

Rebooting the electronics industry

New innovations are vital to address unprecedented economic challenges

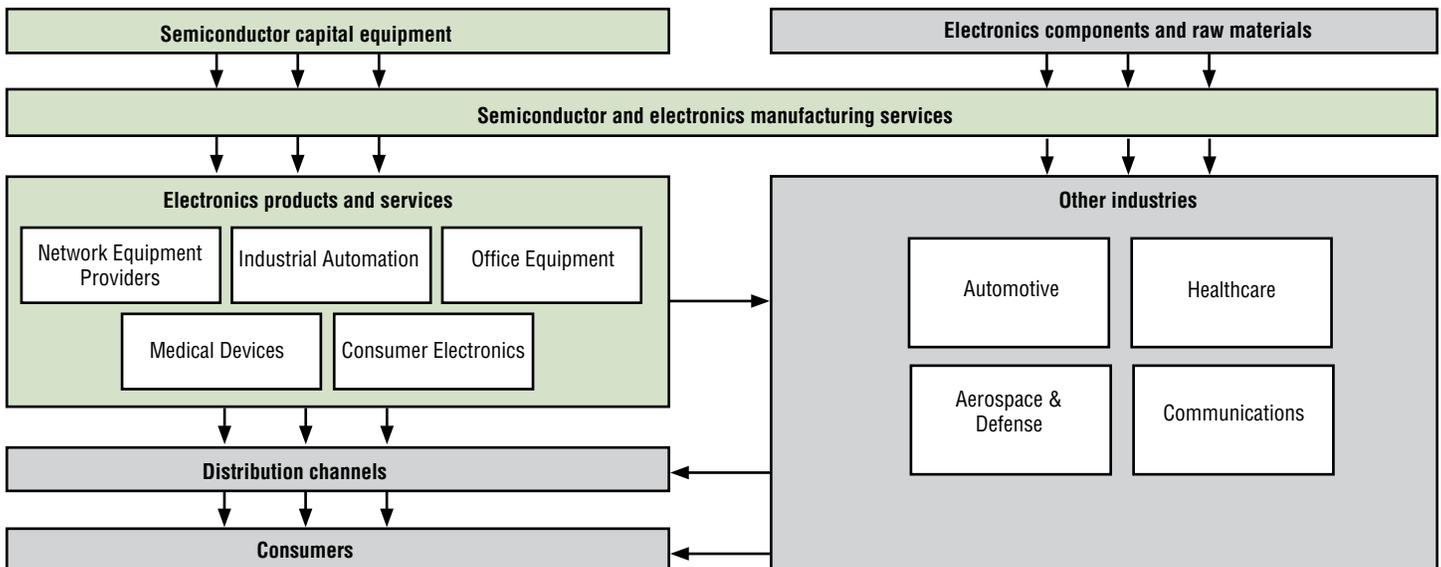
The reeling financial markets are challenging global business leaders to aggressively rethink their strategies. Across the electronics industry, effects are likely to be quite different, reflecting the enormous diversity of the industry itself. From consumer electronics to medical devices, industry sub-segments will have to respond – each in its own way – to lower consumer spending and stricter access to capital.

At the same time, the Internet has permanently changed not just our everyday lives, but also society at large and how enterprises operate around the world. The desire for

intelligent, interactive electronic devices – from the largest flat-panel television to the smallest radio-frequency identification tag – is here to stay. To operate efficiently in the new economic environment, electronics companies will need to respond decisively to the sharp downturn by staying true to the industry’s renowned reputation for valuing innovation.

The sub-segments of the electronics industry each play a role in the business ecosystem. While semiconductors give intelligence to devices, some electronics products serve as stand-alone finished goods and others provide input components for other industries (see Figure 1).

Figure 1. The role of electronics in the business ecosystem.



Source: IBM Institute for Business Value analysis.

Opting for innovation: Industry outlooks by sub-segment

To help global business leaders gain a broad view of the diverse electronics industry, and to help them plot their future innovation courses, IBM has prepared quick outlooks for selected industry sub-segments: semiconductor, Network Equipment Providers, Industrial Automation, office equipment, medical devices and Consumer Electronics.

Semiconductor: To fab or not to fab?

