Unlocking the full potential of data and analytics in pharma

A perspective on design best practices for building a data and analytics operating model

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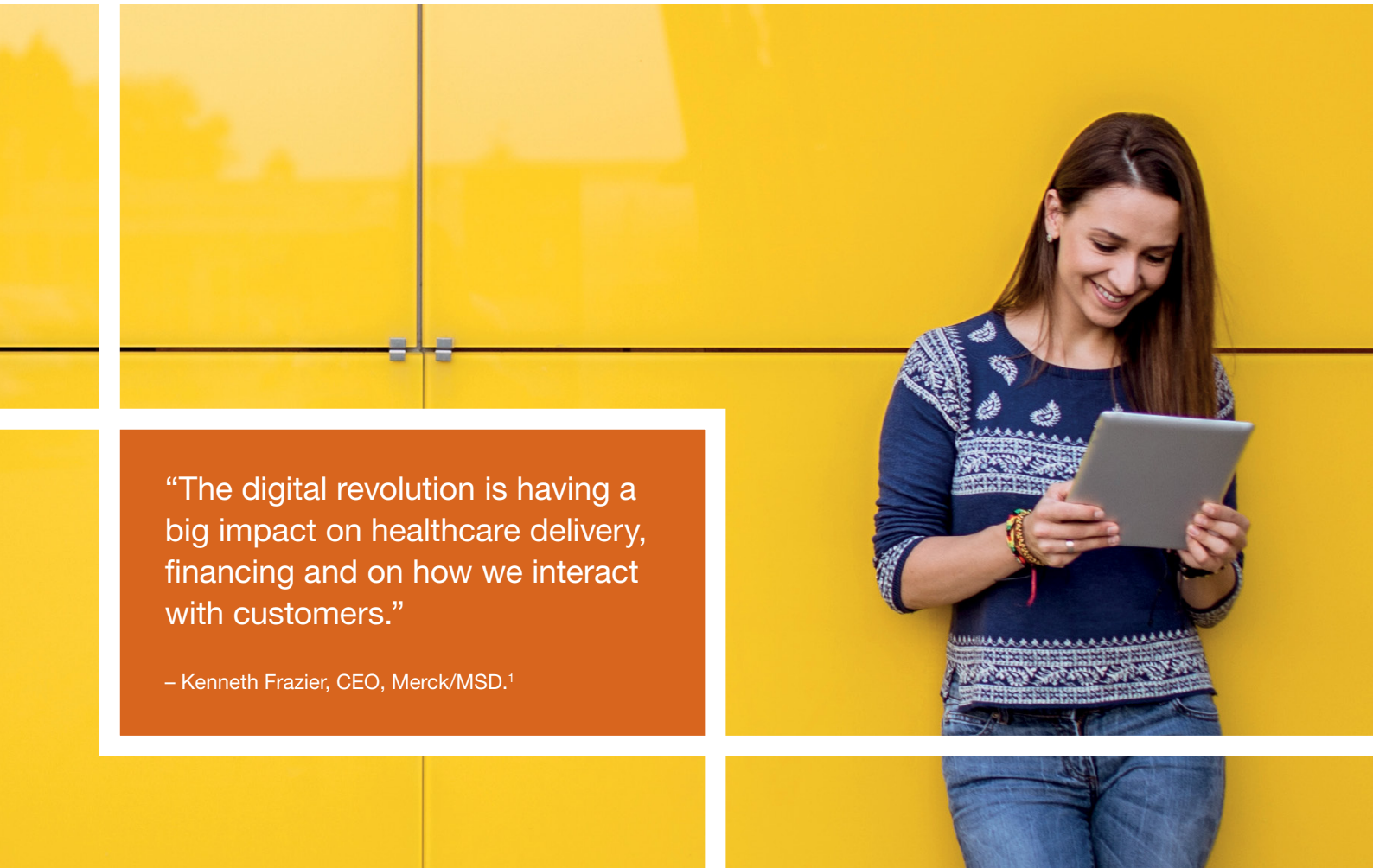


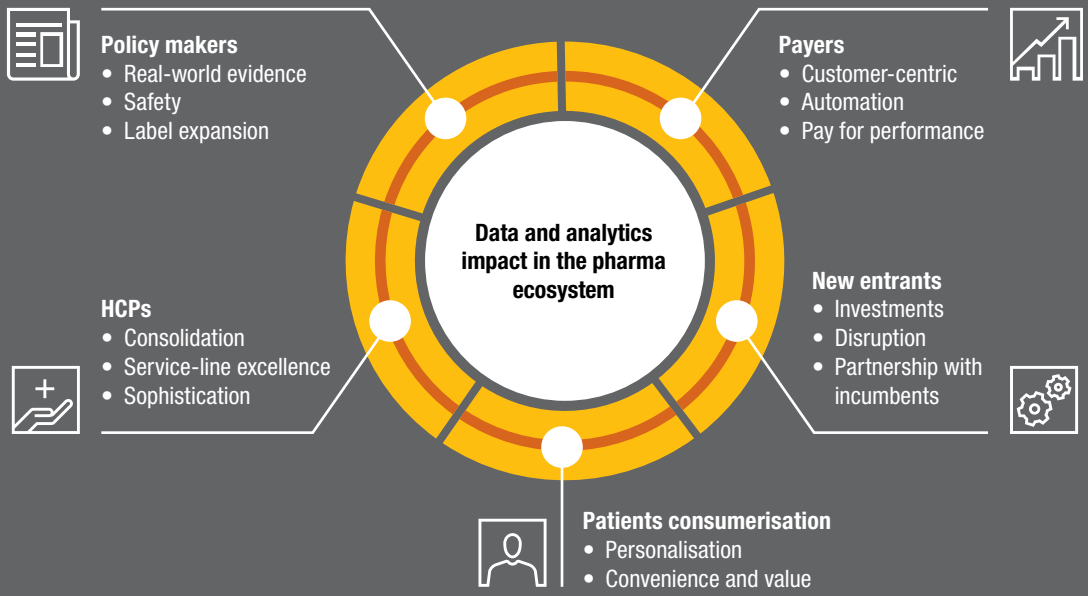
"The digital revolution is having a big impact on healthcare delivery, financing and on how we interact with customers."

