Digital Transformation at Royal Philips

Teaching Case

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Abstract

In 2017, Philips' goal was to use innovation to improve the lives of three billion people a year by 2025. To achieve that, the company was shifting from selling medical products in a transactional manner to providing integrated healthcare solutions based on digital health technology ("HealthTech"). Based on our interviews with 23 executives at Philips, the case examines the two directions of the transformation required by this shift: Externally, Philips worked on transforming how healthcare was conducted. Healthcare professionals would have to change the way they worked and reimbursement schemes needed to change to incentivize payers, providers, and patients in vastly different ways. Internally, Philips needed to redesign how its employees worked. The company componentized its business, introduced digital platforms, and co-created integrated solutions with the various stakeholders of the healthcare industry. In other words: Philips was transforming itself in order to reinvent healthcare in the digital age.

Keywords: Digital Transformation, Business Architecture, Enterprise Architecture

Introduction

In the six years leading up to 2017, Royal Philips' focus was honed on striving to make the world healthier and more sustainable through innovation, with a goal to improve the lives of three billion people a year by 2025.[1] Company leaders believed that smart, connected health technology ("HealthTech") was essential to tackling some of the healthcare industry's toughest challenges.

> *"In the world we are living in, healthcare costs are going up, there are more people with chronic diseases, there is an aging population, and at the same time, less funding [per patient] to pay for it. Technology is the only way forward. Smart technology, predictive analytics, and clinical decision support is the only hope we have globally to bridge the gap."*
> *(Carla Kriwet, EVP and Chief Business Leader, Connected Care and Health Informatics)*

To address the healthcare industry's woes, Philips was attempting to shift its business model from selling medical products in a transactional manner to providing integrated healthcare solutions.

> *"Continuing to only focus on separate products—here is an MRI scanner, here is a CT scanner, here are pathology scanners—doesn't solve the problem for the customer. It's not how much better you make a product, it's how much better you make the system. So we take a holistic systems and solutions approach." (Frans van Houten, Chief Executive Officer)*

Philips was developing integrated solutions to enable healthier lives; simultaneously, it was addressing the sometimes-conflicting incentives that guided care providers and payers. For example, the Philips Care

[1] Philips, "Our journey in health technology" (internal document, 2017), p. 2.

Orchestrator solution connected sleep apnea patients with healthcare practitioners and insurers. Patients could opt to use an internet-connected breathing mask that would enable practitioners to monitor and adapt settings and treatments. Meanwhile, insurance companies could tie reimbursement to breathing mask use and improved patient health.

As Philips shifted from product sales to providing integrated solutions, it was embarking on a fundamental transformation. Company leaders believed that Philips would need to upend its traditional business silos.

> *"In the old world, where you had discrete products, you could allocate responsibility and you could measure results, but now we need to manage the company much more as an integrated operating company, rather than as a portfolio company. And that means from strategy to performance management to culture and behavior, it all needs to be more integrated, which is hard work." (Frans van Houten, Chief Executive Officer)*

The transformation was daunting, but the 71,000 HealthTech employees were enthusiastic about the vision.

> *"It's going to change this company, because it will make it more relevant to our customers and society at large. We're going to create new realities, in a space that we are now completely focused on, that probably without our collaborating with our customers would never have been conceived. How much fun is that?" (Gerrit Schick, Business Group Manager DACH, CCHI)*[2]

Philips leadership had set a goal to "improve the lives of three billion people per year by 2025;"[3] in 2016, the company had reported that it had touched the lives of 2.1 billion people.[4]

A Brief History of Transformation at Philips

Transformation wasn't new to Royal Philips. In 2017, management circulated an internal document—"Our journey in health technology"—discussing "Philips 6.0," hinting at how often the firm had reinvented itself.

Founded in 1891 with a focus on incandescent lamps, Philips had diversified into more than 60 businesses in over 100 countries. Known to consumers for light bulbs, radios, TVs, Philishave shavers, and other things, the company had introduced the world's first VCR and laser disk player, and had partnered with Sony to launch the CD, DVD, and Blu-ray standards. It had also built a strong foundation in medical imaging.

Product diversification had caused excessive internal complexity, though, and as a result, Philips' financial performance began to falter. During the first ten years of the 21st century, revenues plunged 40%, losses accumulated, and the company's market capitalization fell significantly.[4]

In 2011, Philips appointed a new CEO, Frans van Houten, to redress its performance issues. He divested several businesses and initiated "Accelerate!," a program intended to simplify and restore profitability.

Accelerate! was a company-wide transformation program that, among other objectives, involved the implementation of a platform of globally standardized business processes and IT systems. The enabling IT platform (called the Philips Integrated Landscape, or PIL) targeted three categories of processes: idea-to-market (processes related to innovation, supported by a product-lifecycle management system), market-to-order (marketing and sales processes, supported e.g., by a Salesforce CRM system), and order-to-cash (processes around finance and back office fulfillment, supported e.g., by SAP ERP). Business process owners on the executive committee were accountable for establishing and maintaining these standards.[5]

Although van Houten did not change the company's organizational structure at the time, he reassigned accountability for profit and loss (P&L). Philips was structured along three dimensions: (1) *businesses* that developed products, (2) geographic *markets* that sold products in different countries, and (3) *functions* (e.g., HR, Operations, Innovation and Strategy, Finance) that enabled businesses and markets (see Appendix 1). Historically, businesses had been the dominant axis in the company's organizational matrix.

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[2] DACH stands for Germany (D), Austria (A) and Switzerland (CH).

[3] Philips, Annual Report 2016, December 31, 2016, from the Philips Investor Relations website, p.18.

[4] Annual Report 2016, Message from the CEO, p.4.

[5] M. Mocker, J.W. Ross, and E. van Heck, "Transforming Royal Philips: Seeking Local Relevance While Leveraging Global Scale," MIT Sloan CISR Working Paper No. 394, February 2014.

Starting in 2011, in order to put businesses and markets on equal footing, chief market leaders were included on the executive committee and Business Market Combinations (BMCs) were formed. In BMCs—e.g., shavers in China, CT scanners in DACH—markets and businesses were jointly P&L accountable.

Changes from Accelerate! were starting to make an impact on the company's financials: between 2014 and 2016, Philips' revenue had increased roughly 7% annually to €24.5 billion. Earnings before interest, taxes, and amortization (EBITA) boasted a compound annual growth rate (CAGR) of 65% and grew to €2.2 billion, while return on sales increased from 3.8% to 9.1% (see Appendix 2).