Impact: The semiconductor sub-segment is hugely fragmented, with hundreds of players of various sizes that are focused on a wide range of product types and market niches. The segment is already in a cyclical down-cycle, awash in excess capacity and government incentives for building even more. From DRAMs to processors, pricing is in a free-fall.¹ With many of the costs in semiconductor manufacturing fixed, marginal cost for additional chips is low. Because of this, we may see substantial price fluctuations before the economic downturn reverses.

For the time being, foundries are expected to make minimal investments, and we may see technology node delays since customers will likely avoid being part of the risk during an economic downturn. In addition, we may see manufacturing consolidate as companies transition to fabless design houses instead.

Outlook: In spite of the short-term troubles, the long-term outlook for the semiconductor industry is very strong. Demand for chips and advanced technology, and the spread of electronics into nearly every product seems unstoppable. And with each succeeding generation of technology, the number of players who can afford the exponentially increasing table stakes in this business has been dropping to about half that in the prior generation.²

Recent big private equity investments in the space appear to be a vote of confidence in this scenario. Semiconductor consolidation is likely to attract private equity investors, with their long-term outlooks. For a few players already heavily invested in the space, the choice will be to exit now at big losses or hang on and wait for signs of an upswing. We believe that with over US\$450 billion in raised – but uninvested – capital, private equity firms will choose the latter.³

Potential innovations: With the growing demand for clean energy, photovoltaic cells represent a tremendous opportunity for semiconductor companies to use their manufacturing capacity and know-how in a related product category. Also, new intelligent consumer and commercial devices will require custom chipsets that require substantial design capability. These areas may well entice those companies that choose to defer capital investment, but are willing to explore new revenue opportunities.

Network Equipment Providers: Consolidation continues

Impact: The Network Equipment Provider (NEP) sub-segment derives its sales from the build-out or upgrade of telecommunication infrastructures. Its customer base of telcos will likely defer investment in infrastructure programs in a tight credit market. Even as demand for bandwidth appears to be insatiable, a sharp drop in capital spending is expected to force NEPs to sharpen their value propositions for the latest voice and data technologies.

The new economic environment may test which NEP can control costs and survive in the long run. Telcos will be looking for cost savings through supply chain efficiency, and the savings can be significant. In Australia, Telstra recently completed a major supply chain overhaul that slashed inventories by 50 percent and eliminated over 2,000 suppliers.⁴ Repeat that process worldwide and a significant decrease in the number of remaining NEPs is possible.

Also, since telcos have consolidated substantially in recent years, they are now poised to make coordinated buying decisions as merged enterprises. They come from a strong negotiating position and are ready to benefit from economies of scale, seeking equipment providers that can match their sizes. As a result, NEPs are facing more pricing pressures and are entering their own periods of consolidation.⁵

Outlook: In spite of cost pressures and likely consolidation, there are a few bright spots where NEPs can seek revenue opportunities in both the consumer and enterprise markets. Competition among cable, DSL and other broadband providers is set to intensify in the next couple of years as consumer demand for bandwidth – both fixed and mobile

– seems insatiable. Bandwidth caps and speed restrictions may fall by the wayside as telcos chase consumer revenue and try to offset rapidly declining landline revenue.⁶

Enterprises, though generally cutting costs, may also spend on selected investments. Those that enable telecommuting, remote working, and post-merger integration money-savers are likely to get the most attention. Many enterprises are looking at saving money by mobilizing employees and then giving them a single broadband path for voice, instant messaging, and enterprise data. The savings on office space and operating costs are big, but it requires an investment to be enabled. NEPs may be able to capitalize on these opportunities by fulfilling these enterprise needs.

Potential innovations: A “green” supply chain has the potential of providing NEPs with significant cost savings. Many of the major NEPs are based in Europe, where the government and its people have been more advanced in addressing environmental issues. NEPs can save money by reducing heating and cooling costs during the manufacturing process. They can also provide stronger business cases to their telco customers if their equipment consumes less energy.

Industrial Automation: Demand for factory equipment drops

Impact: The Industrial Automation (IA) sub-segment is largely driven by capital expenditures that come from factory and office growth and renovation, all of which could be quickly and significantly impacted by the credit crunch. With capital investments cut back, companies that specialize in maintenance – rather than new infrastructure – could stand to benefit most from the new economic environment.

