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INTEGRATION OF HEALTHCARE INFORMATION USING ICT-CHALLENGES AHEAD OF LEBANON AND BELARUS

In their obligatory route towards digital economy, developing countries face challenges of automating their processes, as stakeholders' information in each economic sector, and among different sectors, are not fully connected, depriving themselves a lot of benefits and feasible results. The health sector of developing countries can benefit a lot from integrating its information digitally using ICT, yet the forecasted challenges differ from a country to another, also among peers of the same society. The challenges facing Lebanon and Belarus regarding integrating the healthcare data using ICT, as part of developing into digital economy, have many things in common yet a lot of differences.

Key words: ICT, Healthcare, challenges, information society.

Introduction. While the developing countries are pressured by the developed countries and international organizations to become a part of the digital economy, the level of readiness to join differs from a country to another, also from a sector to another within the same country, and among different levels at the same sector, also among peers of the same sector. Using information and communication technologies (ICT) to integrate healthcare information has many advantages on efficiency, transparency, integrity, productivity and more, and can be a starting point for a developed country to switch sides on the digital divide. To achieve this integration, a country needs to overpass upcoming challenges according to its specific characteristics. Analyzing challenges between Lebanon and Belarus can yield different outcomes.

Comparative analysis of the health sector in Lebanon and Belarus. The health sectors in Lebanon and Belarus have a lot in common, and many differences. While Belarus' population doubles that of Lebanon (9,357,000 [1, p. 42] to 4,822,000 [1, p. 204] respectively), health numbers are closer. Physician density per 10,000 populations is 3.93 for Belarus [1, p. 42], and 3.20 for Lebanon [1, p. 204]; life expectancy at birth in Belarus is 74.5 years [2, p. 136] and 81.24 years in Lebanon [3, p. 3]. Populations contradict in growth in Lebanon the number of births scored 90,647 newborns (2.05%) and deaths scored 25,847 mortalities (0.59%) and a positive growth rate of 1.5% [3, p. 3]. In Belarus, the number of births is 94,042 (0.99%) and deaths scored 120,053 (1.27%) with a negative growth rate of –2.8% [2, p. 55].

In Lebanon, the infant mortality rate is 6.7 per 1,000 live births (0.067%); maternal mortality is 16.9 per 100,000 live births [3, p. 3]. Infant mortality in Belarus scored 1.1 per 1,000 live births (0.011%), and maternal mortality scored only 3 per 100,000 live births [4, p. 21].

The total health expenditure in Belarus is 6.1% of GDP [1, p. 42] compared to 7.1% of GDP in Lebanon [1, p. 204]. Belarus has higher hospital bed density per 10,000 population of 111 beds [1, p. 42] compared to 35 only in Lebanon [1, p. 204].

The structure of the health sector differs between the two countries regarding its ownership and reference. In Belarus health sector belongs to the public sector, as it is activated and supervised and governed by the ministry of health in Belarus, and is the exclusive guarantor and client, with a small role for insurance companies (16 contracted insurance companies in 2018, 22 in 2017 and 23 in 2016 covering 1,226,100 policies of which 283,600 are personal of the total voluntary share of 715,900, while other 510,200 are compulsory insurance [2, p. 360].

While in Lebanon it is mostly owned by the private sector (82.4% private) [5], as the ministry of public health in Lebanon (MoPH) supervises this sector, draws the strategies, and makes the regulations, and mostly interacts with hospitals as being one of their multiple guarantors (MoPH in Lebanon covers 1,629,015 [6, p. 74] about 40% of Lebanese patients not covered by other guarantors. Other patients are covered by: the national security fund 1,077,683 [6, p. 64], the civil servants cooperative 193,860 [6, p. 69], military schemes of army 263,100, interior security forces 126,677, general security forces 16,285 and national security forces 5,645 beneficiaries [6, p. 69, 70].

Hospitals in Lebanon are 165 (29 governmental and 136 private). Other institutions contracting with MoPH in Lebanon include 220 primary healthcare centers, 187 dental labs, 242 physiotherapy centers, 458 nurseries, 2,145 pharmacies. As for medical clinics, most doctors run private clinics of their own [5].

While the number in Belarus is bigger 612 governmental hospitals, supported by 2,230 outpatient polyclinics of which are primary and emergence care centers, dental, laboratory and x-ray centers [2, p. 119]. The numbers in Belarus exceed their peers in Lebanon according to population and geographical area.

