

# Changing lanes for success

Flexible automotive  
business models in times  
of accelerated change

Automotive



## **IBM Institute for Business Value**

IBM Global Business Services, through the IBM Institute for Business Value, develops fact-based strategic insights for senior business executives around critical industry-specific and cross-industry issues. This executive brief is based on an in-depth study by the Institute's research team. It is part of an ongoing commitment by IBM Global Business Services to provide analysis and viewpoints that help companies realize business value. You may contact the authors or send an e-mail to [iibv@us.ibm.com](mailto:iibv@us.ibm.com) for more information.



# Changing lanes for success

## *Flexible automotive business models in times of accelerated change*

### Executive summary

The demise of the automotive industry has been reported for some time. Lower than expected product sales, high material costs and increased competition are just some of the roadblocks that have led several large suppliers to bankruptcy, pushed several major automakers close to it and drastically altered the makeup of the entire industry. Many have said that the automotive industry is heading for a major wreck.

But are things really that dire? Is the industry really in such bad shape that companies and investors are looking for the nearest exit ramp, instead of merely changing lanes to pursue a more profitable path?

Using profitability as the gauge for success, IBM researched 100 of the top automotive companies and found that significantly more were financially successful in 2005 than in 2001. Our analysis determined that flexible business models are a key contributing factor.

Business model flexibility among leading automotive companies can be illustrated across different dimensions of the business: *responsiveness* to customer needs, *differentiation* of products and services, and *efficiency* in operations, as well as the *impact* or magnitude of desired change.

After reviewing specific case studies, we recommend that any company aiming to become more flexible should test its proposed changes against a set of guiding principles:

- *Componentize* your company so that it works as an aggregation of smaller, more nimble businesses
- *Specialize* your company by focusing on your core strengths, and leveraging partners to fill in gaps and exploit opportunity areas
- *Simplify* by looking for opportunities to make business easier and straightforward
- *Standardize* the interactions of people, processes and technology in your business
- *Sense* shifts within the industry and beyond that require responses or present opportunity.

## Introduction

Many automotive companies, including several that have traditionally led the pack, have become accustomed to traveling down the road without having to make changes. They have sustained profitability by remaining in a single lane. However, the traffic conditions in the global automotive industry are changing rapidly (see Figure 1), becoming more crowded and harder to navigate. Successful companies need to be flexible as they navigate, or change lanes to avoid traffic jams, detours and other situations that could block their route to success.

## Getting under the hood of today's automotive industry

The demise of the automotive industry has been reported for some time. Lower than expected product sales, high material costs and increased competition are just some of the roadblocks that have led several large suppliers to bankruptcy, pushed several major automakers close to it and drastically altered the makeup of the entire industry. Many have said that the automotive industry is headed for a major wreck.

But are things really that dire? Is the industry really in such bad shape that companies and investors are looking for the nearest exit ramp?

As part of our ongoing IBM research around the global automotive industry, we asked the following questions:

- What characterizes the fast-changing environment of the automotive industry today?
- Which companies are successful today?
- What capabilities are needed to thrive and prosper?
- What can an individual company do to handle today's environment and to prepare for the future?

To answer these questions and learn how companies are successfully changing lanes, we leveraged IBM work with innovation and CEOs by incorporating the findings from two recent studies: "Global Innovation Outlook (GIO) 2.0"<sup>1</sup> and "Expanding the Innovation Horizon: the Global CEO Study 2006."<sup>2</sup> Both of these studies provided significant insight across a number of industries, including automotive. The GIO 2.0 grew out of numerous focus groups

**Figure 1. Sweeping changes in today's auto industry.**

Portfolio/market shifts	Industry reconfiguration	Accelerating technology
<p><b>Product mix</b></p> <ul style="list-style-type: none"> <li>• Influx of new models</li> <li>• Increased niche models</li> <li>• Shorter product lifecycles</li> <li>• Increased customization</li> </ul> <p><b>Buying preferences</b></p> <ul style="list-style-type: none"> <li>• Model segment shifts</li> <li>• Changing consumer ownership costs</li> <li>• New markets and buyers</li> <li>• Decreased consumer brand loyalty</li> <li>• Increased personalization</li> </ul>	<p><b>Operational performance</b></p> <ul style="list-style-type: none"> <li>• Profitability polarization</li> <li>• Unsustainable cost structure</li> <li>• Overcapacity, too far from demand</li> <li>• Flexible assembly</li> </ul> <p><b>Globalization</b></p> <ul style="list-style-type: none"> <li>• Supplier base shakeout</li> <li>• Extended, complex value nets</li> <li>• Shifting responsibilities and accountability</li> <li>• Production and sourcing</li> </ul>	<p><b>In-business</b></p> <ul style="list-style-type: none"> <li>• Open standards</li> <li>• Information security</li> <li>• Virtual resources</li> </ul> <p><b>In-factory</b></p> <ul style="list-style-type: none"> <li>• Simulated manufacturing</li> <li>• Business integration</li> <li>• Enabled by technology</li> </ul> <p><b>In-vehicle</b></p> <ul style="list-style-type: none"> <li>• Increased electronics and embedded software content</li> <li>• Increased complexity</li> <li>• Emerging standards</li> </ul>

