Advancing AI Adoption in the Public Sector: Toward Hybrid Intelligence with Stakeholder Perspectives

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Abstract. Governments are increasingly adopting AI to improve public services as part of smart city development, and hybrid intelligence plays an essential role in this developmental process. This panel, emphasizing stakeholder perspectives, explores the opportunities and challenges of adopting hybrid intelligence for smart city development. We include three papers and six authors for the panel. The first paper investigates how smart city initiatives facilitated through citizen-government participation platforms differ in terms of stakeholder groups, types of participation, and technology employed. The second paper examines how the municipal city, Hsinchu City Government, utilizes intersection fisheye camera images to analyze traffic flow and their related stakeholders' views on such adoption. The last study examines data-driven public services by combining the strengths of human experiences and artificial intelligence. This paper discusses studies utilizing open data, big data, or linked data to support informed decision-making through an inclusive process and inter-governmental collaboration and innovation transfer, as shown in the second paper. The panel will also reserve time for the audience to join the discussions and share their related research in applying hybrid intelligence for smart city development.
Keywords. AI, hybrid intelligence, digital twin, big data, smart city.
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1. Theme and Goals

Increasingly, governments are adopting AI to improve public services and increase automation processes as part of the smart city development. Liu, Tang, and Collard (2025) show that hybrid intelligence plays an essential role in smart city development through a review of over 10,000 articles (e.g., Kitchin, 2014; Anttiroiko et al., 2014; Gil-Garcia et al., 2015; Gil-Garcia et al., 2016; Meijer & Bolívar, 2016; Elazhary, 2019; Kumar et al., 2020). Liu et al. (2025) show that existing literature focuses on technological and engagement components for designing hybrid intelligence in smart city development. For instance, Elazhary (2019) shows that TransWiseway utilizes sensors and cloud computing to improve safety and efficiency. TransWiseway is a smart transportation system, also known as Web of Wisdom Things, developed by Intel technologies by utilizing crowd information and accumulating user experiences for decisions (Elazhary, 2019).

Besides technological advancements in analyzing massive crowd information and behaviors, Liu et al. (2025) point out the essential aspect of engagement in adopting AI, developing hybrid intelligence, and keeping the crowd informed regarding how their information is utilized or actively engages the crowd for AI development. For

instance, Gil-Garcia, Zhang, and Puron-Cid (2016) introduce the concept of "smartness" in government, identifying fourteen key components: "integration, innovation, evidence-based decision-making, citizen-centricity, sustainability, creativity, effectiveness, efficiency, equality, entrepreneurialism, citizen engagement, openness, resiliency, and technology savviness" (p.525). Developing a smart city should include these steps to foster collaboration and citizen participation (Gil-Garcia et al., 2016). Also, the government should involve citizens as co-producers in policy development and service implementation (Liu, 2021). Often, governments adopt strategies for open data sharing, data-driven services (Nikiforova et al., 2023), and guidelines tapping into crowd information (Liu et al., 2025). For instance, Nikiforova et al. (2023) highlight the importance of stakeholders' aspects in the high-value dataset literature.

This panel, emphasizing stakeholder perspectives, explores the opportunities and challenges of adopting hybrid intelligence for smart city development. We include three papers and six authors for the panel. The first paper investigates how smart city initiatives facilitated through citizen-government participation platforms differ in terms of stakeholder groups, types of participation, and technology employed. The second paper examines how the municipal city, Hsinchu City Government, utilizes intersection fisheye camera images to analyze traffic flow and their related stakeholders' views on such adoption. The last study examines data-driven public services by combining the strengths of human experiences and artificial intelligence. This paper investigates studies utilizing open data, big data, or linked data to support informed decision-making through inclusive process (Ciesielska et al., 2022) and inter-governmental collaboration and innovation transfer (Ciesielska et al., 2021). The panel will also reserve time for the audience to join the discussions and share their related research in applying hybrid intelligence for smart city development.

