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DIGITAL IS CHANGING OUR WORLD, QUICKLY AND IRREVERSIBLY

FROM CUSTOMER RELATIONSHIPS *and production control to communication with suppliers: In the digital age, companies need to rethink their entire business models. Those who don't risk failure and extinction.*

The successful battle of the traditional booksellers and their Tolino e-reader with the Internet giant Amazon and its Kindle device not only inspires courage, but is also rich in lessons. Even the most cursory of analyses is enough to dispel a widely held belief that, contrary to popular opinion, digitization is not primarily an information technology (IT) issue. Effective IT is just the foundation on which the digitization of the entire company is built. It's about far more than simply implementing digital technologies—the ultimate goal is to develop completely new business models. This takes us to the heart of the issue: digitization starts with the CEO.

1.1 WHAT IS A DIGITAL TRANSFORMATION?

A digital transformation leverages the opportunities presented by technology—from IT to advanced analytics, sensors, robotics, and 3D printing—to drive business forward. The entire ecosystem of the company is affected, including employees, customers, suppliers, and partners. Companies that want to digitize successfully can either improve their current business model and processes, add new sources of revenue to their business model, or replace their old business model with a new superior model. In doing so, companies realize new customer experiences, generate new value propositions, and raise the organization to new levels of effectiveness and efficiency. Digitization thus changes structures, processes, and IT, as well as the people who live and work in this new reality.

Digital Players Conquer and Disrupt All Industries

However, this wonderful new world has a dark side: those who refuse to change, lose. Digitization triggers creative destruction, a term popularized by economist Joseph Schumpeter. The new combination of production factors ousts and destroys old structures and traditional business models.

Digitization is fundamentally changing the world

	Market leader	Attacker
Computers	COMPAQ	DELL
Video rental	BLOCKBUSTER	NETFLIX
Books	BORDERS	amazon
Mobility	TAXI ⚠	UBER
Automakers	⛽🚗 ⚠	TESLA

Digitization claimed its first prominent victim when the Internet was still in its infancy, when smartphones belonged to the realm of science fiction and apps were still unheard-of: Compaq was the undisputed global leader in personal computer (PC) and server sales in 1996, with a market share of more than 50 percent in the business customer segment. Compaq built its computers in the old-fashioned way, and delivered them to distribution partners for sale in their stores. That same year, the then 31-year-old Michael Dell launched direct sales of his Dell PCs via the Internet without the need for brick-and-mortar stores. And it wasn't just the order process that was revolutionary: Dell's customers were able to assemble their own customized PCs using a kit on the website. Thus, computers were no longer built according to the Compaq principle of "build to stock," but rather "build to order," and were tailored to the needs of the individual customer.

Although not immediately apparent to its competitors, Dell's business model was superior to the business model of Compaq and the rest

of the industry. Online sales and lean mass production according to the build-to-order principle made the difference between earning and losing money in this hard-fought market with tight margins. Compaq didn't dare to change its business model because it feared a channel conflict, and ultimately stayed true to its existing model. In 1997, Compaq was acquired by Hewlett-Packard, and Dell rose to become the world market leader.
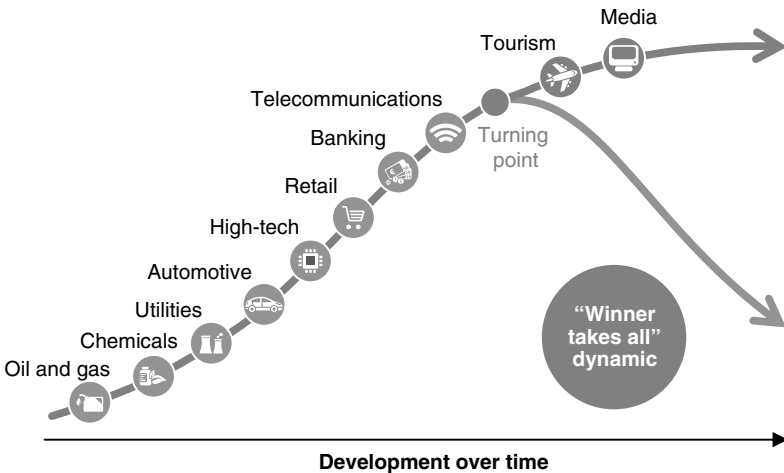
Since Dell's digital revolution of the PC industry, many industries have had their foundations shaken. Video libraries, CD stores, travel agents, and local banks are just some of the endangered species in a world where we now stream our movies and music via Netflix and Spotify, book our flights and accommodations via portals like Expedia and Airbnb, manage our bank accounts online, and can even secure classic banking services like loans via crowdfunding sites like Prosper.

