

An AI+X Future for Qatar and the Region¹

Qatar is a small peninsular nation on the north-eastern coast of the Arabian peninsula. Qatar is endowed with abundant hydrocarbon resources and is the world's largest producer of liquified natural gas (LNG) which accounts for over eighty-percent of its export earnings. Like many of its wealthy neighbors, Qatar faces a unique dilemma with the onset of Artificial Intelligence (AI) technologies. Despite having one of the world's highest per-capita income and a highly educated local population, the majority of Qataris are under-employed and working in government white collar jobs where they are unable to fully realize the potential of their level of education. These are precisely the occupations that are likely to be made redundant by AI (Frey, 2019). The bulk of the workforce in Qatar consists of expatriates drawn primarily from South Asia and the Middle-East and North Africa (MENA) region. As the finite horizon of a natural resource based economy comes closer, countries like Qatar have no option but to embrace Artificial Intelligence (AI) to transition into a knowledge-based economy while protecting and perhaps enhancing their current standard of living.

A Nuanced View of AI

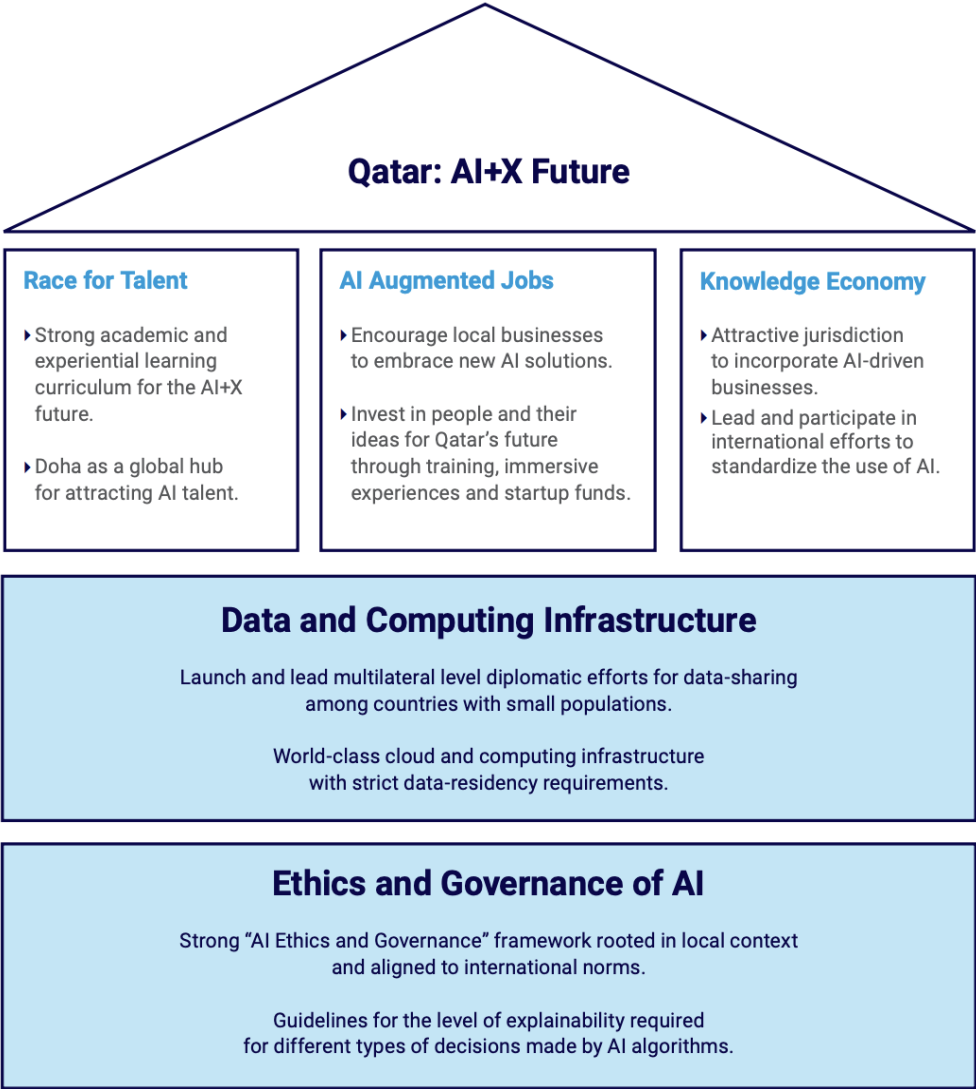
In October 2019 and in collaboration with Qatar Computing Research Institute (QCRI), the government of Qatar released a National Strategy for AI (Qatar Computing Research Institute, 2019). The aim of the Strategy is to make decision-makers and the wider public in Qatar have a nuanced and realistic view of AI technology and at the same time serve as a “call for action” towards a future where AI will become the defining technology of the twenty-first century and beyond.

