



**ABA**  
**TECHNOLOGY**  
SPECIAL REPORT

thebusiness|year

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**What role has ABA Technology played in the fight against the pandemic and what has its contribution been to the vaccination campaign?**

Getting vaccines is part of the job, but without storage capacity and transport systems, it is impossible to get them to communities. Aware of the critical role that the cold chain plays in a vaccination campaign, the Ministry of Health, since the start of vaccination efforts in Morocco, has been working closely with its key partners, such as ABA Technology, to set up, expand, and strengthen the country's cold chain capacity.

These efforts include the installation of temperature sensors in cold rooms, refrigerators and freezers in vaccine storage spaces at central, provincial, and local levels, and also in refrigerated containers for transport, as well as in isotherm cases to ensure the safe flow of vaccines during the final stages of movement to their destination. ABA Technology also provides technical and logistical support at all levels to ensure that the management of the cold chain is effective.

Through our close collaboration, ABA Technology has shown great mastery of the profession and unparalleled efficiency, and has won our faith to entrust it with the deployment strategy for the second phase of the national vaccination campaign. ✖

Read more at [thebusinessyear.com/morocco](https://thebusinessyear.com/morocco)

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# HONED EXPERTISE

Mohamed Benouda  
FOUNDER,  
ABA TECHNOLOGY

**Aba Technology prides itself on being a partner, not a mere service provider, ensuring that its clients are fully supported at all times.**

**BIO**

Mohamed Benouda founded ABA Technology in 2017 and has over 22 years of work experience. Previous positions have included Director General at General Groupe Palmeraie, Director General at Groupe SNTL, and Director of Development at the Diversification Groupe SNTL, as well as a range of senior roles at companies in Paris and Nantes.

**How is Nextronic technology involved in the fight against COVID-19?**

Temperature monitoring is used by all kinds of companies that are required by regulations to monitor the temperature of their products, or those that demonstrably want to guarantee the quality of their products. Temperature is a key element in the safeguard of medicine and most importantly vaccine efficiency. It is crucial that all vaccine storages be equipped with temperature monitoring. In Morocco, the Ministries of Health and Interior have chosen ABA Technology for this particular task. Our sensors are used in over 4,400 vaccination centers, 83 provincial warehouses, and have traveled thousands of miles across the country. This is not only because our technology is innovative and reliable, but also because we are the only firm that currently masters the totality of the IoT value chain, offering key solutions throughout the whole monitoring process.

**How do your products help clients tackle their challenges?**

The biggest challenge our clients encounter is that most suppliers sell sensors but do not provide solutions. This means the client can only purchase a device they must be able to track on their own. We deliver turnkey solutions that follow industry guidelines and regulations. In addition to a reliable and accurate sensor network, Aba Technology offers an innovative on-line platform called Nextrack, along with all the services that our clients need for quality assurance.

**What does ABA Technology do differently than others in the market?**

Our products and company are very unique in our industry because we develop and produce everything in house. The group presents a turnkey solution throughout the IoT value chain:

from designing and manufacturing the hardware, through insuring its connectivity network, to the full integration of its applications. This gives unprecedented control over the quality and functionality of our products and services. As a result, we deliver a high-quality standard generically, but we can also switch immediately if customization helps solve customer challenges. All our services and products are designed by us and are constantly improved based on feedback from our clients. We have only one goal in mind: help our customers comply with laws and regulations in a smart and simple way. We are proud to be distinguished as one of the first companies in Morocco to market a combination of IoT and SaaS solutions for the medical products marketplace.

**What is the most important thing you want people to know about Aba Technology solutions?**

If you choose Aba Technology's solutions, you get a partner and not a supplier. We help you with the implementation set up and manage your needed IoT solution. With the know-how of our teams, we have 10 years of experience in this area that we are happy to share. The solutions we offer in the monitoring of the vaccine cold chain helps our clients gain real-time insight into the temperature conditions of the warehouses, vehicles, and cooling units that ship the vaccine throughout Morocco. In addition, no complicated IT implementation or infrastructure is required to work with Aba Technology. Our clients can rely on ABA Technology's solutions, support, and expertise. We help them implement the best solutions for their organization. In addition, we provide our clients with customer service to support them with any issues they may encounter.

Which technological innovations do you foresee will take place in the cold chain management industry?

