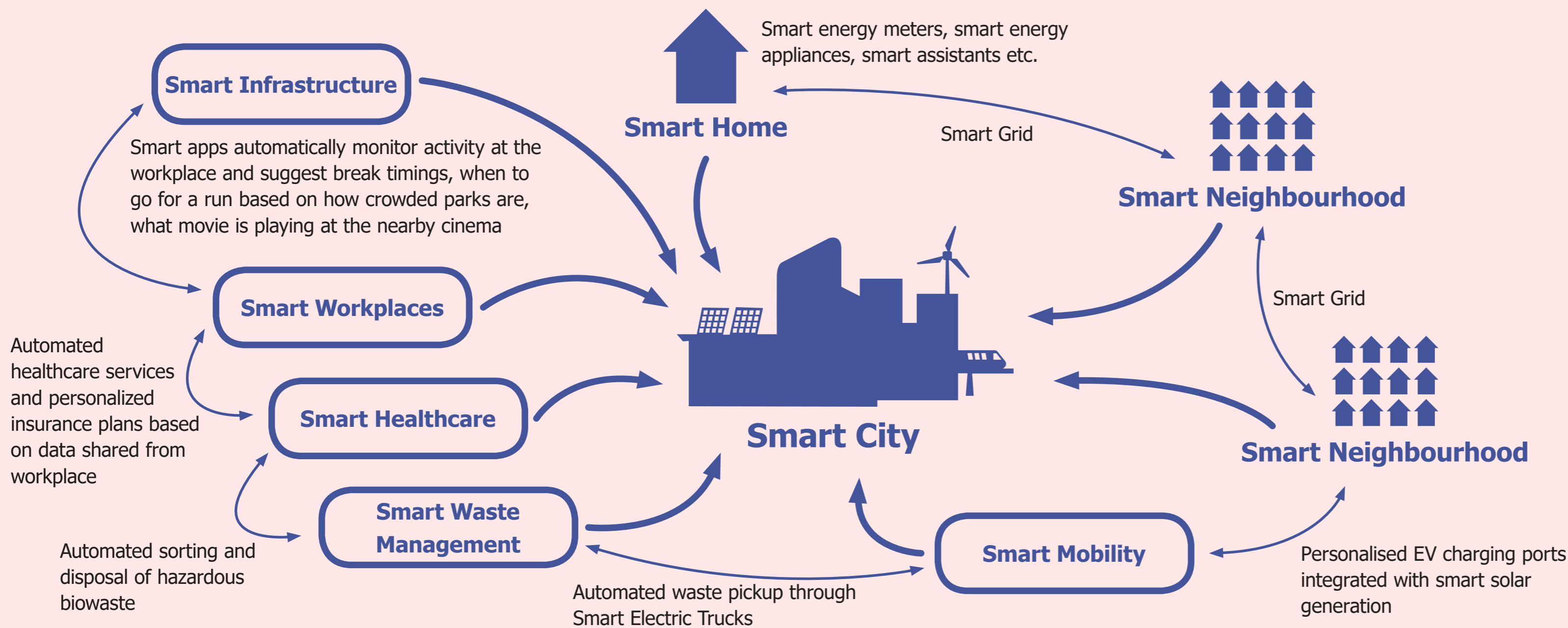# SOCIAL (IN)JUSTICE IN THE SMART GRID TRANSITION

As European nations scramble to meet their net-zero targets, smart grid technologies present a promising solution for both energy producers and consumers. However, these "simple, non-intrusive" artefacts in smart homes such as smart meters could be inevitably linked to the whole smart city in the future, making it highly complex to predict what kind of data is captured, how it is manipulated, and by whom it is used and for what.

Smart Infrastructure

Smart apps automatically monitor activity at the workplace and suggest break timings, when to go for a run based on how crowded parks are, what movie is playing at the nearby cinema

Smart energy meters, smart energy appliances, smart assistants etc.

Smart Home

Smart Grid

Smart Workplaces

Automated healthcare services and personalized insurance plans based on data shared from workplace

Smart Healthcare

Smart Neighbourhood

Smart City

Smart Grid

Smart Neighbourhood

Smart Waste Management

Automated sorting and disposal of hazardous biowaste

Automated waste pickup through Smart Electric Trucks

Smart Mobility

Personalised EV charging ports integrated with smart solar generation

So what is the social cost of this digitalization of Europe's energy system?

