Converge products

Making 1 + 1 > 2

A pattern study from the Center for the Edge's
Patterns of Disruption series

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Def. **Integrate distinct products to provide far greater value than the individual products can deliver independently.**

Amid the proliferation of gadgets, devices, and technology-based services, multiuse products deliver basic functionality across a range of product categories for a customer base that does not require the depth of features offered by single-purpose products. The consolidation of features from many products into one, stand-alone product delivers design and production efficiencies to producers. Meanwhile, as with the Swiss Army Knife introduced in the 1890s, customers gain the convenience and flexibility of easy-to-use products that minimize redundancy.[1]

In the report ***Patterns of disruption: Anticipating disruptive strategies in a world of unicorns, black swans, and exponentials***, we explored, from an established incumbent's point of view, the factors that turn a new technology or new approach into something cataclysmic to the marketplace—and to incumbents' businesses. In doing so, we identified nine distinct patterns of disruption: recognizable configurations of marketplace conditions and new entrants' approaches that can pose a disruptive threat to incumbents. Here, we take a deep dive into one of these nine patterns of disruption: **converge products.**

Figure 1. Pattern snapshot

Convergence consolidates select features from a variety of products—potentially from different sectors or categories—into a distinct, modular product. The most visible example is smartphones converging everything from handheld GPS systems to flashlights to cameras to music players in a single product, displacing each of the individual products as a result. When products start to use similar technological components and underlying infrastructure, producers who focus on developing the common infrastructure to remove redundancies across adjacent markets can expand across existing product sectors and create new ones. For the customer who needs or desires the component functionality, converged products offer a more economical and convenient way to access a breadth of basic functionality than they could get if they had to purchase and maintain distinct products. For example, if a consumer were to purchase the main functions and applications of a smartphone as individual products on Amazon—navigation system, alarm clock, planner, digital camera, cell phone—it would cost over $1,200 and weigh over 8 pounds.[2] As customers become accustomed to versatile, multifaceted products and comfortable that the quality can meet their needs—driven by the compelling value proposition of a more economical all-in-one device—their preferences shift from wanting all of the latest technology to desiring high levels of convenience and connectivity.[3] In fact, in consumer electronics, 60 percent of consumers preferred a core set of product features at a reasonable price than all the "bells and whistles" at a higher price.[4]

Convergence is largely driven by the underlying technology, which, as it becomes standardized, tends to change the economics such that lower-end, stand-alone products can no longer compete with the same capabilities wrapped into a multiuse device. Ravi Mantena and Arun Sundarajan, professors from the NYU Stern School of Business, have described a process whereby technological convergence (for example, adoption of digital technology) is followed by product convergence (multifunctional offerings) and potentially industry convergence.[5] As products across a broad range of industries become increasingly digital, there is a higher likelihood of shared underlying, fundamental technologies. As these core technologies (for example, general-purpose hardware, platforms, storage) increasingly overlap across adjacent markets and capabilities blur across previously distinct markets, the economics of product distribution, sales, and marketing will continue to change and result in the displacement of many traditional incumbents.[6]

> "The component parts of these technologies can be combined and recombined by innovators to create new devices and applications. Since these innovators are working in parallel with similar components, it is common to see simultaneous invention . . ."
>
> ——Hal Varian, Google chief economist, describing combinatorial innovation[7]

The economics of production/distribution and the preferences of the customer base determine where convergence, or its opposite "unbundling," may succeed. In unbundling,[8] a new approach makes separate, more specialized stand-alone offerings technically feasible and economically viable in way it was not previously; convergence, on the other hand, occurs when the ability to share an infrastructure, platform, or foundation promises to dramatically improve the economics of providing functionality, such that the individual products can no longer be offered competitively against the converged product. **On the demand side**, unbundling is more likely to occur when customers have very niche and specialized demands and preferences, possibly desiring more depth, while convergence will emerge most often in the low ends of markets, when customers have similar needs in terms of products and value breadth. Volatile markets and economic downturns, such as the one in the mid-2000s, make some customers more cost-conscious and can amplify the desirability of the value and breadth of a converged product. Research has shown that once most consumers make the initial transition to a lower-priced product, they continue to prefer and purchase lower-end goods because the quality exceeded expectations and satisfied the majority of their needs.[9]

