



Global Manufacturing Outlook: Fostering Growth through Innovation

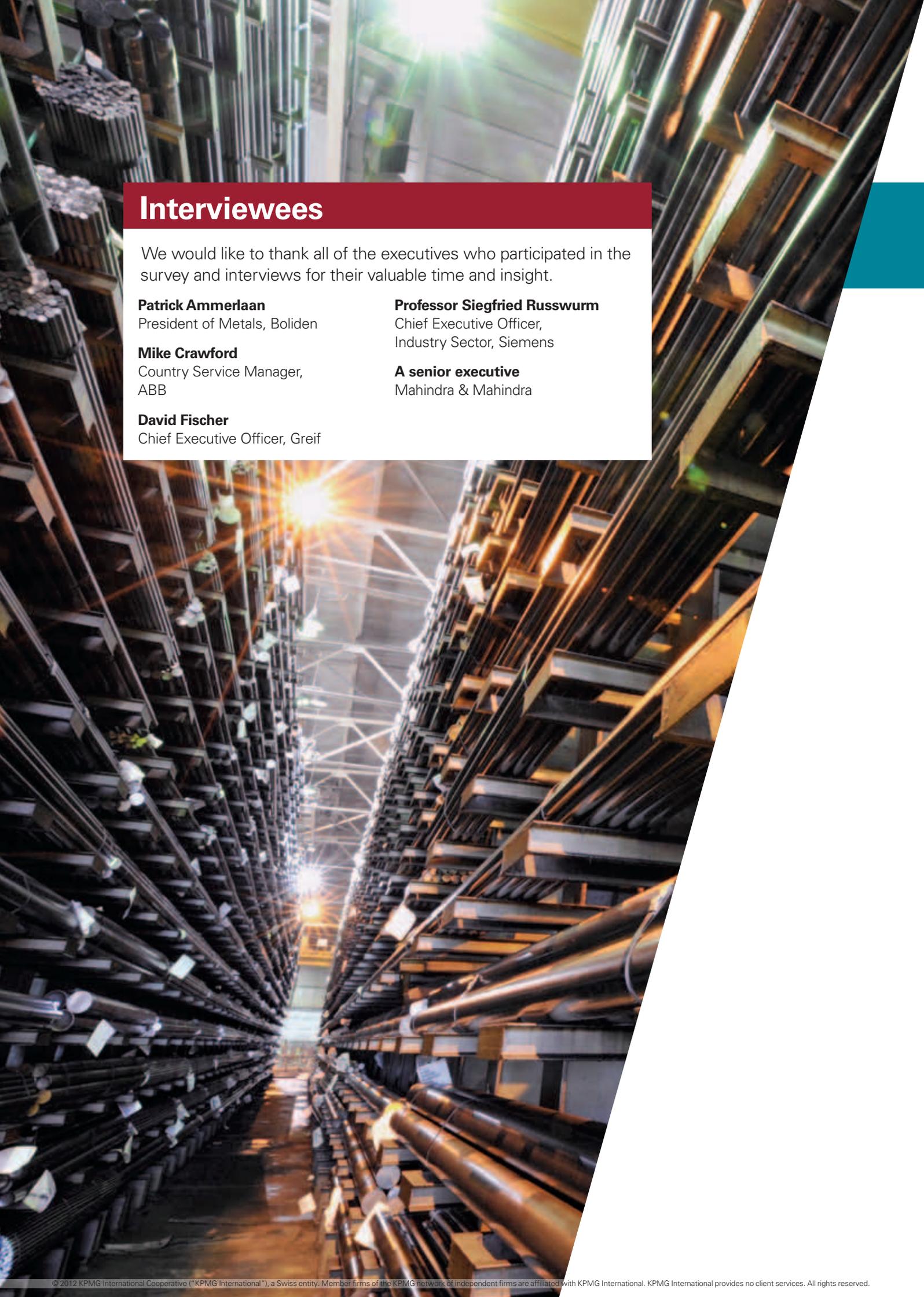
Global research commissioned by
KPMG International from the
Economist Intelligence Unit

KPMG

cutting through complexity

Economist Intelligence Unit

The
Economist



Interviewees

We would like to thank all of the executives who participated in the survey and interviews for their valuable time and insight.

Patrick Ammerlaan

President of Metals, Boliden

Professor Siegfried Russwurm

Chief Executive Officer,
Industry Sector, Siemens

Mike Crawford

Country Service Manager,
ABB

A senior executive

Mahindra & Mahindra

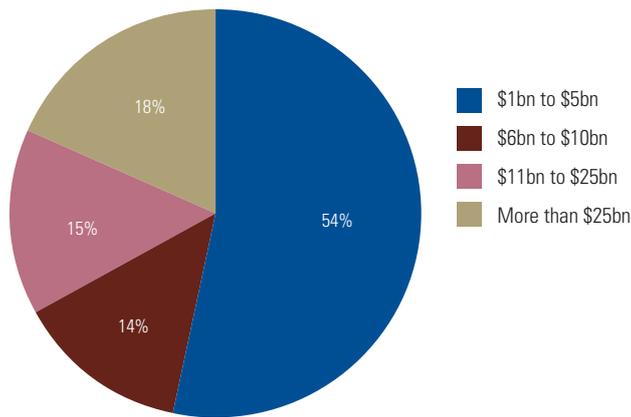
David Fischer

Chief Executive Officer, Greif

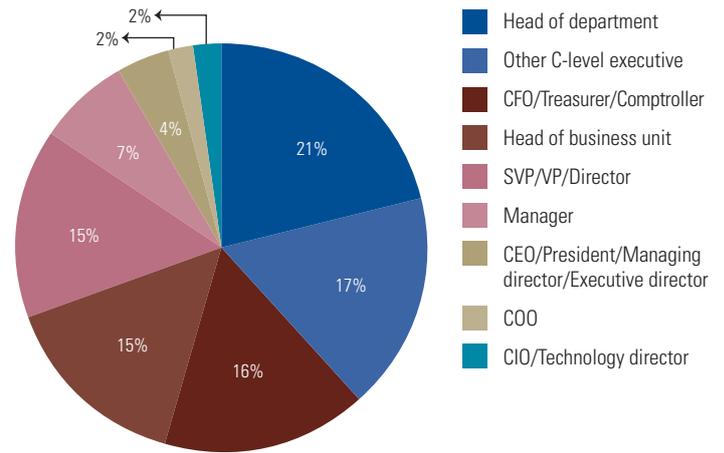
About the survey

A total of 241 senior manufacturing executives participated in the survey, which was conducted in February 2012. All respondents are responsible for, or significantly involved in, finance, supply chain, procurement or strategic development. Respondents represent the aerospace and defense, metals, engineering and industrial products sectors, including industrial conglomerates. All participants represent companies with more than US\$1 billion in annual revenue; 33 percent hail from organizations with more than US\$10 billion in revenue. Nearly half (41 percent) of respondents are C-suite executives or board members. They are geographically split among Western Europe (29 percent), North America (23 percent), Asia-Pacific (28 percent), Middle East and Africa (10 percent) and Latin America (10 percent).

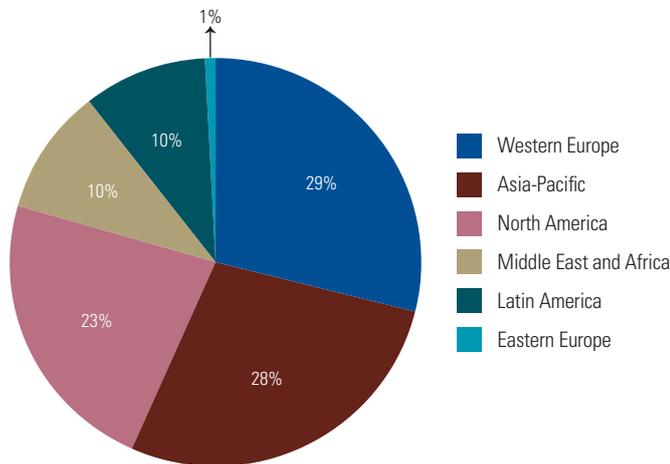
1. What are your organization's global annual revenues in US dollars?



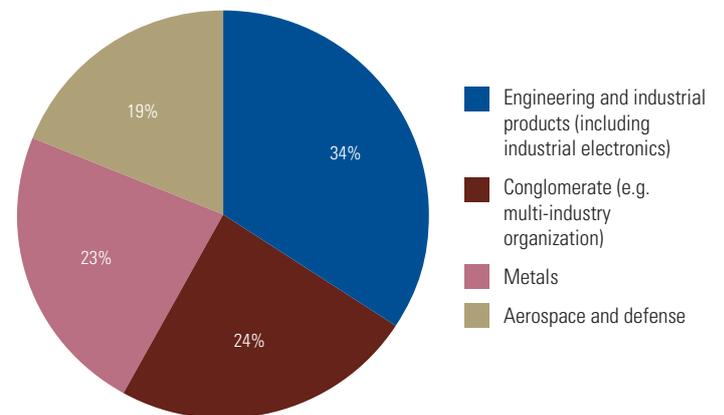
2. Which of the following best describes your title?



3. In which region are you personally based?



4. What is your primary industry?



Source: Economist Intelligence Survey, 2012

Note: Graphs may not add up to 100% due to rounding.

Foreword

An era of transformation for manufacturing

All signs point to a manufacturing sector that is entering a transformative period, characterized by sustained but modest growth, a renewed focus on product and process innovation, and unprecedented collaboration across the value chain. Further, while the volatility of global economic events creates new challenges on a daily basis, manufacturers have developed frameworks and tools to improve transparency and mitigate risk across the supply chain as well as the global enterprise. Finally, manufacturers continue to focus on more competitive cost structures as they align their business models with changing market dynamics.

As evidenced by the findings of our survey, it seems that manufacturers are in the early stages of major product innovation. Today they are keenly aware that while shrewd cost management will always be near the top of the agenda, their top-line and bottom-line growth objectives can only be met with innovative, market leading products and related services. In this regard, we are beginning to see interesting developments in the alliances companies are forming to explore and commercialize their collective intellectual property and product development capabilities.

