Technology & the Healthcare Systems in Uzbekistan & Japan

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Technology is evolving at an alarming rate. In the space of 15 years, we have progressed from using a mobile phone to make phone calls to the adoption of a device that is a necessity to manage our lives. We rely on our mobile phones to capture our memories as high-quality photos, and to entertain us with movies, games, and anything else on the Internet. Apps allow us to manage our businesses, finances, emails, and more. Video calls enable us to connect face to face with anyone in the world. While there has been extensive innovation, the real challenge we face is not trying to maintain this electrifying momentum in discovery but finding ways of implementing changes so that they can positively disrupt industries to ensure all stakeholders benefit.

Moreover, the use of Information Technology (IT) is common in all areas, including healthcare. Many healthcare organizations use IT-enabled applications for simplifying healthcare processes such as administration, managing health records across departments, and billing. On the other hand, some organizations are still struggling with conventional healthcare processes and paper-based health records. An increase in population, complemented by new and complex treatments for diseases, has increased demand for better and more efficient healthcare services globally. Due to the complexity of health problems, multiple healthcare providers are involved in the treatment of a patient. Patients receive health services from several different hospitals, making the healthcare process more complicated. The need for complete health information on a patient – such as the patient's history, allergies, laboratory tests, medication, and so on – at one place for his/her better care is increasing.

Many countries are promoting increased use of IT in healthcare services for enhancing continuity of better healthcare with the following goals:
• Keeping medical records
• Indicating probable cause of a disease

The Case of Uzbekistan

Implementation of Information, Communication and Technology (ICT) in the healthcare industry plays a vital role in improving people's health conditions and quality of life in developing countries. Uzbekistan, as one of the rapidly developing nations, has been struggling to transform its healthcare industry over the last three decades after splitting from the former Soviet Union. This article is intended to show the importance of the healthcare system by developing patient health records with a universal Smart IC Card in Uzbekistan and potentially in Central Asia where more than 60 million people don't have a proper health record history. Through the implementation of my proposal for the use of a Smart IC Card in hospitals in Uzbekistan, medical services will be enormously improved with accurate electronic medical records,

information sharing, medical record management, precise diagnoses, and so forth. As a starting point, one particular region in Uzbekistan will be selected, and research will be conducted based on patients and hospitals in that region.

As *Chart 1* illustrates, more than 90% of the patient registration process in hospitals in the Andijan region of Uzbekistan still relies on paperwork. Keeping patient records, submitting medical claims, making referrals, writing prescriptions, filling out forms and booking appointments are typically time-consuming manual processes which are old-fashioned practices and habits from the former Soviet Union and doctors have a stubborn affinity for using paper to collect and retain patient data.

On the other hand, there are plenty of cases of hospitals in the Andijan region having had numerous problems and mistreatments due to the loss of paper documents and lack of historical medical data when patients were unconscious, as in the event of emergency care, car accidents, natural disasters, fire accidents, and earthquakes. Hence, I believe that this new system will provide a solid solution for the healthcare system in the Andijan region through eliminating misdiagnoses and loss of patient records, which will eventually contribute to improving the Uzbek nation's quality of life.

The Case of Japan

Whenever I visit different clinics and hospitals in Japan I have to fill out a questionnaire. I find it quite time-consuming, and I cannot always provide sufficiently accurate information such as my height, weight, past medical conditions, or specific medical conditions of my family members, etc. Hospitals in Uzbekistan have a similar issue. Once, when I went to doctor in the capital city, he asked me to bring all my past

CHART 1
Results of survey in Andijan

Hospital database, 7%
Online, 2%
Paper base, 90%

■ Paper base ■ Hospital database ■ Online
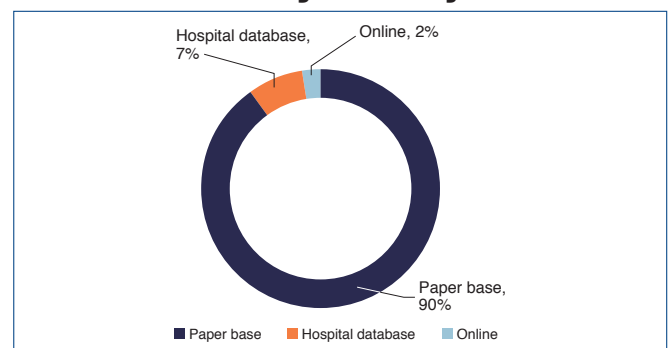
Source: Compiled by the author from the research survey in Uzbekistan

medical records from my local general practitioner because this was necessary for him to reach a correct diagnosis, so I had to go back my hometown to get all my records, such as immunization records, previous blood test results, and so on. Another practical example was when my uncle was diagnosed with a serious illness in 2010, and he dealt with the usual medical hospitals in Uzbekistan by contending with multiple doctors and healthcare facilities. Seven times he filled out forms listing personal and medical information. But one time, he forgot to list a drug allergy, which led to a problem during treatment.

However, my uncle successfully recovered, and his story gave me an idea: why not put medical information on an electronic IC Card that patients could take with them wherever they go?

