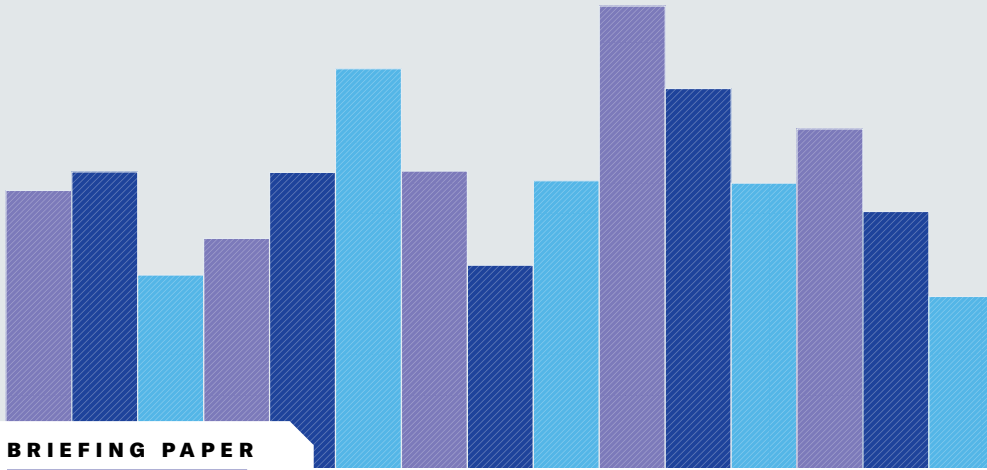




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BRIEFING PAPER

The Journey toward Insights at Scale for Health Care Providers



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Health care executives are well aware of the importance of data-driven insights to help improve the quality of care and improve the clinician workflow experience. Leveraging insights can expose operational inefficiencies and hidden friction points within clinical workflows. While most health care systems have had some success in converting data into insights, the majority have not been able to truly realize the full potential of “insights at scale” across their organization.

With insights at scale, health systems can generate both clinical and operational actionable insights that can be embedded in clinical workflows throughout the continuum of care. This ability unlocks compounding returns for health care organizations, from newfound operational efficiency to more accurate clinical decisions to more effective treatment pathways.

Providers can use insights that are generated at scale to help solve pervasive problems in conditions such as chronic disease and to advance the health of entire populations. There is an opportunity for the entire health care industry to innovate on how we can predict and prevent disease, as well as personalize care when we can leverage insights at scale. These innovations will lead to better experiences in health care for patients and staff and ultimately improve health and well-being for our communities worldwide.

As a health tech industry, we are still in the experimentation phase of understanding what that future insights-at-scale world could (and should) look like, but progress is very encouraging. Enabling technologies such as artificial intelligence and predictive analytics are helping health care organizations shift from data overload to meaningful insights. Findings from our global [Future Health Index 2022 report](#) indicate that health care executives are generally united in their recognition of the value and potential of predictive analytics to improve care outcomes and deliver on their other priorities.

To climb the digital maturity curve to insights at scale, health care organizations need enterprise-wide strategies that enable end-to-end health system data integration. To be most effective, these strategies must be centered on interoperability, cloud integration, and strategic collaborations with health technology partners.

To explore the topic further, Philips sponsored this Harvard Business Review Analytic Services report to hear from health care executives around the world. Hailing from North America, Western Europe, and Saudi Arabia, the C-suite executives in this report share how they are reaping the benefits of predictive analytics on their journeys to redefining health care. I encourage you to read the report and see how these executives, supported by strategic health technology partners, are working through obstacles and toward higher-value, farther-reaching returns on insights across their organization and beyond.



Shez Partovi
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The Journey toward Insights at Scale for Health Care Providers

The rapid increase of data collected from today's clinical and operational information systems paves the way for new digital approaches to health care delivery, health tech innovation, and clinical decision making. However, many health care executives admit that their organizations lack the technical expertise and managerial resources required to implement new digital business processes.

"As the managing director of a hospital, I face many challenges: driving digitization, ensuring quality, guaranteeing patient and employee safety, and reducing costs," says Markus Mord, CEO of Marienhospital in Stuttgart, Germany. "Hospitals should open up to technology companies to work more closely in partnership and jointly find solutions to the challenges in health care."