Another predominant theme this year is the continuing shift towards increased customer and supplier collaboration, from the earliest stages of product development to after-market support and services. This inclusive approach to innovation helps to share potential risks, costs, and rewards throughout the supply chain while accelerating speed to market. It also allows manufacturers to better understand the needs of their end-users, strengthen customer relationships, add value to their products, and build confidence that they are placing the right bets on the right products for the right markets.

It may be impossible to predict commodity price fluctuations, natural disasters, or debt crises, but industrial manufacturers are demanding more of technology to improve supply chain transparency and agility. We continue to see manufacturers strategically moving their operations and supply base closer to their end markets to reduce both costs and risks. Manufacturers are also taking a hard look at their business models, flattening their regional and global organizations, and leveraging geographic and product advantages across multiple businesses or product lines. They are clearly focused on what they do best and exiting businesses that are not core to their long-term success.

I hope you find this year's report compelling and thought provoking. It seems clear that we are embarking on a new era for manufacturing. Understanding the priorities and expectations of your peers will hopefully provide insight into this next chapter.



Jeff Dobbs

KPMG Global Head of Diversified Industrials

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Executive summary



The global economic recovery faltered during 2011. The euro zone lurched from one debt crisis to another, geopolitical tensions affected the oil market and volatile commodity prices posed new levels of supply chain challenges—all threatening the vitality of the global economy. These macroeconomic uncertainties, coupled with high levels of household debt across the developed world, reduced the growth rate of world manufacturing output to 4.2 percent in the fourth quarter of 2011 against the same period the previous year. This represented the lowest quarterly growth rate in 2011.¹

However, as **Global Manufacturing Outlook 2012: Fostering Growth through Innovation**, an Economist Intelligence Unit report sponsored by KPMG, reveals, global manufacturers worldwide remain optimistic about the near-term outlook for their businesses. They are using the low-growth environment to become leaner and more efficient. Since 2011, manufacturers have become slightly more bullish that an upswing in the global economy is imminent. Thus they are ramping up their innovation activity, finding ways to increase efficiency (for example, by improving the ways they manage costs and optimize their supply chains), and add value to their offerings simultaneously.

¹ United Nations Industrial Development Organization, "World Manufacturing Statistics for Quarter IV, 2011", 1 March 2012

Some of the key findings emerging from our research include:

- **Profitable growth is the new manufacturing mantra.** Since 2011, the proportion of survey respondents worldwide for whom top-line growth is a priority has doubled. Yet an even higher proportion of respondents are prioritizing the bottom line, so as to become – and remain – as lean as possible. Manufacturers are confident of a near-term upswing in their own businesses, but are also still concerned about costs. Input cost volatility is their leading concern, as it was in 2011, and 57 percent believe the cost structure of their business models will need to change over the next 12 to 24 months. They also continue to rationalize their operations. Indeed, 54 percent of respondents say that “exiting unprofitable product lines and/or geographies” will become more important for them over the same period.

“The downturn has given our most sophisticated customers a zero-waste mentality,” says David Fischer, CEO of US firm Greif, the world’s largest manufacturer of rigid industrial packaging. “As a result, they will have a much greater advantage as the recovery builds.”

- **A new wave of transformational innovation has begun, based on closer collaboration across the supply chain.** Seventy-two percent of respondents worldwide believe transformational innovation has either begun or will do so within 12 to 24 months. In line with the profitable growth agenda, they are adopting a two-pronged approach to innovation: working to extend and enhance their product lines while cutting costs via process innovation. Survey respondents show less enthusiasm for the classic open innovation model² of shared development and exploitation of intellectual property. However, when asked about the importance of intellectual property (IP) ownership versus exploitation of IP, notable regional differences emerge.

Yet respondents are clear on the need for greater collaboration with external parties, especially suppliers and customers. Indeed, 61 percent believe “supply chain collaboration and transparency” will make a “significant” or “very significant” contribution to their profits over the next 12 to 24 months.

- **Manufacturers are moving even closer to the customer via supply chain reorganization and value-added services.** By altering their business models, manufacturers are finding synergies at the intersection between cost and growth strategies. For example, they are increasingly moving manufacturing facilities and sources of supply closer to end-markets – not only to manage costs better but also to localize their product offerings appropriately with greater speed, agility, and accuracy. Forty-six percent of respondents expect this trend of nearshoring to increase over the next 12 to 24 months.

Meanwhile, value-added services continue to rise, as manufacturers find ways to sell high-margin services in areas such as maintenance, performance optimization, and product lifecycle management. “There is a definite trend toward the introduction of advanced services to optimize process performance and deliver operational excellence,” says Mike Crawford, country service manager for the UK at ABB, the US\$40 billion Swiss provider of power and automation technologies. While the general economic outlook remains uncertain, devising new value-added services also represents a comparatively low-cost and low-risk way to expand offerings and boost revenues. Sixty-three percent of respondents expect new/enhanced customer services to make a “significant” or “very significant” contribution to profits in the next 12 to 24 months – a rise of nine percentage points over the equivalent figure for the past 12 to 24 months.

² “Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology,” Henry Chesbrough, *Open Innovation: The New Imperative* (Harvard Business School Press, 2003).

The business outlook: readying for growth

Manufacturers are ramping up their innovation efforts to improve their offerings in anticipation of extra orders and to make themselves even leaner.

While manufacturers are confident that renewed growth in their sector is imminent, the highly competitive and volatile business environment renders cost-cutting a necessity. They are ramping up their innovation efforts to improve their offerings in anticipation of extra orders and to make themselves even leaner. Manufacturers' business models are changing as a result, with value-added services becoming a more important source of revenue and nearshoring yielding numerous benefits. These are the key findings of *Global Manufacturing Outlook 2012: Fostering Growth through Innovation*.

The global economic recovery is proving to be fraught with false starts, market volatility, and macroeconomic uncertainty. For example, the euro

zone debt crisis, which survey respondents rank as the biggest obstacle to global growth, continues to hamper investment as this report goes to press. Yet 75 percent of manufacturers are either optimistic or very optimistic about the outlook for their business over the next 12 to 24 months. They are confident that their own businesses are in a good position to return to healthy levels of growth, even though they cannot be certain that the wider economy will do the same. As David Fischer, CEO of US firm Greif, puts it, "I think the recovery has grabbed hold, but I don't think it will prove to be quick. I think the global economy will take two or three years to crawl back to healthy levels of growth."



The profitable growth agenda

As in previous low-growth environments, manufacturers are trying to find ways to use idle resources and preserve shareholder value. Sixty-two percent of respondents say they are improving the efficiency of their processes, while 47 percent say they are “refocusing the business on its core offerings and capabilities.” These two activities, regarded as the most important by some margin, reflect the second area of strategic focus mentioned above – maintaining lean operations. Indeed, the growth picture is still uncertain enough for 54 percent of respondents to predict that “exiting unprofitable product lines and/or geographies” will become *more* important over the next 12 to 24 months.

Yet 45 percent of respondents say they are prioritizing top-line growth on a 12 to 24 months horizon – more than double the proportion who said so last year. More strikingly, 47 percent are prioritizing bottom-line growth over the same

period. In other words, manufacturers are preparing not just for imminent growth but for *high-margin* growth. The types of innovation they are conducting and the ways in which they are altering their business models are critical to the success of this two-pronged strategy.

The demand for this high-margin business will come from some predictable places. Forty-three percent of survey respondents worldwide see the US as a key source of demand for top-line growth over the next 12 to 24 months and another 41 percent as a key source of bottom-line growth for their organizations. The next most popular locales are more than 10 percentage points behind. Yet among respondents from emerging markets, the US lead is less pronounced – here it is cited by 38 percent of respondents, followed closely by China (35 percent), India (29 percent), Brazil (19 percent) and Singapore (12 percent).

43 percent of survey respondents worldwide see the US as a key source of demand for top-line growth over the next 12 to 24 months and another 41 percent as a key source of bottom-line growth for their organizations.

Respondents say “cost management” is the area of their business in which they expect to invest and/or expand most over the coming 12 to 24 months.

Cost control vital for bottom-line growth

Forty-four percent of respondents worldwide believe input cost volatility is the biggest challenge facing their business over a 12 to 24 months horizon – the same proportion as in 2011. And this concern is supported by external data. The ISM Prices Index, for example, which gauges cost inputs for US manufacturers, reached 61.5 percent in February 2012, up six percentage points against the previous month. Yet the Economist Intelligence Unit predicts in its *Global Outlook Forecasts* that the price of industrial raw materials will fall on average by 12.8 percent in 2012 while that of crude oil will rise by 3.6 percent.

With such a mixed picture, it’s not surprising that respondents say “cost management” is the area of their business in which they expect to invest and/or expand most over the coming 12 to 24 months. Manufacturers also say that cost structure is the area of their business model that will be subject to the greatest change over the same period. In addition, respondents do not expect cost pressures to abate over the next 12 to 24 months: less than 10 percent of survey respondents expect decreases

in energy and transport costs, and less than 15 percent anticipate decreases in skilled labor and raw materials costs. The remaining respondents are fairly evenly split between flat or increased costs.

Learning how to deal with variable input costs can be a way to build competitive advantage. “We work across many industries, all with different economies and challenges, but the one thing all our customers have in common is that they want a reliable plant and a non-disruptive life-cycle performance,” says Mr. Crawford at ABB. “They are therefore very interested in advanced solutions for preventive and predictive maintenance, to overcome skills shortages, and reduce the need for costly in-depth human diagnosis and repairs.” Furthermore, Professor Siegfried Russwurm, CEO, Industry Sector, at Siemens, the German electronics and electrical engineering company, believes greater resource efficiency and productivity can be achieved provided one takes a holistic approach to production that takes in the “entire value chain” and deploys the right technologies in the right way (see textbox below).

Case study

Siemens vision of the factory of the future

The factory of the future will be one in which “every step of the production process is optimized using innovative software systems,” says Professor Siegfried Russwurm, CEO, Industry Sector, at Siemens, the German electronics and electrical engineering company. Many of the necessary technologies already exist, he says, but few companies have been able to integrate them all. “The key to success,” he says, “is the fusion of the digital product-lifecycle-management [PLM] world with the real world of production.”