We have a firm belief that the use of IoT technologies will exponentially improve temperature monitoring in pharma logistics. Small-scale pharmaceutical transport is becoming more cost effective, therefore the solutions to guarantee quality must also adapt to this evolution, to ensure uncompromising functionality, connectivity, and compliance with regulations. ✖

# LOCAL SOLUTIONS, GLOBAL AMBITIONS

**At the heart of ABA Technology, the Casablanca control tower monitors the vaccine cold chain.**

**SINCE THE START** of the COVID-19 vaccination campaign, ABA Technology has been tracking and monitoring the vaccine cold chain, a crucial task for the industrial and technological group specializing in the value chain of the Internet of Things (IoT), which has reinvented itself by taking a keen interest in healthtech.

At ABA Technology, they call it the control tower. Confined in a room with large bay windows, a dozen technicians sit in front of their computers, spread out under big surveillance screens. “This is where we remotely monitor changes in vaccine behavior,” explains a young operator, hovering over her mouse to display various indicators on the screen.

Her task is to keep an eye on the region of Draâ-Tafilalet. A zoom shot on the specific area and red bubbles, in scattered places, are displayed on a map of Morocco. At the bottom of the screen, an interface indicates the temperature of the vaccines stored at the different sites, while a graph details its evolution over the last few hours. “We can trace and keep an eye, in real time, on the vaccine stocks,” continues the young technician.

The vaccine, whether from Sinopharm or AstraZeneca, must be stored at a temperature between 2 ° C and 8 ° C. “Once the threshold is exceeded, the system automatically sends an SMS alert to the health personnel present in the station and to a mobile intervention team that travels to correct the malfunction of the refrigeration equipment,” continues the operator.

## **A 99.99% CONSERVATION RATE**

Part of the management of the vaccination campaign is played out at the premises of ABA Technology. Installed on the seventh floor of the Technopark in Casablanca, where, along the windows, a breathtaking view of the economic capital is laid in front of the engineers busy manufacturing electronic cards or creating user interfaces. Structured around an ecosystem of innovation-driven startups, ABA Technology is currently the only company that manages

the whole IoT value chain.

The industrial and technological group, with its seven subsidiaries, has collaborated with the Ministries of Health and the Interior to trace the anti-COVID19 vaccine cold chain, from its arrival at Casablanca’s airport to the various vaccination stations across the Kingdom. A crucial task.

“Between 20 and 25% of vaccines in the world are lost because of the failure to master the cold chain,” explains Mohamed Benouda, founding president of ABA Technology. We dare to ask: have vaccine losses been recorded since the arrival of the first batches at the end of January? “We are at a 99.99% dose conservation rate,” he replied. The former director general of the National Transport and Logistics Company (SNTL) and the Palmeraie Development Group, however, refuses to say more, arguing the confidential nature of the data.

In total, 17,000 temperature sensors are planted in various parts of the Kingdom, among them two types. Intended for a first use, the “datalogger,” installed at the level of the insulated boxes for vaccine carriers, makes it possible to monitor the transport of the vaccine between the provincial depots and the vaccination units. It records and indicates temperature variations while automatically generating reports.

The other model developed by ABA Technology is a temperature sensor intended for cold rooms, refrigerators, as well as transport and refrigerated cabinets. It offers real-time traceability, given the stored volume of the vaccine and the length of its storage throughout the vaccination campaign. In the event of a temperature excursion, a team trained by the company and based in the region intervenes immediately.

## **LOGISTICS CHALLENGE**

Around a hundred technicians across Morocco have been trained to be able to intervene within 30 minutes or even an hour of de-

tecting the excursions. In the event of an incident requiring a long period of intervention, various rescue centers have been set up in a radius close to the vaccination station in order to store the vaccines during repair.

The CEO mentions regular contacts with the health authorities, who directly oversee the smooth running of the task with the company. These take place daily according to Mohamed Benouda's entourage. Monitoring reports sometimes take place directly, by videoconference, with the Minister of Health Khalid Aït Taleb, or even the director of the Directorate of Medicines and Pharmacy (DMP), sometimes until late at night.