– Kenneth Frazier, CEO, Merck/MSD.[1]

1. The increasing challenge of data and analytics governance in pharma

1.1 The analytics transformation and why it's on every pharma company's CEO agenda

Exhibit 1: Data and analytics impact in the pharma ecosystem



Data and analytics are effecting fundamental changes in how the pharmaceutical industry operates (see Exhibit 1). The availability of data and widespread digitalisation have influenced how all key stakeholders interact with or use pharmaceutical companies' products. At the same time, greater reliance on data has presented an additional layer of complexity, opening the industry to a wider range of stakeholders, many of which are data-natives or harness data as a key source of value generation.

Patients are increasingly willing to use digital channels to engage in their wellbeing, with the pandemic creating an additional push towards digital health. Today, for example, 59% of all adults in the US access health information online,[2] with 65% of patients expressing a willingness[3] to have virtual appointments via video sessions. Additionally, 52% of all mobile phone users gather health information through their devices.[4]

Health care professionals (HCPs) are making greater use of digital resources. In the UK, for example, a digital start-up, Babylon Health, provides triage services. During the pandemic it assessed the needs of 31,000 UK patients with COVID symptoms, a task that would have otherwise fallen to HCPs.[5] HCPs are also increasingly willing to engage remotely with pharmaceutical companies, with 54% agreeing that remote engagement with pharma sales reps is either partially or wholly sufficient[6] to meet their needs.

Payers can use the wider availability of data to move towards outcome-based reimbursement models. Cigna, one of the world's major health insurance companies, has contracted more than 85% of its HCPs in value-based arrangements, with 50% of these even taking on two-sided (i.e. upside and downside) risks.[7]

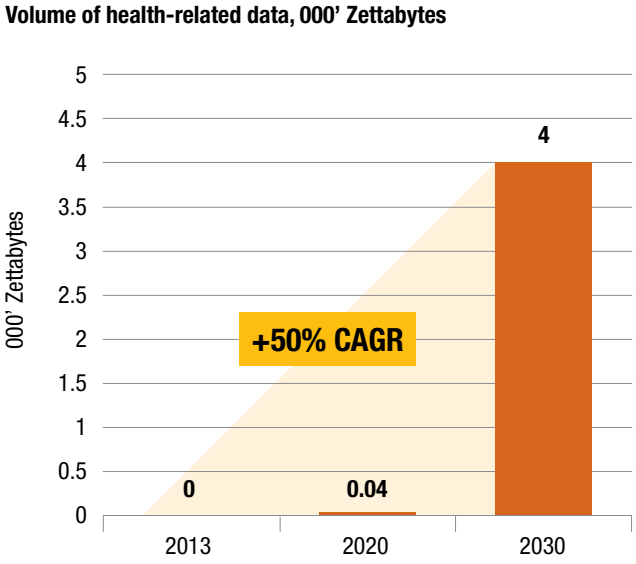
Policymakers will be able to make faster and better decisions in the future thanks to the increased availability of real-world evidence (RWE) data, particularly in the areas of regulatory approvals for new drugs or label expansions that are contingent on drug safety and efficacy. Furthermore, a shift towards digital channels for care may reduce the overall cost burden and improve quality.[8]

New entrants – from fast-moving startups to established technology players – are emerging in the healthcare space. In the US in 2020 alone, US$14.1bn of venture funding was dedicated to digital health[9] and the value of companies providing healthcare-relevant data soared. The US$3.5bn valuation of 23andMe, a DNA database enabling improved drug research for cell and gene therapy among others, is just one example.[10]

1.2 Recent developments and future expectations for analytics in pharma transformation

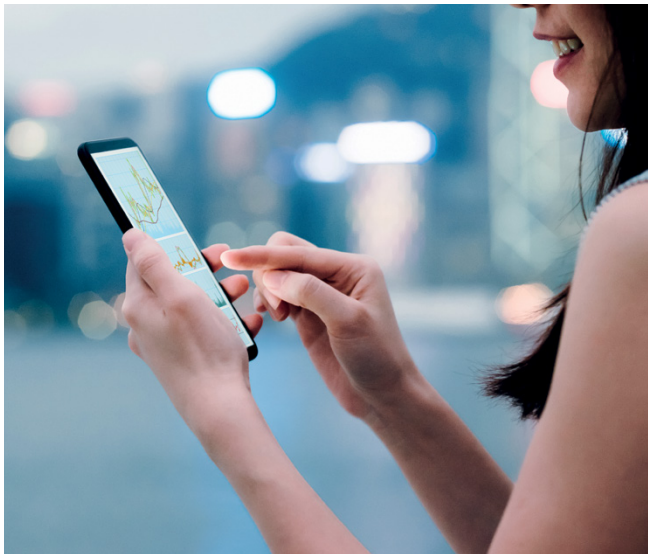
Healthcare data is growing at an unprecedented rate (see Exhibit 2). Today approximately 30% of the world's data volume is generated by the healthcare industry,[11] with the past decade seeing an explosion in the amount of available health data. While the innovation of previous decades focused on medical products and the delivery of historic and evidence-based care, the present is characterised by medical platforms focused on real-time, outcome-based care. The next decade will move towards medical solutions – using AI, robotics, and virtual and augmented reality – to deliver intelligent solutions for both evidence and outcome-based health, but focusing more on collaborative, preventative care.[12]

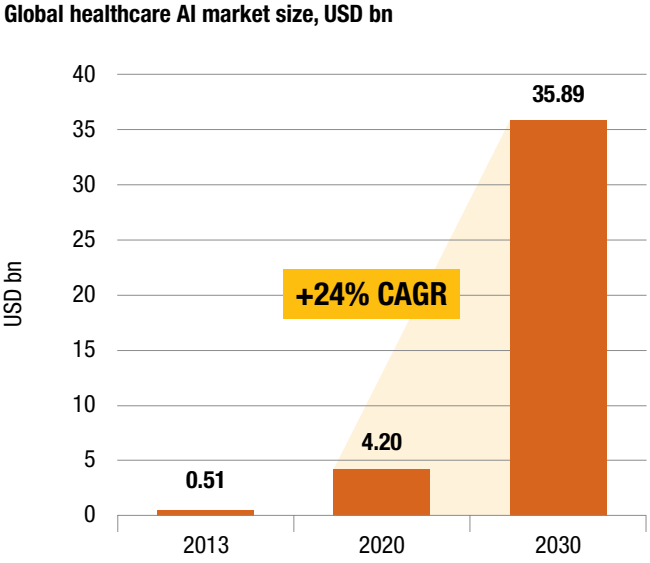
Exhibit 2: Volume of health-related data 2013-2030



The increased availability of data is enabling the development and application of AI-based advanced analytics approaches and tools. The global market for artificial intelligence (AI) in the healthcare industry has grown at an unprecedented rate and is expected to continue growing at almost 25% CAGR over the next 10 years[13] (see Exhibit 3).