The latest industrial software enables products, processes, and even the layouts of entire production lines to be simulated on computers before a single physical component is touched, Professor Russwurm explains. With virtual prototyping, engineers can “design multiple solutions to a problem, compare them, and analyze their performance,

with no restrictions – for example, no controller asking, ‘What do you want a second control system for?’” With the latest PLM software, they can develop and control “not only particular production processes on a single machine but entire factories.” Link these technologies together using the latest IT and automation standards, and you have a factory that can be adjusted on the fly to accommodate design variants and improvements with maximum speed and efficiency.

He adds, “It doesn’t matter if you’re talking about the automotive industry, the consumer goods industry or the machine-building industry. When product design and production planning function simultaneously, time-to-market can be shortened drastically. It’s a paradigm shift for the whole manufacturing sector.”



Good ideas from hard times

Austerity, fluctuating business cycles, and new markets can stimulate innovative solutions

The aerospace and defense (A&D) industry has long been accustomed to economic uncertainty, often due to sudden and dramatic swings in government spending or consumer demand. Yet throughout the past few decades, its main players have managed to remain largely profitable, thanks to the ability to adapt nimbly to changing conditions – a skill that could translate well across the wider global manufacturing sector.

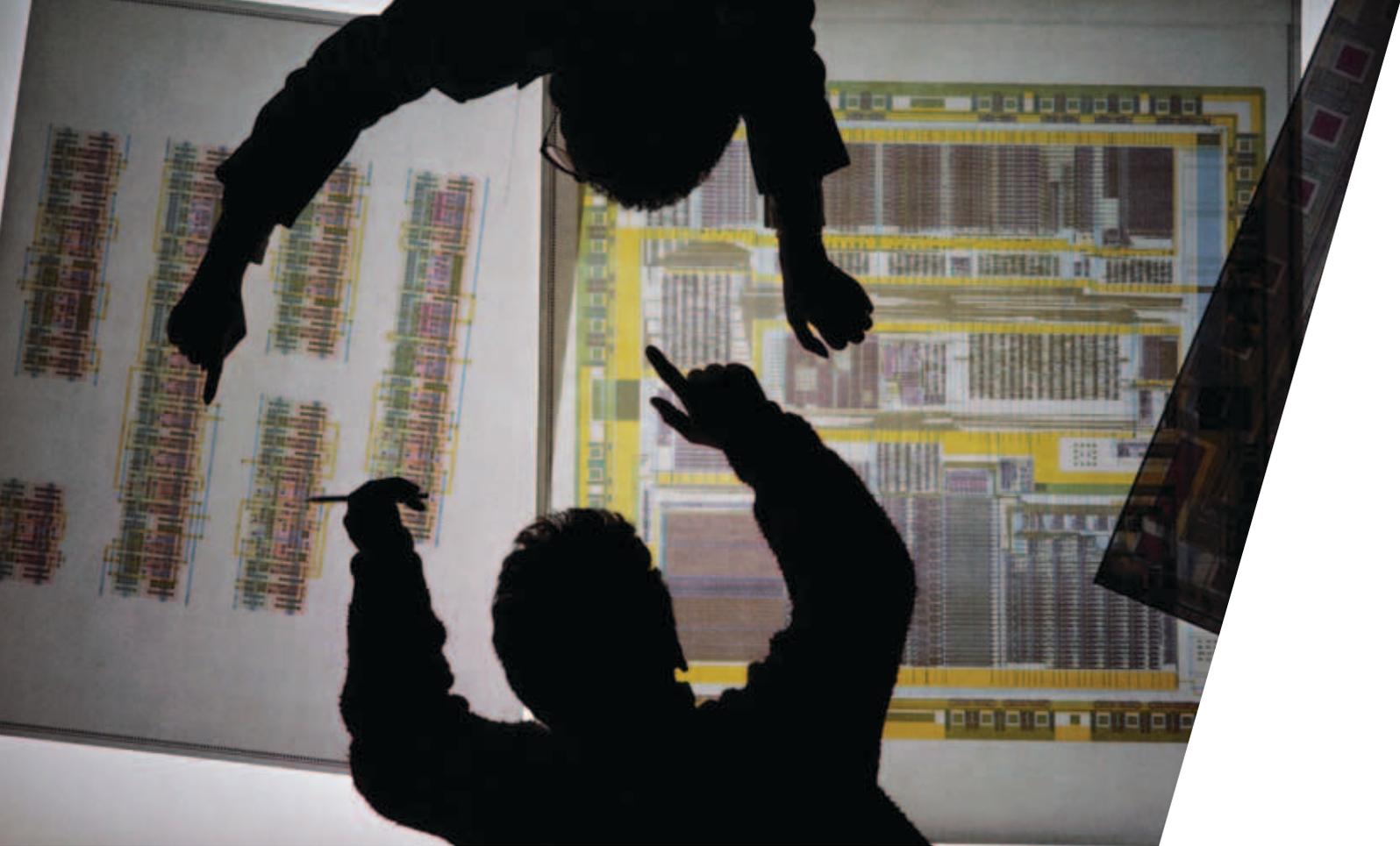
Cost Constraints Breed Innovation

One example of innovation that arose from pressure on defense budgets is the emergence of unmanned aerial vehicles (UAV's), a positive by-product from the last economic downturn; A&D companies had to find a way to produce a defense product that was cheaper and easier to maintain than traditional defense aircraft. Similarly, the expected declining demand from developed economies is forcing businesses from all sectors to look further afield to new geographies, but the differing local requirements mean existing products may not be applicable, particularly in emerging countries where budgets are tighter. This has become a stimulus to design and produce more cost-effective models, making use of new technologies related to alternative materials and energy-efficient processes.

Openness to New Business Models

Many A&D firms have transformed their business models in search of new revenue streams by offering leasing or 'pay-as-you-use', also known as 'power by the hour', agreements that give clients an alternative to expensive purchases. Another avenue for incremental revenue, after-market services, provides a way to generate additional income with lower asset and managed labor input than that required for new product development, for example. However, the industrial sector can again learn from the early experience of aero manufacturers, some of whom made costly ventures into fleet servicing by underestimating the demands of their customers. Before entering into service contracts, it is therefore vital to have a detailed understanding of the customer's expectations and potential usage and factor this into the pricing and terms and conditions.





A new wave of collaborative innovation

72 percent of respondents worldwide believe the “next wave of transformational innovation” in manufacturing is either under way or will begin in 12 to 24 months.

Since the Industrial Revolution, economic downturns have been followed by surges of innovation. Lean times call for frugality, which for corporations – especially manufacturers – means cutting costs and striving to operate more efficiently. These measures tend to lead to growth fuelled by innovation.

The current economic recovery, fragile though it is, promises to produce an even greater surge of innovation as the pace of technological change accelerates and different technologies are combined more frequently in novel ways. In manufacturing, for example, advances in materials science and electronics have combined to create nanotechnology: the manipulation of matter on the billionth-of-a-meter scale.

This year’s survey found that 72 percent of respondents worldwide believe the “next wave of transformational innovation” in manufacturing is either under way or will

begin in 12 to 24 months. And when asked about their expectations for activity levels in different types of innovation, a majority said they expect either an increase or a significant increase in 12 to 24 months.

As expected, the most popular categories were incremental innovation (ie, the expansion or enhancement of existing product lines) and process innovation – both of which are believed to be lower-cost and lower-risk activities than other types of innovation. In each of these categories, more than 70 percent of respondents said they expect to see an increase or a significant increase in activity. However, there was also a strong appetite shown for radical innovation (ie, the development of new product lines), for which the equivalent figure was 59 percent; and even for fundamental research (ie, research with no immediate practical or commercial application but that may yield opportunities in the long term), at 54 percent.

Global manufacturers focus on advanced solutions

This strong commitment to long-term innovation will be vital to global manufacturers going forward, as the cost of manufacturing technology continues to fall and barriers to entry are lowered for smaller players. Component manufacturers, for example, are increasingly seeing their business eroded by 3D printing – a relatively new but rapidly developing technique for manufacturing physical objects from digital design files. A 3D printer composes physical objects by building them up in layers, usually from rapidly setting polymers. It therefore offers a low-cost way to recreate simple products, such as components, in small batches without the need for expensive production lines. One can now buy

a 3D printer for a little more than one percent of its costs against seven years ago.

To differentiate themselves against new market entrants, global manufacturers may need to provide more advanced solutions. Of course, the more sophisticated the offering, the more closely manufacturers will need to work with their customers, to fully understand their needs and support them as they take advantage of more powerful, but more complex, systems. As we'll explore later in the report, this is not only leading to greater collaboration from an innovation perspective but to the shifting of manufacturing business models to include more value-added services.

As the cost of manufacturing technology continues to fall, the barriers to entry are lowered for smaller players.

KPMG Insight



Doug Gates
KPMG Principal,
Business
Effectiveness
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US

A tipping point in innovation – collaboration is key

After several challenging years that forced many manufacturers to hold off on investing in R&D, we're now witnessing a ramp-up in spending on innovation. I believe, many industries are reaching a tipping point in design, with huge potential for disruptive innovation in certain segments, not just derivative solutions. I believe one factor contributing to this leap in innovation is that manufacturers are re-evaluating and re-tooling their processes to better manage their innovation portfolios, helping them make quick but informed decisions on where to place their bets.

In the past, the quest for breakthrough innovation may have meant that companies threw everything they had at R&D; today, they want to make sure they're being wise in their R&D investments. They are still tightly controlling spending, performing the due diligence necessary to make decisions with long-term benefits, and looking to collaborate with the best partners. This new, inclusive approach to collaboration also offers unique cost-saving

benefits, as manufacturers can disperse risks and costs throughout the supply chain and take advantage of opportunities to leverage existing partner expertise and capabilities.

One of the primary partnership arrangements I am seeing emerge is between manufacturers and their customers. In the not-too-distant past, I believe companies relied too heavily on their own internal understanding of the customer instead of letting the customer experience drive the business and play a greater role in innovation. By working collaboratively with their customers – especially in the early stages of product development – I find manufacturers now becoming better attuned to their pressures and expectations. Through such collaboration manufacturers are better placed to identify new opportunities and anticipate customer needs, thereby creating products that have the right features, functions, and price-points – overall, a winning proposition.

