Reading notes

Brussels, 20/12/2022

To the attention of the
Health and Care Cluster of Large-Scale Pilots

Subject: Digital platforms and digital ecosystems in healthcare - Towards a more open and integrative approach

This note provides a selection and consolidation of the relevant extracts from two reports analysing the **digital platform market in healthcare**[1]. Rather than using many direct quotes from the original documentation, areas of work are often adapted or interpreted.

- A report from Roland Berger, an international management consultancy, entitled "Future of health 2 / The rise of healthcare platforms"
- An OPEN DEI position paper of May 2022 entitled: "*An analysis of drivers and barriers for the Uptake of Digital Platforms in Europe*"

Relevant extracts from

"Future of health 2 / The rise of healthcare platforms

Roland Berger | September 2020

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1. Introduction: Digital platforms

In its report, Roland Berger, international management consultancy, stated with regard to **digital healthcare platforms**:

"*There is little doubt among experts that platforms will also transform the healthcare sector in the coming years. Industry platforms already integrate healthcare services and different technologies to provide a customized, end-to-end solution for users and patients. Applying new business models, they enable an improved customer experience with easy access to different services and treatments, greater efficiency and – in theory, at least – improved outcomes.*"

The report classifies the different platforms found in healthcare according to the following **four categories**: pure data, platforms with horizontal integration, platforms with vertical integration, and integrated meta-platforms.

- **Pure data platforms** create value out of collecting and analysing large amounts of data, which is then used to improve diagnoses and generate personalised treatment plans, as well as better and more tailored products and services, ultimately leading to better outcomes. Pure data platforms also enhance patient engagement.

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[1] The OPEN DEI position paper covers three domains in addition to healthcare: manufacturing, energy, and agri-food.

- **Platforms with horizontal integration** generally focus either on a specific indication, such as cancer or diabetes, or on a specific treatment setting, such as health management within companies. They support users along the entire patient journey.
- **Platforms with vertical integration** do not focus on specific indications but integrate different steps along the value chain or patient journey. Quite often, they connect players from different parts of the healthcare value chain, such as pharmaceutical companies with pharmacies or telemedicine providers with hospitals. In this way, these types of platforms support collaboration across disciplines and specialties.
- **Integrated meta-platforms** operate on an even larger scale than the previous three types. They interlink most of the players in a specific healthcare system and are therefore both vertically and horizontally integrated. Some integrated meta-platforms are combined even more intensively since they encompass a country's entire public health system.

How does the healthcare industry see **platforms** developing in the period up until 2025? To find out what industry insiders think, Roland Berger carried out a survey of more than 500 experts.

Contrary to expectations, survey respondents believe that **platforms offering specific services** are likely to continue to play a major role in the year 2025. (It may be that Europeans prefer highly specialised, personalised services, and would not accept the dominance of a single, government-monitored meta-platform, such as Tencent or WeChat used in China.)
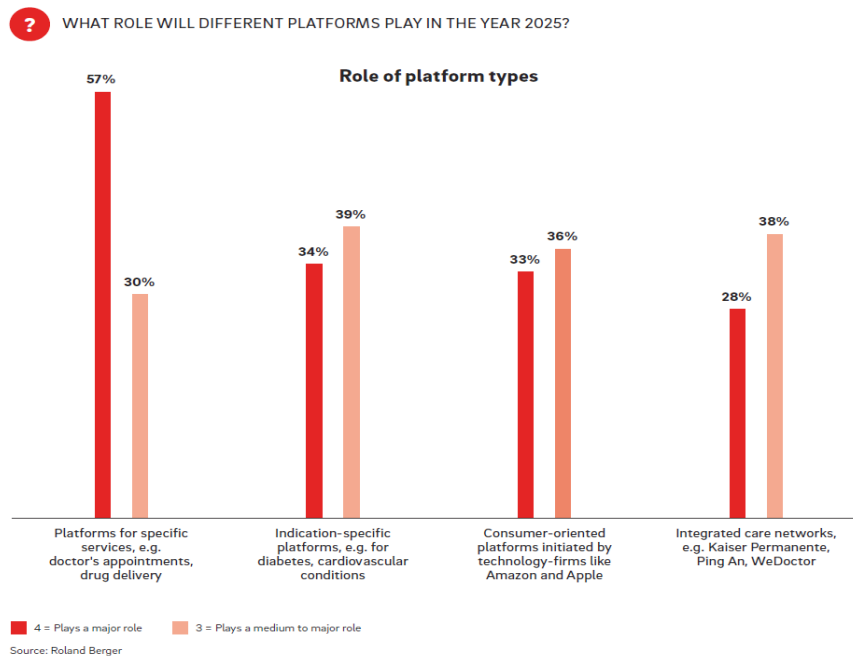

Figure 1: Platforms specializing in specific services are expected to grow (Source: Roland Berger, 2020)

Relevant extracts from

[An analysis of drivers and barriers for the Uptake of Digital Platforms in Europe](#)
[Open Dei] Position Paper | May 2022

2. Digital platforms and the ecosystem economy

The **vision** of International Data Corporation (IDC), a market intelligence company, of the **Future Enterprise** is of an organisation that underpins business processes with technology, is fuelled by innovation, is platform-enabled, and is ecosystem-centric. For the purpose of the IDC discussion, what is important is the fact that the organisation is enabled by **a platform** and is **ecosystem-centric**.