Source: IBM Institute for Business Value analysis, 2006.

conducted around the world on major issues, including transportation, while the Global CEO Study 2006 included interviews with 765 CEOs worldwide.

In addition to the primary research, this study includes a financial analysis of 100 of the top global automotive manufacturers and suppliers. Companies included in this analysis had revenue exceeding US\$2 billion, had publicly available financial data and listed automotive as their parent industry, or derived at least 25 percent of their yearly revenue from the automotive industry.

### Profitability is the gauge for success

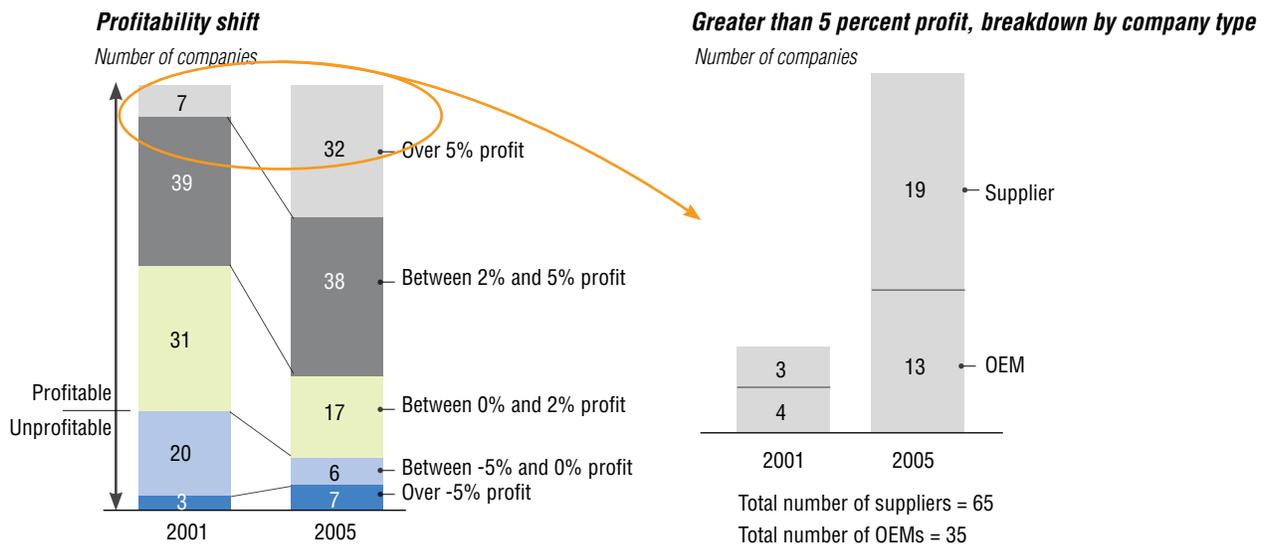
We analyzed a number of financial indicators in 2001 and 2005, and the key measurement for our analysis was profitability.<sup>3</sup> For several years, many automotive companies have pulled in strong revenues, but higher profits did not necessarily result from higher revenues – incentive programs, high warranty costs and increased product portfolio costs (to name a few) created a significant drag on the bottom line. Because of their size and diversity, though, some companies have been able to sustain operations for a significant period of time, even in the face of poor profits. But ultimately, the lack of profits has

limited their flexibility to make investments, create new or overhaul existing products, and improve the efficiencies in their operations.

So, what did the analysis find? Despite reports of gloom and doom, there has been a significant shift in the profitability of the 100 companies we analyzed between 2001 and 2005 (see left side of Figure 2). Although some companies are still experiencing significant problems, many more are doing better than they were five years ago and a significant number are doing very well.

An “average” profitability in automotive has been approximately 2 percent. But average isn’t good enough. We wanted to know who is making “good” profits, so we set our target at 5 percent. Companies in the revenue range of US\$2 billion to US\$50 billion showed the greatest profit increases.<sup>4</sup> Looking at OEMs and suppliers, we found that more companies in both groups exceeded 5 percent profit in 2005, compared to 2001 (see right side of Figure 2). And, the number of underperforming companies across all revenue ranges was significantly reduced during this period. While there are still a number of struggling companies, only five accounted for 90 percent of the net loss by companies in this sample set in 2005.<sup>5</sup>

**Figure 2. Profitability shifts between 2001 to 2005.**



Source: IBM Institute for Business Value analysis, 2006.