Collaboration becomes crucial

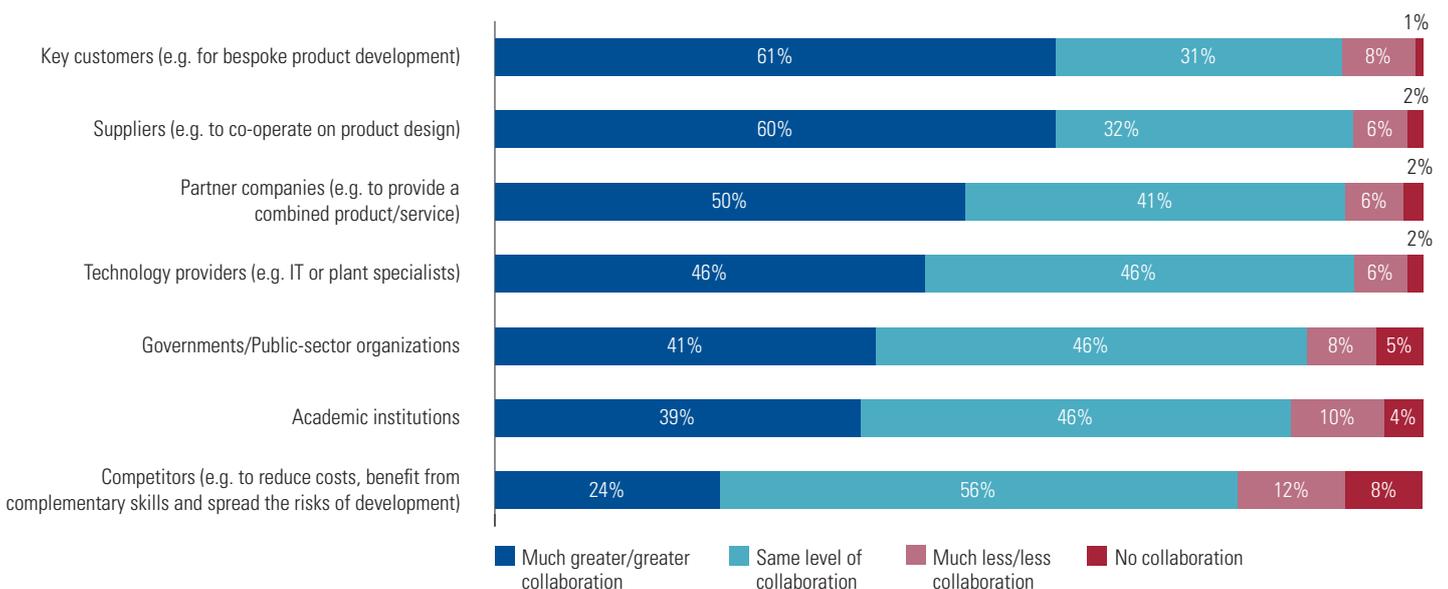
Another key finding of this year's survey was that collaboration is becoming more important to global manufacturers where innovation is concerned. A majority of respondents plan greater or much greater collaboration on a 12 to 24 months horizon with partner companies, key customers, and suppliers.

In the developed world, leading companies have long recognized that collaboration on certain types of innovation can reduce costs, spread risk and get products to market faster than would otherwise be possible. Such practices date from the 1960s but arguably entered the mainstream in 2003, with the publication of *Open Innovation: The new imperative for creating and profiting from technology*,

by Henry Chesbrough, a professor at the University of California, Berkeley. One of Professor Chesbrough's key points was that it was no longer possible or desirable for the R&D department of a single firm to attempt to monopolize the knowledge, expertise, and IP of its industry. Rather, he suggested, innovations should be allowed to flow in and out of organizations to where they can be best handled at each stage of their development.

Collaboration on R&D calls into question whether companies are looking to own IP or simply access or exploit it. When asked whether respondents agreed with the following statement: "It is more important to be able to extract value from IP than to own it," responses varied by region.

Do you intend to collaborate in innovation more or less with the following external groups over the next 12 to 24 months?



Source: Economist Intelligence Survey, 2012

Note: Graphs may not add up to 100% due to rounding.



European manufacturers: managing costs, improving profitability, and spurring on innovation

Having cut costs and tightened up budgets during the recession, European industrial businesses are keen to keep these efficiencies embedded, especially given the ongoing uncertainties of the euro zone crisis. As an upside to the last downturn, many European manufacturers are operating more efficiently now and have funds in reserve to finance strategic priorities thus reducing their dependency on banks.

In a continued effort to manage costs, companies in the region are seeking to increase their flexibility through adopting a multidimensional rather than single-track approach. Measures might include:

- optimizing their working capital to 'free up' funds;
- analyzing their supply chains in search of cost-saving opportunities; or
- reducing the number of suppliers and collaborating more closely with them.

To improve their profitability, many European manufacturers are revisiting their business models, seeking to exit certain low-margin businesses or moving into or enhancing service and maintenance offerings, either organically or by partnering with existing providers of after-market services.

Despite elements of austerity in the marketplace, European companies understand that growth must remain on the agenda to be successful, and, to that end, innovation is a particular priority. Given the speed of change in technology and customer tastes, I am seeing many

European companies shift their emphasis from pure R&D to the commercial exploitation of intellectual property.

To better enable this transition, research is increasingly being shared across a wider network of partners, including not only suppliers and key customers, but also academia, industry, and entrepreneurs. These parties are essentially willing to 'trade' IP to foster greater collaboration on product and process development in a bid to remain competitive and grow sales. I believe that we can expect globalization to lead to *more open innovation*, which is accelerating knowledge and skills transfers between diverse stakeholders. Rather than companies individually placing all the emphasis on a single product offering, they are beginning to emphasize partnerships to build total solutions.

Furthermore, they are gaining competitive advantage and achieving additional innovation in sustainability and energy efficiency. I think this is absolutely vital not only to enhance brand reputation and satisfy tougher regulatory demands on emissions going forward but also to reduce costs and ensure their longer-term viability.



Only 16 percent of North American respondents either agreed or strongly agreed with the statement, compared with 36 percent and 55 percent of respondents from Europe and Asia-Pacific, respectively.

Nevertheless, most survey respondents recognize the benefit of working more closely with key suppliers and key customers. Sixty percent of respondents predict greater or much greater collaboration with these two groups. "Collaboration in our innovation efforts is essential to ensure that we understand the challenges faced by our customers," says Mr. Crawford. ABB has just opened a new facility in Aberdeen, Scotland – the center of the UK's oil industry – that enables oil and gas customers to monitor offshore rigs, develop, and refine control systems in a simulated environment and control rig machinery remotely. In this way ABB is able to work with operators to maximize production and rig reliability. They can

also maintain a close relationship with key customers, and respond quickly to their needs no matter what the general economic circumstances. "When demand for their products or services is down, their focus is generally on reducing the unit cost of production," Mr. Crawford explains. "When the market is buoyant, their focus is generally on enhancing productivity and maximizing up-time."

At Greif, meanwhile, Mr. Fischer says that collaboration is "absolutely becoming more essential" where new-product development is concerned because of the number of sustainability regulations being introduced in its various markets. "When your customers need to make changes, you may need to change your product base and you may need extra support from your suppliers to make this happen," he says. "So in our supply chain we need complete forward-and-aft integration."

60 percent of respondents predict greater or much greater collaboration with key suppliers and key customers.

Case study

Greif: "NexDrum" cuts costs while adding value



Collaborating in the right way with the right partners can yield many benefits. At Greif, a US industrial packaging manufacturer, these benefits include not only new product development and increased efficiency but also a strengthening of key customer relationships and the potential for value-added services.

CEO David Fischer explains that Greif works with a select group of key customers to "beta test" new products. "These are typically large, global chemical companies that are forward-thinking in their packaging needs," he says. "They have a can-do mentality and, although they're still demanding partners, they don't get hung up about the inevitable setbacks we experience during the innovation process."

Respondents to the Economist Intelligence Unit survey say the following factors are most critical for selecting another organization with which to collaborate on innovation: financial stability (cited by 46 percent), the availability of skills (41 percent), and processes and technology (40 percent).

One of the products this cadre of partners has helped Greif to develop in recent months is what Mr. Fischer refers to as the "NexDrum." Traditionally, he explains, large plastic drums have been blow-molded in a certain way, from one piece of material. The NexDrum, by contrast, is built using an extrusion process for the body and injection-molding for the top and bottom, all of which are sonically welded together. "We can more precisely control the geometric dimensions of the walls," he says, "and take around 3 lbs of plastic out of a typical 18-20 lb drum while achieving the same performance of a blow-molded design."

The increased cost of manufacture of the NexDrum is offset by savings on transit costs, since the resulting containers weigh considerably less – another benefit that supports the sustainability agenda of both Greif and its collaboration partners. Greif is increasingly selling services to its customers related to sustainability compliance. Thus the NexDrum provides a tangible example of how innovation in products can support business models that are increasingly service-oriented.

Emerging markets race up the value chain

One of the strongest trends to emerge from this year's survey was the high level of innovation activity in emerging markets relative to developed markets. In all 10 of the innovation activities surveyed, respondents from emerging markets were more likely to say they expected to see an increase or significant increase in activity over a 12 to 24 months horizon, in some cases by a significant margin.

In the areas of radical innovation and fundamental research, for example, they were 10 percentage points and 14 percentage points ahead, respectively. The evidence is clear that emerging-market manufacturers are seeking to compete with their developed-market rivals for higher-margin business.

"We're definitely increasing our innovation activity," says a senior executive at Mahindra & Mahindra (M&M), one of the world's biggest

manufacturers of farm vehicles and equipment, headquartered in India. He explains that M&M has two main objectives for its innovation strategy: cutting costs and developing new products. "Emerging-market manufacturers like us have got to work hard to make sure we're staying as cost competitive as possible because there are a lot of multinationals beginning to enter our markets," he says.

The way M&M approaches innovation has become far more structured in recent years, he continues. "Until about three years ago, if we came up with a major innovation then it was often by fluke. Today, we've got cross-functional teams that work to specific targets and with much more accountability." These teams vary depending on the project but typically include representatives from R&D, manufacturing, and quality assurance.

One of the strongest trends to emerge from this year's survey was the high level of innovation activity in emerging markets.