Digitization Is Relevant for All Industries—Only Scale and Speed Will Vary

Anyone who hopes one's own industry will not be affected by digitization and chooses to continue along as before in blissful oblivion is making a risky assumption. Essentially, all sectors are affected; the only difference is the severity and length of time until the old business model is rendered obsolete.

Digitization affects all industries—with varying speed and scale

Digital maturity of various industries

Media

Tourism

Telecommunications

Turning point

Banking

Retail

High-tech

Automotive

Utilities

Chemicals

Oil and gas

"Winner takes all" dynamic

Development over time

Companies face dramatic challenges in many industries. Who is to say that tomorrow's driverless cars will still be built by Ford, BMW, Toyota, and the like, and not by Tesla, Google, or Apple? And in a few years, who will equip our smart homes with Internet-connected robot vacuum cleaners and ovens? Who will deliver the groceries that our smart refrigerators automatically order online? Kroger or Amazon?

Naturally, the topic of digitization is on the agenda of most companies. Many companies have started digital initiatives, for example in customer communications, in production, or in supplier interaction. However, most CEOs currently admit they do not have an overarching digital strategy. Their ideal transformation toward becoming a digital company often lacks definition, and all too often they have too narrow an understanding of the term *digitization*. It is not just IT and technology. These are only the foundation. Rather, it is about transforming the entire company—redefining customer value propositions, value-added processes, and people's working methods.

It has radically changed consumer behavior and expectations, destroyed traditional business models, and redefined industries. It revolutionizes production—think Industry 4.0—and rocks entire business sectors. Retail faces challenges from digital competitors like Amazon and Alibaba, the banking industry is threatened by lucrative fintech segments, travel portals like Expedia and Priceline are shaking up the tourism industry, and the traditional business models of the advertising industry are being rocked by a variety of digital channels. Digitization is even creating new markets, for example the so-called sharing economy where urban hipsters dispense with owning a car in favor of Uber or Zipcar.

Companies operating in the analog world must not let it get too late before they join the digital mix. Start-ups that tap into a customer need sometimes experience explosive growth. In China, for example, Tencent, whose WhatsApp-equivalent QQ is used by 900 million Chinese customers, saw its revenues increase a hundredfold in 10 years to around €14 billion in 2015. Tencent states that one in two employees works in research and development. And Chinese Uber rival Didi Chuxing, which dominates the taxi and limousine market in the country, more than tripled its company value in 18 months from around $6 billion in 2015 to some $20 billion.

New Business Models Follow a Classic Pattern

The business ideas triggered by digitization can be grouped across two dimensions depending on whether they are driven by the supply side or the demand side and whether they lead to extended or improved or even completely new business models. An example of a new offering leading to an extended business model is Kayak. The company has digitized the classic travel agency business, allowing users to search for flights, hotels, and rental cars online. The business model itself is still based on a classic system where providers pay a commission to Kayak.

Other digital companies' offerings tap into a demand that it was previously not possible to service. One example of this is Spotify, whose streaming service provides customers with access to its entire library of music. Rather than paying to listen to individual songs, users pay a subscription. This completely new business model revolutionized the music market and fundamentally turned the industry on its head. By comparison, Apple's iTunes music store appears conventional.

An example of a demand-driven revolution is the Dollar Shave Club. The company, which was recently bought by Unilever for $1 billion, offers razors and shaving accessories for men in return for a membership fee. By subscribing, members receive a monthly package containing the necessary blades and shaving foam, which saves a trip to the drugstore.

Nike iD is a demand-driven extension of a business model. Customers can individually design their sports shoes online, customizing the shape, material, and color, and even add a monogram.