Another note is that x-ray, Laboratories, pharmacies and physiotherapy centers in Lebanon are not all for outpatient. They can be included in a hospital, where registering such departments in a hospital follows the same criteria as registering an outpatient center.

To conclude, the current health system in Belarus is better organized and supervised and distributed according to population, since it is owned and handled directly by the ministry of public health, and this allows for easier change and less resistance when trying to improve the processes, integrating data, or implementing nationwide strategies. On the other hand, Lebanon's health system is better regarding the open system allowing competition among private institutes among each other and with public institutes, to buy better medical technologies and bigger investment, availability of doctors from diverse expertise and backgrounds (Russian, American, French, British, Middle Eastern, and others), this same open system allows bad distribution of health services, as many institutes can be at one street, and many villages have no access to any health services and need to travel for miles to find appropriate medical treatment.

Challenges ahead of integrating the health sector information. In the last few years, both countries are making efforts to automate their health sector processes as part of economic sectors, in their strive to go deeper into the digital economy. So far, the health sector haven't reached feasible automation despite the availability of ICT in both countries, and the road towards integration of patient health data into standardized, scientific and accessible electronic health records (EHR) is facing many challenges. We'll describe some of these challenges and their effects on both countries.

1. No Unique patient identity. Belarus introduced the national EHR system in 2005 [1, p. 42], added to that each Belarusian citizen has a unique national identity number. This allows to unify the health record for each citizen as a solid background. But medical cards are not connected to national id. Poor implemented solutions allowed duplication in identities for the same patient, as data were taken according to name, family and data of birth, which results in duplicate files for the same patient, or one file for many patients. Depending on the national identification number of Belarusian citizenship can be the starting point of unique EHR identity. In Lebanon, multiple identification cards and numbers that leads to multiple EHRs for each citizen, before thinking of errors in data entry or similar data of different patients. This needs to be solved. If not using the citizen ID as mandatory identifier of every Lebanese patient in health facilities, they should at least implement the previous projects of the ministry of health for issuing national health card (proposed by most consecutive ministers of public health, and not yet implemented). This is the first obligatory step before applying any automation project. Else, feasible and automated integration will continue to be theoretical.

2. Funding problems. In Belarus, funding depends on the government, while in Lebanon the private sector holds a great proportion of funding. The funding of digitization of economic sectors is encouraged by international organization. Belarus turned to The World Bank – international bank for reconstruction and development, who made a study on 27.10.2016, for a proposed loan of $125 million to Belarus for a "Health system modernization project" and a strategy to implement (from 2017 till 2022) including establishment of e-health system, acquiring the necessary technology, improving competencies of working personnel [7]. This can solve the funding problem, and achieve an integrated system. Waiting for the positive results, since this project is active towards implementation. Regarding funding Lebanon depends on international initiatives by loans and grants, and the last conference was "Cedre", organized with the help of France on 06.04.2018, and with the participation of 37 countries and 14 inter-national and regional organizations. This conference resulted of promised $11.6 billion, $10.8 billion as soft loans, and $0.8 billion as grants [8, p. 2] aiming to develop the Lebanese economy. New criterion of "Cedre", that was different from similar previous conferences (Paris I, II, III and others), is that funding is conditional, asking for reforms and anti-corruption procedures before releasing money. Donors have serious fears against the potential mismanagement and misuse of the Cedre funds, under current political conditions, due to the existing corruption, tax evasion, customs gaps [8, p. 6]. These conditions come after unsuccessful use of previous loans and generous donations. In Lebanese health, many attempts were made by the ministry of public health. So far, with or without suitable investments, the steps towards integrated automation are very shy. A promising initiative was made in the first half of 2019 by the ministry of public health and the concerned stakeholders named: "EHR Readiness: Building Consensus on the Readiness for EHR in Lebanon", organized by the Policy Support Observatory (PSO) at the Ministry of Public Health (MoPH) to engage all health care providers and stakeholders to define a roadmap for eHealth in Lebanon. The conference was followed by four focus group discussions (IT, third-party payers, hospitals and public sector), then a survey for all stakeholders on current status and readiness for implementation. Then, a General Meeting was held on 15.06.2019 at the American University of Beirut, attended by representatives of the Minister of Public Health and the

Minister of State for Administrative Reform, and a total number of 103 stakeholders attended the meeting representing different governmental and private institutions including the Syndicate of private hospitals, Order of Physicians, Order of Nurses, Order of Pharmacists, health guarantors, third-party payers, and software providers. Four speakers presented the experience of several countries in implementing Electronic Health Records and a panel discussion whereby the audience and speakers shared their thoughts and beliefs. Another perspective is that funding in a liberal economy like Lebanon is more dynamic and flexible regarding the speed of change especially with private sector less bureaucracy. This can give Lebanon a better chance for faster change. But fast is not always good. Integrating economic sectors data especially health should be studied carefully and applied by the government as a whole on all sectors, and this gives a better opportunity for Belarus.

