsson et al. (2023): *explainability, mediation, literacy, and legal tradeoffs*. The first consideration revolves around *explainability*, which aims to make the workings of AI systems easier to understand and less like a "black box" they are often perceived to be. However, the challenge lies in the risk of oversimplifying the system's workings to the point where essential details and nuances are lost. The second dimension, *mediation*, focuses on how transparency is shared and presented as it is not neutral – it is inherently shaped by choices about how information is conveyed. Whether it is conveyed through visual outputs, text, symbols, or user interfaces, these forms of mediation determine how AI systems are understood, especially by users without expertise in the field as they may experience struggles with processing technical information. *Literacy*, the third component, refers to the required knowledge to understand AI systems, with different groups like developers, policymakers, and the public having varying levels of understanding. It is important to recognise that efforts to make users understand AI systems may shift the burden of accountability onto individuals, thereby reducing scrutiny on institutions and corporations.

Lastly, *legal trade-offs* must be carefully considered to balance competing interests while maintaining transparency where it matters most. This includes protecting intellectual property, ensuring system security, and preventing the misuse of AI systems.

The paper *"Transparency for AI Systems: A Value-Based Approach"* by Stefan Buijsman (2024) offers valuable insights and conceptual tools or frameworks that can be applied to analyze transparency in surveillance systems – we deem it to be well-suited for the facial detection system at ICA Brösarp. Among the approaches discussed, the proposed value-based framework – the one we ought to use to evaluate our case – stands out as a better alternative to existing process and outcome based conceptual models. The paper proposes the focus to shift on embedding ethical and societal values – such as fairness, accountability, and privacy – throughout the system's design, implementation, and operation. These dimensions ought to be organised in the following structure: Identifying the relevant ethical and societal values pertinent to the system's intended use, providing working definitions of these values and how they are interpreted in the system's context, translate or include these values in the design requirements, assessing the system's performance based on the criterias of the values, and resolve conflicts between values by explaining the decisions made to address and balance these tensions.

In the book *The Transparency Paradox* by Ida Koivisto (2022), the author explores how the concept of transparency resonates with individuals, which prompts institutions to leverage this appeal for the modern push for truth about governance as a means of legitimizing themselves. Koivisto argues that this premise is false – she illustrates how transparency is often leveraged as a tool for optics, prioritizing appearances rather than neutrality it ostensibly promises. Further, we aim to hone into the author's critiques on the notion that transparency inherently provides access to truth or reality, where the act of making something "transparent" often obscures more than it reveals.

The book addresses the limitations of transparency in the context of digitalization as it highlights how technologies continue to blur the lines between reality and representation (Koivisto, 2022). Downstream from deception in surveillance systems, technologies provide what is so described as a "site of simulacra", reinforcing distrust in institutions[1]. As it gets more difficult to navigate

[1]Simulacra is a term that refers to representations or imitations of things that may lose connection to their original source or reality.

layers of deception and misinformation, the effect is that skepticism gets amplified toward systems that promise openness and accountability. (Jolliffe, C., 2024) This further undermines the significance of transparency since the collapse of the boundaries between the visible and the hidden makes transparency ineffective in fulfilling its promise of truth-telling. (Koivisto, 2022)

Trust

The EU High-Level Expert Group on Artificial Intelligence that has created the previously mentioned ethical framework, emphasizes trust throughout the guidelines. However if we look at their own definition of trust, it states that trust involves, “the willingness of one party to depend on another in a risky situation (trusting intention)”. Trustworthy AI must therefore also take into account “not only the trustworthiness of the AI system itself, but requires a holistic and systemic approach, encompassing the trustworthiness of all actors and processes that are part of the system’s socio-technical context throughout its entire life cycle.” (European Commission 2019). Therefore effectiveness of the presented principles, such as transparency in creating trust with users, depends on where the system is deployed.

In the *TRUST – THE NORDIC GOLD* (Ulf Andreasson, 2017) Andreasson argues the level of social trust in Sweden is exceptionally high compared to most other countries. He defines trust as “the expectation that a given norm is respected by people they do not know, and the expectation that these people do not have dishonest intentions”.

The Swedish Trust Barometer findings, conducted by Marie Cederschiöld University which is formerly known as Ersta Sköndal Bräcke Högskola (2021), support Sweden’s status as a high-trust society, showing significance in general, institutional and community trust, with trust levels remaining consistent over time. The data suggests that the contributing factors to trust in Sweden are decentralized governance and strong social structures.

Decision-making in the Swedish municipalities are tailored to the specific needs of communities. Local governments in Sweden are aiming at making their practices transparent and provide public records accessible to the general public, which builds confidence in institutions. Additionally, Sweden’s strong welfare system, which provides free access to healthcare and education, and its emphasis on social cohesion further reinforce the institutional trust across the country. (Abdelzadeh & Lundberg, 2024)

Underlying these explanations is the optimism citizens hold about the future, as reduced anxiety about uncertainties creates space for trust (Trägårdh & Ersta Sköndal Bräcke Högskola, 2021).

Methodology

A qualitative approach was chosen to collect information because the concepts of transparency and trust can be difficult to quantify, especially given the timeframe of the assignment. Semi structured interviews were used. This approach facilitates the collection of participants' opinions and experiences from people being surveilled by cameras at the store knowing that they have been through the experience recently. Semi structured interviews will allow for a lot of detail on the issues we cover in the interviews while also allowing respondents to introduce issues of their own that they think are relevant to the themes. The participants were selected by us standing outside the store asking if they wanted to participate in a study. When conducting the interviews we used grounded theory as our framework for processing our data. Since we did not use any sort of automatic transcription we started coding our data already during our interview by taking notes of the key concepts that emerged during the course of the interview.
We also did a small ethnographic study while waiting for people to participate in our interviews by observing the people and the surveillance system at the store. We were outside the store for about two hours on a Saturday between 11 AM and 1 PM. This was based on google showing this as the busiest hours of the business.

Results & Analysis

Ethnography

We drove to Brösarp because there were no good public transport services from Lund or Malmö. We decided to go on a Saturday at 12 because google indicated that it would be the busiest time at the store. The village Brösarp was a slow community with not a lot going on. When we were passing through towards the city center we noticed that despite being small, there was a football pitch and a padel court near the local school. There were a few shops like an antique store, a spa venue, and a pizzeria. The only movement was to and from the ICA supermarket and the tea &

gift shop beside it. The village consists of almost exclusively villas with some terraced houses not more than two stories high. The village itself was too small to sustain a store of this size – it was obvious that a lot of the customers lived in adjacent communities. We sat in the parking lot and observed the people around us going to and from the store. The people were almost exclusively adults with most people looking to be middle aged. Most people arrived solo by car. No particular gender was more prevalent than the other and very few children were observed. We went into the store to observe the surveillance system for ourselves. The facial detection system failed to clearly communicate its intended purpose (deterrence of crime), functionality (detection or recognition?), and compliance with ethical standards. The system does not align with ethical values like privacy and autonomy, and these, unfortunately, not values explicitly addressed in its design. There seems to be no verifiable measures showing how effectively the system balances crime deterrence with respect for individual rights. Clearly, the system did not meet fundamental criteria for transparency when analyzed through a value-based framework. It is still important to acknowledge that a system can be transparent while still engaging in ethically questionable practices or manipulating perceptions and behaviors. (Licon, 2024) This prompts the question of whether transparency and honesty is sufficient to resolve the ethical dilemma we raised entirely.

