Post-COVID-19 Perspectives on International Business

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Edited by

Jessica Lichy

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PREFACE

POST-COVID PERSPECTIVES FROM POST-MILLENNIAL GRADUATES FACING NEW CHANGE & CHALLENGES IN INTERNATIONAL BUSINESS

MARC CASTAGNET

When I was first invited to write a few words, I almost declined, then being naturally curious, I decided to explore further and was pleasantly astonished to discover the collection of articles made under the editorial leadership of Jessica Lichy. Faced with the challenges of COVID-19, we often do not give sufficient grace and force to the dynamism, innovation, agility, resilience, creativity, hope and resolve – which are the main drivers of this ebullient, explosive world that is developing, cascading in front of us since the beginning of this pandemic (or earlier). Jessica, thank you for this amazing *tour de force* of curating such diverse articles, prompting us to feel vulnerable and strong, hopeful in times of doubt, highlighting the complexity in human behaviour – with an eye towards improving, discovering and adapting current systems, and managing new ones. Ultimately, this collection highlights the need to find ways for our society to reposition itself; to be more responsible, caring and loving in defining sustainable solutions for the years to come using technology, innovations, and human-centric design.

Here is a selection of key ideas from our writers:

- Healthcare is a precious resource in which we all have a stake. The focus must now be on understanding health in its holistic, interdisciplinary, bio-psychosocial context – for developing and exploiting technologies that support this vision.

- Product positioning for millennials and Generation Z during COVID-19 is extremely complex: it needs to be environmentally friendly, potentially pricier, and digitally present (including influencers) to be attached to certain groups asserting their social identity.

- The increase in home working (a direct consequence of COVID-19) has been made easier by organisations and technology; however, it is increasing loneliness and damaging the mental health of some individuals.

- Be local in a global world; the notion of the 'global village', enhanced by digital technologies and cloud computing, may give the impression of nations coming closer together towards a global consumer culture – yet unexpected events such as the COVID-19 pandemic serve as a reminder of the fragility of mankind. In addition, the consumer's mind is complex and unpredictable. Consumers connect meta-culture/meta-environment, sub-culture/sub-environment and communities to build market perception.

- For greater efficiency in the public sector, there is a need to set up meeting mechanisms and implement action plans at all levels for public bodies. This will enable a concerted and synchronised multiplication of actions for each project, and make the actors at each hierarchical level accountable; this is of utmost importance when huge amounts of public money will be spent during and after COVID-19, in order to maintain and restart economies around the world.

- Youth Participation in Mainland China is starting to actively take part in the Sustainable Development Goals set up by the United Nations; social impact movements and awareness are relatively new and need to be controlled by the CCP (Chinese Communist Party).

It is now time to enjoy reading these chapters, please share your feedback with Jessica!

Introduction

Post-COVID Perspectives
from Post-Millennial Graduates facing New Change & Challenges in International Business

Jessica Lichy

The chapters of this book are drawn from research projects undertaken by IDRAC Business School scholars and guest authors. Now graduated and in the world of work, the scholars reflect on their research projects and provide an update on their findings, to discuss the new changes and challenges faced in today's world of work.

Aimed at scholars and practitioners, this book provides pertinent illustrations of a changing society, together with insights into best practice for conducting business beyond borders. The intention is to raise awareness of diverse factors that need to be taken into consideration before venturing into transnational operations. The authors share their insights and advice on a number of aspects of modern-day business and society – framed by the impact of the COVID-19 pandemic.

The chapters bring together a range of issues that have resonance for managers facing new challenges brought about by the changed environment. The first chapter explores the long-overdue issue of putting 'Health' and 'Care' back into 'Healthcare'. The second chapter looks at the growing problem of sustainable consumption by today's younger consumers. The third chapter discusses the pursuit of loyalty by luxury firms among Gen Y and Gen Z consumers. Similarly, the fourth chapter investigates millennial perceptions of Instagram influencers in the French fashion industry. The fifth chapter makes a detailed analysis of the extent to which COVID-19 is influencing the vision of working from home in France among employers and employees. The sixth chapter provides an overview of why

managers need to rethink standardization versus adaptation of international marketing strategies: post-pandemic views. The seventh chapter examines the difficulties of strategic implementation in public organisations: the case of a metropolitan town hall. The penultimate chapter offers an insight into how to tailor customer experience according to cultural differences in the luxury hospitality industry. The final chapter puts forward a detailed vision of the reality of sustainable action among Chinese youth.

Building resilience and achieving sustainable success requires much more than expanding business operations overseas to reach new clients or customers, with a view to increasing profits – as this book will demonstrate. The chapters of this book draw on diverse aspects of international business to reflect the extent to which today's society is both international and connected, driven by the co-evolution of society and technology. Rapid advances in information and communication technologies (ICT) have brought individuals closer together via virtual platforms. While ICT continue to transform business (economics, markets, industry structure, consumer segmentation), the impact has been perhaps greater on society (jobs, consumer values, consumer behaviour, labour markets) – especially as our world has been reduced to a screen by the onset of the COVID-19 pandemic.