Exhibit 3: Global healthcare AI market size 2013-2030





In the future, pharmaceutical companies will not only need to embrace digital and analytics in their business, but become leaders in applying these technologies to ensure the long-term viability of the pharmaceutical business model. Companies will need to collect, store and process data, and use analytical solutions to derive insights for efficient business decision-making. The data they collect will power a wide range of transformational analytics use cases across the entire pharma value chain.[15]

AI can, for example, improve the overall probability of product success by 5-10% in research and early development through improving disease state and target understanding, and lead optimisation. Clinical trial costs could be reduced by 10-15% through protocol optimisation, data-adaptive development plans, and/or improved trial planning and execution. In manufacturing and supply chain, AI can help to achieve significant savings through end-to-end supply chain planning, yield optimisation or procurement excellence. AI can also improve market access, commercial and medical performance (e.g. by 5-10% improvement in net revenue) through better understanding of real-world outcomes, gross-to-net optimisation and tailored customer engagement. Finally, data and analytics can also serve as a broader enabler, impacting areas such as improving human capital / organisational health, forecasting excellence or competitive intelligence to generate further organisational benefits.[16]

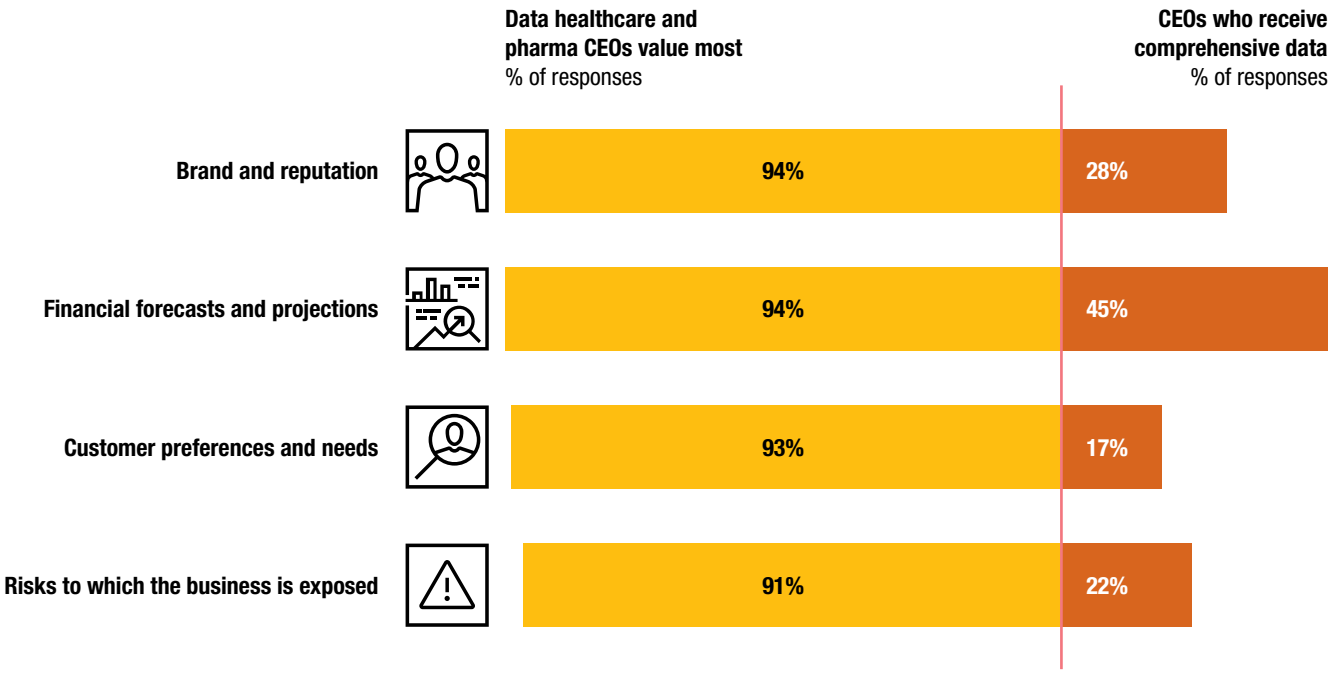
The huge availability of data and opportunities for analytics and insights also mean that pharmaceutical companies will be able to make decisions in different ways. To capture this opportunity requires people to change their behaviour. They need to understand the value of making decisions based on data and analytics and, based on that understanding, start doing things differently. Pharma companies need to empower this new mindset and behaviour by upskilling their people and structuring their organisation, processes and tools to empower their people to maximise the potential of advanced analytics.

> "The technology — whether it's digital, AI, cloud, data sciences, the Internet of Things — will be ubiquitous across healthcare going forward."
>
> – Alex Gorsky, CEO, Johnson&Johnson.[14]

1.3 The ever-increasing need for an effective data and analytics operating model

Despite data's acknowledged criticality, there's still plenty of room to improve how well pharma companies harness data and analytics to improve their decision-making. According to the 2019 PwC CEO survey,[17] most healthcare and pharma CEOs indicated that despite the vast volume of raw data available, precious little of this is translated into actionable intelligence that they can actually use. For instance, while 93% of CEOs say that they value data on customer needs and preferences, only 17% receive relevant comprehensive data[18] (see Exhibit 4). The factors that contribute to this information gap include data siloes, sub-par analytical talent and a lack of information sharing (see Exhibit 4). In order to overcome these barriers – and more – it will be crucial for pharma companies to develop consistent data governance and an effective operating model.

Exhibit 4: Data healthcare and pharma CEO survey responses on the topics of healthcare data



An effective data and analytics operating model is built on six foundational elements (see Exhibit 5). It starts with defining the vision, strategy and guiding principles that will provide the desired end-state and the foundation on which the rest of the elements will be built. Governance and organisation set the decision-making structure, while processes and activities establish organisational roles and responsibilities. The sourcing strategy determines the extent to which capabilities will be bought or built; the people building-block focuses on developing internal knowledge and capabilities, while platforms cover the development of core data and analytics use cases and templates.

