GLOBAL INFORMATION SOCIETY WATCH 2019

Artificial intelligence:
Human rights, social justice and development

Association for Progressive Communications (APC),
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Operational team
Valeria Betancourt (APC)
Alan Finlay (APC)
Mallory Knodel (ARTICLE 19)
Vidushi Marda (ARTICLE 19)
Maja Romano (APC)

Project coordination team
Valeria Betancourt (APC)
Cathy Chen (APC)
Flavia Fascendini (APC)
Alan Finlay (APC)
Mallory Knodel (ARTICLE 19)
Vidushi Marda (ARTICLE 19)
Leila Nachawati (APC)
Lori Nordstrom (APC)
Maja Romano (APC)

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Maja Romano (APC)

Editor
Alan Finlay (APC)

Assistant editor and proofreading
Lori Nordstrom (APC)

Publication production support
Cathy Chen (APC)

Graphic design
Monocromo

Cover illustration
Matías Bervejillo

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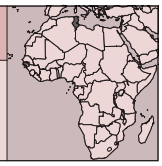
TUNISIA

AN ARTIFICIAL INTELLIGENCE REVOLUTION IN PUBLIC FINANCE MANAGEMENT IN TUNISIA



iGmena
Hamza Ben Mehrez
www.igmena.org

Introduction

Public sector institutions in Tunisia are open to harnessing the potential of artificial intelligence (AI) to promote policies for sustainable and equitable development, without forgetting the challenges posed by this emerging technology. In 2015, the government embarked on a series of public sector reforms to improve government operations and to meet the needs of citizens. It also recognises the need for further public sector reforms through the implementation of an accountable public finance management information system (PFMIS), and is proposing the introduction of AI in the current financial system, which has been identified as one of the areas most vulnerable to corruption.[1]

Public sector reforms and AI

In 2016, the government set out its vision for AI, among other imperatives, in a strategy document detailing a five-year development plan for Tunisia (2016-2020). This strategy document was later supplemented by the government's economic and social roadmap for 2018-2020.[2]

The economic and social roadmap for 2018-2020 seeks to accelerate the reforms started under the five-year development plan two years earlier. The aim of the development plan is to guarantee human rights, as well as social and economic growth in Tunisia.[3] Furthermore, the UNESCO Chair on Science, Technology and Innovation Policy, in partnership with the National Agency for Scientific Research Promotion, set up a task force to unlock Tunisia's AI potential.[4] The primary goal of the task force is to facilitate the emergence of an AI ecosystem that acts as a strong lever for equitable, sustainable development and job creation.

The Ministry of Finance is in the process of undertaking fundamental reforms in public finance management. In tandem, it is revising and improving its legal framework governing financial controls and improving transparency policies in managing public finances.[5] To complement these reforms, the government financial system also seeks to integrate its disparate financial and accounting systems to improve administrative and budgetary transparency, as well as to adapt its control structures to a more systematic approach.

However, the pace of AI use has been slower than anticipated. Areas such as multi-year fiscal planning, managing investments, public financial accounting and reporting require a complex AI infrastructure that takes time to set up.

AI application in the public finance management information system (PFMIS)

The PFMIS consists of core sub-systems that provide the government with the necessary information to plan, execute and monitor public finances.[6] The scope and functionality of the PFMIS include fraud detection, budget efficiency and financial analytics.[7]

By leveraging a mix of machine learning, big data and natural language processing techniques, AI is helping the auditors and finance officials at the Ministry of Finance deal with the massive amounts of data that need to be processed in line with the transparency and accountability requirements of their fiduciary responsibilities to the Tunisian

1 National Agency for the Promotion of Scientific Research. (2018). *National Artificial Intelligence Strategy: Unlocking Tunisia's capacity potential*. www.anpr.tn/national-ai-strategy-unlocking-tunisias-capabilities-potential

2 Bennani, F. (2018). *Tunisia – Innovative Startups and SMEs Project (P167380): Concept Project Information Document*. The World Bank. documents.worldbank.org/curated/en/133791541834427775/Concept-Project-Information-Document-PID-Tunisia-Innovative-Startups-and-SMEs-Project-P167380

3 World Food Programme. (2017). *Draft Tunisia Country Strategic Plan*. docs.wfp.org/api/documents/40c35cf3-4055-4588-9c89-e3e59ac6a483/download

4 Tim, D. (2018, 28 June). An Overview of National AI Strategies. *Politics+AI*. https://www.medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd

5 OECD. (2016). *Open Government in Tunisia*. https://www.oecd-ilibrary.org/docserver/9789264227118-en.pdf?expires=1559928898&id=id&accname=guest&checksum=AE439C572C8737A9C6F792AC3177604C

6 Kanzari, R. (2018, 11 June). Programme-based budgeting reform in Tunisia – Lessons learned. *CABRI*. https://www.cabri-sbo.org/en/blog/2018/programme-based-budgeting-reform-in-tunisia-lessons-learned

7 Underwood, C. (2019, 2 February). Machine Learning for Fraud Detection – Modern Applications and Risks. *Emerj*. https://www.emerj.com/ai-podcast-interviews/machine-learning-fraud-detection-modern-applications-risks

taxpayers, which in turn will help restore the public's trust in the government.