Continuing with the themes raised in the two previous volumes (*The Driving Trends of International Business in the 21st Century* and *New Business Models in International Higher Education*), the chapters of this book provide a brick-in-the-wall snapshot of the changing landscape of international business in a global, online society.

Special thanks go to Wendy Leslie at Xceltranslate (xceltranslate@yahoo. com), professional proof-reader and French-English translator, who edited the chapters of this book.

ARTICLE I

COVID-19:
TIME TO PUT THE 'HEALTH' AND 'CARE' BACK INTO HEALTHCARE

WENDY LESLIE

Abstract

The COVID-19 virus has rapidly and dramatically impacted the world in literally every area of life: social, economic, political, environmental, behavioural, mental and physical health… provoking deep and far-reaching changes, the full impacts of which remain as yet unknown. It has engendered overwhelming feats of methodological and practical changes within the space of months, which would otherwise have taken years to develop and implement. 2020 has, of course, placed our healthcare systems firmly in the spotlight. This chapter sets out the pressing case for a long-overdue overhaul of our global health systems, presenting themes inductively drawn from qualitative semi-structured interviews of key actors in the healthcare and data sciences sectors which identify the main axes for shaping new transformative models. Healthcare must shift towards preventive, integrated and decentralised care as far as possible: a biopsychosocial interdisciplinary approach combined with, in practice, exploiting data sciences for decentralised provision of care underpinned by centralised multidisciplinary information systems.

Introduction

Little did we know merely a year ago how 2020 would be marked by something as huge and far-reaching as the emergence and spread of COVID-19, bringing global markets to their knees. A phenomenon unprecedented in our lifetimes: over 3 million deaths so far and counting. 2020 is being named the *annus horribilis*, also punctuated by vast forest fires in Australia, Brazil and the USA, flash floods, and deep global

economic downturn due to the pandemic (in October 2020 the IMF forecast a 4.4% global shrink in the economy, the worst contraction since the Great Depression of the 1930s (Global Times, 2020). As such, few things are foreseeable for the future.

2020 has of course firmly placed our global health systems in the spotlight, critically needed and yet demonstrably falling short. For those raising the alarm over decades of cost-cutting, this was a disaster waiting to happen. As an industry in which everyone has a stake, healthcare should be top of political and social agendas, but it has perhaps taken this emergency pandemic state to make it so.

Even before COVID-19, we could predict with confidence that certain critical issues would become increasingly urgent in the coming years: protecting the environment, sustainable development, our changing demography, feeding our growing population, and sustainable healthcare provision have all been firmly among these (and are moreover largely interrelated). Even our most developed healthcare systems in the West have been overburdened for years. This is set to deepen due to factors we know to be inevitable, notably our aging population, and increases in mental health and chronic conditions. And no one knows what implications COVID-19 will have in the longer term. Yet rather than a looming disaster, we must grasp this challenge, coinciding as it does with the increasing sophistication of data science, information system (IS) capacities and fast-paced technological advances, as a driver to overhaul the system. But to do this, we must know what we need from healthcare… and what is not working.

Putting the "health" and the "care" back into healthcare: "Can we collectively take this moment to spark and accelerate the radical changes needed? Can we truly disrupt the way healthcare is organized, distributed and delivered?" (Kimpen, 2020). An overhaul of our existing healthcare systems – indebted, unable to meet our exponential needs and widely mismanaged – is crucial and requires a fundamental change in our approach to health: from "concentrating on reactive care" (McCaman, 2016, Orion Health 2020), towards proactively reducing illness and associated costs: person-centred and value-based models (Outhwaite, 2020). Indeed, we now know that much of our health status is determined by lifestyle choices and behaviours. Even with COVID-19, chronic illnesses have hugely surpassed infectious diseases as the main causes of death in today's world, and the majority of these have significant behavioural and proximal risk components (Australian Institute of Health and Welfare, 2020).

Of course, finding data incorporating reliable COVID-19 mortality over time is a challenge today, but we do know that the virus is currently the third leading cause of death in America. More people died in the first 8 months of 2020 in the US than in any of the previous 50 years. Given the numbers (1.8 million reported COVID-19 deaths by 31st December 2020), we can position it among the top 10 leading causes of death worldwide, although non-communicable causes still lead. The UN called the 1 million deaths mark an "agonizing milestone" (UN, 2020), as someone dies of COVID-19 every 16 seconds. Beyond the virus, ischaemic heart disease and stroke are the biggest killers, accounting for 1 in 3 deaths in OECD countries, with cancer accounting for 1 in 4. The United Nations (2018) states that 41 million people die of 'preventable' chronic diseases every year: not forgetting that chronic illness entails not only high mortality but also lengthy treatment, disabilities and reduced quality of life (QoL). Awareness of this is shifting focus from merely treating the problem once it is manifest, to preventive screening and early diagnosis, and promoting healthy lifestyles, to curb the prevalence and severity of certain illnesses. But there is still much progress to be made.