### A snapshot of industry improvements

The 100 companies (35 automotive OEMs and 65 suppliers) showed the following improvements from 2001 to 2005:

- 70 made more than 2 percent profit in 2005, compared to 46 in 2001
- 35 increased profits by at least 3 percentage points
- 32 achieved 5 percent profit or better in 2005
- 17 replaced losses with profits, while 6 did the opposite.

Having established that there are many successful companies in today's automotive industry, we then looked for what was contributing to their success. Did they have something in common?

### Flexibility enables changing lanes

Our research indicates that innovation and flexibility are critical to a successful automotive company and are recognized as important by many company leaders. Through our own analysis of the top 100 automotive companies and the Global CEO Study 2006, we believe that *in general and across all industries, the more successful companies tend to be more innovative with their business models.*

Profit leaders in the automotive industry are, in fact, more flexible than their counterparts. We define flexibility as the ability to shift at least part of the enterprise's focus quickly in response to external forces: for example, to take advantage of changing markets, exploit new technology or address increased competition. A successful company can move smoothly into the right position at the right time. Conversely, an unsuccessful company often is not flexible enough.

### Automotive executives were quoted in the IBM Global CEO Study 2006:

"The organization must be dynamic, flexible and proactive to achieve an edge"

"People's skills and flexibility are a fundamental resource."

"The business model should be flexible and innovative according to the market."

"Flexibility without losing core competencies is key. Balance is needed."

"Change management is very hard. Will need to break existing processes and make (them) more flexible."

### How to think about flexibility in an automotive company

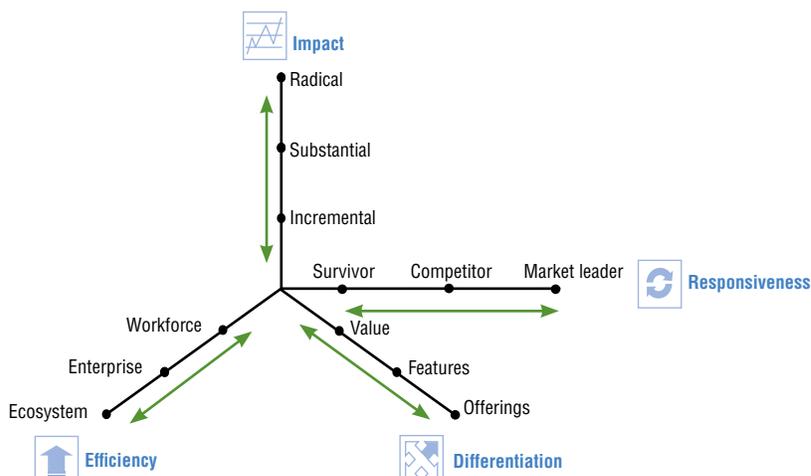
Companies need flexibility at the core of their business models to help them take advantage of situations that were disruptive in the past. The kind of companywide flexibility we're talking about can't be achieved by just flipping on the turn signal. Simply intending to change does not make it so, nor does it guarantee success.

Four dimensions of business model flexibility emerged during our analysis (see Figure 3). In reviewing successful (and less successful) companies, it became apparent that automotive companies should be in a position to flex quickly in these four dimensions.

Each dimension is aimed at a different aspect of the business (see Figure 4):

- *Responsiveness.* Anticipating and responding to customer needs, as well as to market and industry changes.
- *Differentiation.* Translating customer needs into innovative products and services that customers desire and competitors imitate.
- *Efficiency.* Common, lean processes and operations for producing products and services at a cost that generates profits and supports growth.
- *Impact.* Determining the magnitude of desired change in products, services and operations.

Figure 3. Illustrating business model flexibility.



Source: IBM Institute for Business Value analysis, 2006.

Figure 4. Characteristics of the four dimensions of flexibility.