Key stats

- Garmin, a leader in the navigation and mapping technology market, lost 70 percent of its market capitalization in the two years after navigation apps were introduced; TomTom, another leading player, lost nearly 85 percent.[10]
- By September 2014, global shipments of digital point-and-shoot cameras, after 29 consecutive months of decline, had decreased 32 percent.[11]
- The mobile chip market (global cellular baseband market) was worth $18.9 billion in 2013, up from $8.6 billion in 2006.[12]

One reason convergence can be so challenging for incumbents is that the new product, in which their current product capabilities are but a feature, quickly renders existing product lines and the assets that support them obsolete, turning them into liabilities that no longer have a competitive advantage or even a place in the market. The speed with which a converged product emerges and scales can be too fast for incumbents to reallocate existing assets and redesign existing processes. Spanning across multiple categories or sectors, the converged product benefits from the sometimes faster rate of technological advances or product development in an adjacent market and also may achieve scale faster as customers rapidly adopt the offering that delivers far greater value.

Convergence may also challenge incumbents' assumptions about how the products are used, what the customer values about the product, and what product category they compete in. The converged product essentially creates a new market that moves with

different competitive dynamics than the various single-product markets. Incumbent product companies tend to orient their strategy and operations around the assumption that the product serves a specific, well-established use and that the needs and preferences of the core customer base are static. They focus on measuring their performance against traditional competitors and differentiating themselves through quality, performance, features, or price. A converged product doesn't fit any one category they are prepared to compete against. They may not even be aware of it until it has already taken significant share—and their own product's capabilities can become just one feature among many.

By the nature of convergence, this pattern can affect multiple markets in parallel; however, disruption won't necessarily occur in all of the affected markets. Those most vulnerable will likely be markets where the customer needs aren't that differentiated, a minimum quality threshold satisfies the needs of the majority of a given product's user base, and the underlying technology is becoming more standardized with other stand-alone products used by a similar customer segment. Additionally, convergence will likely be more appealing to customers at lower technology levels where they derive more value from the added convenience, simplification, and ease of ownership than they would from incremental features in one category.[13] While expensive, single-purpose products and services also risk becoming outdated if the core technologies are still evolving rapidly, they are less likely to be converged with other expensive products simply because the resulting product would not be affordable to large portions of the market. Some displaced incumbents have successfully navigated the evolving market by moving upstream and focusing on niche, high-end, and specialized portions of the market whose needs cannot be served by multiuse devices.

Digging deeper

Does this pattern apply only to the technology industry?

Convergence tends to relate to technological advances, but we see convergence beginning to take place in a variety of industries, in part because technology is becoming fundamental to most sectors.

- Insurance: Insurance brokers, capitalizing on newly available means of collecting and analyzing data across a wider number of shared data sources, are now beginning to incorporate risk management services into their portfolios. A Towers Watson Survey reported that 75 percent of global insurers now include enterprise risk management as a vital component of their business.[14]

- Medical devices: Treatment of chronic conditions are changing as telemedicine and mobile health converge. Patients use push-to-talk devices in tele-monitoring situations in which sensor data is transmitted to a facility, encouraging patients to become more responsible for their own care delivery and their own health.[15] As more diagnostic tools can be powered by and remotely accessed via smartphones and other mobile technology, the need for once distinct medical devices (and facilities) diminishes.

Isn't convergence the same as bundling?

Convergence of products involves absorbing the core capabilities of one or more products into the functionality of a separate and distinct product, which then essentially becomes the combination of two or more products. "Bundling" typically refers to a sales, marketing, and pricing strategy designed to drive the combined sale of more than one product or service, each of which can be used independent of the other parts of the bundle. With convergence, the underlying infrastructure and technology is combined such that only one end product or service is sold, and the individual component capabilities cannot easily be stripped back out of the product.