As orders for new plants decline, IA companies are shifting their investments from new products to equipment refurbishment opportunities. Products that improve the return on investment for refurbishment with lower energy costs should be particularly popular.

Outlook: Growth is likely to be strongest for those companies who offer Contractual Service Agreements (CSAs). Operational services now have the opportunity to

develop additional services that will improve their clients’ total cost of ownership. By analyzing their maintenance trends and data, IA companies will be able to create new offerings that off-load risk from their clients and lock out after-market service and parts competitors as well, thereby improving margins.

Potential innovations: IA companies can explore water and energy management improvements for existing manufacturing processes used at factories. Not only could such solutions reduce operating costs, but also help factories follow the growing trends among industrial companies to implement environmentally responsible programs. In turn, IA companies can establish their reputations as global companies that are committed to sustainability.

Office Equipment: Upgrades deferred pending better times

Impact: Unlike some other parts of the electronics industry, the office equipment sub-segment is already highly consolidated, both in computing as well as printing, scanning and copying. As a result, most players in this sub-segment are well positioned to weather a period of reduced demand. While equipment upgrades are unlikely, office equipment companies will continue to service their installed bases at customer sites.

Outlook: Other changes may have a more profound effect on the office equipment sub-segment. Foremost is the shifting definition of “the office.” More and more companies are slashing office space and asking workers to telecommute, not only to reduce the cost of maintaining office space, but to improve job satisfaction. That trend, combined with the rise of cloud computing and the increasing ubiquity of broadband connections, may have a much bigger negative impact on the sub-segment than a short-term reduction in demand.

For parts of the office equipment sub-segment facing declining demand, intense market share competition is likely in the next few years. To offset some of the price competition and pump up demand, office equipment companies are buying distributors and service partners. Signing long-term

deals now may allow these companies to refresh clients' equipment bases and pump up demand at the start of these contracts. However, with little experience in pricing and managing complex multi-year service deals, some companies may be embracing far more risk than they understand.

For those office equipment customers that are able to spend money in the new economic environment, much of it may go into transforming the office from a primary workspace to a meeting and collaboration location. Video projectors, teleconferencing and video-conferencing systems, and "hot desking solutions" – such as call routing and unassigned workspaces – are all key features of the emerging office environment. Color printing is likely to increase in importance, too. As fewer documents are printed, a greater proportion is likely to be for customer presentations and thus designed to impress.

Potential innovations: The virtual office of tomorrow will need equipment that can recognize users and their preferences. Whether to monitor and adjust chair heights or temperature settings, the next generation of office equipment may require these and other assorted kinds of built-in "new intelligence" that can provide greater insights about helping individuals work more productively.

Medical Devices: Government payers hold steady... for now

Impact: Healthcare remains an industry apart, and consequently, so does the medical devices sub-segment. As countries grow wealthier, demand for healthcare rises much faster than income. In the developed nations, despite lower population growth rates, aging populations continue to pump up spending. Medical devices, though costly, often result in much higher quality of life and fewer hospital visits, and so have typically seemed immune to market ups and downs.

Demand for healthcare and medical devices, is unlikely to face big changes as a result of the credit crunch in the very short term. Governments are the world's biggest health payers and their access to credit is not in doubt. This advantage helps to buffer medical device companies somewhat from the economic downturn.

Outlook: While the economic downturn may not have a drastic effect on medical device companies, another force

is underway. Within two to three years, big changes could affect the sub-segment, primarily driven by healthcare changes in the U.S. market, the world's largest and the origin of most medical device advances and regulatory frameworks adapted in other industrialized countries. Consequently, medical device makers around the world watch developments in the U.S. system with great interest.

The U.S. healthcare system is near a breaking point in terms of raising costs, while maintaining quality and access. Government leaders have proposed various approaches to overhauling the system. High-cost interventions, including many with advanced medical devices, could be the first to suffer during belt tightening. With margins often at 70 percent and higher, and a dearth of studies to show the added value of the most expensive devices, the industry is vulnerable to buyer pricing pressure.

In spite of such possible changes, public leaders and their constituents are typically slow to agree upon healthcare initiatives to be implemented. We believe the medical device industry will weather the economic downturn quite well overall and do not expect any dramatic change in rates of industry consolidation in the near term.