In the meantime, I had a talk with a professor who works for Tampere University in Finland, and he mentioned this kind of project, which is ongoing in his lab. Moreover, I was genuinely interested and asked several questions and got some research materials, and I realized that Finland and Estonia have a higher e-care system for patients and doctors as well. Then I decided to go to Finland, Estonia, and Uzbekistan to conduct further research and learn about their best practices.

Project Overview

I propose a project that will be mainly concentrated on development of a Smart IC Card which maintains electronic medical records of the patient through systematized collection of electronically stored health information in a digital format *(Chart 2)*. When necessary these records can be shared across different healthcare organizations, including hospitals, clinics and pharmacies. A Smart IC Card may include a range of data, including demographics, medical history, medication and allergies, immunization status, laboratory test results, radiology images (x-ray), vital signs, personal statistics like age and weight, and billing information.

A Smart IC Card will be designed to store data accurately and to capture the state of a patient across time. It will eliminate the need to track down a patient's previous medical records and assist in ensuring data is accurate and legible. It can also reduce the risk of data replication as there will be only one modifiable file, which means the file will be more likely up to date, and that will decrease the risk of lost paperwork.

Due to the digital information being recorded on this Smart IC Card, it will be significantly effective when extracting medical data for the examination of possible trends and long-term changes in a patient. As future research and further development of this project, the data of medical records on this card can then be efficiently and anonymously used for epidemiological analysis at the national level or population-based studies when this Smart IC Card data is securely connected to Internet cloud systems and widely adopted by the Uzbek government in the future.

During my research I visited Finland and Estonia in order to acquire their best practices and understand their centralized patient medical record systems which are managed by their governments. I also visited the Andijan region in Uzbekistan in order to further investigate and understand how to implement my research concept in the region. In Finland I worked with Prof. Tarmo Lipping, Prof. Hannu Jaakkola and Prof. Jari Soini at Tampere University of Technology. They took me to their research laboratory and explained to me about their research in this field, which is about the Internet Healthcare System IC Card.

CHART 2
Process in using IC Data Card in clinic or hospital
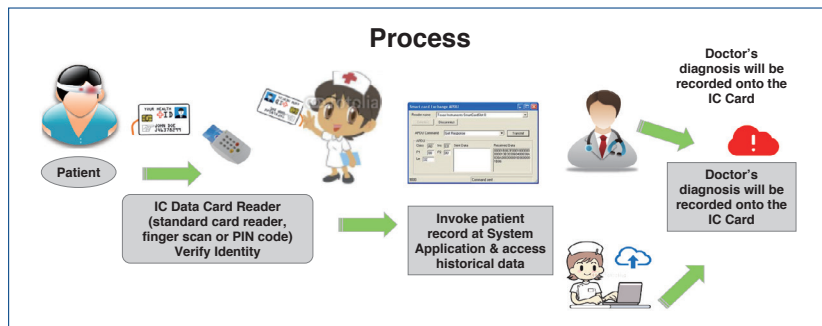
Source: Compiled by the author from Keio University GESL program project

Here is one good example to support my idea. When the patient is 45 years old, a Smart IC Card will contain 45 years of information about the patient's health condition. For further examination of a patient's health, past data will be incredibly useful for doctors. By implementing this kind of Smart IC Card, doctors at any hospital will be able to access a patient's past medical records, which would be key components for better examination of his or her health conditions and will help to identify the illness background. This Smart IC Card will be usable in any hospital where a card reader is installed and securely protected, which patients can access by using a PIN number, finger scan or facial recognition.

The benefits of electronic records on a Smart IC Card in ambulances include patient data sharing, injury and illness prevention, better review of pre-hospital care and design treatment options which support doctors in making accurate diagnoses. Moreover, a Smart IC Card can immediately identify alien diseases – such as Covid-19 or Ebola – if they are brought into the territory of Japan, Uzbekistan or other countries and could help prevent them from spreading.

A Smart IC Card will allow traditional paper-based medical documents to be converted to digital at the time of entry with substantially less cost. Doctors could analyze patient data from an electronic health record to predict, detect and potentially prevent adverse events. This can include discharge and transfer orders, pharmacy orders, radiology results, laboratory results and any other data from ancillary services or provider notes. This Smart IC Card could also alert doctors when a patient with HIV or any potential illness did not receive care for over a certain period of time. Therefore, a Smart IC Card could also potentially reduce the number of missed critical opportunities and regular check-ups.

Through this Smart IC Card, doctors will be able to view the patient's full chart which will cut down on guessing at histories and seeing multiple specialists, and may allow for better care in emergency situations. It will also provide better access to test results and offer evidence-based recommendations for better medical services in the Andijan region of Uzbekistan.

But the implementation of such new technologies in healthcare is a particular struggle. How is this introduction of a Smart IC Card to be achieved and how would it be distributed? We will need to explore for solutions. But it is true that we have entered into a new era of medicine where a patient can have access to the full medical encyclopedia on a smartphone with the adoption of the Internet. I will follow up this article in another one for *Japan SPOTLIGHT* in the Sept.-Oct. 2020 issue with my proposal for solutions. **JS**

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