Deloitte.

Mastering Innovation

Exploiting Ideas for Profitable Growth

A Deloitte Research Global Manufacturing Study

Table of Contents

About Deloitte Research

Deloitte Research, a part of Deloitte Services LP, identifies, analyses, and explains the major issues driving today's business dynamics and shaping tomorrow's global marketplace. From provocative points of view about strategy and organizational change to straight talk about economics, regulation and technology, Deloitte Research delivers innovative, practical insights companies can use to improve their bottom line performance. Operating through a network of dedicated research professionals, senior consulting practitioners of the various member firms of Deloitte Touche Tohmatsu, academics and technology specialists, Deloitte Research exhibits deep industry knowledge, functional understanding, and commitment to thought leadership. In boardrooms and business journals, Deloitte Research is known for bringing new perspective to real-world concerns.

Executive Summary

For manufacturers today, innovation is *the* engine of growth. Paradoxically, however, building or restructuring their operations to profitably bring new products and services to market is near the bottom of most manufacturers' priorities.

Our research shows this to hold true in just about every industry we have analyzed—from consumer products, automotive, and chemicals, to pharmaceuticals and high tech. Yet, our data also suggest that overcoming this "innovation paradox" is crucial to survival and success in increasingly complex global markets.

Few of the nearly 650 companies from North America and Europe that we have studied have resolved the paradox.[1] However, those making inroads generated better business performance, with profit levels up to 73 percent higher than all other companies studied. These companies are resolving the paradox by synchronizing their global operations amidst massive complexities. We thus refer to these leaders as "complexity masters."

Based on our research, we believe that nearly every manufacturer will have to master such complexity over the rest of the decade. The pressures to innovate are unrelenting. Executives expect new product revenue as a share of total sales to hit 34 percent in 2007, up from just 21 percent in 1998. Over the next six years, products representing more than 70 percent of manufacturers' sales today will be obsolete due to changing customer demands and competitive offerings. For companies in the fastest-moving industries like high tech and fashion goods, such obsolescence may take only a year or two. Without innovation, companies are doomed to decay.

But generating profitable innovation is far from easy. Many companies fail to effectively generate big new concepts and assess whether they are "sustaining" (improvements to existing lines) or "disruptive" (potentially cannibalizing, and thus needing to be nurtured as a whole new business).[2] And, once a new concept is developed, the value chain that builds and brings it to market often cannot cope effectively with the dramatically increasing complexities of global markets.[3]

The reasons for this are many. Some manufacturers lack incisive information on customer needs, supplier capabilities, product profitability, and supply chain costs. Others are ineffective at collaborating internally and with customers and suppliers. Still others have difficulty matching supply with uncertain demand or are thwarted by inflexible, high-cost supply chains. Given the challenges for effectively managing the entire product lifecycle—from idea to launch to after-sales service—it is perhaps of little surprise that companies overall are reluctant to spend more on R&D. Executives forecast average R&D spending as a percentage of revenues to increase only slightly over the next three years, from 4.1 percent today to just 4.4 percent in 2007.

Based on our research on the success factors behind complexity masters and in-depth analysis of best practices, there are some very decisive steps that companies can take to generate profitable growth through innovation:[4]

1 Deloitte Research – Mastering Innovation
As used in this document, the term "Deloitte" includes Deloitte & Touche LLP, Deloitte Consulting LLP.

- **Creating Innovation:** Generating and evaluating ideas. Leading companies aim to better identify both "sustaining" and "disruptive" innovations, the latter of which are typically ignored by managers of established companies trying to protect their current products. They are superior at generating ideas or sourcing concepts from outside the organization, developing business cases upon which enlightened investment decisions can be made, understanding the gap between the performance of existing products that satisfy customer demands and proposed new offerings, and deciding on the best organizational model for putting the innovations into action.

- **Exploiting Innovation:** Turning ideas into growth and profits. Companies that successfully exploit innovation maximize profits throughout the entire lifecycle of a new product; essentially they look at it as a "profit cycle" rather than as a lifecycle. Most companies focus on the front end of the cycle—on creating a product that will make a big splash with customers. Good companies realize that this is only the first leg of a long race. They know the profitability of a new product can erode rapidly if its design cannot be updated quickly and cheaply, if it cannot be marketed and serviced cost-effectively, and if other "downstream" activities are not dealt with at the outset. The best at product innovation synchronize the entire value chain, not just the product development process.

- **Building Innovation Capabilities.** Behind the ability to create and exploit new ideas are four key capabilities that propel complexity masters to success:

  – Better *visibility,* both upstream and downstream in the value chain, through access to information on product profitability, production and distribution costs, and the ability to model future scenarios.

  – *Flexibility* in product designs and platforms that allow for quick modification of product offerings to meet market demands, and flexibility in the supply chain network to quickly shift manufacturing loads, production volumes, and product mixes.

  – More extensive *collaboration* with customers to define product requirements and with suppliers to design components and new materials. Complexity masters are also far more likely to have methodologies and processes in place for managing the lifecycle of their products.

  – Use of advanced *technologies* for product lifecycle management (PLM), product data management (PDM), customer relationship management (CRM), and advanced planning and scheduling (APS).

Such capabilities give these manufacturers an edge in creating, evaluating, and exploiting innovation throughout the entire lifecycle, from idea to launch to after-sales service.

Profitable growth through innovation may be difficult at best. But without innovation, companies will eventually languish and fail. As our research shows, however, companies with an in-depth understanding of the challenges, opportunities, and capabilities for building an "innovation machine" are rewarded handsomely with high profits, stronger growth, and more value for shareholders.

The Innovation Paradox

Growth is back at the top of the agenda for manufacturers worldwide. But it is not the 1980s' and 1990s' version driven by mergers and acquisitions (M&A). Given their mixed success with business combinations, manufacturers in nearly every industry that we studied now place M&A at or near the bottom of their growth strategies. Global manufacturers are instead making innovation their primary source of new revenue growth. This is the case across nearly 650 companies and business units in nearly every industry we studied across North America and Europe, including automotive, consumer products, chemicals, general manufacturing, pharmaceuticals, and high technology and telecommunications equipment (Figure 1).[5]

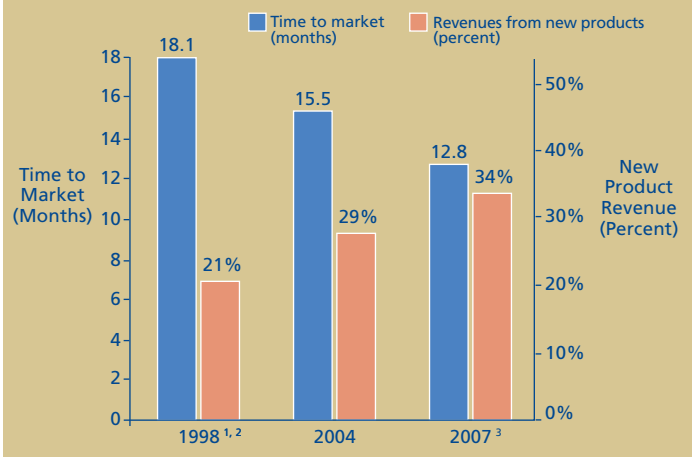
To say they are banking on innovation would not be an overstatement. By 2007, our research suggests, sales of new products introduced in the three preceding years are expected to generate 34 percent of total revenue, a huge increase from 21 percent in 1998 (Figure 2). To achieve this, companies are shortening the time to market for new products from an average of more than 18 months in 1998 to less than 13 months in 2007. The implications are daunting: By 2010, products representing more than 70 percent of today's sales will be obsolete on average. For some businesses in fast-moving technology-intensive industries, this may take only a year or two as leaders such as IBM, Intel, Nokia, and Samsung Electronics boost their innovation efforts.[6]