In 2014, Philips began the separation of its lighting business; and combined its consumer health and professional healthcare businesses, augmented by significant investments in health informatics. In 2016, Philips spun off the lighting business and converted the diversified high tech conglomerate into a company focused on health technology. In 2017, Philips' business groups were organized into three clusters:

Personal Health: Consumer products for health and wellness (e.g., baby monitors, electric toothbrushes), personal care (e.g., shavers), domestic appliances (e.g., air fryers, air purifiers), and sleep and respiratory care (e.g., respiratory sleeping masks)
Diagnosis and Treatment: Diagnostic imaging, image-guided therapy, and ultrasound
Connected Care and Health Informatics (CCHI): Integrated solutions for patient monitoring (e.g., bedside monitors), population health (e.g., software to stratify a population of patients according to the intensity of required care), and healthcare informatics (e.g., managed solutions to facilitate remote care)

Leadership believed that these three clusters offered myriad opportunities to deliver integrated solutions that could transform healthcare. [6]

From Products to Solutions: Philips' Vision for Healthcare

Philips had been a provider of medical products as far back as 1917, when it started to repair medical X-ray tubes; in time, the company progressed to producing medical scanners and clinical software. [7] As the company introduced integrated solutions, its traditional products provided critical technology components. Solutions augmented these hardware devices with software and services.

> *"[Potential new competitors like Apple and IBM] can sell software, or data, or an algorithm, or whatever, but they are not able to sell products with a platform, with algorithms, with service, and I think that's our advantage."* *(Peter Vullinghs, Market Leader DACH)*

For more than ten years, Philips had been offering managed technology services, which bundled equipment like MRI scanners with software and maintenance. In these arrangements, hospitals agreed to 10–15 year-long contracts in which Philips managed their equipment for a monthly fee. Now, Philips' integrated solutions were solving more complex problems—for consumers as well as clinicians.

> *"It's not only bundling Philips products anymore, but it's also about integrating these solutions, and partnering with relevant third parties, and having a local, commercial, innovation aspect to it."* *(Gerrit Schick, Business Group Manager DACH, CCHI)*

One of the simplest integrated solutions in the consumer space was based on a smart version of the Sonicare toothbrush. Its sensors collected data on brushing behavior. As part of a basic integrated solution, that data could not only be displayed on a companion smartphone app, but also shared with dentists, enabling them to recommend changes in brushing technique or frequency.

In another example, the uGrow solution helped parents navigate the first one thousand days of a child's life. uGrow culled data from a range of connected devices such as thermometers, scales, baby bottles, and baby monitors to provide a detailed analysis of a baby's development. The eventual solution—referred to as a "maternity nurse in your pocket"—would suggest when to seek help from a healthcare professional.

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[6] "Philips to sharpen strategic focus by establishing two market-leading companies in Lighting solutions and in HealthTech, combining Healthcare and Consumer Lifestyle," Philips press release, September 23, 2014.
[7] "More than a century of innovation and entrepreneurship," Philips wesbite, https://philips.to/2zegJu6

In a more complex integrated solution, one healthcare provider asked Philips to help reduce the "door-to-needle" time of a patient suffering a stroke to 90 min. or less and to provide continuous care during recovery. This required seamless collaboration of emergency response services and the hospital. Using connected devices permitted remote patient evaluation by a neurologist, enabling bypassing the emergency room and expediting patient delivery to an operating room. Following post-operative care in the hospital, connected devices could allow continuous remote monitoring to control treatment effectiveness during recovery at home. Philips envisioned offering end-to-end solutions like this through five stages of a "health continuum": healthy living, prevention, diagnosis, treatment, and home care. (See figure 1.)

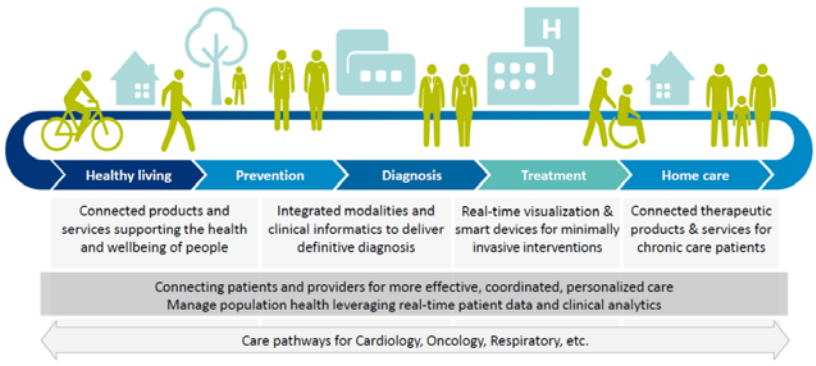

Figure 1. Philips' Approach to the Healthcare Continuum[8]

To focus its efforts and investments related to new solutions, Philips designated four priority "health spaces": cardiology, oncology, respiratory, and fertility/pregnancy/parenting. These were areas where Philips already held a strong position and/or anticipated the greatest potential for growth. In addition, they represented three of the four top causes of death globally.[9]

For example, to help consumers pursue healthier lifestyles, Philips launched Jovia Health:[10] a solution combining data from connected devices with a wellness app and coaching services. Over time, Philips believed that similar solutions would help to shift industry focus from treatment to prevention.

> *"We are exploring models right now where the users actually get money back if they hit their exercise goals for the month. So when somebody hits their goals—they're following the program that we've put in front of them via the app, and they're losing weight, or their resting heart rate is going lower, things that would be good health metrics—then we can actually trigger things like invoices (to the insurance company or employer) at that point."*
> *(Derin Basden, Head of Global Solution Delivery, Personal Health Solutions)*

In the clinical space, Philips offered solutions such as IntelliSpace Oncology and IntelliSpace Cardiovascular. In oncology, doctors relied on data from various sources (e.g., oncology, radiology, genomics) and typically had little time to thoroughly analyze the information before offering a diagnosis. Philips' solution generated a "mission briefing" which presented an analysis of each individual case. The briefing helped doctors recognize important anomalies, monitor changes in a patient's condition (e.g., a growing tumor, a new issue with a blood vessel), and recommend optimal therapy.

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[8] Source: Royal Philips, First Quarter 2017 Results Information Booklet, April 24, 2017, p.8.

[9] In its 2014 Global Status Report, the World Health Organization stated that chronic diseases "cause more deaths than all other causes combined," and notes that deaths from chronic diseases are projected to increase from 38 million in 2012 to 52 million by 2030. Cancer, diabetes, cardiovascular diseases, and chronic respiratory diseases accounted for more than 80% of those deaths. WHO, "Global Status Report on Noncommunicable Diseases 2014," 2014.

[10] In late 2017, Philips discontinued the PHS business innovation unit responsible for Jovia Health in its current form.

Running the software on past cases had revealed that, in 20% of the decisions, doctors had recommended suboptimal treatment. Philips' solutions could have assisted doctors in recommending treatment with full integration of all the relevant information.

> "*We heard hospitals say, "In the past, sometimes decisions were made without full visibility to every element, such as Body Mass Index, which could have or had an effect on treatment decisions." And just being able to see all the information integrated in the right ways is critical here." (Yair Briman, Business Group Leader, Healthcare Informatics)*

Another clinical solution, eICU, helped intensive care unit (ICU) doctors prioritize urgent patient cases, and identify candidates for ICU release. This solution combined bedside monitors and analytics software to enable a single physician to watch over 100–150 ICU beds remotely.