Dimension	Business model focus		
<b>Responsiveness</b> <b>Key measurements</b> <ul style="list-style-type: none"> <li>Customer satisfaction</li> <li>Market share</li> <li>SG&amp;A</li> <li>Time to market</li> </ul>	<b>Survivor</b> <ul style="list-style-type: none"> <li>Reactive (vs. proactive) to market needs</li> <li>Satisfies regulatory requirements</li> <li>Minimal investment in new products and technology</li> </ul>	<b>Competitor</b> <ul style="list-style-type: none"> <li>Quick response to industry competitor actions</li> <li>Involvement in multi-partner collaboration in non-competitive initiatives</li> <li>Differentiating capabilities to drive revenue growth</li> </ul>	<b>Market leader</b> <ul style="list-style-type: none"> <li>Continually ahead of the competition in selected areas</li> <li>Increased product and service personalization and customization</li> <li>Short time-to-market product cycle</li> <li>Development of new channel and delivery paths</li> </ul>
<b>Differentiation</b> <b>Key measurements</b> <ul style="list-style-type: none"> <li>Customer satisfaction</li> <li>Market share</li> <li>R&amp;D expense</li> <li>Revenue growth</li> </ul>	<b>Value</b> <ul style="list-style-type: none"> <li>Competitive price</li> <li>High quality</li> <li>Brand loyalty</li> <li>Customer service</li> </ul>	<b>Feature</b> <ul style="list-style-type: none"> <li>Value added improvements to existing products and services</li> <li>Vehicle accessories such as navigation systems and concierge services</li> </ul>	<b>Offerings</b> <ul style="list-style-type: none"> <li>Development of new products and services for existing markets and/or new markets</li> <li>Creation of new markets – both segment and geographical</li> </ul>
<b>Efficiency</b> <b>Key measurements</b> <ul style="list-style-type: none"> <li>Return on assets</li> <li>Cost of goods sold</li> <li>Productivity</li> </ul>	<b>Workforce</b> <ul style="list-style-type: none"> <li>Workflow automation</li> <li>Knowledge and insight driven</li> <li>Learning organization</li> <li>Innovation culture</li> </ul>	<b>Enterprise</b> <ul style="list-style-type: none"> <li>Focus on core competencies across the organization</li> <li>Standardization of business processes</li> <li>Operations flexibility</li> <li>Sensing organization</li> </ul>	<b>Ecosystem</b> <ul style="list-style-type: none"> <li>Collaboration and integration with partners/suppliers outside of the enterprise</li> <li>Global focus</li> <li>Anticipation and response to industry and market changes</li> <li>Ease of doing business within the ecosystem</li> </ul>
<b>Impact</b> <b>Key measurements</b> <ul style="list-style-type: none"> <li>Revenue growth</li> <li>Market share</li> <li>R&amp;D expense</li> <li>Cost of goods sold</li> <li>Return of investments</li> </ul>	<b>Incremental</b> <ul style="list-style-type: none"> <li>Minimal adjustments to maintain current position</li> <li>Continuous improvement for long-term survival</li> <li>Focus is to stay competitive</li> <li>Minimal investment of resources</li> </ul>	<b>Substantial</b> <ul style="list-style-type: none"> <li>Provides value-added business opportunities to lead the industry</li> <li>Strives to achieve a competitive advantage in a market or segment</li> <li>Considerable investment of resources</li> </ul>	<b>Radical</b> <ul style="list-style-type: none"> <li>Meant to create disruptive change</li> <li>Creates new base of performance, competitors, and business models</li> <li>Often comes from outside the industry and is often technology based</li> <li>Substantial investment of resources</li> </ul>

Source: IBM Institute for Business Value analysis, 2006.

## Who is demonstrating flexibility?

Today, many organizations are making the move to become more flexible – some on a grander scale than others. In searching for examples in the industry that demonstrate business model flexibility, several stood out in their abilities to adapt at the product or company level.

Our research suggests that those maintaining a degree of flexibility have generated higher profits. That can, in turn, be used to expand their product and services lines to attract more customers and explore new markets. Although not the only examples, these automotive manufacturers and suppliers leverage flexible business models:

- BMW – Changed the way it looked at its customers and discovered whole new markets to enter while maintaining its reputation as a premium vehicle manufacturer
- Magna Steyr – Identified its key skills and, based on the industry challenges of managing assembly capacity, developed a new service
- Toyota – As a quality leader in the industry, Toyota understands that all markets – luxury, youth, truck – want reliable vehicles and has taken these concepts to new and well researched markets