KPMG Insight



Richard Rekhy
KPMG Head of
Advisory,
KPMG in India

India's evolving manufacturing ecosystem

In recent years, aggregate demand from the Indian market has become significant by global standards and is projected to sustain rapid growth over the next two decades or more. India now stands as an important source of growth for multinational manufacturers and leading industrials, who are no longer satisfied with addressing only a segment of the potential overall market here. In order to compete in the larger, more price sensitive segments, companies have ramped up their local sourcing, customized their designs to meet Indian requirements, and revamped their cost structures and manufacturing capacities. Building upon India's successful service base, many global manufacturers now have significant R&D facilities in India to capitalize on the abundance of local skills and capabilities, and this has naturally led to a focus on frugal designs targeted to the local market as well as other emerging markets.

As global supply chain patterns have shifted decisively towards Asia to reduce costs, India's comparative advantages in more advanced engineering are driving global players to expand their capacities in India, helping to transform the Indian supplier ecosystem from a fragmented, single-tiered model towards a multi-tiered, more collaborative supplier network. With India's manufacturing sector maturing and moving further up the global value chain, the challenges for both domestic companies and invested global players lie in scaling up to increase volume and developing more sophisticated capabilities here to effectively address local growth, and beyond. I believe those companies that are willing to make the investment now stand to gain a substantial piece of the 'high-growth market' pie in due course.



Leon Kanters
Tax Partner,
KPMG in the
Netherlands

Monitoring global developments in customs & duties

After the last few years of tight economies and lower profits, governments are looking for ways to protect their 'income' in the form of tax revenue. This can take many forms, e.g. higher tax rates for existing companies, tax incentives for new companies, and indirect tax policy changes with respect to transfer pricing, VAT, and/or customs duties. Specifically on customs and duties, I find that companies are struggling to keep up with developments in this arena, and thus I have listed a few areas that I think are worth highlighting:

1. Technology improving supply chain

oversight: Surprisingly, many multinationals have no idea what they're actually paying on a global scale on indirect taxes, even when they have an in-house tax department. Although companies can now easily scan their supply chains using technologies such as Electronic Filing & Payment systems (EFPs) to help make customs duties more visible on a global scale and to monitor payments and logistics costs, the fact remains that customs duties are often not specified on invoices and are therefore hidden within logistics.

2. Leveraging existing trade agreements:

The World Trade Organization (WTO)-SAFE program, established to improve the safety and security of global trade links, should positively impact international trade in the near future. Mutual recognition between economic blocks (e.g. the US-led Customs-Trade Partnership Against Terrorism and the EU's Authorised Economic Operator status program) will aid buyers and sellers, allowing for shortened lead times, reduced administration for customs clearance, and accelerated trade flows.

3. Closer cooperation with partners:

Companies can benefit from customs duty reductions by working closely with related companies and partners. As more

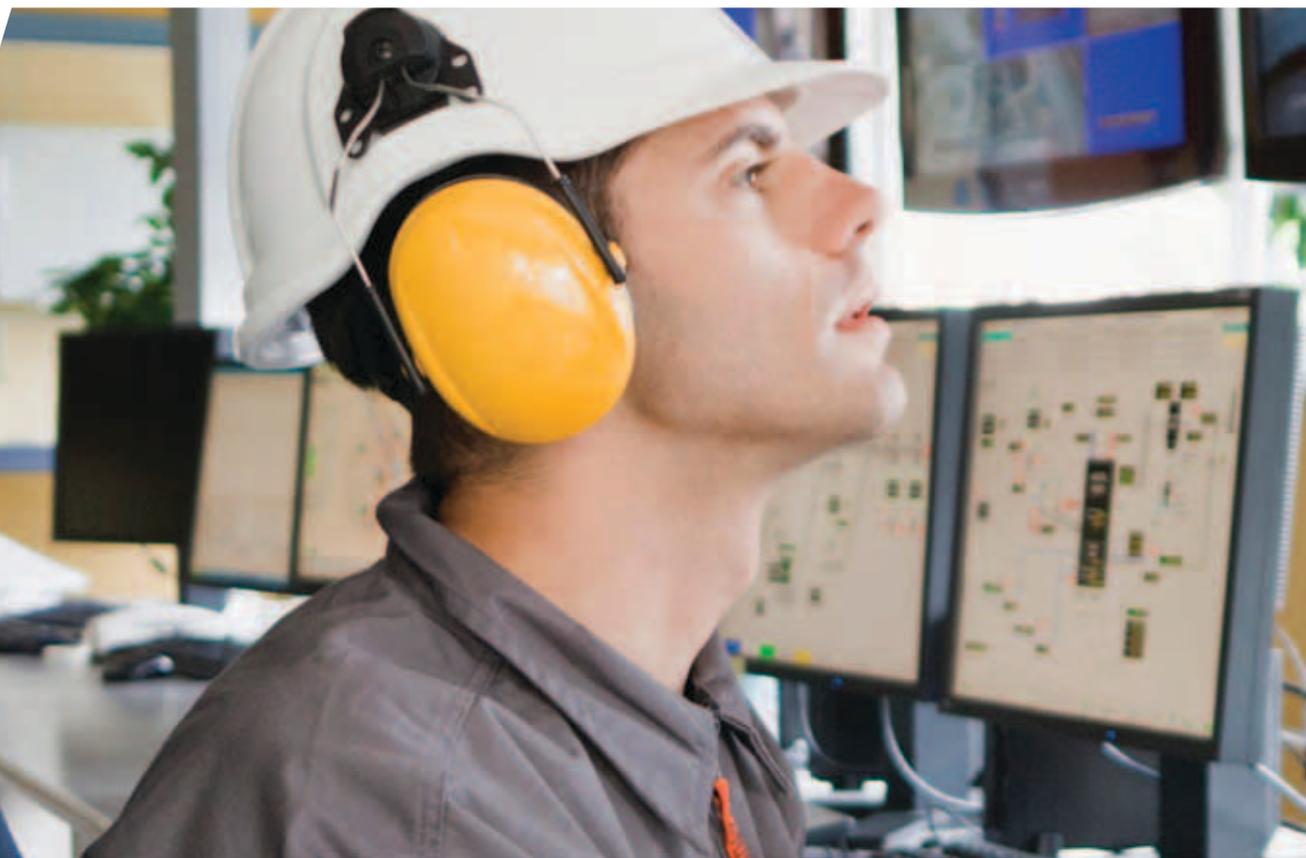
production is taking place in low-cost jurisdictions, even domestic suppliers may be sourcing materials or components from other countries. By establishing robust knowledge of the entire supply chain, companies can work with their suppliers to save on customs duties.

4. New trade agreements to add

complexity: WTO negotiations seeking to establish multilateral trade agreements remain largely unsuccessful and have not led to any significant results since 1994. As a result, various trade blocks have started independent free-trade negotiations (e.g. South Korea with the EU) that will lead to divergent rules between different countries and regions, creating an additional burden for multinational companies and intensifying the need for effective compliance functions.

5. Potential issues with nanotechnology:

The rapid adoption of nanotechnology by global manufacturers will require development from a tax and customs perspective. As questions remain as to the safety and security of this innovation, we will likely see an increase in customs legislations to manage potential health impacts and import/export controls.





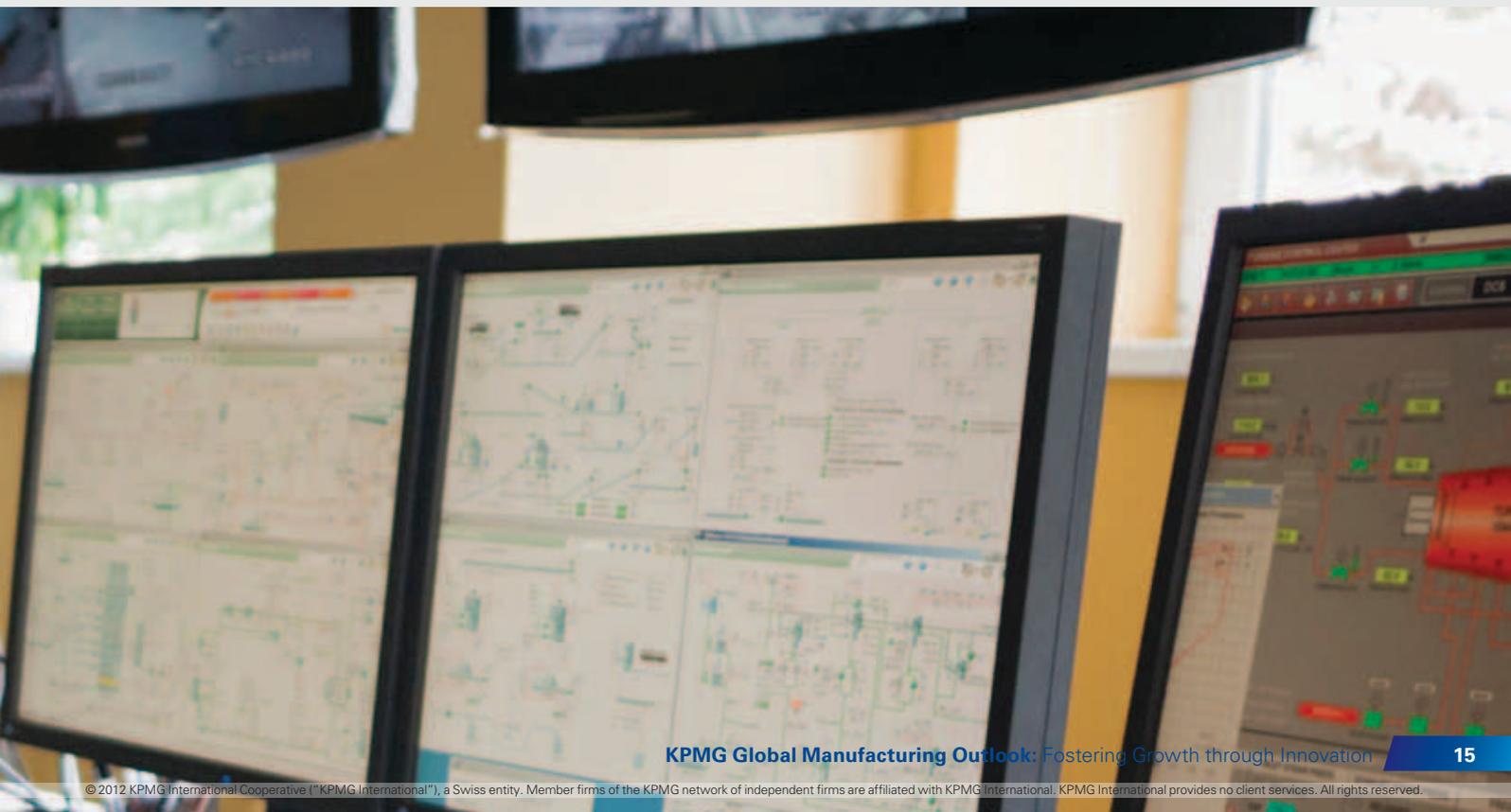
Analyzing the potential risks and rewards of near-shoring

Uniquely diverse factors impact each company's supply chain, demanding a customized approach to minimize supply chain risks.