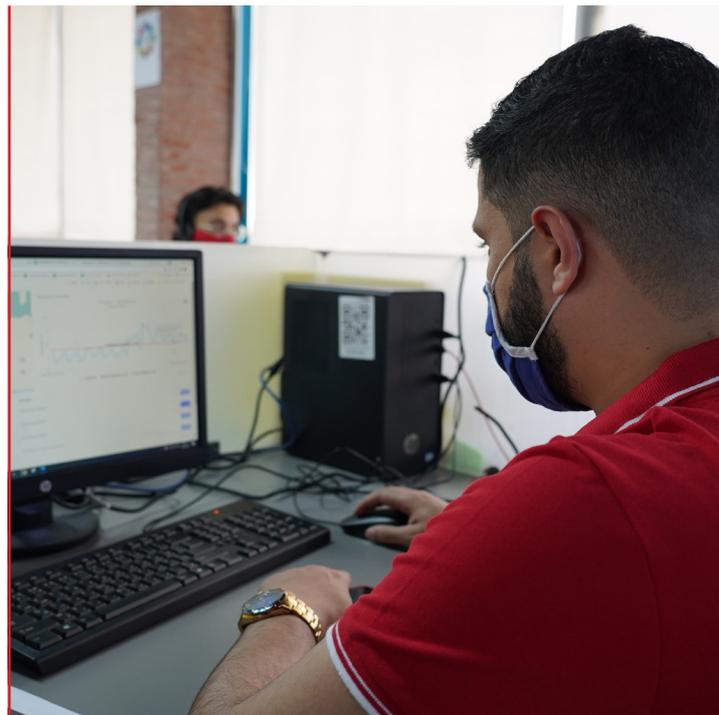
"When we were approached by the Interior Ministry on November 25, 2020, we had three weeks to deliver 17,000 sensors in a context of scarcity of raw materials and disrupted air freight at the beginning of December," said Mohamed Benouda. A logistical challenge that marked the production of the sensors took place in the last five days before the delivery date.

At the same time, the company had to invest in a new factory in Bouskoura, "which had to be built quickly" in December to replace the initial site based in Aïn Sebaa. "We had to prepare an industrial unit in 10 days, set up production circuits, and recruit 240 people divided into three shifts," he adds.

The production of electronic cards has increased fivefold with the relocation of the industrial site. The key to ABA Technology's success? A desire to provide its customers with a turnkey solution throughout the IoT value chain. A trademark claimed by the company whose ecosystem of seven subsidiaries allows it to be present across the entire value chain. "We start from concept to design, through maintenance to installation and visualization via a platform that we developed ourselves."

#### **THE PANDEMIC, A CURSE OR A BLESSING ?**

Before being an investment company, it is through its subsidiaries



aries that the group's development began. In 2011, Inteliflex was created by Yassine Abouch, electronics engineer and now partner of Mohamed Benouda. The company is focused on the integration and installation of surveillance cameras for customs and airports.

Quickly, a lack of local actors was identified in the electronic component where maintenance is carried out. Nextronic was then created in 2014 and started out as an electronics design office and then moved into the manufacture of motherboards, while Inteliflex took care of the installation. "We realized that Industry 4.0 was becoming an important area of investment," recalls Mohamed Benouda. From there is aggregated a set of subsidiaries focused on the manufacture of sensors (Nextcor) and the development of software and communication protocol platforms (DigiEye and Hardiot).

The scheme has proven itself and has been rising crescendo for a year. The pandemic? Somewhat a boon, since the group has initiated a shift in new health technologies—healthtech. "Initially, it was only in the spirit of volunteering and solidarity; we did not see healthtech as a sector of activity," says the CEO.

The shift happened in two stages. First, the repair, in April, of the ventilators at the Ibn Rochd University Hospital in Casablanca. Then, the company looked into the design of infrared thermometers, previously imported from abroad at MAD1,000 per unit. "We

made them for MAD400 first, then MAD350. This is one way of saying that we can produce locally and cheaper," argues Mohamed Benouda.

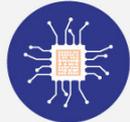
Since then, ABA Technology has been producing 20,000 visor helmets in a few months before presenting, in September, its first thermal camera in the presence of the Minister of Industry, Moulay Hafid Elalamy, who has made "100% made in Morocco" his slogan of battle. In addition to taking the temperature, the thermal camera, produced by Nextronic, is also part of mask wear detection and facial recognition.

Inteliflex and Nextronic now have 350 employees, where they were in their forties at the start of 2020. Future ambitions include the field of robotics, especially for medical use, but especially the international boom, which is a logical continuation as the Moroccan market is starting to shrink for ABA Technology's ambitions. "We are able to produce 700,000 electronic products per year in a country that does not yet consume as much," explains Mohamed Benouda.