According to Mord, when implementing new digital approaches, health care providers must first leverage clinical and operational data to gain meaningful and timely insights. Second, they must use these insights to improve the quality of patient care, enhance staff experience, and ultimately drive business results. Wise use of data can address the challenges hospitals and health systems face as they strive to obtain data-driven clinical and operational insights at scale—in which insights are embedded in organizational workflows.


Unfortunately, properly collecting and analyzing the data that drives these insights are no small tasks, as health care data typically resides in a wide variety of locations and systems. To obtain insights at scale, data must be transformed into a consistent format and exchanged securely between points of care. For example, at SEHA Virtual Hospital in Riyadh, Saudi Arabia, data from the radiology information system and picture archiving and communication system—commonly known as PACS—is combined with operational data and displayed through dashboards that monitor

HIGHLIGHTS

Astute use of data can solve the challenges that hospitals and health systems face as they seek to **obtain data-driven clinical and operational insights at scale**—in which insights are embedded in organizational workflows.

Through strategic partnerships, health care organizations can **supplement their internal resources to achieve insights at scale** by leveraging advanced technologies such as artificial intelligence and predictive analytics.

Data-driven insights help health care providers **derive steady returns on their capital investments** by providing information that can improve operational efficiency and transform clinical processes.



“Hospitals should open up to technology companies to work more closely in partnership and jointly find solutions to the challenges in health care.”

Markus Mord, CEO of Marienhospital

performance across 70 hospitals. Synthesizing data is a common challenge in the health care industry. Fifty-seven percent of informatics professionals surveyed for the Future Health Index 2022 report, a global study commissioned by Philips that analyzed the responses of nearly 3,000 health care executives across 15 countries, stated that data silos hinder their ability to use data effectively.

Other obstacles block data usage, too. For example, an immense amount of external data flows between health care providers, insurance companies, life sciences companies, and medical research institutions. Additional relevant external data resides in national registries. All this external data further complicates the analytics effort.

Through strategic partnerships, health care organizations can supplement their internal resources to achieve insights at scale by leveraging advanced technologies such as artificial intelligence (AI) and predictive analytics. When asked what types of assistance health care executives seek from health tech companies, 27% of those who participated in the Future Health Index 2022 report said they want help integrating technology systems in their facilities, 26% said they want guidance with data analysis, and 26% said they want access to innovative technology.

This report examines both the opportunities and challenges that hospitals and health systems face as they seek to obtain data-driven clinical and operational insights at scale. It also explores how to leverage real-time data to obtain insights into operational and clinical processes, all

with the goal of improving patient outcomes, increasing clinical confidence, and sharing knowledge and expertise in care pathways.

Leveraging Clinical Data to Connect the Dots

As health care executives well know, there is a difference between data and insight. Data is a raw element that requires context for interpretation. Insight provides understanding about likely outcomes for patients and actionable information for clinical decision making that can help guide treatment plans.

Geisinger Health System is a case in point. Headquartered in Danville, Pa., United States, Geisinger serves more than three million patients in south-central and northeastern Pennsylvania. By leveraging collaborative partnerships, health care professionals at Geisinger have been able to break down data silos, improve clinical performance, and enhance operational efficiency. The foundation of Geisinger’s data-driven initiatives is the collection of electronic medical records that it has been capturing and storing since 1996.

“We have many years of data to help us understand patient trajectories,” notes Alex Zimmerman, a vice president at Geisinger Heart and Vascular Institute. “This growing repository of data allows us to look beyond transactional medicine to understand the complete patient journey, as well as to care for our communities at a multigenerational level.



“Our storyboards help us measure quality, safety, and productivity—not just internally, but also in comparison to the rest of the world,” explains Mary Frances Suter, associate vice president at Geisinger Heart and Vascular Institute.

Once we identify parents or grandparents with genetic markers that are likely to lead to challenging health outcomes, we can not only provide care for them, but also ensure their family members have access to education and care.”

For example, Geisinger is combining lipid profiles, genetic data, socioeconomic data, and patient-supplied information about eating habits and other lifestyle factors to categorize its patient population into cohorts. This exercise allows doctors to predict the likelihood of coronary artery disease and other concomitant diseases, such as diabetes, and take measures to help improve the health of the population by devising appropriate clinical and educational programs. “Analyzing this data allows us to assess our disease burden, some of the social determinants of health, and variability across our different geographies,” Zimmerman says.

