THE INTERNATIONAL WORKSHOP & SUMMER SCHOOL ON THE POLITICAL ECONOMY OF GREEN-DIGITAL TRANSITION

GROUP PRESENTATION ABSTRACTS – BY THEMES

AI, Platform Capitalism and Commons-Based Economies

Fabyola Alves

The Use of Artificial Intelligence in the Court of Justice of the State of Ceará: Analysis and Perspectives

The acceleration of technological advances has been a major factor in changing the social relations of contemporary capitalism. Artificial intelligence and algorithmic systems are among these innovations, being increasingly adopted by corporations and governments, with potential effects on various spheres of society. Furthermore, the boom in generative AI, marked by the launch of ChatGPT in November 2022, has significantly revitalized the contemporary debate on artificial intelligence and its implications. In this context, public authorities around the world have been adopting artificial intelligence tools in various sectors. Among them, initiatives in the Judiciary stand out. In Brazil, the judiciary sector has implemented several AI initiatives, sparking debates on issues such as discriminatory bias and impacts on access to justice. In this sense, this study aims to critically examine how the Ceará Judiciary is positioned in relation to the adoption of AI. The first chapter will discuss the definitions of artificial intelligence and its role in contemporary capitalism, followed by a global analysis of the use of AI in Judiciary, its applications, regulations and how or if the issue of algorithmic biases is being addressed. Subsequently, the significant advances in AI in the Brazilian Judiciary will be described, first at the federal level and then with more detail at the state of Ceará, also including the regulations that guide its use. The survey will be exploratory, consisting in collecting data from judicial electronic portals and research on the topic using search tools. The research is in the phase of processing data already collected and bibliographical research for the preparation of chapters.

Flávio Henry Ferreira

On the Concept of Commons-Based Economies and How to Achieve Them

Keywords: Commons, Decentralized Planning, Commonism, CommonPlan, Cyber-Physical Systems.

This paper provides a brief introduction to the system of decentralized governance based on interdependent Common-Pool Resources (Commons) utilization, and its consequent communal allocation of resources, supply and demand and mediation of value. Furthermore, it aims to bring forth the solutions already proposed in technical literature inspired by this form of social-economic organization.

Usually, Central Planning and Decentralized Markets are seen as the only alternatives to solving resource allocation issues, but represent two opposing approaches . The former involves explicit determination of solutions, while the latter relies on spontaneous emergence through market transactions. In Capitalist systems, Centralized Planning is linked to industrial production, characterized by hierarchical control, while Decentralized Markets handle the distribution of goods, often perceived as chaotic. Beyond Capitalism, alternative methods of resource management exist, such as those in the works by Elinor Ostrom, recognized with a Nobel Prize in Economics, who demonstrated effective governance of shared resources through rule-based systems. It has been made as a counter to the speculative notion presented in Hardin's "The Tragedy of the Commons," which suggests only state intervention or private property regimes as viable governance models for common resources.

Subsequently, for overcoming the Capitalist mode of production, Commons-based societies must aim for the abolition of money and all of its likewise substitutes. The discrepancy between the actual production of value and its monetary representation in Capitalism, especially in the form of fictitious capital, has widened, exacerbated by crises like the 2008 financial crash and the recent pandemics. To avoid said crises in

favor of a more human-centric social-economic organization, the ways to abolish money theorized by sociologists James Holloway and Karl Marx are evaluated.

Therefore, the State-of-the-Art means to achieve Commons-Based economies with abolition of mediation by money-value are discussed upon this study, citing what has been and still is to be done. Computational methods such as COMMONSIM, a simulation of the Commonism utopia, and CommonPlan, a novel simulation of social-economic governance by polycentric decentralized planning based on the I-EPOS algorithm, are to be investigated and explained.