Below I consider the application of AI in the detection of fraud, budget efficiency, and financial analytics, and how AI applications can restore citizen trust in the Ministry of Finance through creating fiscal accountability that guarantees development, social justice and human rights.

Detection of fraud

Tunisia is the only country in the Middle East and North Africa (MENA) region to publicly publish its annual budget and audited financial reports.[8] This approach has been attributed to the open government movement and has been seen by many as a citizen-inclusive approach to solving the problem of fraud and corruption in the government, and of promoting transparency and accountability.[9] Releasing financial data to the public should make it possible for Tunisian citizens to dig into data and find errors and mistakes, or instances of fraud, and share the burden of analysis with each other.

However, this approach was not able to put an end to the public's mistrust of government officials. Missteps in areas such as the standardisation of data formats, the application programming interface (API) and the frequency of updates to the data sets have limited the potential for analysis by citizens.[10] In addition, when larger data sets are released, Tunisian citizens do not have the capacity to perform a full analysis of the data in a single pass. For example, Microsoft Excel, the world's most widely available financial analysis tool, has a million-row limit for data processing, while other available data science and accounting tools and resources are out of reach of the majority of Tunisian citizens. The data might be readily available, but the professional tools and skills are not.[11]

The Ministry of Finance is meanwhile planning to set up a fraud hotline to uncover corruption in public finance. AI will help the ministry to review the tip-offs received through the fraud hotline, given the requirement that citizens who report on corruption anonymously have to be convinced to surrender their anonymity to prove the claim being made. Upon receiving a tip, an AI tool can be directed to review any claim made that includes financial data. This would allow the financial data to speak for itself, relieving Tunisian citizens of having to reveal their identity early on in the investigative process, and not resulting in them being unnecessarily exposed.

Budget efficiencies

AI has the ability to dramatically improve the efficiency of developing the national budget, and its usability,[12] by ingesting large amounts of financial data from different sources. The Ministry of Finance is also testing the use of AI in risk assessments of all transactions against current and past data. In addition, the ministry is producing reports that allow auditors and financial officers to gain better insight into the use of financial data and take corrective actions accordingly.[13]

With the application of AI, the ministry could load and analyse financial data for public review, thereby applying the open government standard of transparency. The algorithms they are using could also be made available for public review.[14] In addition, the application of AI in the finance department will help to direct the limited resources to the departments that need them most, instead of burning resources using round-robin audit approaches and a random sampling of transactions for review.[15]

Financial analytics

The Ministry of Finance is testing the use of both supervised and unsupervised algorithms to categorise all the financial transactions loaded onto its financial platform.[16]

Supervised algorithms are based on trained data using known patterns of fraud that are provided by forensic accountants.[17] Unsupervised algorithms are special, because they are developed to allow the data to speak for itself, meaning that transactions are clustered into neighbourhoods of

8 Trabelsi, K. (2014, 5 February). Tunisia's Citizens Budget: One More Step Toward the "Open Budget". *International Budget Partnership*. https://www.internationalbudget.org/2014/02/tunisias-citizens-budget-one-more-step-toward-the-open-budget/

9 https://www.huffpostmaghreb.com/2014/01/16/tunisie-open-government_n_4608045.html

10 https://www.webopedia.com/TERM/A/API.html

11 https://www.educba.com/financial-analytics

12 How spending occurs, and how this can be evaluated, reviewed, etc.

13 Bisias, D., Flood, M., & Valavanis, S. (2012). A Survey of Systemic Risk Analytics. *Annual Review of Financial Economics, 4,* 255-296. https://www.annualreviews.org/doi/abs/10.1146/annurev-financial-110311-101754

14 Open Government Initiative. (2018). *Driving Democracy Forward: Year in Review 2018*. https://www.opengovpartnership.org/ogp_annual-report-2018_20190227

15 Macfarlane, A. G . (2016, 14 November). Using the Round Robin Method for Efficient Board Meetings. *Jacobson Jarvis*. https://www.jjco.com/2016/11/14/using-round-robin-method-efficient-board-meetings

16 Brownlee, J. (2016, 16 March). Supervised and Unsupervised Machine Learning Algorithms. *Machine Learning Mastery*. https://www.machinelearningmastery.com/supervised-and-unsupervised-machine-learning-algorithms

17 Craig, J. (2019, 29 April). How AI restores the public's trust in the fiscal accountability of governments. *MindBridge*. https://www.mindbridge.ai/ai-restores-public-trust-in-fiscal-accountability-of-governments

numbers that are interesting to accountants, for example, when they make rare connections between two accounts.[18]