Interviews

A noteworthy observation is that the screen was not noticed by some customers even though they had noticed the actual cameras in the store and were aware of the fact that they were being surveilled. “I noticed the cameras”, was a response we got several times when we asked if the customer noticed any form of surveillance. Only three out of the seven interviewed actually noticed the screen showing the surveillance system. “I remember noticing the screen when it was put up, but I had forgotten about it” was an interesting comment. The ones that had noticed the screen would only pay attention to it the first time they saw it and would not think about it much after that, although they initially felt slight concerns about potential implications, such as their biometric data being stored in a database. This leads to the idea that this type of surveillance is being normalized which was also mentioned by a customer.

Overall, the general consensus was that they were not personally worried about being tracked if the purpose was crime prevention. But none of the customers were able to do more than speculate what it was that the system did. This led to discussions on what the legislation allows or that there was an element of trust that this system was being used for their own good. Five customers viewed the technology positively, seeing it as a beneficial measure for improving safety in the area. They expressed confidence that laws or legal safeguards are in place to prevent a large corporation like ICA from engaging in harmful surveillance practices that could potentially have dire consequences on individuals. Although they were positive in their sentiment concerning the benefits the system could give to the community, they sometimes also expressed a negative sentiment towards them being surveilled and it being uncomfortable.

The remaining, however, remained neutral in their opinions. The three who noticed the screen One individual was specifically worried that the technology could be used to exploitatively monitor customer behavior while also acknowledging that similar insights could be more easily obtained by analyzing purchase data from membership cards. Another customer noted that such surveillance practices appear to be becoming more common and expressed concern about this trend. Lastly, one comment that “It is completely unnecessary”, arguing that in a place like Brösarp, where petty crime is relatively rare, investing in such technology may not be a sound financial decision for the business.

For all customers, increased transparency or knowledge of the system did not appear to change their opinions regarding the existing surveillance practices at ICA Brösarp. The ethical frameworks we introduced advised creators of systems to think critically about the effects an AI system can have and give them pointers on how to mitigate these risks with transparency. Our results don’t show transparency having a discernible effect. Some customers deduced what the system was doing by considering what legislation allows and that it was simply a scaring tactic. Showing us that they trusted ICA enough to presume that it was not breaking the law. Whilst others were not aware of how these systems work and accepted the idea that they were being surveilled and trusted that it was for their own benefit. This is interesting because not only does it question whether transparency, if required by the legislation or not, would have any effect on the customers. It also seems like the system introduced has had little effect on the customers despite trying to frame itself as doing more than the law permits. Of course we cannot say that we interviewed everyone that visits the store or the group of people it was designed to deter.

However we did get customers of different ages and genders that seemed to be representative of the people you expect to find in a small village like Brösarp in sweden. All of our interviewees were also customers that frequent the store.

Through our coding of the interviews we also got some recurring key concepts that came up. By comparing the themes that we each coded from the interviews we got lack of transparency, legislation, discomfort, trust in the use of the system and awareness of the surveillance as main concepts. While interviewees showed varying levels of awareness, discomfort and knowledge of the legislation. All of them acknowledged the lack of transparency in the system and expressed trust that the system was being used in their favor. This is in accordance with the idea that small communities will have high trust within the community which also affects their institutional trust (Swedish Trust Barometer 2021).

Conclusion

Our results do suggest that despite transparency being a key concept in both legal and ethical frameworks, it is not something that will always affect the reaction to a surveillance system in a small high trust community. ICA Brösarp are simultaneously being transparent and open about surveillance being used but are not being transparent about what their surveillance system is doing. Yet, many customers do not notice the efforts they have made to expand their system and do not care to understand the system or already know what is allowed by law and trust that the store is not doing anything illegal or immoral. We have a situation where the legal framework in the EU being the GDPR and AIA, require transparency. The Trustworthy AI ethics guidelines state that communication with subjects and explainability are key in creating transparent trustworthy AI. The value-based approach we introduced prioritises stakeholder-centered design which considers that different groups may need different levels and or types of transparency. Which clearly is not what is being done in ICA Brösarp. They do not fulfill the ethical requirements in any framework for transparency that we have introduced. Yet customers showed high trust in the systems being used for their benefit despite us highlighting the transparency concerns. An explanation of what was happening did not impact the customers' idea of what was happening or their trust towards the system. Clearly it is not enough to just quickly explain the

system when informing people about what surveillance is being used, if we want to increase trust in a small community.

This conclusion is in accordance with the ideas of Nguyen and Licon in that transparency, though touted as being a solution to ethical dilemmas and deception, can have an adverse effect or no effect at all if it is not implemented in a way that balances several factors. Ethical frameworks always putting a large emphasis on transparency does not consider the systems socio-technical context. It seems that ICA brösarp did implement their system in a way that is both legal and trustworthy to their customers, despite not conforming to commonly accepted AI guidelines.

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Appendix

Disclosure Statement - Generative AI

In this paper we used Chat GPT to receive feedback and improve the language of the paper. The following links show the prompts used:

https://chatgpt.com/share/67864840-ec38-8007-aaad-cf6e142a3da5

https://chatgpt.com/share/6788e3f5-7edc-8007-8f08-d7a041c359eb

Essay 3 – University AI Policy in Nordic Smart Cities. Investigating thematic structures of university AI policy documents, using unsupervised machine learning methods

Özgür Ak, Klara Wiklundh, & Daniel Jóhannsson

University AI Policy in Nordic Smart Cities

Investigating thematic structures of university AI policy documents, using unsupervised machine learning methods.