Figure 1. Top Factors for Growth – 2004 to 2007: New Product/Services Launch on Top; M&A at Bottom

Rank	All Manufacturing	Automotive	Consumer Products	Discrete Manufacturing	High Tech/Telecom Equipment	Life Sciences	Process/ Chemicals
1	New Product and Services Launch	New Product and Services Launch	New Product and Services Launch	New Product and Services Launch	New Product and Services Launch	New Product and Services Launch	New Product and Services Launch
2	Economic Turnaround	Economic Turnaround	New Channels	Economic Turnaround	Economic Turnaround	Industry Growth	Economic Turnaround
3	Industry Growth	Industry Growth	Economic Turnaround	Industry Growth	Industry Growth	JVs/Alliances	Industry Growth
4	New Channels	New Market Entry	Industry Growth	New Market Entry	New Channels	New Channels	New Market Entry
5	New Market Entry	JVs/Alliances	New Market Entry	New Channels	JVs/Alliances	M&A	New Channels
6	JVs/Alliances	New Channels	M&A	JVs/Alliances	New Market Entry	New Market Entry	JVs/Alliances
7	M&A	M&A	JVs/Alliances	M&A	M&A	Economic Turnaround	M&A

Source: Deloitte Research

Figure 2. The Twin Challenges of Innovation
Reducing Time to Market While Increasing New Product Revenue



Source: Deloitte Research
Note: [1]Data on revenues from new products are based on Deloitte Research, Global Report – Vision in Manufacturing (New York: Deloitte Research, 1998).
[2]Data on time to market refer to year 2001.
[3]Expected.

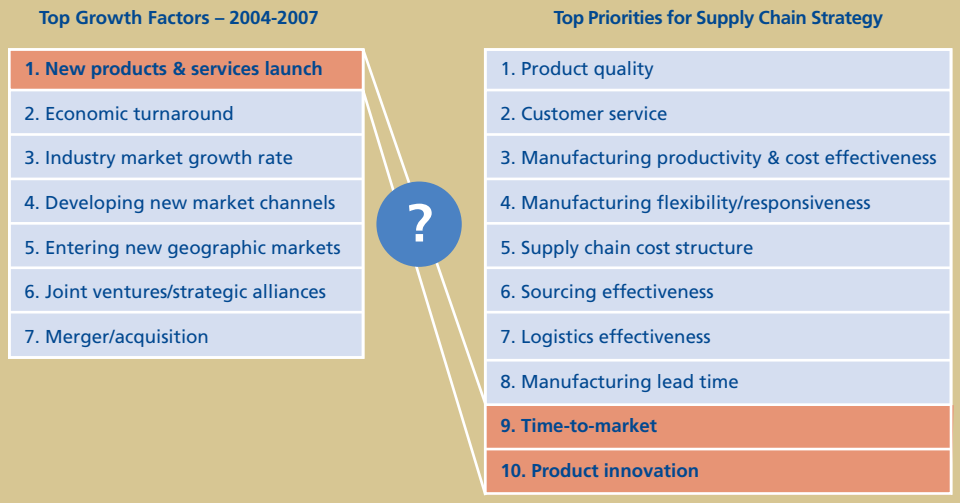
The mandate for growth is strongly driven by investors. Our recent analysis of the 100 top-performing global manufacturing companies shows that from 36 percent to 82 percent of their total market value can be attributed to investors' expected return on *future* investments rather than on *current* assets.[7]

But history tells us that *profitable* innovation and growth are very difficult to achieve. Research suggests that more than 86 percent of new product ideas never make it to market.[8] And of those that do, 50 percent to 70 percent fail.[9] The process –- from the moment an idea is sparked to the time when a product is retired from the market — is enormously complex. Most manufacturers have little confidence in their ability to manage it effectively.[10] No wonder manufacturing executives forecast overall R&D spending as a percentage of revenue to increase only slightly, from 4.1 percent today to 4.4 percent in 2007.

Yet in light of manufacturers' desperate need for profitable innovation, there remains a paradox: Most of these same companies are reluctant to pursue the strategies and build the operational capabilities necessary for innovation to pay off. As we will show later, within this *innovation paradox* are the answers to generating profitable innovation (Figure 3).

Our study found that the clear majority of manufacturers' value chains lack the capabilities to effectively generate new products and sustain them over their lifecycles. One major reason is the rapidly increasing complexities of global markets and value chains. To reduce costs and pursue global markets, companies are dispersing engineering, design, and manufacturing as well as marketing, sales, and service activities around the world. This has made it significantly more difficult to coordinate the value chain and manage products effectively across their lifecycles.[11] While operating around the world may help companies generate ideas for innovation, the complexity of the global network is likely to render the evaluation and exploitation of innovations even more difficult -– whether they are "sustaining" existing businesses, or "disruptive" ideas that need to be nurtured in their own right (Figure 4).[12]

Figure 3. The Innovation Paradox
Innovation Top Factor for Growth, but Bottom Priority for Supply Chain?



Source: Deloitte Research

Figure 4. Accepting the Challenge of Growth:
Sustaining and Disruptive Innovation

Source: Deloitte Research

The challenges are many. When it comes to deciding which ideas to fund, managers often protect current product lines by rejecting "disruptive innovations" –- new offerings that threaten margins and sales of existing lines. Managers are rarely willing to sacrifice short-term profits for long-term opportunities. Conflicting incentives, funding, and accountabilities kill great ideas or let mediocre or bad ones through the stage gates of the innovation process.

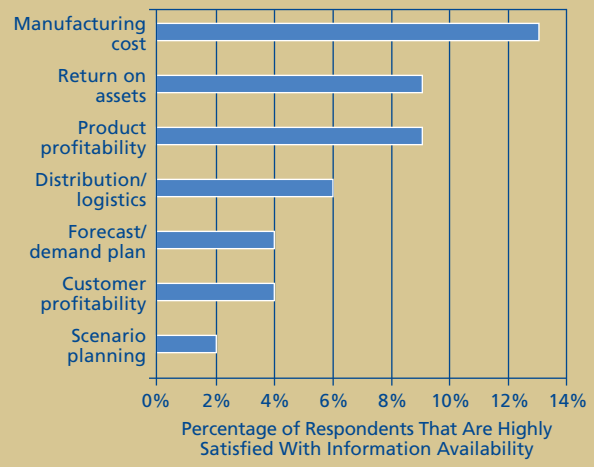
Even when a blockbuster idea survives, bringing it to market, creating strong demand for it, and maximizing its profits throughout its lifecycle are not easily accomplished.[13] Innovators often end up watching the inevitable imitators siphon off sales and profits. Many times, the "hare" assumes the enormous cost of developing and educating a market. Having an already prepared market, the "tortoise" is able to spend far less on marketing, which lowers its price point. From our research it is apparent that most manufacturers struggle to effectively match new and existing products with market demands.

From there, the race is on to incorporate new features and functions that customers truly want without having to engineer the product and build new manufacturing processes from scratch. Whether they are building mobile phones, laptop computers, or aircraft engines, the manufacturers that cannot rapidly update their products to incorporate the latest technologies and features lose ground. Sometimes the culprit is a rigid product design; other times it is a rigid supply chain that cannot change production lines or suppliers quickly and cost-effectively. Whatever the case, the innovators quickly realize that the innovation race does not end after the first lap. The sprinters who do not prepare themselves for subsequent laps eventually fall behind, never to catch up.

Indeed, the complexities of global manufacturing can throttle product innovation. In a world in which competitors react faster than ever and customers grow more powerful and demanding, manufacturers that do not have the capabilities for mastering the entire lifecycle of their new products end up wasting huge sums on innovation. The gaps in capabilities to reach that level of competence are significant for most of the companies we studied.