Exhibit 5: The six building blocks of the data and analytics operating model

		Why is it important?
Operating Model	1. Vision, Strategy and Guiding Principles	• Understand the purpose of the data analytics operating model and set its desired end state • Define baseline principles which the data and analytics capability will lean on
	2. Governance and Organisation	• Define the decision-making structure on portfolio level • Set KPIs and targets • Size the resource requirement to deliver on the vision and strategy
	3. Processes and Activities	• Develop roles and responsibilities for all key stakeholders involved • Map the key operational processes • Develop a phrasing approach and the necessary decision gates
	4. Sourcing Strategy	• Develop the strategy to source the capabilities and tools • Identify the vendors and define the knowledge transfer approach
	5. People and Capability	• Establish the culture of knowledge sharing and community building • Design the training approach to attain the skills required
	6. Platforms	• Develop use cases for technologies • Build a toolkit and a template repository

"My vision is that, in less than ten years, every Takeda employee will be empowered by an artificial intelligence assistant to help make better decisions, enabling us to deliver transformative therapies and better experiences to patients, physicians and payers faster."

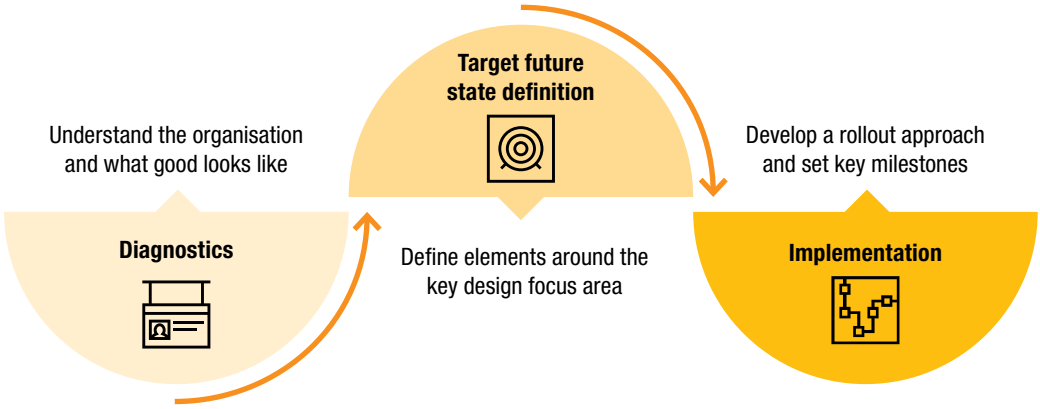
– Christophe Weber, CEO, Takeda.[19]

A number of converging factors mean a well-designed data and analytics strategy is imperative. These include industry-wide digital disruption, the increased abundance of healthcare data, and the double-digit growth in the interest in analytics/AI solutions within healthcare. Yet, a strategy cannot be realised unless the implementation is there to support it. That requires an effective and scalable operating model tailored to the needs of analytics and data. This will play a critical role in determining the successes and failures of the pharmaceutical industry in the decade to come. Those companies that can implement successfully will be able to elevate their decision-making, create new solutions and deliver experiences that will shape the future of healthcare.

2. Best practice data and analytics operating model design approach: examples from life sciences

The process for designing an operating model spans three key stages: diagnostics, target future-state definition and implementation (see Exhibit 6). The goal of diagnostics is to understand the organisation's operating model as well as understanding what good looks like by identifying leading practice examples from peers. Once the current state and relevant benchmarks are known, the target future state can be defined around the appropriate dimensions of the six key building blocks of the operating model design (Exhibit 5). The defined target future state then needs to be implemented through a robust and clear approach to rollout.

Exhibit 6: Operating model design process



The two examples below demonstrate best practice approaches within the pharmaceutical industry for conducting diagnostics and defining target future state for data and analytics operating models.

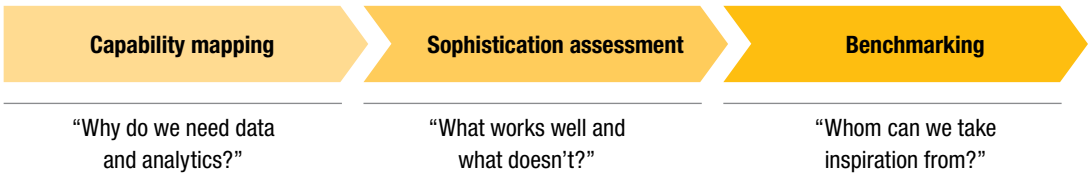
- **Case example 1** shows a diagnostics approach for digital and analytics capabilities within the market access function of a mid-sized biotech.
- **Case example 2** shows the target future state design approach for the development and scaling of digital and analytics use cases in a mid-size pharma company.

Case example 1:

Diagnostics of digital and analytics capabilities within the market access function of a mid-size biotech

The first step of any successful undertaking is a good understanding of the starting point, and that includes an assessment of key strengths as well as any gaps. The same holds for organisational design in the pharmaceutical industry. In order to unlock the full potential of data and analytics, an organisation needs to first understand and assess its current state by mapping existing capabilities with the needs for digital and analytics solutions. Next, they must assess the degree of data and analytics sophistication within these organisational capabilities, and third, they should benchmark their level of digital and analytics sophistication against relevant peers (Exhibit 7).

Exhibit 7: A three-step approach to assess the maturity of the DnA operating model

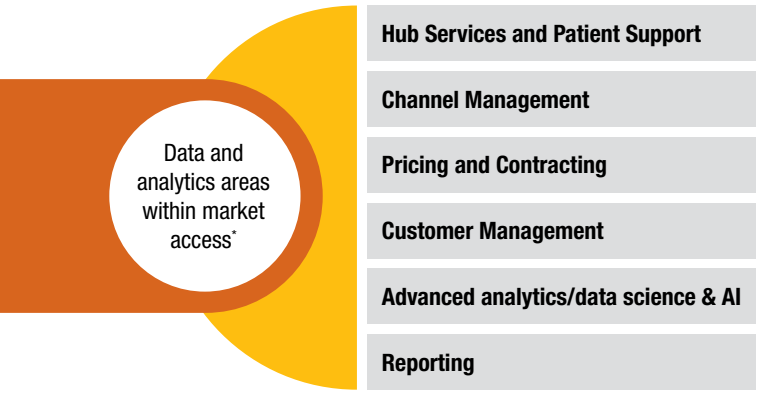


A robust diagnostics framework based around key data and analytics capabilities within the function in question is therefore paramount. This can enable organisations to develop a solid baseline understanding of itself within the industry, as well as provide clear guidance on where the main focus areas should be for the future operating model and governance design.