The subsidiaries are already working with city halls in Paris, Spain, Bahrain, and Tunisia. Within 2021, ABA Technology intends to set up in France for the European market, as well as in Israel for the American market in this IoT field. ✖

# ABA Technology

ABA Technology is an industrial and technological group and a global and integrated player of the IoT value chain. It is structured around a technological ecosystem of five companies able to accelerate digital transformation and ignite technological disruption:



## NEXTRONIC

Design and prototyping of products, manufacture of electronic boards, first series manufacturer



## NEXTCOR

Manufacture of electronic products



## DIGIEYE

IoT and AI software platforms



## INTELIFEX

Integration and installation of IoT equipment, managed services, and maintenance



## HARDIOT

Connectivity and security platform to set up communication between the devices and the software

The ABA Technology group employs 350 people distributed among its subsidiaries, and has a factory in Bouskoura structured around 3 activities

1. MANUFACTURE OF ELECTRONIC CARDS
2. MANUFACTURE OF TECHNOLOGICAL AND ELECTRONIC EQUIPMENT
3. PLASTIC INJECTION

The group also has a sourcing office in China and a subsidiary in Barcelona and will be setting up a new office in Paris in the upcoming months.



## ABA TECHNOLOGY INNOVATION CENTER

ABA Technology Center is an engineering, innovation, and managed service center specialized in the IoT, electronics, and digital transformation. The center employs 80 multidisciplinary engineers with the following skills:

- **HARDWARE SKILLS** ROUTING, SCHEMATIC, 3D CONCEPTION, STIMULATION SOURCING BOM LIST, SOFT TESTING, SOFT EMBEDDED, UX EXPERIENCE
- **SOFTWARE SKILLS** FRONTEND, BACKEND, FULLSTACK, AI CONCEPTION, IMAGE PROCESSING, BIG DATA, CLOUD DATABASE, SDK
- **FABLAB AND RAPID PROTOTYPING SKILLS** 3D PRINTING, PROTOTYPING, TESTING, CERTIFICATION
- **IOT CONTROL TOWER SKILLS** DASHBOARD, BUSINESS INTELLIGENCE, PREDICTIVE ANALYSIS

## ACHIEVEMENTS & DEVELOPMENTS

Based on the skills of these different subsidiaries, the ABA Technology Group has been able to industrialize and market several products in the following different business sectors:

- **HEALTHTECH** INFRARED THERMOMETERS, OXIMETER, CONNECTED TEMPERATURE SENSORS
- **SURVEILLANCE AND SECURITY** SURVEILLANCE CAMERA, THERMAL CAMERA, ACCESS CONTROL, PERIMETER CONTROL
- **AGRITECH** CONNECTED WEATHER STATION CLOUD
- **ELECTRIC MOBILITY** SMART BATTERY CHARGING STATION FOR ELECTRIC VEHICLES

### ABA TECHNOLOGY AT A GLANCE:

- 17,000 TEMPERATURE SENSORS
- 83 PROVINCIAL WAREHOUSES
- 100S OF EXPEDITIONS
- 4,400 VACCINATION CENTERS
- 1 CENTRAL WAREHOUSE
- VACCINES: ASTRAZENECA, SINOPHARM, SPUTNIK, PFIZER



# THE IOT REVOLUTION

Yassine Abouch  
FOUNDER,  
NEXTRONIC

**Yassine Abouch understands that IoT can revolutionize business, but that to benefit from the technology, a company must first understand its potential.**

## BIO

Yassine Abouch graduated with a master's from the University Jaume Paul. He is a serial entrepreneur in technologies. He has founded and launched several start-ups in the fields of digitalization and integration technological, IoT, and renewable energies. He is co-founder of one of the oldest FabLabs in Africa: the FabLab Casablanca. He is also one of the precursors of Made in Morocco electronics. He is also involved in several open research and development source projects. He works with the biggest companies in Morocco and around the world.

## What is IoT for you?

IoT is a set of technologies that have been applied in the elements that surround us for some years and that is experiencing increasing growth. With the idea of connecting the things around us to the internet, a wide range of possibilities open up in different applications, starting from connecting something as basic as a parking place to a device as complex as a connected satellite. These solutions facilitate the use of information to the user as well as to the manufacturers or equipment managers.

## What new technologies do you think will have a relevant role in the future and how do they relate to the development of IoT?

In my opinion, the main technologies that will have an important role in the future of IoT are all those that on one hand improve communication, both in speed and costs, and on the other improve the presentation and exploitation of the information that the devices generate. We could highlight technologies such as: virtual reality or augmented reality, which will facilitate users' understanding of information; artificial intelligence, which will help the management of teams and decision making; and big data, which favors the storage and processing of information generated by devices, taking into account that the amount of data to be managed is increasing exponentially.