Why? First, few companies have the visibility and insight into where money is and potentially will be made. For example, a very small fraction of companies are highly satisfied with their level of visibility into manufacturing cost (13 percent), product profitability (9 percent), customer profitability (4 percent), and potential scenarios for the business (2 percent) –- all important issues for making good decisions on new product introductions and managing products over the lifecycle (Figure 5).[14]

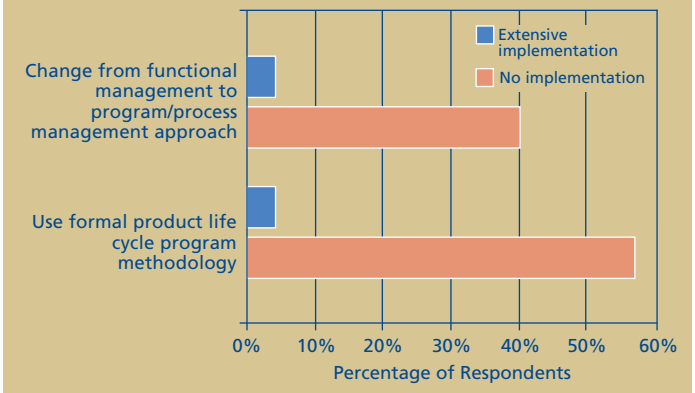
Figure 5. Lack of Visibility to Where Money Is and Will Be Made:
A Major Challenge to Effective Product Development



Source: Deloitte Research

Second, despite decades of talk around the benefits of better implementing and managing innovation and product lifecycle methodologies and processes, few companies are comfortable with their capabilities in this regard (Figure 6). Just 4 percent of companies surveyed have extensively implemented a program methodology for product lifecycle management. An astounding 57 percent say they have no such program methodology in place.

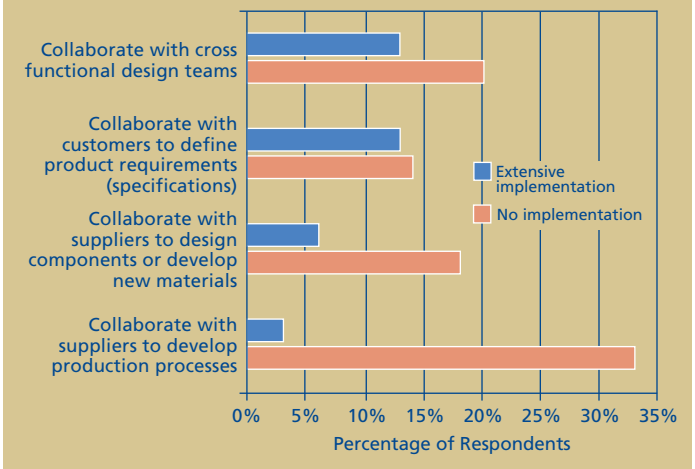
Figure 6. Lack of Process and Methodology in Product Innovation and Life Cycle Management



Source: Deloitte Research

Third, companies are rarely sufficiently connected internally and with customers and suppliers to manage the product lifecycle effectively (Figure 7). For example, only 13 percent of executives say they collaborate extensively with customer on new product designs. On the supplier side –- despite rampant outsourcing of manufacturing and other capabilities –- a third of all companies do not collaborate with suppliers to improve production processes.

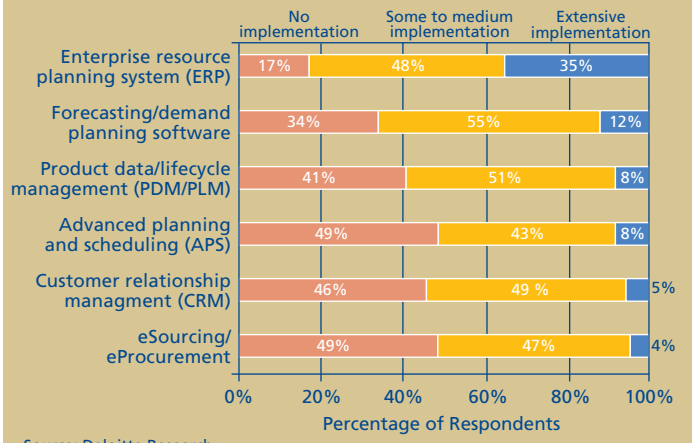
Figure 7. Lack of Collaboration Across the Value Chain



Source: Deloitte Research

Finally, most global companies lack the technologies necessary to run the innovation and production lifecycle process effectively, including PDM/PLM systems, implemented extensively by just 8 percent of the firms (Figure 8). The only system pervasive across manufacturing is ERP, implemented by 83 percent of the companies, although less than one-third of those were considered "extensive implementations" by executives surveyed. Other important technologies for synchronizing the value chain such as CRM, APS, and e-Sourcing systems are still early in the adoption phase.

Figure 8. Lack of Technology
Only 8 Percent of Companies Have Extensive Implementation of PDM/PLM Technology



Source: Deloitte Research

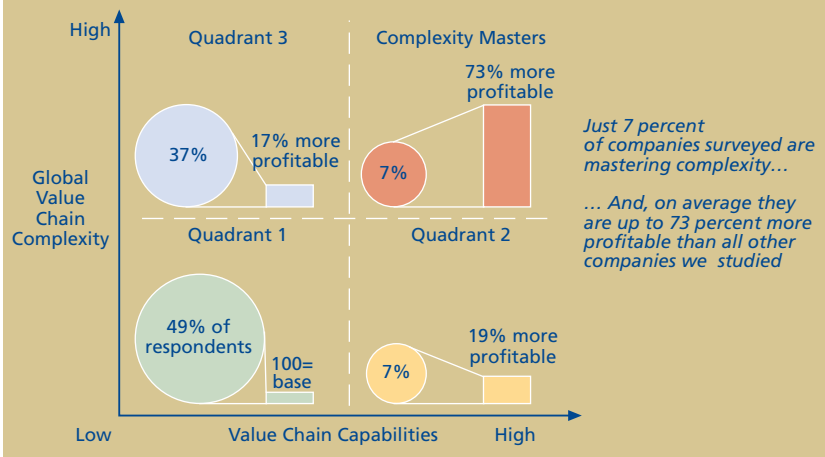
Mastering Innovation

Manufacturers are more dependent than ever on innovation for growth. But as we also know, generating profitable innovation is exceedingly difficult. Nonetheless, our research finds that a number of companies have found a way to do so.

Leveraging global networks -– internally and with suppliers and customers –- is a hallmark of successful innovators. Our research on a subset of the survey base (the 300+ larger companies and business units with revenues ranging from US$200 million to US$10 billion and higher) shows that those that can synchronize complex global value chains are up to 73 percent more profitable than the others (Figure 9).

Furthermore, they are far more likely to exceed their goals for growth, capital/asset returns, and shareholder value.[15] These companies (which we refer to as "complexity masters") excel at coordinating activities throughout the life of a product — product development, supply chain operations, and marketing, sales, and after-sales service. But only 7 percent of the 300+ larger companies can be considered complexity masters.