Capability mapping

To understand why data and analytics are needed, the organisation must first understand which capabilities require these solutions, identify the key creators and consumers of analytics outputs, and understand the interaction points within the organisation. In the example of the market access function of a biotech company, there are six key areas that capture the essence of data and analytics (see Exhibit 8). While individual components can vary from company to company, the key decisions and functions can be structured around hub services and patient support (e.g. longitudinal view of patient journey), channel management (e.g. automation of data inquires), pricing and contracting (e.g. price determination), customer management, advanced analytics/data science & AI (e.g. predictive analytics), and reporting (e.g. single source of truth).

Exhibit 8: Six key areas of data and analytics within pharma market access

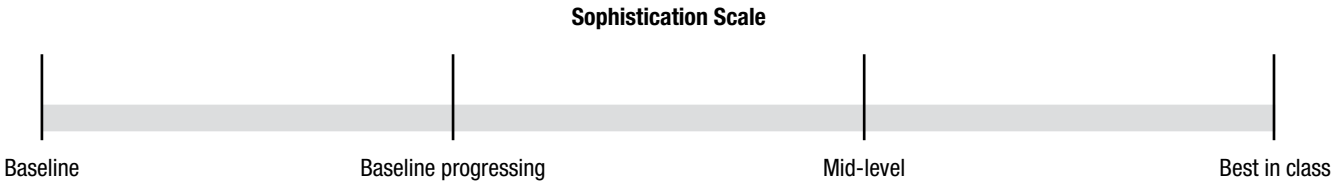


*These areas are meant to capture all market access functions

Sophistication assessment

For each of these six key areas of data and analytics within the market access function, it's important to have a clear methodology for assessing the current state. One way to do this is through a 'sophistication scale', that ranks the company's capabilities from 'baseline' to 'best in class' based on predetermined criteria (see Exhibit 9). Each level of sophistication can be detailed further if necessary (e.g. the presence of a single source of truth for data, data governance board in place, scalability of infrastructure and percentage of potential users for the solutions.

Exhibit 9: Approach to assess the level of data and analytics capability sophistication



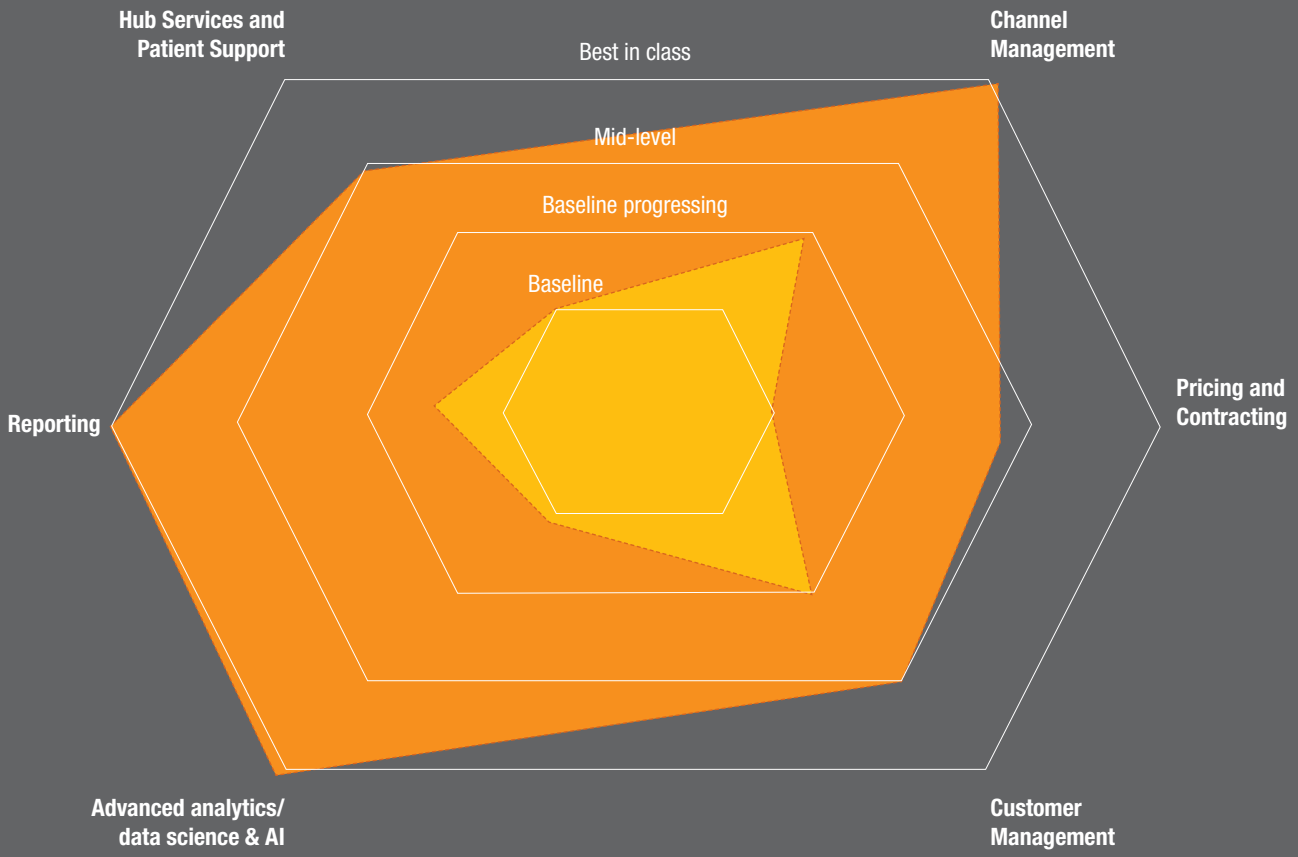
Once the methodology for assessing the sophistication is clear, the organisation should self-assess across each area to gauge the maturity of its operating model. An example of such analysis can be seen in Exhibit 10, where a company was assessed across all the key areas.

Exhibit 10: Example of operating model maturity assessment

Benchmarking

Once it has developed a solid understanding of its current state, the organisation should then benchmark its performance across the same areas against its peers (either selected or industry leaders). Mapping each peer across the same dimensions provides a solid overview of where the key operating model advantages lie for a selected peer. Additionally, compiling a list of best practices demonstrated by peers across all areas can provide further insight into what works well (Exhibit 11).

Exhibit 11: Market access analytics capability benchmarking example



Having the organisational and peer performance across the key areas of the data and analytics operating model lays the foundations for future decision-making. It helps identify the future-state capability needs of the organisation and serves as a baseline for determining priorities in the operating model design, taking into account the organisation's foundations and strategic positioning.

