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Delivering Business Value Through Operational Excellence

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The Seven Myths of Operational Excellence

by

David Simchi-Levi

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FOREWORD BY THE EXECUTIVE DIRECTOR, TLI – ASIA PACIFIC

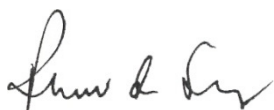


It is our great pleasure to host the fourth session of THINK Innovation! “Delivering Business Value through Operational Excellence”. It is especially kind of David to contribute this whitepaper for reprints on the “Seven Myths of Operational Excellence”. I am particularly enthused that 9 “rules” are subsequently proposed to dispel or overcome many of the pre-conceptions.

This is the fourth whitepaper in the series and several distinguished authors and speakers have made THINK Innovation! a great success in disseminating knowledge through these seminars and master classes.

It is the Institute’s hope that these contributions have in some way transformed your operations from good to productive through strategic, tactical and operational innovation and excellence.

I look forward to meeting you at this and the next session.

A handwritten signature in black ink, appearing to read 'Robert de Souza'.

Dr. Robert de Souza

The Seven Myths of Operational Excellence

By

David Simchi-Levi
MIT, Professor of Engineering Systems

Introduction

In early 2005, Pepsi Bottling Group (PBG) approached the Massachusetts Institute of Technology (MIT) with a daunting challenge: consumer preference was shifting from carbonated drinks to noncarbonated drinks and from cans to bottles. At that time, PBG produced these newly preferred products in a limited number of plants resulting in half of the plants operating at capacity and leading to service problems during periods of peak demand.¹ What did PBG do to address the problem? Did it invest in more manufacturing capacity or outsourced production? Not even close!

MIT-PBG's approach to the challenge was surprisingly simple. It focused on a flexible manufacturing strategy that matched production sourcing decisions with consumer preferences on a quarterly basis. In this strategy, quarterly sourcing decisions are based on total supply chain costs including manufacturing, transportation, and warehousing costs as well as customer service requirements. This strategy, which emphasizes cost, service, and customer preferences, improved supply chain performance by significantly reducing out-of-stock levels, effectively adding one and a half production lines' worth of capacity to PBG's supply chain without any capital expenditure.²

The PBG story would be incomplete if we did not mention how the new strategy affected a potentially catastrophic supply disruption. In August 2005, a fire at a Detroit chemical plant near one of PBG's suppliers threatened to shut down PBG plants, which would have led to significant financial losses. Within twenty-four hours, PBG identified lower-cost alternative production sites and prevented a supply disruption, demonstrating the power of its supply chain flexibility.³

Other companies have not been as successful as PBG in coping with supply disruptions or operational problems. Consider, for example, Foxmeyer, which began the year 1996 as the second-largest wholesale drug distributor in the United States (with \$5 billion in revenue) and ended it with the sale of its main operating division to its largest competitor, McKesson (for \$80 million). The problem was the implementation of a new information system and automated distribution center that did not work but instead created a snowball of operational problems. As if this were not enough, cost savings built into client contracts based on anticipated efficiency gains from the new systems did not materialize and generated huge financial losses.⁴

Undoubtedly, operational or supply problems can affect stock prices and shareholder wealth many months after the initial disruption. In this respect, the Mattel product recall of August 2007 is a tale worth telling. Over a period of two weeks, Mattel, the world's largest toy maker, recalled 18 million toys made in China because of hazards such as lead paint.⁵ Figure 1 shows the five-year performance of one dollar invested in 2003 in Mattel and its competitor, Hasbro. Although both stocks moved in parallel from the third quarter of 2003 up to August of 2007, Mattel's stock went into a free fall after its recall announcement and had not recovered even a year after the disruption.

These challenges faced by senior management are extravagated by the recent changes in the global economy.

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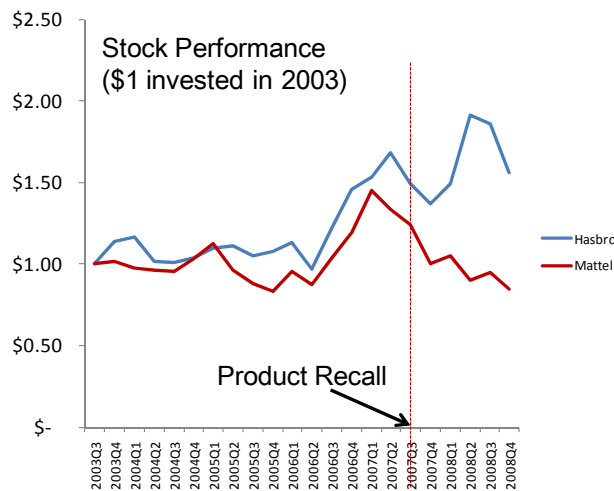


Figure 1: Supply chain disruption and stock performance: Mattel and Hasbro, 2003-2008.

Today's Business Challenges

Operations and supply chain pundits have long emphasized the importance of strategies such as just-in-time, lean manufacturing, off-shoring, and frequent deliveries to retail outlets. However, with the recent changes in the global economy, rising labor costs in developing countries, and huge volatility in oil and other commodity prices, some of these strategies may imperil the firm's supply chain and its ability to compete successfully.

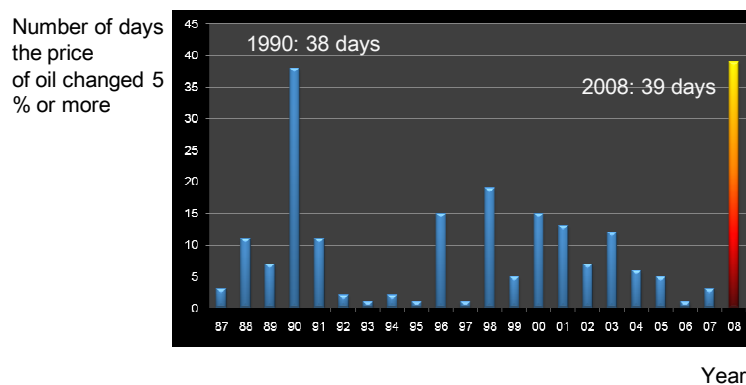


Figure 2: Oil price volatility, 1987 to 2008

For example, in the current economy, companies face an unprecedented level of volatility in demand forecast, commodity prices, and exchange rates that threatens their ability to control operations costs. Consider, for example, Figure 2, which shows the number of days that the price of oil changed by 5 percent or more. As you can see, in normal years, daily oil price changed by at least 5 percent only 5 to 20 times. But in 2008 it changed 39 times, definitely not a normal year! That year was the most volatile year since the recession of 1990.

The effect of oil-price volatility and upward trend—oil price increased by almost 90 percent between January 2009 and January 2010—is exacerbated by changes in labor costs in developing countries.