¹ Ashraf Aboulnaga and Sanjay Chawla and Ahmed Elmagarmid
Affiliation: Qatar Computing Research Institute (QCRI)

Mohammed Al-Mannai and Hassan El-Sayed
Affiliation: Ministry of Transportation and Communications (MoTC)

Pillars of AI

The Strategy is divided into sections (referred as pillars): *Race for Talent, AI-Augmented Jobs, Knowledge Economy, Data and Computing Infrastructure, Ethics and Governance of AI and AI+X Future*. For each of these pillars, the Strategy makes Qatar-specific recommendations in order for the country to realize its National Vision to transition into a knowledge-based economy by 2030. Here we briefly outline and contextualize the pillars and report on progress since the Strategy was announced.



Race for Talent: Ninety-five percent of the workforce in Qatar consists of non-Qatari expatriates. A large bulk of the workforce consists of blue-collar workers employed in the construction and service sector. As the infrastructure work related to the FIFA 2022 World Cup comes to an end, Qatar needs to create pathways to attract talent that has experience working in AI and digital ecosystems. For example, fast track visas for AI Engineers can help build a critical mass of AI talent in the country - at least in the short term. The AI talent can be deployed in existing strategic industries ranging from Oil and Gas, Banking, Utilities and Telecommunications. For a more sustainable and long term solution to create AI talent, the Strategy proposes a measured transformation of the curriculum at all levels of education. Modern AI rests on the ability to transform data and students from early on need to be taught how to work with data and develop a data-driven approach to problem solving, analysis and critical thinking. For example, different types of data associated with COVID-19 could be used in a mathematics class to introduce “curve-fitting” or in a biology class to introduce protein sequence structure or in a geography class to compare the spread of the virus across different parts of the world.

AI-Augmented Jobs: A recent study by QCRI, as a follow up work on the Strategy, indicates a massive impact of AI in the Qatari workplace (Qatar Center for AI, 2020). Nearly 45% of tasks associated with jobs in which Qataris are employed can be augmented with existing commercially available AI technology or for which a patent has been approved. Similarly a large number of occupations where non-Qataris are employed will be impacted. Nearly all studies on the impact of AI on the workplace indicate that white-collar jobs are more susceptible to be replaced by AI than blue collar jobs. Since a majority of the Qatari population is engaged in white collar occupation they are likely to be disproportionately impacted. Policy makers around the world are facing the dilemma of embracing AI technology and at the same time preventing massive job losses that could lead to social and political upheaval. In Qatar the trade-off between AI and job loss will not be that stark because the majority of the Qatari population is overeducated and underemployed. Creating training programs that can help them transition to an AI-augmented work environment will be relatively easier in Qatar than in other parts of the world. Qatar has already built a world class infrastructure in education and research and many major international universities have a branch campus in the country. For example, Carnegie Mellon University, which arguably is the fountainhead of AI research and education, has a branch campus in Qatar where undergraduate degrees in computer science and information systems are offered. CMU’s expertise in AI could be leveraged to create training courses to help transition workers to an AI-augmented workplace.

Knowledge Economy: AI can serve as a catalyst for Qatar to transform itself into a knowledge economy as envisioned in the Qatar National Vision 2030 plan. Qatar needs to transition from an economy based on hydrocarbon and downstream industries to an economy grounded in data and AI. An ecosystem should emerge where talent, ideas and investment are allowed to interact in a harmonious manner. Qatar's investment in research centers like QCRI can be the genesis of such an ecosystem. QCRI has already developed specialized AI technology in Arabic speech translation, urban computing, fake news detection, data integration, persona generation and systematic reviews and these technologies have already been spun-out into startups. Processes have been put in place where researchers can go on "entrepreneurial leave" to transition these start-ups to their next level of maturity. The next step is to update legal frameworks where investors can enter and exit the market in a transparent manner. Local talent needs to be harnessed into the ecosystem to ensure long term sustainability.