Philips' integrated solutions were designed to improve healthcare outcomes at lower cost. Revenue from solutions grew from 25% in 2014 to 28% in 2016 (ca. €5 billion); the company planned revenues from solutions to reach 35% in 2020 (ca. €7 billion).[11] Success depended on executing a transformation within Philips, and on pushing maybe even more dramatic change in the healthcare industry.

The External Transformation: Changing Healthcare

One of the biggest challenges Philips faced was the state of the healthcare industry itself, which allocated most resources to diagnosis and treatment rather than prevention. Even in 2017, prevention programs accounted for less than 10% of all healthcare spending. While integrated solutions reducing admissions or length of stay could be beneficial to patients and society, they risked decreasing hospitals' revenues.

> "*We've had cases where people scaled back programs improving outcomes because they reduced admissions. They want to do the right things, but [current] reimbursement models are not rewarding them for that yet." (Manu Varma, Business Leader, Wellcentive & Hospital to Home)*

While in principle all parties strove to provide patients the best care possible, Philips recognized that insurers were eager to reduce healthcare-related costs, while hospitals were focused on revenues, reimbursement practices, and efficiency.

> "*The main economic value of our eICU solution is that it reduces the length of stay—people have fewer complications and they go home faster. We saved around $1,000 to $1,500 per admission. But the lion's share of the value is going to the payer, and that is true for all of these types of solutions today." (Manu Varma)*

Thus, part of the challenge was to identify who might benefit from a solution and willing to pay for it.

> "*So I'm figuring out who wants to pay for prevention. [Among the] examples are insurers. They are benefiting from people changing their behavior and not being sick. Also, employers who want happier and healthier employees."*
> *(Rob Goudswaard, Business Development Leader, Personal Health Solutions)*

Philips was working with diverse stakeholders to shift funding within the healthcare system. One approach was to permit hospitals transparency into what different insurance companies actually rewarded. In 2016, Philips had acquired Wellcentive, an analytics platform exposing the incentives an individual health system had instituted in its agreements with payers. For example, some of a health system's contracts might reward reducing admissions while others might not. Philips believed that transparency could instigate changes in government policies and payer contracts, and eventually reallocate resources within health continuums.

> "*When did telehealth catch on in the US? When hospitals were no longer reimbursed for a patient returning within 30 days after discharge. That's a financial incentive in the system that drove providers to monitor patients after discharge." (Walter van Kuijen, Market Solutions Leader)*

In addition to system changes, Philips' leaders noted that integrated solutions typically required changes in healthcare providers' work habits. As a result, employees were sometimes wary of Philips' solutions.

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[11] Philips, First Quarter 2017 Results Information Booklet, April 24, 2017, p. 14.

> *"The other day we were talking to a nurse, basically saying with these types of integrated solutions, where you used to have to see eighty patients during the week, you [now] only have to see one because the other seventy-nine don't need actual consultations. But what she heard is 'oh, my job is no longer needed.'" (Tjon Chen, Integrated Care Consultant)*

Also, highly trained specialists were used to working in certain ways. Philips' solutions, however, had the potential to significantly change these processes.

> *"The tools available to pathologists have long relied on 'eyeballing' tissue and applying personal expertise to recognize anomalies and patterns in human tissue to diagnose diseases. We propose to change that process." (Krishna Kumar, Business Group Leader, Philips Emerging Businesses)*

But making that change was not easy.

> *"Clinical practice in pathology has operated in exactly the same fashion using slide preparation and microscopy for the last 30+ years. Changing a force of habit is never easy. [...] the importance of molecular, precision medicine and its relation to pathology was not yet fully understood. We're trying to change that and shift hospitals and labs from current practices to digital diagnosis [...]. This is creating the market for digital and computational pathology." (Krishna Kumar)*

Healthcare providers, in general, were not yet clamoring for connected care technology. In the 2017 edition of its *Future Health Index* report series, an international study involving 33,000 healthcare professionals, insurers, and members of the public, Philips found that "nearly three quarters of healthcare professionals and the general population polled say connected care technology is important in improving the prevention of medical issues. Yet nearly as many healthcare professionals (63%) say connected care technology was rarely or never being used when patients are healthy or have no medical conditions."[12] Nonetheless, connected medical devices were gradually changing healthcare practices.

> *"Last week in my clinic I saw a fifty-nine-year-old man with hypertension, high cholesterol, and intermittent atrial fibrillation (a heart rhythm disturbance). Before our visit, he had sent me a screenshot graph of over one hundred blood pressure readings that he had taken in recent weeks with his smartphone-connected wristband. He had noticed some spikes in his evening blood pressure, and we had already changed the dose and timing of his medication; the spikes were now nicely controlled. Having lost fifteen pounds in the past four months, he had also been pleased to see that he was having far fewer atrial fibrillation episodes, which he knew from the credit card-size electrocardiogram sensor attached to his smartphone. In my three decades as a doctor, I have never seen such an acceleration of new technology, both hardware and software, across every dimension of medical practice." (Eric Topol, in an essay in The Wall Street Journal)*[13]

To accelerate adoption of practices relying on connected healthcare technology, Philips was collaborating with medical research facilities, such as Mount Sinai Hospital in New York City, Massachusetts General Hospital in Boston, Karolinska University Hospital in Stockholm, and Rostock University Medical Center.

And Philips was changing the way it did business internally and interacted with customers.

Internal Transformation: Transforming How Philips Did Business

Although Philips' long-term success depended on significant changes in the healthcare industry and new customer processes, the company's immediate concern was the transformation of its own business.

> *"Pivoting into services, solutions, platforms, data and analytics, that is a very different world in terms of how you service, sell, build, [and] interact with customers."*
> *(Blake Cahill, Senior Vice President, Global Head of Digital Marketing and Media)*

In particular, leaders were trying to break down traditional business silos to facilitate integration.

> *"We had to change the way we worked which started with the perception of control. Roles and responsibilities change in the company. It means that, in terms of culture and behavior, you need*

[12] Philips, Future Health Index 2017, p.9.
[13] Eric Topol, "The Smart-Medicine Solution to the Health-Care Crisis," The Wall Street Journal, July 7, 2017.

> *to make sure that people [are] prepared to work together for a bigger goal with the customer as the driving force of all we do." (Frans van Houten, Chief Executive Officer)*

Building and Using Components

A critical concept for developing integrated solutions was to break down offerings into reusable components that could be assembled in multiple ways to meet unique customer needs.