Zhen Zeng

Ant Forest and Making of Environmental Subjects in the Digital Age

Key words: FinTech, platform, environmentality, subjects, China

This paper delves into the dynamics of how FinTech platform capital permeates the sphere of environmental governance, through a critical examination of Ant Forest, a gamified afforestation programme initiated by Alipay which is China's largest FinTech company. This innovative programme quantifies users' carbon footprints, rewarding their low-carbon actions with tangible real-world trees predominantly planted in the arid areas of Northern China.

This study analyses 25 in-depth interviews with Ant Forest users, in-game texts and images, alongside the researcher's own gaming experiences. By drawing on Robert Fletcher's variegated environmentalities approach, I interrogate the multifaceted ways in which Ant Forest shapes environmental discourses, produces and articulates environmental knowledge, employs control and surveillance mechanisms, and creation of digital environmental subjectivities.

The findings suggest a paradoxical relationship between Ant Forest's inherent "platform-based" characteristics and its supposed objectives of promoting carbon literacy and making of calculative subjects for individual carbon management. Moreover, the research highlights a significant aspect of user interaction within the gamified green governmental context, where trees become objects of intense fetishization in various forms. These phenomena lead to a diminished focus on the broader ecological and social implications of afforestation activities of Ant Forest. Additionally, this trend marks a significant departure from the traditional perspective of public tree planting projects as collective efforts and tools for mass mobilization. Instead, it is increasingly perceived as an individual environmental responsibility, indicating a profound transformation in the cultural and social understanding of environmental restoration in today's Chinese society.

Mohamed Korium

Deep Learning-Based Methodology for Detecting GPS Spoofing Cyberattacks

The operations of unmanned aerial vehicles (UAVs) are susceptible to cybersecurity risks, especially because of their strong reliance on the Global Positioning System (GPS) and radio frequency (RF) sensors. GPS and RF sensors are vulnerable to potential threats such as spoofing attacks that can cause the UAVs to behave erratically. Since these threats are widespread and potent, it is imperative to develop effective intrusion detection systems. In this paper, we present a deep learning-based methodology for detecting GPS spoofing cyberattacks. We combine convolutional neural networks with transfer learning to design a method that is fast, accurate, and general. The effectiveness of the proposed solution is demonstrated by extensive numerical experiments carried out using benchmark datasets. We achieved an accuracy of 100% within a running time of 120.64 s and a detection time of 2.035 s in the case of the training dataset. Further, using this trained model, we achieved an accuracy of 99.25% within a detection time of 2.721 s on an unseen dataset that was unrelated to the one used for training the model. Our results demonstrate that the proposed Image-based intrusion detection method outperforms the existing solutions while providing a general model for detecting cyberattacks included in unseen datasets.

Critical Approaches to Digital Capitalism

Helena M. R. Barreto

For a Critique of the Political Economy of Digital Platforms

Keywords: political economy, communication, culture, digital platforms, Internet

This contribution aims to develop a Marxist approach to the phenomenon of digital platforms from the perspective of the Political Economy of Information, Communication, and Culture (EPC) developed in Brazil. The core issue of the social relations of production that characterize the different types of platforms as capitalist companies is addressed based on the Marxian concept of subsumption of labor and involves fundamental issues, such as the productive or unproductive characteristic of labor in each case, the forms of exploitation, the specificities of intellectual labor etc. The work discusses why, in this moment, this process of platformization is associated of the productive restructuring that, through digitalization and its developments, favors the concentration and centralization of capital.

This approach highlights the communication sector as it helps create a new social mediation structure suitable for the new capitalist regulation model. Throughout the 20th century, the Cultural Industry was developed as a mediation element between the world of life and the system, using Habermas's terms (1984). Until then, it operated based on national States, developing advertising, publicity, and program functions (Bolaño, 2015). After the transition of the Taylorist-Fordist-Keynesian mode of regulation to the one based on neoliberal policies, the world saw the progressive privatization and the convergence audiovisual-telecommunications-informatics. It has brought information-culture-capitalism closer. It has also reshaped markets, increasing the concentration at the transnational level.