Consumer Behavior Has Dramatically Changed in Recent Years

The McKinsey long-term study "TMT Digital Insights" tracks changes in consumer behavior in the most important global markets and segments, and has revealed dramatic changes in US consumer behavior. Here are two examples:

Consumers want everything, anywhere, anytime: In 2016, 83 percent of consumers possessed a smartphone—the same number as those who own a home PC. Even tablets, which first became a mass phenomenon in 2010 with Apple's iPad, are now owned by two-thirds of consumers. This has key consequences for user behavior: US consumers now spend more time on

Digitization enables new business models

Demand

Supply

New business model
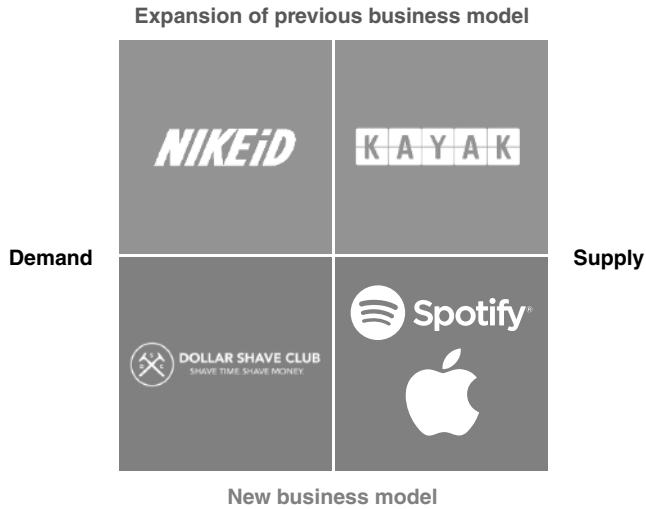
their smartphones and tablets than they do on the PC. Mobile consumers expect answers immediately when researching products and prices on the move or when they want to order something. Smartphones and tablets have become personal command centers. Companies that do not adjust their online presence to service the mobile "anytime, anywhere" mentality may lose ground to their competitors.

Increasing relevance of visual media: The medium of video has become significantly more important. Consumers now spend more time watching videos than before—often at the same time as other (often also digital) activities. So-called over-the-top (OTT) video content published directly online is threatening traditional linear TV and pay-per-view models. To remain attractive to customers, companies need to supplement their traditional text-intensive communications with videos. For a long time now, consumer fascination with the virtual world has impacted the real world economy: advertising budgets have shifted dramatically—from TV and print to mobile providers. And now video content is conquering the small screen: series are now optimized for smartphone screens in terms of time and image composition.

Retailers, service providers, and consumer goods companies are also feeling the pressure to digitize their processes and offerings, driven by

customers whose research and buying behavior has drastically changed in the past decade. Consumers browse online forums to find out about a product's quality, they check value for money on comparison sites, and they use Twitter, Instagram, and the like to post their opinions. And even when shopping in a store, they're happy to check their smartphones to see if a product they like is available for a lower price from an online retailer or a local rival.

1.2 ESTABLISHED MARKET DEFINITIONS DON'T APPLY ANYMORE

At the same time, managers find that the established definitions of their markets no longer apply—new challenges lurk everywhere. The networking of previously unconnected devices with online data sources—the Internet of Things—has dissolved traditional industry boundaries. Take the health care sector as an example: suddenly, technology firms with their apps and fitness bands have entered their industry, using the data leveraged from their customers to develop completely new business models. Even the old classification of companies that sell to business customers (B2B), and those that deliver to end customers (B2C) is becoming blurred—suddenly we see the term B2B2C. Even an industrial company like Alcoa might now like to know what the end customer does with its aluminum.

Naturally, as digital pushes through, the frequency of channel conflicts that need to be managed increases. The accumulated data needs to be professionally analyzed, which requires new talent in the company. The result of all these factors is increased pressure on management.

Innovations Arise at Industry Boundaries

Previously, the business world was transparent: everyone knew who their competitors were, and surprises from outside the industry were rare. This fine sense of certainty has gone; digitization has made transgressions easy. For example, Amazon with its Amazon Web Services (AWS) is now the world's leading provider of cloud services. Microsoft and IBM, which might have been expected to occupy this position as the top dogs in the IT industry, are positioned on the next rung down by some distance—they never reckoned with this competitor. Originally, Amazon had only intended to better utilize the capacities of its huge data centers. In the meantime, IT companies yet again find themselves wrangling with another intruder:

General Electric (GE), whose subsidiary Predix offers a cloud-based platform for analyzing data sent from industrial machines—a cornerstone of Industry 4.0 applications.

Even traditional machinery manufacturers are now crossing industrial boundaries. John Deere, for example, one of the giants in agricultural machinery and tractor manufacturing, offers software and data-based services. These services process highly detailed weather forecasts with data on soil conditions, the specific properties of the seed used, and a wide range of additional information to provide recommendations to farmers to help them increase their yields. It also helps save fuel, reduce repair cycles, and ensure optimum use of the vehicle fleet. Sensors installed in the vehicles send on-site data to the Deere data center, and farmers can access their information via the MyJohnDeere.com platform or view it on their smartphone or tablet via the Mobile Farm Manager app.