Özgür Ak, Klara Wiklundh, & Daniel Jóhannsson
Group 4

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Introduction

Smart technologies are becoming more and more advanced and prevalent in today's societies, and "smart cities" become centers for innovation by embracing emerging technologies. Smart cities have been an interest to academics and practitioners for quite some time. However, the literature on smart cities still falls short in providing an all-unifying definition of what they are, even though the idea of digitalized societies has been around since the 1950s. (Kitchin, 2019)

The term, smart cities, has evolved through time, in parallel to new technologies and innovations. For instance, Kitchin et al. (2019) noted that "*In simple terms, the smart city seeks to improve city life through the application of digital technologies to the management and delivery of city services and infrastructures and solving urban issues.*" On the other hand, Haarstad et al. (2017) explain how the term "smart city" is a textbook example of an "empty signifier", a word with no concrete meaning or definition. They point out that, according to the European Commission, more than half of European cities with populations over 100.000 inhabitants had proposed and/or implemented smart city initiatives. The smart city is a term that shifts meaning depending on how it is utilized; it is not static. The question they pose to understand smart cities is: what a smart city does, not what it is. That means that we understand smart cities as a discourse, a strategy or a way of framing policy and how this context shapes themes, like in their case: sustainability.

Although opinions on the definitions and prerequisites of smart cities may vary, one thing everyone univocally agrees on is that their potential benefits are endless, offering a more sustainable way of living by leveraging technology to enhance productivity and convenience (Podda et al., 2024). However, for smart technologies that are utilized in smart cities to work, extensive data collection, surveillance, and not-so-transparent algorithms are needed. This could lead to ethical problems, like systematic discrimination and unjust solutions, that may cause more harm than good (Kitchin et al, 2019). Therefore, the ways in which we utilize smart technologies in the broader city ecosystem become an important topic of interest for many stakeholders from citizens to politicians and from academics to practitioners.

Universities and companies are social entities where many stakeholders with different goals get together to work on the same projects (see Bourdie, 1990) like smart technologies and sustainable innovation, building smart cities. Universities can encourage engagement of young members of society and provide insight to smart city projects. Therefore, we can also see university students as stakeholders as they are going to be the next generation of professionals implementing smart technologies in smart cities, often being early adopters of emerging technologies.

Universities play an integral role in driving research, practical implementations, and policy development for smart technologies, with the goal of creating and sharing knowledge with the ecosystem's stakeholders (Ferraris et al., 2020, p.3). Universities are not only central to driving advancements in smart technologies, but also crucial in shaping societal attitudes towards them by developing frameworks that govern their use on campus as well as across city-wide ecosystems through collaborations with both private and public entities (see, Puttkamer, 2024). How educators and students are guided to use smart technologies, such as Artificial Intelligence, in education will have an impact on their digital literacy, critical thinking, and problem solving skills.

Recent advances in large language models (LLMs)—sophisticated AI systems that generate human-like text in response to user queries (e.g., ChatGPT, Gemini, Github Copilot, Claude)—have attracted significant attention of late. As such tools become increasingly more integrated into almost every aspect of our lives, educational institutions and governing bodies are playing a catch-up game to ensure that their implementations are fair, effective, accessible, and uphold academic integrity (Wang et al., 2004).

Consequently, many universities have recently published some form of AI recommendation or policy guideline documents to reflect on their priorities, values, and integration philosophy in regards to AI, mostly LLMs. By analyzing these policy guidelines, we can uncover patterns, common themes, and divergences related to governance, ethics, and educational practices, offering greater transparency into the often opaque workings of universities as an integral part of smart cities. The findings could offer insights into how universities guide student interaction with AI and shape the values and themes imparted to them, ultimately influencing the future of smart city ecosystems.

To this end, in this explanatory study, we examine the thematic structures of AI policy documents issued by universities in smart cities across the Nordic region—namely, Denmark, Finland, Iceland, Norway, and Sweden. Aiming to provide insights into the utilization of AI in education as an integral component of smart city ecosystems, we ask the following research questions:

1) What themes are most prevalent in university AI policy documents across the Nordics?
2) Are there notable similarities or differences in the thematic structures of the policy documents across universities and countries?

In the following section, we give an overview of the academic manuscripts investigating the use of AI in education. In the same section, we also provide information about the existing European and

Nordic guidelines for integrating AI into education as well as society as a whole. Next, the dataset we curated for this research will be introduced and described in detail. Then, methods used in the data analysis will be introduced and described. Following the results of the data analysis will be presented and discussed in relation to the literature. Finally, we conclude our research by providing conclusion remarks on the results in light of our research questions, addressing limitations of the study, and making recommendations about future studies.

Literature Review

The recent pandemic has highlighted significant inequalities in education, especially regarding access to technology and digital literacy. As societies become increasingly more digital, addressing disparities in access to digital education is essential to prevent widening educational gaps and excluding disadvantaged groups. Smart city schools offer a unique opportunity to address these challenges by providing a centralized platform to democratize access to emerging technologies, foster digital literacy, and provide both personalized and scalable solutions (Mangina & Fridolin, 2022). In their paper, *"Could AI Democratise Education? Socio-Technical Imaginaries of an EdTech Revolution*", Bulathwela et al. (2021) tackle the same issue but on a larger scale. The authors emphasize AI's potential to democratize information accessibility not only locally but also globally. The authors believe that with use of open-source and human-centric AI, the education landscape could be much more equal.

AI has the potential to make significant improvements in education. In their review, *"Artificial Intelligence in Education: A Review,"* Chen et al. (2020) highlight that AI is already strongly utilized in education. The AI tools are personalized for learning processes, as well as increase engagement with learning material. These tools are not only beneficial for the students, but also the educators themselves. They ease the administrative burdens and let the educators focus more on the pedagogical aspects related to teaching. However, despite AIs vast arsenal of potentials, concerns remain regarding its use in education—particularly in terms of ethics, privacy, and transparency. For instance, Crow et. al. (2017) argued that increased use of AI in education may encourage dishonesty and compromise academic integrity by facilitating plagiarism or producing artificial academic manuscripts.

Several studies stress the importance of developing clear AI guidelines within educational institutions. For instance, in their work in "*Generative AI Tools and Assessment: Guidelines of the World's Top-Ranking Universities*," Moorhouse et al. (2023) revealed that less than half of the

world's top 50 universities, on some metric, provide publicly available AI guidelines. The authors argued for the importance of integrating generative AI in educational contexts rather than banning it entirely. Complementing this perspective, Jørnø et al. (2022) in "*The Imaginary of Personalization in Relation to Platforms and Teacher Agency in Denmark"* critiqued the oversimplified debate between maximal technology integration and its total exclusion from educational landscape. They assert that while personalizing learning with AI has the potential to improve educational outcomes, it must be balanced with ethical considerations such as privacy and transparency.

In another study, *"AI-based Tools in Higher Education: A Comparative Analysis of University Guidelines,"* Hoffman et al. (2024) conducted a comparative study of AI guidelines from universities in Germany. They concluded that many universities lack proper guidelines on AI use, and therefore constructed a unified recommendations for AI use in education composed of the important parts from some of the university guidelines issued by some of universities in Germany.