The platformization is a new moment of the convergence process. It is a further step in the concentration of social production, enabled by digitalization and its developments – including data economy – which leads to the setting up of a social mediation structure suitable for the new global culture system. Its expression is the formation of digital platforms. These structures aggregate different actors and their productions. As a result of digitalization, data collection and treatment, and the exploration of network effects, digital platforms renew the roles of the cultural industry and question the role of Governments, regulation systems, and Governance – concepts this paper seeks to clarify.

This text contributes to three themes that are prominent in the current debate: i) which are defining platformization and digital platform; ii) defining the related concepts of regulation and governance; iii) and the classifications of different platforms, considering their activities, role in the set of systems, and funding model.

Oriana Chaves de Oliveira Paz

State action in the development of AI: Chief Scientist Program in Ceará Case Study

Keywords: Dependence and development. Artificial intelligence. Ceará. Public policy.

Main argument: The contemporary reality is that in which many countries have understood that AI-based systems enable economic and social opportunities, our object adheres to the global trend of configuring what Mendes (2022) calls ‘complex scientific-business-governmental networks’ — that means the alliance productive between University, private sphere, investment from the private sphere, and State investment. Thus, we raise the research question: in the current phase of global capitalism, how is AI produced in non-hegemonic contexts, such as the state of Ceará?

Theoretical approach: the working hypotheses are constructed based on the historical context presented and based on the theory of Frank (1966) on development and dependence, and Rikap (2022) on the extractive, rentier and monopolistic dynamics of contemporary digital capitalism. Methodology: have a qualitative and descritive approach, and use the digital search for public documents in the public domain. Main evidence: The results present public policies for configuring the local technological environment, organized as a local historical process aimed at innovation.

Furthermore, we identify institutional restructuring, regulatory laws and other public policies. As the final conclusion, for now, is that even with financial investment from the private sector, the innovation is in the State pocket.

Christopher Chagnon

Data Extractivism and Social Pollution in Zambia

The value of personal data as a resource is undeniable. Although it is not a new resource, the ability to harvest it en masse is a relatively new phenomenon, with companies that deal in data harvesting being some of the most valuable in the world. The push to harvest ever more personal data and maximize profit has led to technology companies employing approaches which are extractivist in nature. Just as extractivist approaches in mining, hydrocarbon extraction, agriculture, agroforestry, and others create environmental pollution, these approaches in the technology sector create what can be thought of as social pollution. Some manifestations of social pollution can be seen as global (tech addiction, political polarization, changes to how individuals engage with the world and communities around them, negative impacts on mental health, etc.), while there are also manifestations which occur primarily in the Global South (loss/marginalization of language and culture, de facto imposed changes to cultures, traditions, and ceremonies, etc.). While countries in the Global North are more valuable for big tech companies, countries in the Global South represent the greatest potential for growth and domination. Like many countries in the Global South, Zambia has seen rapid expansion of internet access and smart devices, and in recent years the Zambian government has grappled with developing and implementing regulations on the technology sector and internet, while also promoting tech sector development as an avenue of national development. This article draws upon dozens of interviews with people working in government, technology, and civil society in Zambia to highlight experiences and changes which can be seen as manifestations of social pollution.

Pedro Emílio Gória Silva

Labor Shortage in a Post-Capitalist Society

Our objective is to evaluate and discuss the impact of a possible labor shortage on a post-capitalist society. We admit that such a society has a decentralised planning that manages supply and demand. Also, such a planning includes aspects related to production and circulation. In the proposed model, society does not establish exchange relationships mediated by money or other artefacts that could possibly have the theoretical and functional aspect of money. In fact, we hope to disentangle any employment relationship that goes back to capitalism.