2. Panel Content

2.1 Hybrid Intelligence for Smart City Development: Stakeholders Perspective

Increasingly, governments adopt various stakeholders in smart city development (Gil-Garcia et al., 2016). With the rise of AI technology, incorporating crowds into the development and implementation process has become essential (Liu, 2017a; Liu, 2021). Liu, Guo, and Chen (2023) reveal an interesting case where the government adopts a living lab concept, allowing various stakeholders to experiment with emerging technologies before scaling up or adopted by the governments. That study provides online smart city proposals and achieves data from the Taipei City Government. Digital technology can replace the government in its dominant position (Linders, 2012, 451). Musiatowicz-Podbial (2024) mentioned that successful collaboration among stakeholders requires certain upfront conditions of common platform establishment, introduction of government incentives and inducements, and the perceiving the mutual benefits of collaboration among stakeholders. Municipal governments could develop platforms for stakeholder participation in smart city development (Liu et al., 2023) and citizen participation in public service provisions (Liu, Chao, & Chen, 2024). This study builds on the platform framework and stakeholder analysis to further investigate how smart city initiatives facilitated through citizen-government participation platforms differ, in terms of collaborating parties, the role of technology in enhancing collaboration and the results of collaboration measured both as direct outputs and longer-term outcomes. Our study conducts a systematic review of the social partners and state collaboration in smart city development. Building on existing literature, our paper proposes a stakeholder analytical framework to understand interactions characteristics. Using an archived dataset, our paper shows that most citizen-initiated projects could not be sustained or implemented due to lacking capital or resources. Successful projects build solid relationships with different governmental units and private enterprises. Based on our findings, governments could provide monetary resources as seed funds and should also offer networking opportunities for selected projects to sustain.

2.2 Fisheye Camera Images for Traffic Flow Detection in Hsinchu City

Although digital twins have become a standard technology in smart city development—particularly in traffic flow monitoring—establishing a comprehensive digital twin system across an entire city requires careful consideration of financial resources, technical capabilities, and privacy concerns. This challenge is especially pressing for cities with limited budgets, which must find cost-effective ways to achieve similar outcomes. This case study highlights the smart transportation initiative led by the Hsinchu City Government. Hsinchu City and Hsinchu County form a major hub of Taiwan's high-tech industry, with clusters of chip manufacturing facilities such as TSMC. During peak commuting hours, traffic congestion is a significant issue. To address this, the Hsinchu City Government utilized fisheye cameras installed at intersections to analyze traffic flow—yielding promising results. In this initiative, the Hsinchu City Police Department provided the traffic video footage, while the National Center for High-Performance Computing and National Yang Ming Chiao Tung University conducted the data analysis. This collaborative effort exemplifies a successful public-private partnership, underpinned by secure data-sharing practices among various data holders. It also reflects the formation of a data ecosystem between government and academic institutions. A traffic flow model was established using 40 fisheye cameras at intersections, enabling intelligent traffic management and control.