This review highlights that universities adopt varied strategies regarding the use of AI in education. Nonetheless, the works reviewed consistently emphasize AI's potential to revolutionize education with numerous benefits, provided that its pitfalls are adequately discussed and addressed. Next, we provide information on the national AI policies issued by Nordic countries.

Nordic National AI Policies in Education

AI tools, like LLMs, are used both by academic staff and students on and off campus. Some of these tools help teachers create study plans and students take notes on dense course literature. However, since these tools are relatively new, there is yet to be an overall consensus on how they can and should be used.

The European commission has published ethical guidelines regarding "the use of artificial intelligence and data in teaching and learning for educators" but it is mainly directed to primary and secondary school teachers, not university lecturers. The main ethical considerations are fairness, justified choice, human agency, and humanity, and that teachers should be guided by these principles in regards to the use of AI. The requirements of the AI-tools used are human centric, oversight, transparency, diversity and non-discrimination, privacy and data governance, and lastly, societal and environmental wellbeing (European Commission, 2022).

The *Danish National Agency for Education* and *Quality under the Ministry of Children and Education* have also published a report about how teachers may implement generative AI in secondary education. They highlight the responsibility for the school management to create and

implement guidelines for the use of AI and to involve the students in discussions on how AI can be used. Educational institutions are encouraged to invest in digital literacy through teaching critical and creative thinking, as well as ethical considerations regarding AI, to ensure that students are competent and responsible users of AI. They see AI as a smart technology that will be crucial to advance education and society, (Styrelsen for Undervisning og Kvalitet, 2024).

The Finnish Ministry of Education and Culture refers to the European commission's guidelines on the use of AI in education, but they also have their own guidelines and policies about digitalisation. In the document, "*Policies for the digitalisation of education and training until 2027,*" published by the Ministry of Education and Culture, Finland envisions becoming a world-leading developer and user of sustainable digitalisation in education by 2027. They do not specifically mention the use of smart technologies, but suggest that digitalisation will lead to more equal opportunities in education, and the realisation of their policies will mean "advancing equality, long-term, innovative and systematic development of digital solutions in the sector." (Finnish Ministry of Education and Culture, 2023).

Norway also has a national strategy similar to Denmark and Finland, both directed to AI in a broader societal context and in education. For instance, a report from the Norwegian Ministry of Education and Research—"Learning: Lost in the Shuffle?"—examines the use of learning analytics, data collection and how learning analytics can improve teaching and enhance learning. They note that use of AI tools in education need to ensure the students rights, and the education act committee also recommends that "codes of conduct be drawn up for the education sector." They hope that individualized learning can adapt education to each student's needs and conditions, leading to better study results and a fairer education where all students are given the opportunity to reach their full potential (Regjeringen.no, 2022).

Although as of this moment, there are no national policy guidelines for AI in education in Sweden, the country has a general national vision in becoming a world leader in digitalisation with smart technologies, with the focus on teaching and developing competence in AI (Regeringen och Regeringskansliet, 2018). Thus, universities are free to develop their own frameworks and enforce their own rules about the use of AI for their academic staff and students. Iceland, like Sweden, seems only to have national AI policy's with the objective to build and maintain ethical use and development of AI (Government of Iceland, 2021).

Data

For this study, we curated a new dataset from the AI policy documents published by universities in cities associated with smart technologies and smart city governance across the Nordics region. We first began by identifying smart cities and the universities within these cities across the Nordic region, comprising Denmark, Finland, Iceland, Norway, and Sweden. We identified a total of 22 universities from 17 cities—further detailed in Table 1.

Table 1. Descriptive statistics on the University AI Policy dataset presenting the number of universities included in this research across smart cities in the Nordic region.

Country	Cities	Universities
Denmark	Copenhagen, Århus	Copenhagen Business School (CBS), Århus University
Finland	Helsinki, Åbo	Aalto University, Arcada University of Applied Sciences, Helsinki University (HU), Åbo University
Iceland	Bifröst, Reykjavik	Bifröst University, Reykjavik University (RU), University of Iceland (UI)
Norway	Bergen, Oslo, Trondheim	Norwegian University of Science & Technology (NTNU), Oslo Metropolitan University (Oslomet), University of Bergen (UiB), University of Oslo (UiO), Western Norway University of Applied Sciences (HVL)
Sweden	Göteborg, Jönköping, Linköping, Lund, Stockholm, Uppsala	Göteborg University (GU), Jönköping University (JU), Karolinska Institute (KI), Linköping University (LiU), Lund University (LU), Royal Institute of Technology (KTH), Stockholm University (SU), Uppsala University (UU)

The four Nordic country capitals, Copenhagen, Helsinki, Oslo, and Stockholm, are represented in the top 20 of 142 cities in the IMD Smart City Index for 2024. Because there is no consensus in the literature on a definition of smart cities or no overseeing body that adorns cities with an official smart city label, we also included in this research the other Nordic capital that have similar characteristics, all of which have varying numbers of large research and applied science universities and implement smart technologies as part of their broader smart city ecosystems—specifically Göteborg, Jönköping, Linköping, Lund, Uppsala, Umeå, Bergen, Trondheim, Århus, Åbo, Reykjavik, and Bifröst.

We then conducted online searches on search engines like Google to locate any potential AI policy or guidelines documents for each of the identified universities. The results almost always directed us to the official websites of the universities, where we could download publicly available AI policy documentation either in PDF format or download the website to save them later as PDFs. Some universities keep their AI policy documents behind login pages of their official websites. For such cases, we directly contacted the administrative services of the universities, and they emailed us the documents in the PDF format. These documents were then compiled into a corpus, with varying numbers of documents representing each university.

Methodology

This research is designed to systematically investigate the thematic structures of the documents in our dataset. By analyzing these guidelines, this research aims to identify areas of interest in regards to the implementation of AI in education, such as educational practices, governance, transparency, ethics, and participation, highlighting common themes as well as areas of divergence.

To this end, we first apply an unsupervised machine learning algorithm, Latent Dirichlet Allocation (LDA), to uncover latent themes prevalent in the documents. Following this, we use Principal Component Analysis (PCA), another unsupervised machine learning method, to reduce the high dimensionality of the dataset to visualize the relationships among identified themes, universities, and countries based on their similarities in the latent themes identified in the LDA analysis.

Latent Dirichlet Allocation

Latent Dirichlet Allocation algorithm (LDA) models the relationships between documents, topics, and words by assigning different probabilities to words across multiple topics, thereby capturing their varying relevance within each theme, and different probabilities for themes within each document (Blei, Ng, and Jordan, 2003). The LDA algorithm takes two inputs (document-term matrix and a k-value) and outputs two matrices (topic-term and document-topic).