"*I'm one of thousands to have long-term post-Covid symptoms. This crisis won't end with a vaccine*" (Prikash, 2020). It is important here to evoke emerging accounts of "Long Covid": long-term health implications reported by some who have been infected by COVID-19 (CDC, 2020). Only time will tell what Long Covid really entails, but it potentially signifies a crossroads between infection and chronic illness.

Simultaneously, data science techniques and tools are now sophisticated enough for us to derive all sorts of predictive information from data, while information systems are finally powerful enough to meet the needs of complex healthcare systems. As resources are increasingly strained, the advantages of using technology for preventive and curative healthcare are at least threefold: lowered costs, improved efficiency and increased QoL.

And yet, these remain woefully unexploited. The Future Health Index 2019 report (Philips, 2019) found that telehealth is not yet commonplace in healthcare professionals' daily work, with 39% not using it at all. Why is this? Dobbs *et al*. (2015) suggest humans are slow to adapt to change. We moreover base decisions on past experiences, a strategy now failing us in our rapidly changing times. Mannion and Davies (2018) furthermore highlight how healthcare organisations comprise multiple subcultures, which may undermine change due to a silo effect and complex layers of authority and influence.

On the subject of influence, a campaign by *Médecins du Monde* (2016), designed to lower the cost of medicine, bore the slogan "*Alongside real estate and petrol, what is one of the most profitable markets? Sickness!*" While controversial, this nevertheless highlights how the current model may suit certain influential stakeholders. Finally, as far as technology goes, Adler (2015) argues the computing power enabling data to be deployed in real-time has only recently become available. Now it is here, it is undoubtedly where the innovation of tomorrow lies. Although we have been slow to embrace change, COVID-19 arguably has the single merit that it is forcing change to embrace us.

Indeed, although the rising star of big data reached a plateau from 2015 onwards (Turk, 2016) it has come into its own in this pandemic in five ways: 1) predicting individual and community infection risks, 2) predicting patient outcomes, 3) monitoring hospital admissions, 4) identifying chemical/drug combination reactions, and 5) estimating real-time spread and forecasting future spread of the virus (Matthews, 2020).

To resume all this, Herzlinger (2006) describes three kinds of innovation in healthcare which are explored herein: 1) changes to how consumers use healthcare (we argue for preventive and decentralised care); 2) use of technology to develop new products and treatments to improve care (data sciences to screen and model illnesses); and 3) generating new business models for horizontal/vertical integration of healthcare activities (again, decentralised and underpinned by multidisciplinary IS). This chapter therefore sets out a systemic vision englobing all three kinds of innovation. It is structured as follows. It first presents a literature review and overview of the current context of healthcare in concept and in practice, followed by theoretical underpinnings. Then, qualitative research undertaken in the form of semi-structured interviews with actors in healthcare and data sciences sectors is presented, from which themes were inductively identified and developed to propose the main axes of focus for future healthcare models. Themes are discussed with theoretical underpinnings in the discussion section. A final section presents conclusions and recommendations.

Findings shape a new model of healthcare systems: a preventive, integrated, holistic and decentralised approach, fundamentally implemented in practice by data science and information systems (IS).

Literature Review

The Context: a Healthcare System on the Cusp of Change

Our healthcare systems have been in trouble-mode for a while, with change not aligned with the pace of increasing demands. In 2020, the lack of planning for a pandemic led to not only avoidable COVID-19 related deaths, but also deaths from other causes due to resources being funnelled to cope with the strain (Grady, 2020). We have limited supply faced with unlimited demand and the gap is widening (Feber, 2016). This has never been so evident as in 2020, as frontline healthcare workers put their lives at risk working with a highly infectious virus without proper protective equipment. At the time of writing this chapter, a third generally Europe-wide wave is in force, each lockdown motivated by doctors ringing alarm bells at the number of ICU beds being taken by COVID-19 patients (Drewett, 2020). Beyond COVID-19, the OECD paints a stark picture of the challenges facing healthcare systems. Almost one third of adults live with two or more chronic conditions (up by 50% since 2012). Health expenditure has largely outpaced economic growth and will represent 10.2% of GDP in OECD countries by 2030 (OECD, 2019). Moreover, the healthcare system wastes sizeable sums per year on missed prevention opportunities, with 90% of the US 3.5$ trillion health expenditure, for example, spent on chronic and mental health conditions, many of which are preventable (NCCDPHP, 2020). Notwithstanding the fact that we have no idea of the long-term implications of COVID-19. The need to make the system more efficient, and "put the 'health' back into healthcare" (Sturmberg, 2018) cannot be overstated: focusing on keeping people healthy rather than dealing with the significant consequences of illness as far as possible is win-win in health, QoL and economic terms. "*An ounce of prevention is worth a pound of cure*" (Martin, Lomas and Claxton, 2019).