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Between 2003 and 2008, labor costs in developing countries increased significantly (see Table 1), much faster than the increase in labor costs in the United States or Mexico. During this period, average annual wages increased in the United States by 3 percent, in Mexico by 5 percent, and in China by 19 percent. These wage differences and the changes in oil prices suggest that off-shoring and outsourcing decisions that were made a few years ago may not be appropriate in the current environment.

Country	Brazil	China	Malaysia	Mexico	US
Average Annual Wage Increase	21%	19%	8%	5%	3%

Table 1: Average annual wage increases in five countries, 2003 to 2008

At the same time, low-cost country sourcing strategies and lean practices have helped companies reduce costs but have significantly increased exposure to all sorts of risks, from operational problems to man-made and natural disasters. Similarly, globalization has increased the risk of counterfeit components and products entering the supply chain with severe consequences to the economy, public health and safety, and national security. Finally, new and future regulations around low carbon manufacturing and logistics activities may pose enormous challenges to overcome if business is to contribute to the sustainability agenda.

From my vantage point as an academic, consultant, and entrepreneur, I have observed tremendous changes in the operations and supply chain strategies employed by companies across all industries. A number of trends have emerged in the last few years—more emphasis on improving service levels and response times and satisfying customer needs; a move from a functional focus in which each area is marching to its own drum to a holistic approach to supply chain; a significant focus on risk-mitigation strategies to address supply and market volatility, disruptions, and globalization; and IT investments to achieve better planning, coordination, event visibility, and execution of decisions across the entire supply chain.

Taken together these trends suggest not only that operations and supply chain management have evolved, but also highlight the stage of maturity and sophistication of many organizations. All of these are, of course, positive developments.

But with all these positive trends, why do many companies struggle, stumble, or sometimes fail entirely in their operations strategies? My answer is that there are barriers to success -- recognizing them can help an organization avoid potential problems. Unfortunately, some of these pitfalls are disguised as quite reasonable strategic goals, but when they are followed, an organization is almost guaranteed to fail or miss opportunities. This paper reviews the top seven pitfalls—these are common mistakes that I refer to as *the seven myths of operational excellence*.

MYTH 1: Reduce costs by all means

Some companies make cost reduction a strategic goal, particularly when times are hard and cutting costs seems to be the natural strategy to survive. This strategy violates many supply chain and operations principles, especially those that suggest that for certain product characteristics--such as innovative products--responsiveness, not cost reduction, is the appropriate operations strategy.

Even when cost is an important objective, companies need to balance it with service, invest in flexibility to reduce risk, and deploy the appropriate information technology (IT) infrastructure for long-term viability and

growth. Avoid these investments, and you will be taking the same journey that Ericsson's mobile division took in 2000 when it faced a supply disruption (see Example 1). Therefore, executives need to remember an important lesson learned over the collapse of many supply chains:

➔ **RULE 1.1: *Invest now, or you will pay later.***

Example 1:

In 2000, the Philips Semiconductor's factory in Albuquerque, New Mexico, produced several types of radio frequency chips used in mobile telephones. Major customers included original equipment manufacturers such as Ericsson and Nokia. On Friday, March 17, 2000, at 8:00 p.m., lightning struck the Philips plant. The fire, smoke, and water used during the fire exhaustion destroyed or contaminated almost all the silicon stock in the factory, and the plant was shut down for months.

Three days after the fire, Nokia detected delays in incoming orders from the Albuquerque plant. In the initial contacts, Philips reported that it expected the plant to be shut for only one week. Fearing the worst, Nokia decided to send engineers to New Mexico to evaluate the damage. When the engineers were not allowed access to the plant, Nokia raised red flags and increased the frequency of monitoring incoming orders from the plant from weekly to daily. On March 31, two weeks after the fire, Philips confirmed to Nokia that months of orders would be disrupted.

Nokia's response to the news was decisive. The company changed product design so that it could use chips from other suppliers that committed to a five-day lead time. Unfortunately, this was not enough. One of the five components provided by Philips was impossible to source from other suppliers. So Nokia convinced Philips to provide this component from two of Philips's factories in China and the Netherlands.

Ericsson's experience was quite different. The news took four weeks to reach upper management, even though Philips informed Ericsson of the fire three days after the incident. It took Ericsson five weeks to realize the severity of the situation. By that time, the alternative supply of chips was already taken by Nokia. The impact on Ericsson was devastating. Nearly \$400 million in potential sales was lost, and only part of the loss was covered by insurance. This, together with other problems, such as component shortages, the wrong product mix, and marketing problems—caused Ericsson Cell Phone Division to suffer a \$1.68 billion loss in 2000 and forced the company to exit the cell-phone market.⁶

This case can be put in perspective by reviewing Nokia and Ericsson's strategies prior to 2000. For many years, Nokia focused on modular product architecture, a strategy that provides supply chain flexibility through product design. Because Ericsson's strategy was all about cost reduction, it adopted a single sourcing strategy in the 1990s—eliminating backup suppliers in an effort to reduce costs and streamline the supply chain.⁷

The implications are clear: supply chain cost reduction cannot justify a business strategy that does not maintain any degree of flexibility.

This rule is exemplified by a few recent events. Ford recall in August of 2000 for millions of vehicles to address tread separation in Firestone tires, Toyota recall in October 2009 of 3.8 million vehicles in the US in response to sudden acceleration problems, and British Petroleum oil spill disaster in the Gulf of Mexico. Nobody knows for sure, but at least some in the media and congress blamed cost cutting measures on these problems.

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For instance, in 2000, Toyota launched “Construction of Cost Competitiveness for the 21st Century” (CCC21), an initiative whose objective was to cut costs of 180 key-parts by 30 percent. Substantial savings were achieved—about \$10 billion by 2005—by reducing component variety⁶. This implies that a defect in one component can affect many different vehicles, all of which use the same component.

Amazon’s approach to IT investments is another example. For many years, Amazon was criticized for its low profitability, big investment in IT, and significant costs tied up with service processes. But by 2009, Amazon emerged as the largest online retailer, with high profits and superior customer service—all achieved through its investment in IT and a relentless focus on customer service.

Finally, the myth described here applies also to low cost country manufacturing strategy—a strategy followed by many companies. Indeed, increasing competition in the manufacturing industry has led to mounting pressure to reduce supply chain costs. Companies have responded by pursuing strategies such as outsourcing and off-shoring to retain market position or gain competitive advantage. Such cost-cutting measures may not be appropriate in today’s environment.

First, with escalating oil prices and rising labor costs in developing countries—between 2002 and 2008, labor costs in countries such as Brazil and China have increased significantly (see Table 1) much faster than the increase in costs in the United States and Mexico—off-shoring and outsourcing decisions that were made a few years ago may need to be reevaluated.

Second, the move to low cost countries in Asia correlates directly to the rising risk levels in the supply chain. As off-shoring and globalization of manufacturing operations continue to grow, supply chains are geographically more diverse and therefore exposed to various types of natural and manmade disasters.