The first input, document-term matrix, represents documents in rows and the columns show all individual words or n number of word constructs in the corpus. In this research, the corpus of university AI policies underwent several preprocessing steps to create this matrix. First, all the words in the corpus were made lowercase. As the second step, tokenization technique is used to break large text data into smaller units, such as words, word pairs, or sentences. For this research, we opted for the single word representations, as they yielded outputs that were easier to interpret. As the third step in preprocessing, we systematically identified and removed irrelevant words that do not contribute to topic interpretations. This step involved creating a customized stop word list, which expanded iteratively based on the model's output. For example, high-frequency words unrelated to AI themes or relevant across all possible themes (e.g., 'ai', genai', 'university,' and 'policy') were excluded to improve the quality of the topics generated. (Jurafsky & Martin, 2023)

As the second input, the LDA model requires a 'k-value,' which represents the total number of topics to extract from the corpus. This value is initially determined based on the researchers' domain knowledge and an informed hypothesis about the themes likely to emerge (Blei, Ng, and Jordan, 2003). Quantitative approaches are also often utilized alongside qualitative assessments to

decide the optimal k value. In this research, we employed the *coherence score*, which quantifies the semantic similarities between the terms defining each theme, thereby enhancing the interpretability of the identified themes (Röder et al., 2015). Choosing the optimal k value requires an iterative approach between the model's inputs and outputs to ensure that the extracted topics are distinct, interpretable, and relevant to the research questions.

The LDA models produce two outputs. First, the document-topic matrix, which represents the probability distribution of topics for each document. Each row corresponds to a document, and each column represents a topic. The values in the matrix indicate the proportion of the document dedicated to each topic, enabling us to identify dominant topics for specific universities. The second output, the topic-term matrix, presents the probability distribution of terms constituting each topic. Each row corresponds to a topic, and each column represents a word. The values in the matrix indicate the relevance of each term to the corresponding topic. These values are computed either using raw word counts or TF-IDF (Term Frequency-Inverse Document Frequency), a measure that highlights terms that are particularly important within a given topic while accounting for their overall frequency across the corpus. In this research, we use the raw word counts.

LDA uncovers shared themes structures across an entire corpus by analyzing word co-occurrence patterns associated with these identified themes. While this corpus-wide perspective is effective for discovering global topics, assigning these topics accurately to individual documents presents challenges, particularly for a corpus with documents of varying lengths. For instance, shorter documents lack sufficient co-occurrence information to reliably represent their underlying topic distribution, leading to noisier or less precise topic assignments. Conversely, long documents, which tend to cover a broader range of topics, can dilute the identification of dominant themes or disproportionately influence the model by overrepresenting topics tied to frequent terms. (Zhao et al., 2011; Zuo et al., 2014).

The university AI policy documents under examination are notably imbalanced, where some documents are exceedingly brief, comprising only two pages, while some extend to a dozen pages. This imbalance skews the LDA probability computations, causing the model to disproportionately emphasize frequent words in longer documents while marginalizing common words in shorter ones. To mitigate this problem and ensure that the LDA topic assignments for documents are reliable, it is essential to maintain a balanced corpus with respect to the characteristics of the documents.

To maximize inclusivity in the dataset, a tailored approach was adopted. First, for the exceptionally short documents (n=2), pages were duplicated to ensure adequate representation in the dataset. This

duplication process preserved the original content and integrity of the documents while enhancing the reliability of the LDA model's document-topic output. Second, the very long documents (n=5) were divided into multiple subdocuments according to specific headings found in each document. Splitting longer documents into subdocuments resulted in multiple entries for such universities in the dataset, unlike standard observations that are represented by a single row. Each subdocument addressed a narrower range of themes, fragmenting the full thematic structure. Therefore, after fitting the LDA model, the probability scores were aggregated across these subdocuments to reconstruct the overall thematic profile for these universities. These aggregated scores were then normalized to a 0–1 range to ensure consistency with the remaining corpus observations. This strategy ensured that each university was represented by a single row that unified a set of thematic probabilities and to maintain consistency and comparability across the corpus.

Principal Component Analysis

Suppose we want to explore a high-dimensional dataset that holds *n* observations measured on total of *p* predictors, and to examine the relationships among these predictors and observations, we plot each pair in its own two-dimensional scatterplot. This approach, however, quickly becomes impractical as *p* increases because it would require a total of $\frac{p(p-1)}{2}$ scatterplots, and each plot would show only a fraction of the overall information (James et al., 2021, p.499). This is where dimensionality reduction methods come into play.

Principal Component Analysis (PCA) is an unsupervised machine learning method that addresses the challenge of high-dimensionality by condensing all predictors into a smaller number of components (James et al., 2021, pp.498-516). These *principal components* are unique linear combinations of all *p* predictors that maximize variance, effectively compressing multiple predictor variables into a more interpretable two- or three-dimensional space, thereby supporting exploratory analysis (Hastie et al., 2009, p. 676). This transformation preserves the most significant differences among all predictors, showing how they relate to each other (i.e., whether they are positively or negatively correlated) and illustrating how observations cluster based on their underlying structure, with proximity in this reduced space implying similarity.

In this research, we first utilized Latent Dirichlet Allocation (LDA) to identify latent themes that are found within the university AI policy documents and then created a document-topic matrix containing probability scores for each identified theme across all observations, thereby defining the thematic structure of each document. Each document's set of topic probabilities forms a multi-dimensional feature vector that exhibits some degree of high correlation among its

components. Applying PCA to these vectors reduces them to several principal components, each of which is a unique linear combination of the original topic predictors, collectively explaining most of the variation in topic distributions. This transformation facilitates clearer visualization of how documents cluster or differ in terms of their thematic content.

Results and Discussion

This section first provides the LDA analysis results, highlighting the latent topics identified in the corpus and revealing the thematic structure of each document. Then, the PCA plots illustrate how documents with similar thematic structures cluster together in a three-dimensional space.

LDA Results

To initiate the topic modeling analysis, we used domain knowledge of prevalent themes in AI in education to define a baseline for the number of topics. The literature often discusses topics like educational practices, governance, transparency, ethics, participation, and others in regards to the implementation of emerging technologies within the broader educational landscape. We set up a range of k values from 4 to 12 to test which topic number best captures the themes present in the corpus, and computed the coherence scores that indicate the quality of the semantic relationships between the words constituting each topic.

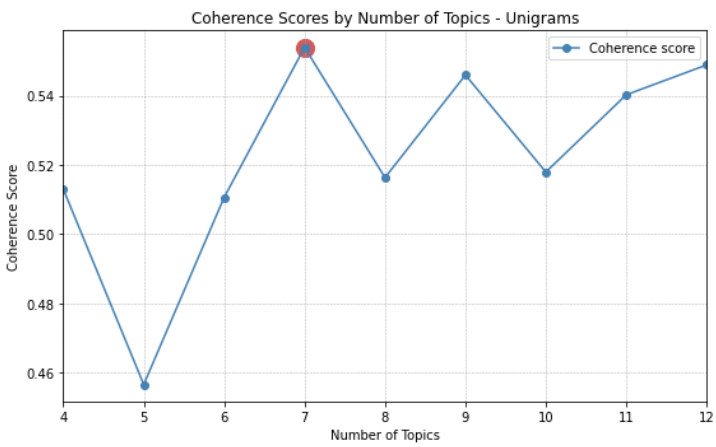

Figure 1. Coherence scores across different K values (number of topics). Higher score indicates better semantic relationship between the terms constituting each topic.

