

Transforming medical technology businesses to create value with digital

Mitch Beaumont, Prasanth Prasad, Ulrica Sebstedt, Mandeep Dhillon

Within the healthcare sector, both existing players and new entrants can create significant value with digital products and services. However, for established “analog-native” medical technology companies, going digital will require significant business and operational model changes, which can be daunting. Nevertheless, executives can proactively manage these changes and their impact by considering a set of levers that they can control. This article introduces a framework with those levers

that can be used to guide medical technology companies through their digital transformations.

Going digital – a difficult path for established medical technology companies

Recent advances in technology, along with changes in healthcare reimbursement models and care delivery pathways, have created opportunities for digital products and

services to play an important role in healthcare. The benefits of digital, such as lowering costs, increasing patient engagement, and improving outcomes, have been discussed extensively¹. Many new entrants and start-ups are taking advantage of the opportunity and challenging established healthcare companies, hoping to get a share of an industry that makes up about 10% of the global economy². These organizations employ newer, more agile working models that are better aligned with being digital. Additionally, they have a further advantage emerging: regulators that have not been friendly to software products in the past have started to embrace new iterative development approaches to accommodate the growth of digital health³.

There is significant value to be captured with digital products and services in the healthcare industry. However, existing medical technology companies going digital will require major business and operational model changes. This article introduces a framework and set of levers that can help medical technology executives proactively manage these changes and their impact, therefore guiding their companies through digital transformation.



1. [Succeeding with Digital Health – Winning offerings and digital transformation.](#)
Arthur D. Little, March 2016

2. In the United States, the world's largest economy, health expenditure is over 17% of GDP. Source: World Bank Data (data.worldbank.org)

3. As an example, see the US FDA's Digital Health Software Precertification (PreCert) Program at www.fda.gov

In contrast, established medical technology companies face a different picture. Their operational and cultural DNA has been steeped in rigid company processes that were created to minimize the risk of non-compliance with regulatory requirements such as FDA guidance. For many of them, results have been elusive as going digital has strained their current ways of doing business. In fact, being successful with digital products and services requires established companies to rethink their business models and the underlying operational models. This can be seen with some recent examples of established medical technology companies that have managed to find levels of success.

Rethinking models – Roche Diagnostics and GE

Roche Diagnostics saw insufficient outcomes from diabetes treatments, and decided a more holistic approach was needed to manage diabetes. To that end, it adopted an ecosystem approach to connect and offer integrated digital solutions to all stakeholders involved in the diabetes management cycle, in order to optimize care processes and improve prevention.

Before the ecosystem was created Roche's main value proposition was offering its diabetes management systems such as glucose meters and insulin pumps. With the ecosystem, Roche could expand its value proposition for patients and enable "more time in range"⁴, leading to fewer hospitalizations. Roche became a partner to patients, helping them manage their conditions, rather than just being a manufacturer of products. Operationally, Roche separated Roche Diabetes Care into a subsidiary with its own operating model to facilitate the creation of a world-leading big-data ecosystem for diabetes management. A new, global hub with the required digital and IT capabilities was created in Barcelona, and co-promotion and distribution partnerships were set up with a number of complementary companies, including Medtronic, mySugr and Senseonics.

4. People with diabetes seek to keep their blood sugar levels within a certain range to prevent serious health issues

With this successful digital transformation, Roche went from only treating sick people in acute care settings to enabling treatment in chronic care and remote settings as well. In addition, it increased patient engagement to proactively assist with prevention by improving patient lifestyles.

GE has been a leader in driving digital transformation across its many businesses. A new division, GE Healthymagination (GEhM), was created for its healthcare business, with its own innovation operating model and supporting processes designed to develop new, disruptive business models in healthcare.

GEhM borrowed from agile methods and employed an innovation approach of rapid, iterative sets of tasks to identify, define and validate opportunities in the digital health space – a stark departure from GE's traditional stage-gate or waterfall processes. This resulted in the "Healthy Cities" program, which focused on improving population health for various US cities by engaging local governments, large providers, and universities. GE set up data ecosystems and the necessary infrastructure for collecting and managing population health data collected from a broad range of existing products provided by GE and its partners.

