

# AI, robotics and healthcare: development in the Middle East

Hamish Clark, Rasha Saleh and Siham Awada of PwC detail how AI and robotics are transforming healthcare and their adoption so far, and assess some of the questions to be addressed as this development continues.



In October 2017 the UAE Government used a cabinet reshuffle to appoint its first minister for artificial intelligence ('AI'). This development highlights the seriousness with which the UAE is taking the fields of AI and robotics, which have seen increasing demand, including within the health sector, in the Middle East. Hamish Clark, Rasha Saleh and Siham Awada of PwC detail how AI and robotics are transforming healthcare and their adoption so far, and assess some of the questions to be addressed as this development continues.

The ground breaking ministerial appointment in the UAE for artificial intelligence ('AI') is important context to this article. Healthcare is witnessing tremendous change in the Middle East due to changing demographics (a growing and ageing population); a shift in the disease profile (towards lifestyle chronic diseases); a rise in healthcare costs; and a more educated and empowered patient population. This has increased demand for healthcare services, and specifically personalised care. This demand however remains unmet for large segments of the population. How can healthcare systems improve value and access for all? The answer is through AI and robotics. It began with medical products (e.g. equipment and consumables), now we are on to medical platforms (e.g. wearables and Big Data), and the next move will be towards medical solutions (e.g. AI and robotics). This is a result of the prevalence of advanced technology and the explosion of healthcare data, which is paving the way for disruption in how healthcare is delivered.

AI and robotics in healthcare can solve many of the current issues being faced globally by healthcare systems.

However, there is an ongoing debate regarding the effective regulation of AI and robotics in healthcare. Some of the questions that need to be addressed include:

- Why do we need regulation?
- How safe is the use of AI and who is liable if something goes wrong?
- How will patient confidentiality be managed and will regulation have an impact on patient confidentiality?
- What are the ethical considerations?
- Who accredits AI and robotic services?

AI and robotics are capable of transforming healthcare. Almost all aspects of our lives have been digitised. Most of us are barely aware of it, but advanced technologies and the internet have changed the way we live, and the way we work. AI and robotics are becoming increasingly sophisticated at doing what humans do but more efficiently, quickly and at a lower cost. On one side of the digital coin, AI is having a very positive impact on how patients access and receive care, enabling them to take a proactive

approach to managing their own health through the use of wearables and smartphones. Through the development of genomics and precision medicine it also enables them to benefit from early detection of diseases and more accurate and quicker diagnosis through the use of solutions like IBM Watson and Google DeepMind, among others. On the other side of the digital coin, AI and robotics

are changing the way healthcare professionals work and how they navigate and deliver services. They are capable of saving physicians' time and improving efficiency. For example, Watson Oncology is able to read 40 million documents in 15 seconds, which is simply beyond human capabilities. It also has the ability to review 500 charts in a few hours, saving 500 hours of a doctor's time. It can also support medical teams with decision making and it improves accuracy. For example, AI software has the ability to review and translate mammograms into diagnostic information 30 times faster than doctors with 99% accuracy.

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Finally, it can support medical training for a larger number of people. The Medical Realities platform, for example, has the ability to live-stream an operation to be watched by 13,000 surgical students across 115 countries.

## The public is ready for AI and robotics

Citizens in the MENA region are ready to receive care through the latest forms of technology i.e. AI and robotics. In our recent report 'What Doctor? Why AI and robotics will define New Health,' 66% of those surveyed in the Middle East are willing to replace human doctors with AI and robotics (see Figure 1). Clearly, the public is ready to embrace this new world of healthcare. This is not 'science fiction' as the technology is here: it is a question of how quickly it will become mainstream.

The World Economic Forum has stated that there is tremendous investment in tech startups in the MENA region, with the number of entrepreneurship support entities increasing threefold between 2010 and 2015. Additionally, no other region has advanced so rapidly in ICT infrastructure as the MENA region has in the last five years. Specifically, the UAE has secured 50% of all tech funding in the region for the past three years; add to this the fact that the UAE has been rated the easiest country in the region to set up and run a new business.

This is also a result of the diversification efforts by GCC countries to attract foreign and local investment. Most recently, Hikma Ventures in Jordan launched a '\$30 million dollar digital, health-focused corporate venture capital fund.' On the other hand, other MENA countries have been struggling to keep up with such a pace due to challenges around highly bureaucratic systems along with a lack of support from their governments. While different countries are moving at a different pace and face various kinds of challenges, a common theme is the potential regulatory and legal barriers that may inhibit the growth of the healthcare AI market.