## What is your understanding of the importance of digital transformation for organizations? What is the role of IoT in this process?

We live in a competitive world that pushes companies to adapt and incorporate added value to their products, as well as achieve the optimization of manufacturing costs, management, or handling of each of the elements that we have around

us. This situation forces companies and individuals to accelerate their digital transformation. However, this process does not have to be difficult. It can be carried out progressively with the incorporation of technological components to the different elements related to the daily activity of the organization. IoT technologies facilitate the possibility of connecting these elements and therefore obtain information on their operation, use, breakdowns, and so on. Having all this information about the operation of the devices can have a direct impact on many of the company's activities, such as knowing the costs of operating the equipment, analyzing preventive maintenance, improving response times, or minimizing stop times, among others.

## What are the challenges you face when starting a customized project based on the client's needs?

The main challenges when starting a project are always linked to the internal organization and the objective of the project. Incorporating technologies into the lives of people or companies implies a change in the organization and its habits since new information appears suddenly and, therefore, it is necessary to carry out an exhaustive analysis and observe which parts of the organization are affected in order to improve or change them. In the case of companies, organizational changes can affect production, commercial actions, as the product has added value, maintenance, or analysis of data. On the other hand, it is important to be clear about the objective that the client wants to achieve with the IoT solution—improving sales, improving management, minimizing time waste—in order to know with precision their needs and the desired result in order to focus resources and efforts efficiently.

## What is the process and what are the key phases for the development of these solutions?

First, it is necessary to do an analysis and detect the needs that a specific area has. Once these are identified, it is essential to define clear objectives. During the development process it is crucial that the staff feel involved in the project and face it in order to meet the requirements established and it is also a way of learning and improvement. Likewise, I would mention that introducing a technological partner that can bring experience and knowledge to the development of the project would be a key point, like IoTsens. ✖



Image: ABA



## HAND IN HAND

Prof. Bouchra Meddah  
DIRECTOR OF MEDICINES AND  
PHARMACY, MINISTRY OF HEALTH &  
MEMBER OF THE COMMITTEE  
IN CHARGE OF THE ANTI-COVID  
VACCINATION STRATEGY

**Morocco was quick to respond to COVID-19, and through public-private cooperation an effective vaccination program has been implemented.**

### BIO

Prof. Bouchra Meddah has a PhD in pharmacy from the Faculty of Medicine and Pharmacy of Rabat. She worked for five years at the National Institute of Oncology and has also worked in academia. She is currently the Director of Medicines and Pharmacy at the Ministry of Health and is a Member of the Committee in Charge of the Anti-COVID Vaccination Strategy.

**You are leading Morocco's vaccination campaign, including logistics and delivery. How did you organize this campaign?**

The organization of the COVID-19 vaccination campaign was a collaboration between different actors in the public and private sectors. We have developed a strategy tailored to the needs of the population. This strategy—by phase and by order of priority—meets a dual objective: to reduce hospitalizations and deaths and to maintain the country's essential activities, particularly those of the health system during the pandemic. Two main criteria were taken into account by the Directorate of Medicines and Pharmacy (DMP) to establish this prioritization: the existence of an individual risk factor for developing a severe form of the disease and the accumulated exposure to the virus. The first objectives of the COVID-19 vaccination program were to reduce the morbidity and mortality attributable to the disease (hospitalizations, intensive care admissions, and deaths) and to maintain the essential activities of the country, particularly those of the health system during the pandemic. In

order to assign the prioritization of the people to be vaccinated during the campaign, the DMP conducted a review of the scientific literature with a view to the risk factors of serious forms, that is to say leading to a hospitalization or death, as well as the risk factors for exposure in the professional sector or depending on the type of accommodation. The two most important risk factors for severe forms are age and the presence of comorbidities. Regarding the risk of exposure, the DMP established, at the end of its analysis, that the professionals most at risk are medical health professionals, paramedics, and medical auxiliaries likely to receive and be in contact with patients infected with COVID-19. Thus, the DMP has developed a preliminary vaccination strategy, starting by prioritizing the people most at risk of severe disease and those most exposed to the virus, to take into account a gradual arrival of vaccine doses over the course of 2021. This strategy thus identifies five phases. The first three cover the critical initiation phase of the vaccination campaign and aim to allow the vaccination of all people at risk of severe COVID-19 in order to reduce hospitalizations and deaths and people who are highly exposed to the virus. The following two phases continue to open vaccination to those over 18 without comorbidities and will be specified as the objectives of the previous phases are achieved.

