Renovating Healthcare

Clinical process optimization uses information to fundamentally improve medical practice and resulting outcomes

Digitally harnessing clinical, financial and operational data brings about sustainable, measurable change. The resulting approach improves the quality, delivery and cost of healthcare and will enable a process transformation.

By **Dr. Ian Chuang**
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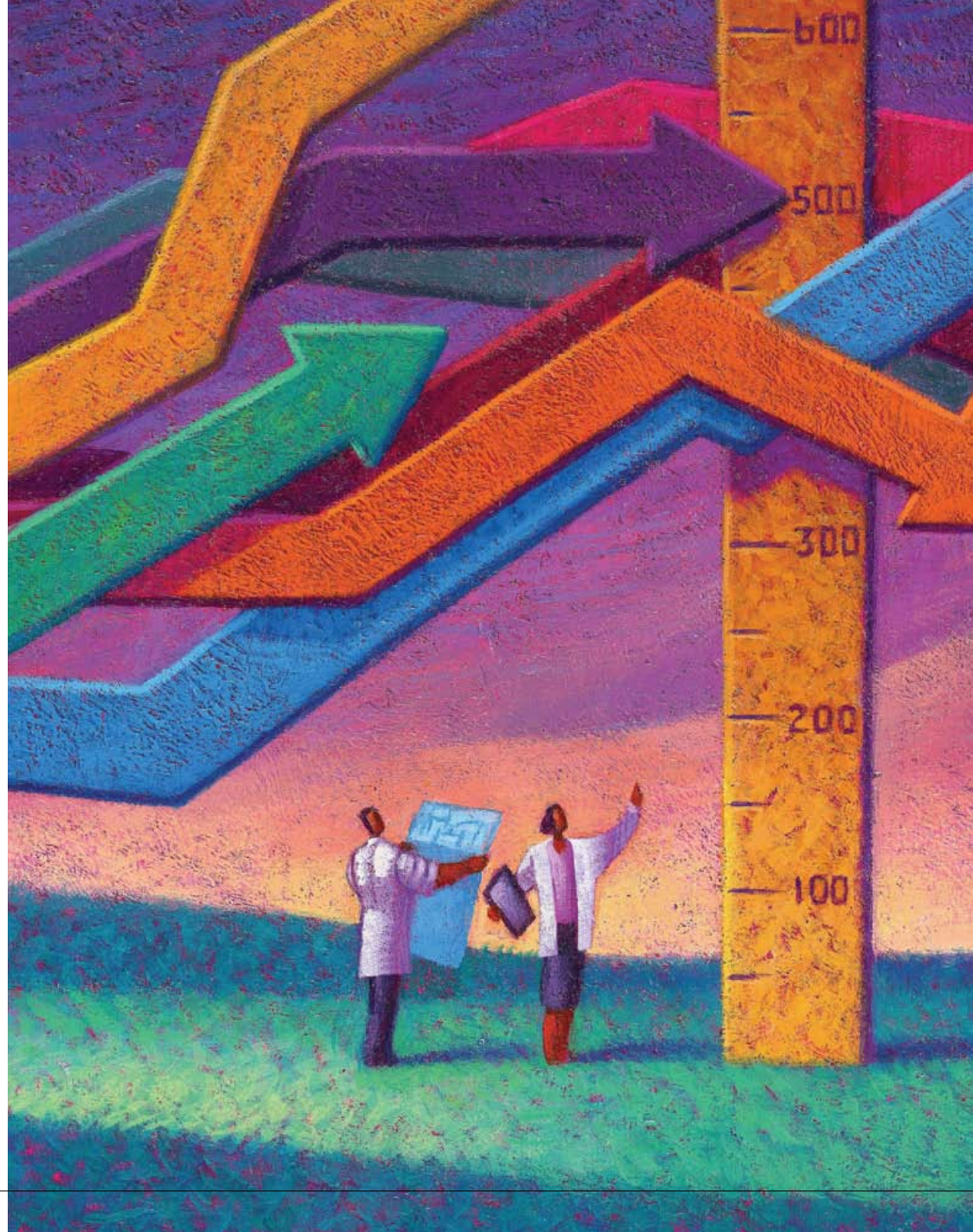
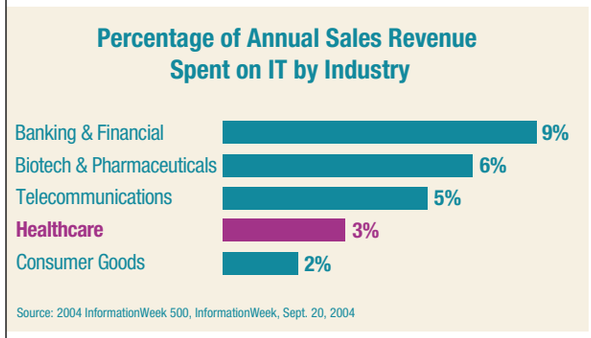
In 1984, Michael Dell had $1,000 and an unprecedented idea. Dell wanted to build relationships directly with his customers and use the availability of real-time information to revolutionize PCs manufacturing.

