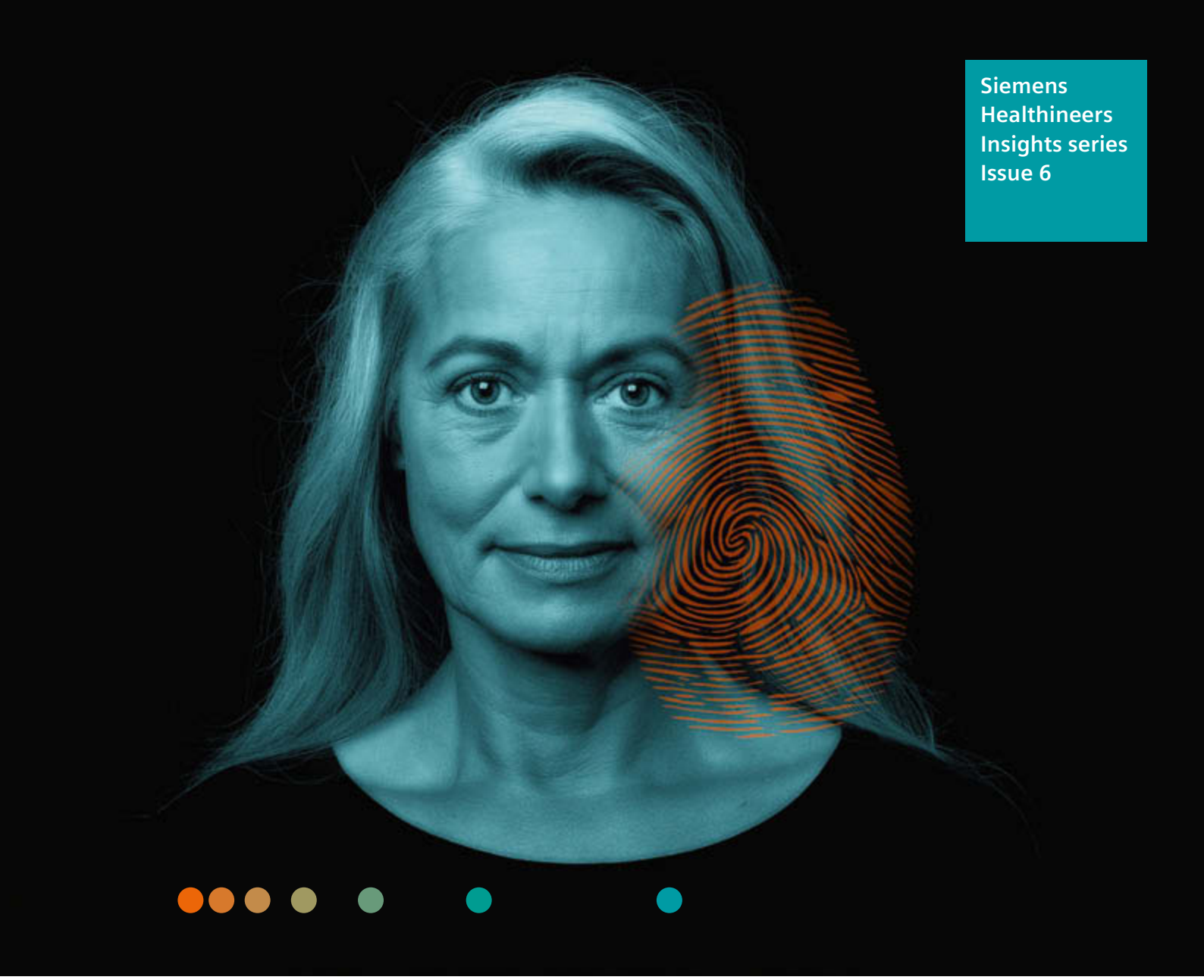

Siemens Healthineers Insights series
Issue 6

Standardization and personalization: lessons from other industries

A paper on effectively managing variations in healthcare with Prof. Michael T. Modic, Vanderbilt University Medical Center

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SIEMENS Healthineers

About Siemens Healthineers Insights series

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Paper

Standardization and personalization: lessons from other industries

Executive summary

Today, healthcare providers and their executives worldwide are under increasing pressure to generate higher value and reduce costs. In order to successfully pursue these two goals, this paper identifies lessons from other industries on how to effectively manage variations in healthcare: reducing unwarranted variations and enhancing warranted, or necessary, variations. By assessing numerous industries, including manufacturing, retail, banking, transportation and hospitality, we suggest best practices on how to deliver and bring together standardization and personalization.