Theories and Practices of Green-Energy Transition

Clayton Mendonç Cunha

Green Reindustrialization or the Saudi Arabia of Hydrogen? Promises and Prospects of Green Hydrogen for the Development of Ceará

The environmental concerns arising from the ongoing climate emergency, coupled with the challenges posed by geopolitical issues such as the wars in Ukraine and Gaza, have led several countries to accelerate the search for new, more efficient, reliable, and cleaner sources of energy. In this context, there has been growing interest in and promise for the use of Green Hydrogen (GH2) as an energy vector for development and economic decarbonization. In Ceará, a state located in Brazil's northeast, GH2 has aroused strong economic expectations in the face of investment promises of tens of billions of dollars, attracted by the favorable conditions for the cheap generation of the large quantities of solar and wind energy needed for large-scale GH2 production. But although the optimism shown about the potential of GH2 to boost the state's development is unanimous among representatives of the government and the local business community, the future hydrogen economy is sometimes described as having an industrializing potential for the state comparable in Brazilian history to that experienced by São Paulo at the beginning of the 20th century, while in others the effect is described as turning Ceará into the Saudi Arabia of hydrogen, which evokes very different images of what the desired development would be. This exploratory article therefore aims to investigate the socio-economic promises and prospects of the GH2 hub in the Pecém Industrial and Port Complex (CIPP), Ceará. To do so, we

mapped what is already concrete about the sector in terms of public and private investment projects, business initiatives and public and regulatory policies in the state and interviewed some of the actors involved in the state government, the Federation of Industries of Ceará (FIEC) and CIPP. The aim is to analyze the real potential of GH2 as a vector for economic, scientific and technological development and decarbonization of the Ceará economy, as well as the challenges involved in achieving these objectives, possible anticipated problems and the mitigation measures planned to be adopted.

Marta Vallvé

Revising the Theory of Metabolic Rift to Study Socio-Ecological Conflicts

Key Words: metabolic rift, socio-ecological conflicts, social metabolism, Marxist theory

This is a theoretical paper that reflects on the conceptual tools to analyse the material roots of socio-ecological conflicts from a Marxist perspective. In the text, I identify a strand of literature that attributes the material causes of socio-ecological conflicts to changes in flows of energy and materials and I underline some of its limitations. Instead, I propose to analyse the material bases of socio-ecological conflicts using the notion of the metabolic rift, which connects disruptions of natural cycles to rifts in social metabolism. However, I claim the term “social metabolism” in Marx’s work has another meaning than what metabolic rift scholars assume: it refers to the process by which the products of labour reach the point where they cover human needs. Therefore, I interpret Marx’s arguments in a new way: the metabolic rift is first a rift in social metabolism, a separation in the social terrain (between production and consumption) that results in disruptions of natural cycles and the metabolism between humans and nature. To study the material roots of socio-ecological conflicts, I propose to identify the natural and social aspects of the metabolic rift behind a conflict, analyse their connection, and situate the conflict and metabolic rift historically, identifying metabolic changes in relation to the continuity of capital accumulation. This approach will allow researchers to acknowledge not only the new aspects of conflicts but also how they express old capitalist contradictions. Also, it can help situate socio-ecological conflicts in a broader picture and understand better their connection to other social problems.

Usman Ashraf

Environmental, Social and Legal Contradictions of Green Energy Transition in Solar Power Projects, Pakistan

Chinese investments in coal power in Pakistan under the Belt and Road Initiative drew a lot of criticism from multiple environmental groups. The push for more greener energy sources culminated in Quid-e-Azam Solar Power Project (QASP). The project constructed in Cholistan desert is spread over more than 600 acres and hosts about 1.6 million solar modules. This research using green extractivism framework highlights the environmental, social and legal contradictions of the solar power project.