Figure 9. Profiting From Complexity:
Mastering Value Chain Synchronization

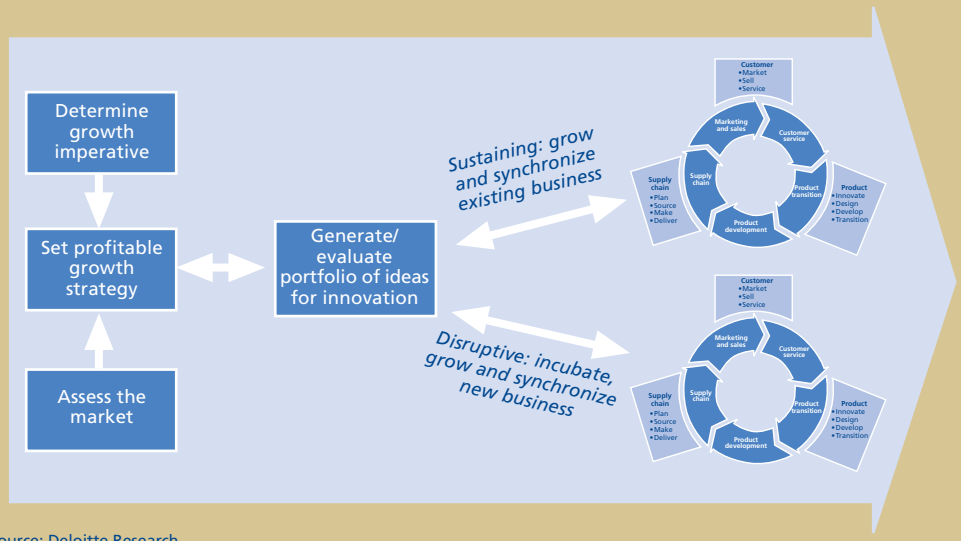


Source: Deloitte Research

From our survey data and in-depth case studies of leading innovation management practices, we find that companies successful in driving innovation to the bottom line are ahead in their approaches to (Figure 10):

- **Creating Innovation:** Generating and evaluating ideas. They create a culture of innovation that aims to recognize and reward both "sustaining" and "disruptive" innovations.[16] They are superior at generating ideas or sourcing concepts from outside the organization, developing business cases upon which enlightened investment decisions can be made, understanding the gap between the performance of existing products that satisfy customer demand and proposed new offerings, and deciding on the best organizational model and market channels for putting the innovation into action.
- **Exploiting Innovation:** Turning ideas into growth and profits. Maximizing profits throughout the entire lifecycle of a new product is a key priority of companies that successfully exploit innovation. These companies look at a product lifecycle as a "profit cycle." While most companies focus on the front end of the cycle (that is, on creating a product that will make a big splash with customers), a few companies realize that this is only the first leg of the race. They know the profitability of a new product can erode rapidly if it cannot be updated quickly and cheaply, marketed and serviced cost-effectively, and other "downstream" activities are not anticipated at the outset. They look beyond the product launch to the support infrastructure that must be in place. The best at product innovation synchronize the entire value chain, not just the product development process.
- **Building Innovation Capabilities.** Key to profitable growth from innovation is to build the capabilities necessary for synchronizing product development, supply chain, and demand-creation activities across the value chain. Our research suggests four major areas to focus on: visibility, flexibility, collaboration, and technology. Most companies struggle in most or all of these areas. However, complexity masters have made significant strides in building these capabilities, although gaps remain even for the best companies.

Figure 10. A Framework for Mastering Innovation:
Synchronizing the Value Chain



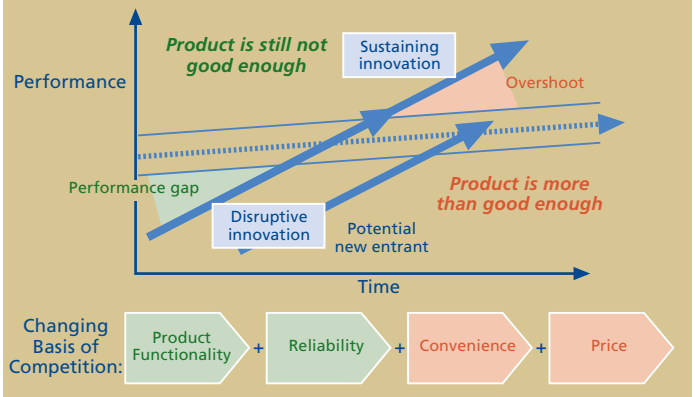
Source: Deloitte Research
Note: For details on the synchronization model, see Figure 12, page 10

Creating Innovation: Generating and Evaluating Ideas

Manufacturers that are superior at product innovation make it a formal, centralized, step-by-step business process, not a haphazardly conducted and dispersed activity. After all, innovation goes far beyond continuous improvement programs and suggestion boxes; the activity of generating and evaluating ideas typically is best run outside the operations of the core business. The reason is that businesses today are usually focused on short- to medium-term growth and profitability. Most managers typically will ignore new product opportunities that threaten their existing lines.

New product ideas must be evaluated on their own merits –- their value proposition to customers and the shareholder value proposition to the company (i.e., whether it can make money delivering such customer value at the projected price and cost points). A key determination is whether a new product concept reflects "sustaining" or "disruptive" innovation (Figure 11). Sustaining innovations are incremental improvements to existing products, while disruptive innovations are substantial improvements that can displace or cannibalize prior lines altogether.

Figure 11. The Disruptive Innovation Model



Source: Deloitte Research based on Clayton Christensen and Michael Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth* (Boston, MA: Harvard Business School Press, 2003).

The likelihood of generating blockbuster new product concepts increases significantly when managers can tap the entire company for new ideas, as well as customers, suppliers, and the external research community. The case of Mondi shows how to formalize the idea generation and evaluation activity. A leader in the European paper and packaging industry (and the largest operating contributor of headline earnings of global resources group – Anglo American PLC), Mondi has turned innovation into a serious endeavor. Its Strategic Innovation Program is charged with helping the company to double its operating profit over the next five years. Specifically, it is expected to produce US$120 million in annual profits by 2007—profits that management could not see coming from continual cost cutting, focused acquisitions, or differentiation of existing products.[17]

Working closely with Mondi group companies, a centralized team manages the process of harvesting, sharing, evaluating, and developing innovative ideas in the group, and creating a culture so that such ideas can flourish. A web-based system called the Innovation Zone provides a repository for all ideas and lets employees share and improve them. This allows an unbiased evaluation of ideas, enabling Mondi to decide whether to pursue them within its existing businesses (i.e., "sustaining innovation") or whether to create whole new businesses to avoid debilitating conflicts with existing operations (i.e. "disruptive innovation").

The potential "disruptive" ideas generated and pursued so far include investing in specific disruptive technologies and developing a low cost protective packaging solution, which could significantly challenge various incumbent packaging technologies and products (including polystyrene and a commonly used foam protective packaging). "Sustaining" ideas pursued include a new corrugated pallet solution and investing in a leading designer and patent holder of radio frequency identification (RFID) chips, a technology for identifying and tracking product movements in a supply chain. RFID is starting to gain ground in particular after being mandated by organizations such as Wal-Mart Stores and the U.S. Department of Defense.[18] As such, RFID may become a key ingredient in sustaining a successful packaging business.

Exploiting Innovation: Turning Ideas into Growth and Profits

Great ideas for new products are not enough to generate outsized profits from innovation. Leaders operate with the credo of being "right to market"—not necessarily "first to market."[19] Being "right to market" is about introducing the right products at the right time in the right markets with the right supply chain—and then continually using the information generated further down the value chain (especially from selling and servicing the product) to update and optimize the pricing, performance, quality, promotion, and other aspects of the product.

As such, innovation leaders look at the entire value chain of activities—from the time a new product is developed, to when it is manufactured and distributed, to when it is sold and serviced, over the lifetime of the product—as one integrated feedback loop.

The German sports car manufacturer Porsche provides an example of a top-performing company that deftly manages the profit cycle of new products.[20] In recent years, the company developed its first sport utility vehicle, the Cayenne. Defying conventional wisdom suggesting that the high-performance sports-car maker would dilute its brand value from venturing into the SUV market, Porsche brought its high-performance luxury SUV to market in 2002.

