



Digital
Transformation
Solutions (DTS)

Whitepaper

Enabling Providers To Put Patients First In A Sustainable Engagement With An Intelligent Platform



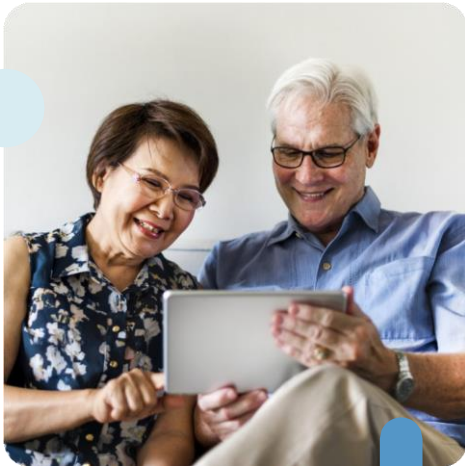
Abstract

The healthcare and life sciences industry has long been facing fragmentation and complexity in the distribution of its resources. Issues created by this are further intensified due to misaligned payment incentives and oversights in a highly regulated environment. Consequently, creating a negative impact on patient-related outcomes, quality of care, and cost of treatments. At this point, a one-stop care delivery model by converging **patient consumerism** and **digital transformation** has become necessary for providers to forge a more connected experience.

This paper talks about how adopting a platform approach, especially in a data-rich environment like the healthcare and life sciences industry, can help providers advance patient-centricity, equity, and modernization in their services.

Making Sense Of The Many Barriers Prevalent Across The Care Continuum

With the healthcare and life sciences value chain consisting of payers, providers, insurers, producers, and distributors, the amount of data generated is exponential yet crucial in forecasting trends across the domain. However, these players lack the much-needed, matured technology implementations that can help tap into the data's potential and facilitate a seamless exchange for value-based care delivery. **Here are a few barriers that are persistent across healthcare systems:**



Unstructured data

such as lab reports, clinical notes, socioeconomic information, etc., offer immense potential for actionable insight extraction in transforming care services. However, the heterogeneous nature of the data, diversity in sources, and lack of quality makes it cumbersome to process. Besides, many organizations do not have the right tools to improve data completeness, functionality, and plausibility, thereby accruing inaccurate insights.



Interoperability

may be considered the holy grail for delivering holistic care services. However, it comes with multiple bottlenecks, such as resistance from providers due to paper-based records, the non-uniform nature of privacy rules and laws, prohibitive systems, and associated costs. Moreover, minimal to zero specificity in healthcare standards and a large variety of complex terminologies across every system delay the establishment of semantic interoperability.

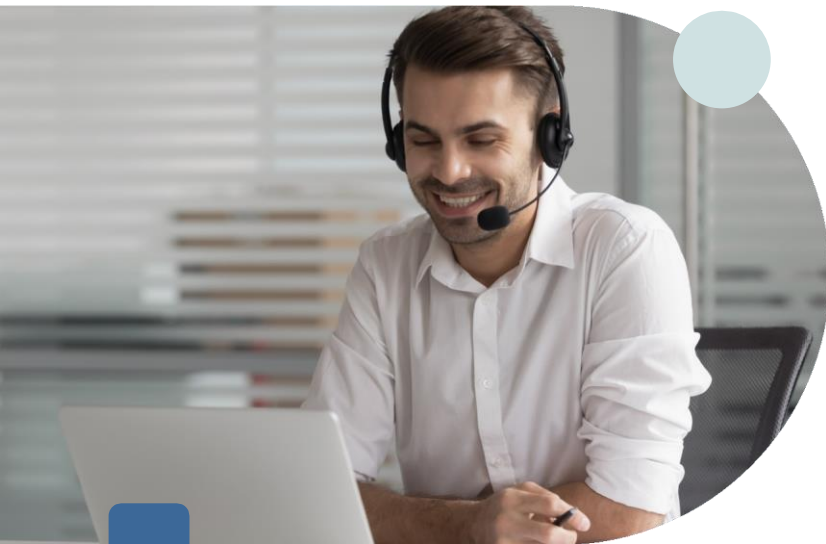
Now, let's look at the barriers that directly impact patient experiences:

Personalization in healthcare

Personalization in healthcare seems like a distant goal, with many organizations yet to fully transition from fee-for-service to value-based care models. Moreover, a disparate picture of the patient's treatment history, lack of an all-encompassing patient directory across genomic, psychographics, etc., no single point of accountability to study and record empirical data, and more create a huge gap in patient-provider communication and improvement of care outcomes.



In an ecosystem spanning from hospitals and clinics to physicians and home health systems, a cohesive



Remote care

Remote care when implemented widely, can help alleviate the pressure over traditional, hospital-level care systems. But, the lack of robust data security protocols, boundaries of ownership, frail data management practices, delayed access to data, lack of systems integration practices, and self-provisioning of medical devices takes away from organizations the transparency and evidence otherwise required in making remote care well-founded.

framework that overcomes the limits of data fragmentation and complexities has become imperative. The key is to implement a sustainable alternative to legacy information- and value-exchange systems. Given the ongoing shift to value-based care, large-scale investments in telehealth, adoption of Fast Healthcare Interoperability Resources (FHIR) standard, and remote management of chronic conditions, platforms seem to be the **ideal way forward**.

Introducing HARMAN Intelligent Healthcare Platform

HARMAN Intelligent Healthcare Platform is designed to help healthcare and life sciences enterprises seamlessly transform their data, analytics, intelligence, and governance functions. The solution enables a new level of patient-centricity by accelerating insights-driven decisions at the point of care.

The faculty of this platform solution resides in its network effects, wherein value creation is not limited to just the provider but extends to all stakeholders involved in the care ecosystem - from 360-view of patient data, and real-time data for operationalizing policy frameworks to personalized care via wearable sensors.

The main components of the platform are as follows:



Data machine

A scalable, reliable, and comprehensive engine that supports all data types, ensures data quality, and resolves any data privacy concerns. This component seamlessly ingests, processes, and securely stores data from multiple sources. It can support batch processing and real-time data streams from various formats, including electronic medical records, FHIR, HL7, etc. By leveraging this component, providers can better understand their data and how to use it to improve care, optimize costs, and drive service innovation.



Analytics and visualization machine

A key component of the platform solution, the analytics and visualization machine helps providers with actionable insights at the right time for making informed decisions. It identifies potential health issues and intervenes early basis of trends, patterns, or risks. The component also helps tailor treatments and routine recommendations that meet a patient's individual needs. The data lake stores various data types at scale and assists providers in running exploratory and predictive analytics along with visualizations.



Intelligence machine

Comprising machine learning and deep learning algorithms and models, this component powers cases such as remote patient care, unstructured document processing, insurance claims analytics, demand forecasting, and more. It also consists of the HARMAN Remote Care Platform (RCP) for virtual care and the HARMAN Intelligent Device Management Platform for endpoint management. It also equips providers with customer-centric analysis, anomaly detection, future state prediction, and rapid decision-making skills.



Governance machine

This engine ensures data complies with relevant regulations across the platform. Providers can access HIPAA-eligible services, certifications for industry-relevant global IT and compliance standards, and support for GDPR, HITRUST, ENS High, HDS, and C5. The machine warrants developing and implementing policies, procedures, and processes that standardize all data types' management, use, and protection. It also streamlines data cleansing, analysis, integration, visualization, and more.

The HIPAA-compliant platform includes key architecture principles such as convergence toward future architectures, multi-tenancy capabilities, serverless technologies and cloud nativity, and preventive and proactive monitoring of disruptions. Founded on flexibility and agility, the platform allows users to add new data sources and access data via common API patterns and microservices.

Enhance The Patient Experience By Focusing On Core Tasks

Patient-centricity

Facilitate patient-centric analysis and data-driven treatment management.