> *"We have often used the analogy of Lego bricks, where we say each Lego brick needs to be excellent. But it's how you put the Lego bricks together for the customer, making them fully interoperable, that gives superior customer value and, by the way, gives us a deeper, longer-lasting relationship and recurring revenues—something that cannot easily be displaced by a competitor." (Frans van Houten, Chief Executive Officer)*

Leaders were considering two types of businesses at Philips: one that created components—those "Lego bricks"—and another that assembled solutions from components. Component businesses would create and manage individual components:

> *"The sensor [a biosensor attached to the body to provide continuous monitoring of a certain condition] is a Lego brick for a general hospital ward solution. But it can also be a Lego brick for a discharge solution—I discharge a patient, I want to keep monitoring this patient at home." (Jeroen Tas, Executive Vice President and Chief Innovation and Strategy Officer)*

Solutions businesses would assemble hardware, software, and service components into solutions.

> *"It's the 'give me all the Lego bricks, I'll build a solution' business." (Jeroen Tas)*

Senior executives viewed their roles as prioritizing the integrated solutions that Philips would pursue, and ensuring that the individual components required for those solutions were available.

> *"We have to make sure that all the constituent elements, the component parts that together build a solution—suites of systems, smart devices, software and services—can actually be put together, that they are interoperable." (Frans van Houten, Chief Executive Officer)*

To ensure an interoperable, reusable inventory of configurable technology and business components (e.g., interfaces to smart devices, analytics, authentication), Philips was building and leveraging digital platforms.

Building and Leveraging Digital Platforms

At Philips, integrated solutions were almost always digitally enabled (for example, by a connected toothbrush, a medical scanner, or a patient monitor) and generated data. Software algorithms analyzed the data, and apps displayed summary information to the user and others as appropriate.

Initially, individual business units had built new digital solutions by developing the required capabilities all by themselves. These one-off approaches brought solutions to market, but often failed to create reusable components. In many cases, they caused redundancies and inconsistencies (for example, in data formats and conventions) that limited data sharing. In short, they were a barrier to integration.

> *"How do you move away from first-of-a-kinds to replicable solutions? From customized versions to the configured ones? That's when you start industrializing."*
> *(Walter van Kuijen, Market Solutions Leader)*

In mid-2014, to facilitate component integration and reuse, Philips had begun developing digital platforms.

> *"Internally we have started to introduce platforms, because we can no longer think in terms of piece-part products, but rather components of systems. If we are to deliver outstanding customer value, interoperability must be the norm, not the exception—and that means a foundation of common platforms." (Frans van Houten, Chief Executive Officer)*

Two platforms—HealthSuite Digital Platform (HSDP) and Connected Digital Platforms and Propositions (CDP^2)—provided enterprise-wide functionality for Philips' integrated solutions.

HSDP ran on the Amazon Web Services (AWS) cloud platform and provided connectivity, authorization, storage, and other basic infrastructure services (see Appendix 3). CDP² was built on HSDP to simplify tbusiness services, such as registering a new device or authorizing a new user. The services available from CDP² shielded application developers in the business groups from having to use the more basic services offered by HSDP. In fact, business unit developers were expected to refrain from using HSDP directly.

Management viewed HSDP and CDP² as essential to the development and scaling of integrated solutions. Philips' success was dependent on continuing to populate these—and potentially other—platforms.

> *"The key point with platforms is it becomes much easier to quickly generate new solutions. If to generate a new solution you have to build from the ground up, that takes a long time." (Dale Wiggins, General Manager, HealthSuite Digital Platform)*

Building and leveraging platforms was a long journey.

> *"We have quite a few pieces. But in the developmental cycle of moving towards a very mature, kick-ass end-to-end platform for Philips, we're in the toddler phase. We're looking forward to getting this thing to maturity!" (Liat Ben-Zur, SVP Connected Digital Platforms and Propositions)*

Hoping to accelerate platform adoption, Philips released updated versions of its platforms at least once every quarter. By mid-2017, Philips had developed eighteen digitally enabled solutions (e.g., uGrow parenting solution, Care Orchestrator) on its HSDP and CDP² platforms, up from just four such solutions in 2015. The release of new components was gradually accelerating delivery of new solutions, and the goal was to have thirty-one solutions on the platforms by end of 2017. Achieving this goal was dependent upon a growing inventory of reusable components, an effort that required significant up-front planning.

> *"You have to think far in advance architecturally of what are you trying to build, why are you trying to build it, and how will it evolve, so you can make the right architectural decisions for software and hardware, for interface designs, and for backend designs." (Liat Ben-Zur)*

Both the component businesses and the solutions businesses faced challenges adapting to a platform strategy. Component businesses had to develop API-enabled components usable across the enterprise.

> *"That is something I learned from Amazon—just give everything an API. [Developers in a business unit] may say, 'Hey, we don't have time [to help another business build a solution], but guess what, we have an API. As long as you use this API it's fine. And there's no other way you can get to my functionality, except through that API.'" (Jeroen Tas)*

For most developers in the component businesses (and the contractors with whom they worked), creating reusable, API-enabled components was a novel approach to building functionality. They had become efficient at tweaking existing systems in their business silos to address new requirements.

> *"If you need new functionality, it's always easier to tweak the legacy a little bit. That's why people have a hard time moving over to platforms. Because it's always, 'I need this little piece of functionality. Oh, let me code it into the existing code base. It's too much risk, too much effort to go to the other platforms.' So therefore, as you see in every company, if you don't do something, legacy always wins." (Jeroen Tas, EVP and Chief Innovation and Strategy Officer)*

Developers in the solutions businesses also had to approach their roles differently. They had to understand both the purpose and the process of assembling components into services.

> *"They say, 'Okay, I see all these services on your web portal, but how will I possibly go about building a solution?' So if you look at the backlog that we have associated with our client experience portal, it's a lot about creating journeys—user journeys—that help walk the developer through how they'd ultimately create applications of certain types."*
> *(Dale Wiggins, General Manager, HealthSuite Digital Platform)*

And while platforms *should* have accelerated delivery of new solutions, some solutions had to wait while reusable components were built onto the platform. In those cases, developers found that the platform approach sometimes resulted in bottlenecks; they could have moved faster had they been allowed to build solutions outside of the corporate-wide shared platform.

> *"If we were a true startup, we would go a lot faster. But we're tied to HSDP, which slows us down quite a bit. At the same time, what we have is very reliable and we can say it's a medically-regulated product." (Derin Basden, Head of Global Solution Delivery, Personal Health Solutions)*

Business leaders regularly encountered instances where platforms were not yet able to support required functionality. For example, because it targeted the Chinese market, one solution required authentication via phone or social networks instead of via the standard email-based service available on CDP² and HSDP.

Given such local differences, some questioned the appropriateness of a single global platform.

> *"[Some customers may be] skeptical as to whether a global platform, which is primarily built with American partners, will work in Germany because we have very strict data privacy rules. Maybe we have to have a German HSDP, and an American HSDP. But then you're talking about a loss of scale and synergies. And then it becomes difficult." (Peter Vullinghs, Market Leader DACH)*

Considering the demand for speed and that not all businesses were alike, the CDP² team examined proposed business solutions carefully to distinguish unique needs from common needs.