The company was not acting on some engineer's whim. The development of the Cayenne was based on significant visibility and insight into the company's current and potential customers' tastes and preferences, which indicated a strong desire for a Porsche SUV as long as Porsche ensured the high performance standards and German heritage associated with the brand. Such consumer insights suggested that the car did not have to be built 100 percent with Porsche parts, which would have been a huge investment and major gamble. Porsche shared product development with Volkswagen, built a flexible supply chain program for the vehicle, and outsourced most of the components, while keeping final assembly in-house at a new plant in Germany to ensure the German heritage that customers wanted. To date, the launch of the Cayenne has proved to be a major success, with sales outstripping initial estimates.[21]

The manufacturers that are the most profitable at pushing new products through their value chain -– the "complexity masters"—had far stronger capabilities in two areas: synchronizing activities *within* each of three value chain processes (product development, supply chain, and the customer operations of marketing, sales, and service); and synchronizing *across* those three major processes (Figure 12).

Figure 12. Synchronizing the Value Chain: Creating a Profit Cycle

- Complexity masters succeed by effectively synchronizing the value chain within and across customer, product, and supply chain operations
- Key capabilities for synchronizing the value chain:
  - Visibility
  - Collaboration
  - Flexibility
  - Technology

Source: Deloitte Research

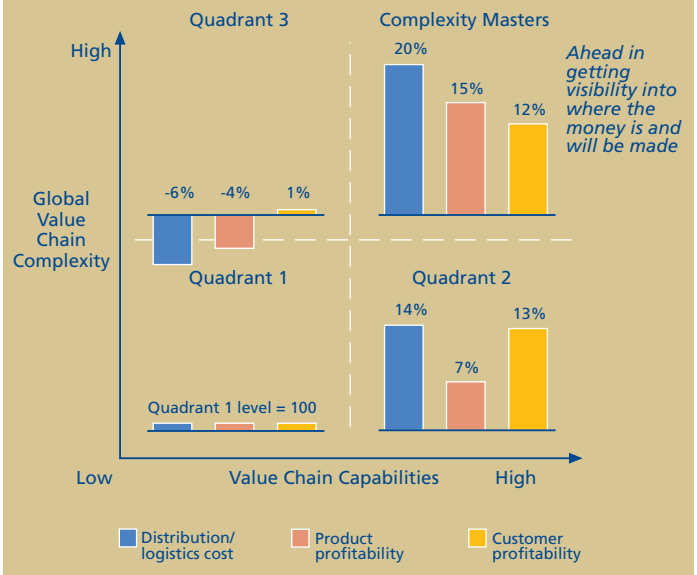
Complexity masters are able to create what we call a "profit cycle" where decisions in all areas are made with a view towards the ultimate impact on profits across the lifecycle of products, from innovation and R&D; sourcing, manufacturing, and delivery; to marketing, sales, and after-sales service. This may include more "conventional" capabilities such as design for quality and manufacturing, but also emerging competencies such as product design for after-sales service, supply chain flexibility for customized sales, and product marketing strategies for differentiated product development.

Building Innovation Capabilities

Behind the ability to create a profit cycle by effectively synchronizing the value chain, four key ingredients make complexity masters stand out: visibility, flexibility, collaboration, and technology.

- **Visibility:** Complexity masters have better visibility both upstream and downstream in the value chain because of better information on future scenarios, product profitability, and manufacturing and distribution costs (Figure 13). This allows them to generate more and better ideas; evaluate them more effectively; and exploit them where, when, and in ways that hold the most promise.[22] For example, Dell Computer continuously improves its visibility into customer demands and supply chain capabilities. In turn, that helps Dell identify, develop, launch, market, service, support, and even abandon new products more effectively. Because of Dell's direct interaction with customers and real-time visibility into its supply chain, it can better match the development of new products or product extensions to specific customer groups with the most appropriate features and price levels.[23] Overall, the utilization of existing and emerging technologies, such as new applications for RFID, is providing leading companies with an edge over the competition in terms of visibility across the value chain.[24]

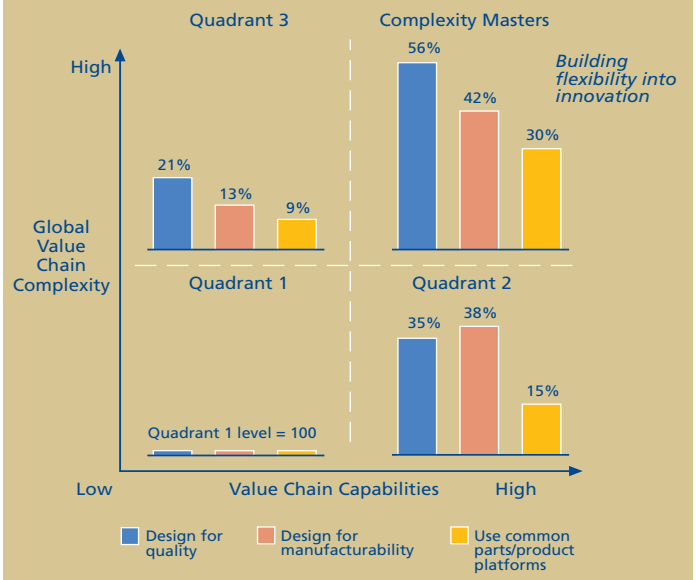
Figure 13. Visibility to Profitability



Source: Deloitte Research
Note: Percentage positive gap in satisfaction with visibility relative to Quadrant 1 companies (Quadrant 1 Level = 100)

- **Flexibility:** To effectively manage products across their lifecycles, complexity masters build flexibility into product development, manufacturing, and other operations so they can quickly shift manufacturing loads, change production volumes and product mixes, and modify products to meet market demand. They are far ahead of the competition in terms of capabilities such as design for quality and manufacturing, and in the use of common parts and/or product platforms (Figure 14). In the global automotive industry, which has long been hampered by highly fixed costs in product development, manufacturing, and distribution, even giants such as General Motors have restructured their product innovation and manufacturing processes for improved flexibility. By creating common product platforms, increasing the use of shared parts, and creating more flexible assembly lines, they are cutting development times, lowering minimum efficient scale, improving logistics systems, and increasing value chain flexibility. These factors let them meet uncertain and rapidly changing customer demands more profitably.[25]

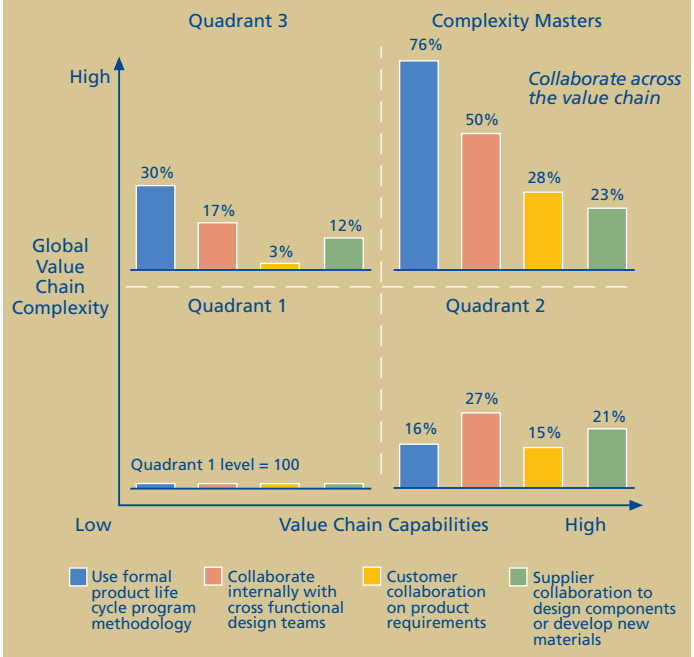
Figure 14. Innovation Flexibility



Source: Deloitte Research
Note: Percentage positive gap in implementation of performance improvement technique relative to Quadrant 1 companies (Quadrant 1 Level = 100)