Horizon 2030 (FNI, 2012) is a global project, developed further by healthcare professionals in France, advising on how healthcare systems must evolve by 2030. It highlights the need for analysing emerging needs, reducing hospital admissions through home-based and person-centred care strategies, and a shift away from illness as the sole focus of healthcare (Martin *et al.*, 2019). The project furthermore calls for increased interdisciplinary collaborative work to provide customised and integrated care solutions. It ultimately presents the case for decentralisation of many healthcare activities to streamline hospital operations, geared towards the most urgent and incumbent ailments. The pandemic highlights the advantages of reducing hospital admissions, thereby reducing the phenomenon of hospitals

becoming incubators of infection (the World Health Organization (2020) estimates that hundreds of millions of healthcare-associated infections occur per year).

The Role of Data Science

IBM heralded the need for models enabling "prediction, mitigation, preparation and response" driving disaster preparedness (O'Brien, 2015), models which can compare historical data on illnesses and treatment with specific patient data to support rapid and accurate decision-making. This is the vocation data science must adopt at the heart of the healthcare system: predicting all sorts of health outcomes in real-time, from huge amounts of objectively-generated data which are both generalised (population data) and customised (patient data), stored within one integrated system. Until very recently, this was an overwhelming target.

And yet, the technology is now here (Adler, 2015) with increasing incorporation of data science techniques in all sectors. Exploiting big data analytics in healthcare promises lower costs and improved health outcomes. Health-related data, held, shared and exploited within an integrated IS, will outline the architectural framework and define the majority of processes of our future healthcare systems. Healthcare has always generated huge amounts of data, driven by "record-keeping, compliance and regulatory requirements and patient care" (Raghupathi and Raghupathi, 2014). With the target now being to digitalise all this, the potential to support a wide range of healthcare functions is far-reaching, from real-time and facilitated communication across departments, to support for clinical decision-making (e.g. benchmarking data), disease monitoring and preventive health management in the wider population.

Data science is a field "at the intersection of social sciences, statistics, information and computer science and design" (Berkeley, 2020). In our knowledge- and information-intensive, and increasingly digitalised economies, huge amounts of data are generated. 'Data Science' refers to techniques and technologies which "make it economical to deal with very large datasets (big data) on the extreme end of the scale" (Pearlson and Saunders, 2012). By extreme, while the 'megabyte' we are generally familiar with is equal to 10^6 bytes, big datasets are rather in the order of exabytes ('EB' 10^{18} bytes) and zettabytes ('ZB' 10^{26} bytes), invariably stored in unstructured formats. Coined the 'big data problem', this was far too large for traditional data management tools to store, let alone manipulate. Specialised computers and software tools have only recently

been produced which enable us to store, share, search and analyse our fast-growing accumulations of data in a meaningful way (Adler, 2015).

Information Systems

An organisation's IS is central to nearly every process. It forms the backbone of operations and must reflect organisational strategy. The IS defines in practice how information is managed, organised and used. In healthcare, IS must adhere not only to organisational policies but also to government regulations, especially concerning confidentiality and security of patient information. It must also be designed to a large scale, storing information on millions of patients, in constant use by thousands of employees. This does not mean managers require in-depth knowledge of how their IS is developed or functions abstractly, but they must fundamentally be involved in shaping and understanding what it measures and ensuring its processes are meaningfully aligned to strategy and organisational objectives (Pearlson and Saunders, 2012).

Theoretical Underpinnings

Evidence-based decision-making: Factors such as globalisation, technological advances and the sheer pace of change in today's world are making the use of theoretical decision-making models, based on past phenomena, virtually redundant. Just to scratch the surface of this complexity, how can you possibly predict the future based on a past in which COVID-19 is entirely absent? This, indeed, is a major argument for embracing data science techniques. Dobbs *et al*. (2015) say our tendency to make decisions by extrapolating past experiences to the present is like looking in a rear-view mirror, which was more-or-less fine until recent years as "changes were incremental and somewhat predictable". Not so 2020! At the same time, Dobbs *et al*. (2015) say we are in a "golden age of instant communication and boundless information" and urge a shift towards evidence-based decision-making. The relevance of this in healthcare cannot be overstated. A rise in older people and chronic illnesses, as well as complex comorbidities, new diseases, new treatments, regular changes to policies and processes… our mainstream, traditional models cannot keep up. Exploiting patient information (data analytics) can identify trends and causal relationships as they emerge (on a population scale) and predict and model events and outcomes in real-time (on an individual scale) to support processes and decision-making. Arguably, such a seamless information system could have improved our understanding of COVID-19 to provide

coherent strategy and care more rapidly.