Ultimately, GE successfully created a new value proposition for various city and municipal governments, a market that GE Healthcare did not previously serve. In addition, GE was able to extract more value through the increased sales of its products, as these were required to deliver on the value proposition.

For both of these leading medical technology organizations, we see a combination of business-model and operating-model change being used to deliberately alter how each company engages in the market and the way it works. To help executives be more strategic in considering a digital transformation, it is possible to create a simple, yet comprehensive framework for thinking about these types of changes.

A framework to guide the digital transformation

Based on our experience, and from assessing examples such as Roche and GE, we have identified two sets of primary levers that executives can use to impact the changes to their companies' business and operational models that are necessary to support a digital business. The specific levers used, and the degree to which they are "pulled", will be unique to each company's environment and its ultimate goals for digital. Most medical technology companies, including the examples cited above, will focus more on two or three levers, with more minor changes in the others happening.

Business model levers

- **Value proposition.** Digital products and services can enhance or shift a medical technology company's value proposition in the market. For example, it can extend its products to provide remote-monitoring capabilities that can improve care and reduce costs. Or it can offer tools such as applications and reminders to increase patient engagement and improve adherence. Typically, a digital business will want to build upon the company's existing core value proposition, rather than creating a completely new one.
- **Value extraction.** Most medical technology companies have focused on selling devices, or generating revenue per unit. However, monetization of value can take on alternative forms with digital, such as service-oriented models, e.g., selling hours of operation for a home health device versus the device itself, and data-centric models, e.g., selling the data generated by the devices. These new models may require working with government payers and insurance companies to gain support for reimbursement.
- **Markets served.** Digital can enable a company to shift or expand the markets it serves to open up new business opportunities. For example, digitally enabled products and services can be marketed to caregivers of the elderly or children who are willing to pay for access to data on activity

or medication adherence to give them peace of mind. Alternatively, companies may be able to create new business relationships with other value-chain players, such as home health companies, by providing information that improves the effectiveness and efficiency of in-home care delivery.

Operating model levers

- **Process/methods.** Going digital requires new ways of working. Software development cycle times are faster, and will be more effectively enabled by agile methods, which are fundamentally different from existing linear or phase-gate approaches employed by most medical technology companies⁵. Robust technology and portfolio management methods are needed to keep up with the faster pace of technology change and ensure R&D resources are invested in the right areas.
- **Delivery network.** Becoming digital can create opportunities for medical technology companies to engage with a broader ecosystem to develop offers and reach the market. The complexity and system-like nature of many digital-centric solutions creates attractive opportunities to engage development and/or delivery partners.
- **Capabilities/footprint.** Adding digital elements to a portfolio will require new capabilities in areas such as application development, data management and security. In addition, medical technology companies will require capabilities in areas such as consumer insight and behavioral economics to ensure their digital-health solutions meet patient/user needs and expectations. The organizational footprint should also be an important consideration to help gain technical talent or local market knowledge and access.

5. [For a discussion on applying agile methods to product development, see "Using agile approaches for breakthrough product innovation", Arthur D. Little Prism, Issue 1, 2017.](#)

These levers are depicted in the framework shown in Figure 1, where a more significant change in each group of levers collectively creates an overall more significant change along the respective dimension. Companies can use this visualization to qualitatively assess the degree of change – and change management – they will need to make to support a digital strategy and transformation.