Adopting an Attitude of Prevention

Geisinger’s transformative health care initiatives require a shift of focus—from caring for the sick to caring for the well. “We want to intervene before someone ends up in the hospital,” says Mary Frances Suter, associate vice president at Geisinger Heart and Vascular Institute. “That’s where data becomes incredibly powerful.”

However, while data is power, there is a lot of it, so it’s easy for anyone trying to derive insights from it to get lost in the minutiae. “The most important thing is deciding what’s important and how it’s going to change mindsets,” Suter adds.

To that end, Geisinger’s health tech partner does more than simply supply technology. It also provides expertise to help the cardiology department leverage data, map it, and use it to improve operational performance. While basic industry guidelines stipulate that echocardiogram technicians should be able to perform eight ultrasound studies per day, that doesn’t account for differences among patients. As Suter points out, it is less complex to conduct an echo on a healthy 28-year-old patient than on a critical care patient who is on a ventilator. This disparity between patients motivated the cardiovascular department to adopt a metric called the “echo value unit” to better calculate how much work goes into each study. Data is presented through business intelligence dashboards, which it calls

“storyboards,” at the system, regional, and personal levels, as well as compared against benchmarks derived from national registries. “Our storyboards help us measure quality, safety, and productivity—not just internally, but also in comparison to the rest of the world,” Suter explains.

Progressing to Artificial Intelligence and Predictive Analytics

As health care providers progress along the digital maturity curve, strategic partnerships can help them transition from historical reporting to predictive analytics—from determining what happened by viewing a dashboard to figuring out what will happen and how the outcome is likely to evolve by consulting a predictive model.

In Geisinger’s cardiology service line, clinicians leverage decades of data from echocardiograms to determine optimal treatment paths for patients. Software programs use image recognition software to power a “virtuous cycle” that can improve cardiac care and reduce costs. By comparing data from thousands of cardiac cases, the program can identify anomalies in these images and then send an alert to the attending physician. The red flag is an insight that intervention may be necessary to help a patient’s cardiovascular health. These insights are also called clinical predictions, which are based on the application of machine learning algorithms to medical data.

“Combining artificial intelligence with these large data sets can be unbelievably powerful,” says Dr. George Ruiz, chair of cardiology and vice chair of Geisinger’s Heart and Vascular Institute. “And that is just the start. We can envision a world where acquiring and interpreting echocardiograms is easier and the fidelity of the images is more true to reality. Machines could leverage decades of clinical echocardiogram data and apply it to individual patient cases to diagnose issues sooner. We can understand operations and patient care at a very deep level. And it carries the promise of bending cost curves.”

Marienhospital is applying AI and predictive analytics capabilities to improve the experience of patients and staff while lowering operational costs. “Predictive analytics allows for more targeted patient management and a preventive approach to caring for patients,” explains Marienhospital’s



“Predictive analytics allows for more targeted patient management and a preventive approach to caring for patients,” says Mord of Marienhospital.

Mord. “Instead of [our] reacting when the disease begins, the patient is informed about possible changes as a preventive measure. This allows us to measure and significantly improve patient outcomes.”

For example, in the laboratories of Marienhospital’s pathology department, microscopes are supplemented by high-performance computer workstations. Every step, from the initial evaluation of a lab specimen to the final report, is digitally documented in the central pathology information system. A quick response (QR) code is assigned to each specimen and accompanies it through the entire process. If a second opinion is needed, the data can be securely shared with consulting physicians all over the world, who will then make their diagnosis.

“Tissue samples are digitally scanned while still on the microscope slide and viewed on a screen in ultrahigh resolution and in 3D,” Mord explains. “This makes every little detail and every suspicious structure visible.”

These technology projects were driven in part by the Hospital Future Act (*Krankenhauszukunftsgesetz*), a federal mandate that encourages German health care organizations to invest in modern technologies such as AI and predictive analytics. The act allocates funding for projects such as Marienhospital’s digital documentation system. But potential recipients had to act quickly to demonstrate how the funds could be used to improve IT infrastructure, cybersecurity, data privacy, and other pressing issues related to patient care. “Applying for Hospital Future Act funding required quick action,” Mord says. “Within a short time, we established a partnership with a health care technology provider to identify the work processes that could best be digitized and integrated into existing processes.”