Thus, depending on the industry, product characteristics and customer value proposition, executives need to consider moving manufacturing and sourcing from off-shoring in Asia closer to market demand—such as Mexico for demand in North America and Eastern Europe for consumers in Western Europe.

➔ **RULE 1.2:** *Higher labor costs in developing countries, escalating oil prices, and the need to better manage risk force more regional activities.*

MYTH 2: Invest in a lot of flexibility

Companies that focus on risk-mitigation strategies often invest in redundant and flexible processes and capacities. This is of course appropriate. Indeed, introducing flexibility into manufacturing, supply chain, and network strategies is essential if companies are to respond effectively to ongoing change. Of course, the question is how to achieve flexibility and how much of it is required since flexibility does not come free.

To answer the question I define flexibility as the *ability to respond to change without increasing operational and supply chain costs and with little or no delay in response time*. In this definition, *change* refers to change in demand volume and mix, commodity prices, labor costs, exchange rates, technology, equipment availability, market conditions, the production and logistics environment or any supply disruption.

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This definition includes three key words—*change*, *cost*, and *time*—that refer to the three most critical performance measures influenced by operations—customer experience, operational costs, and business response time. The “ability to respond to change” implies that even in the face of a disruption the firm should be able to match supply and demand to avoid hurting customer experience. Similarly, everything else being equal, implementing flexibility should help the firm reduce long-run operational costs or improve response time or both.

Typically, the higher the degree of flexibility, the more expensive it is to achieve it. Consequently, organizations need a systematic process to measure the level of flexibility that currently exists in their business, identify additional degrees of flexibility possible in their business, and characterize the costs and benefits associated with each one so that they can choose the best course of action.

My approach to flexibility is an engineering systems approach because it takes a holistic view of the business; it integrates manufacturing, logistics, transportation, and product design and hence is interdisciplinary; and it focuses on reducing system, process, and product complexity.

I classify the different strategies that can be applied to achieve flexibility into three categories: system design, process design and product design.

System design: Firms can achieve flexibility by carefully designing their manufacturing or distribution network.

Process design: Examples of achieving flexibility through process design include a flexible workforce, worker cross-training, a lean manufacturing, organization and management structure, and varied procurement strategies such as flexible contracts, dual sourcing and outsourcing.

Product design Product design solutions that allow a firm to achieve flexibility include modular product architecture, standard components and interfaces, postponement strategies, and component substitution.

To illustrate the concept and impact of flexibility, I focus henceforth on achieving flexibility through system design—a design of the manufacturing and distribution network that enables flexibility.

Figure 3 depicts three different system designs of a supply chain with five manufacturing facilities and five product families.³ In the design called “No flexibility” (sometimes called “Dedicated”), each plant is responsible for one product family. By contrast, the system design called “Full flexibility” (sometimes called “Total flexibility”) has each plant capable of producing all product families.

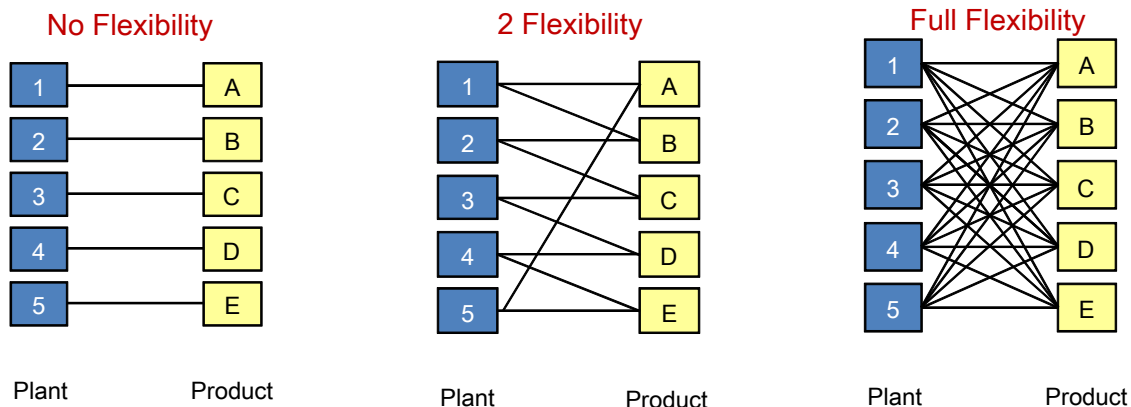


Figure 3: Achieving flexibility through system design

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Under a no flexibility design, each plant is responsible for one product family, and hence lot sizes are large and there are no, or very few, set-ups. As a result, this system design reduces manufacturing costs. But, since each plant is focused on one product family, plants generally are far from market demand, which increases transportation costs. The reverse is true for a full flexibility design. In this case, each plant is responsible for many product families, hence lot sizes are small and there are many set-ups which increase manufacturing costs. However, market demand can be served from the closest plant, and therefore this system design significantly reduces transportation costs.

Between these two extremes there are various designs. For instance, a 2-flexibility design (the center design in Figure 3) has each plant produce exactly two product families. Such a design increases manufacturing costs but decreases transportation costs relative to the costs associated with a dedicated, or no flexibility strategy.

Thus, an n-flexibility strategy is one where each plant is capable of producing n product families. The higher the value of n, the higher the degree of flexibility, and with this come different manufacturing and transportation tradeoffs. Lower degrees of flexibility tend to reduce manufacturing costs but increase transportation costs, while higher degrees of flexibility reduce transportation costs at the expense of manufacturing costs.

But flexibility does not come free—the higher the degree of flexibility the more expensive it is to achieve it. That is, the initial cost required to reconfigure the manufacturing network increases with the degree of flexibility. So identifying the right tradeoff between risk-mitigation strategies and investment cost is an important challenge. Fortunately, our second rule suggests an important insight:

➡ RULE 2: *A small investment in flexibility provides almost all the benefit of full flexibility.*

That is, small investments in flexibility allow the firm to respond effectively to various types of changes and disruptions. This is nicely illustrated in Example 2.

Example 2:

This flexible manufacturing strategy was implemented at Pepsi Bottling Group (PBG), a large manufacturer and distributor of soft drinks, whose challenges were described in the Introduction. The transformation of the supply chain was remarkable. The journey of PBG started with a six-month proof-of-concept and was followed by implementation across the entire supply chain. Over a period of two years, the firm observed the following changes:⁸

- The creation of regular meetings that brought together supply chain, transportation, finance, sales, and manufacturing functions to discuss sourcing and pre-build strategies,
- A reduction in raw material and supplies inventory from \$201 million to \$195 million,
- A two percentage point decline in growth of transport miles even as revenue grew, and
- An additional 12.3 million cases available to be sold due to reduction in warehouse out-of-stock levels.

To put this in perspective, the reduction in warehouse out-of-stock effectively added one and a half production lines without any capital expenditure.