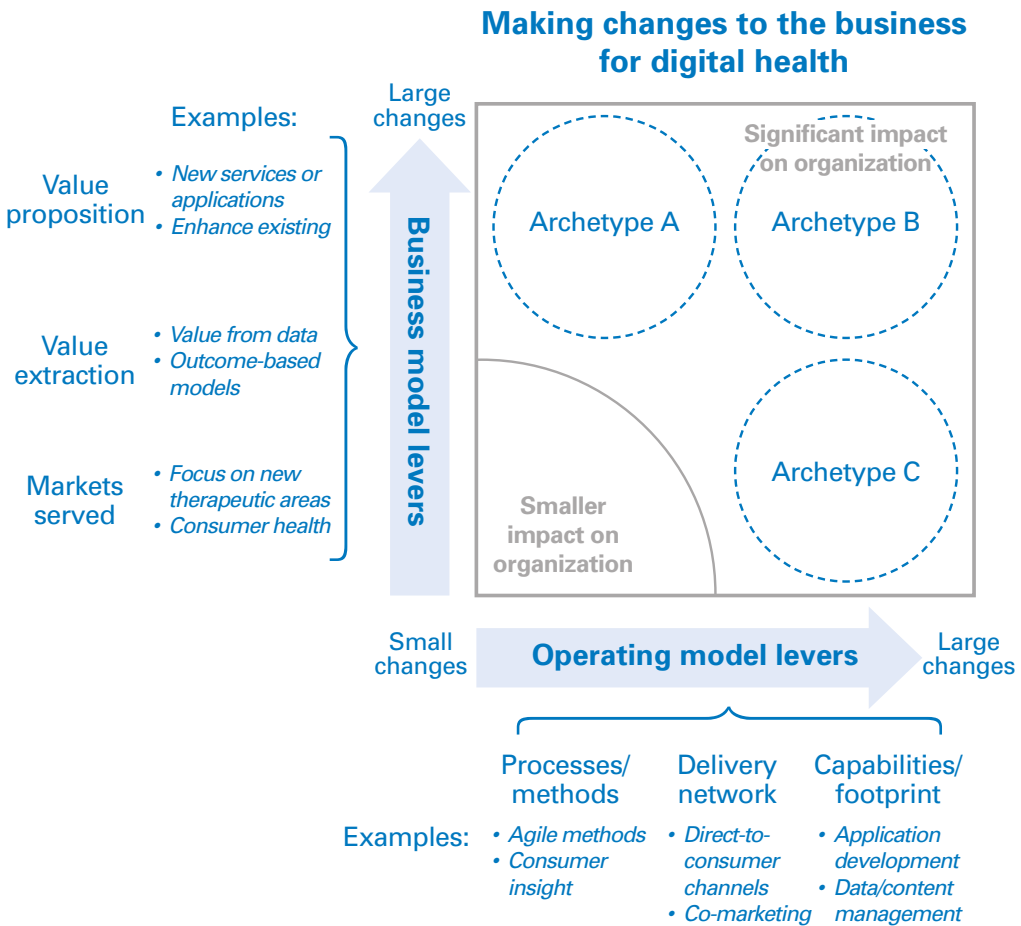


Figure 1: **The levers to guide digital transformation**

Each company’s strategy for becoming a digital health player will be unique to its internal and external situation, and entail some degree of change to both the business and supporting operational models. However, these transformations broadly fall into three archetypes, as described in Figure 2, which are also indicated on the framework in Figure 1.

Archetype	Objective	Description
A	Finding completely new sources of value	<p>This model emphasizes changes to how a company engages with the market. Operating-model changes are made to support the new business-model objectives.</p> <p>GE’s transformation might fit this archetype best, given that its business-model changes with the Healthy Cities program may have been more significant than its operating-model changes.</p>
B	Reinventing the business	<p>Medical technology companies pursuing this transformation strategy are looking to make a significant and disruptive change to the industry.</p> <p>A good example is ResMed. (See sidebar.) ResMed has made significant changes to both its business model and operational model, and has become a leading connected-health company versus the traditional medical-device company it once was.</p>
C	Improving how value is delivered today	<p>This approach leverages operating-model improvements to enable digital products and services that enhance the current business model but do not significantly change it.</p> <p>Roche Diagnostics’ strategy emphasized changing its operating model in order to enable the data ecosystem, and while it did shift the value proposition to reduce hospital readmissions, there was limited change in how Roche would extract value and the markets it served.</p>

Figure 2: **Three archetypes to drive change**

Case Study: Creating a connected healthcare company

ResMed is a producer of medical devices and cloud-based software applications that diagnose, treat and manage sleep apnea, chronic obstructive pulmonary disease (COPD) and other chronic diseases, with USD 2.1 billion in revenue. Just as importantly, ResMed is a global leader in connected care, with more than 3 million patients remotely monitored every day. Its path to this position was very deliberate and involved transforming multiple aspects of its business and operating models.