Conduct proactive patient engagement and real-time monitoring, and improve health conditions.

Accelerate innovation

Deliver digital-first experiences and wellness-centric mobility solutions.

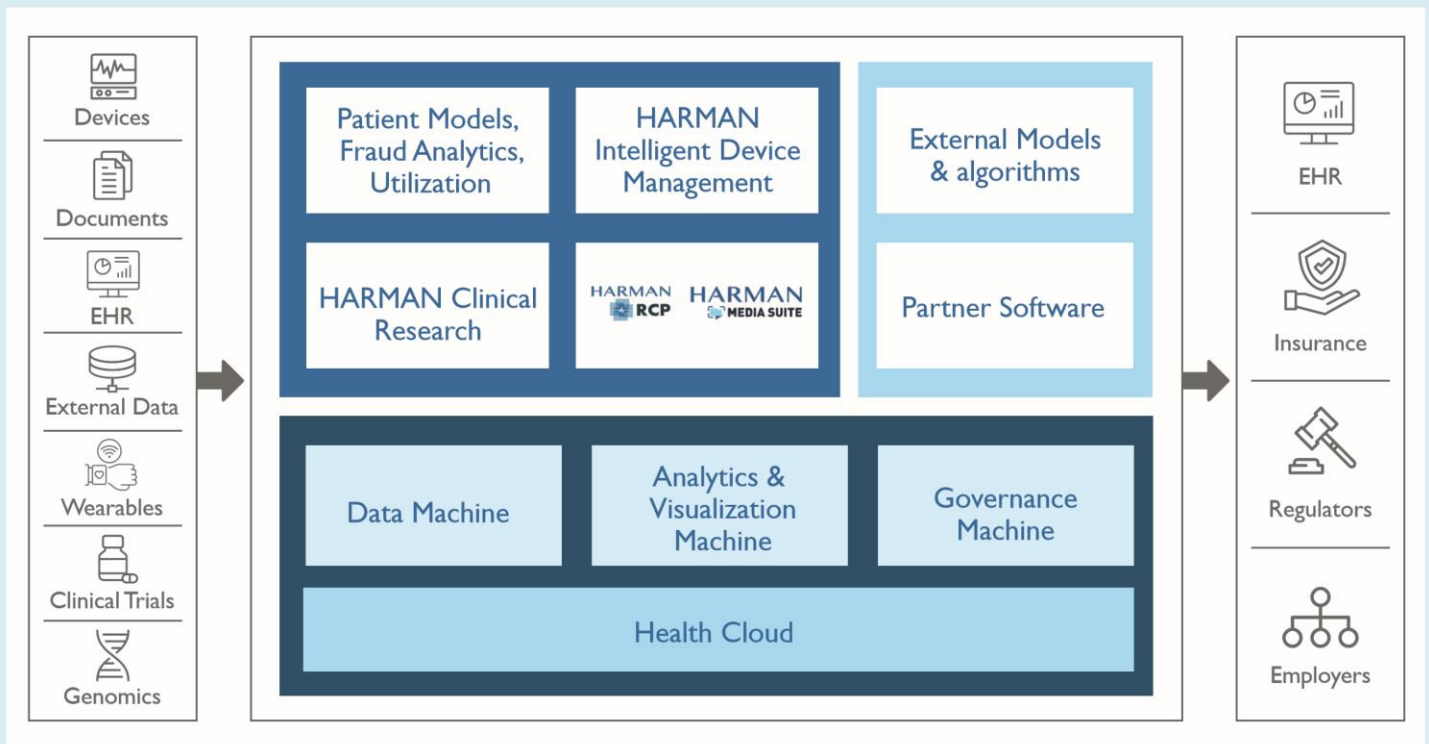
Transform unstructured data into structured data and meet future business requirements with a robust platform strategy.

Data-driven decisions

Identify root causes of data disruptions and run patient and care analytics. Implement AI-based risk profiling, standardize data practices, and streamline pipelines.