Background
- "Smart grid technologies" is an umbrella term for many ICT-enabled technologies which monitor energy production and consumption and communicate the findings in pre-determined automated intervals to a range of different stakeholders. Digitalization of household data raises concerns regarding privacy, risks related to security, fear of losing user autonomy, lack of transparency, as well as (in)justice concerns in terms of unequal distribution of benefits and harms from this major change in energy production and consumption.
- There are thus clear moral, ethical, and social implications of this transition, some of which have been well-researched over the last decade - but have thus far focussed on low-income households solely from an energy justice lens.
- Current research has inadequately considered the nuances of the power dynamics between those at the forefront of this transition, and how these technologies will affect marginalized groups.
- This Ph.D. aims to uncover the social cost of the transition to smart grid technologies by examining the complex sociotechnical dynamics in the European Smart Grid through critical social theories such as post-colonial theory, anti-racist theory, feminist technoscience etc.

Where to look for social (in)justice?

Algorithms & Machine Learning

Justice concerns arising from increasing automation in electricity systems have not yet attracted much attention. Algorithms are often designed using prior data which could entrench gender, racial and other biases, aggravating social injustices against some user groups. They are also often protected by proprietary laws which make it difficult to hold them accountable when injustices occur.

Actor Interactions

Fine-grained, automated data collected by these technologies could be used not only for energy-use optimization by legitimate actors in the sociotechnical system, but also to gain capital and increase targeted marketing, shared with public agencies to classify citizens, predict crimes and decide who receives public benefits.

Visions for a 'Smart' Future

How various actors envision a 'smart' future provides an opportunity to investigate their motivations, the predominant social groups which are included and excluded, their priorities, and in doing so predict the future societal impacts of smart grid technologies.

What could (in)justice look like?

Anti-Racist Perspective

Racial minorities are segregated, policed, and surveilled in the name of protecting order, maintaining security and preventing crime - across Germany, the Netherlands Scandinavia, and the U.K.
These households are particularly vulnerable in this transition as their energy consumption data could be used to make judgments about them by state agencies and policy workers which still operate by the subtle logics of racial disparity and subjugation.
This could aggravate injustices against them - by adding hurdles while obtaining citizenship, state benefits and their freedoms could be violated in the name of national security. Coupled with the fact that their data could be monetized in an opaque way at a large scale by big tech companies, the injustices against these often lower-income, working class households would only aggravate.

Queer-Feminist Perspective

Smart grid systems directly monitor other smart home technologies to shut down power when there are voltage fluctuations to save energy. Further, they could override manual control to automatically schedule white goods like washing machines which can impact the quality of life of inhabitants. This could be more harmful for single, working mothers with children who could be compelled to operate their washing machine at certain times only, and in such an event, they would be unable to, causing distress. Smart assistants which are often used in conjunction with other smart devices in smart homes tend to be modelled by male engineers who reinforce the image of the ideal, middle-class, white housewife - docile, submissive and nurturing. This male-dominated industry thus ends up redefining and reinforcing stereotypes which feminists have fought hard to

eliminate over the last few decades.
The effects of cyber attacks on smart grid systems on diverse types of social groups has not been evaluated. In the context of certain societal events, some marginalized communities might become the subject of unwarranted hate and attention which makes them more vulnerable to such attacks. Queer households using such technologies would be at a heightened risk of such attacks and require extra security measures which need to be evaluated.
Trans people are at a risk of being excluded from the digitalization of social welfare systems which are often modelled after the male-female binary. This could not only misgender them but violate their human rights by erasing their identities by identifying them as outliers.

Key References

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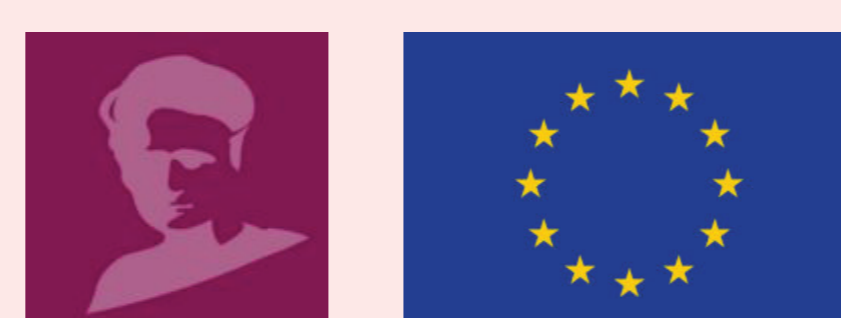
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Get in Touch

Nickhil Sharma
Ph. D. Candidate
University of East Anglia,
Norwich, United Kingdom.
Twitter: @nickhil.sharma1
Mail: N.Sharma@uea.ac.uk

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UEA University of East Anglia