- **Collaboration:** Complexity masters collaborate more extensively with customers to define product requirements, and with suppliers to design components and new materials and to develop more efficient and flexible processes (Figure 15). They are far more likely to have methodologies and processes in place to manage product lifecycles. As the experience of Samsung Electronics shows in its collaboration with Best Buy, the largest U.S.-based retailer of consumer electronics, collaborating effectively with channel partners can generate often unforeseen opportunities for growth and profits. By improving collaboration, the two partners were able to double sales of consumer electronics products from Samsung through the retailer over a two-year period.[26]

Figure 15. Collaborate to Innovate

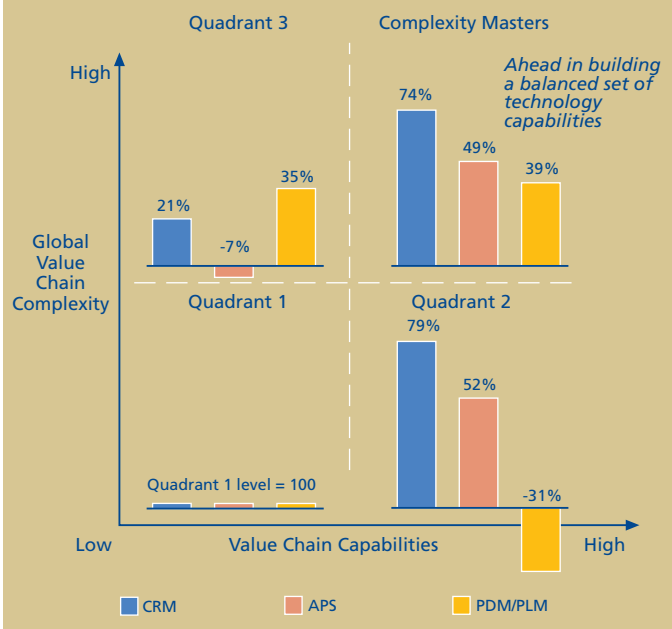


Source: Deloitte Research
Note: Percentage positive gap in implementation of performance improvement technique relative to Quadrant 1 companies (Quadrant 1 Level = 100)

- **Technology and systems:** Complexity masters are ahead of the pack in using advanced technologies for PDM/PLM, CRM, and APS (Figure 16). Combined with the right processes and methodologies, new technologies for managing the profit cycle — from product development to after-sales service -- have become key sources of differentiation. In the often intractable global chemicals industry, companies like Rohm & Haas, a US$6 billion maker of global maker of coatings, electronic materials, performance chemicals, and sealants, are using new technologies to improve visibility and collaboration. That helps them synchronize their value chains. In its US$1.7 billion coatings business, Rohm & Haas created an on-line repository of its expertise on existing and new products. This lets the company collaborate with customers in real-time. That, in turn, enhances customer satisfaction, shortens the sales cycle, and helps bring new products to market more effectively.[27]

Such capabilities give these manufacturers an edge in squeezing out the most profits and growth from their products throughout their entire lifecycle.

Figure 16. Supporting Innovation Through Technology



Source: Deloitte Research
Note: Percentage positive gap in technology implementation relative to Quadrant 1 companies (Quadrant 1 Level = 100)

Conclusion

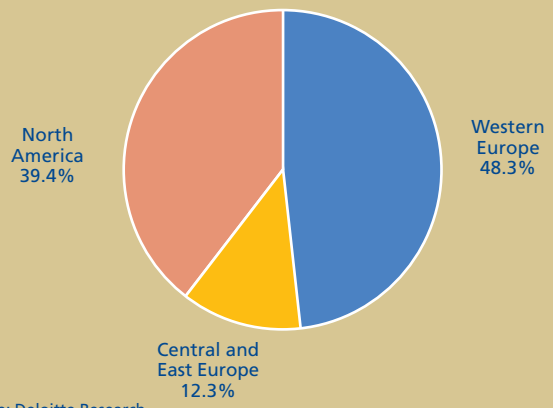
Setting a goal for innovation to drive growth is easy. Achieving it profitably, however, is hard. Despite declaring the launch of new products and services as their top growth focus, most of the nearly 650 companies in our study lack the capabilities for setting and executing a profitable growth strategy through innovation. A major reason is that their operational priorities and capabilities— their plans for improving the value chains that create and bring new products to market — are rarely well-aligned with their strategies for growth.

Given the many and often conflicting priorities in most enterprises, this *innovation paradox* is hardly surprising. Yet the few companies that have made the most strides in resolving this paradox are reaping the rewards. By putting in place solid capabilities for creating, evaluating, exploiting, and synchronizing innovation efforts across their value chain, they are clearing a path for profitable growth that most competitors cannot follow.

Appendix A: Survey Methodology and Respondent Profile

Our research on mastering innovation is based in part on comprehensive, in-depth survey interviews with executives at nearly 650 companies based in Western Europe (48.3 percent of total respondents), North America (39.4 percent), and Central and Eastern Europe (12.3 percent) (Figure A).[28]

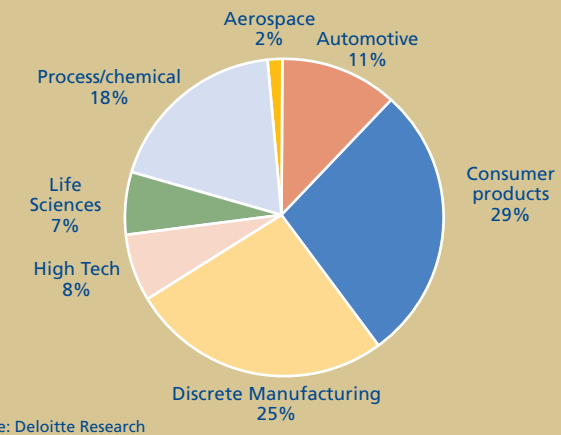
Figure A. Regional Profile



Source: Deloitte Research

Companies came from a wide range of industries including aerospace and defense, automotive, consumer products, life sciences, process and chemicals, high technology and telecommunications, and general manufacturing (including metal fabrication, industrial machinery, and equipment) (Figure B).

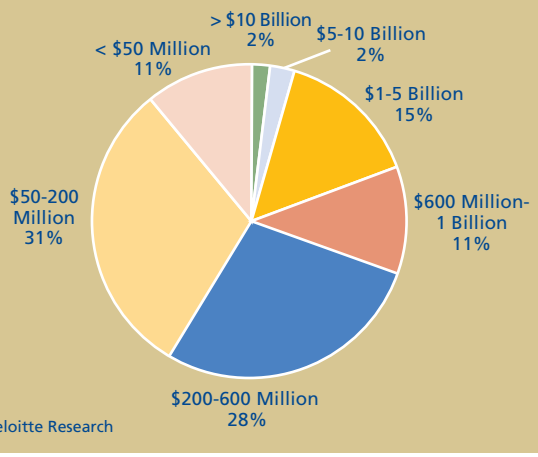
Figure B. Industry Profile



Source: Deloitte Research

Of all reporting entities, including both entire companies and business units of larger parent companies, about 40 percent have revenues between US$200 million and US$1 billion, and nearly 20 percent have revenues in excess of US$1 billion (Figure C).

Figure C. Business Unit Revenue Profile



Source: Deloitte Research

Appendix B: Defining Complexity Masters

To determine the practices of manufacturers that manage complexity well, we focused on a subset of the total survey population: the 300+ survey respondents with annual revenues of at least US$200 million.[29] We then divided the survey population by two dimensions (Figure 9):

- Degree of global value chain complexity. This was based on measuring the geographic diffusion (low or high) of four value chain functions (sourcing, manufacturing, engineering, and marketing/sales operations) across 13 geographic regions. We created a global value chain complexity index, scoring companies from 1 to 52. A manufacturer's score depended on the extent to which it scattered the four value chain activities across the 13 geographies.[30]
- Level of value chain capabilities. This axis gauges the relative competitiveness of each company on 10 value chain capabilities. We created a universal measure by taking a composite score of each respondent's ratings in product innovation, time to market, sourcing effectiveness, product quality, manufacturing flexibility, manufacturing productivity and cost-effectiveness, manufacturing lead time, logistics effectiveness, customer service, and supply chain cost structure. Manufacturers scored themselves against primary competitors on a 5-point scale (1 equals "significant disadvantage," 3 is "equal capability," and 5 is "strong advantage"). Based on the 10 metrics and the 5-point scale, we then created a value chain capability index in which a company could score between 10 and 50.