**The global average of lost vaccine doses along the supply chain is around 20-30%. What have been the main achievements in ensuring that Morocco delivered 99.99% of its vaccines?**

The Moroccan authorities have mobilized the human and material resources necessary to carry out the national anti-coronavirus (COVID-19) vaccination campaign. Following the guidelines of His Majesty King Mohammed VI, the Ministry of Health mobilized enormous human resources, and sophisticated logistics and IT techniques to succeed in the national vaccination campaign against COVID-19, with particular emphasis on issues of traceability and the cold chain. The temperature-controlled logistics of mass vaccination against COVID-19 poses a real challenge, both in terms of its scale and its technical specificity. Whatever the temperature that must be controlled during all or part of the chain, this will in all cases require investing in new means: the cold chain requires cutting-edge expertise, both from a technical point of view and an organizational one. ABA Technology was able to ensure the traceability of the cold chain and achieve a vaccine conservation rate of 99.99% through a rigorous monitoring system that allowed us to have a constant and continuous monitoring of the state of the vaccines, from its arrival to the airport to its administration to patients.

**Vaccine skepticism is a serious challenge the world cannot afford to lose the fight against. How was Morocco able to counter this?**

The state mobilized the ministerial departments concerned and health professionals, but also socio-economic actors to allow better control of the pandemic. An inter-ministerial monitoring committee steered the action plan under its various components. The Ministry of Health deployed a series of

actions to raise its level of vigilance in monitoring the epidemiological situation in real time, then it adjusted its mode of operation by setting up a technical and scientific advisory committee whose mission is the definition of a protocol for the care of patients with COVID-19, and by adapting the organization of the care system in response to a new intervention logic: identification of referral structures for referral of possible cases and management of confirmed cases of infection. A credible communication plan has been deployed to the public through continuous information in the media on the monitoring of the health situation in the country; the production of information kits in national and foreign languages; and the development of educational materials for raising awareness in schools and among public and private health professionals by launching a digital platform and creating a new communication dynamic to allow real-time access to medical news and training. At all stages, the information disseminated to the public was based on recommendations from the scientific committee mobilized in the management of the pandemic to avoid any unnecessary disinformation that could distort the credibility of the authorities and the effectiveness of the response. This communication was also able to reassure the populations of the safety of vaccines, assure them of their effectiveness, as well as of the importance of vaccination to preserve their health, their life, and that of their families, and to obtain the most effective community immunity as early as possible, for a gradual return to normal life. Science and scientists have done their duty by providing

us with several safe and effective vaccines in less than a year after the outbreak of the pandemic. His Majesty King Mohammed VI, through his personal follow-up and his directives, allowed our country to access vaccination at the appropriate time in order to protect the Moroccan people in a broad and early manner, and to be among the first countries in the world in this race, without any discrimination between citizens, after having adopted free access for all. The Moroccan state, and first of all the health system and the administrative apparatus, as well as all the interveners, civil and military, have been perfectly prepared for a great and powerful job of managing the vaccination process in safe and reassuring conditions. Today, the responsibility and the solution for a quick and safe exit from this health crisis are in the hands of the citizens and within their reach. However, it remains our duty, as health professionals and as decision-makers and actors, to help our fellow citizens who are still hesitant or reluctant to make the right decision at the right time, by overcoming their legitimate but scientifically unjustified fears. This was the role of the communication and awareness campaign.

**How did you ensure strong collaboration with private-sector actors like ABA Technology during this vaccination campaign?**

This health crisis has demonstrated that collaboration between the public and the private sector would be one of the avenues for improving the national health system. COVID-19 is the most important global health challenge of our lives, and it will take all of us to work together as a national community to end this pandemic. We need to harness the best ideas from multiple stakeholders including governments, regulatory authorities, academia, NGOs, and industry to stop COVID-19. ABA Technology has demonstrated an unprecedented level of collaboration across the innovation ecosystem to address this health crisis since the start of the pandemic. The ABA teams mobilized to repair broken ventilators and provide visors and PPE to the medical profession in a commendable spirit of solidarity. And then they managed to deliver infrared thermometers and temperature sensors to us in record time and in a really difficult conjuncture. This powerful partnership has allowed us to retain 99.99% of the doses of COVID19 vaccines. Working in perfect symbiosis, ABA Technology has helped us to maximize

the chances of the success of this vaccination campaign and together we are drawing up a roadmap to preventively manage future threats.

