

Special Talk

# Manufacturing Strategy for Thriving in Era of Change

Progress and Outlook for Reborn Global Manufacturing Industry



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Japan's manufacturing industry is undergoing a paradigm shift in the face of issues such as globalization, the rise of emerging economies, environmental problems, and exchange rate fluctuations. The industrial machinery and production equipment that have underpinned the strength of the "Made in Japan" brand require new solutions and services that can respond to this shift by helping to reduce the environmental burden and enhance the international competitiveness of Japanese manufacturing. As manufacturing enters an era of change, what form should "monozukuri" (Japan's manufacturing ethos) take both inside and outside Japan? What is required for Japanese manufacturing to remain strong in international markets? These questions were discussed by Mitsuo Okamoto, President & CEO of Amada Co., Ltd., a manufacturer of machine tools active in the global market, and Representative Executive Officer, Executive Vice President and Executive Officer Nobuo Mochida and Vice President and Executive Officer Masahiro Kitano who manage the MONOZUKURI Group at Hitachi.

## Paradigm Shift and Reform of Development Workplace

**Kitano:** Japan's manufacturing industry has been responsible for numerous world-beating products. In recent years, however, the challenges faced by the industry have become more complex, including greater globalization, the rise of emerging economies, environmental problems such as global warming, and exchange rate fluctuations. This has led to questions about the best structure for the overall industry and what approach to take to the industrial machinery and production equipment that underpin its strength.

Today we have invited Mitsuo Okamoto, President & CEO of Amada Co., Ltd., a general manufacturer of metalworking machinery that has enjoyed ongoing growth in global markets, to discuss what stance Japan's manufacturing industry should take in response to these changes and in the process to ask him about the secrets behind his company's strength as well as its product strategy, technology development strategy, and so on.

Can you please start by giving us your view of current market conditions.

**Okamoto:** The market environment underwent a major change after the financial crisis of 2008. Steel products have formed the backbone of Japan's manufacturing industry right back to the days when it was said that "steel makes the nation" and our production of cutting and forming machines has grown in step with total world production of steel. All that changed with the Lehman shock.

**Mochida:** I was President of Hitachi Metals, Ltd. at the

time of the crisis and I am aware that, although total steel production continued to rise, shipments of your cutting and forming machines actually decreased which came as quite a shock.

**Okamoto:** This was a major paradigm shift for us and brought a sense of crisis within the company. The two years after the Lehman shock from 2008 to 2009 were treated as an important turning point in the company's progress and firmed up our views about major changes including our approach to business and product development. We launched reforms that would create a proactive business style rather than a defensive one.

Amada was among the first machinery suppliers to enter the international market which we did back in 1971. We established subsidiaries in Europe and America and our expansion into overseas markets, which started out with service businesses, has since moved on to the construction of factories so that production can be based wherever makes most sense. We say that "global" has become the standard within our company. However, all product development has been based in Japan with development and marketing targeted at local SMEs (small- and medium-sized enterprises). This is because the wide diversity of work received from SMEs means that their needs are a good indicator of the overall direction of the market. However, with a shrinking domestic market and the view within the industry that the way forward lies outside Japan, we have recognized a need to exchange information with large companies that have expanded offshore and to incorporate their views into our product development. With this in mind, we





somewhat belatedly established a new “monozukuri” department to undertake joint development with large customers.

**Kitano:** Although the manufacturing industry’s traditional style of establishing business plans based on leading economic indicators has broken down, I see evidence of the speed of your decision making in the way you responded quickly by creating your own markets and the creative way you redirected your approach toward working with large companies.

**Okamoto:** On the other hand, I believe we need to take more account of the views of the overseas market when developing products with a large market outside Japan such as laser processing machines. The product development approach taken by our development team in Japan has been strongly biased toward establishing the technology first and then applying it in products. Rapid development of products intended to meet the needs of overseas markets is not something we have been able to achieve. To deal with this we have changed the way we go about development to involve agents from our overseas subsidiaries and incorporate their views from the product planning stage.