After large-scale disasters such as the tsunami in Japan or the widespread market disruption caused by the Arab Spring exposed the fragility of global supply chains, manufacturers took pause to reassess their reliance on centralized manufacturing, logistics, or warehousing operations. In response, many manufacturers turned, and continue to turn, to near-shoring in order to reduce logistic costs, disperse supply chain risk, and move facilities closer to customers.

However, strategic relocation closer to core end-markets carries its own unique set of risks. Local economies can decline suddenly, which could lead to over-capacity if a factory or distribution unit is too dependent upon sales in a single country. Manufacturers operating in the heavier industrial sectors need to exercise thorough due diligence when weighing the relative advantages of such a move as the sheer cost of moving their physical assets elsewhere or constructing a new facility might cancel out any near-shore benefits or prevent economies of scale.

Rather than attempt to hedge against every potential crisis, I believe manufacturers should instead make a broader assessment of the various threats that could disrupt their supply chains from beginning to end, factoring in viable contingencies for disruptive incidents, such as a natural disaster, an abrupt rise in labor costs, or a sudden shortage of raw materials. While near-shoring may be a shrewd move for some, for others it may be more important to locate their production and logistics in countries with a good skills base, strong infrastructure, and a favorable political and regulatory environment. In addition, some of the desired benefits of near-shoring – such as increased agility, shorter lead times, and improved information flow – can be achieved within a business's existing organizational structure, but with a renewed focus on optimizing operational and distribution efficiency.





Business models that bring the customer closer

The business models of many global manufacturers are expected to become more service-oriented.

Global manufacturers are ramping up their innovation activity and aiming to provide more sophisticated solutions than their smaller rivals in pursuit of high-margin growth. They are therefore building closer relationships with customers, who in turn are coming to expect more as a result of advances in manufacturing technology. When survey respondents were asked which features of their business they expected customers to find most important over the next 12 to 24 months, “customized solutions” (cited by 46 percent) was second only to new products (47 percent).

The business models of many global manufacturers are, in turn, becoming more service-oriented. It is a natural

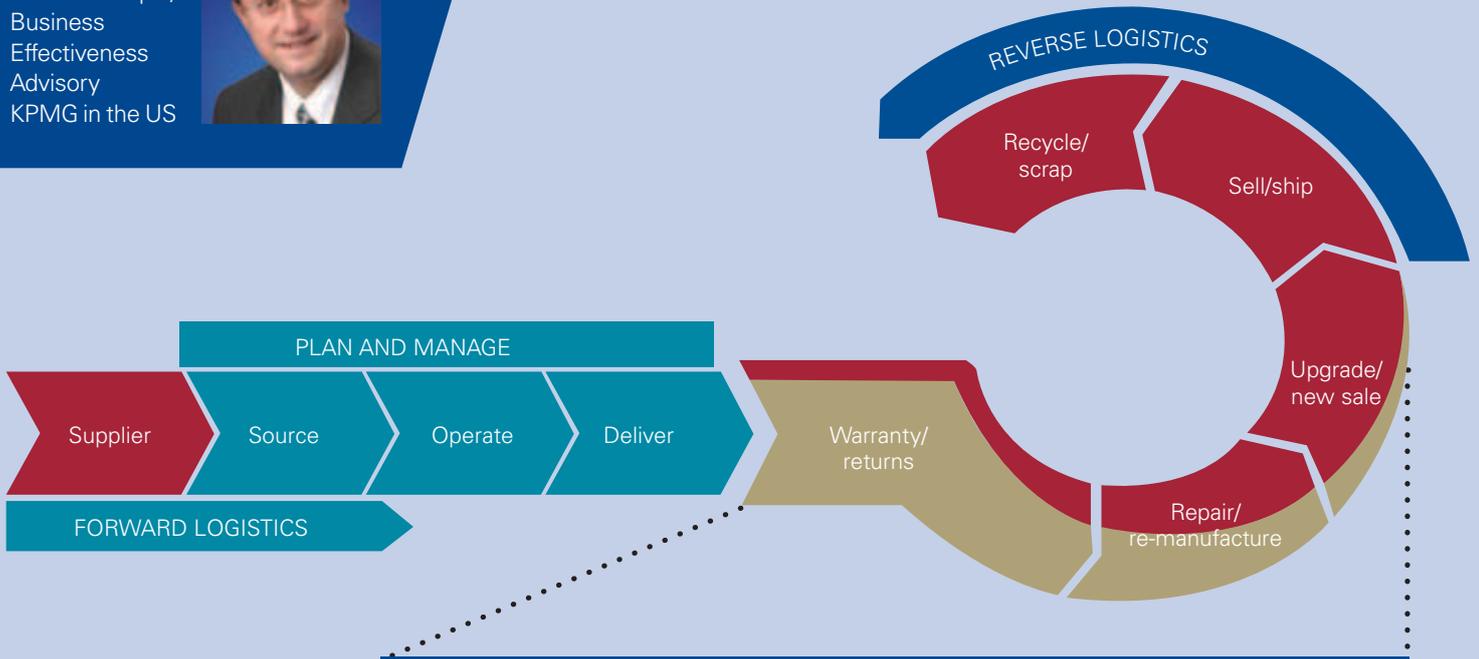
consequence of the low-growth environment, since the development of new service offerings involves lower risks and costs than the development of new products or markets. It is also a natural consequence of the technological advances in the sector, which are continually reducing the need for the direct employment of people on production lines. As *The Economist* noted in its special report on manufacturing and innovation,³ the “manufacturing output [of the US] in dollar terms is now about the same as China’s, but it achieved this with only 10 percent of the workforce deployed by China.” This huge difference in productivity is thanks in large part to technology, which China will undoubtedly seek to acquire in the future.

³ The Economist, 21 April 2012, pp50.

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 KPMG Principal,
 Business
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 KPMG in the US



KPMG supply chain model: forward and reverse logistics
Emphasizing service to optimize returns



Service supply chain opportunities – throughout the product life cycle

Opportunity 1	Opportunity 2	Opportunity 3
Sell Support Services Early	Embrace Ongoing Service	Improve Contract Renewals
<p>We are seeing more and more companies focusing on support services early in the sale process to generate revenue and enhance the life of a company's products. By initiating just a few fundamental changes, a company may be able to increase its support service and establish longer lasting relationships. Leading metrics demonstrate the revenue-generating power of selling a service contract at the beginning of a product's life cycle can increase new service rates by approximately 25 percent by avoiding the reselling of support services at a later date.</p>	<p>Creating good experiences at every point of customer interaction is integral to building long-term relationships. Retooling a company's reverse logistics to embrace customer service will help reduce overall supply chain expenditures for all parties while boosting revenue. Focusing on reverse logistics can also dramatically reduce inventory replenishment lead-times.</p>	<p>Contract renewals also offer a great opportunity for manufacturers to improve service revenue, build greater customer loyalty, and expand opportunities for future product sales and service revenue growth. By leveraging leading indicators, we estimate companies can improve their contract renewal rates by as much as 20 percent by proactively reaching out to their customers at least one full quarter before contracts are due to expire.</p>

To differentiate themselves from their competitors, global manufacturers therefore must orient their business models more toward value-added services such as development and maintenance contracts, as well as other forms of ongoing collaboration. At the same time, they must be willing to experiment with new cost structures, to ensure that the costs associated with this shift do not conflict with other lines of business.

The “manuservice” model

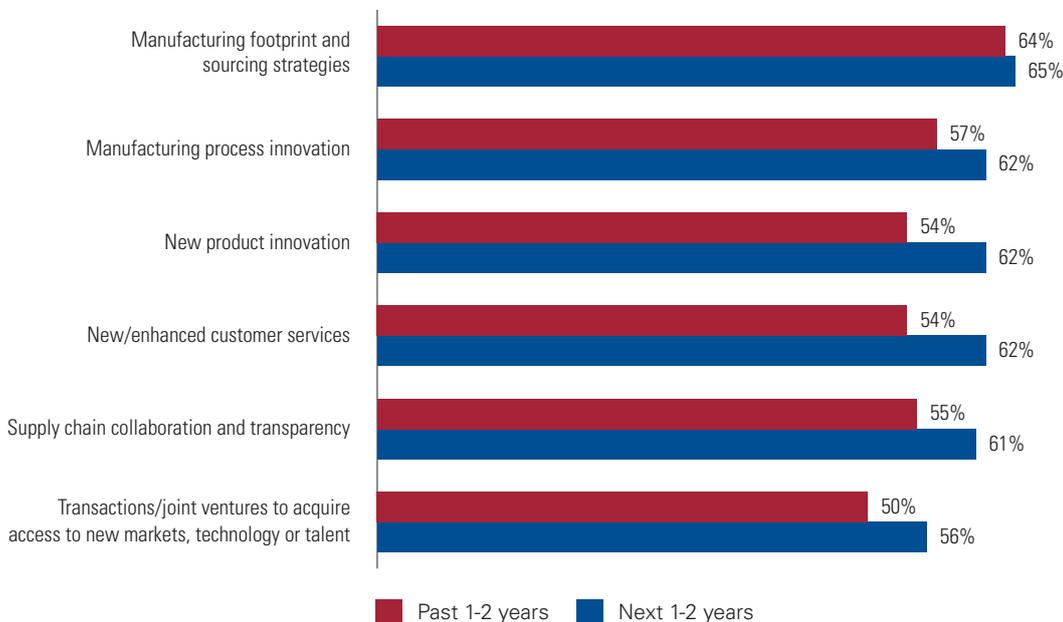
The survey finds evidence for the continued rise of the “manuservice” model in which manufacturers provide after-market services related to their products. Asked in which areas they expected to make significant changes to their business model over the next 12 to

24 months, 49 percent of respondents worldwide said “value proposition,” referring to pricing model or added-value arrangements such as maintenance services. This was the third-place choice after “cost structure” and “target sales markets,” results that were to be expected given the continued importance of cost control established elsewhere in our survey and the retrenchment of manufacturers to core markets, also expressed in other data.