Marienhospital is not alone. According to the Future Health Index 2022 report, almost one-third (31%) of German health care executives invested in AI in 2021. This investment has grown to 60% in 2022 and is expected to rise to 79% by 2025. The report says 54% of German health care executives have adopted predictive analytics or are in the process of adopting predictive analytics in their hospitals or health care facilities.

“Algorithms offer possibilities for precise diagnoses that don’t even exist today,” states Stephan Rühle, head of IT/medical technology at Marienhospital. “AI works nonstop in real time and can identify recurring patterns in countless

samples more reliably than humans.” The advantages are obvious: faster diagnosis leads to the faster therapy initiation, while the interdisciplinary exchange among experts improves the treatment quality. Ultimately, those insights help individual patients, who benefit from faster and more accurate diagnoses and outcomes.

“We see real value in a strong strategic partnership that helps us achieve the possibilities of modernizations such as predictive analytics and artificial intelligence,” Mord adds.

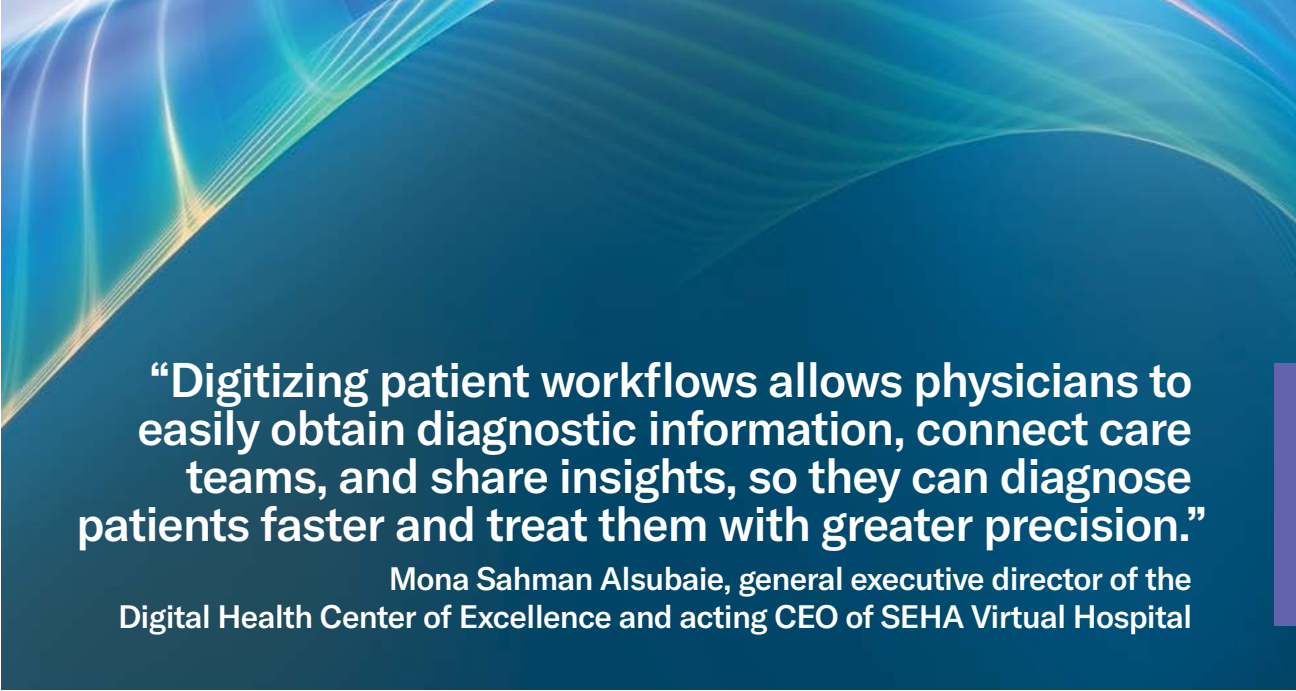
Obtaining Help from Health Tech Experts

While these digital transformation initiatives yield measurable improvements, Mord admits that funding is limited and human resources are scarce. That’s why Marienhospital relies on its health tech partner to complement its in-house capabilities. One key piece of the partnership involved improving the design and performance of Marienhospital’s Emergency Medicine Clinic. Working with health technology consultants, the hospital conducted a patient-centered assessment of clinical workflow and then used those findings to create a “gap analysis.” The results were translated into recommendations for process changes and a space plan for the emergency medicine clinic. As a result, 10 key improvement initiatives were developed in four focus areas: patient experience, data analysis, spatial design, and clinical process improvement.

