International Hospital Federation

Adopting Innovation and Technologies in Healthcare

Part 1: Dynamic of Change –
on the Impact of Innovation and Technology in Health Care

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IHFYEL Young Executive Leaders

The IHF Young Executive Leaders' Initiative 2019

In early 2019 the International Hospital Federation formed the first ever Young Executive Leaders group which had the purpose of engaging young healthcare leaders from around the world in identifying future needs in the provision of healthcare. Our group of 19 young leaders (clinicians, hospital administrators and entrepreneurs) from 10 different countries which span 14 different time zones selected the impact of innovation and technology in health care and divided into three groups to focus our work. We decided to focus on three specific areas that would drive our research, analysis, and outcomes:

1. **The dynamic of change – on the impact of innovation and technology in healthcare**

2. The impact of technology on care delivery processes to improve efficiency and outcomes

3. The impact of human factors on the success or failure of these innovations

Many of the challenges we all face in health care transcend borders, but by allowing our ideas, our creativity, and our passion to transcend those same borders, all patients stand to benefit. It has been a tremendous opportunity being a part of something incredible and this document shares a portion of that experience. It is our hope that you, your organizations and most importantly your patients may benefit from it as well.

This document present section 1 – Dynamic of Change, in which we discuss a method or approach to tackle change. Innovation and using innovative technologies require rigor and discipline, and the PESTLE model is one method by which this change can be analyzed and approached.

Disclaimer: This paper represents the personal views of participants of Young Executive Leaders initiative. It doesn't represent the view of the organizations to which these participants belong.

Executive Summary

Innovation technology is the future of our healthcare setting. The acceleration of these forces has reached a new level of importance for leaders who need to plan differently for the future of both healthcare delivery and the workforce who will deliver care. As young leaders, we have the responsibility to learn, study and understand the overall dynamic of change of this hot topic. It was a challenge to determine the best approach to summarize such a broad topic.

We decided to use PESTLE to analysis among different countries so as to capture common themes and translated to advantages and disadvantages for each domain. There are six domains: Political, Environmental, Social, Technological, Legal and Economical. A PESTLE analysis is a management framework and diagnostic tool. The outcome of the analysis will help us understand factors external to our healthcare system which can have an impact on strategy and influence administrative decisions. PESTLE analysis encourages a thinking that is logical and strategic - rather than a thinking that is instinctive or habitual. Once the main overarching factors are clearly included in a PESTLE analysis, the next challenge is to relate this in real terms into practice and implementation. This document summarizes the results for each PESTLE dimension. In annex 1, you will find the detailed domains for each country.

Key messages:

* The imbalance between public and private sectors are the common problem worldwide. To keep merging both parties, and/or encourage collaboration, can be of great benefit for our clients or patients.
* The evolution of training up new leaders with the competencies necessary to innovate technology.
* To challenge the traditional hierarchies by making new young leaders as a bridge or shortcut to the frontline staff to reach the high up chief executive or hospital executive leaders fasten the delivery process.

Introduction

Innovation and technology are market forces continuously referenced in any healthcare setting today. While not necessarily new, the acceleration of these forces has reached a new level of importance for leaders who need to plan differently for the future of both healthcare delivery and the workforce who will deliver care.

As emerging leaders in healthcare, representing a multidisciplinary viewpoint of this change, we set out to better understand the overall dynamic of change innovation and technology. Planning for the future of innovation and technology growth in our individual organizations can no longer be a one-time event or limited to implementation of an electronic health record. In a recent study conducted by Philips, it was found that of the 15 countries surveyed, 78% of healthcare professionals currently use digital health technology or mobile health apps.[1]

The acceleration and adoption of innovation and technology has also tipped the balance between the public and private sector. Indeed, many of the barriers to access this arena have been lowered, and significant financial opportunities arose. This has triggered a non-traditional competition for health care systems who could not respond as quickly to changing consumer preferences.

Approach

As a group representing not only our individual organizations, but our respective countries as well, it was a challenge to determine the best approach to summarize such a broad topic. We landed upon the use of a PESTLE analysis as a way to capture common themes which were then translated to advantages and disadvantages for each domain.