Furthermore, new/enhanced customer services were predicted to make a significant or very significant contribution to profits in the next 12 to 24 months by 63 percent of respondents worldwide – a rise of nine percentage points over their impact on profits over the past 12 to 24 months (see chart).

63 percent of respondents predicted that new/enhanced customer services would make a significant or very significant contribution to profits in the next 12 to 24 months.

Which of the following elements of your operations will contribute significantly to overall profitability?



Source: Economist Intelligence Survey, 2012

Mr. Crawford at ABB says these results are in line with his experience. "Service is a key focus for us," he says. "We're investing significantly in our service organization and will be recruiting about 20,000 additional service employees globally by 2015. I wouldn't say that we are seeing a complete reinvention of our industry. But there is a definite trend toward the introduction of advanced services to optimize process performance and deliver operational excellence."

Adding value to commoditized businesses

Yet even manufacturers of much simpler products find they can offer valuable services to their customers. For example, Boliden, a Swedish mining and smelting company, is helping buyers of its copper with their product lifecycle management so that it can recover and reuse more material. To this end, it recently opened the world's largest recycling facility for electronic waste at its copper smelting plant in Rönnskär.

"Our key customers are getting more and more concerned about the origins, and the future, of the materials they are using," says Patrick Ammerlaan, Boliden's president of metals. "They want a European supplier they can trust, and they want more from their supply chain than simply reliable deliveries – everything from environmental performance to HR [human resources] practices is becoming more important. So the sustainability agenda is giving us the opportunity to form closer ties with our customers and to help them in many value-adding ways."

Mr. Crawford continues, "In many industries the consequence of a failure can be significant, particularly where the 'value in use' and complexity of the installed equipment is high. Unreliable plants also consume more energy and produce more waste. So we offer a portfolio of advanced services aimed at keeping production running, evolving systems to extend their lifecycle, and optimizing process performance."

"This is one of the highest demands our customers have going forward," agrees Mr. Fischer at Greif. "Supplying them with packaging is table stakes but the real goal is to help them with their sustainability efforts." He explains that Greif is increasingly "picking up empties wherever they are, reconditioning and repainting them, and, where this can't happen, recycling the raw materials." Greif has customers "throughout North America" who use the company not only to supply packaging but to fill it with their product, arrange shipping, and then recover the empties. It recently began to offer this end-to-end service in China, and demand is growing. Mr. Fischer says, "The more we can involve ourselves in the customer's supply chain, the more we can help them concentrate on what they do best."

"Service is a key focus for us. We're investing significantly in our service organization and will be recruiting about 20,000 additional service employees globally by 2015."

Mike Crawford
Country Service
Manager, ABB



Cost volatility is nothing new to the metals industry, but the current trend towards vertical integration could prove a valuable hedge – or an additional risk.

The metals market, true to its cyclical style, has been struggling to regain momentum after the last few recessionary years. In a bid to control costs, I have seen many metals manufacturers temporarily drastically reduce or even cease production in their less efficient plants, some of which may be shut down permanently if market conditions fail to improve. I am also seeing companies seeking to further reduce waste by trimming down layers of management, moving to shared service centers, developing outsourcing models, and looking to process innovation for greater efficiency.

Perhaps the most notable phenomenon to come out of this downturn is the challenge now posed to the growing number of companies that were looking to secure supply of raw materials through vertical integration. During the good years experienced by the sector up to 2008, companies were increasingly frustrated by the concentration of raw material supplies in the hands of a small group of powerful mining companies. This triggered significant M&A activity from metals companies acquiring such assets to increase

self-sufficiency. As a matter of fact, today some of the major metals players are also ranked among the world's top mining companies. This strategic move into mining does however have a potential flipside, as it gives metals producers a larger stake in what remains a highly cyclical industry, leaving them even more exposed should demand fall further.

To manage the market volatility, commodity hedging instruments such as derivatives are gaining ground, but tend to be limited, due to the limited depth of such markets and the lack of commonality in the sector, with a range of different grades of steel and variations in prices in different markets. While there is no magic answer for this industry, I believe the companies that are proactive about addressing their cost structures, structurally adjust capacity in mature markets whilst carefully managing their capital expenditures by investing in key assets located in growing economies, will be better positioned for long-term staying power.

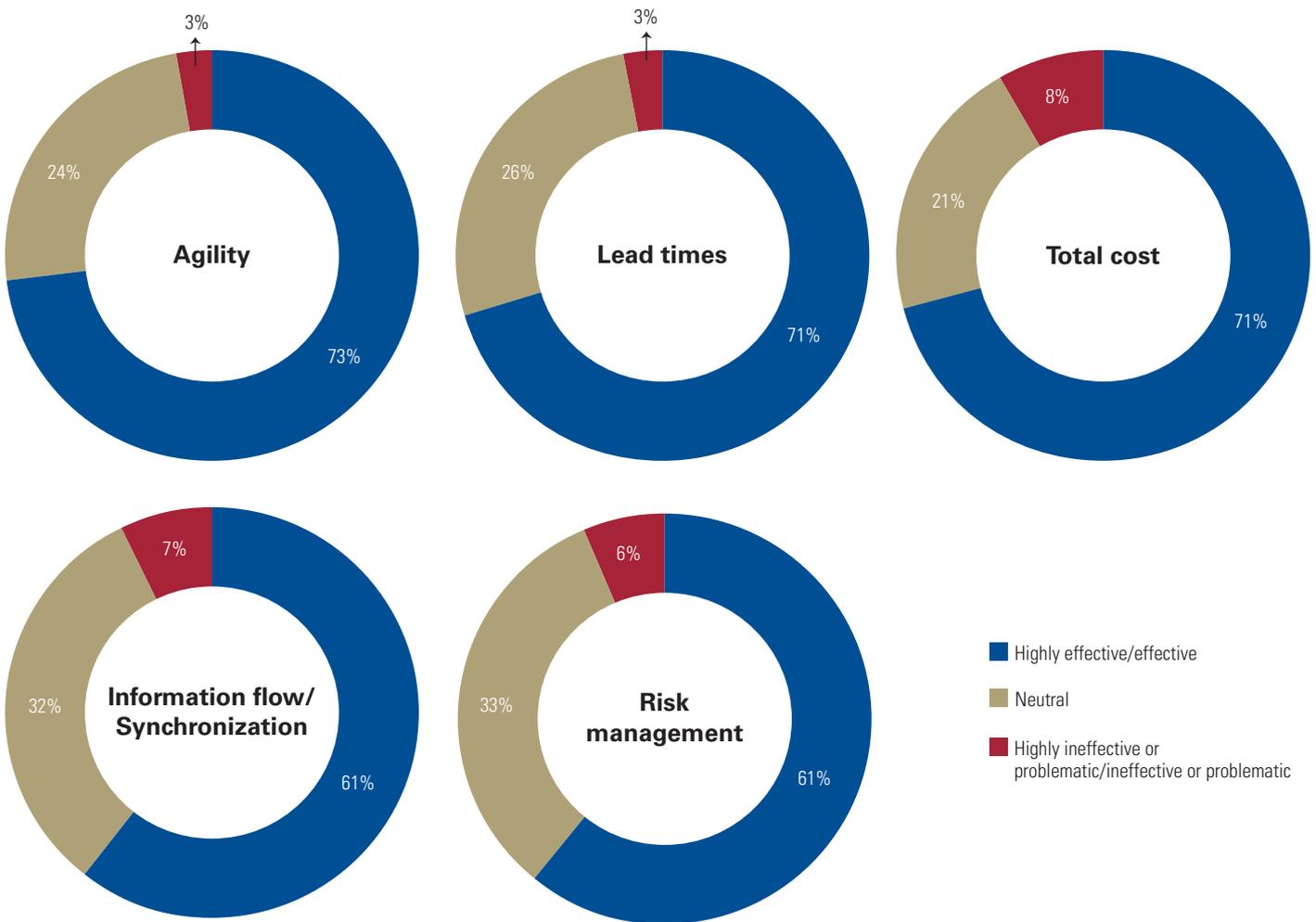


Moving closer to future customers

To deliver more tailored solutions and services – while maximizing responsiveness and minimizing cost – global manufacturers are also positioning their facilities close to end-markets. A majority of respondents worldwide believe

nearshoring is either “effective” or “highly effective” at improving agility, lead times, risk management, information flow/synchronization, and total cost.

With respect to your supply chain, how would you rate the impact of nearshoring for the following characteristics?



Source: Economist Intelligence Survey, 2012

They are also becoming more sophisticated about where they locate their offshore facilities. Many, for example, now use a “China + 1” strategy – adding an additional production base in a lower-cost country in Asia. In this way, they can maintain their responsiveness to the burgeoning Chinese market without being so beholden to its wage inflation, which in recent years has been running at around 20 percent annually.

Asked which direction they believe the nearshoring trend will take over the next 12 to 24 months, 46 percent of survey respondents worldwide say they think it will increase while

50 percent say it will stay the same; only 4 percent predict a decrease. However, perspectives differ both by region and level of market development. On the latter difference, 53 percent of those from emerging markets believe the trend will increase against 41 percent of those from developed markets – more evidence to support the notion that emerging-market manufacturers seek to catch up with their developed-market rivals in terms of supply chain sophistication.

Case study

India bucks the “boomerang effect”

High wage inflation in China, combined with recent supply chain shocks and high unemployment in developed countries, is persuading some developed-world manufacturers to move production closer to home – the so-called boomerang effect. This trend should gain momentum as wage costs become a smaller part of the overall cost of making and selling products.