MYTH 3: Apply the same operations strategy across all products, channels, and customers

Companies often offer a variety of products and serve multiple customer segments through a number of channels. A common mistake is the deployment of a single supply chain across all channels, customers, and products. This is true since products may possess different characteristics (such as technology innovation speed, demand uncertainty, and economies of scale), channels (such as retail and online) have different requirements, and customer segments can include a mix of individual consumers, small and midsize businesses, as well as large corporations, each with its own unique demand volume and response-time requirement.

Indeed, a careful observation of effective operations and supply chain strategies for various physical products—such as apparel, PCs, automotive products, and consumer packaged goods—suggests a striking insight. *Product innovation speed* — sometimes referred to as *technology* or *product clock speed*²—that is, the speed by which technologies or products change in a particular industry, fundamentally and dramatically affects operations strategy.

To understand the impact, we relate the innovation speed to two products types—functional and innovative products.⁹ *Functional products* are characterized by slow innovation speed, low product variety, and typically low profit margins. Examples include grocery products— milk, soap, and flour— car tires, and basic office equipment. *Innovative products* are characterized by fast technology innovation speed, short product life cycle, high product variety, and relatively high margins. Examples include fashion items and electronics.

Often, the same product can be both functional and innovative. Basic food products— such as pasta, coffee, and jam—are offered in standard packaging as well as in artisanal or gourmet options. Similarly, the same company, for instance Tommy Hilfiger, manufactures products that are functional—white button-down shirts—and fashionable, as in its latest fall designs.

Undoubtedly, the supply chain strategy for innovative products—products and industries where the products or technology change frequently—must be fundamentally different than that for slow innovation speed products. Similarly, product design strategy and its relationship with supply chain characteristics depend on product innovation speed.

Table 2 compares the characteristics of functional and innovative products.¹⁰ As you can see, this distinction between innovative and functional products has an enormous effect on forecast accuracy, the risk of obsolescence, and the cost of lost sales and hence must affect the type of supply chain employed in each case.

	Functional	Innovative
Product Variety	Low	High
Product Life Cycle	Long	Short
Forecast Accuracy	High	Low
Risk of Obsolescence	Low	High
Cost of lost sale	Low	High

Table 2: Functional versus innovation products

Even those who understand the impact of innovation speed on supply chain strategy are sometimes confused about implementation consequences. First, it is indeed possible for a product to start as an innovative product

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and shift later in the product lifecycle to become a commodity or a functional product. Second, many products—for example, PCs, furniture, or even apparel—can be offered in different forms, either as functional or innovative.¹¹ Finally, functional and innovative products are two extreme product characteristics on a spectrum that spans various degrees of technology innovation speed.

Of course, product characteristics are not the only drivers of operations and supply chain strategies—product proliferation has a huge impact. But product proliferation is a function of the sales channel. Indeed, many online retailers have focused on providing their customers with numerous choices of similar products, while brick-and-mortar retailers competing in the same space offer a smaller subset of the same products. Think about the numerous possible configurations that HP or Dell offer on their Web site versus the limited options that these firms sell through traditional retailers such as Best Buy. This implies that supply chain challenges and opportunities are quite different depending on whether the firm sells its products online or in traditional stores, as is illustrated in Table 3.

In my opinion, this is at the heart of some of the operational challenges that the Gap Inc. is now facing. Indeed, the firm owns three brands, Banana Republic, Gap and Old Navy, each of which offers a different customer value proposition. Banana Republic is a specialty retailer providing a large selection of high-end fashion products; Old Navy focuses on low-cost clothing and Gap on casual, not trendy, products. With these different value propositions, there is a need for multiple supply chains, but the Gap employs only a single one across all three brands.

	Retail	Online
Product Variety	Low	High
Customization	Limited	High
Forecast Accuracy	High	Low
Volume by Product	High	Low

Table 3: Retail versus online channels

By contrast, supply chain channel master Wal-Mart and fashion retailer Limitedbrands have multiple supply chains—one that flows through central distribution centers, another that ships directly to regional warehouses, and a third that ships from vendors directly to stores. HP has multiple supply chains in its printing group, each of which is associated with specific type of customers and sales channels. The key to success is the ability to take advantage of synergies across the various supply chains—synergies in procurement, manufacturing, logistics, transportation, and order management and fulfillment.

➡ RULE 3: Different brands, channels and product characteristics may require different supply chain strategies

The same is often true for mergers and acquisitions. Senior executives often target new acquisitions by focusing on revenue growth but do not pay much attention to synergies across customer value, the supply chains and operations of the two companies. Lack of synergies demand significant effort and resources to capture the potential benefits. If these efforts outpace the potential benefits, such an acquisition is doomed to fail.

To emphasize this point, consider the 1998 failed merger of Mercedes-Benz and Chrysler. Built on the promise of complementary products and geography strength, the merger failed to “achieve global integration,” according to Daimler CEO Dieter Zetsche. On the surface, the merger made strategic sense with premium vehicles from Mercedes-Benz complementing low-cost products from Chrysler and with complementary

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geographic strength – Mercedes-Benz mostly in Europe and Chrysler primarily in North America. The problem, of course, was that different customer value propositions of each company required completely different supply chain strategies. Indeed, Chrysler’s focus on low-cost vehicles demands an efficient supply chain, quite different than the supply chain that needs to support high-end vehicles, vehicles that require focus on brand, value added service and investment in innovative technologies.

MYTH 4: Deploy the latest and the best information technology

The desire to keep up with competition and invest in the most advanced information technology—actively encouraged by IT vendors—seems to make a lot of sense. This is another common mistake made by many executives.

IT strategy should be driven by business strategy, not by software vendor’s newly released technology. Unfortunately, many companies confuse the two. IT decisions often are made by people who understand and are excited by new technology, advanced features, or rich functionality. These people do not necessarily understand business strategy, and if they do, they are not always able to link or align IT and business strategies. Think about how many times you have heard in your own organization that a new technology for supply chain or operations was acquired by the IT department with little or no involvement from the relevant functional groups. When you raised questions about the wisdom of the investment, the response typically was, “You just do not understand. We need a technology that our IT department can support,” and dismissed the need for technology that supports the business strategy and your functional needs.

So what should drive IT investments?

➤ RULE 4: *Enabling, supporting, and enforcing a business strategy are the objectives of IT investments.*

The three key words in this definition of the objectives of IT investments are *enabling, supporting, and enforcing*:

Enabling IT provides new capabilities that a firm was never able to accomplish before. Wal-Mart’s continuous-replenishment strategy required a direct link between suppliers, distribution centers, and retail outlets. Without the IT infrastructure, this innovative supply chain strategy was not possible. Similarly, taking advantage of Amazon’s investment in IT infrastructure, Target was able to successfully expand to the online market, thus providing a significant revenue boost.