**What are your goals for 2021?**

The COVID-19 pandemic has exposed weaknesses in all health systems and created challenges that will persist long after vaccination campaigns have rolled out. Our main focus for this year is to examine how immunization fits into our overall pandemic strategy and what the implications for recovery are. At the same time, medium- and long-term planning must take into account the possibility that COVID-19 may become endemic, which will require adapting, with a significant strengthening of health systems, the integration of this disease into routine immunization programs, and an analysis of long-term costs to health systems. At the DMP level, we have set several areas of action for this year, in particular:

- ▶ Modernization of the Directorate of Medicines and Pharmacy: one of the main demands of the Ministry of Health is the modernization of services provided to the public.
- ▶ Dematerialization of administrative procedures: in order to decentralize the services of the DMP and prevent companies from repetitive travel to the headquarters of the DMP in Rabat. This need became more prominent during the health crisis.
- ▶ Transparency: in compliance with the 2011 constitution and the right of access to information, making DMP data available to the general public. Currently, we are working on putting in place the necessary means and tools to guarantee transparency, integrity and impartiality in all the services we provide to the public.
- ▶ Finalize the Medicine Agency project. This project, which dates back several years, wants the DMP to be set up as an agency that has the financial and human resources necessary for it to be more efficient. This project is currently in progress.
- ▶ Strengthening the South-South African partnership for drug control. I started working on this issue in my early days as division head of the National Medicines Control Laboratory. The laboratory hosted various African delegations (Mali, Mauritania, Tunisia, Niger, Benin, etc.), made up of technicians, analysts, and heads of laboratories, who came to benefit from our expertise in the field. ✖

**ABA Technology is headquartered in Casablanca, Morocco's main economic hub**





## BY THE BOOK

Abdelouahab Belmadani  
HEAD OF THE PLANNING AND  
FINANCIAL RESOURCES DIVISION,  
DIRECTORATE OF MEDICINES AND  
PHARMACY (DMP)

**The DMP played a key role in ensuring that the public, as well as health workers, were sufficiently protected during COVID-19, as well as guaranteeing an equitable vaccination program.**

### BIO

Abdelouahab Belmadani graduated with a state engineer diploma in agro-economics from Institut Agronomique Veterinaire Hassan II, followed by a master's in banking and financial markets from the Université François Rabelais. He has participated in the financial structuring of major infrastructure projects including the implementations of PPPs, monitoring projects financed by bilateral and multilateral donors. He is the director and members of several governance bodies and is certificated in the administration of public establishments and companies, gender-sensitive budgeting, and results-based budget management.

**As chief of the planning and finance division of the DMP, what were the main challenges you had to overcome?**

COVID-19 has revealed critical gaps in health systems around the world. The rapidly evolving pandemic has demanded extraordinary measures, and comprehensive national governance is essential to safeguard human lives, health, and livelihoods. This implies coordinating programs between the various competent authorities, including the Ministry of Health, Interior, Finance, and Industry, not to mention our partners in the private sector. Since the onset of the health crisis, the government has made every effort to address the underinvestment in health service delivery by rapidly increasing public spending on vital equipment, drugs, and temporary health infrastructure. Many countries, including Morocco, have faced the COVID-19 emergency with health workforce shortages in key occupational categories and/or imbalanced regional distributions of health workers, resulting in organi-

zational disruption to other essential health services, as many existing health workers have been redeployed. Additionally, in 2020, increased strains have been placed on the healthcare workforce by COVID-19 infections among healthcare workers, the increasing workload under difficult conditions, and the impact of the crisis on the mental health of health workers. In many countries, women, who make up the majority of health workers, have been disproportionately affected. Many health workers have had to be quarantined, become ill, or take time off work. This has had a negative impact on health workers themselves, but also on the ability of health systems to respond to COVID-19 and to maintain other essential services.

**How did you contribute to the planning of the vaccination campaign?**

I cannot stress enough the importance of the successful deployment of COVID-19 vaccines. As the number of daily cases worldwide hits record highs, vaccines are emerging as the most powerful medicine to protect lives and end the pandemic. Fortunately, Morocco has started the second phase of vaccination and we are gradually starting to see the end of the tunnel. In preparing to carry out this vaccination campaign, which is of unprecedented scale, it was imperative to improve the health systems so that they are ready from start to finish, both immediately, so that the vaccination campaign is operational, and in the long term, in the event that COVID-19 becomes an endemic disease with which we must live. We had to take action at an unprecedented speed and scale, under the instructions of His Majesty King Mohammed VI and under the watchful