There are many forms of a PEST or PESTLE analysis available that can be customized. For our purposes it served as a framework to obtain a broad overview of technology and innovation from a multitude of differing perspectives. Our domains were defined and based on the following:

1. *"Political:* These factors determine the extent to which a government may influence the economy or a certain industry.

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[1] Philips. (2019). *Future Health Index 2019: Transforming Healthcare Experience*. P. 21. Retrieved from: https://www.philips.com/a-w/about/news/future-health-index/reports/2019/transforming-healthcare-experiences.html

2. *Economic:* These factors are determinants of an economy's performance that directly impacts a company and have resonating long term effects.
3. *Social:* These factors scrutinize the social environment of the market, and gauge determinants like cultural trends, demographics, population analytics etc.
4. *Technological:* These factors pertain to innovations in technology that may affect the operations of the industry and the market favorably or unfavorably.
5. *Legal:* These factors have both external and internal sides. There are certain laws that affect the business environment in a certain country while there are certain policies that companies maintain for themselves. Legal analysis takes into account both of these angles and then charts out the strategies in light of these legislations.
6. *Environmental:* These factors include all those that influence or are determined by the surrounding environment."[2]

Results

POLITICAL SUMMARY

Innovation and technology adoption may be one of the areas that is the least impacted by political uncertainty and differing opinions. Our respective countries seem to all agree that adoption to promote increased access to care while hopefully reducing costs is the right direction for all. The common factor limiting the advancement of this is bureaucracy - disagreement on how to implement, how to pay, having the right decision makers that truly represent those who benefit from the tools, etc.

Regulators appear to be limiting the ability to advance many platforms. The US is an outlier with a mixed private and public payer system, but even those European and Asian countries with broader universal systems have their limitations to adoption. The common theme though continues to be that regardless of the political environment, having those furthest from the patients making decisions about how to regulate is not the best approach to the advancement of innovation and technology. Government regulation has a very important role in all of our respective countries and organizations, but in the case of technology it may be better off allowing private industry or healthcare itself to drive and advance change.

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[2] *What is a PESTLE Analysis? A tool for Business Analysis*. Retrieved from:
https://pestleanalysis.com/what-is-pestle-analysis/

ECONOMIC SUMMARY

Over the world, many countries are facing long recession/stagnation, high inequality of income, high unemployment, economic crisis and resource limitations. This can count as a major barrier to promote healthcare innovation. However, the governments of these countries still try hard to invest on health innovation quoting from 3.4% to 9% GDP annually worldwide[3]. It is difficult but still possible to meet the rising cost of healthcare.

In the US, they have a well-developed insurance system; insurance companies can reimburse the healthcare expenses of consumers. This supports private companies continuing to grow and heavily invest in healthcare – most of who are better with meeting consumer needs – and are forcing health care systems to advance innovation more quickly. In Asia, the private sector is usually less involved in entrepreneurial activity in clinical research and development, because investing in innovation technology will affect their profitability. Private industry does not always link to a single electronic health record and could potentially impact a patient's healthcare provider from having the full picture of their health. Disparity and imbalance of public and private systems can lead to the majority of patients being unable to enjoy the fruit of innovation technology in health.

SOCIAL SUMMARY

Many developed countries are facing aging population. There is a huge socio-cultural and educational gap between major cities and countryside small villages. Older health professionals are more difficult to adhere to changes. These are some major barriers for the implementation of innovation technology in healthcare system.

However, globalization lead to a diversity in Religion and Race among many countries. This ends up with relatively open and flexible social norms to adopt
Innovation. In some places like Hong Kong, the respect for the medical profession is strongly embedded in the local culture, which may be a positive driving force for the development of new technology or treatment.

TECHNOLOGICAL SUMMARY

This is a global trend for all government, health regulators and the private health sector to have

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[3] *Global Spending on Health: A World in Transition*. Retrieved from:

https://www.who.int/health_financing/documents/health-expenditure-report-2019.pdf?ua=1

electronic health records, electronic pharmaceutical and health insurance transactions, but there is still limited activity in big data analysis. High speed development and coverage of WIFI, smart phones and computerization are key factors.

The "hardware" development is faster than the "software" development. That means cultural, training, policy and administrative system can't keep up with the implementation of the technology.