The biopsychosocial model & holistic approach: Healthcare has seen a major shift in theoretical paradigm in the past 30 years. Previously, the traditional biomedical model of health reigned unrivalled. This model views the health of the body separately to the psychological and environmental contexts of the individual (Yuill, Crinson and Duncan, 2010) and the patient is considered in terms of their symptoms and passively treated. However, Engel (1980) proposed the biopsychosocial model of health and illness, wherein interactions between biological, psychological and social factors determine the cause(s), manifestation and outcome of wellness and disease, and cannot thus be considered separately. The biopsychosocial model of health is now the posited model in academia and has led to increasing adoption of a holistic approach to health, whereby the person is seen as a whole, made up of interdependent parts, not merely the reductionist sum of their bodily symptoms, as shown in Figure 1:

Figure 1: Biopsychosocial Model of Health (Engel, 1980)
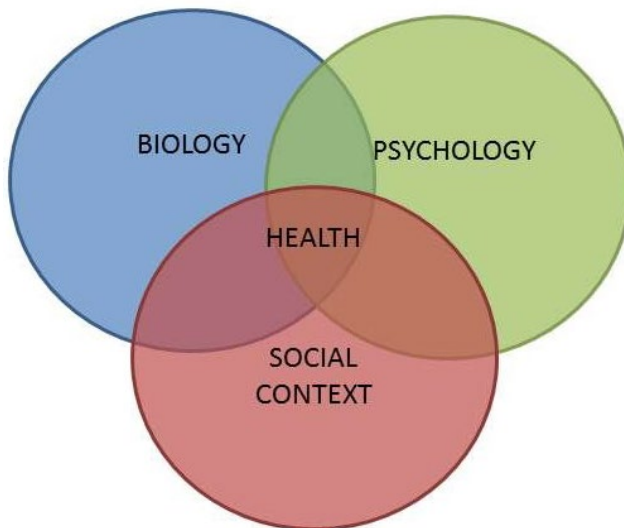
With the rising prevalence of chronic and mental health conditions, which do not respond as well to medical treatment as do infectious diseases, healthcare systems are experiencing the limits of the biomedical model and realising the significant influence of behavioural and environmental factors

on health, "the wider determinants of illness" (Outhwaite, 2020). Components of illness outcomes are proposed in Figure 2 below:

Figure 2: Factors Influencing Health Outcomes (Source World Economic Forum 2020)
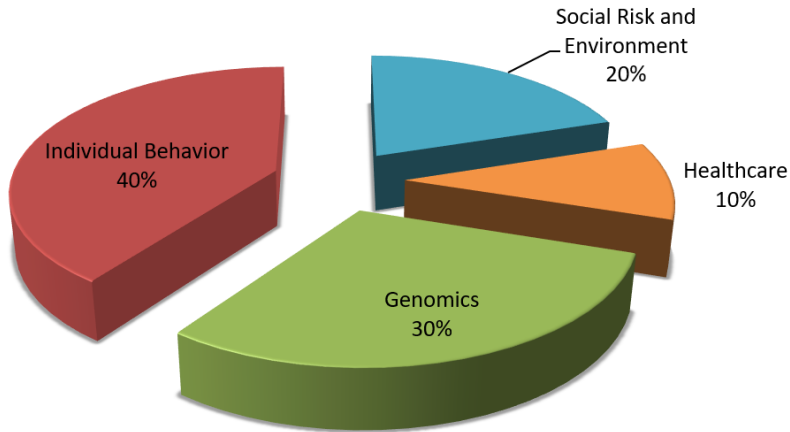

Figure 2 shows how behavioural, social and environmental factors account for 60 per cent of health outcomes. While the biopsychosocial model and holistic approach to health are now mainstream adopted positions in the Western world in theory, this is arguably not entirely true in practice. If it were, our healthcare systems would be investing more in preventive health measures, making individuals veritable *actors* responsible, to a significant extent, for their health status via informed behaviour and lifestyle choices. Indeed, many chronic illnesses should never develop in the first place. Given that we have sophisticated understandings of risk factors for many diseases, and that we now have the powerful technology and data science techniques to predict certain illness outcomes (and will increasingly over time), this is frustrating.

Crucially, truly adopting the biopsychosocial model of health expands the parameters for innovation opportunities exponentially. From a target audience limited to healthcare-related professionals, products and services, this now potentially extends to literally everybody in every area of their lives: from diet, exercise, sexual health behaviour, risk-taking and sleep hygiene patterns, to work, home and social environments. And in our COVID-19 times, to hygiene, social distancing, mental health awareness and beyond.