Today, emergency physicians at Marienhospital can use computerized observation stations to quickly diagnose and treat patients. This ability leads to better acute care within the department, better handoff of data when patients are transferred to other areas of the hospital, and more consistent and informed follow-up after patients are discharged to outpatient facilities.

“With analytic services from our health tech partner, we optimized key clinical processes and improved medical handoffs,” Mord says.

The benefits of these digital transformation initiatives are not limited to patient outcomes and patient satisfaction. According to Mord, in a highly competitive market for specialists, Marienhospital has also created a more attractive and modern working environment for physicians and pathologists, making it easier to recruit top talent. Given the high turnover and



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Mona Sahman Alsubaie, general executive director of the Digital Health Center of Excellence and acting CEO of SEHA Virtual Hospital

resignation rates during the Covid-19 pandemic, it is especially important to be able to attract talent easily.

Moving from Data to Insights at Scale

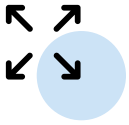
With 152 hospitals and more than 30 subspecialized services, SEHA Virtual Hospital uses digital technology to extend the reach of its specialist resources throughout Saudi Arabia. Important outcomes of these efforts include minimizing the amount of time patients spend in the hospital, reducing transfer rates of patients from rural to urban areas, optimizing staff ratios to minimize workforce shortages, and ensuring that patients receive optimal treatment based on global guidelines. It’s all part of a larger national program known as Saudi Vision 2030, which entails using digital technology to transform the nation’s health sector and improve the quality of life for Saudi citizens. Patients can visit their local hospitals and attend video sessions with top medical specialists from across the kingdom.

According to Mona Sahman Alsubaie, general executive director of the Digital Health Center of Excellence and acting CEO of SEHA Virtual Hospital, collecting and analyzing patient data fuel continuous improvement in a range of areas such as streamlining patient workflows, optimizing assets, and planning for the future needs of patient populations. “Virtual services save time and money through direct patient care, remote monitoring, and other required medical interventions,” she explains. “Digitizing patient workflows allows physicians

to easily obtain diagnostic information, connect care teams, and share insights, so they can diagnose patients faster and treat them with greater precision.”

Thanks to the back-end integration of patient data, doctors can assess vital signs and instantly share the results of tests and X-rays with a broad network of specialists. “Our health tech partner ensures that our data is acquired, validated, stored, and protected in a standardized way,” explains Alsubaie. This insistence on standardization is the starting point for a series of modernization initiatives across cardiology, oncology, radiology, population health, ultrasound, and acute care. These projects span many diverse care pathways, yet they share a common goal: to enhance patient access to quality care and improve population health using data insights.

For example, the SEHA Virtual Radiology service line connects 70 hospitals to a centralized radiology service, allowing the virtual health system to increase the utilization of available resources and maximize the efficiency of imaging technicians and diagnostic specialists. With a four-hour reporting turnaround time for routine cases and a half-hour turnaround for urgent cases, patients throughout Saudi Arabia can obtain advanced medical imaging services and rapid diagnoses, while radiologists can extend their reach. The centralized service is powered by a telepresence solution that uses remote audio and video technology to facilitate communication between radiology technologists and medical experts. In many cases, questions can be answered during the imaging exam.



“Do [your partners] understand where health care is going? It’s not just about solving today’s problems. It’s about transforming delivery in the organization,” says Alex Zimmerman, vice president, Geisinger Heart and Vascular Institute.