His innovative strategy transformed personal computers from a made-to-stock product to a made-to-order commodity. Buyers were no longer faced with the sole option of pre-configured computers from the warehouse. Instead, purchasers could construct their own PCs, option by option, and rapidly receive technology configured to their personal specifications.

"Dell is about making technology more accessible," Dell said at a recent industry event. Now chairman of the board of hardware giant Dell, Inc., he continued, "Our direct model allows us to build relationships with customers and use the information they give us to develop and improve our products and services. We're about driving value and performance in the industry."

Dell's philosophy revolutionized the hardware industry decades ago. But the healthcare field has made insufficient progress in similarly embracing the availability and value of information to improve medical practice and outcomes. If physicians from the 1900s were to visit a medical facility today, they would





find that patient care is largely unchanged as compared to care in their own era—despite the ballooning of medical and medication knowledge. Clinical process optimization provides a comprehensive framework that will transform the healthcare industry.

Through clinical process optimization, healthcare providers digitally harness clinical, financial and operational data to bring about sustainable, measurable change. It is a comprehensive and adaptive system for achieving and sustaining clinical process automation. Clinical process optimization improves the quality, delivery and cost of healthcare through the closed-loop understanding of clinical outcomes, the use of clinical and statistical data analysis and the re-engineering of clinical processes.

Healthcare has lagged behind other industries in reforming itself through information technology because the industry's needs are more complex than any other. Technology has just begun to reach a level of sophistication sufficient to optimize clinical processes. Healthcare has unique and highly complex needs.

When Y2K preparations concluded, healthcare organizations focused on computerizing departments. Industry innovators soon moved away from the best-of-breed or departmental automation approach in favor of integrated, enterprise-wide strategies. Healthcare organizations with an integrated strategy can capitalize on clinical process automation and the value of the data they capture from clinical care. Centralized databases store information that spans facilities and venues of care. Controlled medical terminology provides a consistent, structured way to codify clinical data.

Clinicians actively utilize electronic medical records, perceiving their value for direct interactions, such as order placement and documentation, as opposed to the passive activities of simply looking up results. Clinicians rely on decision support, such as rules, alerts and order sets, to make the best possible decisions in the care of their patients. And clinicians infuse evidence into the care process, creating a continuous cycle of ongoing learning that enables the best possible outcomes.