Case studies

Qualcomm "System on a Chip" displaces mobile chipset makers

Qualcomm gained control of the mobile semiconductor market via the introduction of a new product, the System on a Chip (SoC), in 2002.[16] The SoC is an integrated circuit that combines all of the primary components of a computer (for example, central processing unit, graphics card, and memory controller) into a single chip. Consolidating previously separate products into complementary features of a single chip helped Qualcomm to capture market share from incumbents, and lead the mobile semiconductor market. The SoC created value in the following ways for customers (handset manufacturers and mobile carriers):

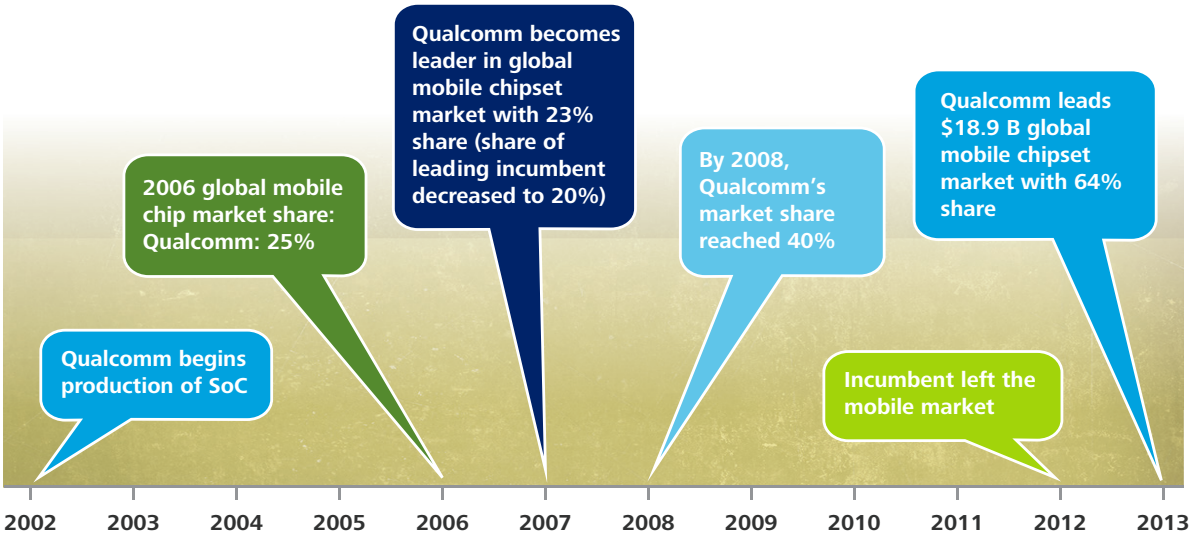
- **Elimination of redundancy:** SoCs could integrate elements (such as memory and graphics capabilities) that were previously duplicated in each component
  - Qualcomm's MSM6250 single-chip solution eliminated the need for an external applications processor and associated memory, significantly reducing bill-of-material costs, board size, and power consumption. It included MPEG-4 video encoding/decoding, JPEG encoding/decoding, MP3/AAC audio decoding, a 2D/3D graphics accelerator for advanced gaming applications, a MIDI synthesizer, and a digital camera interface that supported up to 2-megapixel resolution.[17]
- **Cost efficiency:** The removal of redundant capabilities in the new architecture yielded lower overall costs and resulted in lower power consumption and more cost-effective memory.
- **Increased convenience:** With the smaller, more versatile SoCs, handset manufacturers and mobile carriers could easily deploy chips by simply dropping the SoC in the device rather than having to insert individual components.

By 2007, Qualcomm led the mobile chipset market.[18]

Qualcomm's entry into the market (see figure 2) with a complex product that broke with the status quo for the industry made it difficult for incumbents to effectively respond. By combining features from products that were assumed to be more valuable on their own, Qualcomm addresses a systemic need for efficiency and simplicity that likely could not be further addressed by any single component product. Qualcomm's holistic approach to mobile chips challenged the incumbents' core assumptions about what mobile handset manufacturers wanted and in what form factor. Drawing on several years of R&D, technology designed by Qualcomm allowed the SoC chip to absorb and integrate core functionality from a variety of individual components. Qualcomm also outsourced to third-party foundries (factories/workshops) to quickly scale its offerings to meet surging demand. In addition, had incumbents tried to respond by developing multifaceted chips, they would have been likely forced to write off the expensive assets configured specifically for manufacturing individual product lines.

A variety of conditions facilitated the success of SoC within the semiconductor industry. Within the mobile chip space, many related but distinct offerings that comprised the mobile chipset were purchased by the same customers: handset manufacturers. Thus, the ability to purchase one product that contained all of the components necessary to operate a mobile handset was compelling for customers. In addition, the accelerating rate of product development in the industry led to innovations

Figure 2. Qualcomm SoC displaced market leaders



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Graphic: Deloitte University Press | DUPress.com

being adopted faster, likely making all incumbents more vulnerable because of the inflexibility of the R&D- and asset-intensive nature of chips.