> *"If this is just for one business, we're not going to do this with our platform resources. They need to do this as part of their proposition. If it's something that is obviously generic and a lot of businesses can benefit from it, we'll add that to our platform roadmap and it's going to be ready on a certain date. Sometimes that's four to five months out, depending on the backlog that we have." (Liat Ben-Zur, Senior Vice President, Connected Digital Platforms and Propositions)*

Reconciling Digital Offerings and Philips' Operational Systems

While the HSDP and CDP² teams worked to build platforms and help people throughout Philips use them to deliver solutions, the company had to address shortcomings in its operational systems. For example, when a user registered for a pay-per-use or subscription service, HSDP and CDP² would ideally trigger the company's ERP system via an API to invoice the user on a regular basis. However, the effort to convert existing ERP systems—which supported order-to-cash processes—to Philips' Integrated Landscape (PIL) had not yet advanced enough to support this kind of activity.

> *"We underestimated how complex it would be to escape from our legacy, from all those ERP systems, and to go to a new platform approach. That's caused some frustration internally but getting it right is essential." (Frans van Houten, Chief Executive Officer)*

In the near-term, Philips was developing workarounds as needed.

> *"When we launch [a solution] this year, we plan to use a partner in the US to handle invoicing, because our IT systems aren't ready for this particular part of the process. We must invoice the partner directly for a group of users as opposed to invoicing one user at a time, which our IT systems currently can't handle. It's not ideal to use a third party. But this is what we do. We work with a customer, figure out what we can do, and we work with our teams and figure out what they can do." (Derin Basden, Head of Global Solution Delivery, Personal Health Solutions)*

A central IT unit, led by the Philips CIO, was working to build out the PIL platform for operational systems critical to the reliability and efficiency of the company's core business processes. Meanwhile, separate groups (comprised of several hundred IT professionals in the Strategy and Innovation unit) were working to build out HSDP and CDP². Additionally, hundreds of IT professionals from the solutions businesses were using components and building solutions on the digital platforms. These teams adopted development practices better suited to building cloud-based solutions.

> *"The majority of people [within] Philips are familiar with building very robust client-server solutions, or solutions that are completely contained within an individual workstation or an individual embedded product. The cloud requires a very different way of programming—a very different way of architecting, designing, and documenting solutions."*
> *(Dale Wiggins, General Manager, HealthSuite Digital Platform)*

Leaders found that running a platform business required a shift in mindset for everyone in the company.

> *"To get people in an existing business to commit to leveraging shared digital platforms is difficult—because it will typically imply a significant reengineering of their legacy product and system architecture, which comes at a cost. There is also a cultural element in this. It means giving up control over part of your solution stack, and overcoming the "not invented here" syndrome. Driving change effectively depends on the culture of the company. In our company, which has a collaborative culture where decisions are typically based on expertise, not just on hierarchical position, change is not something you can dictate top down. So we have to work a lot on convincing people, finding the right change agents, making people see the value—complemented by clear policies and a firm handshake on the change roadmap." (Henk van Houten, CTO)*

Co-Creating Integrated Solutions

Philips' transition from product manufacturer to integrated solutions provider required new approaches to innovation and customer engagement. In fact, Philips was co-creating solutions with its customers.

> *"The classical process where the business develops something, then they throw it over the fence, and then the sales force sells it, that doesn't work anymore since quite some time. The classical boundaries of a development process are challenged, and new opportunities arise: Market organizations create new solutions together with customers, R&D teams are part of the pre-sales process. We are transitioning to agile development models, with much faster cycles, and blurred internal and external boundaries." (Carla Kriwet, EVP and Chief Business Leader, CCHI)*

Philips wanted to start the process of developing an offering with a deep understanding of the customer's needs. Philips would then provide a customized solution utilizing, as much as possible, the company's existing business components. Hence, co-creation was as much a sales process as a development process.

> *"Account executives engage with their customer on <u>their</u> needs, <u>their</u> pains. It's a whole cycle of getting to what is really keeping them awake at night. It is building that trust and rapport. That is a big task." (Walter van Kuijen, Market Solutions Leader)*

To better understand customer needs, Philips augmented sales staff with consultants who performed solution-related "Healthcare Transformation Services" (HTS). This growing group of consultants helped Philips' customers imagine new processes, such as how to route patients through different stages of the patient journey, or even how to reach clinical decisions.

To deliver solutions that met the requirements of newly imagined customer processes, account executives (who continued to manage customer relationships) worked with solutions teams to configure specific solutions. Leaders of solutions teams were supported by four regional Integrated Solutions Centers (ISCs). ISCs had expertise in key areas like bid management, financial modeling, and partner contracting, and possessed a high-level view of existing solutions. In addition, ISCs interacted with the individual Philips businesses that would provide the components for a solution. The ISCs also brought to bear their overview across the portfolio of already existing solutions to maximize reuse.

Recognizing that some healthcare problems were so complex that customers could not clearly articulate their needs, Philips created HealthSuite Labs. HealthSuite Labs offered a standalone, fee-based service intended to help (potential) customers articulate a vision for change and an approach to fulfilling it.

> *"We don't always know what their challenges are. They don't know what they want. It's a very consultative process that requires talking through to understand."*
> *(Manu Varma, Wellcentive and Hospital to Home)*

When embarking on a HealthSuite Labs engagement, the customer and Philips agreed to solve a complex healthcare challenge jointly. To do so, HealthSuite Labs typically brought together providers (e.g., hospital managers, physicians, nurses), patients, and payers (insurance companies). In total, a HealthSuite Labs session would include 12–40 people, many of whom were not regularly in a position to talk with each other. This multidisciplinary and collaborative approach allowed teams to tackle difficult healthcare issues; their proposed solutions were an improvement for the overall healthcare system rather than a single stakeholder. For example, a HealthSuite Labs engagement could help redesign reimbursement schemes so all parties would profit and were incentivized to do what was best from an overall outcome and cost perspective.

HealthSuite Labs employed a structured methodology for co-creating complex integrated solutions, and incorporated practices from design thinking and agile methodologies. After careful preparation, two multi-day workshops were held over a period of 6–12 weeks. Given the mix of perspectives and the intensity of the process, it was also labeled a "pressure cooker" approach. The first workshop, entitled "Vision Lab," focused on articulating a well-defined problem statement (agreed to by all stakeholders) and developing a joint vision for how to solve the problem.

> *"Getting people to try and articulate their vision is always difficult. One company said they want to cure or prevent people from developing Type 1 diabetes. That is a very ambitious problem statement. What are you going to do specifically within that problem set? How do you merge assets from multiple organizations symbiotically? And how do you actually deploy it in the marketplace?" (Mark Slaughter, Strategy and Innovation)*

The second workshop, called "Solution Lab," involved a deep-dive into the design of a solution.

Although HealthSuite Labs engagements were initiated by customer request, or proposed by salespeople or consultants, they were not designed to directly sell Philips products or solutions.