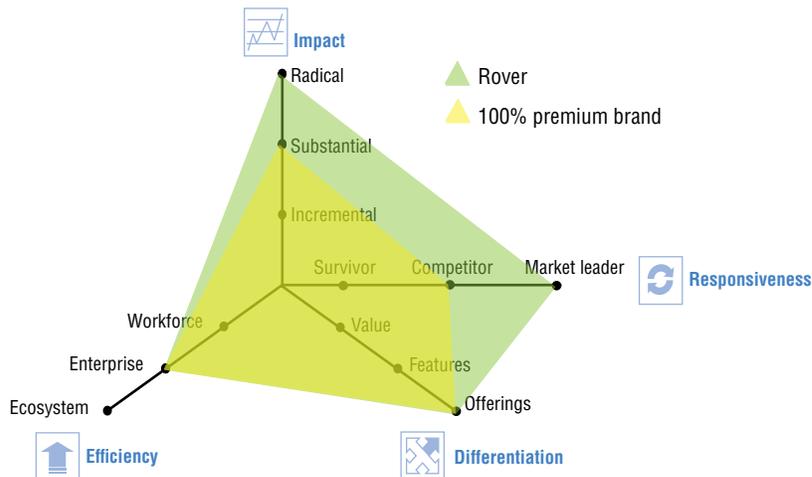
- Gentex – Took a basic vehicle component, the headlight, and made it into a selling feature by exploiting new technology
- OnStar – By gathering information to better understand its customer base, OnStar was able to transform its concierge type services into vehicle “peace of mind” as a reason to buy a GM vehicle.

### Company flexibility case 1: BMW

With its Rover acquisition in the 1990s, BMW attempted to expand its business into broader, non-premium markets (as others were doing), but concluded that doing so eroded its brand image.<sup>6</sup>

Realizing that its core strengths were in premium vehicles, BMW has kept this focus, but has worked to expand within the premium area (see Figure 5). It has defined broader and more profitable premium vehicle markets by assessing its markets by lifestyle, rather than age and income. Using this “lifestyle market” approach, BMW has created a model of identification to a social group, as well as emotional gratification – driving significant customer loyalty.

Figure 5. BMW business model flexibility.



Source: IBM Institute for Business Value analysis, 2006.

This new market model has also expanded the definition of premium to encompass the “soon-to-be rich” buying Minis, the rich buying BMWs and the very rich buying Rolls Royces. This has transformed its previously limited customer definition from that of a 50-year old BMW owner to a much larger market of drivers at any age.

**Company flexibility case 2: Magna Steyr**

Magna Steyr, traditionally an automotive supplier, now assembles BMW’s X-3, as well as vehicles from several other companies. This synergism between BMW and Magna Steyr opens up new partnership opportunities between automotive OEMs and suppliers, where suppliers are responsible for a larger part of the finished product. Even a few years ago, it was shocking to think that an outside firm would do vehicle assembly.

Despite overall industry overcapacity, Magna rethought its own manufacturing processes and those of its customers. It realized that automotive OEMs like BMW would utilize a top supplier’s capabilities in the areas of engineering, supplier management and even vehicle assembly since OEM assembly capacity may not be in the right place for the right product. Essentially, Magna sells flexibility and

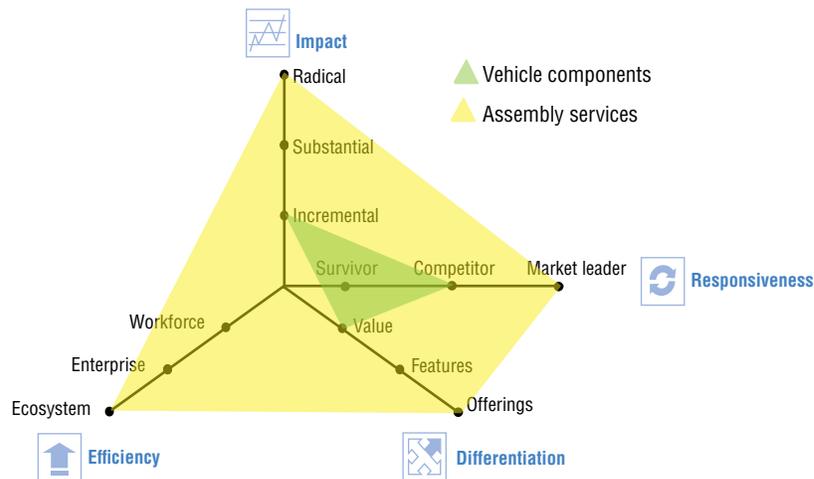
speed to market for OEMs through contract development and vehicle assembly. As a result, it has created an ecosystem-altering service to manage production surges, niche vehicles and market volatility (see Figure 6).

Magna looked at its strengths in engineering and manufacturing and filled a market need. Using a combination of specialization, simplification and standardization to exploit its partnership with BMW, Magna leveraged its own competencies in flexible manufacturing. Magna pooled best practices across multiple OEMs, including engineering design, manufacturing, supply chain and adaptive processes/culture to provide flexibility and speed to OEMs.