Data and Computing Infrastructure: Modern AI is based on data and requires a robust computing infrastructure. Qatar should take a leading role in multilateral efforts for data exchange as it had done in the World Trade Organization (WTO) by hosting the Doha round in 2001. Several barriers against the free flow of data are emerging around the world as concerns of data privacy and security are leading countries to inhibit the flow of data. While the Strategy was written before the pandemic, it foreshadowed the importance of data exchange. For example, WHO initiated Solidarity Trials for finding effective treatment for COVID-19 involved over twelve thousand patients in five hundred hospitals across thirty countries. Data on treatments was exchanged and collected by the WHO and several studies have been published for evaluating COVID-19 therapeutics (WHO, 2020). In the 2019 G20 summit in Osaka, an initiative Data Free Flow with Trust (DFFT) was started to create standards and policies encouraging a seamless flow of relevant data across the globe while ensuring safeguards arounds privacy and security (World Economic Forum, n.d.). Qatar should form a coalition amongst small nations to ensure that they have an effective voice in global forums on data exchange.

Ethics and Governance of AI: While AI models are extremely accurate and outperform humans on many benchmark cognitive tasks, their decision-making logic often remains opaque and uninterpretable. As AI models are based on data, they may inadvertently capture and amplify social biases that are inconsistent with the laws of the land. For example in the United States, AI models for determining the length of a jail sentence for a convicted criminal amplified racial biases even though racial information was not

provided to the model (Rudin et al., 2020). Similarly social media platforms have “hard coded” maximizing retention as their objective and will recommend content to a user which often leads to extreme polarization in a society. As AI technology permeates into important sectors of society like education, health and law, care must be taken that recommendations from AI systems are ethical and remain consistent with local ethical norms and practices.

An AI+X Future

As a small country with a limited technological base and talent, Qatar will remain a net importer of AI technology for the foreseeable future. However, the Strategy has identified a few niche domains where Qatar can be an important player in the world stage. For example, in precision medicine, new AI-driven technology can be built around the data emerging from the Qatar Genome Project (QGP). In particular Qatar can take the lead in developing specialized AI tools to detect, preempt and manage diseases associated with the practice of consanguinity. In the domain of digitalization of the Arabic language, Qatar-based international news media, academic entities and research institutes can combine forces and develop novel AI technology. Qatar has invested billions of dollars in sporting infrastructure and can encapsulate the learning in AI tools which can be exported to international markets. As the world’s largest producer and supplier of Liquefied Natural Gas (LNG), Qatar can use the vast amount of associated data generated from the gas fields to create niche AI products for the hydrocarbon industry. Finally in the area of transportation, where Qatar has invested huge amounts of resources to become a “smart nation,” the triangulation of data, talent and investment can create cutting-edge AI technology.

Strategy Update

The Strategy was released in October 2019 and by March 2020, Qatar like the rest of the world, was in the midst of an unprecedented pandemic. As the world moved online, the role of data and AI has become even more salient than before. From the outset, the WHO warned that the world was not only witnessing a pandemic but an “infodemic” where unreliable and false information was interrupting efforts to control the pandemic. Thus the importance of “Ethical AI and Data” has clearly stood out during the pandemic. On the positive side, the democratization of COVID-19 data ensured that local AI models could be developed to forecast the spread of the disease. In fact, data-driven models developed

by QCRI to forecast the epidemic curve and mobility patterns were extensively used by policy makers in the country.

The government of Qatar is in the process of forming an implementation and oversight council to streamline AI activities based on recommendations of the Strategy. The council will have representation from all arms of the government, academic and research institutions and civil society. The brave new world of AI is taking root in Qatar and the region.

Bibliography

Frey, C. B. (2019). *The Technology Trap*. Princeton Press.

Qatar Center for AI. (2020, November). *Impact of AI on Qatar's Labor Market*. Impact of AI on Qatar's Labor Market. https://qcai.qcri.org/wp-content/uploads/2020/11/Impact-of-AI-on-Qatars-Labor-Market_15Nov2019.pdf

Qatar Computing Research Institute. (2019). *National AI Strategy for Qatar*. National AI Strategy for Qatar. <https://qcai.qcri.org/wp-content/uploads/2020/04/QCRI-Artificial-Intelligence-Strategy-2019-ENG.pdf>

Rudin, C., Wang, C., & Coker, B. (2020). The Age of Secrecy and Unfairness in Recidivism Prediction. *Harvard Data Science Review*, 2(1). <https://doi.org/10.1162/99608f92.6ed64b30>

WHO. (2020). *Solidarity Trials*. Solidarity Trials. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov/solidarity-clinical-trial-for-covid-19-treatments>

World Economic Forum. (n.d.). *Data Free Flow with Trust*. Data Free Flow with Trust. http://www3.weforum.org/docs/WEF_Paths_Towards_Free_and_Trusted_Data%20_Flows_2020.pdf