A Systemic Approach: The holistic approach to healthcare is becoming the dominant mainstream ideology in psychosocial sciences and is part of a much wider shift in perspective. In business, we adopt a "systemic" perspective, defining "transversal" and "interdepartmental" roles and functions. In academia, "multidisciplinary" or "interdisciplinarity" are used to explain phenomena which do not fall neatly in one domain. These are all dimensions of a new world perspective. Often called 'interdisciplinary thinking' (Kosner, 2011), this ideology assumes nothing is a static, independent object; we are rather interested in interrelated, interdependent, ongoingly and reciprocally interacting and influencing *processes* without silos and artificial boundaries. As such, we cannot explore one phenomenon outside of its environment or network. In the present research, we will see how all issues and avenues for opportunity are interconnected, thus the need for a systemic overhaul for effective change.

Systems theory (Adams, 2012) defines a system as a group of components interacting dynamically with an organised purpose, depending on the aim(s) and stake(s). The healthcare system is one of the most complex systems we have, with many stakeholders, disciplines and activities, steeped in regulatory constraints. Therefore, identifying problems and areas for change requires exploring highly complex networks of influence and processes within this system.

Stakeholders & Systems: Stakeholder theory (Freeman, 1984) purports that to measure, understand and navigate a complex universe comprising several actors (stakeholders), we must identify all parties having a potential vested interest in the 'stake'. They may be internal or external, including governmental bodies, political groups, trade associations, trade unions, communities, financiers, suppliers, employees, customers, and indeed competitors (Freeman, 1984). Grasping these links helps target those with influence, and determine, according to stakeholders' interests, how to generate value proposition and develop strategies around the stake, as well as not overlooking certain important factors and risks. Fundamentally, we are all stakeholders in healthcare.

The Agency for Healthcare and Research (2007) divides stakeholders into 4 distinct groups: patients, payers/regulators, service/product providers and manufacturers. While stakeholders can be internal or external, this does not define their degree of influence. For example, the government is external to the healthcare system and yet exerts much influence, in terms of regulations, funding and procedures of accountability.

Table 1: Breakdown of Healthcare Sector Stakeholder Interests (Source: Agency for Healthcare Research and Quality, 2007)

PATIENT	**"*Am I getting the best care?*"** - Convenient - Respectful, compassionate - Trusted information provided about choices - Lower out-of-pocket cost	**PAYER**	**"*Am I only paying for effective care?*"** - Lower cost - Predictability - Better outcomes

PROVIDER	**"*Am I being rewarded for good work?*"**
	- Better outcomes
	- Higher reimbursement
	- Increased volumes
	- More efficiency
	- Chance to innovate
	- Enhanced reputation
		REGULATOR	**"*Am I protecting public health?*"**
			- Safe and effective products
			- 2 types of challenge
			    - Not approve drugs later found to be dangerous
			    - Approving drugs in a timely fashion

EMPLOYER	**"*Am I getting value for money?*"** - Lower cost - Best care - Satisfied workforce/beneficiaries - Healthy & productive employees	**MANUFACTURER**	**"*Am I rewarded for safe and effective products?*"** - Improved patient outcomes - Recouping R&D investments - Fair and transparent coverage process - Clear evidence requirements

Table 1 above illustrates several areas of frustration where the current system is not meeting needs. With long waiting lists (Triggle, 2019), bed shortages and too-early discharges, patients may not feel they get adequate care. Service-providers must continually cut costs and meet increasingly demanding targets (Kutscher, 2014). Employers also face imperatives to cut costs and can see that neither patients nor staff are satisfied. Payers such as health insurance companies are undoubtedly seeing costs increase, which are difficult to pass on (Mathews, 2016). Regulators are seeing regulations

flouted due to overburdening (Triggle, 2019). Manufacturers of pharmaceutical products, medical devices, etc. are also seeing budgets squeezed, with less returns on often heavy R&D investment (Tidd, Bessant and Pavitt, 2015). This has all made for the ticking time bomb of this pandemic (and there may be more): when you constantly increase targets and reduce budgets, the likelihood of error, dissatisfaction and fatalities is heightened.

Data Science in Healthcare: Data science is an interdisciplinary field, spanning mathematics, programming, statistics and domain knowledge (Adler, 2015). It requires conducting sophisticated and systematic analyses to extract insights from data sets to predict future trends and identify strategic opportunities.

Data science is entering every domain but moving much faster in certain industries than others. One could be forgiven for thinking healthcare is a less attractive business sector than finance, say. We are regularly reminded of health budget shortcomings and cost-cutting drives. It is furthermore an extremely complex system, spanning geographic regions, disciplines and structures, from hospitals to hospices to GP clinics. It is a system governed by many regulations and structures of accountability, not ideal for innovation which thrives on flexibility. However, the principle of Jugaad (Radjou, Prabhu and Ahuja, 2012) would beg to differ. Jugaad describes a bottom-up, frugal and flexible approach wherein successful innovators find opportunity in adversity, targeting environments characterized by scarcity of resources, ineffective infrastructure, poor governance, constrained purchasing power, etc. to offer low-cost solutions. New healthcare models can respond to challenges with "better-faster-cheaper" value propositions.

