

DATA AND GREEN ECONOMY¹

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I would like to submit that there is a direct connection between data, productivity, competitiveness and sustainability. Pakistan as a late comer has to leap frog conventional development strategies by fostering innovation and technology driven environment. For that we have to invest in skill upgradation, infrastructure, connectivity(internet stability and latency, fiberization, 5G), National Data Exchange layer for data sharing , APIs building on the layers of a secure interoperable and citizen centric Digital ID framework , Digital payments which are already operational or advanced stage of development. . There are five layers for AI – Data, Energy, Chips for computing power, Infrastructure (Land, Power delivery, cooling, Construction), networking tens of thousands of processes into one machine and Models,

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There is a lot of controversy and uncertainty about the future of AI among those who argue that it is getting out of control and human beings cannot do much about it. Scientists working in this field and tech entrepreneurs are calling for slow down and regulation. Others are pumping billions of dollars in expanding the scope of AI in various aspects and dimensions. Apprehensions about massive job displacement and consequential high unemployment are raising alarm bells among politicians. In my view the policies of deglobalization and nationalism may be equally responsible for job displacement . There is growing concerns among the educators that the wider use of Chat GPT, Claude, Deepseek etc by students is retarding their cognitive abilities to think critically and be creative. As they would be the ones that would be providing the prompts to Machine learning models there are chances of these models going astray . This disconnect between human agency and the machine learning capability may precipitate a situation where men lose control over technology which has not happened so far in the history of mankind. It would be a sad moment if opaque algorithms trained in invisible data take over

decision making. As I am not qualified to make any observations one way or the other I use the existing knowledge base to underpin my remarks this evening which in essence show the set of opportunities that have opened up through Big Data and AI models and applications.

I would like to briefly touch upon the sectors which would benefit from data, AI and transition to green economy except I would take few of your minutes to dwell upon agriculture as Pakistan's biggest threat from Climate risks is to Food, Water and Energy security.

Agriculture

Using satellite imagery, weather sensors and data based algorithms, AI empowers farmers to track crop progress over the entire crop cycle and make informed decisions regarding various agriculture practices. AI facilitates the optimization of tillage and irrigation, allows precision application of fertilisers based on mapping of soil contents, insights from field trials and remote sensing. AI enabled irrigation systems save water by adjusting water quantities and timings based on the data collected through field sensors and weather

forecasts. AI powered applications, and GPS modules embedded in robots, drones and unmanned ground vehicles are used for crop mapping, real time crop monitoring . early detection of crop diseases or nutritional deficiencies , yield analysis and the precise application of pesticides and herbicides .

Precision farming increased crop yields while mitigating the climate change and prevents the inefficient use of valuable resources such as water, fertilizers, pesticides. In Pakistan we have low educated farmers , small average farm size, mostly subsistence farming . There is scarcity of skilled professionals , limitations of data , poor financial conditions of farmers, poor internet connectivity in rural areas. Public policy and institutional strengthening interventions would have to intervene to ease these constraints to maximize benefits of AI driven technologies. That can increase productivity of small farmers by reducing their cost of production , enhance their purchasing power, reduce poverty incidence and minimize gender and regional inequalities. Higher rural incomes add to aggregate demand for goods and services in the economy at the same time ensuring food, energy and water

security . Environmental hazards have to be comanaged along with raising the living standards of the poor, marginalized, vulnerable segments of the population.

Health care – Electronic health records, telemedicine, aid in diagnostics, personalized medicine, drug testing process , Gene editing, Bioengineering . Clinicians using AI increased the share of correctly diagnosed with cancer from 82.1 to 86.1 percent.

Education – On line learning platforms, Tailored learning by AI assisted tutors raising the average standards , Virtual reality

Finance—Digital payments, Blockchain, Risk management, credit scoring models based on Big data, Reliable environmental, social and governance data can help channel capital towards cleaner technologies and more resource-efficient enterprises. A SBP Survey in 2025 shows that 50 percent of regulated entities are using AI for customer service, credit risk assessment, fraud detection, process automation, risk mitigation strategies, sustainability related risks and opportunities

Manufacturing—Internet of things, Robotics, Additive manufacturing

Transportation – Evs, autonomous driving, smart infrastructure

Energy and utilities—Smart grids, Renewable energy, Energy storage systems, Smart meters and digital grids can provide information about when and where electricity is consumed. This allows better demand management, reduces losses and facilitates the integration of solar, wind and other renewable sources into the electricity system.

Retail , cross border trade, and E Commerce--- Customer service, Personalized marketing, augmented reality. Cross border digitally delivered services are the fastest growing segment of international trade rising 8 percent a year over past two decades. E commerce is turning into a globalized local market . Gig economy is shattering the traditional notions of employment

Logistics and supply chain—IOT tracking, predictive analysis

Real Estate—Virtual property tour, Smart buildings

**Government—Digital Identity , E Governance,
Integrated National Data Centre**

**Media and Entertainment—Streaming, Virtual events,
Immersive experience**

**Urban management--Data on traffic flows, fuel
consumption, air quality, public transport and land
use can help cities reduce congestion and pollution
while improving mobility**

**Let me make some tentative concluding remarks.
After sketching the above benign aspects of AI there
is no doubt in my mind that it would remain useful if
AI human partnership outperform both AI and
humans alone.**

**First, data is a strategic national asset. Countries
that can generate, manage and use high-quality data
will have an advantage in policymaking, business,
science and technology.**

**Second, data is an instrument of better governance.
It can help governments allocate scarce resources
more efficiently, target social programmes more
accurately, monitor public expenditure and hold
institutions accountable for results.**

Third, data is a foundation of the new economy. Artificial intelligence, digital finance, precision agriculture, smart manufacturing, modern logistics and countless other technologies depend on reliable data.

Fourth, Data should be used judiciously and disseminated widely for achieving successful transition to green and sustainable economic transformation