**Company flexibility case 3: Toyota**

A large part of Toyota’s continued success has come from sensing changing market needs and adapting its business model as customer tastes change. Toyota spends a lot of effort to understand what customers want and what they will buy. For example, to design the Tundra, Toyota engineers visited field locations such as ranches, mines, construction sites and oil fields to study customer uses of large pick-ups. Then, it allocated resources to the features and quality customer valued most.

Figure 6. Magna Steyr business model flexibility.



Source: IBM Institute for Business Value analysis, 2006.

Toyota also realized that an aftermarket personalization program would be big for a sporty line like the Scion, aimed at the next generation of automobile buyers. So, Toyota now offers 150 Scion add-ons, such as personalized sound systems, shift knobs, rear view mirrors, cell phone holders and racing pedals that can be added by dealers at the time of purchase.

Examples of Toyota adapting its business model (see Figure 7) include:

- The Toyota Production System concepts were used to eliminate waste and create lean manufacturing focused on quality and efficiency
- Toyota then expanded with new products – the luxury market with Lexus, environmental hybrids, youthful vehicles like the Scion, and large SUVs like the Tundra
- Now, as Toyota pursues rapid expansion in North America and Asia, it continues to focus on being a high quality and efficient manufacturer.

### Product-focused flexibility

Our analysis also found that some companies exhibited remarkable flexibility in particular areas of the company. Here are two examples that are associated with products.

#### Product flexibility case 1: Gentex

Gentex, an automotive supplier, has turned a commodity product (headlights) into a differentiating feature of higher-end vehicles (see Figure 8). Its Smartbeam camera-on-a-chip technology automatically controls a vehicle's high beam headlights according to surrounding traffic conditions. Gentex also offers complementary auto-dimming mirrors designed to make nighttime driving safer. Like power windows and anti-lock brakes, these innovative headlights could soon become standard features on most vehicles. Gentex continues to invest in creating innovative products while remaining profitable.

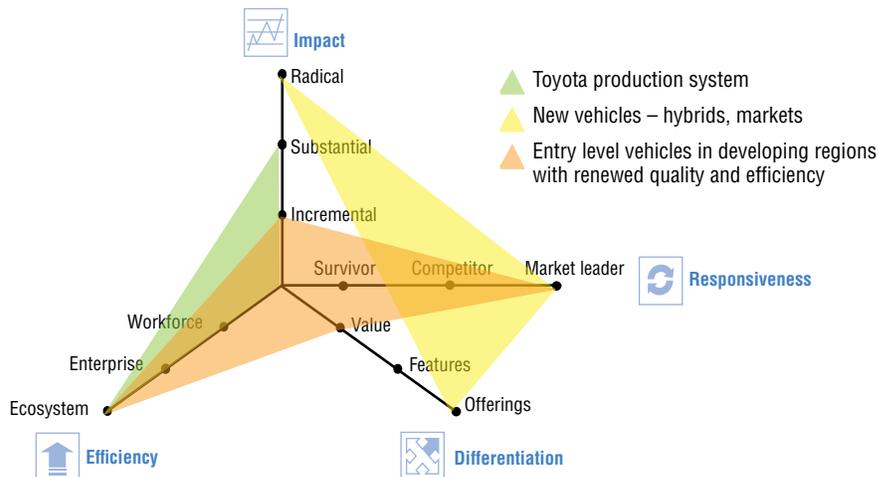
#### Product flexibility case 2: GM's OnStar

While GM as a whole has experienced tough times in the past few years, its OnStar service is a good example of business model flexibility.

OnStar now has over 4 million subscribers, and each month initiates 23,000 calls for roadside assistance, 5000 emergency services calls, 950 airbag deployment calls, unlocks 43,000 doors, locates 450 stolen vehicles and responds to 380,000 requests for directions.<sup>7</sup>

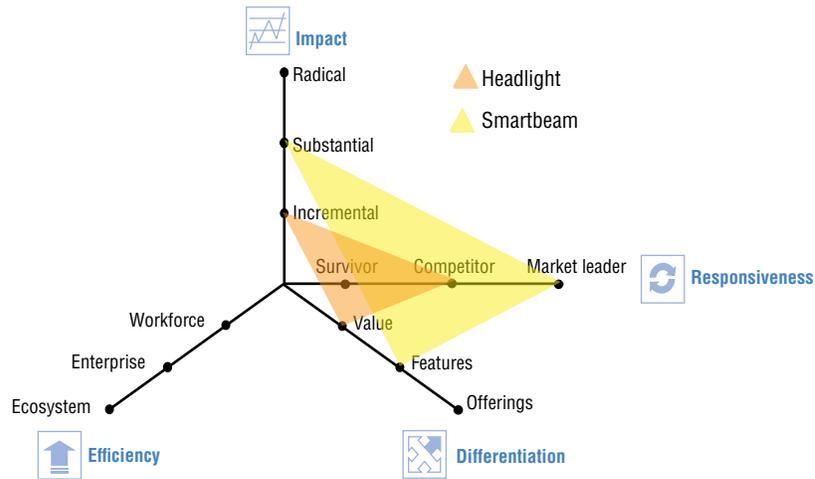
OnStar provided GM with a new customer relationship model where continuous contact is key to retention and

Figure 7. Toyota business model flexibility.