> *"Product 'sales' pitches are not allowed in HealthSuite Labs engagements." (Ron Buron, Regional Director, Account Executive)*

Despite that, Philips brought a variety of internal resources—business managers, R&D staff, design experts—to every Lab session. For Philips, the payback on this investment was threefold. First, Philips' people felt they better understood the needs of patients and providers.

> *"We have progressed a lot in becoming more patient centric. We had talked a lot about patients, but I never actually met a patient until we started pioneering HealthSuite Labs. It made me humble, because of the burden the disease entails for patients. The way they are supported is far from optimal." (Mark van Meggelen, Business Leader, CCHI, Benelux)*

Second, participants from Philips were learning which business components could be reused, and how components could be configured to meet customer needs. The idea behind co-creating a solution was not only that individual customers would get a solution to their specific problem, but also that Philips would identify common requirements to make its solutions business scalable.

> *"Every solution is designed for a specific customer, reusing as much as possible proven and replicable building blocks." (Walter van Kuijen, Market Solutions Leader)*

Third, by bringing together healthcare providers, payers and policy makers, HealthSuite Lab sessions helped Philips with the required external transformation of how the healthcare industry worked.

By mid-2017, Philips had conducted thirty HealthSuite Labs sessions. They were labor intensive, but they had triggered positive customer reactions.

> *"The feedback: "Wow!" Overwhelmingly positive. The customer acknowledged that they could never have done it on their own. The customer's CEO is talking about this meeting in board meetings. It really helps change our brand perception from just a patient monitoring vendor or an MRI vendor to a true strategic partner." (Ron Buron, Regional Director, Account Executive)*

Solutions would continue to evolve once Philips learned how they were being used by customers.

> *"The whole point of making something digital is so you can have an ongoing conversation with the customer about the product. You no longer [need] focus groups to understand what features people like or don't like, because you're getting real-time information on exactly what features people are using and not using. You can dynamically improve your product." (Liat Ben-Zur, Senior Vice President, Connected Digital Platforms and Propositions)*

Managing the Transition

In 2017, the majority of Philips' revenues came—and would, leaders anticipated, for several years to come—from traditional product sales, not integrated solutions. Neither Philips nor its customers were ready for the company to abandon its traditional business model.

> *"You don't become a solutions company overnight. So, in terms of bread and butter, of course we still have transactional business [...]." (Frans van Houten, Chief Executive Officer)*

Company leaders recognized that, individually and collectively, employees had much to learn about the solutions business. They had found it relatively easy to offer digital propositions that merely added an app to an existing medical or consumer device. But moving beyond app-enabled devices to integrated solutions demanded entirely new competencies.

> *"It's no longer just about the hardware roadmap, where you stick an app on it. You have to think about data, the value of data. You have to have a data strategy. What are you going to collect? Why are you going to collect that data? How are you going to use that data? How do you make sure that we track that data, and leverage the insights from that data to improve the product, to improve the understanding of the consumer?" (Liat Ben-Zur, SVP, CDP²)*

Individuals throughout the company faced new challenges. For example, a salesperson might have to shift from responding to an RFP for a patient monitoring system to proposing integrated solutions that would help providers deliver better, cheaper healthcare. Or instead of selling to the head of radiology, he or she would now consult with the hospital's CEO. Not everybody was equipped to do this.

And knowing that many customers still sought traditional Philips products, the company could not completely abandon the structures, roles, and processes critical to selling medical and consumer products.

> *"You have a business that has a lot of 'gravity'—and that's still largely our product business. It's 'the quarterly machine' that drives your quarterly results. And the company has been wired around that. So that's the way people are incented, that's the way marketing is organized. That's the way you optimize your supply chain. And it's orthogonal to integrated solutions. So it's very hard to change that machinery." (Jeroen Tas, EVP and Chief Innovation and Strategy Officer)*

The need to retain much of the machinery that had made Philips successful while having to reposition the company as a solutions business was creating constant tensions.

> *"It's a struggle: 'Today, do I focus on my transactions, or today do I focus on the bigger picture, and the integrated solutions?'" (Ron Buron, Regional Director, Account Executive)*

Furthermore, incentive systems contributed to the tension.

> *"You cannot [only] incentivize your salesforce on the transaction anymore. You'll need to [also] incentivize [...] on building a credible funnel of qualified opportunities and converting those, because that's the future value for our customers, for us as a company and to our shareholders." (Walter van Kuijen, Market Solutions Leader)*

Philips was introducing new training and certification programs for salespeople, while revamping incentives. However, individuals could easily feel overwhelmed by the scope of their responsibilities.

> *"The challenge is understanding the breadth and the depth of our portfolio solutions. It's very difficult for any one executive responsible for their silo, to try to appreciate, all at once, this woven blanket of solutions." (Ron Buron, Regional Director, Account Executive)*

To address these issues, Philips had initially created a central team to focus exclusively on solutions. This team and the traditional businesses, which shared P&L responsibilities with the markets in BMCs, had worked in parallel. But the attempt to separate solutions from the rest of the business ran into issues.

> *"[The central solution teams] worked with customers, but sometimes overpromised, creating issues in the end." (Carla Kriwet, EVP and Chief Business Leader, CCHI)*

Management responded to the issues created by the centralized team by having solutions teams draw resources from the central businesses and the decentralized markets team.

> *"So in the market organization we have developed the next iteration of the blueprint, where we have a standing sales organization, with reps per product, and then we have a solutions organization which specifically engages with the C-Suite, and those customers who are prepared to move on a more holistic path. That gives us focus on both [solutions and more transactional sales]." (Frans van Houten, Chief Executive Officer)*

In this setup, product-focused sales representatives would mostly identify leads for the solutions team, which would then follow up with the customer on more complex integrated solutions. This way, the local market organization (overseeing both sales representatives and solutions teams) was aware of both ongoing, traditional dealings and solutions business with their customers.

> *"So therefore, we are carefully picking the people who are joining the solution sales team. We are educating our existing customer organization in identifying potential customers and generating leads for the solutions team. And then the follow up on the leads is being done by the expert teams such as the connected care team, the EMR team, or by a dedicated solutions team." (Gerrit Schick, Business Group Manager DACH, CCHI)*

It was clear to top management that this was unlikely to be the final design of the organization. The company would have to learn and adjust accordingly.

> *"So from experimenting with solutions sales on the side, we now move to the standing organization for standard products with a solutions organization that can handle these more sophisticated customer projects. And maybe in the coming years, when the dominant business model is the solutions business model, those standard products might go through distribution, through a dealer, and the rest is carried out by us. So I think you need to constantly evolve." (Frans van Houten, Chief Executive Officer)*

At the same time, too frequent changes in organizational design threatened to demotivate and confuse.