Our region is facing challenges around the availability, quality and maintenance of data as well as the access to data to use in AI applications. Since data is at the heart of AI solutions, it is imperative that providers begin to collect and store

certain sets of health data; that they ensure the quality of collected and reported data is accurate; and that they maintain this data in an automated format for ease of use.

Transparent and flexible regulatory frameworks are required in order to regulate the AI and robotics in healthcare market effectively. How does the Middle East leapfrog the West in its adoption of AI and robotics? The message is clear that the public is ready for AI and robotics. However, effective regulation is often regarded as a barrier to the adoption of AI technologies in healthcare. Therefore, how can we move from having a regulatory environment that is potentially stifling innovation to one that is a driver of growth?

## Here are three main considerations:

1. How safe is the use of AI in healthcare? The differentiating factor for most AI solutions is that they actually provide more accurate diagnoses and treatment recommendations since they have the capacity to process amounts of data that humans would never be capable of achieving. However, there is a concern around safety, for example in regards to the use of healthcare smartphone applications, where the regulation of this market is still in its early stages. An effective regulatory framework is important to the success of AI solutions in order to ensure patient safety is protected at all times.

2. Who will be liable if something goes wrong? The lines around medical liability get blurred when there is an AI solution in play; if something goes wrong (inaccurate diagnosis, wrong treatment recommendation, faulty robotic procedure, etc) is the developer responsible? Or the manufacturer of the product? Or the physician operating the AI solution?

Or the healthcare entity managing the AI solution? The key is to ensure patients' rights are protected and clear remediation processes are in place if an error does occur (as it does currently in human delivered care).

Such regulations would also typically provide for risk allocation rules which would inform parties' liabilities for medical errors.

3. How ethical is the use of AI in healthcare? Despite people's willingness to adopt AI solutions and robots for their healthcare needs, they still question the role of AI solutions in decision-making around diagnosis and treatment and the level of awareness and understanding of patients around their personal data use and access. This is especially true when there are situations where a physician's recommendation is contradictory to that of an AI solution. Herein comes the role of providers and 'responsible AI' in ensuring patients are aware of the AI technology they are using and consent to certain uses of their data as well as always retaining the ability to make the final choice.

## What's next?

AI and robotics in healthcare is here, it is not 'science fiction' and regulation needs to move fast to keep ahead of the disruption and the impact on the industry. The cornerstone in implementing AI in healthcare will be underpinned by trust and transparency in the system and how care is delivered safely and effectively to patients. This can only be done within an effective and progressive regulatory environment.

There is the potential for AI and robotics to be a force for good, empowering people to achieve more and helping to resolve many of the problems faced in today's world. The big risk is that AI is allowed to operate beyond the boundaries of reasonable control.

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Figure 1: In November 2016, PwC surveyed over 11,000 people across 12 countries in the EMEA region and the evidence clearly shows that more than half of those surveyed are willing to replace human doctors with AI and robotics. Source: Emerging Trends in Healthcare, PwC; What Doctor? Why AI and Robotics will define New Health, PwC Health.

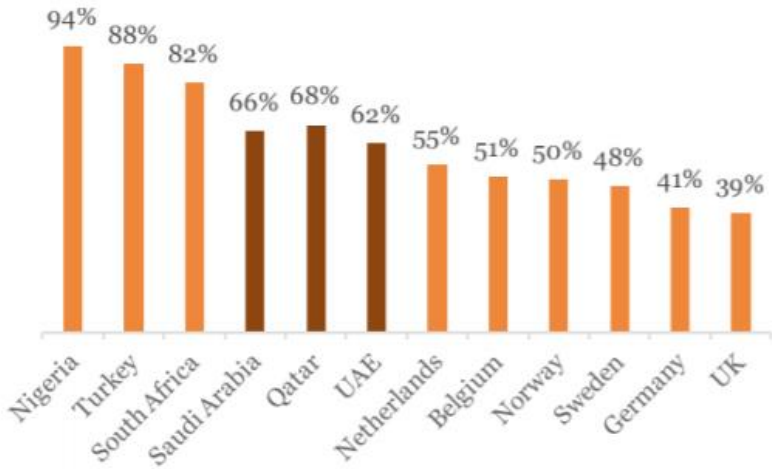


Figure 2: There is a generally high willingness to engage with AI and robotics across all countries. Nigeria, Turkey and South Africa are the most willing. Source: Emerging Trends in Healthcare, PwC; What Doctor? Why AI and Robotics will define New Health, PwC Health.

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