Source: IBM Institute for Business Value analysis, 2006.

**Figure 8. Gentex business model flexibility.**

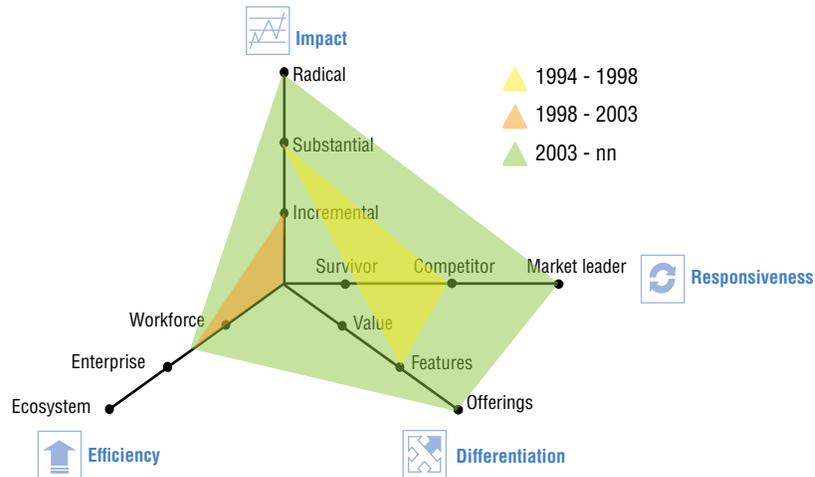


Source: IBM Institute for Business Value analysis, 2006.

loyalty. GM first created OnStar as a service to exploit its telematics capabilities, initially imagining an Internet-enabled source of entertainment. Over time, customer feedback convinced GM that the real differentiator was

safety and peace of mind. When OnStar redirected its focus from a vehicle feature to a safety and security offering, its impact on the business increased (see Figure 9).

**Figure 9. OnStar business model flexibility.**



Source: IBM Institute for Business Value analysis, 2006.

In short, the OnStar success was a result of GM's ability to sense its real market for this service and then adjust. When the initial "infotainment" capabilities failed to gain large-scale traction with customers, OnStar investigated what capabilities were necessary for customer retention. Moving to a "peace of mind" service pulled more potential customers into dealers, increased subscription rates and enabled an environment for ongoing customer interaction.

### Driving toward flexibility

Business model flexibility isn't easy. Like innovation, flexibility isn't something that a company simply decides to do one day. It needs to be developed and honed as a set of capabilities over time and requires hard work, discipline and leadership. So what does it take? We devised a set of principles that companies can apply when moving toward a more flexible business model.

With these guiding principles in place, companies can more effectively adapt their business, organization and technology environments to take advantage of business situations as they occur:

- **Componentize** your company so that it works as an aggregation of smaller, more nimble businesses. Componentization allows you to evaluate your company in the context of its ecosystem to better understand its strengths and weaknesses. Management in the future will entail orchestration of a complex and continually changing network of businesses and teams, both inside and outside the boundaries of the enterprise. Some suppliers have begun to componentize today by considering their engineering or research departments as services to be used internally, as well as to be sold to others as a service.
- **Specialize** your company by focusing on its core strengths, and depend on partners to fill in gaps and exploit opportunity areas. This will allow you to dedicate limited resources to those areas of your business that truly differentiate you from your competitors. Examples of specializing include partnering with others to develop new environmental technologies or leveraging an existing logistics network.
- **Simplify** by looking for opportunities to make business easier and straightforward. Most companies have reengineered their businesses from the inside out, but often fail to step back and assess interactions with their partners. Making it easier to do business with you will provide greater flexibility to move business partners in and out of your ecosystem to respond to new opportunities.
- **Standardize** the interactions of people, processes and technology in your business. Standardization and rules create an environment where decisions can be made at the point of interaction (not up the chain of command) and become the "glue of collaboration." Just like technology standardization allows door handles or HVAC systems to be integrated into the vehicle, business standardization can facilitate the expansion into new markets and regions as companies aim to globalize their businesses.
- **Sense** shifts within the industry and beyond that require responses or present opportunity. Sensing change includes external impacts to your company, such as new competitor products or emerging technologies, as well as monitoring your internal measurements for areas to improve. The availability of new technologies, for example, can accelerate the sensing and predicting of potential product quality issues before they become warranty problems and potentially allow manufacturers and suppliers to save millions of dollars in warranty costs.<sup>8</sup>