> *"Sometimes, I think we change our views too often for a big company. That can be difficult to follow and sometimes very frustrating." (Peter Vullinghs, Market Leader DACH)*

In the near term, Philips needed to seize the right opportunities to foster organizational learning, build capabilities, and work with leading-edge customers.

> *"When we get a [customer] request, the first question we should be asking is, 'Is this a one-off, or can we use it for other customers?' Because that's a good investment." (Derin Basden, Head of Global Solution Delivery, Personal Health Solutions)*

That also meant Philips had to reject opportunities of limited value, which was easier said than done.

> *"There are so many opportunities, and as a Dutch businessman, when I see a big opportunity my heart bleeds to say no. But obviously we need to set our priorities and have focus … this is also part of business management." (Peter Vullinghs, Market Leader DACH)*

The company also expected to learn from its mistakes.

> *"When we make big, $50 million mistakes, they are usually because we are killing something too late. It's the typical innovator's problem." (Frans van Houten, Chief Executive Officer)*

Building a Healthcare Industry Ecosystem

While Philips believed integrated solutions would help deliver better healthcare outcomes at lower cost, it was also clear to management that Philips would not be able to meet all needs requested by customers all by itself. Hence, Philips considered building ecosystems.

Like other ecosystem orchestrators (e.g., Apple, Google), Philips wanted to provide the "operating system" for HealthTech solutions, and to enable third-party development of smart, connected components such as medical devices. To that end, Philips had started to provide software development kits (SDKs) and access to its APIs. Opening up to third parties like this would increasingly make it possible for Philips to address customer needs with a broader selection of components.

The technological foundation for the ecosystem's "operating system" was HSDP. In addition to serving internal solutions, Philips intended to make HSDP an industry-wide standard platform.

> *"We believe this industry needs a healthcare-focused platform, and we believe that we have proven that we can [deliver on] a very wide range of use cases. We're not there yet, but we're well on our way." (Jeroen Tas, Executive Vice President and Chief Innovation and Strategy Officer)*

HSDP was already being offered as a platform-as-a-service (PaaS) to external parties.[14] Just as developers could use the Amazon AWS, Microsoft Azure, or Google App Engine platforms to build software solutions in the cloud, they could use HSDP's services, offered via APIs, to build solutions and components for the healthcare industry. Philips would guarantee not only technical availability of services, but also healthcare data privacy regulation compliance crucial for anyone working with medical data.

In mid-2017, the developer portal HSDP.io provided a service catalog, but the platform was available only to invited partners, in part because onboarding new partners was a labor-intensive process.

> *"This is still work in progress; we aren't where we need to be yet. But our intention is to make HSDP a completely self-service environment. It needs to be, to allow us to deliver these services at the cost point that Philips needs to be successful in this market. And it's the only way to scale. If we have to keep adding people to service each individual client request, there's just no way that's going to work." (Dale Wiggins, General Manager, HealthSuite Digital Platform)*

At the same time, making HSDP available commercially meant allocating development capacity externally.

> *"Commercializing a digital platform externally is not a convincing proposition as long as you are not migrating your existing and most successful businesses onto it yourself, solving all implementation difficulties in practice, and demonstrating the end user value. So this is the first priority. It is a bit of a dilemma, as external users will be needed to drive scale."*
> *(Henk van Houten, Chief Technology Officer)*

For Philips, HealthTech startups were one potential source of ecosystem partners. In 2017, Philips had created a startup accelerator, Philips HealthWorks, with locations in Bangalore, Shanghai, Cambridge (US), and Eindhoven. The accelerator offered infrastructure (e.g., HSDP), financial resources, industry contacts, and expert insights to selected early-stage startups as part of a three month program. Philips expected the startups could become valuable contributors to, as well as consumers of, Philips' HSDP-based healthcare ecosystem. Philips was planning to invest €75 million in early-stage HealthTech startups over ten years.

Philips was already engaging with partners to further its ecosystem. For example, in early 2017 German car manufacturer Daimler AG had announced a partnership with Philips to promote drivers' wellbeing that made use of data from Philips' connected devices while driving.[15]

Ecosystems introduced another layer of change within Philips. Sales teams would need to understand partner products to design integrated solutions. Back office personnel would need to master the art of revenue splits, as solutions leveraged third-party offerings. Support staff have to solve problems related to partner products and services. And Philips would need to learn how to partner with traditional competitors, such as Siemens and GE, to truly fulfill its role as a trusted provider of integrated solutions.

Looking Ahead

In mid-2017, Philips' transformation to a solutions-based company was ongoing.

> *"We still need to further define the solutions and related business models, and not all sales people are comfortable selling it yet." (Carla Kriwet, EVP and Chief Business Leader, CCHI)*

Creating a shift in mindset was considered critical to the company's success going forward.

> *"I think we've come a long way. The next chapter is really developing those capabilities, along with full solutions selling. And people thinking in solutions rather than just products."*
> *(Pieter Nota, former EVP, Chief Business Leader Personal Health Businesses and CMO)*

People were inspired by the company's mission and, as a result, Philips was attracting top talent.

> *"A very powerful vision attracts bees to honey. We now have a crisp focus in the company and we say, 'We are a health technology company. And we help hospitals and care providers drive better*

[14] While HSDP was offered externally, CDP² was restricted to internal access as it offered services that codified the "Philips way" of some processes, such as registering customers and devices.
[15] "Holistic concept for greater well-being and fitness: Mercedes-Benz 'Fit & Healthy': Comfort is becoming even more intelligent," January 6, 2017, on the Daimler AG Global Media Site, https://bit.ly/2q7kFFu

> *outcomes and higher productivity. Come and join Philips because you will do something really meaningful.' That works fantastically. We've had AI engineers coming to us and saying, 'Rather than predicting next year's fashion trends, let's see if we can help care providers predict how a patient outcome can be improved.' So that's cool." (Frans van Houten, Chief Executive Officer)*

Management was pleased with progress and optimistic.

> *"It's working, and it's great to see that the customers now see us as leaders. Employees are champing at the bit and shareholders are starting to have confidence. We're at a fifteen-year high in our share price. Actually, I got an email this morning from a shareholder that said, 'If you continue with this mission, innovation, and drive for customer value, the value of your company can go a lot higher.'" (Frans van Houten, Chief Executive Officer)*

Acknowledgements

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Appendix 1 – Philips Organization

This chart illustrates the high-level organizational structure of Philips and includes interviewees for this case study. It is not a comprehensive organizational chart.