Essentially, ecosystems are seen as the foundations for future **economies**. Hence, it is important to assess the role that digital **ecosystems** and digital **platforms** play in this process, the **scaling-up** of these systems/platforms, potential elements of **disruption** (e.g., the Covid-19 pandemic), and a variety of **other developments** in fields related to data, values, investment, and infrastructure.

Digital ecosystems will play a critical role in the years ahead for organisations. The ecosystems are described as having at least the following **characteristics**. They need to have **a supporting cast of partners** that function as a scalable extension of the organisation(s), as well as acting also as a source of data and insights, a co-developer of applications, and a provider of shared operations.
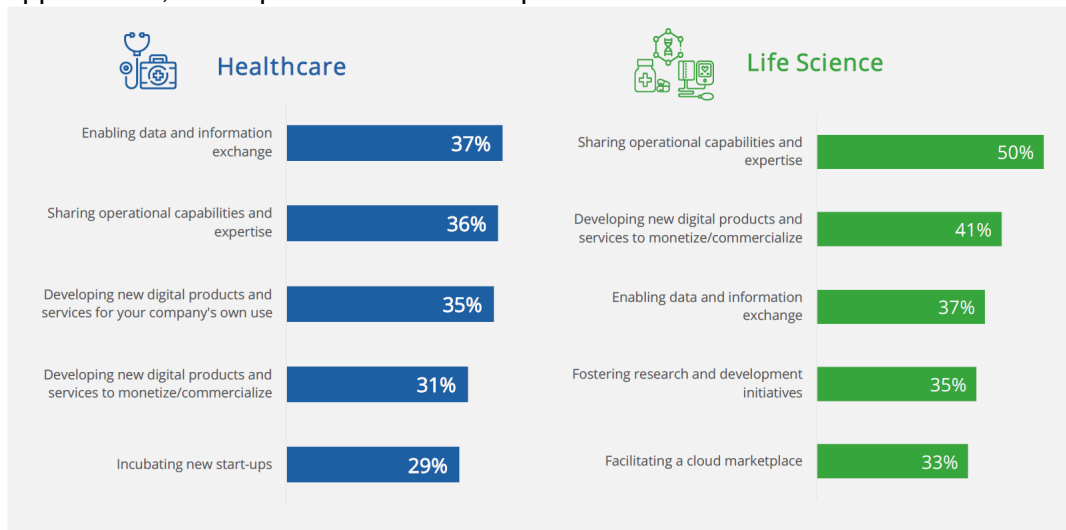

Healthcare		Life Science	
Enabling data and information exchange	37%	Sharing operational capabilities and expertise	50%
Sharing operational capabilities and expertise	36%	Developing new digital products and services to monetize/commercialize	41%
Developing new digital products and services for your company's own use	35%	Enabling data and information exchange	37%
Developing new digital products and services to monetize/commercialize	31%	Fostering research and development initiatives	35%
Incubating new start-ups	29%	Facilitating a cloud marketplace	33%

Figure 2:Primary focus of digital ecosystem in Health & Care organizations[2]

Platforms can be described as **virtual environments** facilitating the exchange and connection of data between different organisations through a shared reference architecture and common governance rules[3]. By linking together different actors that are interested in

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[2] IDC EMEA, European Industry Acceleration Survey, April 2021 (Healthcare and Life Sciences)
[3] In OPEN DEI Task Force 1, the focus has been on platforms (and their building blocks) which facilitate the emergence of a Data Space (hence, with a focus on data rather than services). A number

sharing information in the form of data, digital platforms constitute **a composite business ecosystem** which combines players from disparate backgrounds: they foster the creation of both new data-driven services and innovative business processes.

The **scaling-up** of digital ecosystems will require a number of **developments** on the part of digital platforms. They will need to deliver scale and speed, as well as federate data from connected products, assets, people, and processes. They will have to do this in combination with **adequate governance models** that are sufficient to foster trusted collaboration among partners.