LEGAL SUMMARY

Despite different countries having different legal system, some common pros and cons can be summarized here. The advantage of developed countries having integrity in their legal systems and healthcare authorities is the ability to provide licensing credentials for medical providers so as to protect patients from healthcare malpractice. This helps maintain a high standard of healthcare systems worldwide. Whenever innovative procedures are introduced into practice, they are well regulated and gain the public trust.

On the other hand, too rigid systems can make clinicians and organizations reluctant to try innovative technology on patients. Data protection or privacy laws further restrict the sharing of patients' data in patient care or research. In larger nations with many states or cities, the limitation of geographical barriers and workforce shortages have further jeopardized the access to resources (e.g. rural areas) and had a big impact on patient care. Concerning public-private practice, the public sector may be too bureaucratic to effectively support innovative technology application. Likewise, the private sector also has a barrier to innovative technology implementations resulting from strict Laws and health regulations.

ENVIRONMENTAL SUMMARY

Nearly all nations suffer from global warming and pollution which lead to chronic diseases. Our healthcare system has to spend a lot of resources to tackle them each year, resulting in the emergence of an obstacle for the development of innovation technology.

In many nations worldwide, people living in rural area may have difficulties in accessing tertiary medical care. With the development of telemedicine, one may consult the specialist through conference call and receive approach management. People living in urban area are not without disadvantages: in some cities like Hong Kong, most of the hospitals are surrounded by other buildings that limit the future development or expansion.

Annex 1: PESTLE Analysis

PESTLE ANALYSIS – POLITICAL

COUNTRY	POLITICAL TOPICS
Brazil	• Democratic, relatively stable government • Free press, though traditional media is controlled by a handful of groups • Parts of healthcare are extremely regulated - eg. price regulations for medications and health insurance • High levels of corruption, with ongoing efforts to fight it • Relatively closed economy, not very integrated to worldwide supply chains • Highly regulated trade in health products • Convoluted tax system, relatively high rates • Restrictive and outdated labor regulations • Highly polarized political environment • Health not a political priority
Hong Kong	• Before 1997, British Colony. After 1997, return to China as Special Administrative Region. • One country, two systems, a high degree of autonomy, Hong Kong People administrating Hong Kong • The Hong Kong government is economically liberal, but currently universal suffrage is only granted in District Council elections, and in elections for half of the Legislative Council. The head of the government (The Chief Executive of Hong Kong) is elected through an electoral college with the majority of its members elected by a limited number of voters mainly within business and professional sectors. • Enjoy freedom of speech, press/ media and internet • However, throughout the last 20 years, minor conflicts gradually developed and accumulated to become major ones due to the implementation of "one country, two systems". One country is weighting more than the two systems. • Public expenditure on Health as % of total public expenditure: 16.6% (2018)

Portugal	• Representative democracy
	• Active social participation
	• Healthcare as a mandatory service of the Portuguese state: "Universal and tending free healthcare system" – Portuguese Constitution
	• Public-based healthcare system (SNS) is accessible to all Portuguese population
	• SNS treat any major health problems without significant out-of-pocket costs
	• There is an interesting understanding of the political parties in health sector, always for the population
	• Shift towards a more prominent private sector
United Arab Emirates	• Autocratic monarchy with relatively liberal views compared to the immediate region
	• The neighboring region is politically unstable
	• Traditional media usually censored and controlled
	• The country has a single federal government with a ministry of health but several separate healthcare regulators under local governments of different emirates (or states). Each emirate has healthcare as a different priority with Abu Dhabi having the most healthcare spending. There is no integration between the different government healthcare regulators.
	• The local government of the emirate of Dubai is the most progressive in introduction of new technologies in government services and promotes start-ups and incubators, but there is limited access to decision makers and committees which approve new technology.
	• There is a heavy reliance on contacts in government to get projects moving.
United States of America	• Bipartisan support for healthcare reform advancement – divided government making decision making challenging
	• More state decision control over health regulation
	• Presidential election year (2020)
	• Affordable Care Act – Coverage mandate removed, but State expansion remains for Medicaid and exchanges
	• Proposed CY 2020 Physician Fee Schedule – adds 3 new codes for opioid use disorder
	• Limitations on where patient is located – Medicare's rural geography requirement
	• 21st Century Cures Act
	• Only certain services/CPT covered – regulated and reviewed annually by US Department of Health and Human Services