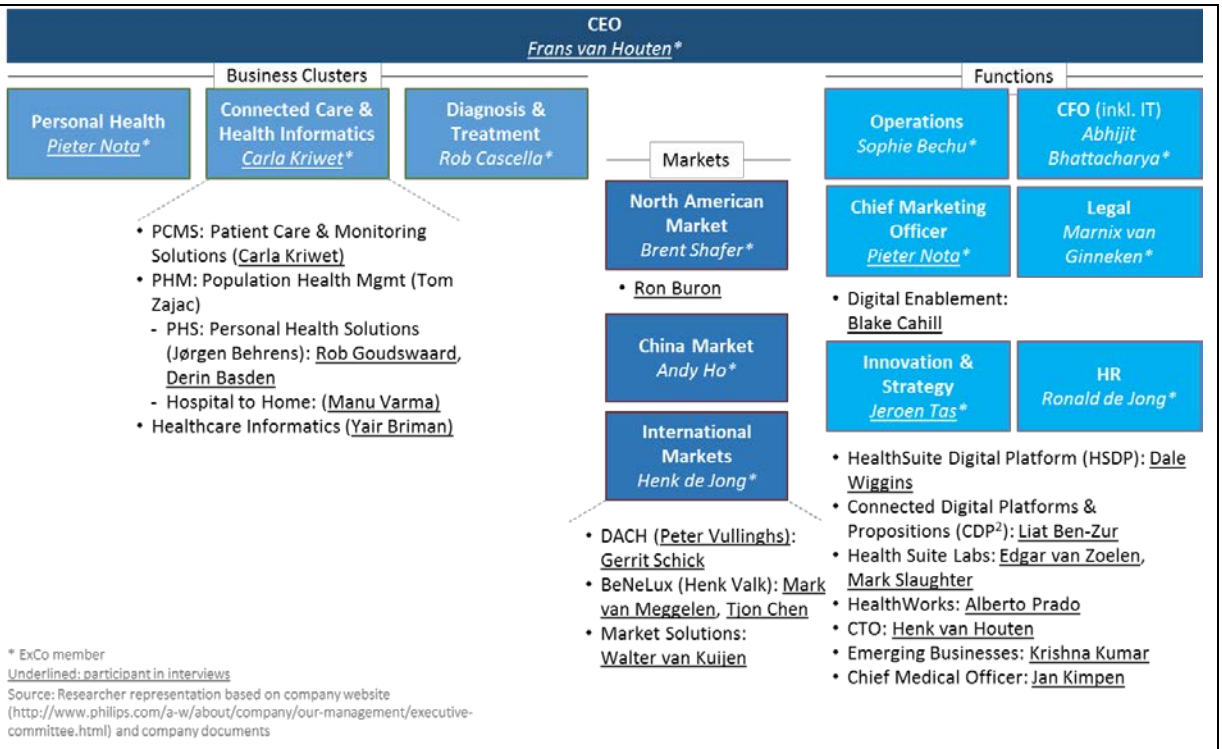

Figure 2. Philips Organization

Appendix 2: Philips Financial Performance

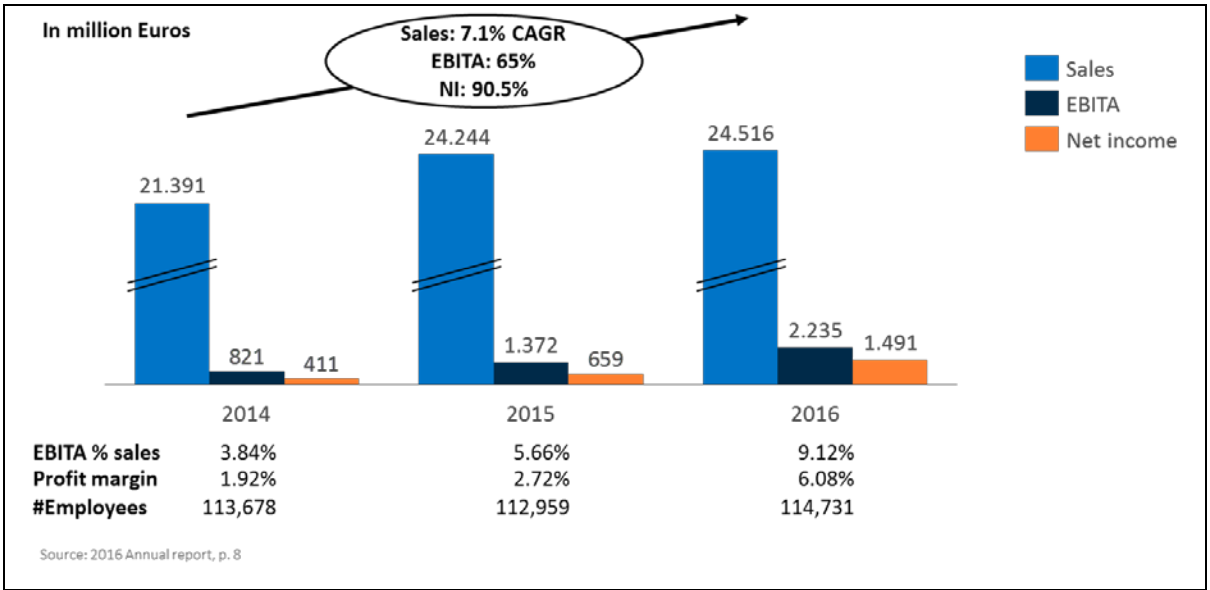

Figure 3. Philips Financial Performance

Table 1. Philips Financial Performance by Business Unit

FY 2016	HealthTech			Lighting
	Personal Health	**Diagnosis and Treatment**	**Connected Care and Health Informatics**	
Share of total revenues	30%	28%	13%	29%
Adjusted EBITA	15.6%	9.4%	10.3%	9.1%
Employees[16]	70,924 (including "HealthTech Other")			34,256

Table 1. Philips Financial Performance by Business Unit

Sources: Details from Philips, *Annual Report 2016*, December 31, 2016, from the Philips Investor Relations website, p. 8 (top), p. 21 (bottom row), Philips, Fourth Quarter and Full Year 2016 Results Information Booklet, January 24, 2017, from the Philips website, p. 4, (middle row).

[16] HealthTech employees include "HealthTech Other;" HealthTech and Lighting employees do not include 9,508 employees from discontinued operations and 43 "Legacy Items" employees.

Appendix 3 – Digital Services Offered by HSDP

Table 2. Digital Services Offered by HSDP	
Service category	**Services in this category offer the following functionality:**
Authorize	Provide centralized identity and access management, securely identify users, authorize consent, ensure data privacy, track user activity
Connect	Manages update, monitor, and remotely control smart devices ranging from consumer-grade wearables to large medical systems. Also provide capabilities to collect data from those devices and third-party services for use in clinical and personal health propositions
Host	Provide tools to monitor the health of systems and performance of applications across global deployments
Store	Acquire, access, and manage personal data from devices and applications through a cloud-hosted repository
Analyze	Furnish the foundational infrastructure to build decision-support algorithms and machine-learning applications
Orchestrate	Provide functionality to support an application's ability to create and complete routine tasks and to coordinate communications among users
Share	Permit building standard interfaces between HealthSuite-enabled applications and devices with external third-party systems to facilitate cross-enterprise integration

Table 2. Digital Services Offered by HSDP

Source: "Catalog," Philips HealthSuite Client Portal, www.hsdp.io/catalog.