One of our management principles is to “grow with our customers” and these changes reflect this philosophy. In the changing environment in which our customers operate, the policy of pursuing productivity, although effective in the past, is no longer the sole determinant of value in machine tools. We also need to pursue other forms of added

value such as taking account of the environment or ways of winning customer orders. To achieve this, in parallel with producing advanced technology, a major feature of our reforms is to pay closer attention to the views of customers from both Japan and overseas and to reflect these in our products. In order to make great progress in the three years from 2010, we spent the first two years (2008 and 2009) laying the foundations.

**Mochida:** Although markets overall have continued to shrink since the Lehman shock, we are at last seeing signs of recovery. The more economic globalization accelerates, the more intense is the competition between firms. It was in response to this difficult business environment that Hitachi announced its 2012 Mid-term Management Plan in May 2010. Based on this plan, we are currently working on “leveraging Hitachi’s strengths to promote a global growth strategy,” “focusing business resources on the Social Innovation Business,” and “strengthening the business structure to stabilize profitability.” In particular, we are focusing our management resources on our Social Innovation Business which can be broadly divided into the three areas of industrial, transportation, and urban development systems; power systems; and information and telecommunication systems as well as the businesses that integrate these different fields and the materials and key devices that provide the essential foundations for all three. Industrial machinery and production equipment are also a key area of activity for Hitachi because of their role in supporting this Social Innovation Business.

## Development of Next-generation Technologies for Flexible Manufacturing

**Kitano:** While the market changes that followed the financial crisis have been a major test for the manufacturing industry, they can also be seen as a chance to grow stronger.

What are your views on changes and trends in the area of technology?

**Okamoto:** It is anticipated that developed economies like Japan will shift away from short-run production of a wide variety of products toward “flexible manufacturing” practices that can meet diverse customer needs. Because of the need for flexible production equipment to achieve this style of production, we have been working on laser processing machines that can perform a wide variety of processes on different materials under the control of a single program. We have recently developed our own fiber laser oscillator for use in the next generation of laser machines. In addition to being able to handle materials for which CO<sub>2</sub> (carbon dioxide) lasers are ineffective, other benefits made possible by the new technology include support for microfabrication, dramatic improvements in cutting speed, and automatic setup of optimum processing conditions.

While in-house development of flagship models like this befits our role as a leading supplier, we also avoid being excessively self-reliant by undertaking joint development of devices such as servo motors and are seeking to maintain our profitability by also paying due attention to

high-volume models.

Our SME customers in particular are confronting issues that go beyond the daily challenges of manufacturing such as reducing costs, improving quality, and shortening lead times and extend to safety, the environment, efficiency, and the question of how to maintain know-how despite an aging workforce. Our technology development is driven by consideration of what is needed to resolve these issues. The fiber laser oscillator has attracted interest from large companies as well as the SME sector and we have received considerable feedback since its announcement in 2009.

We are also jointly developing a new processing machine with Hitachi’s Omika Plant which we anticipate will be a groundbreaking product.

**Kitano:** We are also putting a greater emphasis on collaboration within the supply chain. We believe this collaboration is an important factor in creating more added value over the entire production process from metals through to processing and the final product.

**Mochida:** In the industrial machinery sector, ongoing globalization and technical innovation are driving major changes in performance and other product requirements. To further enhance the environmental performance and global applicability of these machines, Hitachi is developing innovative core technologies while also working with leading suppliers such as Amada. Typical examples include using advanced numeric simulation to enhance analytic design practices and the development of new materials.