PESTLE ANALYSIS - ECONOMIC

COUNTRY	ECONOMIC TOPICS
Brazil	• Long recession/stagnation for the past 6 years, past 35 years of mediocre growth, with short spurts • Relatively high, but decreasing interest rates, underdeveloped private credit market • High inequality of income - demand for all levels of services • High (but falling) unemployment, impacting insured population • Inflation stable at a relatively low rate • Health spending at 9% of GDP • TOP 5 largest markets for private healthcare in the world • Rising costs in healthcare
Hong Kong	• Hong Kong Health expenditure as a percentage of GDP went up from 3.6% in 1989/90 to 6.2% in 2017/8 (i.e. HK$million: 167,581) • After more than 20 years' deliberations on health care financing reform, the government has chosen to put forward a Voluntary Health Insurance Scheme (VHIS),hopefully can adjust the imbalance between public and private healthcare by encouraging more people to use private healthcare services so as to relieve pressure on the public system. • Public and private charging system is in great difference. From outpatient, private charges 10-100 times more, to inpatient, private charges 1000-10000 times more. • Public expenditure on health amount (HK$ million): 85,209 as % of total expenditure on health 50.8% 2017/8 —> Serving more than 90% patients in total. • Private expenditure on health amount (HK$ million): 82,373 as % of total expenditure on health 49.2% 2017/8 —> Serving less than 10% patients in total. • Not like other well developed countries, our Pharmacy still not develop separation of prescribing from dispensing.
Portugal	• Economic crisis • Resource limitations • Excellent professionals – Few economic resources

	However… • Easy access to new health technology in hospitals (which is leading to a unsustainable healthcare system)
United Arab Emirates	• The UAE as a whole is still heavily reliant on oil and gas resources although some emirates such as Dubai have successfully diversified their income. • It has the second largest economy in the Middle East after Saudi Arabia and one of the world's highest GDP per capita. • The UAE's health expenditure reached a value of $13.7 billion in 2018 (3.4% of GDP). • There is a strategy for increasing involvement of the private sector in healthcare and an official national target of increasing medical tourism from the Middle East and Africa. • There is low entrepreneurial activity in clinical research and development and it is mostly an import driven economy. • Inequality of income with a large foreign workforce, especially in the healthcare sector.
United States of America	• Global companies – Amazon, Google, and Apple – all which have more consumer trust • Employers are increasingly looking for was to increase access and lower costs • Some employers are direct contracting with organizations for certain patient populations (i.e. Wal-Mart: Back Surgery) • Multiple payers all with different qualifying payment criteria, but many states have legislated parity for payer coverage • Government payers are becoming the majority with aging population. However, Medicare and Medicaid have increased reimbursement for virtual. • Consumers are increasingly paying more of their health care expenses due to "High Deductible Health Plans" • Not all malpractice carriers will cover providers delivering telemedicine services

PESTLE ANALYSIS – SOCIO-CULTURAL

COUNTRY	SOCIO-CULTURAL TOPICS
Brazil	• 210MM people, growing slowly • Western-style culture, relatively open and flexible social norms • Overwhelmingly Christian, with a majority of people not being strictly practising • High acceptance of diversity, though there are regional differences • Very high crime levels • Laid-back attitude towards life in general - including towards saving, work and health • Huge social class differences, with strong racial elements to it • Early adopters of innovation • Society becoming more active and engaged • Chronic diseases as a major issue, growing levels of obesity and diabetes
Hong Kong	• Hong Kong Population: 7.45M (2017/8), static for past 10 years • Aging population is a major problem which leads to a double of expenses in 10 years. • Patients can easily assess general outpatient clinic (GOPC) or specialty outpatient clinic (SOPC) by walk in or bringing a referral letter respectively. However, public SOPC, despite has mature triage system, still need a long waiting time (in terms of months to years). • HK Citizen only need to pay very little money for public hospital service but not Traveller. • Public Accident and emergency department (AED) is the last resort to treat all the needed, including Traveller who cannot afford the expensive fee in private hospital. • Private hospital usually treat lower risk cases while public hospital with multidisciplinary team usually treat higher risk cases. • Malignancy is the First leading cause of death in 2018 while Pneumonia is the second. However, no. of death from Malignancy is nearly one fold of Pneumonia