These algorithms can also help the ministry to identify transactions that fall outside neighbourhoods of numbers, called outliers.[19] Both supervised and unsupervised algorithms run with standard accounting rules and statistical techniques, such as Benford's Law,[20] which allows every transaction in a financial ledger to be scored.[21] The data is also indexed for rapid search capabilities.[22]

Training in AI

The United States Agency for International Development (USAID) has funded a project called Fiscal Reforms for a Strong Tunisia (FIRST).[23] The FIRST project supported the Ministry of Finance in enhancing its capacity to develop and deliver tax policy and other fiscal reforms using AI and general algebraic modelling system (GAMS) software.[24] Ministry of Finance officials were trained in using the computable general equilibrium (CGE) model.[25]

Restoring public trust

The inability of the Ministry of Finance's audit departments to analyse 100% of its financial data has been a major factor in its inability to spot financial anomalies. While fraud hotlines and open data techniques are a step in the right direction, AI offers an opportunity for the ministry to actively pursue the detection of financial anomalies before even whistleblowers need to act.

Private sector audit firms in Tunisia are already turning to platforms developed by start-ups specialising in AI technology development, such as InstaDeep. InstaDeep raised USD 7 million in funding from AfricInvest and Endeavor Catalyst to expand the use of AI in the public sector by delivering AI products and solutions.[26]

The ministry has also used an AI auditor in their accounting system. This is a promising measure to help Tunisian taxpayers advocate for their human rights for an accountable and transparent tax collection system. Citizens are already becoming aware of the benefits of AI in Tunisia, and are demanding the use of AI at all levels of government to help in the detection of fraud, errors and omissions in financial data and tax collection procedures.

While the adoption and implementation of reforms using AI in public finance has been slow, there is a hope that the government of Tunisia will conduct public consultations with respect to the modification of policies, laws and regulations concerning the use of AI. This is also an opportunity for civil society and the private sector to have their say on the development of new AI policies and approaches in the country.

Action steps

The following steps are necessary in Tunisia to support the deployment of AI technologies:

- The government should help AI start-ups raise funds to boost their role in using different advanced machine-learning techniques, including deep learning. Funding will also help them to scale their AI developments and take their products to market.
- The private sector can offer a set of different AI products and solutions including optimised pattern-recognition, GPU-accelerated analytics, and self-learning decision-making systems. AI solutions are currently being used in different industries including logistics, automation, manufacturing and energy.
- Civil society organisations should participate in cutting-edge research in AI in order to encourage a human rights focus to the development of AI. Civil society can also raise awareness of the benefits and challenges in using AI in both the public and private sectors.

18 Marr, B. (2017, 7 July). Machine Learning, Artificial Intelligence – And The Future of Accounting. *Forbes*. https://www.forbes.com/sites/bernardmarr/2017/07/07/machine-learning-artificial-intelligence-and-the-future-of-accounting/#7185fcf92dd1

19 BBVA. (2018, 3 July). Five contributions of artificial intelligence in the financial sector. *BBVA*. https://www.bbva.com/en/five-contributions-artificial-intelligence-financial-sector

20 Benford's Law can often be used as an indicator of fraudulent data.

21 https://www.marutitech.com/ways-ai-transforming-finance/

22 Statistical Consultants Ltd. (2011, 14 May). Benford's Law and Accounting Fraud Detection. https://www.statisticalconsultants.co.nz/blog/benfords-law-and-accounting-fraud-detection.html

23 https://tn.usembassy.gov/embassy/tunis/usaid-tunisia/economic-growth/fiscal-reform-for-a-strong-tunisia-first

24 Williams, R. N. (2019, 1 February). Making faster decisions with AI. *Financial Management*. https://www.fm-magazine.com/issues/2019/feb/make-faster-decisions-with-ai.html

25 https://tn.usembassy.gov/embassy/tunis/usaid-tunisia/economic-growth/fiscal-reform-for-a-strong-tunisia-first

26 Jackson, T. (2019, 10 May). Tunisia's InstaDeep raises $7m funding to expand AI in Africa. *Disrupt Africa*. www.disrupt-africa.com/2019/05/tunisias-instadeep-raises-7m-funding-to-expand-ai-in-africa

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Artificial intelligence (AI) is now receiving unprecedented global attention as it finds widespread practical application in multiple spheres of activity. But what are the human rights, social justice and development implications of AI when used in areas such as health, education and social services, or in building "smart cities"? How does algorithmic decision making impact on marginalised people and the poor?

This edition of Global Information Society Watch (GISWatch) provides a perspective from the global South on the application of AI to our everyday lives. It includes 40 country reports from countries as diverse as Benin, Argentina, India, Russia and Ukraine, as well as three regional reports. These are framed by eight thematic reports dealing with topics such as data governance, food sovereignty, AI in the workplace, and so-called "killer robots".

While pointing to the positive use of AI to enable rights in ways that were not easily possible before, this edition of GISWatch highlights the real threats that we need to pay attention to if we are going to build an AI-embedded future that enables human dignity.

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