Digitizing data not only improves the quality of care delivered to individual patients; it also allows SEHA to maximize the efficiency of its staff. Consider the cardiology service line, where doctors and nurses use remote devices to collect patients’ vital signs such as electrocardiogram, blood pressure, and weight. Exchanging real-time information regarding each patient’s case maximizes the utilization of medical assets, decreases waste, and avoids unnecessary patient readmission by enabling consistent and continual follow-up. “Our digital transformation has made cardiology more affordable and convenient,” Alsubaie says.

Accelerating the Journey to Digital Maturity

Reducing costs is important, but there are other important reasons to pursue these collaborative endeavors. Experienced health tech partners can help health care providers generate and share insights at scale as they work together to ascend the digital maturity curve and achieve the following goals.

Resolve complexities.

Health tech partners can apply cutting-edge hardware and software to solve the complexities associated with managing health care data. Common issues to target include interoperability, data integration, data cleansing, and data benchmarking. “We have limited resources, so we may not have the bandwidth or ability to deliver on the vision,” says Geisinger Health System’s Ruiz. “Our health tech partner can help us find, map, and present the data in a way that tells a story.”

Implement advanced technology.

AI, machine learning, informatics, and predictive analytics can help health care organizations obtain meaningful insights. Collaborative partnerships are an effective way for companies to successfully implement these initiatives. “Our health tech partners add significant value by providing the newest technology, devices, solutions, analyses, and infrastructure for our projects,” says SEHA Virtual Hospital’s Alsubaie.

Achieve operational benefits.

Health tech experts can help organizations optimize resources and improve workflows to drive innovations that

bring systemic improvements such as forecasting service line revenue, managing resources, and planning for new equipment purchases. “Do [your partners] understand where health care is going?” Geisinger Heart and Vascular Institute’s Zimmerman says. “It’s not just about solving today’s problems. It’s about transforming delivery in the organization.”

Attain clinical breakthroughs.


Providers strive to identify clinical trends, improve the patient experience, and predict and prevent disease to improve population health. Health tech partners can help them reach these goals by leveraging data effectively and deploying new technologies in innovative ways. “Digital transformation will enable us to break new ground in medical progress and align care more closely with people’s needs,” Mord says.

Looking beyond the Technology

The guiding star of health care organizations is to deliver quality care by offering services that meet the needs of patients. However, whether for-profit or not-for-profit, these organizations must manage investments responsibly. Data-driven insights help health care providers derive steady returns on their capital investments by providing information that can improve operational efficiency and transform clinical processes.

According to the Future Health Index 2022 report, data plays a crucial role in helping drive smarter clinical decisions and encourage greater operational efficiency. Nearly two-thirds (65%) of health care executives surveyed believe the value data brings in areas such as digital health records, patient monitoring, and medical devices makes the required time and resource investments worthwhile.

When investing in IT infrastructure, health care providers want more than just help with installing and using the new hardware and software. Health care executives also want to know how to integrate the new gear into their business processes and workflows. “Our health tech partners provide more than technologies and equipment,” Alsubaie confirms. “They help us with needs analysis and global benchmarking as we work together to fulfill the kingdom’s strategic vision. For instance, the vendor that provided our telehealth platform captured our needs and requirements, worked



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with us hand in hand to achieve our goals, and produced an interactive system that fulfills our vision of providing quality virtual care.”

Clinicians at Geisinger had a similar experience when they purchased an integrated cardiovascular (ICV) solution. The new equipment not only automates the process of conducting cardiac ultrasounds but also helps physicians make more accurate clinical decisions based on all available patient data. The ICV vendor helped Geisinger’s cardiovascular team improve clinical workflows by integrating data that was formerly scattered across disparate workstations, modalities, departments, and patient touchpoints.

In other words, true partners don’t just supply technology. They also help health care providers use that technology to become more efficient and productive as they work together to obtain the types of insights that can transform operational processes and improve clinical outcomes. “It’s not just about getting better ultrasound images,” Zimmerman stresses. “It’s about delivering better care to the patients.”

DISCLAIMER

The Future Health Index 2022 report examines the experiences of almost 3,000 health care leaders and their expectations for the future. The research for the Future Health Index 2022 report was conducted in 15 countries (Australia, Brazil, China, France, Germany, India, Indonesia, Italy, the Netherlands, Poland, Russia, Saudi Arabia, Singapore, South Africa, and the United States). The study combines a quantitative survey and qualitative interviews conducted from December 2021 to March 2022.



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