Supporting IT allows a firm to do what it used to do but more efficiently—at a lower cost, in a shorter response time, and with better service levels—effecting all the key performance indicators (KPIs) that are important in operations and supply chain management. Application software such as transportation management systems (TMS), warehouse management systems (WMS), and supply chain planning (SCP) systems are all designed and implemented to support existing functions and activities.

Enforcing IT is applied to ensure that common processes and standard workflow are followed. For example, IT has been applied by Sony to automate customer-facing processes and improve those that require human intervention (such as approval, exception, and escalation).⁷ Such standard workflow and processes are typically

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designed to guarantee consistent customer interactions, independent of the people and the manner in which the customer interacts with the firm, thereby improving customer experience.

Many executives fall into the investment dilemma when considering their IT strategy. Investment in new technology can be risky. The technology might be new, buggy, or about to be replaced and hence not supported in the future. There are also configuration, integration, and training requirements as well as investments in maintenance time and costs. By contrast, lack of investment may lead to loss of market advantage and, even worse, falling behind the competition. So, what should a firm do?

The answer lies in relating business strategy to the core operational and supply chain capabilities that IT needs to enable, support, or enforce. For example, when the business strategy is everyday low pricing, then cost reduction, supply chain efficiency, and supply chain planning are critical capabilities. If current IT is appropriately addressing these needs, typically no new investments are required. But when IT does not support core capabilities—perhaps because of antiquated technology, a change in business strategy, or new government regulations—then smart executives invest in IT.

Example 3:

Consider Zara, the large Spanish clothing company known for fashion, stylish designs, and product diversity. Since 1974, when Amancio Ortega Gaona, Zara's chair, opened his first store, the company's objectives have been to provide customers with trendy fashion products at a reasonable, not necessarily low, price. The key to achieving this goal was to make the way the company manages its supply chain the centerpiece of its strategy.

Four major components in Zara's strategy were critical to its success. First, product variety and scarcity—that is running low on inventory shaped consumer behavior by motivating them to buy early, thus avoiding discounts. Second, speed-to-market—that is delaying product design and production decisions until market signals are available. Third, small production batch sizes to reduce inventory and discount risks. And finally, local decision making responsibilities where store managers make product-assortment and buying decisions so that stores are responsive to local needs. No centralized assortment or buying decisions are followed.

As a result, Zara's IT strategy is designed to support this core capability: store managers have hand-held devices that are used to place orders for new products. But not all decisions are made locally. Pricing decisions are centralized using point-of-sales (POS) data transmitted to headquarter on a daily basis. For all these reasons, Zara's IT infrastructure is very basic, focusing only on providing these capabilities successfully. One implication is that Zara has no ERP system and does not invest in demand forecasting or replenishment technologies.¹²

A related mistake is to initiate a quick and comprehensive IT implementation process. On the surface, it seems there is nothing wrong with this approach. Implement quickly, and you transform your firm's IT and business environment and therefore enjoy the benefits in a relatively short period of time. However, this approach shows a lack of understanding of what IT investment entails and increases the likelihood of implementation problems and user resistance.

One reason for all these challenges is the need to adjust business processes, develop materials, and build confidence. Thus, always start small by focusing on certain geography, a single business unit, or a portion of the business that provides value and experience.

MYTH 5: Ignore IT because it is just another commodity

In addition to the investment dilemma that exists when considering information technology investments, a second dilemma that executives sometimes face is the *process dilemma*, which emerges after a decision is made to invest in IT. The same executives who made the IT investments resist changing their business processes to fit the new technology, either because they believe they have the right processes and in fact “no one knows better how to run our business” or because they are not sure they have the right processes but are worried about too many changes at the same time. Whatever the reason, this can be a huge mistake. Indeed, seldom is technology itself a driver of improvement. Rather, it is the combination of IT infrastructure and business processes designed for supply chain integration and collaboration that allow the firm to significantly improve supply chain performance and achieve a sustainable competitive advantage.

➡ RULE 5: *IT investments need to be accompanied by similar and considerable investments in the appropriate business processes.*

This rule is supported by a wealth of anecdotal evidence as well as a recent study¹³ that analyzed data from about seventy-five different supply chains. The study suggests that IT strategy, sound business processes, and supply chain performance are strongly linked. Interestingly, the study shows that companies that invest mostly in business processes do better than those who invest only in IT and lack the appropriate business processes. Indeed, it suggests that investments only in technology without the appropriate business processes lead to negative returns.

Specifically, the objective of the study was to determine whether there are direct correlations among the maturity of the business process, the maturity of the IT infrastructure, and supply chain performance. Unfortunately, it is difficult to measure the level of maturity of the business process or the IT infrastructure that a company possesses, especially because different portions of the company’s business can be at different levels of maturity. Even one division within a business may be out of balance if the maturity of the business process and the information technology do not complement each other very well.

The results from this study are summarized in Figure 4. The vertical axis provides information about the maturity level of the business processes, and the horizontal axis provides information about the maturity level of the IT systems. Box A represents supply chains that are characterized by immature business processes and immature IT systems. The study suggests that these supply chains suffer from below-average business performance. This includes high inventory levels, high cash-to-cash cycle time, and low profitability.

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Business Processes	Mature	<p><u>Lack of system support</u></p> <ul style="list-style-type: none"> Improved bottom line profitability 27% improvement potential <p style="text-align: center;">B</p>	<p><u>Planning practices and systems aligned</u></p> <ul style="list-style-type: none"> Significant improvement on operational performance 75% higher profitability for best in class <p style="text-align: center;">C</p>
	Immature	<p><u>Single site, informal and manual planning processes</u></p> <ul style="list-style-type: none"> Below average business performance <p style="text-align: center;">A</p>	<p><u>Systems are not complemented by planning practices</u></p> <ul style="list-style-type: none"> Significant inefficiencies <p style="text-align: center;">D</p>
		Immature	Mature
IT Systems			

Figure 4: Linking processes and systems with operational performance

Box B represents supply chains with mature business processes and immature systems. Companies in this category perform significantly better than those that do not invest in either processes or systems, but they leave a lot on the table. Specifically, the study suggests that these supply chains can increase profit (measured as a percentage of revenue) by, on average, 27 percent by investing in IT, that is, by transferring their IT systems through the stages of excellence to become mature systems. Such an investment in IT may require adjusting the business processes.

Box C represents supply chains with mature IT systems and mature business processes. These supply chains enjoy significant improvements in operational performance. More importantly, supply chain leaders—that is, supply chains that have mature processes and are best-in-class systems (are in the top 20 percent of IT maturity) enjoy 75 percent higher profits relative to other companies. Indeed, a remarkable performance.

Finally, box D represents supply chains with mature IT systems but immature business processes. Surprisingly, the study reveals that these companies perform even worse than those with immature systems and immature processes. This situation requires more analysis. Everything else being equal, one would expect that a higher maturity level of the firm’s IT systems would yield higher supply chain performance, but the study suggests that this is not the case.