The analysis show that the solar power project is situated inside Lal Sunhra national park ¬- established to protect Chinkara deer, Caracal and Houbara bustard. In addition, bi-monthly 124 million litres of water is required for washing the panels to remove high quantity of sand deposited because of desert geography. This reveals the contradictory nature of green energy transition in which green energy has precedence over other environmental objectives namely biodiversity and water conservation. Socially, the nomadic herders of Cholistan are displaced and their access to land and pastures has been cut off, hence threating their livelihoods. Legally, the land acquisition act of Pakistan under which the national park was established in 1970s does not allow any use other than designated i.e conservation. In contrast, the land has been leased to private for-profit companies at an exorbitantly low price of 1$/acre/annum.

The research concludes by showing multiple contradictions of green transition narrative in which certain ‘green’ projects are preferred though at the same time these projects are a threat to biodiversity and water conservation as well as social justice.

Ajesh Kumar

Using a Gamified Approach to Identify Energy Information Needs

Energy Interfaces that are used by energy citizens to interact with energy systems can incorporate certain design principles that may aid energy citizens to participate in energy transition activity. These design principles could help in designing interfaces to connect people with energy data to support them in making 'green' decisions that are sensitive to their individual and local contexts or designing local policies that help to overcome some of the barriers to being more active energy citizens, such as determining where and to whom to offer grants. The paper utilizes gamified tools to collect data regarding which information context is more relevant to the participants of the study.

Datafication and Institutional Responsibility Towards Sustainability

Oscar Arruda d'Alva

Official Statistics and Platform Capitalism: The Transition to a Statistical-Algorithmic Regime of Datafication

In this work, we investigate contemporary transformations in official statistics related to datafication processes at National Statistical Offices (NSOs). Our argument is that the crises of the financialized accumulation regime have led to a crisis of governmentality that has implied reconfigurations in the practices, norms and structures of the official statistical sector. In the context of platform capitalism, we point to a transition to a new statistical-algorithmic regime of datafication, characterized by the incidence of global corporations in national statistical systems. We argue that two important drivers of this transition are contemporary changes in the political economy of data and the epistemological obstacle posed by new sources of data to the traditional statistical methods of NSOs. Using tools from Bourdieu's genetic structuralism, we address the interfaces and disputes between the official statistical field, traditionally demarcated by the State, and the field of algorithmic practices, linked to Big Techs and other technology corporations.

Our research reveals that with the rise of the data-driven economy, the NSOs has been pressured to 'modernize' and engage with big data. The data enclosures of private corporations, however, has prevented the States from accessing the new data sources for statistical purpose. The disputes this brings about lead to a double movement in the statistical field. On the one hand, there is a convergence between Big Techs and the transnational statistical field, which leads to the dissemination of a global strategy of public-private partnerships and platformisation of official statistics. On the other hand, there are protective countermovements that aim to strengthen the public character of national statistical systems through new legislation. Efforts to create data markets and to internalize a new habitus in the NSOs through the training of data scientists are opposed by initiatives that aim to promote the protection and access to data as public goods and to ensure the preservation of traditional statistical methods and sources.

Our empirical objects are the implementation of the UN Global Platform and the Latin American Big Data regional hub in Brazil. The research consisted of the analysis of secondary data, collated to primary data obtained through interviews with agents in the statistical field. The disputes in question are relevant to the data sovereignty of countries in the Global South, as the new statistical regime can give rise to the emergence of data colonialism practices.

Joel Hänninen

Dialectic of Responsibility – Big Tech, Corporate Social Responsibility and Ideology

Keywords: big tech, critical theory, ideology, CSR, corporate power, dialectic

In the face of global crises on social, political and ecological fronts, "Big Tech" has captured a lot of scholarly interest. My doctoral dissertation focuses on these platform corporations – i.e. Google, Facebook, Amazon and Apple - and their corporate social responsibility (CSR) discourses during the 2019-2020 "Online Platforms and Market Power" hearings.

Several antitrust and regulatory efforts in the past few years, both in the US and globally, speak to Big Tech's colossal and detrimental impact. They have been accused of e.g. undermining democracy, nudging voters with targeted political ads, socially irresponsible and environmentally harmful conduct, and violations of supply chain human rights. Despite this, Big Tech maintains that it is combatting social ills, tackling climate change, and creating more sustainable futures. There exists thus a glaring contradiction between Big Tech's a) underlying logic of power and capital accumulation, and b) appearance of social responsibility.

