

Fujitsu on: Converging Technologies

Overview

- Predicting the outcomes of social policy changes is hugely complex. Currently, we make assumptions about how people may react to policy inputs. But the variables are so dense that we have just been making coarse-grain approximations. As a result, local governments and smart city initiatives struggle with decision-making. Forecasting the future is complex — especially with many moving parts, particularly human behavior.
- Fujitsu is at the forefront of blending cutting-edge digital technology with human sciences to address societal issues in a borderless physical and digital world. This approach expands on the concept of digital twins – virtual replicas, traditionally used for smaller, self-contained entities such as factories — and scales it up to embrace cities, entire regions, and even societies.
- The exciting field of converging technologies field is advancing rapidly, leading to the availability of unprecedented insights from AI-informed social modeling.

Industry Trends in Brief

- The idea of convergence across technology and social science is not new. It was explored in a 2019 article in [Cleverism](#), which argued that society and culture create science that positively affects society. A [2021 academic paper](#) discussed the intersection between AI and social theory, highlighting the uneven availability of data for different areas of social life and theories.
- However, that gap is no longer a barrier. AI computer image recognition has now advanced to the point where it can recognize and even predict human behaviors. Data generated by computer vision can be analyzed and made available to ML models.
- Access to large-scale behavioral data and advanced analytics is starting to uncover new insights into collective dynamics, networks, and complex social patterns. These will, in turn, lead to new models that uncover precise mechanisms behind herd behavior, for example, in financial markets, the spread of misinformation, and the adoption of societal norms. Representing these in digital twins for what-if intervention analysis can present the evidence needed for policymaking.
- Modeling and computational social science will simulate societies in new detail, enabling refined testing of theories and policies. For example, analyzing city dynamics and residents' needs could inform housing, mobility and recreational planning tailored to localized contexts. New models of pedagogy could lead to customized, AI-enhanced education — more effective for diverse learning styles.
- AI-enhanced digital twins are starting to address societal challenges, such as net zero and circularity. These issues will be transformed through hyper-customization fueled by predictive behavioral models based on observation data about real people rather than potentially biased theoretical models.
- There are risks in this approach, too. Privacy must be preserved, and biases must be eliminated. However, current social modeling is perhaps even more liable to faulty conclusions due to small data samples and the potential for researcher bias. AI-derived social modeling can improve our predictions about human and social behavior and enhance and streamline how social services operate.

Fujitsu and Converging Technologies

- Fujitsu is a leader in constructing Social Digital Twins (SDT) models that combine the effects of people and the environment. They reproduce environments in digital space by sensing the real world and adding behavioral insights.

- To drive these capabilities forward, Fujitsu is creating the essential building blocks for future SDTs via advances in AI. This AI understands, predicts, and evaluates like a human being. The technology captures human behavior elements directly from camera images, acting as the eyes of the machine. The AI can understand the situation and predict what will happen next. Fujitsu is also developing a technology that can analyze human behavior using millimeter-wave sensors without using video footage to ensure even greater privacy protection.
- As a crucial next step, Fujitsu is focused on integrating discoveries about human behavior from the field of humanities. It is collaborating with Carnegie Mellon University (CMU) in the USA on several research projects developing SDT technology. The emphasis is exploring practical applications for joint research and technology in global communities.
- Fujitsu announced a new technology named “[digital rehearsal](#)” in 2023 to support policymaking and business planning. The first demonstration, in cooperation with shared mobility provider Beryl, provides realistic simulations of the effects of different traffic policies, for example, showing how different parking charges can affect the utilization of a park-and-ride scheme. An initial pilot created a social digital twin tracking the use of e-mobility services on the UK’s Isle of Wight and in the fall of 2024, a trial is underway in the UK city of Norwich. The new technology combines the behavioral economics model “Prospect Theory” and AI to infer how people will behave in the real world. It reproduces human biases, such as our tendency to overestimate losses and underestimate potential gains, and situational factors influencing behavior, such as weather conditions.
- Fujitsu has partnered with Hexagon, a global leader in digital reality solutions, to deliver a platform for Stuttgart, Germany, supporting the city’s urban digital twin project. Stuttgart’s civil engineering office will use the SaaS solution to visualize and analyze data from IoT sensors across the city to promote sustainability and enhance the quality of life for 600,000 residents.
- In Japan, Fujitsu and the City of Kawasaki are working with the latest computing and next-generation network technologies to implement an SDT that digitally reproduces real-time information related to the economy, society, and the environment. Also, the partners are establishing a citizen-participation living lab to connect citizens and businesses to realize its vision for a sustainable “future city”.
- Another promising development underway is in crime prevention. Field trials are underway in Japan to help people avoid being taken in by phone call fraud by analyzing a possible victim’s vital data. The technology estimates if people are being deceived based on fluctuations in feelings of anxiety from critical data, such as their breathing and heart rates detected by millimeter-wave sensors.

Fujitsu quote on converging technologies:

Daiki Masumoto, Fellow, SVP, Fujitsu Research at Fujitsu Limited: “Society is just beginning to realize the potential gains from converging technologies like Social Digital Twins with insights from behavioral science. Fujitsu is investing decisively in these areas to create the tools and models that will shape the future of social planning. Expect rapid advances in behavior prediction to improve wellbeing and realize a safe and sustainable society.”

Reference customers

- [Hexagon and Fujitsu support Stuttgart’s urban digital twin project](#)
- [Fujitsu launches ‘digital twin’ trial on the Isle of Wight for e-scooter sharing service](#)
- [Fujitsu embarks on digital collaboration with WBCSD for carbon-neutral transportation](#)

Relevant Fujitsu Products/ Milestones

- [Deucalion: a new EuroHPC supercomputer has been inaugurated](#)
- [Looking Back on the Supercomputer Fugaku Development Project](#)
- [Supercomputer Fugaku retains first place worldwide in HPCG and Graph500 rankings](#)

Further reading/watching

- [Transforming Society in the Digital Age with the World's Most Advanced Computing](#)
- [Social policy is on the edge of a digital revolution](#)
- [Fujitsu Converging Technologies for Sustainability Transformation](#)