To explain this dichotomy, observe that IT infrastructure typically requires significant investment accompanied by expensive support staff but provides only information. There is a need for a process that can effectively transform information into knowledge and decisions. Indeed, the role of the process is to ensure that the various organizational functions focus on the same objectives, that there is a single forecast and one plan that the organization is executing, that activities are coordinated and work is done at the appropriate time and by the appropriate people, that corrective actions are made before a disruption occurs, and that best practices are shared. IT alone cannot accomplish all of these objectives.

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Of course, avoiding myths 4 and 5 is not easy. After all, they are the basis for the IT investment dilemma described and analyzed in earlier. But when the challenge is addressed by following some of the principles outlined here, the benefits are enormous.

MYTH 6: Treat corporate social responsibility as a charity

In 2006, Fonterra—New Zealand’s world-leading exporter of dairy products—was faced with significant competition in local markets. In the United Kingdom, local producers ran advertisements claiming that dairy products with high food miles—those produced thousands of miles away—contribute significantly more to global warming than local produce. UK-based Dairy Crest, for example, underlined growing consumer awareness of the food-miles concept when it launched an advertising campaign comparing its locally produced products with images of Fonterra’s Anchor brand butter traveling thousands of miles to Britain on a rusty ship.¹⁴

Fonterra took a scientific and holistic approach to the challenge. First, it demonstrated that most of the greenhouse gases emitted in the dairy-product supply chain is generated at the farming step. Second, an independent study found that New Zealand farmers used less energy producing lamb than German producers, and another study showed that producing milk in New Zealand and shipping dairy products to Britain consumed 50 percent less energy and generated 50 percent less carbon greenhouse gas than UK milk producers.¹⁵

Laundry detergents, to give another example, have recently been the subject of intense competition. Surprisingly, competition has been not on price but on which product is the most environmentally friendly. Major consumer product manufacturers, such as Unilever and Procter & Gamble, have introduced new concentrated laundry detergents that cost less and are more sustainable. These new detergents use 64 percent less water in their formulation than traditional counterparts, and are easier and more efficient to ship because the bottle is lighter.¹⁶ Wal-Mart and Target both run advertisements that link saving money to saving the planet. Wal-Mart’s ads note that its concentrated products reduce packaging waste—a remarkable trend for a company whose marketing has traditionally focused on everyday low-pricing and broad selection.

One theme running throughout the two stories is that these companies believe that consumers care about social responsibility (such as global warming) and will switch from one brand to another. This is supported by recent surveys that suggest that a majority of consumers would switch to a vendor with products or services that reduce carbon emissions.¹⁷ Of course, the missing information here is “At what price?” But the underlying message is that assuming everything else is equal, most consumers prefer greener products.

A second theme suggested by the Wal-Mart story is that sometimes (but not always) green practices lead to efficiencies and cost reduction. Indeed, the concentrated laundry detergents conserve water and are more efficient to transport.

This is not always the case. More often than not, greener performance is achieved at a cost and as a result there are difficult tradeoffs to be made. The challenge faced by business executives is to identify and exploit opportunities where “doing good” is consistent with “doing well.” And, when these two are not consistent, they need to apply strategies that make a greener supply chain a reality without hurting the business or even while improving its performance.

Doing good is not restricted to environmental issues. It also refers to community development, safety standards, and working conditions.

Example 4:

Consider Nestlé, which grew from a small company founded in 1867 in Switzerland into one of the largest global food companies. The initial business growth model was simple: establish a milk district that includes a large base of farmers, a milk processing facility, and an efficient way to produce and distribute its products to the local market. Add to the mix technical assistance to farmers about best agricultural practices, and you have a menu for success.

It was not surprising that when Nestlé entered India in 1961, it applied the same approach. It set up its first milk processing facility at Moga in the state of Punjab and provided technical assistance and education to farmers to improve milk productivity and quality. But the poor region required more assistance than what worked well in developed countries. So in Moga, Nestlé established milk collection points and chilling centers, installed farm cooling tanks, and provided the transportation to pick up milk at the farms and deliver them to the milk processing facility. In parallel, it delivered veterinary medicines and, most surprisingly, helped village women learn good dairy practices.

This program began in 1961 with 180 farmers and four milk collection centers and grew to 95,000 farmers and 1,700 centers by 2005. It provided employment, higher income, and a higher standard of living to the farmers and to the entire rural community. This business model was not a charity. It allowed Nestlé to establish a unique supply chain and generated a new stream of revenue in a challenging market.¹⁸

Is Nestlé's story a case of corporate social responsibility or a sound business decision? I argue that it is both. That a firm can deliver social and environmental benefits when these two are embedded in the company's cultural and business vision so much so that social responsibility is barely noticeable as a distinct objective.

➔ **RULE 6.1: *Corporate social responsibility can create tangible business opportunities and value.***

My starting point is the link between corporate social responsibility and the firm's image and brand. More often than not, social responsibility is the single most important opportunity that the firm has to create a new stream of revenue by offering new, sustainable products or by entering a new market, especially in developing countries.

Not long ago, corporate social responsibility was viewed as one element in the company's image and brand. It allowed the firm to distinguish itself from the competition in an economy that had an overabundance of supply and where many products were viewed as interchangeable commodities.

Today, social responsibility goes beyond branding. It represents a radical change for businesses as they move away from pure philanthropy and mere compliance with local and international laws and toward sound business investments that create value. This value is achieved through improved efficiency, cost savings, and additional revenue streams from access to new markets and innovative new products.

Consider Coca-Cola's manual distribution centers program in Africa. The initiative provides the financing for local entrepreneurs to set up independently owned, low-cost, manually operated distribution centers. Each distribution center serves a small-scale emerging retail market where conventional distribution channels are impractical—where “truck delivery is not effective or efficient, and where outlets demand smaller, more frequent deliveries of product.”¹⁹ This business model helped Coca-Cola grow its sales and volume throughout

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East Africa. In Ethiopia and Tanzania, for example, Coca-Cola distributes 80 percent of its products through these distribution centers, a business model that creates jobs and generates value.²⁰

To describe my approach to corporate social responsibility, consider Figure 5 where business decisions are mapped along two dimensions—expected effect on business and expected effect on society, including both environmental and social values.