Survey respondents expect the majority of their growth in the near term to come primarily from local markets (after the US, which was ranked the most likely source of growth). And they believe they will increase sourcing largely from local markets. Fifty-one percent of Asian firms plan to increase sourcing from China and 36 percent from India. For North American firms, by contrast, the top destinations are the US (33 percent) and Canada (27 percent).

One emerging market, however, has become massively more popular as a sourcing destination since last year among manufacturers worldwide. A large majority of respondents now say they intend to use India for a variety of activities (see chart).

Of particular note is the rise in willingness of manufacturers to use India for high-value and commercially sensitive activities such as R&D and the production of goods involving significant IP. These data reflect not only recent progress in India as

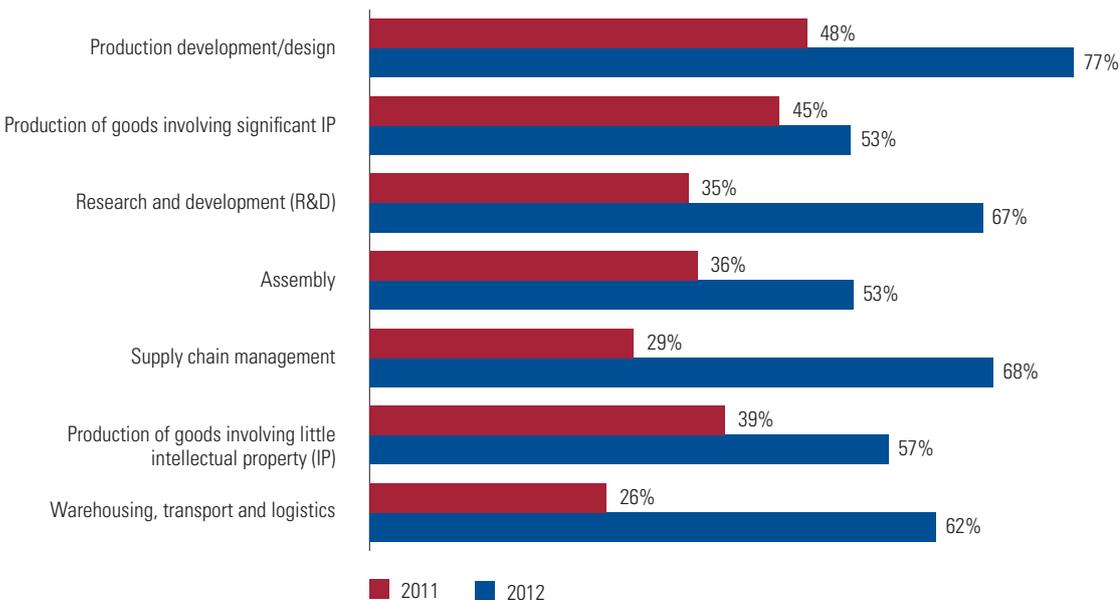
far as IP law is concerned but also that manufacturers from elsewhere regard it as a fast-growing market that requires localized products and services, and the production capacity to support its growing consumption.

As this report goes to press, the IMF has downgraded its forecast for India’s economic growth due to disappointing GDP figures (India’s growth rate slowed from 8.3 percent in Q4 2011 to 6.1 percent Q1 2012). Nonetheless, the aggregate spending power of India’s middle class is expected to surpass that of North America by 2023.

The country still has major problems to overcome, including a high rate of poverty, a dilapidated transport infrastructure, and evolving tax and trade policies. “Logistics is a challenge for us because we use a lot of smaller suppliers in various locations around India, and one stroke of government policy can change our supply chain scenario completely,” says a senior executive at Mahindra & Mahindra (M&M). “We have to work with some inventory, so this is one of the key areas in which we’re seeking to reduce cost.”

He’s not the only one: 58 percent of respondents from emerging markets seek to improve their logistics capabilities over the next 12 to 24 months – the most commonly cited strategy for improving supply chain efficiency after the improvement of manufacturing technologies and processes.

Which activities do you intend to use resources in India for?



Source: Economist Intelligence Survey, 2011, 2012

KPMG Insight



Joerg Strater
KPMG Global
Head of Tax
for Diversified
Industrials

Near-shoring financial benefits – think tax early

As global manufacturers move closer towards their customers, they are reassessing their sourcing strategies. One of the critical components to this reassessment – which is often overshadowed by other operational agility elements – should be the financial considerations, e.g. the contractual, currency, and tax advantages that moving to a regional sourcing model may offer.

When sourcing regionally, manufacturers are often focused on improving their supplier relationships and overall cost models through the negotiation of terms and conditions and establishing natural foreign exchange hedges. But additional savings may be achieved through tax planning – i.e. taking into consideration the

location of your regional sourcing partners and estimating potential tax impacts. If they are located in low-tax countries, such as Switzerland or Luxembourg, both preferred sourcing locations within Europe, or Singapore and Hong Kong in Eastern Asia, or Costa Rica or Panama in the Americas, they may see additional benefit to their strategies via those jurisdictions' competitive tax policies. One of the biggest mistakes I see companies making is taking tax considerations into account too late in the strategic sourcing process and missing additional cost-savings opportunities, or worse yet – having their unplanned tax liabilities offset significant portions of the cost benefits they had planned to achieve with these near-shoring models.

KPMG Insight



Aaron Lo
Partner,
Management
Consulting,
KPMG in
China

China: a country and manufacturing sector in transition

As China's economy moves towards greater globalization, it is more susceptible to worldwide economic issues. The projected 2012 GDP growth of 7.5 percent is the slowest that we have seen in the past decade, however, still substantive for the world's second largest economy. China is going through an unprecedented transformation and is focusing on moving up the value chain in terms of productivity and labor input. In fact, evidence of focus on qualitative growth versus quantitative growth can be found in China's 12th Five Year Plan, which has placed more emphasis on value added manufacturing.

Growth in China is not without some challenges. Labor costs have increased by 15-20 percent per annum on average over the past four years. This together with an appreciating Chinese currency has meant that China is no

longer a viable lowest-cost manufacturing base, resulting in both:

- (i) a shift of labor-intensive manufacturing further inland and even overseas to lower cost countries, e.g. in Southeast Asia; and
- (ii) a transition to greater levels of automation and innovation in order to drive margin growth.

Accordingly, I expect to see significant investment in high-value manufacturing for traditional industries and for government-backed investments in advanced technology industries in the near-term. When you also factor in the growing pool of educated talent, the continuing focus on R&D, and the drive towards lean and performance measurement, I see a core foundation being laid for the transformation to a more sophisticated manufacturing industry in China.

What factors will be critical to industrial manufacturers in achieving success and overcoming challenges over the coming year?

Innovation and the speed at which innovative ideas are put into action are the keys to success. Manufacturers are focusing their efforts on their core competencies, both externally and internally, forming outside alliances or joint ventures with others who complement them and driving greater efficiencies from within by analyzing and transforming their supply chain and internal processes. **This focus will provide the needed agility** companies must have in order to compete in the new economy.

Ken Seel

KPMG Global Head
of Conglomerates

To succeed in Brazil, companies first need to understand that Brazil is no longer a low-cost manufacturer. Companies here have evolved significantly over the last decade and are now struggling with the same issues that companies in mature markets are facing, including increased demand for R&D, rising labor costs, and understanding the role of government in promoting the manufacturing sector.

To be successful, I think **companies need to invest in Brazil for Brazil.** There are plenty of opportunities for more integrated, global investment, but I advise companies to keep abreast of complex tax policies and to hedge for currency volatility when developing their investment strategies in order to convert these potential challenges into competitive advantages.

Charles Kriek

Partner in Charge, Audit, KPMG in Brazil

While carefully managing your cash as an organization is still essential given the current economic environment, we may have reached a stage where some large manufacturers have become overly cautious and risk-averse, reluctant to spend in order to generate better shareholder returns. Many manufacturers now sit on significant amounts of cash but are almost too risk adverse to deploy it by investing in innovation and product development, strategic acquisitions or new markets. **Manufacturers simply can't afford to sit still: they need to focus on risk management rather than risk avoidance** or they will be left behind by bolder competitors who aren't afraid to invest in the future growth of their business.

Graham Smith
KPMG Global Head of
Engineering & Industrial
Products

The manufacturers that I would consider leading-edge, or operating at "best practice levels," are integrating tax into their global procurement and supply chain organizations. **I see a trend beginning whereby companies are including tax measurements into the internal Key Performance Indicators (KPIs) of the supply chain.**

Loek Helderma
KPMG Head of Global Tax Efficient
Supply Chain Management,
KPMG in the Netherlands

In order to succeed in high-growth markets, I believe **global conglomerates need to be on the ground, developing and producing in these destinations.** Customers in rapidly rising economies not only demand and expect that global players provide investment and employment opportunities locally, but that they work with them to develop products specifically targeted towards their own needs and desired price-points.

Harald Heynitz
Partner, KPMG in Germany

Conclusion

This year's *Global Manufacturing Outlook: Fostering Growth through Innovation* report finds evidence that the global economic recovery is gaining momentum, but that global manufacturers do not expect to simply "ride the tide" back to previous rates of growth. If they are to compete for higher-margin business, these companies must experiment with new ways of working, enlisting key partners to help them add value through service-based offerings.

In short, we find that global manufacturers may need to alter their business models – and their strategic approaches to supply chain management, cost optimization and product offerings – in the following ways:

- **Move to occupy areas of innovation that can distinguish them from new entrants.** Global manufacturers must therefore focus their innovation efforts on increasing levels of sophistication and integration in their offerings, and on providing associated services.
- **Develop even closer relationships with customers and suppliers.** If manufacturers are to offer increasingly sophisticated, integrated and high-margin solutions, they need to collaborate more closely with key partners both up and down the supply chain. As far as customers are concerned, it will be vital to work with them not only to better understand their challenges and co-develop solutions but also to ensure that manufacturers have the nearshore facilities and capacity to serve them adequately when growth rebounds.
- **Find ways to build value-added services around their products, even in commoditized lines of business.** The advance of manufacturing technology is accelerating thanks to convergent systems and concepts. As a consequence, it will become increasingly difficult to maintain high levels of growth based solely on the supply of low-margin products. However, as our interviewees demonstrate, even manufacturers of commoditized products can find ways to sell ongoing services to their key customers by taking a holistic view of those customers' needs.



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