The chemicals group Monsanto is pushing into the agricultural world from a different direction. In 2012, the seed specialist bought Precision Planting, a manufacturer of hardware and software, whose products help farmers during sowing to optimize seed depth, distances, and conditions to ensure the best roots. It's the same customer base as Monsanto's core business and the same value proposition—more yield in the field—and yet a completely different technical approach. Monsanto has harmoniously expanded its business model, while at the same time breaking down industry boundaries.

Blurring Boundaries between B2B and B2C: B2B Becomes B2B2C

Previously, these worlds were strictly separated. When addressing end consumers, the pitch focused on emotion, enjoyment, and, above all, simplicity: the choice had to be made simple for consumers. Business customers, on the other hand, wanted to know the details; they demanded facts and rationality.

This distinction, however, is now obsolete due to digitization. Once business clients experienced how easy orders were with Amazon or Google as private consumers, how simple it was to search for products, and how quickly items could be delivered, they naturally transferred these expectations to the B2B segment. Why should an order for machine spare parts be more complicated than ordering a book from Amazon? Why does the delivery take weeks instead of one day? Why is the manual written in technical jargon

and not simple to understand? Why is the supplier's website so difficult to search? And why doesn't the supplier respond immediately to a complaint?

And it's not just customer relationships in the B2B segment that are increasingly mirroring those in the consumer sector. Thanks to digitization, many B2B providers are expanding their business model and also addressing end customers: B2B2C. Take Craftzilla as an example: the Indian e-commerce platform connects small-scale home decor manufacturers and artisans, who previously sold their products through specialty retailers, directly to the end customers. Craftzilla doesn't hold any inventory—the company connects sellers with customers and takes a commission from sales made on its website.

Fitness band manufacturer Fitbit applies the B2B2C concept by establishing company fitness programs with companies like BP and Adobe to promote employee health: the contract partner is the company—B2B—and the employees are the consumers—B2B2C. Panasonic and Allianz also collaborate in the same manner to make houses and apartments more secure. Panasonic installs its monitoring and control systems at the customer's home, while Allianz Global Assistance, a subsidiary service provider of Allianz, is alerted in the event of a serious incident so that emergency services are dispatched.

Managing Channel Conflicts

Digitization is revolutionizing customer contact, and not just in the end consumer segment. New rules also apply in B2B, often based on the B2C model. German heating system manufacturers, for example, previously marketed their products primarily via the installers. Companies such as Buderus, Viessmann, Vaillant, Wolf, and Junkers all cultivated their heating installers, who in turn brought in customers.

A Berlin-based start-up, Thermondo, however, disrupted this model by creating a platform to connect the various decentralized service and installation teams that supply customers with heating systems across Germany. The portal was founded in 2012. As early as 2015, the company was achieving an annual growth rate of 864 percent. A customer searching the portal can choose from numerous brands, and is given a tailored fixed price that includes installation. Thermondo even gives advice on applying for funding.

Manufacturers and tradespeople now have a problem: their old business model is under threat. The problem sounds familiar—think back

to the Compaq example. And just like in the Compaq case, the problem doesn't simply go away. An approach now needs to be developed governing how, for example, heating system manufacturers, installers, Thermondo, and the other market players work together in the new ecosystem. What is needed is omnichannel management.

Thermondo is revolutionizing the heating industry, providing customers an end-to-end offering of installation and assembly
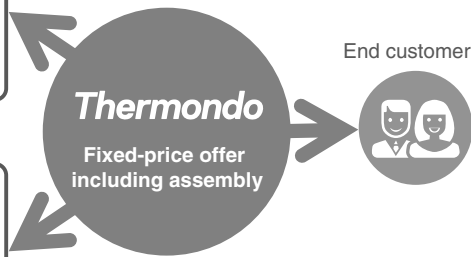
Source: Company websites

Software and Analytics Competencies Becoming Increasingly Important

"Data is the new oil" is a popular saying. Data forms the raw material for any digitization initiative. According to a McKinsey study, in 2015 international flows of data contributed more to global economic growth than classic trading of goods. Companies receive or procure huge amounts of data that can be translated into large sums of money with smart analytics.

Thus, online retailers like Amazon or Overstock use dynamic pricing systems that allow them to make second-specific price adjustments for the several million items in their ranges. To this end, they constantly retrieve information about competitors' prices, and process this along with data about current sales promotions. Using time series and big data analyses, they then calculate new inverse demand curves for all their items in hourly cycles.