Manufacturing offers lessons on how to lower costs and reduce unwarranted variations by focusing more strongly on standardization, which is highly effective in improving quality, safety and efficiency. Retail, with its emphasis on segmentation and customer service, can help healthcare executives to understand patients in a more multidimensional and individualized way, making it easier to focus on meaningful variations. Banking, transportation and hospitality have been transformed in recent years through digitalization and interoperability, resulting in lower costs and an improved customer experience.

Historically, the fields of medicine and healthcare have been somewhat insular, often thinking of themselves as unique. In today's competitive, consumer-driven, globalized marketplace, we believe this attitude must change. Other industries have important insights to offer – and we can learn to accelerate the delivery of higher-value care. This can significantly help to expand precision medicine – removing waste while at the same time helping to customize and personalize healthcare.

We believe these three approaches – standardization, personalization, and the better use of digital data – can be more effectively deployed throughout the healthcare system.

The challenge

The need to reduce unwarranted variation is a fundamental challenge facing healthcare systems and providers worldwide.

Variations in care delivery – variations not justified by specific patient conditions – are undesirable for several reasons: they drive up costs, they result in an inefficient allocation of healthcare resources, they fail to improve outcomes, and they frustrate patients. These can also be called "bad" variations. Differences in how care is delivered among similar patients with the same disease in different locations, or in different departments or by different clinicians, serves as an illustrative example. On the other hand, not all variations are bad. There are also "good" variations. For example, those that take into account a specific patient and his or her condition. These types of variations permit individualized care, which enhances patient comfort and improves outcomes. The challenge is distinguishing between these two categories of variations and applying this knowledge. Two techniques or practices that can provide assistance in identifying and distinguishing warranted variations ("good" variations) from unwarranted variations ("bad") are standardization and individualization.

Effective decision-making can also be greatly enhanced by digitalization. Much of the digital data that currently exists within the healthcare system is currently not being leveraged as well as it could be. Much of this data is not connected, making it inaccessible to those who can benefit from it. Consequently, the data we already have often fails to deliver actionable results. We believe these three approaches – standardization, individualization, and the better use of digital data – can be more effectively deployed throughout the healthcare system, by hospitals, by practitioners, and by healthcare policy-makers, and can contribute to significant benefits for patients as well as providers.The business and care models for managing lives over an open-ended time is distinct from the specialty care model which is most often aligned with the moment or episode. Take the case of primary care. Today's primary care model in the U.S. is based on volume and Relative Value Units (RVU: Medicare reimbursement formula). This model is not sustainable. Managing lives is becoming more important than just seeing patients. Expectations to provide meaningful preventive care, management of acute and chronic conditions, closure of care gaps that vary by payer, educational, care coordination and payment/care navigation needs overwhelm the traditional capabilities of small and large primary care practices.

Specialty care, on the other hand, continues to focus on the episode and in most volume-driven models continues to be the major component of the revenue stream. This can result in conflicts. In the eyes of one executive, it's relevant to highlight that even in the current volume-driven model, in most elective and episodic procedures, for example hip replacement, understanding the variations in critical steps during this procedure does deliver higher value by driving down costs and improving accuracy. Change to value will not happen at once and thus it is critical to preserve the success of the existing model while gaining market relevance by adopting a new one. Fortunately, the blocking and tackling approach of combining lessons from manufacturing, retail and other industries supports both the old and the new.

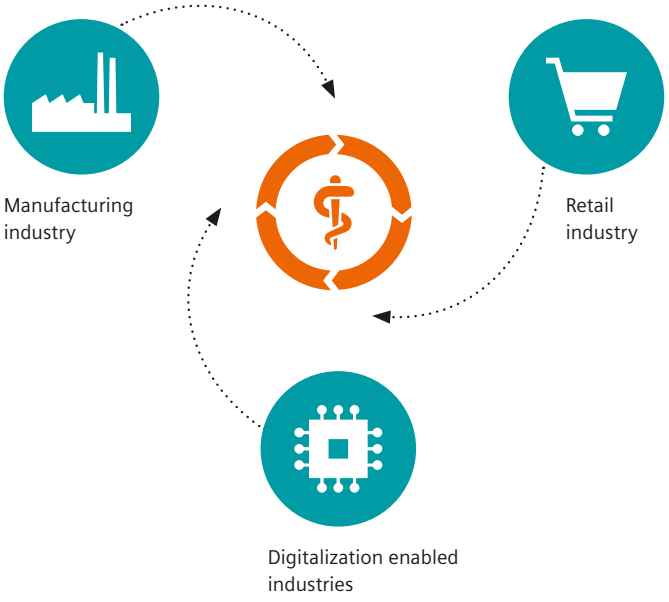
The solution

Solving these problems in hospitals and other healthcare organizations requires leadership from the top. CEOs must lead this effort and be willing to take the necessary steps to revamp their operations, especially in terms of evolving business models.