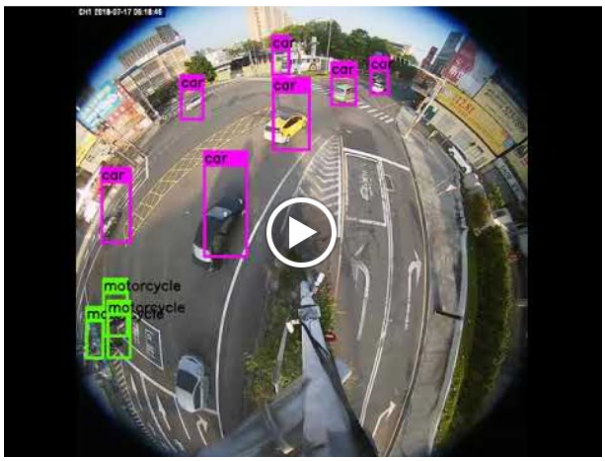

Fig. 1 - Vehicle Identification

2.3 Enabling Data-Driven Public Services and Governance through Hybrid Intelligence

Increasingly, governments adopt strategies for open data sharing, data-driven services (Nikiforova et al., 2023), and guidelines tapping into crowd information (Liu et al., 2025). However, data-driven services and governance face challenges, including awareness of data input (Liu et al., 2025), misinformation (Lorenz-Spreen et al., 2020), and representation (Liu, 2017a). Liu et al. (2025) reveal two types of conditions for data inputs in the designs of hybrid intelligence, including conscious crowd and unconscious crowd. The conscious crowd actively provides information and data by acknowledging how the data is used and for what purposes (Liu et al., 2025). On the other hand, the unconscious crowd might not fully realize how their data is analyzed (Liu et al., 2025). Valentino et al. (2020) show that the public might not be aware of the documentation of their behaviors by the sensing technologies. This talk discusses the transformation of high-value datasets (Nikiforova et al., 2023; Ciesielska et al., 2021; Ciesielska et al., 2022) for public services and governance by utilizing artificial intelligence, crowd intelligence, and hybrid intelligence.

3. Significances to the Attendees

The panel is designed for international academic scholars across different disciplines, government officials, policymakers, practitioners, and other industry leaders interested in engaging diverse stakeholders to address the impacts and challenges of AI or HI adoption in the public sector. The discussion will provide both theoretical constructs and practical suggestions for designing inclusive and effective AI and CI in public governance.

4. Panel Structure

Tab. 1 – Panel Program.

Session	Duration	Theme	Presenter
Introduction	5 min.		Chair
1st Presentation	20 min.	Hybrid Intelligence for Smart City Development: Stakeholders Perspective	Grażyna Musiatowicz-Podbiał;
2nd Presentation	20 min.	Fisheye Camera Images for Traffic Flow Detection in Hsinchu City	Hsien-Lee Tseng; Ko Wei-Jan
3rd Presentation	20 min.	Enabling Data-Driven Public Services and Governance through Hybrid Intelligence	Helen K. Liu
Discussions	20 min.	Q&A	Open to the audience
Closing	5 min.		Chair

5. Panalists

Helen K. Liu: Professor in the Department of Political Science and Director of the NTU Center for Collective Intelligence, National Taiwan University (NTU). Her research develops crowdsourcing platform design principles for the public sector to engage citizens. Her research interests are crowdsourcing, online engagement, collaborative governance, e-governance, and inter-organizational networks. She serves as a conference co-chair of the dg.o

conference 2024. She also serves on the *Government Information Quarterly* and *Public Administration* editorial board.

Grażyna Musiatowicz-Podbiał: Assistant Professor at Department of Informatics in Management, Faculty of Management and Economics, Gdańsk University of Technology, Poland. Her research includes applied information technology, IT strategies, digital transformation, economic, digital business, digital government, and digital platforms. She served as a conference co-chair of the dg.o conference 2023.

Hsien-Lee Tseng is an Associate Professor at the Department of Public Administration and Management at the National University of Tainan, Taiwan, specializing in e-governance, data governance, and public policy. He is also a research fellow at the Taiwan E-Governance (TEG) Research Center. His recent research focuses on digital rights and principles, and AI application in public sectors.

Wei-Jan Ko is a PhD candidate at National Yang Ming Chiao Tung University and currently serves as a researcher at Center of Research Acquisition, National Institute of Cyber Security, Taiwan. His expertise lies in information security, data governance, and digital policy.

Magdalena Ciesielska: Assistant professor at the Department of Informatics in Management, Faculty of Management and Economics, Gdańsk University of Technology, Poland. Her research includes e-government, smart city, and sustainability.

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- **Use of AI***: During the preparation of this work, the author(s) used Grammaly in order to proof-read the proposal. After using this tool/service, the author(s) reviewed, edited, made the content their own and validated the outcome as needed, and take(s) full responsibility for the content of the publication.
- **Conflict Of Interest (COI)***: There is no conflict of interest

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