By grouping survey respondents along the two axes, four groups result:

- Quadrant 1. Companies with low global value chain complexity (scoring below 20 on the global complexity index) and low-to-medium value chain capabilities (scoring below 40 on the value chain capability index). These manufacturers comprise nearly half (49 percent) of the base.
- Quadrant 2. Companies with low global value chain complexity (scoring below 20 on the complexity index) but high value chain capabilities (scoring 40 and above on the value chain capability index — on average exceeding the capabilities of their primary competitors across our ten metrics). Only 7 percent of the respondents fell into this category.
- Quadrant 3. Companies with high complexity (scoring 20 and above on the complexity index) but low-to-medium capabilities (scoring below 40 on the value chain capability index). This group accounted for about 37 percent of all companies.
- Quadrant 4. Companies with high complexity (scoring 20 and above on the complexity index) and high capabilities (scoring 40 and above on the value chain capability index). We refer to this group as the "complexity masters." Constituting just 7 percent of the sample, they indeed are a select group.

Endnotes

[1] In this study, we use the terms "manufacturer," "business unit," "company," etc., interchangeably. The focus of the survey research is on the relevant business unit level at which manufacturing strategies are defined and operations are managed. See Appendix for more details on the methodology and respondent profile.

[2] For more on "sustaining" and "disruptive" innovation, see Clayton M. Christensen and Michael E. Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth (Boston, MA: Harvard Business School Press, 2003).*

[3] By "value chain," we not only include the supply chain operations of sourcing, manufacturing, and logistics but also the product development activities including R&D, innovation, product design, engineering, and transition, and the customer-related activities of marketing, sales, and service.

[4] See also Deloitte Research, *Creating Unique Customer Experiences: The Next Stage of Integrated Product Development* (New York: Deloitte, 2001).

[5] See Appendix for more details on the methodology and respondent profile.

[6] See David Pringle, "Top tech firms to boost R&D spending," *The Wall Street Journal*, January 29, 2004.

[7] Source: Deloitte Research, *Global Manufacturing 100* (New York: Deloitte, 2002); based on data from CSFB HOLT Value Associates. Enterprise value is calculated as the market value of equity, debt, and minority interests.

[8] Based on a survey of 13,000 product launches from 700 industrial companies in the years from 1976 to 1981. See Booz Allen & Hamilton, *New Products Management for the 1980s* (New York: Booz Allen & Hamilton, 1982). A survey by the Product Development and Management Association in 1995 suggested that to generate one successful product it took 6.6 ideas; slightly down from about 7 ideas in 1982 as suggested by the Booz Allen & Hamilton study. See Abbie Griffin, "PDMA research on new product development practices: updating trends and benchmarking best practices," *Journal of Product Innovation Management*, 14: 429-458, 1997. For more research, see also Robert G. Cooper, *Winning at New Products: Accelerating the Process from Idea to Launch* (Cambridge, MA: Basic Books, 2001).

[9] See also Robert Tucker, *Driving Growth Through Innovation: How Leading Firms Are Transforming Their Futures* (San Francisco, CA: Berrett-Koehler Publishing, 2002).

[10] A recent survey of 30 manufacturers found that only 30 percent believe they have both "strategic" and "financial" control over the new product development and introduction process. Strategic control was defined as the ability to reach time, margin, and market share goals. Financial control was defined as the ability to stay within budget and assess resource requests systematically. See Kevin O'Marah, "Design Is the Sizzle, PLM Is the Steak," AMR Research Alert on Product Lifecycle Management, January 7, 2004.

[11] For evidence, see Deloitte Research, *Mastering Complexity in Global Manufacturing: Powering Profits and Growth through Value Chain Synchronization* (New York and London: Deloitte, 2003).

[12] For more on "sustaining" and "disruptive" innovation, see Clayton M. Christensen and Michael E. Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth (Boston, MA: Harvard Business School Press, 2003).*

[13] One study of 50 new product categories from their inception found that only 11 percent of the pioneers — defined as "the first to sell in a new product category" — remained market leaders. See Gerard J. Tellis and Peter N. Golder, "First to market, first to fail: real causes of enduring market leadership," *Sloan Management Review*, Vol. 37, No. 2, Winter 1996. See also Peter N. Golder and Gerard J. Tellis, "Pioneer advantage: Marketing logic or marketing legend?" *Journal of Marketing Research*, Vol. XXX (May 1993), pp. 158-170.

[14] For more on how to position a business in the value chain, see Clayton M. Christensen, Michael E. Raynor, and Matthew C. Verlinden, "Skate to Where the Money Will Be," *Harvard Business Review*, November 1, 2001.

[15] For further details on the methodology, see Appendix B. See also Deloitte Research, *Mastering Complexity in Global Manufacturing: Powering Profits and Growth through Value Chain Synchronization* (New York and London: Deloitte, 2003).

[16] For more on "disruptive" and "sustaining" innovation, see Clayton M. Christensen and Michael M. Raynor, *The Innovator's Solution: Creating and Sustaining Successful Growth (Boston, MA: Harvard Business School Press, 2003)*

[17] As Tony Trahar, chief executive officer of Anglo American PLC, stated recently, "Initiatives are under way to inspire a culture of innovation and translate creative thinking into competitive advantage. Innovation remains a key priority for growth in the longer term." See "Tony Trahar talks strategy," *AngloWorld*, December 2003.

[18] For more on RFID, see e.g. Deloitte Research, *Move Over Barcodes: Consumer Goods Firms Eye Radio Frequency ID* (New York: Deloitte, 2003).

[19] See Gerard J. Tellis and Peter N. Golder, "First to market, first to fail: real causes of enduring market leadership," *Sloan Management Review*, Vol. 37, No. 2, Winter 1996. See also Peter N. Golder and Gerard J. Tellis, "Pioneer advantage: Marketing logic or marketing legend?" *Journal of Marketing Research*, Vol. XXX (May 1993), pp. 158-170.

[20] According to the Deloitte Research' business performance ranking of the largest 1000 manufacturers around the world, Porsche AG came in as the top-performing company in the "Autos, Trucks, and Other Vehicles" segment. See Deloitte Research, Global Manufacturing (New York: Deloitte, 2002).

[21] See also Deloitte Research, *Mastering Complexity in Global Manufacturing: Powering Profits and Growth Through Value Chain Synchronization* (New York and London: Deloitte, 2003).

[22] Based on a survey of 58 new product launches, a study found a strong correlation between gathering, sharing, and effective use of relevant market information and the success of the launches. For 80 percent of the successful launches, the innovation teams had better than average market information available during the process of going from idea to launch. In 75 percent of the failures the teams had less than average information available about the market from inception and gathered and utilized less than the average amount of information during the project. See Brian D. Ottum, and William L. Moore, "The Role of Market Information in New Product Success/Failure," *Journal of Product Innovation Management*, Volume 14, Issue 4, July 1997.

[23] For more on Dell, see also Deloitte Research, *Performance Amid Uncertainty: Competing Today and Positioning for Tomorrow* (New York: Deloitte, 2002).

[24] On RFID, see e.g. Deloitte Research, *Move Over Barcodes: Consumer Goods Firms Eye Radio Frequency ID* (New York: Deloitte, 2003).