Learning from other industries:

As healthcare leaders look at the task ahead of them, we propose that they look beyond the parameters of the healthcare sector to other industries, where important advances have been made:

- Manufacturers know how to reduce unwarranted variation, improve quality, enhance efficiency, and keep unit costs low.
- Retailers know how to add warranted variation through market segmentation and personalized customer goods and services.
- The changes that have taken place in industries such as banking, transportation and hospitality provide insight on how to manage and use data more effectively and can make it easier to identify both warranted and unwarranted variations.



1. Lessons from manufacturing: standardization

The success of the world's leading manufacturers rests in large part on their ability to provide consumers with a consistent level of quality at a reasonable cost. Whether it's one of the 200 million iPhones purchased annually, or one of the 4 billion cups of coffee sold by Starbucks every year, the customers who purchase these items do so with confidence that they know what they are buying. Maintaining this customer confidence – and doing so at a reasonable cost – requires an extremely high level of standardization. Processes, materials, and quality control protocols must be consistent, wherever in the world the products are being offered. This standardization, this drive for consistency, can be classified as the elimination of unwarranted variation.

The working environment of leading global manufacturers offers a valuable insight into how this is achieved. The factory floors of these organizations are organized, efficient and calm. The routines and processes they have in place have been designed to do the same things the right way, day in and day out. Workers understand their roles, processes have been refined and optimized, equipment and machines operate at peak efficiency. To replicate this in healthcare delivery would require greater standardization in three broad categories – disease-based, procedures and processes. Disease-based standardization would include changes in the way patients with acute or chronic conditions such as acute stroke or COPD are cared for. Standardization has already contributed to significant improvements in procedures such as total joint replacement. In the context of processes, standardization can help to ensure that best practices are followed, and that compliance, variations and outcomes are measured in order to contribute to a continuous improvement cycle. The actual steps of a patient's transition from, for example, a hospital to home or to a nursing facility are well known and best practices have been identified and established. The challenge is to consistently follow the procedures in place. This has proven to be challenging. In order for standardization to be effective in a healthcare environment, it is essential that evidence-based guidelines are developed, accepted and implemented. Only then can the highest quality outcomes and the most effective forms of standardization be achieved.

Local conditions at each healthcare provider setting need to be considered, together with an individual organization's culture of self-improvement. The move to global standardization in healthcare would not be an incremental change but would be highly disruptive. It must, therefore, be managed effectively and sensitively. Once in place, a focus on standardization will benefit from continual incremental improvement. That is something that the most successful manufacturing industries value to a high degree. Evidence-based guidelines can only be executed consistently if they are customized, agreed to and adapted by the leaders and their teams in an organization. This approach isn't just good for patients, who benefit from improved care, but also for the bottom line of healthcare providers. A second area where leading global manufacturers have been very successful is in their ability to ensure the reliability of their products and of their operations, including a strong focus on quality and safety. In the medical field, one speaks of "never events" – things that should never happen but sometimes do, for example wrong level spinal surgery. When asked about this, one industrial manager responded, "What is it that you don't get about never events?" In his view, never events should never happen. Manufacturers implement norms and procedures to make sure they don't happen, ever. In healthcare, we treat these occurrences as inevitable, instead of taking the necessary steps to ensure they never happen.

200 million iPhones purchased and 4 billion cups of coffee sold by Starbucks every year demands rigorous standardization.

Learning for overcoming challenges:
If one accepts the value and benefits of greater standardization in healthcare, the question can be asked, "If guidelines already exist, why can't they just be implemented?" Posing this question in this way overlooks a number of essential challenges – challenges related to human nature, organizational behavior, and to the differences that exist among patients and within healthcare organizations.

• **Every patient is different:** The goal of Apple is to ensure that every iPhone that rolls off their assembly lines is identical. With patients who leave a hospital or clinic, the goal is not that simple. Even when standards are in place for one or more conditions, healthcare providers must be sure which one is the right one to use for each specific patient. In that sense, reliance on the accuracy of the patient diagnosis is essential. As in manufacturing, the quality of the input is important. In healthcare, this can be reached by reducing diagnosis variations with technology adapted to the patient, reducing operator bias, and providing access to relevant patient data. This permits the reduction of variations across the continuum of care.