Qualcomm's SoC was catalyzed by technological advances that, following Moore's law, were driving ever smaller, faster, cheaper digital components and the emerging standardization around a core technical infrastructure between disparate components that allowed Qualcomm to converge functionality onto a shared infrastructure. In addition, all consumer electronics manufacturers were becoming accustomed to smaller and more compact core parts, and so the handset manufacturers were eager to simplify their designs and development processes and decrease costs using the SoC instead of multiple components.[19]

Smartphones displace consumer GPS systems

With the rise of smartphones, a host of capabilities, including navigation, have been converged in the device. As a result, the market for portable navigation devices (PND), most notably consumer GPS systems, declined sharply, replaced by a variety of mobile and web applications that use GPS satellite data to provide real-time directions to get drivers (and pedestrians, bikers, and transit riders) from point A to B via the most efficient route possible.[20]

Consumers have become comfortable using smartphones, rather than separate products, for a variety of purposes, driven largely by convenience. With that comfort, consumers increasingly preferred to get directions via the smartphone. Free navigation applications (for example, Apple®[22] Maps, GoogleMaps, Waze) are now either preloaded or easy and free to download on nearly every smartphone, leading to cost and time savings. Additionally, the smartphone reduces the redundancy of purchasing, maintaining, and carrying excess devices.

> "Mobile phones are the kind of commodity business we would like to avoid."
>
> —Garmin CEO (in 2003)[21]

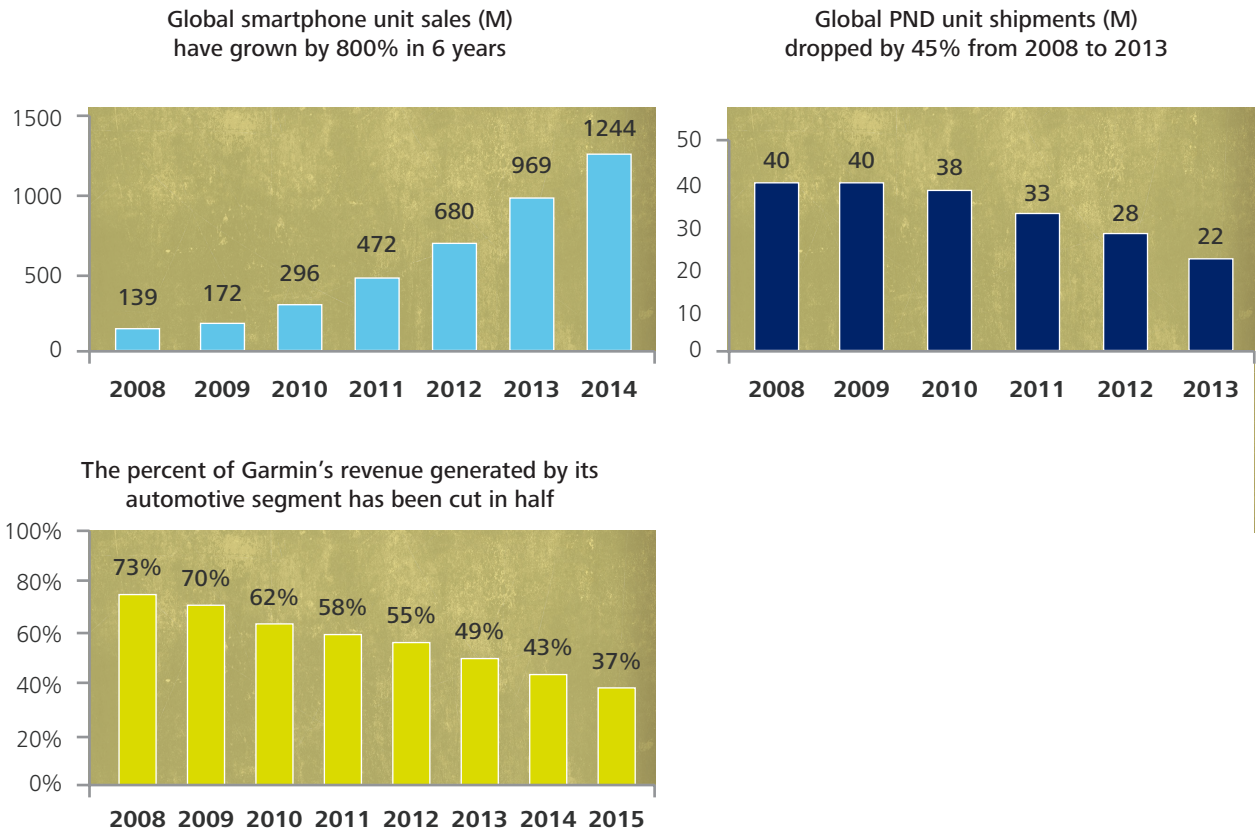
The primary market leaders within the navigation and mapping technology market—Garmin, TomTom, and Magellan—have all seen their GPS sales erode due to the rise of accessible and easy-to-use mobile apps. Garmin lost 70 percent of its market capitalization in the two years after navigation apps were introduced, while TomTom lost nearly 85 percent.[23] In 2007, Garmin had been the top seller of GPS devices and had recently doubled its sales, with 72.6 percent of the company's 2008 revenue coming from automotive sales.[24] By 2015, sales within Garmin's automotive segment accounted for only 37 percent of overall sales.[25] This drastic shift tracked the availability of capable mobile application alternatives (see figure 3).