Figure 1 above demonstrates that increasing the k value above 5 improves the semantic coherence within each topic up to k=7, after which the improvement stabilizes with some fluctuations. Upon

manually reviewing the topic-term matrix, we noticed that topic structures started to duplicate with the exact same terms and probabilities beyond k=8. Consequently, we determined that k=7 is the optimal hyperparameter value for the LDA model.

Topic-Term Matrix

The topic-term matrix provided us with the key terms that contributed to the structure of each of the seven topics. Some overlap in terms across topics is an integral aspect of LDA, as it computes the probabilities of terms appearing in each topic rather than categorizing them definitively. Therefore, we first analyzed the top 10 words with the highest probabilities for each of the seven topics and then only considered five words for each topic that helped create coherent but distinct topics, without much overlap. Based on these keywords for each topic and the themes addressed in the literature, we assigned theme concepts to the topics (see Table 2).

Table 2. LDA Topic-Term Matrix Output. Interpretations of the k=7 themes identified within the corpus.

Topic	Theme	Focus Keywords
Topic 1	Course & Assignment Management	course, assignment, exam, material, assess
Topic 2	Feedback & Risk Management	feedback, risk, examiner, review, guidance
Topic 3	Accessibility & Legal Frameworks	copyright, legal, agreement, protection, data
Topic 4	Educator Responsibility	educator, responsibility, alignment, classroom, privacy
Topic 5	Ethical Assessment in Education	assessment, ethical, bias, transparency, fairness
Topic 6	Governance & Policy Development	policy, rule, regulation, principle, limitation
Topic 7	Research Integrity & Academic Standards	guideline, thesis, plagiarism, integrity, disclosure

The literature touches on several critical subjects similar to the themes we identified. For instance, *Course and Assignment Management* (Topic 1) incorporates aspects like individualized learning (Jørnø et al., 2022) and the planning and assessment of student work (Crow et al., 2017; Chen et al., 2020). Similarly, *Ethical Assessment in Education* (Topic 5) emphasizes that, beyond the individual responsibility of those using tools like LLMs, there is a need for ethical assessment to ensure that student work upholds academic integrity (European Commission, 2022; Moorhouse et al., 2023).

Accessibility and Legal Frameworks theme (Topic 3) also plays a significant role in the literature, incorporating concerns about transparency regarding data privacy as well as respect for intellectual property (European Commission, 2022; Finnish Ministry of Education, 2023). Finally, *Governance*

and Policy Development theme (Topic 7) is highlighted by studies such as those by Podda et al. (2024) and Ferraris et al. (2020), which discuss the governance challenges of integrating AI into smart cities, particularly regarding the roles of universities in developing policies and guidelines.

Regarding *Feedback and Risk Management* (Topic 2), Hoffman et al. (2024) and Mangina and Fridolin (2022) contend that maintaining high academic standards requires promoting digital literacy as a form of risk mitigation to prevent AI misuse in education, such as plagiarism. Overall, the themes we identified have been given varying degrees of importance and are discussed throughout the literature.

Document-Term Matrix

Next, the document-topic matrix reveals the thematic structures of documents in the dataset (Figure 2) based on the themes we identified in the topic-term matrix. The results show certain patterns regarding the thematic structures of the university AI policy documents. For instance, the documents from the three Icelandic universities in the dataset—University of Iceland (UI), Reykjavik University (RU), and Bifröst University—exhibit very similar thematic structures, where they almost exclusively address *Governance and Policy Development* (Topic 6).

The AI policy documents from Finnish universities address a diverse range of themes. In addition to the topic also addressed by Icelandic universities, these documents place emphasis on *Course and Assignment Management* (Topic 1), *Feedback and Risk Management* (Topic 2), and *Ethical Assessment in Education* (Topic 5). This pattern may suggest that Finnish universities aim to incorporate generative AI in a more controlled environment, providing educators with concrete guidelines and standards for its integration. Åbo University stands out by primarily addressing *Research Integrity and Academic Standards* (Topic 7). Here, the emphasis is on a more trust-based, self-regulatory approach for students, supported by general guidelines rather than strict controls.

Across Norwegian universities, the AI policy documents also demonstrate wide-ranging interests, particularly emphasizing *Course and Assignment Management* (Topic 1) and *Ethical Assessment in Education* (Topic 5) appear to be directed to educators. Two noteworthy exceptions are the University of Oslo (UiO), which also pays a considerable attention to *Accessibility and Legal Frameworks* (Topic 3) and University of Bergen (UiB), where it is the only other university except Åbo University where the a strong focus in given to *Research Integrity and Academic Standards* (Topic 7). These two universities appear to encourage their students to use AI services by providing guidance on how to access and navigate AI systems like large language models (LLMs)—whether

popular chat services like ChatGPT, Gemini, or the university's own LLM—and offers information on the legal frameworks regarding data collection and protection practices for these systems.

The documents from the Swedish universities also show relatively uniformed interests in the themes explored, paying a bit more emphasis on *Ethical Assessment in Education* (Topic 5), and in smaller varying degrees on *Governance and Policy Development* (Topic 6) and *Course and Assignment Management* (Topic 1). One pattern that is noteworthy is that four of the eight universities in Sweden—University Gothenburg (GU), Royal Institute of Technology (KTH), Linköping University (LiU), and Stockholm University (SU)—are the only universities in the dataset, along with Aalto University in Finland, pay a considerable attention to *Feedback and Risk Management* (Topic 2).