3. Political instability. This challenge affects the implementation continuity. Political instability in Lebanon is a great challenge against national improvement projects. This country is affected directly by neighboring conflicts, added to political differences among its components that affect every process, not only the health sector. Some projects are approved or denied according to political interests not to social stability. Also redundant change in governments and ministers brings new visions, priorities, policies and tools. Continuing long-term plans should be axiomatic. This is not the case in Lebanon. Belarus political status is more stable especially at the higher level, and has a better chance of implementing long-term plans, when they are available. Yet Belarus also suffers from frequent change of ministers of public health, which also changes visions and priorities, and hinders long-term policies.

4. Inequality of ICT knowledge and awareness. ICT development index rank places Belarus as 41st [1, p. 42] and Lebanon as 52nd [1, p. 204] in the world among 125 surveyed countries. This means that both countries are at the middle of world classification, and a lot of efforts need to be done to get themselves ready for ICT integration of their economic sectors. Internet users are around 75.9% in Lebanon at year 2016 [9]. In Belarus the percentage was 71.1% in 2016 and 79.1% in 2018 (83.1% in urban areas and 67.9% in rural areas) [2, p. 438]. With the vast and easy use of applications on smart phones from the majority of citizens, ICT awareness should be a challenge, but of course it needs to be taken into consideration especially when going deeper into rural areas, technology-illiterate citizens, old or handicapped people and other criteria. Primary computer illiteracy training programs should be easily accessible and free, and should reach all computer-illiterate citizens, according to their knowledge levels, locations, and capabilities.

5. Incompatible infrastructure. Integrating economic sectors using ICT needs supporting infrastructure. The availability of electricity, consistent phone connections, roads, transport, and others in Lebanon is worrying if not catastrophic, as it is classified 117th among 137 countries in the world, and 134th/137 for quality of electricity supply [10, p. 179]. Although most Belarusian infrastructure are built decades ago, yet they have much consistency, availability, productivity, and can be a good basis for setting the plan into implementation. Electricity, communication and internet connections, roads and public transportations are available 24/24 hours and with cheap costs.

6. Resistance of change. Resistance of change, especially to follow new technology of the new world order is wide spread in developing countries. Less resistance is expected in Belarus, because the ministry is the only controller of the health sector, yet in Lebanon, the conflict of interests among guarantors, private and public sectors, political parties and other criteria can set a strong basis for resistance. In both countries, doctors and other health practitioners can resist such solution as it changes the manner they enter or access information. Patients may fear from inability to use technology at critical illness times (in Lebanon and Belarus), or infrastructure shortage (expected in Lebanon), as well as the fear from revealing their private information to un-authorized units.

7. Weak legal and regulatory environment. Neither Belarus [1, p. 42] nor Lebanon [1, p. 204] have defined “medical jurisdiction, liability or reimbursement of eHealth services”, added to most requirements of the legal frameworks for eHealth. This is critical as a basis for successful integration of health information, supplying legal protection for any stakeholder complaining of any breach of privacy or disclosure of secrecy. Success of implementing this project nationally needs to produce the necessary laws, rules and legislations to provide a legal background for all stakeholders to abide to.

Conclusion. Many challenges are waiting on the road of integrating the healthcare information using ICT in both countries, and other developing countries. Although Belarus has better scores regarding studied criteria than Lebanon, and thus has bigger opportunity of integrating the health data using ICT, yet both countries still suffer from many weaknesses to reach feasible implementation. This is affecting not only the health sector but also other domains as well. Yet the first steps towards implementation are already taken, especially the Belarus agreement with the World bank, and

the conference for "EHR readiness" and the following meetings in Lebanon. Plans and roadmaps and expected funding seems to be in place. The country that is more consistent to face challenges with stability, plan accurate implementation, providing human and financial resources, less corruption, and bigger coordination has bigger chances of success. The results expected from this integration are much bigger than these challenges and others. If all beneficiaries are convinced with the benefits, this will create less resistance, quicker implementation and better results.

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