Table 2: Feber's 7 Steps of Big Data in Healthcare Systems (Source: Feber, 2016-bis)

1) SOURCES	Physiological measurements are health data sources.
2) COLLECTION	Regularly monitored, gathered, centralised.
3/4/5) MODELS/ ALGORITHMS/ ARTIFICIAL INTELLIGENCE	Analysts feed data into a model they conceive to reflect their understanding of X health phenomenon. Algorithms/AI are based on past data and support the model by: - automatically calculating processes and predicting outcomes - modelling scenarios e.g. epidemic, drug reaction
6) DECISION-MAKING	Data science tools rank options according to effectiveness.
7) PROCESS AUTOMATION	Repetitive processes: orders, scheduling, communiqués…

Table 2 above ultimately demonstrates the central role of people in a system. People define the data sources needed and how they can be meaningfully measured (Pearlson and Saunders, 2012), design models and algorithms, and select appropriate decisions considering options proposed and context. Not forgetting that data is derived from, and applied for, the benefit of humans. Data science therefore does not replace humans, it rather enriches their roles.

Methodology

Semi-structured interviews were conducted with 9 participants in various healthcare and/or data science related professions. In accordance with Grounded Theory (Glaser, 1992, in Charmaz, 2001), this qualitative research took an inductive approach, exploring data thematically to identify (rather than confirm/infirm) relevant ideas and concepts.

Research questions directing the semi-structured interview were purposely loose:

- What are the most pressing challenges facing your sector today?
- How has COVID-19 impacted your sector?
- What are the most impactful avenues for innovation?
- How can information technologies, IS infrastructure and data science be used to support healthcare systems?

The aim of these interviews was to identify overarching themes from first-hand sources in various roles and organisations.

Sample

Table 3: List of Respondents

Dmitri Adler	Founder of Data Society, US
Peter Boyd	Business Intelligence & Biomedical professional, FR
Alan Bruce	Key Account Manager, Plant-Based Health, EU/US
Sarah Dick	Account Director, JPA Health Communications, US
Lorraine Mitchell	Senior Commercial Manager, NHS, UK
Michael O'Leary	Occupational Therapist and CEO of Spectronics, AU/NZ
Lee Outhwaite	Financial Director, NHS Derbyshire & Finance Lead for the Derbyshire Sustainability & Transformation Partnership, UK
Jules Puttock	Integrated Care Pharmacist, NHS Lothian, UK
Sandrine Roussillon	Independent Nurse, Cardiac FR

Procedure

Respondents were selected opportunistically through the author's network, inclusion criteria being professional associations with data sciences and/or healthcare. Each respondent was made aware of the purpose of the interview and explicitly agreed to be interviewed, recorded and cited in the scope of this research.

Interviews were recorded using a voice recording tool, then transcriptions typed. Thematic analyses were conducted inductively from transcriptions according to Braun and Clarke's (2006) guidelines (familiarise, code,

develop themes, revise). The outcome was a clearly identified set of specific and overarching themes on current issues and opportunities in healthcare. Average interview time was 39 minutes (SD: 32-46 minutes).

Thematic Analysis and Discussion

Rich responses provided first-hand insights into current challenges and opportunities for future developments in healthcare.

Themes

Identified themes are organised and presented according to Table 4 below. It is essential, however, to underline the interconnected nature of themes evoked.

Table 4: Thematic Analysis of Interview Transcripts

		COST-CUTTING
1)		PREVENTIVE HEALTHCARE
	-	New Cost Structures and partnerships
	-	Prevention/Screening
	-	Efficiency
	-	Advancing clinical research
2)		DECENTRALISING CARE: AN INTERDISCIPLINARY APPROACH & INTEGRATED IS
	-	Bridging the gap: training and making systems accessible
	-	Integrated care systems and partnerships
	-	Communication and knowledge-sharing
	-	Decentralisation
3)		DATA SCIENCE & IS UNDERPINNING HEALTHCARE
	-	Real-time, integrated IS and some automated processes
	-	Democratisation of IT
	-	Evidence-based decision-making, customised care
	-	Innovation
	-	Leadership for Change
	-	Training
		ETHICS
		COVID-19

1. Cost-Cutting

(CEO Spectronics, ILT) "*costs are skyrocketing and are unsustainable.*"

(Senior Commercial Manager, NHS UK): "*healthcare operates in a different world now where it's business-minded rather than patient-minded. The main issue is cost. Populations grow, communities grow, and systems don't grow because the money isn't there.*"

Unsurprisingly, cost-cutting is a leading strategy driver. The dichotomy is the balance between cost and improving patient outcomes. With strained resources, it is not difficult to understand reluctance to invest financially in new measures which require significant outlay upfront, for an integrated IS, digitalisation, training, service provision, etc. Moreover, redesigning business processes requires taking people away from their functions to dedicate themselves to training and implementation (Champoty, 2006).