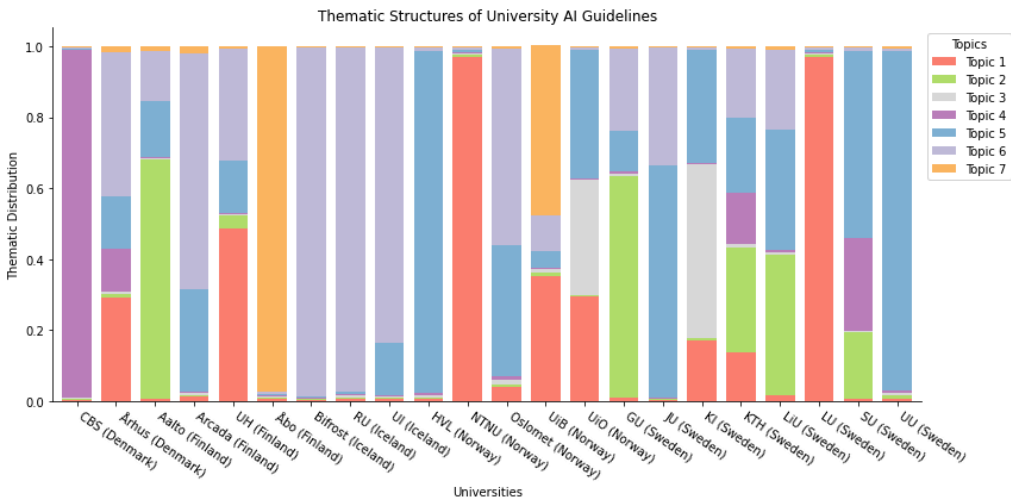

Figure 2. The thematic structure of university AI policy documents in the dataset (n=22).

In Denmark, the AI guideline documents of the two universities reveal different thematic structures. For instance, Copenhagen Business School (CBS) focuses almost exclusively on *Educator Responsibility* (Topic 4)—a theme reflected by only three other universities in the dataset: Århus University in Denmark and the Royal Institute of Technology (KTH) and Stockholm University (SU) from Sweden. In contrast, Århus University adopts a more balanced approach by addressing, in addition to *Educator Responsibility* (Topic 4), *Course and Assignment Management* (Topic 1), *Ethical Assessment in Education* (Topic 5), and *Governance and Policy Development* (Topic 6).

The literature emphasizes the need for a multidimensional framework for AI in education that covers themes such as AI governance, technical literacy, ethical and societal concerns, fairness, and

transparency. While some university AI policy documents in our dataset (e.g., from Århus U., Helsinki U., University of Oslo, Royal Institute of Technology, Linköping University, and Stockholm U.) address most of these themes in a more balanced manner, many institutions still appear to focus primarily on one or two themes—mainly *Course and Assignment Management* (Topic 1) and *Ethical Assessment in Education* (Topic 5). In the following subsection, we present the results of the PCA analysis.

PCA Results

The PCA plots below (Figure 3) reveal both within- and across-country clusterings of university AI policy documents based on the similarities and differences ïn their thematic structures, where each node represents a university AI policy document from our dataset, and the node colors correspond to each of the five Nordic countries. The light blue arrows, originating from the origin, indicate the direction and magnitude of each predictor's (theme) contribution to the positioning of the documents with respect to the top three principal components. The direction of arrows show where the predictors have the strongest influence, while their lengths reflect the strength of their influence.

While the results do not reveal strictly systematic country-based clusterings of the AI policy documents, some noteworthy patterns do emerge. For instance, the clustering of Swedish universities near the center of the three-dimensional space suggests that, on average, their AI policy documents demonstrate a balanced thematic structure, with exceptions, placing relatively similar emphasis across all seven identified themes. However, the plot in Figure 3 (bird's eye view perspective) reveals also that most of the Swedish universities pay extra attention to *Ethical Assessment in Education* (Topic 5). Although the Swedish national guidelines document for AI is broad and short, it does give a high importance on ethical use of AI in any context.

Several university documents in our dataset pay significant attention to *Governance and Policy Development* (Topic 6). For example, all three Icelandic universities (represented by the green nodes in Figure 3), and two other universities—Oslomet (Norway) and Arcada (Finland)—also demonstrate a reasonable focus on this theme.

All three Icelandic universities are very close in proximity and position themselves near the edge of the second principal component—mainly explained by *Governance and Policy Development*, echoing their thematic distribution in Figure 2—collectively forming a tight, distinct cluster. Therefore, Iceland appears to be the only country in our dataset where all its universities share a common focus in their contents and intent. This pattern is especially noteworthy, given that Iceland

lacks any national guidelines regarding the use of AI in education; perhaps it is for this reason that Icelandic universities univocally advocate for the development of governance and policy.

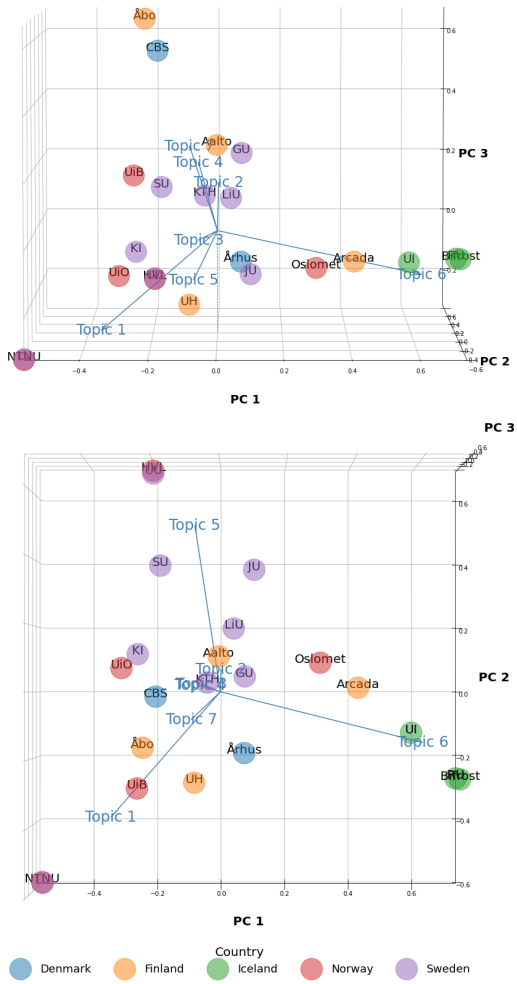

Figure 3. PCA Scatter Plot visualizing the AI policy documents clustering in a three-dimensional space defined by the top three principal components, reflecting thematic similarities in their AI policy structures. The top plot presents a frontal perspective, while the bottom plot offers a bird's-eye view.

The PCA analysis does not reveal any other strong patterns, as documents appear to not have any country wide clusterings in their themes. However, because the dataset has fewer observations for certain countries, the model may not have enough information to reveal any other potential patterns in the university AI policy documents on the country level.

Conclusion

In this research, we identified and revealed the thematic structures of AI policy documents published by universities in smart cities across the Nordics, in order to determine the most prevalent themes and to explore any notable patterns of similarity or difference in their thematic structures across universities and countries.

Our results show that universities in our dataset address a wide range of themes in their AI policy documents. Nevertheless, certain themes are more commonly featured on average—specifically, *Course and Assignment Management* (Topic 1), *Ethical Assessment in Education* (Topic 5), and *Governance and Policy Development* (Topic 6). This finding suggests that smart city universities in the Nordics either have already implemented or aim to implement AI in education in a manner that encourages its use while emphasizing ethical considerations to uphold academic integrity.