The **Covid-19 pandemic, and its aftershocks**, created situations of uncertainty. Many of these uncertainties are still ongoing. The Covid crisis, however, unmasked **problems with data** and made them visible at scale, i.e., it showed just how information that is poorly integrated and often unreliable can impact healthcare systems negatively. In many cases, the pandemic exposed what were in fact longstanding problems and weaknesses; these had simply not yet been exhibited openly or tested by a massive, global (health) crisis.

Hence, the **accuracy and exactitude of data** is clearly important as are the (digital) platforms on which the data flows. For healthcare systems to deliver high quality, personalised and integrated care services along the patient journey, the **key players in the health value chain** now need to rely on digital platforms. These platforms are to provide the technological infrastructure and capabilities to support the delivery of healthcare services, and drive innovation across the health ecosystem. Indeed, the platforms would be able to leverage more informative and up-to-date quality information that is obtained based on a high degree of trust among patients and healthcare service providers (and their partners). That trust is (to be) based on the lawful and ethical use of healthcare and other forms of data.

A shift is therefore occurring in healthcare systems. Healthcare systems are evolving towards a **value-based healthcare paradigm** that aims to shift (healthcare) business models from processing volumes of activities and single patient encounters towards the provision of patient value. (Patient value is defined as the ratio between clinical outcomes and experiences, measured against the related costs, across the whole of the patient journey.) Healthcare systems are therefore moving towards the provision of care services that are more **personalised** and, at the same time, more **integrated** across the whole patient journey. Thus, each organisation in the (healthcare) value chain has a role in **creating value for patients**, and needs to work with the other stakeholders in the chain to maximise this value.

Because of the complex and interdependent character of health determinants, governments have responded to the challenges they pose in a variety of ways. **Governments have invested** in the creation of common digital infrastructures, as well as in the development and the deployment of interoperability and security requirements. These investments have enabled the growth of **digital platforms** aimed at sharing data and insights, capabilities, skills, and processes.

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of fundamental functions are common to all platforms (whatever their focus). This commonality is reflected when "reference architectures" are discussed.
The Large-Scale Pilots of the Health & Care Cluster are also "platforms" but with a focus on use cases. Their specificity is indeed their capacity to orchestrate the key functionalities capable of supporting a diversity of use cases. They often make use of other (technical) platforms (such as the proposal by FIWARE e.g., for the Internet of Things).

The development, over several decades, of various advances, such as shared electronic healthcare records, health information exchange networks, public health registries, as well as solutions for electronic identity (eID) and trusted data services, have laid down both the foundations and the rules for the growth of **digitally-enabled healthcare ecosystems**.

3. Data at the core of the healthcare ecosystem

Data is at the core of any **healthcare ecosystem**. Hence, many governments across Europe have been working towards creating hubs of dedicated infrastructure resources, services, and skills for facilitating data-sharing and the secondary use of data. These **health data hubs** are meant to provide **trusted environments** for healthcare data management, governance, use, and mitigation of the barriers to data-sharing.

Through these initiatives, governments aim to:
- enhance **data quality, interoperability, and portability** through greater standardisation, common data management, and data quality audit technologies and services;
- increase **transparency and visibility** of available healthcare data, driving new opportunities for innovation as well as informing population health management policies in more effective ways;
- mitigate the **reputational and regulatory risks** defining procedures and lawful and ethical health data processing, as well as providing advanced cybersecurity and privacy-enhancing technologies as a service;
- provide economically **affordable, innovative, and trusted data environments** in which research and start-ups can innovate (e.g., data sandboxes, the provision of artificial intelligence (AI) capabilities and expertise);
- foster a **data-sharing culture** by aligning incentives between data creators and users through the provision of specific programmes and funding mechanisms.

4. The technology foundation of the digitally-enabled healthcare ecosystem

Healthcare ecosystem digital platforms are based on at least **four key solutions-enabling technologies**. Examples include:

- **Data management and governance technologies**: these technologies foster the transition toward systems of trust that enable and accelerate research and innovation, and permit the expansion of healthcare services delivery through digital means. The technologies create a shared infrastructural layer for data integration, access, protection and governance (intended to manage the behaviours of people and processes) while maintaining compliance with data-enhancing privacy protection and regulations;
- **An intelligent core**: this core can include cognitive computing, AI, and machine learning solutions;
- **Agile, cloud-based architectures**: these architectures can enable ecosystems to scale rapidly and efficiently, and include new technologies and partners when they are needed;
- **Standardisation, interoperability, and API strategies**: these approaches orchestrate the exchange of data across the ecosystem, the different applications, and use cases. Data integration strategies need to consider the specific requirements and rules that govern healthcare data so as ultimately to ensure quality and safety for patients.