For Mick Farrell, the CEO of ResMed, the decision to go digital was not an option. “Digital or die – it is an existential moment,” he recalled when talking recently with Arthur D. Little about how the company’s digital journey had started. “If we didn’t embrace {digital}, we could go the way of others – as we’ve seen Netflix do to Blockbuster and Uber to taxis.” Thus, ResMed became committed to making the transition to a software-driven medical-device company. After detailed modeling exercises to understand the value equation and investigate possible digital-enabled business models, Farrell and his team discovered “almost every time we could find value.” They launched their effort by including a communication capability in every device sold – it was not optional – and soon discovered they were creating increased value for all of their primary constituents.

For example, ResMed found that it could drive adherence for CPAP⁶ therapy devices from 50% (device alone) to 87% when patients were given a smartphone application, myAir™, which helped them track their sleep-therapy progress. Each morning the patient receives a “myAir score”, essentially gamifying sleep. Increased adherence reduces hospitalizations, which lowers costs and greatly improves the patient’s quality of life. ResMed also discovered that its connected devices decreased set-up costs for home health providers by 59%, a significant value proposition.

6. Continuous Positive Airway Pressure (CPAP) delivers constant airflow to people to address sleep apnea disorder

By receiving nightly data on user performance (e.g., was the mask connected properly?) and compliance (e.g., was it used nightly?), the provider is able to focus its attention on those users that are having issues, and reduce unnecessary outreach to patients doing well with their therapy. This digital capability has enabled ResMed to create a provider subscription service to access the software and data, and effectively changed the basis of competition for sleep-therapy devices.

ResMed also needed to transform its existing operating model to support the business-model changes. Farrell restructured the company to create a vertical business for software and services, which is now 7% of global revenue. A new, centralized health informatics function was established that cut across the entire organization and supported all businesses. ResMed also adopted agile development approaches to accelerate product-update cycles. Necessary skills were added by hiring cloud software engineers from other industries, in addition to some selective acquisitions.

ResMed is now widely considered a global leader in digital health and connected care for medical devices. As evidenced above, it made this transformation deliberately and systematically by identifying, analyzing and pulling many of the available business-model and operating-model levers.

How to get started

There is a clear set of initial steps an established, analog-native medical technology organization should take to get started on a digital transformation. (See Figure 3.) Even if an organization has jumped into creating digital elements or dabbled in deploying a digital service, it will pay dividends to go through the steps to ensure there is a strategic alignment between what the market needs and what the company does.

- **Step 1** – Get a firm understanding of stakeholder needs, especially latent needs, of patients, users, and other relevant players, independent of the application of digital. What experiences do they currently have, and what aspects of those experiences can be improved? Are there areas where efficiency or cost need to be addressed? The objective is not to develop or test solutions at this point, but to understand what needs, if addressed, will create value for the relevant stakeholders. After those needs are understood and rationalized to create a unique list, each is evaluated to determine which might be addressed by digital, and whether they make sense for the company to pursue. This step culminates in generating ideas to address the prioritized needs.
- **Step 2** – Develop ideas into solution concepts, often with multiple ideas brought together into one concept. A concept here can range from a high-level scenario of a potentially new digital service offering to a more specific depiction of functionality being added to an existing medical device. In any case, there is a list of certain characteristics for each potential solution concept that must be identified, even if done with a higher degree of certainty, to inform the next step. At this point it might be necessary to do a prioritization of concepts. This step is an opportune time to start to seek out partnerships or employ a more open innovation model to help make progress and engage expertise not found internally.