Potential innovations: Remote monitoring and disease management systems are an excellent example of how new intelligence can be integrated into electronics devices. Historically, the performance and quality of implanted devices have been monitored on a quarterly or annual basis. Major device manufacturers are looking to expand the range of remote monitoring options for patients and to demonstrate that such options can offer clinical benefits. Assuming they can show, for example, a reduced level of relapses and shorter hospital stays for a range of health conditions from diabetics to heart attacks, demand for these devices could take off.

Consumer Electronics: Price competition intensifies

Impact: Even in good times, the Consumer Electronics (CE) space is characterized by deep price competition, compressed product lifecycles, and continuous pressure to reduce costs. Diminished consumer credit will arguably lead to a decrease in discretionary spending. Consumers may now perceive the latest CE products – which many would typically purchase at the earliest possible retail avail-

ability – to be luxury items they can no longer afford. Price competition is likely to intensify. Retailers, hoping to attract customers with aggressive sales and promotions, will turn that pricing pressure on their original equipment manufacturer (OEM) suppliers.

Most at risk are Japan’s electronics companies, whose returns on invested capital have been chronically low and whose market shares have been declining for more than a decade.⁷ The strong yen, currently at a 13-year high against the U.S. dollar, translates into lower profits for those Japanese companies that rely on the large U.S. consumer market.⁸

Outlook: The top priority for many CE companies will be to cut costs. CE companies will likely look first at back-office and shared service functions since these activities do not affect relationships with retail partners or product availability. CE companies are expected to consolidate back-end processes in optimal locations and, where possible, leverage global resources in low-cost countries.

Supply chain management is likely to gain greater attention. Players throughout the extended supply chain will be focused on working down existing inventories to alleviate the need for working capital. Retailers will likely delay or trim orders, OEM companies will aim to reduce output levels, and the effect will ripple out to contract manufacturers in Asia.

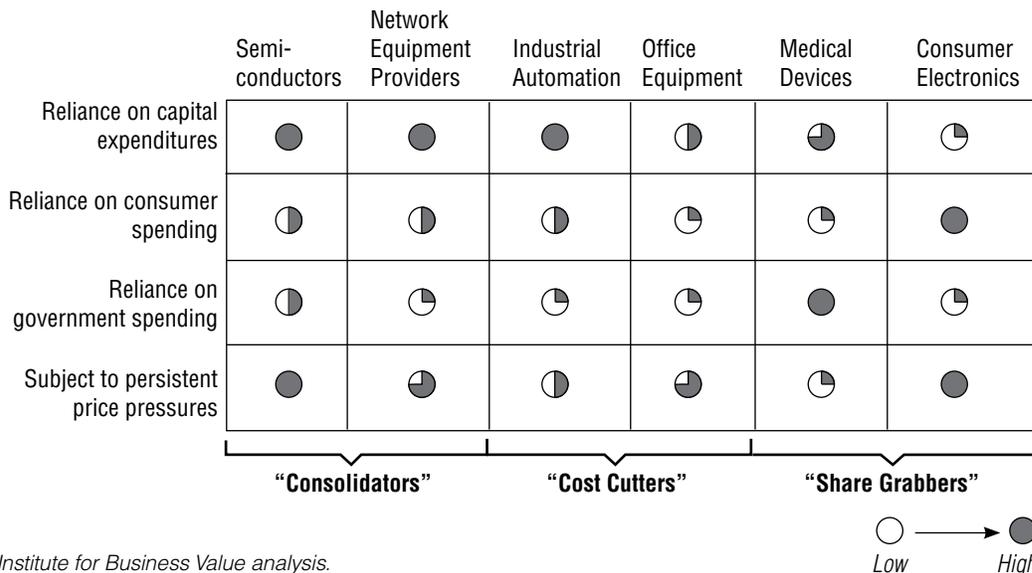
Potential innovations: Products that appeal to the cost-conscious consumer are likely to dominate, often pushing

aside other types of new product introductions. But CE companies can differentiate their products by building in new intelligence, embedded software to provide users with a different value proposition. Improved software development methodologies and tools can allow CE companies to re-use embedded software and simplify customization efforts. Already, we are seeing global positioning systems (GPS) that recalculate driving time based on user-generated information, and gardening gadgets that recommend plant selection based on their ability to collect and interpret soil and weather conditions. These products not only compete on price, but offer unique features to the consumer.