Business agility

Enhance flexibility in operations through simplified payments and claims. Make faster decisions even with unstructured data. Improve collaboration and automate IT architectures.



Our key modules that power connected care experiences

The platform is also capable of treating information as an asset, allows users to reuse existing tools, controls technical debt, drives security and privacy by design, and gives way for seamless interoperability with open standards and open source software.

The HARMAN Intelligent Healthcare Platform enables you to focus on your patients while the backend. The solution taken

care of delivers value for healthcare providers across the following metrics:

Here are some use cases where the platform helped providers expedite value-based care:

Helped improve the quality of care by hospital readmission rates Generated readmission risk and predicting predicted patient attrition

Problem statement:

A major healthcare service provider wanted to develop a model to predict the likelihood of readmissions and guidelines on measures that lower attrition and increase

Solution synopsis:

HARMAN Intelligent Healthcare Platform helped identify the top causes of readmissions using data from various sources like medical history, disease category, demographic profiles. A readmission risk score was generated by building a predictive analysis model. Patient-level risk scores were calculated by analyzing

inpatient data with over 50+ variables.

Benefits: of 80%

Problem statement:

A leading provider of in-center and at-home dialysis services wanted to develop a model to decrease patient readmission rates. develop

Solution synopsis:

HARMAN Intelligent Healthcare Platform helped highlight factors such as vitals, observations, and patient behaviors. Leveraging this information, hospitalization, expiration, and transfers at the time frame of 1, 3, and 6 months were and predicted with a readmission risk model. Visualization of risk distribution was made possible with a dashboard.

Benefits:

- Insights on patient hospitalization with an accuracy

Readmissions were predicted with an accuracy of **82%**

Outcomes were lifted by **350%**

Prediction of patient transfer and expiry with an accuracy of **70%**

Reimagine Healthcare With HARMAN

Today, with booming telehealth and advancing technologies, healthcare is at an inflection point, enabling providers to make the shift in delivering patient-centric services. Built on patented IP and best-in-class open-source technologies, the **HARMAN Intelligent Healthcare Platform** helps providers offer personalized care services in a secure, cost-effective, and privacy-preserving manner. Organizations can gain a single point of entry to all types of healthcare data, give individuals more control over their health, and drive equitable care outcomes with a single connected platform.

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About HARMAN Digital Transformation Solutions (DTS)

HARMAN's **Digital Transformation Solutions** (DTS) is a strategic business unit dedicated in blending the physical and digital to make technology more dynamic in order to serve the ever-changing human needs. Our team of over 7,000 employees, spread across 12 countries in 45+ locations, with their expertise across hardware, software, and industry domains are constantly delivering cutting edge technology solutions to over 200 clients globally. HARMAN DTS aims towards helping customers deliver a holistic experience to their customers – through the convergence of digital, cross channel user experience, cloud, mobility, insightful data, and internet-of-things backed by scalable underlying IT platforms. Healthcare, Communications, Industrial, Software, Retail and Hospitality being our key focus verticals, we have made significant investments into this space. Leveraging our global delivery approach, IPs, platforms and people, we deploy next generation technology platforms across industries, offer cost savings and deliver innovative solutions to help our clients on their digital journey. To know more, please visit <https://services.harman.com>

About HARMAN

HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide, including connected car systems, audio and visual products, enterprise automation solutions; and services supporting the Internet of Things. With leading brands including AKG®, Harman Kardon®, Infinity®, JBL®, Lexicon®, Mark Levinson® and Revel®, HARMAN is admired by audiophiles, musicians and the entertainment venues where they perform around the world. More than 50 million automobiles on the road today are equipped with HARMAN audio and connected car systems. Our software services power billions of mobile devices and systems that are connected, integrated and secure across all platforms, from work and home to car and mobile. HARMAN has a workforce of approximately 30,000 people across the Americas, Europe, and Asia. In March 2017, HARMAN became a wholly-owned subsidiary of Samsung Electronics Co., Ltd.

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