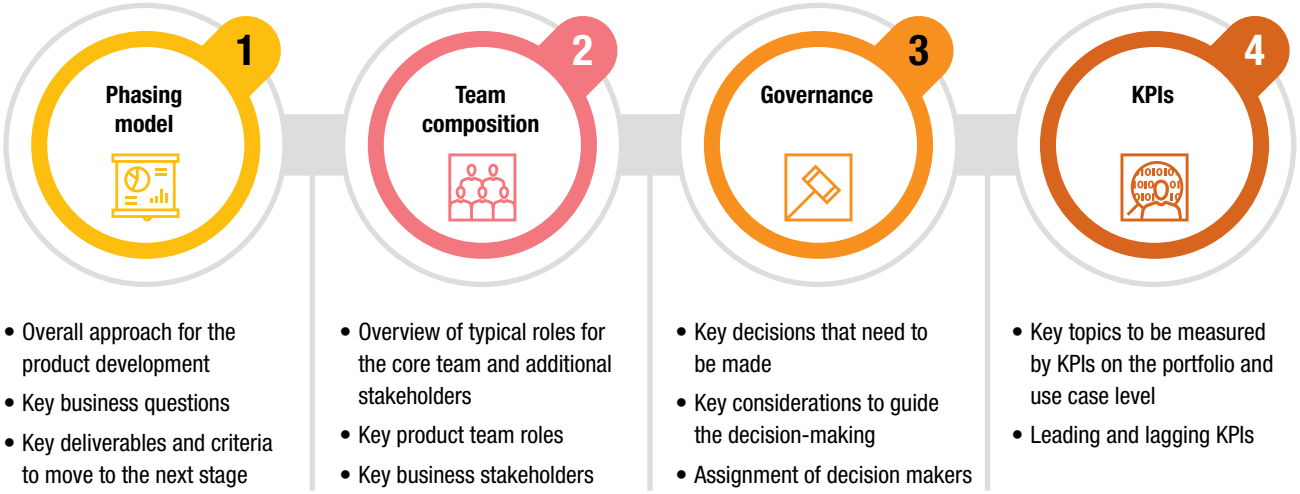
Case example 2:

Target future state definition – Developing and scaling up digital and analytics use cases in a mid-size global pharma company

In a data-driven organisation, critical business data drives decision-making. Typically, data is transformed into insights through three broad areas - reporting (e.g. delivery of dashboards or reports), advanced analytics (e.g. ad-hoc analyses beyond standard reports) and data science (e.g. prescriptive AI-based solutions).

Any successful data solution needs to be viable, desirable and feasible. To ensure this, there needs to be a simple but adaptable operating model and governance supporting the development and realisation of use cases for their respective areas. Four core elements need to be taken into account when designing a use-case development operating model within the data and analytics space in the pharmaceutical industry. These are: a phasing model, providing clear guidelines for transitioning through different product development stages; team composition, for each of those phases; governance (especially between global and local) to drive the decision-making across the phases, and finally KPIs to guide decision-making (see Exhibit 12).

Exhibit 12: Four core elements of operating model design for data and analytics use case development

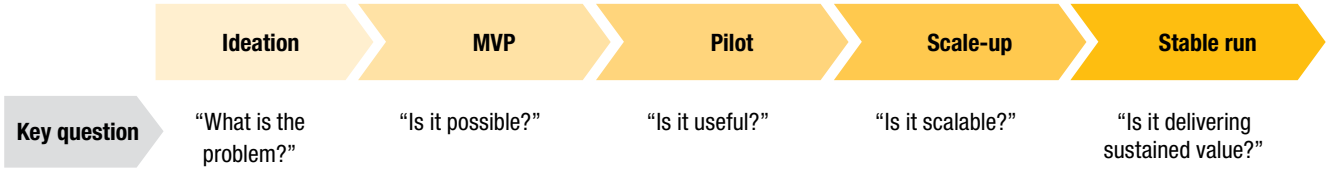


Phasing model

Successfully turning an idea into a stable product should follow five phases, and the operating model should be built with these in mind. Each phase addresses a different business question, for which a clear set of proposed activities, deliverables and decisions must be developed.

These should serve as the key 'decision gates' which the product must pass through in order to move to the next stage (e.g. if the idea has no developed value proposition it cannot move to minimum viable product (MVP) development) (see Exhibit 13).

Exhibit 13: The phasing model for data and analytics use case development



Team composition

The team composition needs to be carefully developed to take into account the evolution of each use case (i.e. from an innovative and agile approach early on to a reliable and scalable approach in the final stages):

- The ideation stage requires a lean core team, including the requestor, sponsor and relevant business process owners, end users and IT/data science team members.
- For MVP development, a product owner should be assigned and a larger team built that includes business analysts, front and back-end developers.
- In the pilot and scale-up stages, the core team is reaching the peak of its size, end users will play an important role for providing feedback for iterations, and legal and compliance start to get involved.
- Once the solution enters the stable run phase, the product team becomes lean again.

While the roles mentioned above are intended as an illustrative example, roles need to be set on a case-by-case basis, with clear descriptions for each. Furthermore, distinct responsibilities must be assigned to each role, distinguished between product execution (i.e. the specific activities around the five steps of the use case development) and ecosystem level (i.e. rollout implementation for the operating model, data governance and the tools used).

Exhibit 14: An illustrative example of team design across the use case development phases