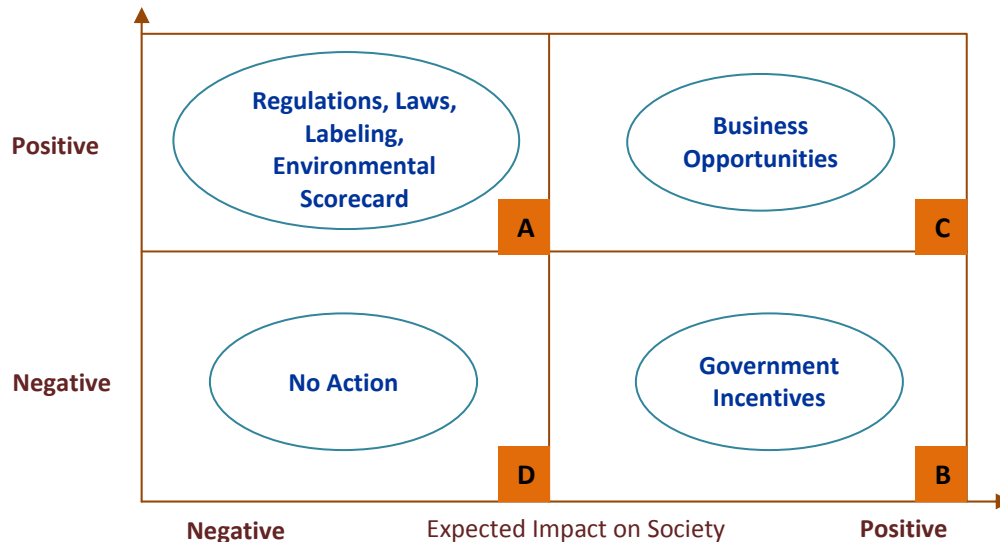


Figure 5: The corporate social responsibility framework

Box A refers to areas where what is good for business conflicts with what is good for society. Examples include operations and supply chain core activities (such as transportation, logistics, and manufacturing) that may increase carbon emission, lead to congestion, pollute natural resources, or consume limited resources (such as water or energy). This is where public policy has an important role. Indeed, polluters (such as, energy providers, manufacturers, shippers, and distributors) affect the environment but do not necessarily face the direct consequences of their actions—these consequences are referred to as *negative externalities*. The role of public policy is to impose a cost structure on the polluters that will force them to take into account the effects of their activities on society and the environment.

➡ **RULE 6.2: The role of public policy is to align company interests with social and environmental needs.**

This is also where consumer-product labeling, regulated by governments or trading partners, can influence change. The Japanese government and UK retailer TESCO introduced carbon labeling that measures the emissions associated with the production and delivery of products. The assumption is that customers care about carbon emission and will force manufacturers to change their behavior through consumer buying choices.

Finally, environmental scorecards imposed by retailers play an important role. For example, in October 2005, Wal-Mart's CEO Lee Scott presented an environmental plan to reduce energy use, waste, and greenhouse-gas emissions. Wal-Mart's target is to cut greenhouse-gas emissions throughout the entire supply chain, including the supply chains of its providers, by 20 percent by 2012. For this purpose, it began in January 2008 to rate its

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suppliers' performance on an environmental scorecard that includes greenhouse-gas emission, transportation-cube utilization, recycled content, and renewable energy.

Box B refers to situations where a business decision may be beneficial to society or the environment but not to the firm. This is where government incentives, whose objective is to change business behavior, can make a difference—through tax incentives provided by states or (developing) countries to motivate businesses to invest in (manufacturing) infrastructure, green technology, worker education, and job training.

Box C represents situations where no incentives or regulations are required. Firms invest because these investments drive economic value. At the same time, they are able to have substantial positive effects on society. This is where the Coca-Cola and Nestlé stories belong.

Boxes B and C are directly related. Government incentives associated with box B must be designed to provide business benefits that complement social benefits. This implies that the role of government incentives is to motivate firms that make decisions with the characteristics of box B to behave as if they were in box C.

From the corporate point of view, box A is all about *operational improvements*. The focus is on measurement, best practices, and compliance. For example, Wal-Mart's sustainability initiative (described earlier) motivated its third-party logistics (3PL) provider in Canada to change the way it ships products to ten stores in Nova Scotia and Prince Edward Island from road to rail, which led to a reduction of carbon emissions by 2,600 tons. In addition, the 3PL provider converted twenty truck generators to electric power, saving about 10,000 gallons of fuel.²¹

Operational improvements (the focus of box A) are different than *business innovations* (the opportunities associated with boxes B and C). Here, the objective is to create a new value proposition that combines economic and social benefits, not mere compliance or best practices. Examples include investments in a new market segment in developing countries; the introduction of new, energy-efficient, products such as household appliances, computers and buildings that require less energy to operate; and a new service for the poor in developed countries.

Walgreens, the drugstore retailer, has a health and wellness division that provides affordable, walk-in, seven-days-a-week healthcare services in over 300 Walgreens stores, and it plans to increase the number of its retail clinics to 2,200. The retail clinics provide diagnosis and prescriptions for common health problems and refer clients to specialists when appropriate. Walgreens is not investing in low-price healthcare services for the uninsured as a form of charity. As Walgreens' top financial executive Wade Miquelon put it, "What ends up happening is people become more loyal to Walgreens." The data suggest that he is right. With up to 30 percent of the retail clinic patients becoming new Walgreens customers, the clinics are bound to drive big business for Walgreens stores.²²

To be successful in a way that allows business and social benefits to be indistinguishable, management must follow a four-step process:

- **Identify the opportunity:** This step is about listing and ranking opportunities that provide both business and social benefits. For box B, government incentives play an important role by generating a business opportunity in a situation where it does not exist without the incentive.
- **Analyze rigorously and systematically:** Here the focus is on available resources—labor, infrastructure, natural resources, and local industry—and on competition, market size, investment required, and tax implications.

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- **Establish performance measures for success:** Avoid short term planning and focus on long-term benefits. This is important as it typically takes time to realize the potential of corporate social responsibility.
- **Implement:** Start small, monitor and review, establish best practices, and finally build scale by transferring knowledge to other regions, products, or services.

This approach to business innovation in corporate social responsibility is no different than the approach that management should take in other business investments. This is no coincidence. Succeeding in corporate social responsibility requires a similar approach to the one taken by corporations, for example, towards risk management. It needs to be embedded in the firm's core values, organizational fabric, and culture. For this purpose, management needs to distinguish between decisions associated with operational improvements and new business innovations that generate true social and economic values.

But business innovation for social responsibility has some unique characteristics. First, firms need to take a long-term perspective rather than focus on immediate shareholder benefits. Second, business and social values must be integrated so that they are indistinguishable. And finally, business innovation for social responsibility requires a departure from traditional business models, the removal of organizational barriers, and the development of an incentive and reward system that typically is different than existing ones.