One can claim that so far, efforts to constrain Big Tech's power have been unrewarding. I argue that this owes to the little-explored ideological effect of their CSR discourses. Ideology has a formidable staying power: while we may fully acknowledge that Big Tech's CSR discourses are ideological and aim to merely reproduce the existing social relations, we continue to act as if we did not know this.

Contrary to extant theorising, I propose approaching CSR dialectically. This would refuse CSR both as 1) a positivist, "triple bottom line" ethos, where CSR is not only good for the planet and people, but for profits, too, and 2) a detestable phenomenon, mere window-dressing. Instead, I maintain that CSR has a radical kernel, a potential within it to realise 'actual responsibility' and thereby create a path for a more democratic and egalitarian global governance.

All four earlier-mentioned tech companies took part in the US House of Representative's hearings. The transcripts that deal with Big Tech's responses to committee inquiries will be analysed with a novel version of Laclau and Mouffe's discourse theory. The research questions are: 1) what CSR discourses do Big Tech companies produce in the 2019-2020 hearings; 2) how do CSR discourses justify and reproduce the corporate power of Big Tech; and 3) what kind of meanings relating to responsibility-as-such can be extracted from the discourses with a dialectical, ideologico-critical reading.

Abdul-Rauf Larry Abdullai

Advancing Digital Sustainability: Insights from ICT Companies' Sustainability Transition Approaches

As nations across the globe race towards setting ambitious net-zero targets either because of international regulations or national strategies, the Finnish Ministry of Transport and Communication unveiled the climate and environment strategy for the IT sector in 2021. However, realizing these impressive targets depends on strong commitments, collaborations, and concrete implementation actions from companies. As such, in this study, we analyzed the evolving trends on what drives ICT companies to implement and adopt sustainability practices. To achieve this, we conduct interviews among ICT companies to understand what sustainability means to them and how they are implementing their green-digital transition strategies. We triangulate our data with companies' archival public documents for triangulation. The result shows the importance of having a clear sustainability vision or target, leadership support, positive company culture and value towards sustainability, employee interest and engagement with broader stakeholders. Overall, this study contributes to research on the role of ICT companies in advancing green-digital transition.

James Adolphus

A Macro-Level Analysis of the Role of Institutional Quality in Sustainable Development

My research investigates the influence of institutional quality on sustainable development using a recently developed estimation technique. While many academics are now concerned about this topic, not many studies have considered these moderating functions when it comes to promoting sustainable development across different regions. This is the study's scientific innovation when compared to other published papers. the study also introduces new variables into the arguments on the drivers of sustainable development while retaining other variables used by previous studies such as natural resource endowment, colonial rule percentage of the population speaking European languages demographic, and geographical conditions. Specifically, the study will test the arguments of neo-liberalists by including economic

freedom and globalization to verify if economic liberalization promotes sustainable development.

Energy Efficiency, Governance and Sustainable Materials

Meysam Norouzi

Exploring the Potential of Additive Manufacturing for Sustainable Materials Engineering: A Case Study on Polycrystalline Ni-Mn-Ga Alloys

Keywords: Additive manufacturing, laser powder bed fusion, Ni-Mn-Ga alloys, sustainable materials engineering, crystallographic orientation.

This extended abstract presents a summary of a working paper that explores the potential of additive manufacturing, specifically laser powder bed fusion (PBF-LB), for sustainable materials engineering. Focusing on the case study of polycrystalline Ni-Mn-Ga alloys, the paper investigates the feasibility of utilizing additive manufacturing techniques to overcome traditional constraints and unlock new possibilities in materials engineering.