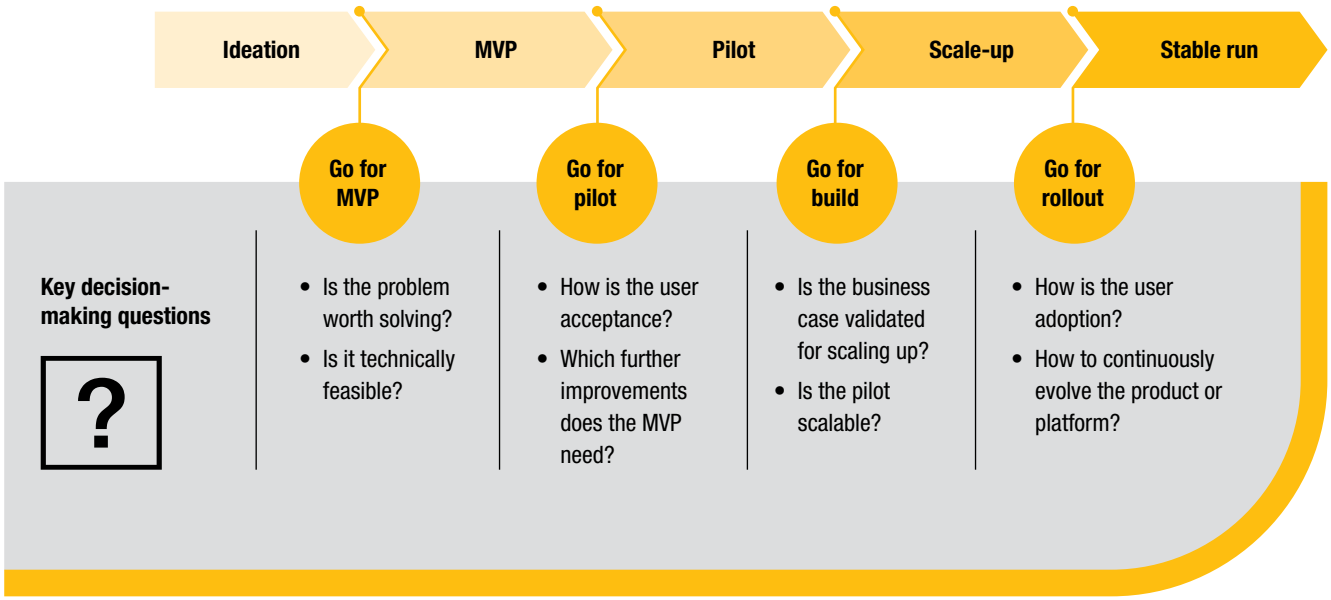
	Ideation	MVP	Pilot	Scale-up	Stable run
Product team	Requestor	Product owner	Product owner	Product owner	Product owner
	Data scientist	Data scientist	Data scientist	Data scientist	Back-end developer
	Front-end developer	Front-end developer	Front-end developer	Back-end developer	Front-end developer
	Back-end developer	Back-end developer	Back-end developer	Front-end developer	Data scientist
	End user	End user	End user	End user	End user
			Scrum master	Scrum master	
		Legal, compliance	Legal, compliance	Legal, compliance	
	SME	SME	SME	SME	SME
Decision maker	Sponsor	Sponsor	Sponsor	Sponsor	Sponsor
	Global/local process owner	Global/local process owner	Global/local process owner	Global/local process owner	Global/local process owner

Core team · IT · Business unit · Decision makers · Data science · Supporting functions (e.g. finance, HR)

Governance (especially between global leadership and local teams)

The development of data and analytics use cases is carried out by both global and local teams, depending on the use case development stage. Global leadership should provide guidance for entering the MVP stage as well as global-level decisions on resourcing, build vs. buy and securing project funding. The MVP to pilot stage decision can be made locally, as the local team is most familiar with the solution's potential and additional feature developments. The decision to scale a use case should fall to global leadership, as the business case requires validation and funding must be ensured. From this point, governance can revert to the local team as they own the product and, as such, are best-placed to make decisions on future improvements.

Exhibit 15: Key decision points and the respective governance by use case development phase

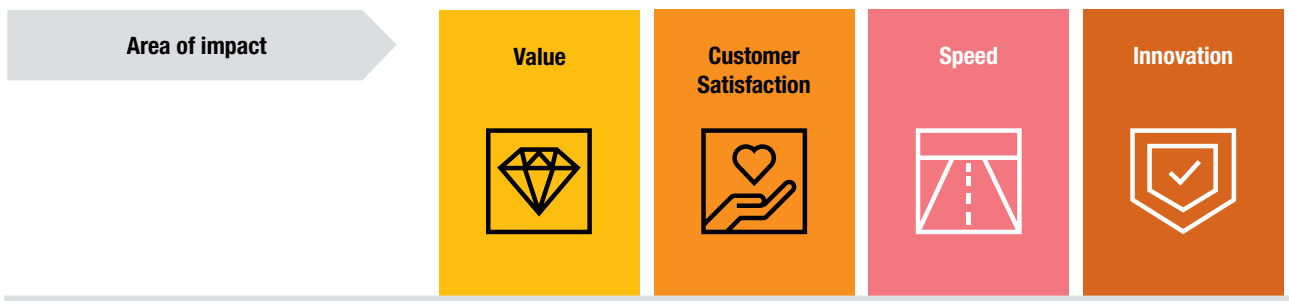


KPIs

KPIs for any use case in development must align to the organisation's strategic goals, e.g. value, customer satisfaction, speed and innovation. KPIs should be designed to measure the impact across these areas and should be developed at the use case level as well as the portfolio level. The KPIs should include both leading (e.g. projected net value) and lagging (e.g. actual net value) indicators.

While the four core elements described here are considered the building blocks of an operating model for data and analytics use case development, individual company nuances will often require further details. These might include areas such as sourcing strategy, knowledge building and transitioning plans, platforms and continuous improvement.

Exhibit 16: Key management-level areas of impact and high-level KPI examples



3. How can your organisation unlock the full potential of its data and analytics?

1

Is your operating model for data and analytics fully embedded into your corporate strategy?

While the operating model can only be as good as the strategy, it will serve as one of the key implementation levers for strategy and, as such, needs to be fully aligned with and embedded in it.

2

Is your organisational culture embracing data and analytics?

To ensure long-term sustainability of the data and analytics operating model, the organisation needs to train its employees and support adoption and knowledge building by empowering the community around data and analytics.

3

Is there an established structure in place for data and analytics use case development and decision-making?

A clear and simple decision-making and governance structure reduces the risk of operational inefficiencies and clearly positions data and analytics within broader company operations.

4

Is your data and analytics use case portfolio defined and scalable?

A defined process for scaling data and analytics use cases provides a platform for expedited development of new solutions and ensures that only those generating value will be taken further into development.

5

Is your digital and analytics performance measurement linked to impact generation?

To ensure that digital and analytics achieve their full potential, the performance of the operating model should be closely linked to expected impact through both leading and lagging indicators.

4. Bibliography

1 Harvard Business Review (https://hbr.org/2018/03/businesses-exist-to-deliver-value-to-society).

2 Pew Research Center (https://www.pewresearch.org/internet/2011/05/12/the-social-life-of-health-information-2011/).

3 ortholive (https://www.ortholive.com/blog/just-the-facts-30-telehealth-statistics-for-doctors-to-know/).

4 referral md (https://getreferralmd.com/2015/08/mobile-healthcare-technology-statistics/).