The Battle for Digital Talent

Although digitization opens up countless opportunities, large companies with a traditional structure and strong division of labor from production through to sales find it difficult to grasp them. The fact that they don't have enough digital talent on board and therefore have to compete in the labor market for the scarce resources of new IT and software experts is just part of the problem. Even if these companies already had such talent, they could not achieve much as an isolated department. There needs to be a basic understanding throughout management of the possibilities and limitations of digitization.

This includes the observation that nothing is to be gained with classic departmental thinking, and that cross-functional teams need to take control of projects. Whoever wants to win the battle for digital talent needs to start here. This is particularly difficult for traditional companies: after all, specialization and a strong division of labor were for a long time considered factors of success.

1.3 THE PACE OF CHANGE IS INCREASING EXPONENTIALLY

A further obstacle on the path toward becoming a digital company lies in a deeply human weakness: we are accustomed to thinking linearly, and highly disruptive change makes us uneasy. According to the futurist and Google director of engineering, Ray Kurzweil, this is why we tend to smooth exponential functions back toward a linear curve by mapping them on a logarithmic scale. However, this is fatal when it comes to mental processing of the changes involved in digitization, because they develop according to an exponential function and at an increasingly rapid pace.

In his essay *The Law of Accelerating Returns* Kurzweil impressively describes the exponential dynamics of technological progress throughout human history when correctly mapped on a linear scale, and not on a distorting logarithmic scale. He surmises that people intuitively gravitate to this distorting perspective, and thus—against their better judgment—significantly underestimate the speed and extent of future developments. He predicts rapid progress for the twenty-first century because we are currently in the advanced section of the exponential curve.

In an interview, he explained the fundamental dynamics of exponential growth: "If I take 30 steps in a linear manner—1, 2, 3, 4, 5—I get to 30. If I take 30 steps in an exponential manner, I go 2, 4, 8, 16, and get to a billion." It's fascinating logic and one that can't be refuted—and yet it's so hard to

believe, the mind blocks it out. "Today, everyone expects continuous, linear development in technical advances, but the future will surprise us far more dramatically than most observers believe," Kurzweil says. "Very few understand what it will mean for the pace of change to accelerate even faster."

Ray Kurzweil's *Law of Accelerating Returns* describes the exponential dynamics of technological progress

Time until next event
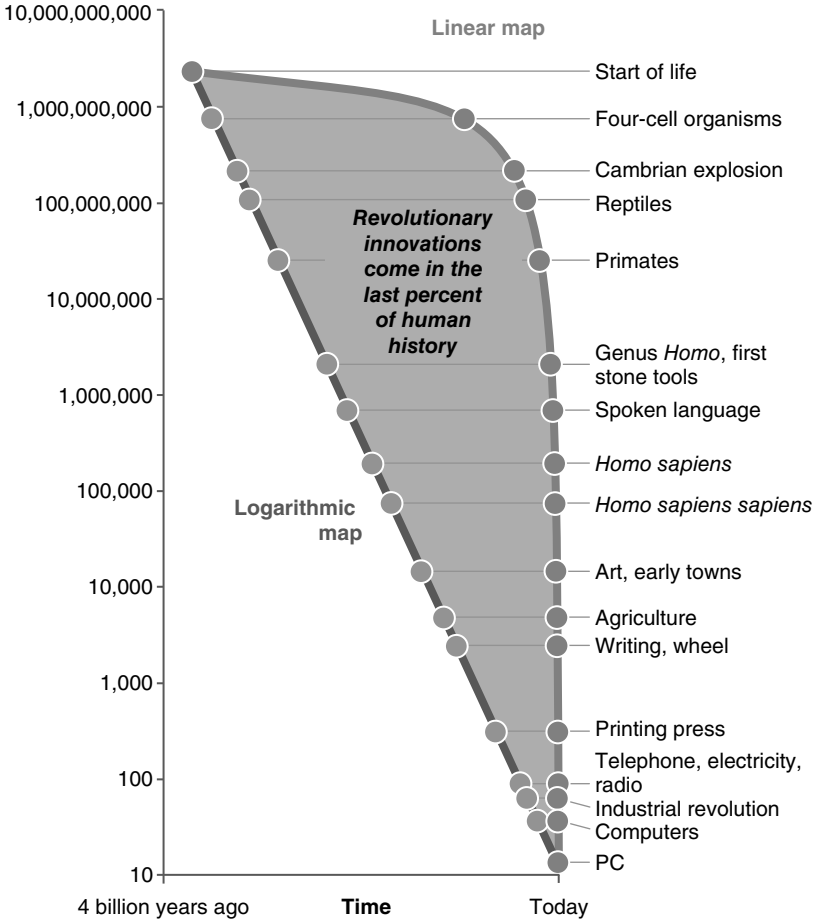
Source: Ray Kurzweil