## Total Solutions for Optimizing Production Lines

**Kitano:** From a global perspective, how do you view technology strategy?

**Okamoto:** Regarding globalization, we are currently strengthening our infrastructure, having allocated five territories (regional hubs) consisting of Japan, America, Europe, China, and ASEAN (Association of Southeast Asian Nations) with the aim of establishing locally managed marketing, production, and procurement. In terms of technology, because the requirements for products targeted at developed economies are largely the same as those for the domestic market, approximately 70% is produced in the target market. However, because of concerns that 100% local production would risk leaking know-how and hollow-out operations in Japan, our strategy also involves exporting modularized components from Japan to a certain extent.

In emerging economies, on the other hand, because they lack a procurement infrastructure, local production is below 50% and is currently limited to products that are expensive to transport. In terms of technology, we don't just assume that being an emerging economy means we should supply models with reduced specifications or that take no account of energy efficiency. Instead, our development pays close attention to local circumstances by, for example, fitting protection mechanisms able to cope with sudden power drops as a standard feature in countries where the electricity supply is unreliable.

**Kitano:** The main themes of the global strategy in Hitachi's Mid-term Management Plan were "promote and expand glocalization," "expand business opportunities in collaboration with partners," and "expand new businesses leveraging Hitachi's strengths." The plan also set a target of increasing the proportion of overseas sales from 41% in 2009 to more than 50% by 2012. We believe that achieving this will require an expansion of overseas production. Although strategies will differ between businesses and products, in either case we believe it important to identify the split between domestic and overseas production and to strengthen our monozukuri manufacturing capabilities.

**Mochida:** From my experience, the difficulty with local production lies not in individual processes but in how to manage quality and cost over the entire process.

**Okamoto:** That is right. When it comes to factory rationalization, there is no point in using the latest equipment to improve specific processes if it only creates bottlenecks elsewhere. That is why we aim to supply total solutions that operate smoothly over areas that span

across multiple processes and optimize overall productivity. It will help if machine tools also adopt software that is more open and networked in the future.

**Kitano:** This means that the companies who install this equipment also need to work alongside equipment suppliers to come up with improvements. I believe the competitiveness of Japanese manufacturing would become even stronger if we could achieve this in factories located around the world.

## Technological Solutions to Environmental Problems

**Kitano:** In addition to "global," another key word relating to the current market environment is "sustainable." Your Amada Group Environmental Declaration published in April 2010 has tackled environmental issues directly by targeting a 25% reduction by 2020 in both average product CO<sub>2</sub> emissions and unit CO<sub>2</sub> emissions by factory and other business operations.

**Okamoto:** We live in an era when corporate activities need to be considered on a global scale. To create a sustainable society, I see it as essential that future corporate activities take account of issues such as the environment, energy, and resources. Our Environmental Declaration identified three activities directed toward this end, namely "producing eco-friendly machine at eco-friendly business establishment," "our eco-friendly merchandise assists customers to manufacture eco-friendly products," and "creating eco-friendly environment at customers' plants."

In other words, as well as improving the efficiency of energy and resource use in component procurement and production of our own products, we also seek to supply environmentally conscious products that will help make our customers' factories more ecological. One example of how we seek to reduce the burden on the environment involves the fiber laser oscillator referred to earlier where we achieved considerable savings in standby power consumption by eliminating the warm-up required by previous units.

The pace of development is also quickening for functions that provide a clear indication of each product's environmental performance by calculating the equivalent CO<sub>2</sub> emissions volume represented by its power consumption and also other factors such as product yield and the gas consumed by the laser.

**Mochida:** When I visited Amada's Fujinomiya Works in 2007, I was impressed by how you had taken account of energy efficiency in every aspect of factory operation despite the facility having been built more than 20 years ago.



**Okamoto:** Being located on 76 ha (760,000 m<sup>2</sup>) at the foot of Mount Fuji, protecting the natural environment is our primary concern and the facilities include a cogeneration system. At our Toki Works, which commenced construction in November 2010, consideration for the environment is reflected in many aspects of the plant facilities including use of solar power, all-electric operation, and water heat storage tanks.