5 Forbes (https://www.forbes.com/sites/daviddawkins/2020/05/05/britains-billion-dollar-babylon-health-app-set-to-launch-for-millions-of-new-yorkers/?sh=45dd9c286563).

6 Six Degrees Medical (https://sixdegreesmed.com/future-hcp-engagement-models/).

7 Healthcare Financial Management Association (https://www.hfma.org/topics/news/2020/10/cigna-s-2021-strategies-highlight-ma-trends-and-the-resulting-ef.html).

8 MobiHealthNews (https://www.mobihealthnews.com/content/babylons-ai-passes-mockup-uks-gp-exam-goes-head-head-doctors).

9 RockHealth (https://rockhealth.com/insights/2020-market-insights-report-chasing-a-new-equilibrium/).

10 Fortune (https://fortune.com/2021/02/04/23andme-going-public-spac-richard-branson-valuation-dna-testing/#:~:text=The%20deal%20values%20the%20Silicon,public%20equity%20(PIPE)%20offering.&text=Co%2Dfounded%20in%202006%20by,to%2Dconsumer%20genetic%20testing%20kits.).

11 RBCCM (https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion).

12 See whitepaper *What doctor? Why AI and robotics will define New Health*, PwC, 2017.

13 Research and Markets (https://www.researchandmarkets.com/reports/5300899/global-ai-in-healthcare-market-analysis-and?utm_source=GNOM&utm_medium=PressRelease&utm_code=rtzhc9&utm_campaign=1510094+-+Global+AI+in+Healthcare+Market+Report+2021%3a+Market+to+Reach+%2435%2c892.2+Million+by+2030&utm_exec=chdo54prd).

14 Olin Business School (https://www.youtube.com/watch?v=XDjjJJv8cc8).

15 McKinsey & Company (https://www.mckinsey.com/industries/life-sciences/our-insights/how-pharma-can-accelerate-business-impact-from-advanced-analytics).

16 McKinsey & Company (https://www.mckinsey.com/industries/life-sciences/our-insights/how-pharma-can-accelerate-business-impact-from-advanced-analytics).

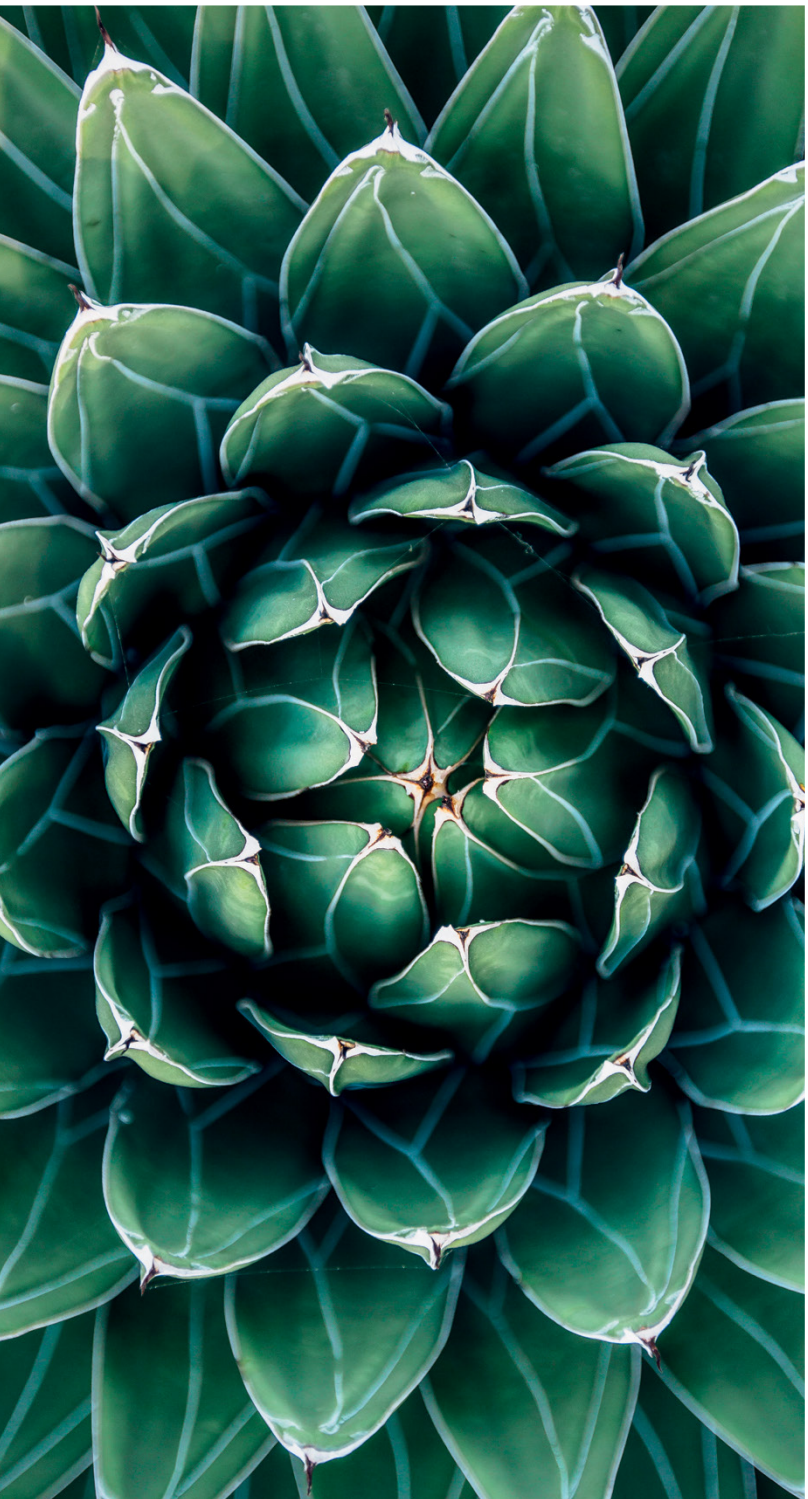
17 See *PwC's 22nd Annual Global CEO Survey*, PwC, 2019.

18 See whitepaper *What doctor? Why AI and robotics will define New Health*, PwC, 2017.

19 Takeda (https://www.takeda.com/newsroom/newsreleases/2020/takeda-accelerates-digital-transformation-with-accenture-and-aws/).

"It is not the strongest of the species that survives, not the most intelligent that survives. It is the one that is the most adaptable to change"

– Charles Darwin



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