With flexibility comes the ability to better respond to the ever changing automotive industry environment. Are you flexible enough to:

- Anticipate customer needs and get products to the market in time to meet those needs?
- Establish partnerships quickly to augment in-house skills or products?
- Gain visibility into the global consequences of rapid choices made today?
- Continually align tactics and resources to the company's strategy?
- Make operational changes without changing organizational structures?
- Change processes without changing technology?
- Identify and incorporate emerging technologies into products, services and operations?

## Becoming flexible at the core

Companies in today's changing automotive industry need flexibility at the core of their business models. Business model flexibility occurs in different dimensions, each aimed at a different aspect of the business: *responsiveness* to customer needs, *differentiation* of products and services, *efficiency* in processes and operations, and the *impact* of desired change. A set of guiding principles – in short, componentize, specialize, simplify, standardize and sense – can help automotive companies achieve vital flexibility.

Are you flexible enough to be able to change lanes for success?

## About the authors

Benjamin Stanley is a Senior Strategic Analyst for the automotive industry within IBM Global Business Services. He can be contacted at [bstanley@us.ibm.com](mailto:bstanley@us.ibm.com).

Linda Ban is the Industrial Sector Leader at the IBM Institute for Business Value. She can be contacted at [iban@us.ibm.com](mailto:iban@us.ibm.com).

Penny Koppinger is a Managing Consultant at the IBM Institute for Business Value. She can be contacted at [pkopping@us.ibm.com](mailto:pkopping@us.ibm.com).

Allan Henderson is a Consultant at the IBM Institute for Business Value. He can be contacted at [hender@us.ibm.com](mailto:hender@us.ibm.com).

## About IBM Global Business Services

With business experts in more than 160 countries, IBM Global Business Services provides clients with deep business process and industry expertise across 17 industries, using innovation to identify, create and deliver value faster. We draw on the full breadth of IBM capabilities, standing behind our advice to help clients implement solutions designed to deliver business outcomes with far-reaching impact and sustainable results.

## References

- <sup>1</sup> Global Innovation Outlook 2.0: Innovation opens up. IBM Corporation. [http://domino.research.ibm.com/comm/www\\_innovate.nsf/pages/world.gio2004.html](http://domino.research.ibm.com/comm/www_innovate.nsf/pages/world.gio2004.html)
- <sup>2</sup> "Expanding the Innovation Horizon: The Global CEO Study 2006." IBM Global Business Services. March 2006. <http://www.ibm.com/bcs/ceostudy>.
- <sup>3</sup> For a few companies, 2005 data wasn't available yet, so we used the most recently available financial numbers.
- <sup>4</sup> IBM Institute for Business Value analysis, 2006.
- <sup>5</sup> IBM Institute for Business Value analysis of publicly available financial reports, 2006.
- <sup>6</sup> Reichlin, Igor. "Racing to Stay Ahead." *The Chief Executive*. November 2003. [http://www.findarticles.com/p/articles/mi\\_m4070/is\\_193/ai\\_110811917](http://www.findarticles.com/p/articles/mi_m4070/is_193/ai_110811917); Taylor III, Alex. "BMW keeps its pedal to the metal." *Fortune*. April 17, 2006; Wolfgang Eschment *Automobilwoche*. "BMW's Aim is 5% Increase in Productivity." *Automotive News*. May 2, 2005. Kochan, Anna. "BMW's Leipzig Plant is Off to Fast Start." *Automotive News*. September 19, 2005.
- <sup>7</sup> Worthen, Ben. "Highway to Value." *CIO Magazine*. February 2006.
- <sup>8</sup> Koppinger, Penny. "Component business modeling: A new lens for examining warranty administration," IBM Institute for Business Value. July 2004. <http://www-1.ibm.com/services/us/index.wss/ibvstudy/imc/a1002879?cntxt=a1000404>.





© Copyright IBM Corporation 2006

IBM Global Services  
Route 100  
Somers, NY 10589  
U.S.A.

Produced in the United States of America  
07-06  
All Rights Reserved

IBM and the IBM logo are registered trademarks of International Business Machines Corporation in the United States, other countries, or both.

Other company, product and service names may be trademarks or service marks of others.

References in this publication to IBM products and services do not imply that IBM intends to make them available in all countries in which IBM operates.