Portugal	• Portuguese population are becoming very old
	• There is a huge socio-cultural and educational gap between seaside major cities and countryside small villages
	• Few health professionals in countryside with low developed health services
	• Heath professionals have an outstanding training and are worldwide recognized
	• Older health professionals – difficult to adhere to changes
	• Younger – easy to adhere to changes
United Arab Emirates	• The 2018 population estimate of the UAE was 9.5 million people, with 88% being expatriates from more than 200 nationalities and only 12% being Emirati nationals. A very large percentage of the expatriate workforce are from South Asia or the Far East and most are young.
	• All Emirati nationals are Muslim and the expatriate population has large numbers of Muslims, Christians and Hindus.
	• The country and people are very tolerant and the lifestyle is a mix of Western with traditional culture maintained in a modernized way.
	• There is a social trend in adopting new technologies, including wearables, and publicity generated for any innovation in services.
	• The relatively small population is easy to penetrate with new ideas.
	• As a rich nation, chronic disease is markedly high with 19% of the population having diabetes. The lower income groups are also at risk.
United States of America	• Healthcare is playing catch-up in online, convenience-obsessed, and increasingly consumer demands
	• Consumers are demanding more access points, better experience, and price transparency
	• Workforce shortages (both clinical and professional) are impacting access
	• Aging population (65+) growing faster than millennial or Gen X
	• Workforce demand and consumer demand for more flexibility
	• Incentive alignment is necessary as outreach stipends and productivity models change for providers

PESTLE ANALYSIS – TECHNOLOGICAL

COUNTRY	TECHNOLOGICAL TOPICS
Brazil	• Few top-level universities with limited integration with markets • Low public and private investment in R&D • Unequal distribution of automation - highly developed banking, underdeveloped in services and manufacturing • Regulations and tariffs make technology more costly • Active start-up culture • Growing tech-literacy
Hong Kong	• Public system: Healthcare computer system, known as clinic management system, is created since 1995 to computerise and digitize patient records so as to make data retrieval easy and efficient at different locations. It is now very mature with 99.99% coverage in Hospital Authority hospitals and clinics. Recent years it extended to "In-patient medication order entry", filmless imaging and Sharing record with Private sector. • Minimal invasive surgery including Da Vinci System (Robotic Surgery) is the main trend operations. The expertises and service in both public and private is equally advanced. • Simulation training is gradually replaced traditional teaching method "see one, do one, teach one", and is emerged into Training curriculum
Portugal	• Almost all the Portuguese Public National Health System (SNS) is in electronic platforms • At the moment, there is a SNS online network and these platforms are becoming connected • It can be possible to work with all the information in each hospital or primary care center

United Arab Emirates	• Although the number of universities and colleges are few and they are all relatively new, there is a large focus on majors in technology fields such as Computer Science and Computer Engineering. • The UAE is the only country in the world with a Minister for Artificial Intelligence responsible for promoting the introduction of AI in training and services. • The Dubai Future Council, a government entity has launched several strategies for AI and Blockchain use and creating a paper-free work environment by 2021. • All government and health regulators and the private health sector have electronic health records and electronic pharmaceutical and health insurance transactions, but there is still limited activity in big data analysis. • 99.06% of the population are active internet users.
United States of America	• Non-traditional entrants with greater access to capital and better understanding of consumer design and/or quicker speed to market. • Site to site specialty care is most prevalent • Disconnect between consumer interest and actual utilization due to rush to implementation without true identification of consumer needs • Differing medical record platforms and interoperability • Remote monitoring devices and chronic care management are increasingly growing • Many vendors are incorporating advanced analytics

PESTLE ANALYSIS – LEGAL

COUNTRY	LEGAL TOPICS
Brazil	• Laws often not enforced in practice • Very detailed legal documents, sometimes acting as a barrier to change • Mostly independent judiciary • Low public trust in the Supreme Court • Right to (Universal, Integral, Equitable) Healthcare enshrined in the Constitution • Rigid legal structure in the public sector make management and purchasing in health more difficult