Progress and Moore's Law

Two examples corroborate Kurzweil's theory of the logarithmic development of progress. The best-known is Moore's law. Gordon Moore, cofounder of Intel, formulated his theory in 1965 in the journal *Electronics*. He noted that the number of circuit components in an integrated circuit doubles each year, and predicted that this will continue. To this day, he has been proved right—processing power has doubled every year. Chips have become smaller and smaller. Today, a standard smartphone has 120 times the processing power of the control computer of NASA's Apollo moon program, and is four times that of an IBM mainframe from 1998—which was the size of a refrigerator. And an iPad 2 would have been one of the world's fastest supercomputers in 1994.
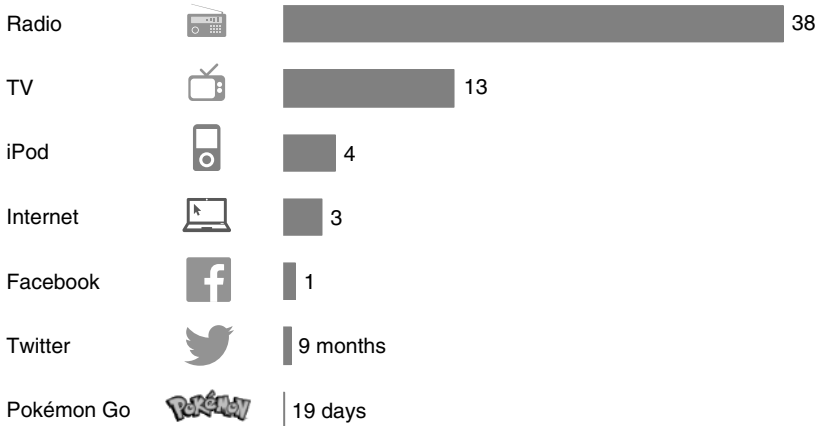
Further support for Kurzweil's theory is the fact that new technologies are adopted increasingly quickly. Following the invention of the radio, it was another 38 years before 50 million devices were in use around the world. The TV needed 13 years to be welcomed into 50 million living rooms. The Internet boasted that many users after just three years. Facebook needed one year to reach this figure, and Twitter just nine months. In 2016, the hype surrounding Pokémon Go heralded a new record: the game was downloaded to the smartphones of 50 million fans in just 19 days. New products and services are being developed and distributed at an unprecedented pace. Managers around the world still struggle to anticipate such rapid change.

1.4 THOSE WHO TURN A BLIND EYE TO DIGITAL RISK FAILURE AND EXTINCTION

Even though no one expects managers to develop psychic powers, the example of the erstwhile global brand Kodak shows what happens when the company's management refuses to accept digital change. Blessed with creative developers, Kodak Labs presented the world's first digital camera as far back as 1975. However, the management put the brakes on the project, fearing that this novelty might adversely affect the highly profitable business with Kodak films. Instead, rivals from Japan did so in the 1980s. When Kodak finally started making digital cameras, it was too late and their early advantage was lost. By 2012, Kodak was bankrupt and its market value of $35 billion was gone.

New technologies spread ever faster

Years to first 50 million users

Technology		Years
Radio		38
TV		13
iPod		4
Internet		3
Facebook		1
Twitter		9 months
Pokémon Go		19 days

Source: Company reports; McKinsey Global Institute

In the meantime, even the market for digital cameras has become a niche market, but who knows, had Kodak taken the bold step into the digital age in 1975, maybe a learning curve like that of Apple would have been possible. Perhaps then the first iPhone would have been built by camera manufacturer Kodak and not by the computer manufacturer Apple.

QUESTIONS MANAGERS SHOULD ASK THEMSELVES: WHERE ARE YOU?

- What is the phase and degree of digitization in your industry?
- Where is your business model most vulnerable?
- How quickly do changes take place, and how big are they?
- How do you react to these changes—with a lot of small, short-term initiatives or with larger, long-term initiatives?
- Do you know which digital investment(s) deliver the greatest benefit in your industry?
- How much change do you need to survive?
- What are you doing yourself? Where do you need partners or acquisitions?