[25] See e.g. Deloitte Research and Stanford Global Supply Chain Management Forum, *Integrating Demand and Supply Chains in the Global Automotive Industry: Creating a Digital Loyalty Network at General Motors* (New York: Deloitte and Stanford, 2003); P. Koudal, H. Lee, B. Peleg, P. Rajwat, and R. Tully, *General Motors: Creating a Digital Loyalty Network through Demand and Supply Chain Integration*, Stanford Global Supply Chain Forum Case SGSCMF 001-2003, January 1, 2003; and P. Koudal and P. Wellener, "Digital loyalty networks: continuously connecting automakers with their customers and suppliers," *Strategy & Leadership, Vol. 31 No. 6, 2003, pp. 4-11.*

[26] For more details, see Deloitte Research, *Mastering Complexity in Global Manufacturing: Powering Profits and Growth through Value Chain Synchronization* (New York and London: Deloitte, 2003).

[27] For more on Rohm & Haas, see also Deloitte Research, *Profiting from Continuous Differentiation in the Global Chemicals Industry* (New York: Deloitte, 2003).

[28] Europe includes Austria, Belgium, Denmark, France, Germany, Italy, The Netherlands, Norway, United Kingdom, Sweden, Portugal, Spain (Western Europe), Bulgaria, Croatia, Czech Republic, Lithuania, Poland, Serbia, Slovakia, Slovenia (Central and Eastern Europe). North America includes Canada and the United States.

[29] For more on the complexity masters, see Deloitte Research, *Mastering Complexity in Global Manufacturing: Powering Profits and Growth through Value Chain Synchronization* (New York and London: Deloitte, 2003).

[30] The 13 regions are: Australia/New Zealand, China, India, Japan, Korea, Other Southeast Asia, Western Europe, Central Europe, Eastern Europe, Africa, United States/ Canada, Mexico/Central America, and South America.

Author

Peter Koudal
Director
Deloitte Research
Deloitte Services LP
Tel: +1 212 436 2647
Email: pkoudal@deloitte.com

Acknowledgments

Deloitte Research gratefully acknowledges the inputs, comments and suggestions to this global study received from: Santosh Anoo; Jason Bergstrom; Brad Cartan; Patrick Conroy; Mark Davis; Allan Donald; Rich Eagles; Doug Engel; Louis Geeringh; Juliet Glassroth; Kevin Gromley; Craig Hanson; Charles Hill; Ken Hutt; Thomas Jankovich; John Kutz; Tom McDaniel; David VanHorn; Michael Raynor; Nadine Trinh; Howard Weinberg, and Claire Wood.

About Deloitte Research

Deloitte Research identifies, analyzes, and explains the major issues driving today's business dynamics and shaping tomorrow's global marketplace. From provocative points of view about strategy and organizational change to straight talk about economics, regulation, and technology, Deloitte Research delivers innovative, practical insights companies can use to improve their bottom line performance. Operating through a network of dedicated research professionals, senior consulting practitioners, and academic and technology partners, Deloitte Research exhibits deep industry knowledge, functional expertise, and a commitment to thought leadership. In boardrooms and business journals, Deloitte Research is known for bringing new perspective to real-world concerns.

For more information about Deloitte Research, please contact the Global Director, Ajit Kambil, at + 617 437 3636 or via e-mail: akambil@deloitte.com.

Recent Thought Leadership

- **Unlocking the Value of Globalisation**: Profiting from Continuous Optimisation
- **Globalization Divided?** Global Investment Trends of U.S. Manufacturers
- **Mastering Complexity in Global Manufacturing:** Powering Profits and Growth Through Value Chain Synchronization
- **Prospering in the Secure Economy**
- **The Challenge of Complexity in Global Manufacturing:** Critical Trends in Supply Chain Management
- **Profiting From Continuous Differentiation in the Global Chemicals Industry**
- **The World's Factory:** China Enters the 21st Century
- **Integrating Demand and Supply Chains in the Global Automotive Industry**
- **The High-Tech Industry and the Relationship Portfolio:** A Strategic Approach to Dynamic Partnering
- **Global Manufacturing 100**
- **Performance Amid Uncertainty in Global Manufacturing:** Competing Today and Positioning for Tomorrow
- **Digital Loyalty Networks:** e-Differentiated Supply Chain and Customer Management
- **Making Customer Loyalty Real:** Lessons From Leading Manufacturers

Please visit www.deloitte.com/research for our latest thought leadership or contact us at: delresearch@deloitte.com.

For More Information

Manufacturing
For more information on Deloitte's Global Manufacturing Practice, please contact:

Global

Gary Coleman
Deloitte Consulting LLP (United States)
Tel: +1 212 492 4119
Email: gcoleman@deloitte.com

Katsuaki Takiguchi
Tohmatsu & Co. (Japan)
Tel: +81 3 6213 3631
Email: ktakiguchi@deloitte.com

Americas

Doug Engel
Deloitte & Touche USA LLP (United States)
Tel: +1 312 946 2399
Email: dengel@deloitte.com

Asia Pacific

Ted Lee
Deloitte Touche Tohmatsu CPA Ltd (China)
Tel: +86 21 6141 2288
Email: tedlee@deloitte.com.cn

Europe, Middle East and Africa

Wim Vaessen
Deloitte Consulting GmbH (Germany)
Tel: +49 (0) 211 8772 3411
Email: wvaessen@deloitte.de

Visit our Web site at www.deloitte.com/manufacturing to learn more about the Deloitte Global Benchmark Program.

Product Innovation and Lifecycle Management
For more information on Deloitte's Product Innovation and Lifecycle Management Services, please contact:

Joseph Buccilli
Tel: +81 70 6408 6991
Email: jbuccilli@deloitte.com

Mark Davis
Tel: +1 313 324 1158
e-mail: mardavis@deloitte.com

Louis Geeringh
Tel: +27 11 209 6332
e-mail: lgeeringh@deloitte.com

Ken Hutt
Tel: +1 404 631 3762
e-mail: khutt@deloitte.com

Wim Vaessen
Tel: +49 0 211 8772 3411
Email: wvaessen@deloitte.de

About Deloitte

Deloitte refers to one or more of Deloitte Touche Tohmatsu, a Swiss Verein, its member firms, and their respective subsidiaries and affiliates. Deloitte Touche Tohmatsu is an organization of member firms around the world devoted to excellence in providing professional services and advice, focused on client service through a global strategy executed locally in nearly 150 countries. With access to the deep intellectual capital of 120,000 people worldwide, Deloitte delivers services in four professional areas—audit, tax, consulting, and financial advisory services—and serves more than one-half of the world's largest companies, as well as large national enterprises, public institutions, locally important clients, and successful, fast-growing global growth companies. Services are not provided by the Deloitte Touche Tohmatsu Verein, and, for regulatory and other reasons, certain member firms do not provide services in all four professional areas.

As a Swiss Verein (association), neither Deloitte Touche Tohmatsu nor any of its member firms has any liability for each other's acts or omissions. Each of the member firms is a separate and independent legal entity operating under the names "Deloitte," "Deloitte & Touche," "Deloitte Touche Tohmatsu," or other related names.

In the United States, Deloitte & Touche USA LLP is the member firm of Deloitte Touche Tohmatsu, and services are provided by the subsidiaries of Deloitte & Touche USA LLP (Deloitte & Touche LLP, Deloitte Consulting LLP, Deloitte Tax LLP, and their subsidiaries) and not by Deloitte & Touche USA LLP. The subsidiaries of the U.S. member firm are among the nation's leading professional services firms, providing audit, tax, consulting, and financial advisory services through nearly 30,000 people in more than 80 cities. Known as employers of choice for innovative human resources programs, they are dedicated to helping their clients and their people excel. For more information, please visit the U.S. member firm's website at www.deloitte.com/us.

Member of
Deloitte Touche Tohmatsu