Portable navigation device sales decreased as consumer adoption of smartphones—and the popular free mobile navigation applications—escalated. Berg Insights estimates PND unit sales to further decrease to 17 million in 2017 and 10 million by 2019, 25 percent of what it was during its peak.[26] In contrast,

GoogleMaps had 200 million global monthly active users as of May 2011.[27]

In the early 2000s, GPS manufacturers recognized that devices were becoming cheaper and easier to integrate with other products, but did not view mobile phone producers as threats because of their core assumptions about the industry and the product. As the Garmin CEO said in 2003, mobile phones represented "the kind of commodity business we would like to avoid."[28] Assuming that high barriers to entry, specifically the ability to acquire GPS location signals from satellites, would prevent mobile phones from taking market share, Garmin felt little pressure to act.[29] Those barriers fell when smartphones gained location placement capabilities through GPS chips and cell phone towers, and Garmin struggled to respond, as reflected in its declining popularity during 2008–2013.[30] Constrained by its investment built around producing navigation devices, Garmin couldn't easily reconfigure to offer smartphones or services that competed with the free mobile navigational apps. In recent years, Garmin has shifted its focus to fitness gadgets and units for niche customer segments like sportsmen and sailors.[31]

Figure 3. PND's declining popularity tracked the rise in smartphones



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Graphic: Deloitte University Press | DUPress.com

As the enabling technologies for smartphones and GPS systems rode the exponential rate of price-performance improvement, GPS systems became commodities and smartphone ownership skyrocketed. Once the technology provided the ability to integrate the GPS components into the smartphone, smartphone-based navigation applications emerged to meet the basic needs of customers who might have considered buying a personal navigation device, and customers were quick to eliminate the redundancy of carrying a personal GPS.

Short stories

Digital cameras

As smartphone adoption soared in the late 2000s, digital point-and-shoot camera sales decreased dramatically. Once smartphones were able to absorb the core functionality of cameras and provide a similar level of quality, customers opted to use their phones for every-day picture-taking.[32] Entry-level cameras cost around $150–$200, while consumers could purchase smartphones equipped with cameras boasting comparable megapixels and sensor sizes for a comparable price accompanied by a variety of other useful features.[33] By September 2014, global shipments of digital point-and-shoot cameras had decreased for the 29th consecutive month.[34] While for Kodak, this second disruption pushed it closer to bankruptcy, some other incumbents successfully refocused on DSLR offerings to provide higher-quality cameras to a select segment of users whose needs smartphones cannot meet.[35]

Insurance

A relatively volatile economic environment and increased rate of catastrophic events (injured catastrophe losses in 2012 were nearly double those of the inflation-adjusted average from the past 30 years) are beginning to influence insurance companies to adjust their focus.[36] Whereas traditional insurance brokers and companies have primarily focused on insuring risk for customers and organizations, they are beginning to also place an emphasis on helping customers manage and minimize risk, taking advantage of similar back-end platforms. Shared foundations and infrastructures across the fields enable providers to collect data in a cheaper and more effective manner, facilitating integration of services. Historically, it would not have been feasible for insurers to engage customers around risk minimization because they lacked analytics, had little visibility into customer behavior, and ineffective technology. By assuming some of the responsibilities typically borne by risk management agencies, insurance companies may not only be converging functionality that was previously managed by distinct entities, but looking out for the best financial interests of customers and themselves.