Regarding our second research question, our findings suggest that although AI policy documents from universities in Finland, Norway, and Sweden generally exhibit similar thematic structures on average, we did not observe any systematic patterns indicating major similarities or differences between these countries. However, some individual universities stand out: for instance, Norwegian University of Science and Technology (NTNU) and Lund University (LU) exhibit nearly identical thematic profiles, as do Western Norway University of Applied Sciences (HVL) and Uppsala University (UU).

It is important to note that our dataset does not equally represent all Nordic countries—Sweden, for example, contributes many more observations than other countries. This imbalance limits our ability to identify clear national trends and cross-country patterns and restricts the generalizability of the findings for country-wide policy. Although LDA is not inherently sensitive to such imbalances and the identified themes remain robust, the interpretations of the PCA results necessitates caution.

Another limitation is that national guidelines for AI in education were not included in the LDA analysis. While we referenced these guidelines in the literature review to provide an overview of national goals and the regulations that universities may need to follow, the sheer length of these documents excluded the possibility of a qualitative analysis of their content. Additionally, LDA does not provide information on the specific context in which keywords appear within each document. For large datasets like ours, quantitative methods—such as sentiment analysis—can determine the context in which keywords are used (e.g., whether they carry positive or negative

connotations), offering more detailed insights into universities' positions regarding the implementation of AI in education.

With these limitations in mind, future studies can build on this research in several ways. First, including a larger and more balanced collection of university AI policy documents from across the Nordics would improve data representativeness. Second, national policy documents for AI in education could be analyzed using an alternative topic modeling approach to identify prevalent topics and consolidate them into coherent themes, enabling a comparative analysis between universities' policies and their respective national guidelines. Third, future research could investigate the context in which these themes are addressed within AI policy documents, offering more detailed insights into the sentiments surrounding the use of AI in education.

Despite its limitations, this research provides robust results that offer valuable insights into the thematic structures of AI policy documents from smart city universities across the Nordics. These findings not only advance our understanding of how universities are approaching the integration of AI in education, but also lay the groundwork for future studies aimed at refining policy frameworks and addressing emerging challenges in the digital education landscape.

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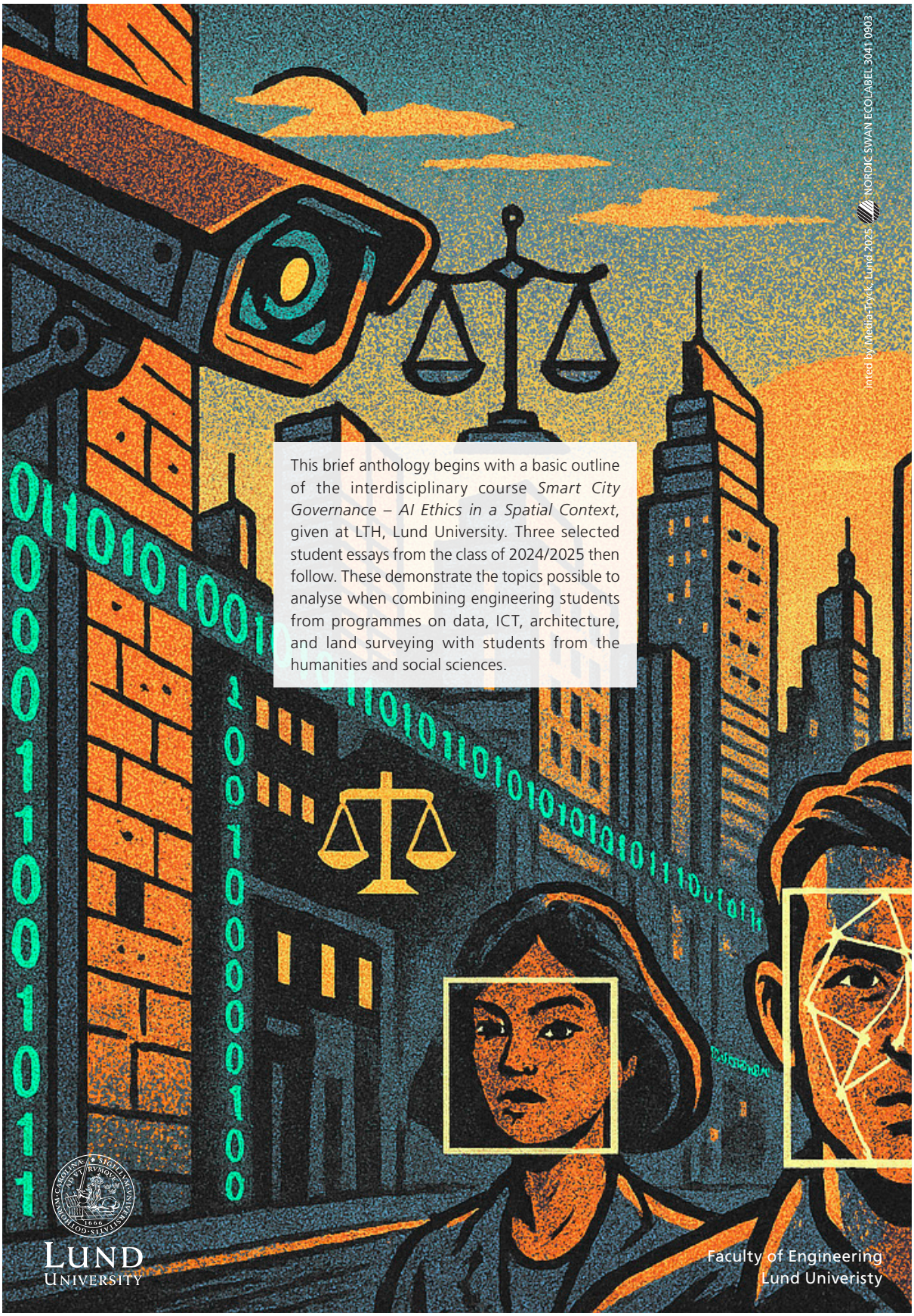
Disclosure statement

In this research, we used LLMs for various tasks, such as general proofreading and alternative text generation suggestions to improve readability.

Logs: From ChatGPT:
“Based on the current version of ChatGPT, there isn’t a built-in feature for directly sharing a session (such as a one-click share button) like there used to be.”

Upon request, we can provide the logs in an agreed format.



This brief anthology begins with a basic outline of the interdisciplinary course *Smart City Governance – AI Ethics in a Spatial Context*, given at LTH, Lund University. Three selected student essays from the class of 2024/2025 then follow. These demonstrate the topics possible to analyse when combining engineering students from programmes on data, ICT, architecture, and land surveying with students from the humanities and social sciences.

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