The examples discussed earlier highlight these characteristics. In East Africa, Coca-Cola captured a new market by replacing traditional distribution centers with a new type of center, an approach that helped lead poor families out of poverty. Nestlé developed a new revenue stream by adding services—typically not part of Nestlé's offering—that supported the local community in Moga, India. Walgreens' story is similar. What is impressive about Walgreens is that it is addressing a challenging sector (health care) in a highly developed market (the United States). Finally, Procter & Gamble and Unilever have removed organizational boundaries between product design and operations, leading to new technologies that conserve water, reduce waste, and improve transportation

And finally, the most common big-impact mistake made by many executives is the following misguided goal

MYTH 7: Leave operations to the functional areas of the company

Consider Zara, the large Spanish clothing company known for fashion, stylish designs, and product diversity. While retailers such as Gap reduce costs by outsourcing manufacturing (mostly to Asia), Zara owns its entire supply chain—from manufacturing through distribution centers to retail outlets. Because of its focus on fashionable, trendy products, for which demand is highly uncertain, Zara procures capacity from its fabric suppliers but does not commit necessarily to a specific color or print until it has a clear picture of consumers' preferences. Retail stores provide direct feedback to the company headquarter through its information technology (IT) infrastructure, allowing designers to identify trends and new styles.

Using this strategy, Zara has reduced time to market for new styles to three to four weeks, significantly shorter than the competition has been able to achieve. In comparison, Gap's focus on low-cost manufacturing in Asia implies a long pipeline that is typically loaded with inventory and hence diminishes the company's ability to frequently introduce new products to the market.

The stories of Zara and Gap communicate a powerful message. Firms operating in the same space but providing different customer value propositions need different operations and supply chain strategies. Gap's focus on

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competitive pricing demands an operations strategy that is dedicated to efficiency—that is, a strategy where the primary goal is *reducing operational costs*. By contrast, Zara’s value proposition, which provides customers with trendy fashion products at affordable prices, requires an operations strategy that is focused on speed—that is, a strategy where a vertically integrated supply chain is dedicated to *responsiveness*.

To highlight the strong connection between customer value proposition and its related operations strategies, consider five Fortune 500 companies: Zara, Dell Direct, Apple, Wal-Mart and Amazon (Table 4). Every one of these five companies has had superior financial performance over a long period of time, each provides a unique value proposition, and each company’s operations strategy directly matches its customer value proposition.

Customer Value Proposition	Example	Operations Strategy
High Fashion content at a reasonable Price	Zara	Speed-to-Market
Customer Experience	Dell Direct	Responsiveness through Configure-to-Order
Product Innovation	Apple	Efficiency through outsourced manufacturing and logistics
Everyday Low Pricing	Wal-Mart	Cost Efficiency
Product Selection and Availability	Amazon	Efficient and reliable Order Fulfillment

Table 4: Different ways to compete in the market

Dell outperformed the competition by over 3,000 percent in shareholder growth from 1988 to 1996.²³ Dell’s success over this eight-year period can be attributed to its virtual integration, a strategy that blurs the traditional boundaries between suppliers, manufacturers, and end users. Dell’s decision to sell computers built from components produced by other manufacturers relieved the firm of the burden of owning assets, investing in research and development, and managing a large workforce. At the same time, its direct sales model allows consumers to configure their own computers and requires Dell to fully customize an order with a short response time.

Dell’s recent struggles are in part due to a change in the personal computer market. Growth in the PC market has shifted from online to retail and from developed to developing countries, where consumers are not used to or not comfortable with online purchasing. Such a shift requires a rethinking of operations and supply chain strategies. Indeed, the previous analysis suggests that Dell’s responsive configure-to-order strategy is a mismatch with the characteristics of the retail channel.

Apple, another example from table xxx has outsourced almost all its PC manufacturing and logistics activities. The firm focuses mainly on research, development, and product innovation as well as marketing and sales. Apple’s product portfolio, unlike Dell’s, is limited and hence its operations strategy emphasizes efficiency rather than responsiveness. For this purpose, Apple serves as the supply chain coordinator, integrator, and provider of operations best-practices, innovations, and strategies for all its partners.

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Finally, Amazon and Wal-Mart are direct competitors in the retail space, each of which focuses on a different channel and a different value proposition. Amazon, the world's largest Internet retailer, provides its customers with a huge variety of products—including books, DVDs, electronics, and other merchandise— and has established itself as the most trusted online retailer through an efficient and reliable order-fulfillment strategy. By contrast, Wal-Mart has built its reputation as the brick-and-mortar master retailer by focusing on squeezing cost and increasing efficiency in its supply chain, thus providing its customers with competitive pricing but not necessarily with extraordinary service.

Looking at the customer value propositions and the corresponding operations strategies for these successful companies reveals an important insight: No firm can compete successfully on all dimensions of customer value, such as innovation, choices, price, and experience. Management needs to pick its goals, since operations and supply chain strategies, the market channel, or even the skill sets required to be successful depend on the specific value proposition.

Similarly, no firm can be both extremely efficient, and thus compete on price, and at the same time highly responsive, and thus provide its customers with a large set of choices in a speedy manner while maintaining an extraordinary service level. We conclude,

➡ RULE 7: *Operations strategy must be centered on the value proposition the firm provides its customers.*

Thus, there is a direct link between the firm's value proposition and its operations strategy. Indeed, operations significantly affect the firm's revenue and profit goals precisely because of their ability to control costs, shorten response times, and improve customer service. Misalignment between customer value propositions—typically the focus of senior executives—and operations strategy leads to higher costs and customer-service problems.

By contrast, when operations executives have an equal seat beside other senior executives, natural synergies emerge. Examples include better integration of the functional areas around the firm's value proposition, alignment of new channels and products with operations strategies, a direct link between IT investments and business and operations strategies, and a risk-management culture that cuts across the entire organization. But to achieve all these benefits, senior management must be directly involved in defining goals, fostering collaboration between different units, setting performance targets, and providing incentives.

This paper would be incomplete without a word of caution. Following the recommendations, frameworks, and rules described in previous sections and avoiding the mistakes outlined in this paper are no guarantee for success. But they can help the firm significantly increase business value and hence the likelihood of outperforming the competition. The alternative, focusing on best practices or mere inertia, is no match to the power of the innovative principles described throughout this paper.

Table 5: Summary of the seven myths and rules

Myths		Rules	
1. Reduce costs by all means		1.1	Invest now, or you will pay later
		1.2	Higher labor costs in developing countries, escalating oil prices, and the need to better manage risk force more regional activities
2. Invest in a lot of flexibility		2.	A small investment in flexibility provides almost all the benefit of full flexibility.
3. Apply the same operations strategy across all products, channels, and customers.		3.	Different brands, channels and product characteristics may require different supply chain strategies.
4. Deploy the latest and the best information technology.		4.	Enabling, supporting, and enforcing a business strategy are the objectives of IT investments
5. Ignore IT because it is just another commodity.		5.	IT investments need to be accompanied by similar and considerable investments in the appropriate business processes
6. Treat corporate social responsibility as a charity.		6.1	Corporate social responsibility can create tangible business opportunities and value
		6.2	The role of public policy is to align company interests with social and environmental needs.
7. Leave operations to the functional areas of the company.		7.	Operations strategy must be centered on the value of proposition the firm provides.

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