(Key Account Manager, Plant-Based Health): "*The tricky thing about the healthcare industry is it's a very long-term sell. The company at the same time has to meet shareholder requirements, which tend to be short-term.*"

This raises the issue of reluctance to enter the healthcare industry because the engagement and R&D investment required for healthcare projects are often long-term, ill-matched to short-term gains strategies of shareholder-led companies.

New Cost Structures & Partnerships

(Key Account Manager, Plant-Based Health): "*focus on long-term partnerships where you add value, provide a service: sharing marketing information, information on clinical studies, developing products and services based on trends in the marketplace*".

New cost structures meaning the initial outlay at least is absorbed should be explored. Bierbaum (2015) describes a vision away from traditional linear and transactional healthcare business relationships, towards "performance partnerships integrating suppliers deeply into the care system" to spread costs and encourage long-term commitment to value creation. Dobbs *et al*. (2015) also argue the need to forge new, more seamless networks of communication: partnerships with information technologists, public health and policy experts, patient advocates and healthcare companies, so that representatives of all stakeholder interests pool their expertise and develop an overarching infrastructure. Financial allocations must be transparent, so

everybody in the system recognises and approves their uses (Outhwaite, 2020).

Prevention/Screening

(CEO Data Society): *"...predicting events: absolutely what will save the most in healthcare costs. Predicting a heart attack or disease. There's a whole host of methods: classification, clustering, network analysis."*

If data exploitation can focus on preventing ill-health, the value proposition is attractive to individuals in terms of QoL, and for healthcare generally in terms of hospital admission avoidance, economy of resources and reduced treatment costs.

(Key Account Manager, Plant-Based Health): "*Healthy lifestyle choices and how to look after yourself need to be relevant to the individual: things they can achieve in their daily lives. We can understand this by monitoring consumer data.*"

Healthy lifestyle choices which are easy to integrate into daily life are key to uptake and success.

(CEO Spectronics, ILT): "*I see huge potential for personal health monitoring, early diagnosis and intervention. This should curb increasing health costs and increase life expectancy and QoL.*"

COVID-19 track-and-trace mobile applications are obvious examples of population-level health monitoring technologies. Wearables are also increasingly popular. As an example (beyond the common watches tracking heartrate, calories and step count), Intel has created wearable technologies for those genetically at-risk of developing Parkinson's disease. This is a particularly cruel affliction in which up to 80% of the brain's dopamine cells will have been obliterated before any noticeable symptoms manifest. Intel's wearables have a dual purpose: the can both alert the wearer if they are predisposed to the disease long before noticeable symptoms, and feed physiological data into a central hub for analysts to study, hoping to find a cure (Feber, 2016).

Efficiency

(CEO Data Society): "*narrowing down the diagnosis faster, having a physician freer, will increase the number of patients they can see on an hourly basis. It makes us more efficient.*"

Evidently, cost-cutting cannot be indiscriminate and requires systemic changes to streamline the system. An example of a company aiding faster diagnosis and prevention is Counsyl (Myriad Women's Health, 2020), a screening tool which gathers data through genetic testing for, e.g. inherited cancer. If an individual is found to be high-risk, they can elect to have frequent screening, preventive surgery, etc. and this data can be integrated into a centralised healthcare database, reducing prevalence of more serious illness and costly in-hospital treatments. Such data ultimately aid predictive analytics to identify at-risk demographics.

(CEO Data Society): "*Depending on what you know to be statistically true, you can have people who are less qualified, when it isn't a serious illness. Being able to do that triage more effectively will lighten the load.*"

The European Commission (2019) supports this, saying that shifting tasks from doctors to nurses or other healthcare professionals can alleviate cost pressures.

(Senior Commercial Manager, NHS UK): "*then if you are having to be treated and hooked up to machines, those machines programme straight into the central record for future preventive care*".

Respondents broadly evoked the need for a centralized system of information sharing to render the system more dynamic and efficient through communication and feedback, whether this be the healthcare system IS or a partner service-provider.

The CEO of Spectronics, however, raised a word of caution: "C*omputer generated, stored and transmitted patient records. This does little to quell demand, and probably increases it: let's test for everything!*"

Is there an over-reliance on health monitoring the more precise it becomes?

Advancing Clinical Research

D. Adler: "*you can model proteins in a much more predictive way. So, you can have a computer do a simulation, which is a lot cheaper, and narrow the field of things you actually test.*"

Predictive modelling of biological processes and drugs will become more mainstream, storing and leveraging the clinical and molecular data we generate (Cattell, Chilukuri and Levy, 2016).