Hong Kong	• The law of Hong Kong is based on the rule of law and the independence of the judiciary. The constitutional framework is provided by the Hong Kong Basic Law, which is a national law of the People's Republic of China (PRC). The separation of the Hong Kong legal system from the PRC is guaranteed constitutionally until at least 2047. • The Hong Kong judiciary has had a longstanding reputation for fairness and was rated as the best judicial system in Asia by one survey in 2008. • Standardization of licensing and credentialing among medical providers. • Doctors worldwide need to take the licensing exam before registration as medical practitioner in HK • Departmental protocol and Specialty based College Guidelines are available with regular update and review
Portugal	• The health services are regulated by an official regulatory state-based institution • Laws for health services are becoming more and more restricted • Laws and health regulation facilitate the appearance of big private sector hospitals • Small private clinical practice has been disappearing • Public sector with many bureaucracy that difficult hospital management, specially in referring to human resources and new equipment acquisition • Data management and sharing became very difficult after the application of the 2018 European General Data Protection Regulation; a step forward data protection, but a step backward in health data sharing and research
United Arab Emirates	• The legal system in the UAE is a mix of Islamic Shariah law in certain instances such as inheritance and marriage, but there are specialized courts for financial and business cases. • Medicolegal cases progress through hospital investigative committees to the ministry and can end up involving the public prosection and police with criminal records generated against healthcare practitioners. This may make some reluctant on trying innovative procedures on patients or involving them in research. • A new healthcare regulatory federal law announced in 2019 limits the storage and processing of healthcare data to local encrypted servers which affects the use of external cloud storage in healthcare.

United States of America	• State to state licensing credentialing for medical providers. Interstate Medical Licensure Compact is an agreement between 29 states • APN, PT, RN/LPN and Psychology all have licensure compacts. • State to State Practice Standards – definitions vary on establishing the patient/physician relationship. • HIPPA and privacy concerns over data sharing and accessibility of records • Insurers selling across state lines • States different approaches to teleprescribing. Some have specific controlled substance rules or to all prescription drugs. Examination rules vary by state. Many prohibit prescribing based solely on an online questionnaire. (Federal supersedes State = stricter rule) • 38 states have some sort of informed consent requirement

PESTLE ANALYSIS – ENVIRONMENTAL

COUNTRY	ENVIRONMENTAL TOPICS
Brazil	• Huge country, mostly tropical • World`s largest preserved rainforest • Threat from expanding agriculture and cattle production • Electricity mostly from renewable sources • 90%+ of the population in cities • Cities suffer from pollution • 50% of the population with access to sewer systems • High levels of recycling • Bad waste management in general - landfills • Mosquito-friendly environment, resulting in high prevalence of dengue fever, chikungunya, zika and other mosquito-borne diseases
Hong Kong	• Percentage of population with sustainable access to an improved water source: 100% • Percentage of population with access to improved sanitation facility: 99% • Waste Diversion Plan compliance rate is still low. • Suffering from Air pollution from neighbouring city e.g. Shenzhen (worst in Winter)

	• Global warming becoming more severe. Rising of temperature per year changing from 0.17 degree C to 0.34 degree C.
Portugal	• Sunny country with an enormous potential to health tourism • Health tourism can lead to the development of sophisticated innovative technologies • The major health problems are those related to older patients and cardiovascular risk, specially, obesity, type 2 diabetes, high blood pressure, stroke • Oncologic problems are also an emerging problem • Need to focus on health primary prevention, specifically, health literacy (very few health literacy in Portuguese population)
United Arab Emirates	• Dry desert climate. Geographically small coastal nation. • 90% of the population are in urban areas but only larger cities such as Abu Dhabi, Dubai and Sharjah have access to tertiary healthcare services. • The hot climate discourages outdoor physical activity which is contributing to the increase in chronic diseases. • As a popular air transit hub with one of the world's largest airports connecting Europe, Africa and Asia, there is concern for exposure to transmittable diseases. • Geographically close to areas of war such as Iraq with depleted uranium with unknown long term health effects. • Heavily car reliant and having a construction boom increasing pollution but there is improving environmental preservation awareness and a push for renewable energy use, electric cars, green buildings and pedestrian-friendly urban design.
United States of America	• Growing focus (and connected payment) on social determinants of health – what goes on outside of the four walls • Rural fiber optic connectivity