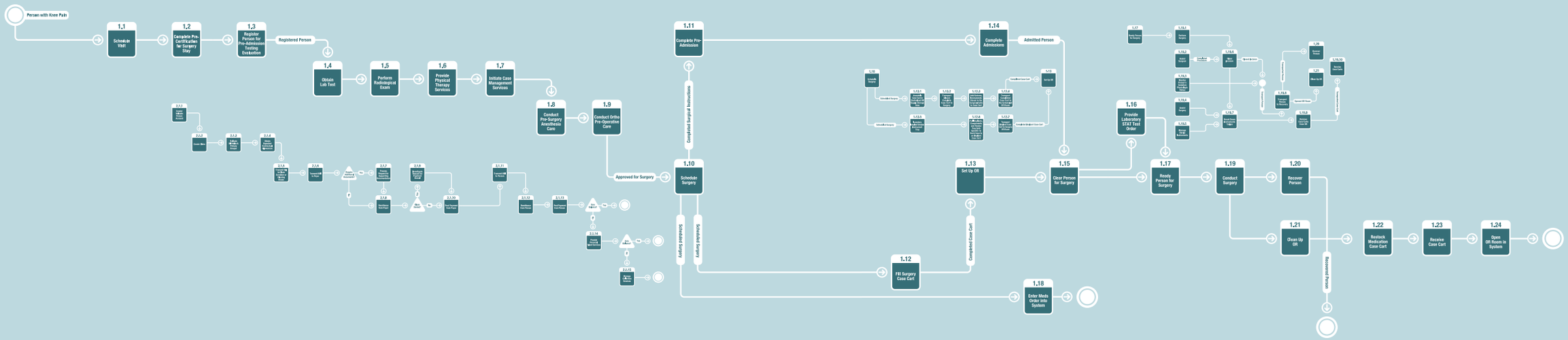
With the technology, infrastructure and culture largely in place, a savvy health organization is poised to reap the benefits of clinical process optimization. It is ready to identify relationships among data, actions and outcomes to effect positive change.

Definitions

Patient care entails hundreds of tasks and decisions, tens to hundreds of participants and hundreds of handoffs. Healthcare organizations operating on paper or with best-of-breed departmental information systems have a hard

Clinical process optimization is built on decision support modeling and an understanding of key conditions at a detailed level. The measurement-driven structure is built in the context of the clinical process. The model below illustrates the steps involved in total knee replacement; however, many of the clinical processes are applicable to other orthopedic surgical procedures.

Clinical Process Optimization Model



time aggregating and studying great volumes of data. They are challenged to glean meaning from data. In contrast, healthcare organizations that embrace clinical process optimization have an opportunity to harness information to re-engineer clinical processes—steps that can maximize effectiveness, efficiency and financial returns.

Although healthcare is complex, we can map each step and its contributional impact in the care process by applying business-process management techniques, identifying and focusing on the high-impact activities, using clinical data, statistical analysis and research to define process that leads to optimized outcomes, and the point of decision making by utilizing executable knowledge. Clinical process optimization can help organizations make significant, measurement-driven impact.

Within this approach to identifying and implementing appropriate improvements, clinical process optimization focuses on unearthing previously unidentified and unconnected relationships among healthcare processes and outcomes. We then benchmark these relationships and metrics against similar organizations and implement measurable process changes. This approach provides organizations with optimal practice models for specific condition episodes and for similar organization types.

Examples

Clinical process optimization can make a positive impact on clinical, operational and financial outcomes. Consider the following studies of the processes involved in knee-replacement surgery:

- Cerner studied the total knee arthroplasty (knee replacement surgery) process in detail, discovering 571 core activities from the orthopedic clinic visit through surgery and the patient's return to the community. The process involves 63 actors and 179 handoffs between actors. As we studied the process, it became apparent that length of stay increased for patients when anemia led to transfusion during surgery. Multiple points in the care process can impact the transfusion rate. By identifying and incorporating a system-wide set of process changes to test for anemia not just before surgery, but weeks prior at the orthopedic clinic, and by adopting surgical techniques that minimize intra-operative blood loss and standardize transfusion guidelines, the healthcare organization can consistently evaluate and optimize hemoglobin levels well before surgery. These steps help reduce transfusion rates and overall length of stay. This opportunity extends to total hip arthroplasty and, potentially, to other major elective surgeries.

Healthcare organizations that have embraced clinical process optimization have achieved diverse benefits in quality and efficiency.