• **Getting buy-in throughout an organization/stakeholder engagement:** Implementing greater standardization throughout an organization can result in a corresponding decline in the decision-making power of some employees. This can be perceived by some as a loss of authority or freedom. In order to be successful, any standardization approach cannot be treated as a one-size-fits-all off the shelf solution. Instead, it must engage all stakeholders. This demands a multidisciplinary approach to create a sense of ownership. New guidelines must be workflow friendly and adaptable to the environment in which they are actualized. Teams must be ready to work together on end-to-end care and hand-offs. If practitioners create the system themselves, they are more likely to put life into it. Such guidelines and processes do not need to be reinvented, but efforts must be made to ensure that measures are adopted and adapted locally to ensure acceptance and effective use.

• **Reforming healthcare organizations:** an end to the "medieval guild system": Embracing a more multidisciplinary approach can run counter to the traditional operating principles that still exist in many healthcare organizations, which can be likened to the "medieval guild system". This is evident when issues cross profit and loss structures in traditional accounting systems, for example. CEOs need to work with their teams across pedigrees to open space for this cultural shift. For example, instead of handing a patient back and forth between departments, a seamless team should deal with someone suffering from a condition that crosses disciplines. Another related barrier to greater standardization throughout the healthcare system are the established professional habits of medical practitioners. Many caregivers are used to doing things in a certain way, the way they have always done them, and not all practitioners followed guidelines consistently. This is a result of their training and of the professional environment and culture in which they work. Overcoming this can be a significant challenge.

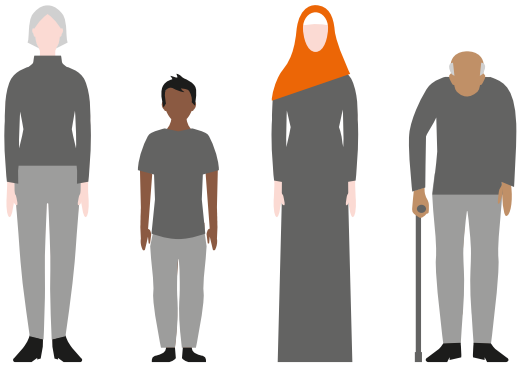
Cleveland Clinic reduced total cost of care for stroke patients by 20% with increased standardization over different venues.

• **Greater discipline and oversight:** Successful implementation of standardization measures also requires a higher level of internal discipline and transparency. Procedures and measurements for documentation, care, and outcomes must be more clearly defined. Health Status Measures (HSM) and Patent Reported Outcome Measures (PROM) are important tools for measuring validated outcomes to assess the efficacy of treatment and process. These should be constant over time, venue, and provider. Patient and provider outcomes need to be validated, accurately reported and, ideally, embedded in the patient's electronic medical record (EMR) whenever possible. The patient experience needs to be analyzed, measured, and factored into the evaluation, and we can see PROMs increasingly being adopted in the clinical practice in various centers around the world. Accurate costing also needs to be factored into the process at each stage. All of this will help physicians to develop new defined processes and tools that can help ensure continuous improvement.

• **Implementation:** As in manufacturing, the implementation of standards requires specific design and organizational changes. Measuring the impact of these changes through appropriate KPIs is relevant in the manufacturing world, both to monitor the effectiveness and for engaging the teams in how their effort is influencing critical results. Standardization of care is not new and there is ample evidence that it works, for example with acute diseases such as stroke. Accepted guidelines already exist and the accreditation efforts of stroke centers have improved care. Yet even in this situation, where everyone should know what to do, significant variation can and does still occur. At the Cleveland Clinic system, embedding the stroke care path in the EMR across different care settings (for example outpatient sites, emergency rooms, hospital floors and ICUs) increased standardization over different venues and made the measurement of compliance more consistent and effective. This resulted in better outcomes with reduced costs through more consistent adherence to evidence-based standards. The number of invasive procedures dropped, fewer people went through intravascular thrombolysis, and the number of related complications fell substantially. Additionally, the total cost of care decreased by 20%. This wasn't a result of a new discovery. It was the result of doing what should have been done in a more consistent way with a stronger focus on measuring compliance and variability. The Mayo Clinic saw similar results. More effective application of its existing stroke pathways resulted in a net cost reduction of nearly 10%, with no adverse impact on outcomes.

Looking at specific procedures, hip and knee replacement has been the poster child and national programs such as BPCI have shown significant impact. Baseline evaluation has determined significant variability in care around length of stay in the hospital, type of implant and use of post-acute care. Using best practices and evidence-based standards, multidisciplinary groups developed standardized approaches that focus on these known variations and agreed to follow them. The results have been significant cost reductions while maintaining or improving outcomes (total hip arthroplasty pathway has reported a decrease in LOS, increase in discharges to home, and cost savings of $2,533 per patient).[1]

1 Implementation of a Total Hip Arthroplasty Care Pathway at a High-Volume Health System: Effect on Length of Stay, Discharge Disposition, and 90-Day Complications. Featherall J et all. J Arthroplasty. 2018 Jun;33(6). [Online] URL <https://www.ncbi.nlm.nih.gov/pubmed/29478678>, [Accessed: 21. August 2019].