- Step 3** – Evaluate the implications to the business model and underlying operating models for each prioritized solution concept. Different concepts can be compared, and the amount of change needed should be considered when determining the specific strategy to pursue. For example, if a concept will require significant changes to certain operating-model elements, such as existing IT infrastructure or long-term contractual relationships, then there may be a decision to forego that concept or to push it further out on a roadmap. Conversely, certain changes, such as a new monetization model or market-positioning message, might be very easy to effect and push some concepts forward faster. At this point, the archetype needed for the transformation will emerge.
- Step 4** – Only once the implications for the business model and operating model are understood can an organization set its strategy and plan for going digital. Learnings from the implication assessment will impact the path forward and facilitate a more innovative way of thinking. For example, if the effort required to build new capabilities, technologies or processes appears high, then partnerships or acquisition might be the best strategy. On the other hand, if the level of change is significant across the company, then perhaps the strategy would best be executed by setting up a new external entity.

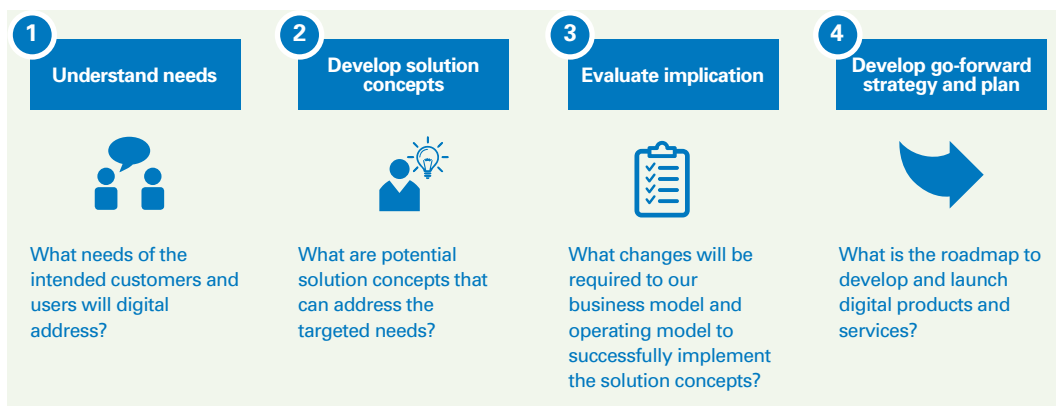


Figure 3: **Steps to get started**

Insight for the Executive

There is significant value to be captured with digital products and services in the healthcare industry. Many new entrants are well positioned to compete because their models are oriented towards software development – more so than existing, analog-native medical technology companies, which are organized to comply with regulations. For these companies, going digital will require significant business- and operational-model changes. Executives can proactively manage these changes and their impact as follows:

- Begin by taking the time to **understand the needs of your customers** or users; avoid making assumptions – talk to them to learn about their experiences.
- Carefully screen to **determine which needs can actually be addressed by digital**; in addition, screen for those needs that it makes sense for the company to address.
- Evaluate solution concepts to **identify the business-model and operational-model changes** that will need to occur to implement digital.
- With an understanding of the implications to the business model and operating model, **set a strategy and develop a plan for going digital**.

Mitch Beaumont

is a Partner in the San Francisco office of Arthur D. Little, and a member of the Technology and Innovation Management Practice.

Prashanth Prasad

is a Manager in the San Francisco office of Arthur D. Little, and a member of the Technology and Innovation Management Practice and Healthcare Practice.

Dr Ulrica Sehlstedt

is a Partner in the Stockholm office of Arthur D. Little, leading the Nordic Healthcare Practice and affiliated with the Strategy & Organization Practice.

Mandeep Dhillon

is a Manager in the London office of Arthur D. Little, and a member of the Digital Strategy and Transformation Practice.