There are several key elements of these digitally-enabled ecosystems, based around a "**health intelligent core**", that render the ecosystems scalable, interconnected, autonomous, and efficient.
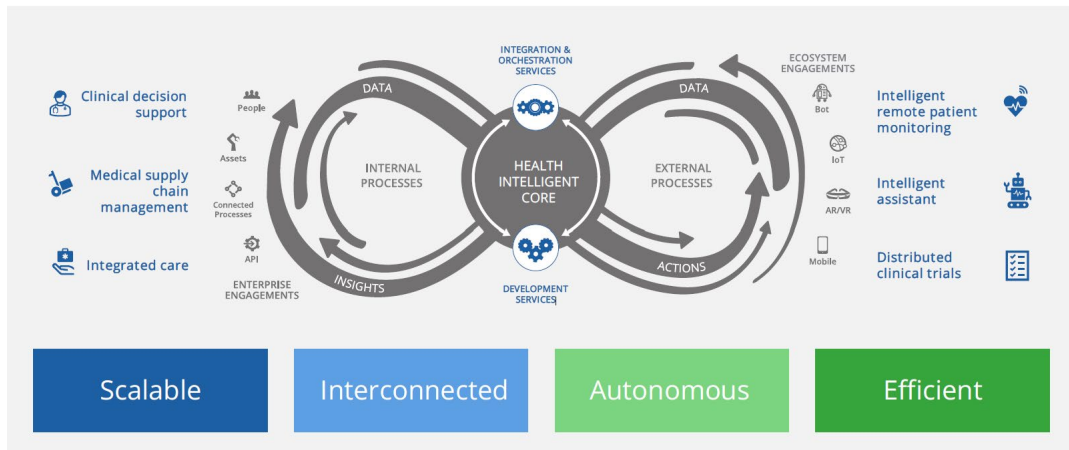

Figure 3: Main technological building blocks for health ecosystems

5. SWOT analyses of the role of digital platforms in digital transformation

In a SWOT analysis (see figure below), the OPEN DEI position paper provides a "big picture" of the status of the **digital platform market**. While this SWOT is dedicated to the adoption of healthcare digital platforms, the position paper also offers a similar analysis for three other domains: manufacturing, energy and agri-food.

Figure 4: SWOT analysis for digital platforms adoption in healthcare

The position paper's analysis and observation of the SWOTs in these four domains show a number of **commonalities** among the domains analysed.

As a result, while there are factors which are related to specific domains (i.e., "they are domain-based"), there are **other factors which are common across different sectors**. Thus, the drivers and barriers can be considered as **cross-domain drivers and barriers** for the adoption of digital platforms in general.

The position paper portrays these factors in the format of a **cross-domain SWOT analysis.** This overall SWOT analysis could be considered to be a **"reference SWOT"** for digital platforms in different sectors.
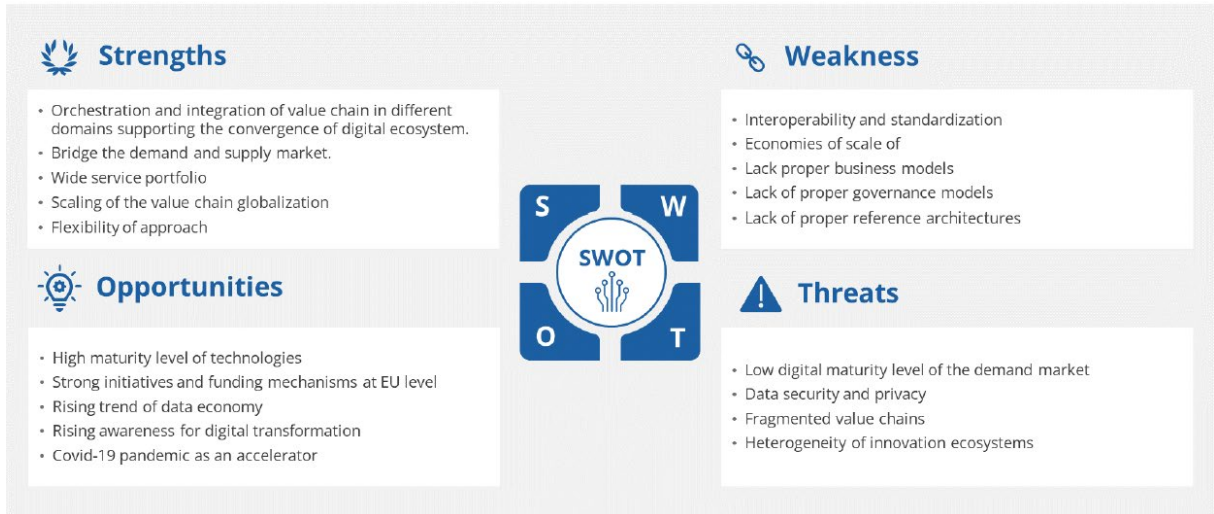
Figure 5: Cross-domain SWOT analysis for digital platforms adoption