Personalization takes a full multi-dimensional view of patients

Medical
Patient's clinical record and dispositions

Cognitive and behavioral
Patient's ability to understand the sitution and act accordingliy

Social
Patient's social network of help and support

Functional
Patient's ability to move and carry out procedures independently

2. Lessons from retail: personalization

The manufacturing sector, as we have seen, owes much of its success to standardization. Successful manufacturers have been able to significantly reduce, or even eliminate, unwarranted variations resulting in greater efficiency, higher quality control, lower costs and greater customer satisfaction.

The retail industry offers a different lesson: successful retailers have moved in the opposite direction. What they have mastered is personalization. Customization. Precise individualization of products and services. This approach also offers valuable ideas for healthcare providers and practitioners. Simply reducing costs and introducing greater standardization is not always an effective or appropriate approach in a healthcare setting. Two of the criticisms that are leveled against embracing a wholesale manufacturing best practice standardization mindset are: 1) patients are not widgets in a factory, and 2) within the practice of medicine there is an element of 'art' that must be acknowledged. Both points are valid to a degree. Reducing unwarranted variability is essential. But it is equally important that the right kind of variability is added back into the equation. The retail sector uses market segmentation of populations to better understand their unique needs and preferences, for example in product design. The fashion retailer Zara offers multiple variations of clothing, styles, and fabric patterns. Starbucks offers their customers an almost bewildering range of options to customize their coffee. This type of segmentation adds value and can be classified as warranted variation. Retailers understand the importance of customer variables. In the healthcare industry, however, these data points have, in the past, not been effectively factored into individual or population care. Extensive patient data does exist – but it is not utilized effectively. If we look at healthcare, patients' medical records can be an important source of relevant data, helping practitioners to tailor their care. Patient Reported Outcome Measures (PROMs) are questionnaires designed to characterize health status by asking patients to self-report their symptoms or conditions. Other social, functional and behavioral characteristics of patients can also be helpful in ensuring that treatment options are optimized, for example a patient's level of health literacy, whether they live with a partner or on their own, their cognitive status, or transportation barriers they face. People's attitudes towards the healthcare industry can also be factored in. Can they be classified as convenience seekers? Frequent fliers? Experience-driven deciders? Knowing this about them can be extremely helpful in personalizing their healthcare experience as well as in building customer loyalty.

Looking at the totality of this data suggests that the common term population health is somewhat misleading. There is no one homogenous, uniform population. Instead, there are multiple populations. It would, therefore, be more accurate to speak of populations' health.

Digitalization must be understood as an enabler for the bigger and more fundamental goals of the organization, not as an end in itself.

3. Lessons from banking, transportation and hospitality: digitalization

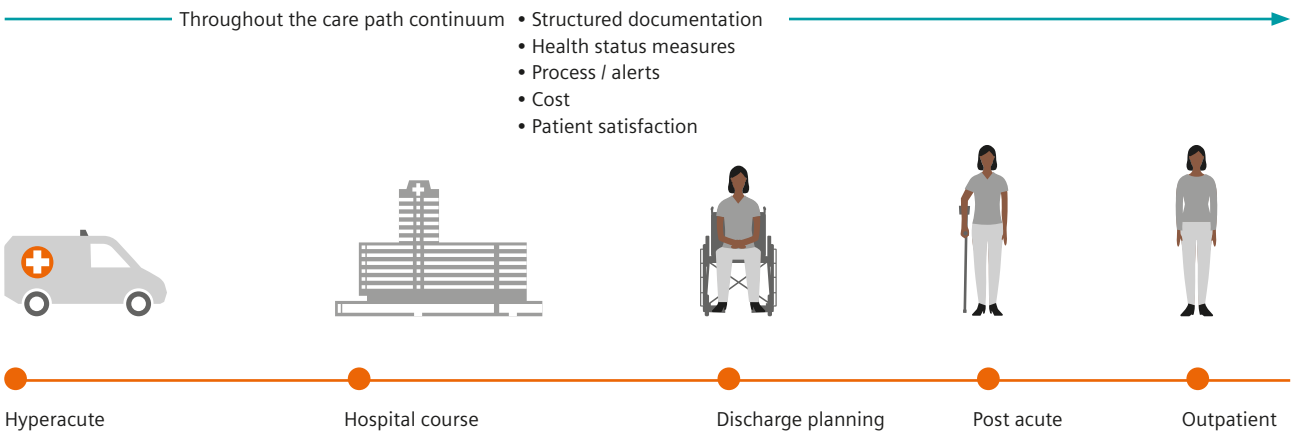
Over the course of the past two decades we have witnessed massive disruption to numerous established industries including banking, retail and logistics, travel planning, personal transportation, and hospitality. Banking has been transformed by online financial services; retail and its logistics have been upended by Amazon; travel planning has been fundamentally altered by services like Expedia; personal transportation has been revolutionized by Uber and others; and the hospitality industry has been re-defined by companies such as Airbnb. What these transformations all have in common is their technological foundation: digitalization. Consumers have clearly made their decision – they have come to demand the convenience, choice and flexibility digital services offer. Within organizations, digitalization and the use of data have also led to transformative changes and significant improvements in efficiency and quality. But the healthcare sector is only now beginning to fully embrace the possibilities of digitalization. Several lessons can be taken from a review of the changes that have taken place in these industries – lessons that offer actionable insights for the healthcare sector.