- One of the challenges in operating-room case scheduling is allocating appropriate case time for elective surgeries. This allocation is important for maximizing cases and managing staff and resources. Statistical analysis through collaboration with healthcare organizations has identified that the surgeon, procedure type and a subset of patient attributes can be highly predictive of total knee arthroplasty case time. This fact will help with the planning and management of the OR suites. It will also reduce unanticipated delays and staff overtime. A similar analysis is currently underway to optimize case times for other major joint replacement surgeries.

It is time to make a fundamental change. The evidence is available. The technology is available.

- Statistical analysis has identified several standardized functional-assessment questions, obtained during the scheduling of a referral to the orthopedic surgeon for total knee arthroplasty consideration, as highly predictive of the likelihood that the patient will need surgery. This insight early on in the care process can help with allocating more appropriate appointment time to complete the initial pre-op orthopedic evaluation. It can also help facilitate pre-op work-up and planning for surgery by the other relevant caregivers, such as physical therapy, case management and financial services.

Healthcare organizations that have embraced clinical process optimization have achieved diverse benefits in quality and efficiency, such as reduced readmission rates, decreased unnecessary clinical testing and reduced length of stay.

Ongoing monitoring to track concrete performance improvements and to guard against slippage is a critical element of our methodology. In addition to ensuring ongoing progress within a given organization, this monitoring helps us aggregate the information into a recommended practice library that helps organizations focused on clinical process optimization.

To ensure healthcare organizations target the appropriate change and measure the appropriate results, key clinical process optimization principles have been developed:

- Leverage existing information-technology investments
- Align objectives with organizational initiatives

- Use decision-support modeling and measurement-driven re-engineering
- Monitor results for alignment with performance goals

This approach assures ongoing monitoring and measurement to realize consistent return on investment and achieve incremental positive change.

How it unfolds

Clinical process optimization begins with an initial organizational assessment. This data analysis helps identify and quantify areas of opportunity for clinical, operational and financial improvement.

In working to understand every activity involved in high-impact care processes, we analyzed all activities critical to the complete business process, spanning clinical, operational and financial outcomes. We bring this knowledge and research to our clinical process optimization clients, enabling them to discover opportunities ripe for enhancement. Next, we use information technology and executable knowledge to promote the process changes that will yield the desired improvements. We realize that process innovation and standardizing on the knowledge-driven, recommended practices will optimize results.

Client data drives specific recommendations that are targeted and applicable to individual client facilities. We collaborate with clients to identify 60- to 90-day adoption targets to put identified opportunities for change into day-to-day practice. This practice enables rapid returns that support individualized corporate imperatives.

Finally, ongoing monitoring through repeated measurements of key process metrics ensures consistent alignment with organizational performance goals. This ongoing analysis ensures that healthcare organizations not only achieve process improvement, but also sustain and continuously build upon it, what we call "moving the meter."

This measurement-driven approach guides clients from data-driven diagnosis through the adoption of recommended practices and integration of decision support for continuous monitoring. The result is an ongoing cycle that paves the way for continued improvement to maximize clinical effectiveness and financial efficiency.

Healthcare poised for fundamental change

If a physician from the 1900s were to visit a medical facility today, he would find the approach to patient care largely consistent with his own approach. It is time to make a fundamental change. The evidence is available. The technology is available. Only the process remains to delve into the data to learn how it can be used to bring about positive change and transform healthcare to a new level of performance. Understand the data. Understand the process. Understand the correlation to outcomes. Define, measure and compare the benchmarks to processes. By embracing these core principles and focusing on relationships between individual clinical steps and overall outcomes, healthcare organizations can embrace clinical process optimization to revolutionize healthcare as Michael Dell revolutionized PC manufacturing. TCQ

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Dr. Ian Chuang joined Cerner Corporation in January 2002 and is currently responsible for developing the information model and core content within Cerner's Knowledge and Discovery offerings. Chuang's research in clinical decision support has been presented at both domestic and global conferences.