The main argument of the paper is that PBF-LB offers a promising avenue for manufacturing functional polycrystalline Ni-Mn-Ga alloys with complex geometries, thereby facilitating the development of innovative materials with enhanced properties. Through a combination of theoretical analysis and empirical evidence, the paper demonstrates how additive manufacturing can be leveraged to address challenges such as grain boundary constraints and achieve significant improvements in magnetic-field-induced strains.

The theoretical approach adopted in the paper draws on principles of materials science, additive manufacturing, and sustainability. By integrating theoretical insights with practical experimentation, the paper aims to contribute to our understanding of the potential of additive manufacturing for sustainable materials engineering.

Methodologically, the paper employs a combination of experimental techniques, including X-ray and electron backscatter diffraction analyses, to investigate crystal texture and grain structure evolution during PBF-LB of Ni-Mn-Ga alloys. The experimental setup includes the utilization of Ni-Mn-Ga single-crystals and high-purity-Ni polycrystal substrates, alongside a volume reduction kit equipped with substrate heating capability.

The main evidence presented in the paper consists of experimental results demonstrating the successful replication of epitaxial structures across multiple layers, as well as the development of coarse oligocrystalline structures with distinct crystallographic orientations. These findings highlight the potential of PBF-LB for manufacturing sub-millimeter-sized crystallographically oriented oligocrystals, thereby opening up new avenues for sustainable materials engineering.

Mehar Ullah

Unified Framework to Select an Internet of Things (IoT) Platform for Power to X (PtX) Cogeneration Plants

This study is a systematic analysis of selected research articles about the Power-to-x (P2X) sector. The relevance of this resides in the fact that most of the world energy is made from fossil fuels, which has been led to a huge amount of greenhouse gas emissions that are the source of global warming. One of the most supported actions against this issue is to produce and use the renewable energy resources, some of which are intermittent like solar and wind. This brings the need for large-scale, longer-period energy storage solutions. In this sense, P2X process chain could play this role: renewable energy can be converted into storable hydrogen, chemicals and fuels via electrolysis and subsequent synthesis with CO2. The focus of this study is to highlight the main contributions that are using the advanced data driven methods and latest technologies like Internet of Things (IoT), big data analytics and machine learning for the efficient operation of P2X cogeneration plants. In this case, one key challenge the industries face is the selection of an IoT platform among the hundreds of IoT platforms in the market. In this paper, we adapt our previously proposed general framework to choose an IoT platform focusing here on the requirements of P2X cogeneration plant. The proposed framework provides an objective methodology that can be used to

select the most suitable IoT platform for different P2X cogeneration plant based on their particular requirements.

Daynara Dias Souza

Implementing Energy-Efficient Solutions in Communication Networks
keywords: cell-free massive MIMO, unmanned aerial vehicles, energy harvesting.

Recently, several approaches have been proposed to improve the communication system, focusing on the energy efficiency aspects of the proposed solutions. Minimizing energy consumption in communication networks is one of the key factors allowing for the future green-digital transition. Among these solutions, it can be highlighted cell-free massive multiple-input multiple-output (CF-mMIMO) networks, aerial base stations using unmanned aerial vehicles (UAVs), and energy-efficient transmission protocol.

User-centric (UC) CF-mMIMO is an essential technology in next-generation communication systems. In CF-mMIMO systems, many transmission and reception points (TRPs) are spread out in the coverage area. The users' equipment (UEs) share the same time-frequency resources, and a specific subset of TRPs serves each UE. These networks stand out for their high spectral efficiency (SE), reduced susceptibility to blocking and shadowing, and uniform performance among UE. Additionally, each TRP is comprised of small components, making it more accessible to install. These networks may consume less energy than conventional massive MIMO networks, which, along with their increase in SE performance, makes them a more energy-efficient solution.