Digital disruption is inevitable

First: digital transformation will be disruptive. There is no way around this fundamental truth. As in each of these industries, established ways of doing things will change, and many traditional processes will have to be abandoned. The travel and hospitality industries, as an example, were initially unprepared for the radical changes brought about by Expedia and Airbnb. Customers were suddenly no longer in direct contact with hotels or travel agents but were, instead, looking at multiple options online, comparing prices, evaluating features, and thinking more carefully about their own travel priorities and preferences. Those hotels that clung to the old way of doing things – waiting for guests to arrive at the reception desk or for a travel agent to call – were at risk of being left behind. Forward-looking hotels, however, adapted to this disruptive development. These hotels responded by improving their own online services and by competing directly with the various travel booking websites, for example by offering their own "Best Price Guarantee". They gained a deeper understanding of what customers were looking for and made corresponding improvements. In order to accommodate guests' range of desires they began to offer a broader range of room categories, and offered more customizable options that guests could choose from to personalize their visit (breakfast variations, extra beds, choice of room location, even choice of pillow types, etc.) In this way, the disruption of digitalization was turned into a force for positive changes.

Digitalization is a tool, not an end in itself

The second lesson healthcare providers can learn from observing the impact of digitalization on these other industries is that an organization's digital strategy must be part of their overall corporate strategy. Digitalization must be seen as a tool, as an enabler, for the bigger and more fundamental goals of the organization not as an end in itself. Amazon, for example, stated very early that their goal was not to be an "online company" or an "internet business". Their goal was much bigger: they set out to transform the entire retail experience: everything from the way shoppers compare products, to how items are delivered, to how they are customized, to support and follow-up were re-evaluated and re-designed. The role of digitalization and big data in healthcare must be treated similarly. As Amazon did with retail shopping, the entire healthcare "customer experience" must be transformed.



Digital transformation must be company-wide effort

The third important point to be learned from each of these industries is that a successful digital strategy must encompass all aspects of an organization; it cannot be treated as "a job for the IT department" while all other departments simply carry on as before. In this effort, effective leadership particularly at the executive level is essential. The scale of the transformation must be understood on two levels: internally, and externally, in interaction with customers (patients). In healthcare, digitalization would ideally be supported by comprehensive, end-to-end, optimized and standardized digital platforms where data can easily be shared and assessed. Here, the lesson of Amazon is instructive. Amazon uses its rich trove of data on customers' buying and browsing habits to personalize and improve their specific shopping experience. Similar possibilities exist in healthcare.

One example of relatively low-hanging fruit: embedding patients' care paths within their medical records. If a patient's medical history were no longer compartmentalized by location of service or system it would be much easier to effectively measure compliance, offer real-time clinical decision support, and to track outcomes across time, venue and provider. This in turn would further drive rapid-cycle improvement and innovation. One way to proceed with this would be to select archives that are open and platform-neutral. Systems could talk to each other, much as ATMs are networked allowing customers to use any terminal at almost any branch to access their own account. Ideally, a patient's medical history would be similarly accessible to those who need access. This would also enhance measurement of compliance, real time clinical decision support and the ability to track outcomes. Hospitals and clinics gravitate to see themselves as unique and differentiated. The move toward greater interoperability and sharing of data would not necessarily compromise this. As we can see in the financial sector, standardized information and common platforms (for example those supporting ATMs) have not undermined the ability of banks to compete and to use their own brands to attract customers and build loyalty. A healthcare model could operate on similar principles.