As the economic downturn has unfolded, IBM took a look at each of these six major industry segments. Looking ahead, we believe three types of behaviors will prevail in electronics (see Figure 2):

- *Consolidators.* In the semiconductor and NEP segments, we expect significant industry consolidation.
- *Cost Cutters.* In the IA and office equipment sectors, some consolidation will occur, but the focus will be cost reduction and operational excellence.
- *Share Grabbers.* In medical devices and CE, increased competition for market share is likely, but for different reasons. In medical devices, the competition may be set off by new regulations and payer strategies. In CE, it is expected from intense price pressure and disruptions in the retail environment.

Figure 2. Industry dynamics in electronic sub-segments.



Source: IBM Institute for Business Value analysis.

Investing for a smart future

Regardless of the industry dynamics requiring a particular sub-segment to focus either on consolidating, cutting costs, or grabbing market share, one thing is clear: the electronics industry is experiencing constant change and it demands continuous investment. Enterprises that cannot keep investing in their operations may be fated to fall furthest behind during an economic downturn. What's more, they may miss great opportunities to create the innovations that can help prepare them for better economic times.

For those electronics companies that do continue to invest, we foresee three focus areas:

1. *New intelligence – Seek ways to help users take advantage of new sources of information to make better choices.*

New product innovation will likely entail using new intelligence and embedded software to create devices that can collect, analyze and present information that better helps end users. This will require that electronics companies de-emphasize their traditional focus on hardware and focus instead on software development, including rigorous requirements management. Long a well-structured discipline in industries such as aerospace, defense and automotive, requirements management will become a critical competency for electronics companies.

Coming up with the right requirements is just one of the first steps in an end-to-end product development lifecycle. Strong and consistent execution will remain essential to separate the winners and losers in the new economic environment.

2. *Dynamic enterprise – Adapt faster to customer expectations.*

In recent years, electronics companies have led the trend toward global integration. More and more, electronics companies are shifting to a model where major back-office functions are globally centralized while sales and market-facing activity is localized. This transformation has not only helped to slash costs by moving resources to their optimal global locations; it has improved skills and responsiveness by moving decision-making to the

deepest center of excellence. In a highly dynamic market, the additional agility and reduced costs provided by this model can help electronics companies sustain performance without losing touch with their local customers around the world.

The new economic environment will potentially reshape some industry sub-segments, sometimes under conditions of exceptional speed and stress. In these conditions, the ability to rapidly execute on separations and integrations will make the difference between thriving in adversity and ending up on the auction block. Typical merger or separation value creation comes from strong integration performance in operations and supply chain activity. Companies that quickly leverage procurement, manufacturing and distribution for efficiency while pushing products through combined sales channels – by staying close to customer needs – should weather a downturn better.

3. *Green and beyond – Enact energy, environment and sustainability initiatives.*

Supply chain management, though much improved in recent years, still has many benefits yet to be fully exploited, including cost savings from effective water and energy management. In the past, the availability of cheap credit made it easy to push inventory ownership off onto suppliers through Vendor Managed Inventory (VMI) programs.

This made balance sheets more attractive without fixing the real problem – a lack of collaboration across the value chain. With suppliers potentially struggling to get the same credit levels now and even beyond, we expect companies to start taking the nuts and bolts of sales and operations planning much more seriously, and consider how business practices that support global sustainability can actually be good for the bottom line.

Salvation through innovation

The coming months will unquestionably present new and interesting challenges – electronics is already one of the world's most extensively and deeply global industries. From Silicon Valley to Bangalore, from Europe's mobile and communications leaders to amazingly productive factories in China, electronics represents one of the earliest engines of growth in emerging markets, as well as a source of innovation and opportunity in mature markets.

In looking ahead to industry transformation, the single biggest wild card remains the same in good times and bad: innovation. Perhaps more than any other, the electronics industry has an endless ability to reinvent and transform itself, from cloud computing to the surprising longevity of Moore's law. Electronics innovation goes beyond functions and user experiences; it extends to operational excellence and business model design – and it should prove invaluable to electronics companies as they face the economic challenges of today and beyond.

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