Deploying a terrestrial infrastructure might be neither cost-effective nor feasible in practical cases, such as complex terrains, private areas, or remote areas. In those situations, aerial communication systems based on UAVs are regarded as a promising new paradigm to facilitate fast and highly flexible deployment of communication infrastructure due to their high maneuverability. UAVs can be viewed as reusable aircraft designed to operate without onboard people, which can be controlled remotely or programmed to fly autonomously. These systems can have a lower installation cost and environmental impact than terrestrial ones, thus being more cost-effective. Additionally, they allow for rapid deployment capabilities due to their inherent flexibility, making them highly attractive.

Nonetheless, it is still crucial to find solutions to reduce energy consumption in these networks further. Some exciting strategies include the use of green energy sources. For instance, the components of the wireless network (e.g., edge CPUs, TRPs, and UEs) can be equipped with solar panels to perform solar energy harvesting. Additionally, a fraction of the radio frequency (RF) energy harvesting is a possible solution for high-density scenarios. Another approach consists of using energy-saving transmission protocols, incorporating features like sleep modes and low-complexity optimizations.

The digital transition can either facilitate or hinder the shift towards sustainability. A significant concern arises from the escalating energy consumption driven by the expanding data processing and computational demands over time. Therefore, a successful transition towards a green-digital future demands carefully considering the environmental impact of any proposed solution in light of the sustainability goals. Ultimately, these advancements can help the pursuit of sustainable communication systems, where energy efficiency not only improves operational aspects, but also aligns with broader environmental ideals.

Atilla Kılınç

The Social Implications of Global Digitalization Discourse as a Governance Apparatus in Regulated Energy Markets: A Case from Turkey
Keywords: Digitalization, Energy Market, Policy Implication, Globalization, and Turkey

Globalization has become integral to many societies as the world becomes increasingly interconnected. However, this has also led to an exponential increase in the demand for energy resources. Based on the approach that energy policies are at the foundation of global conjunctural structures, governments' use of end consumers' access to energy as a state apparatus has been reinforced with the presentation of

digitalization as a strategic requirement. Energy efficiency networks (EEN), one of the obligations created by these conditional contingencies, have emerged. Although EEN began to be used as a strategic digitalization tool in the neo-liberal order, they were turned into a control mechanism in regulated energy markets. While digitalization creates EEN as a state apparatus by using new energy technologies available to governments, it also makes a systematic "back-office" control mechanism in the energy market by grounding the ideology that this apparatus is an element of governance on global conjunctures.

In the context of the United Nations (UN)' Sustainable Development Goals (SDG), governments are responsible for meeting their citizens' energy needs while ensuring supply security. Countries and regions like the European Union, Australia, Germany, and the United Kingdom actively embrace digitalization to accelerate clean energy transitions. However, in some developing countries, regulated energy markets prioritize the enrichment of government partisans over the welfare of their citizens. This dynamic, facilitated by digitalization, leads to the exploitation of the public, a grave societal concern.
In an environment where governments prioritize their partizans' political interests over the well-being of their citizens, it is crucial to evaluate the effectiveness and equity of their efforts to promote environmental protection awareness and address environmental justice. This research aims to analyze and assess the strategies governments employ to identify potential areas for improvement and contribute to more effective and equitable policies.

In this research, I defined globalization as increasing interconnectedness and interdependence among societies. Therefore, it can be framed using theories such as hyperglobalization or globalization as a hegemonic process, emphasizing how it impacts global economic, political, and social domains. In the article, I discussed how digitalization is crucial to governments' strategic requirements in the context of the UN's SDG and current global conjunctures. To support my argument, I drew upon Foucauldian perspectives on governmentality and the concept of the digital state. I explained how governments use digital tools for governance and control. I clarified that to analyze the social implications of digitalization discourse in Turkey's regulated energy market. I intend to provide insights into benefits, drawbacks, and potential areas for future improvement.

Finally, this research article delves into the intricate social implications of using global digitalization discourse as a state apparatus in the regulated energy market of a developing economy like Turkey. It seeks to provide a comprehensive analysis of the effects of this discourse on society and the people involved, shedding light on its potential benefits and drawbacks.