Unlike the world of retail, healthcare works with much more sensitive data and in a much more rigid regulatory environment. Nonetheless, the essential concept of using data about specific patients as well as aggregated data about entire populations to enhance a patient's experience and improve outcomes is an essential step. If existing healthcare organizations and providers do not take this step, others are already developing their own concepts to move into the healthcare realm. Google, for example, is developing processes to use AI to help with disease detection, manage data infrastructure, and potentially become active in health insurance. Like Amazon, Google does not see itself in a small, restricting box; it regards itself as much more than a search and advertising company.

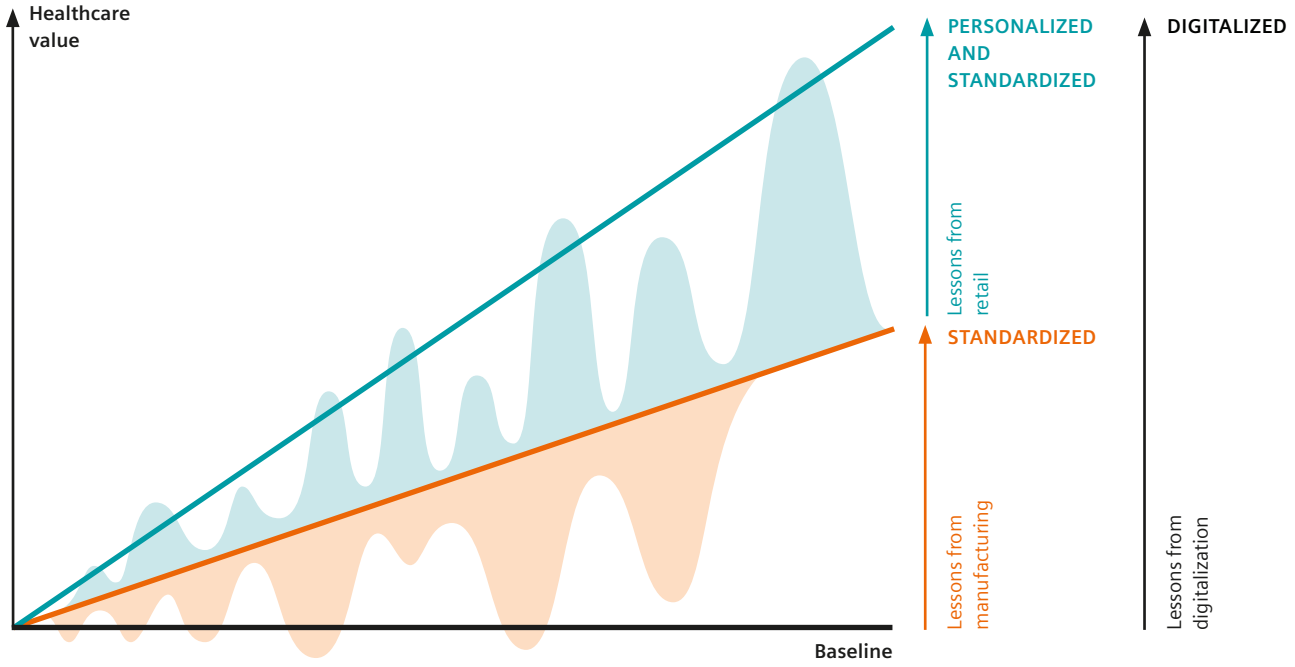
Conclusion

The global healthcare sector stands at an important crossroads. Patients are increasingly approaching their medical care as "empowered consumers", seeking good value as well as treatment and services that correspond to their personal needs and preferences. This has added a new element of competition throughout the industry. Cost pressures and the ongoing struggle for resources are also intensifying. Finally, technology is transforming the entire healthcare sector often at breathtaking speed.These changes are creating new challenges as well as new opportunities. How healthcare providers respond to these challenges could be the difference between success and failure in the years ahead.

Challenges like these are not unique to the healthcare sector. Other industries have faced similar threats and transformations, with some businesses identifying new opportunities and capitalizing on them while others were caught off-guard and stumbled. We believe it is essential for the healthcare sector to understand and respond to these challenges. And we are of the view that developing effective strategies to remain successful and competitive demands that healthcare organizations approach their work in a more strategic, pragmatic and result-oriented way. One essential building block of these efforts must be an effort to manage variations more effectively: to distinguish variations that add value from those that add no value and simply misallocate resources – warranted variations from unwarranted variations. Within the healthcare sector, it is clear that unwarranted variations are a significant problem. Meanwhile, healthcare providers and institutions have been slow to identify where warranted variations can be helpful – helpful in enhancing the patient experience and in reducing costs. This paper proposes that the experiences of other industries can be instructive in this effort and offers an analysis of how the manufacturing sector effectively relies on standardization and how the retail industry effectively deploys personalization and customization. We also offer proposals on how similar efforts can be undertaken in a healthcare context.