Chuang came to Cerner from TherapyEdge, where he spent almost two years in knowledge base design and clinical content as the director of clinical systems development. He also spent one year at Click4Care as the chief medical officer, with responsibilities for system and knowledge-base design. Previously, Chuang held a variety of roles during his three years at HBOC McKesson.

Chuang received his medical degree from the University of Toronto in Ontario, Canada. He completed his family medicine residency at the University of Calgary and he received a master's degree in administrative medicine from the University of Wisconsin in Madison.

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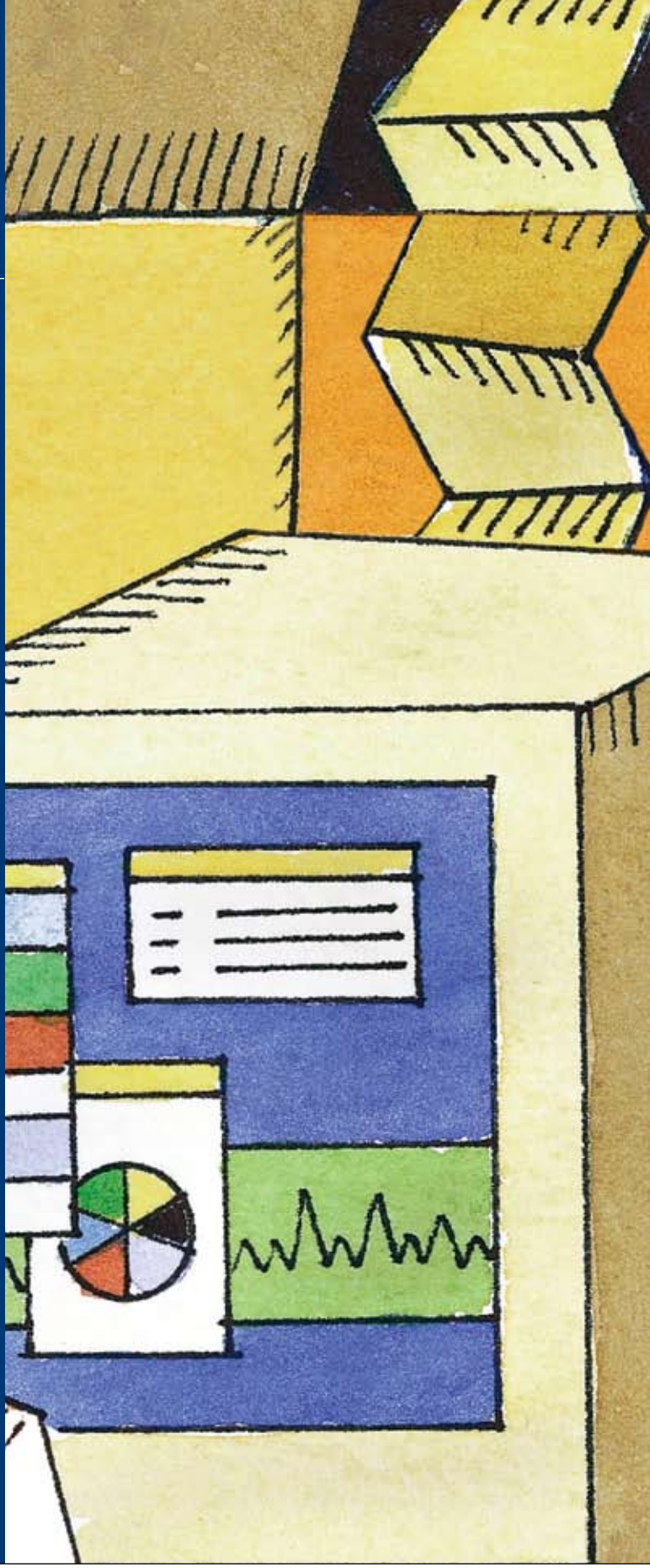

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