eye of the public and in a context of extreme uncertainty. The planning and financing division of the DMP is taking care of several crucial points of this vaccination campaign, including the purchase of vaccines, their distribution, and their financing. In 2021, the global supply of COVID vaccines is likely to be lower than demand, even under the most optimistic scenario. Although the purchase of vaccines is an urgent necessity, each vaccine has its own distribution specifics, especially with regard to price, protocol, storage, transport, and administration. Our purchasing decisions are guided by an assessment of the distribution specifics and capacities of the national health system. When it comes to distribution, supply chain readiness is a critical issue for all countries. Existing chains may not be properly equipped to distribute COVID-19 vaccines. The three main aspects to consider are cold chain capacities, logistics, and related supplies. Effective distribution relies on strengthening the health system. We had to quickly find ways to mobilize health personnel for immunization and improve the data systems necessary for beneficiary monitoring and ongoing pharmacovigilance. Well-designed communication campaigns, which take into account behavioral information, have been put in place in partnership with other actors to increase public acceptance and demand for vaccines. In terms of funding, we had to assess the total cost of purchasing and distributing vaccines in different scenarios and planning accordingly. Budget resources were analyzed based on cost. It is essential to assess options and trade-offs for raising both internal and external funds, including opportunity costs, taking into account the need to maintain a balanced vaccine portfolio.

**What are the lessons learned for the long term that will help improve DMP after the pandemic?**

This pandemic has prompted us to rethink in a comprehensive way the reforms and adaptations of the health system. Beyond its dramatic human consequences and its current and future impact on the economy, COVID-19 has also acted as an indicator of a certain number of difficulties, even dysfunctions of the health system. Many of them were already well identified

by numerous studies and reports, but the health crisis has highlighted and sometimes exacerbated them. To be satisfied with increasing in a more or less simplistic way the resources allocated to a particular sector of the health system, as we hear too often, but without a prior global reflection on the offer of care, would only constitute a temporary palliative. Taken in isolation, this approach would condemn the envisaged reforms to constitute a simple patching up with a persistent risk of inefficiency and injustice in the long term. More than a year after the start of the pandemic, we can identify the main lessons we have learned about its impact on the health system:

1. Planning for the deployment of the health workforce "in peacetime" and during the early stages of a crisis can underpin a more effective response. This requires ad-hoc information on nursing staff by professional profile and distribution in a country.
2. COVID-19 required training in new skills to ensure the right interventions for people infected with the COVID-19 virus or by using telemedicine to provide health services if patients could not get to health facilities. Telehealth and telemedicine are useful options for expanding access to care and helping to reduce infections.
3. The pandemic has shown that protecting health workers is critical to ensuring a healthy health system and a functioning society. Preventing COVID-19 infection among health workers requires responsive strategies that integrate technical advice, training, and distribution of personal protective equipment, access to routine screening, and, where appropriate, recognition of COVID-19 as an occupational disease. For the same reason, it is critical that health workers are now a priority as countries roll out COVID-19 vaccination.
4. It is vital to react quickly to the evolving crisis and to better prepare for future emergencies. This involves identifying the data to be collected and the methods to assess the impact on the health workforce, and the specific investments, policies, and regulations that can facilitate a sufficient number and a judicious distribution of workers, properly trained and equipped. ✘

# COMPLEX CHALLENGES

Industry leaders are beginning to leverage the data hidden in their supply chains to improve efficiency and compliance.

**THE VACCINE** supply chain is currently one of the most complex supply chains in the world. This is no surprise when we consider the global nature of the pandemic and the size and scope of the nations that dominate the demand. These global supply chains involve different players from the production site to the point of delivery. Inevitably, data flow in such processes is complex and prone to delays. Networks are open to vulnerabilities, and compliance culture is often mismatched.

Improving supply chain transparency is a high priority for companies as consumers and regulators are pushing for more information on how the vaccine is transported from the manufacturing units to the point of delivery. Additionally, in order to be compliant with regu-

lators, companies need to know exactly how their products are being handled at every stage of the manufacturing and shipping process.

To tackle the challenges imposed by global supply chains, industry leaders are beginning to leverage the data hidden in their supply chains to gain valuable intelligence. Real-time data acquired through end-to-end monitoring systems and supply chain visibility solutions has the potential to improve supply chain performance at an unprecedented rate. The insights resulting from uncovering supply chain blind spots empower supply chain managers and other senior decision makers to reduce risk in the supply chain, meet environmental and import requirements, and react to disruptions in the supply chain.



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