Is my market vulnerable?

Is the use of my product well-established?

If the typical range of uses for a product is fairly established and understood, it is easier to identify the capabilities and features required to meet basic needs for the broad customer base. In addition, customers will be more likely to feel comfortable with a converged product if they understand the value they derived from simple, well-established use of the stand-alone product.

Are my product offerings used across many similar domains, activities, or user bases?

When distinct products are frequently used either by the same customers or across the same activities, there are clear user benefits to convergence because it eliminates redundancy and increases convenience. Consider whether your customers who use a variety of related products across an activity would accept and prefer to use fewer products.

Does my product/service have limited domain and functionality?

When products or services have limited functionality, they are not as useful or versatile to customers as they could be. Thus, firms can enhance the value of a product or service by adding additional capabilities that appeal to customers. Organizations should consider whether their product traditionally serves a very limited scope and if it would be possible for it to expand.

Is there potential for shared infrastructure across my own and related products?

When individual products within the same, adjacent, or new industries share core underlying technology infrastructure or platforms, it becomes easier and more beneficial for producers to converge the capabilities. Producers can be incentivized by design efficiencies that may save money (through data collection) and grow their customer base, while customers may be excited about the opportunity to increase convenience.

Does quality at the lower end of the product category have the potential to eventually meet the needs of a large portion of the customer base?

When disparate offerings are converged, the quality of each individual offering (as a part of the whole) often initially declines. But as long as the converged product's quality level can potentially satisfy the needs and preferences of a majority of its user base, the product will find a market. Products within industries that are being transformed by innovative technology and rapid price/performance improvements are especially at risk for convergence. Consider whether new technology has the ability to elevate a product's performance above a threshold that most customers will accept, rendering it vulnerable to being made a feature of a multifaceted product.

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About the research team

This report and the Pattern write-up series would not have been possible without the hard work of our research team—colleagues who tracked down case studies and cheerfully dug for data and more data on the way to proving and debunking countless possible patterns.

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Austin Dressen (research fellow, Deloitte Center for the Edge) is a self-described catalyst. Although a traditionally trained historian and entrepreneur, he also serves as resident philosopher-in-training. He is interested in the interaction of human beings and machines in our old, new, and unimagined systems.

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Jay Rughani (former research fellow, Deloitte Center for the Edge) is passionate about developing new technologies that help people enjoy a better quality of life. His interests span issues ranging from resource allocation to cyber security to climate change. Today, he spends his time building technology-driven solutions to improve outcomes and reduce costs within the health care system.

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About the Center for the Edge

The Deloitte Center for the Edge conducts original research and develops substantive points of view for new corporate growth. The center, anchored in Silicon Valley with teams in Europe and Australia, helps senior executives make sense of and profit from emerging opportunities on the edge of business and technology. Center leaders believe that what is created on the edge of the competitive landscape—in terms of technology, geography, demographics, markets—inevitably strikes at the very heart of a business. The Center for the Edge's mission is to identify and explore emerging opportunities related to big shifts that are not yet on the senior management agenda, but ought to be. While Center leaders are focused on long-term trends and opportunities, they are equally focused on implications for near-term action, the day-to-day environment of executives.

Below the surface of current events, buried amid the latest headlines and competitive moves, executives are beginning to see the outlines of a new business landscape. Performance pressures are mounting. The old ways of doing things are generating diminishing returns. Companies are having a harder time making money—and increasingly, their very survival is challenged. Executives must learn ways not only to do their jobs differently, but also to do them better. That, in part, requires understanding the broader changes to the operating environment:

- What is really driving intensifying competitive pressures?
- What long-term opportunities are available?
- What needs to be done today to change course?

Decoding the deep structure of this economic shift will allow executives to thrive in the face of intensifying competition and growing economic pressure. The good news is that the actions needed to address short-term economic conditions are also the best long-term measures to take advantage of the opportunities these challenges create.

For more information about the Center's unique perspective on these challenges, visit www.deloitte.com/centerforedge.


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