Finally, digitalization has been a tremendously transformative – and disruptive – force over the course of the past two decades, in healthcare and far beyond. This transformation will continue; to resist it is a futile as resisting the force of gravity. The challenge is not to search for ways to escape from this digital disruption, but to learn from it; not embracing digitalization as a gimmick or an end in itself, but recognizing its potential. Again, other businesses have demonstrated that utilizing digital capacities and data in these ways can yield great dividends.

Creating higher value in healthcare by implementing lessons from industries on managing variations:



The delivery of value over time is increased with standardization (by reducing unwarranted variations), and with personalization on top of that (by adding appropriate patient variations). Diverse industries provide learning on how to standardize (manufacturing), how to personalize (retail), and how to use digitalization as key enabler (digital enabled industries).

Effective and visionary leadership is essential in this effort. A cultural shift is also imperative. For too long, healthcare professionals have seen themselves and their work as uniquely specialized and exceptional. Of course medical care is more specialized than the preparation and sale of a cup of coffee. But this does not mean that healthcare providers cannot learn from other industries, especially those that have achieved remarkable success in earning customer loyalty, sustaining strong profitability, and developing highly effective business models. To pretend that healthcare is not, or should not, be concerned about issues like customer loyalty, value, and developing sustainable business models is, in our view, an unhelpful misconception.

The coming years will place significant pressure on our healthcare resources, with demographic changes, rising standards of living, and increasing globalization driving much of this pressure. We are confident that these pressures can be successfully managed and overcome. But this effort will demand strong and visionary leadership combined with disciplined and creative thinking.

Suggested follow up on

siemens-healthineers.com/news/expanding-precision-medicine

- Siemens Healthineers Insights series, issue 1: "Five steps every hospital CEO should start today"
- Harvard Business Review: "Expanding Precision Medicine – The Path to Higher Value Care"
- The Economist: "Reducing Unwarranted Variation: Increasing Value of Care"
- The Economist: "Standardisation in healthcare – What is the impact of standardisation on hospital efficiency, cost-savings and patient outcomes"

Insights series, issue 6

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Prior to joining Vanderbilt Michael T. Modic practiced for more than 35 years in Cleveland primarily at the Cleveland Clinic where he also served as Chairman of the Division of Radiology from 1989 through 2006, Chairman of the Neurological Institute from 2006 through 2015 and as Chief Clinical Transformation Officer through December of 2017. He has been a member of the Board of Trustees of the Cleveland Clinic Foundation, Society of Magnetic Resonance in Medicine and Board of Directors of the Society of Magnetic Resonance Imaging. He is a Fellow of the American College of Radiology and a recipient of the Gold Medal of the Society of Magnetic Resonance in Imaging.

Michael T. Modic earned his medical degree from Case Western Reserve University (CWRU) School of Medicine in 1975. He completed a Diagnostic Radiology Residency and Neuroradiology fellowship at the Cleveland Clinic. His clinical practice and research interests have been focused on Neuro Imaging with a special interest in degenerative disease of the spine and its natural history. He is a member of the Neuroradiology section within the Department of Radiology and Radiological Sciences.

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Luis Lasalvia has been keynote speaker, panelist, and moderator at about 500 events and conferences around the world. He authored more than 35 peer reviewed papers and publications, and submitted multiple patents. He's a medical doctor from the Republic University in Montevideo, holds a Master in International Business from Pompeu Fabra University in Barcelona, and executive education at The Wharton School of Business, New York University, and Harvard Business School.

Reto Merges
Global Head of Expanding Precision Medicine
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Reto Merges holds a degree in electrical engineering and information technology from the Karlsruhe Institute of Technology, Germany, and has studied at the Nanjing Normal University, China. His scientific background is in the field of medical imaging where he has authored many publications, while submitting multiple patents.

At Siemens Healthineers, our purpose is to enable healthcare providers to increase value by empowering them on their journey towards expanding precision medicine, transforming care delivery, and improving patient experience, all enabled by digitalizing healthcare. An estimated five million patients worldwide everyday benefit from our innovative technologies and services in the areas of diagnostic and therapeutic imaging, laboratory diagnostics and molecular medicine as well as digital health and enterprise services.

We're a leading medical technology company with over 120 years of experience and 18,500 patents globally. With about 50,000 dedicated colleagues in over 70 countries, we'll continue to innovate and shape the future of healthcare.

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