**Mochida:** To reduce the burden that our business activities place on the environment, Hitachi also established a Super Eco-factory & Office certification program to assess and certify sites which has already demonstrated a practical track record for giving a high level of consideration for the environment. A total of 32 sites have been certified to date. Proactive approaches like these and information about environmental technology are shared within the group and help encourage environmental measures.

Also, the benefits of environmentally compliant products such as their “greenness” have in recent years come to be seen as an aspect of product performance. In the field of industrial machinery, Hitachi, in addition to complying with environmental standards, is working to develop and supply environmentally compliant products based on product design concepts that take account of factors such as resource use and environmental footprint.

**Kitano:** My mentors at Hitachi have always reiterated the idea of “using technology to solve environmental problems.” I believe that environmental measures lead to superior technology and that we need to extend this into innovation.

## Fostering the People who Underpin Industry

**Kitano:** Human resource development is another important issue for manufacturing. In addition to providing basic technical training at our own school, Hitachi also seeks to boost motivation through active participation in events like the WorldSkills Competition. However, I understand that Amada has its own very distinctive approach to human resource development.

**Okamoto:** Against the background of globalization, we encourage people to take a broad approach to work rather than just specializing. Naturally, we rotate staff around departments, our aim being to foster staff who are able to take a broad perspective and understand how their particular area relates to those around them.

A feature of human resource development at Amada is the way we support manufacturing practices at our customers. There are three aspects to this. The Amada School, a vocational training institute established in 1978, trains approximately 2,000 students from the metalworking industry each year. The school also runs the Junior Management College (JMC) course for future managers which has produced nearly 1,000 graduates to date. We are always delighted when we hear about sons in line for succession at companies run by their fathers who, having learned from the course some of what is involved in running a business, are able to discuss succession planning with their fathers and decide to carry on in their footsteps.

We run a Precision Sheet Metal Technology Fair to help customers learn about metalworking technology

and accumulate know-how by providing a forum for improving and exchanging technologies and techniques. We also help organize the 24 Sheet-metal Associations that are active in Japan and provide other assistance such as operational support and exchanges between associations. Our aim with these activities is to facilitate the progress and growth of the sheet metal industry.

**Mochida:** Industry promotion is a very admirable activity.

**Kitano:** You are making an effort to support monozukuri in Japan. What form do you see monozukuri taking in Japan in future?

**Okamoto:** Although "building it where it is used" is a basic principle for manufacturers such as ourselves, local control of all functions from marketing through to development, procurement, production, sales, and service is not viable.

As I mentioned earlier, it makes practical sense to perform tasks such as development and production of important components domestically. In the area of software development, however, we are working with the Indian Institutes of Technology and have a development team based there. In managing a manufacturing company, how to build a flexible organization will be key criteria for future success. It is important that we dispense with sacred cows and take a flexible view of where best to undertake work like development and production.

Directing our efforts toward software is also likely to be a key to future monozukuri manufacturing. We have approximately 300 people in this field based both in Japan and elsewhere.

**Mochida:** I see both software/hardware and software/software integration as being important for our Social Innovation Business. Specifically, overall system optimization requires the integration and interoperation of individual devices and other systems as well as the large systems that link these components together, and this is considered to pose a difficult challenge. President Okamoto has had much to say about how the strength of Japan's monozukuri manufacturing lies in the way it fits technologies together and software is also likely to prove important to how this fitting together and integration can be achieved.

**Okamoto:** I believe that collaboration, links, and technology integration between companies will grow in importance.

**Mochida:** I would like to thank President Okamoto for sharing your views with us today over such a wide range of topics. I hope that we can work together to overcome global limitations imposed by things like the environment and resources to foster the people who will take up the challenge of the future and build a sustainable society while at the same time strengthening links between companies in pursuit of Japanese manufacturing technology.

**Kitano:** I hope we can bring out each other's strengths through collaborative relationships that transcend the boundaries between companies. As globalization progresses, let us go forward together by responding to the needs of regional markets and supplying industrial machinery and production equipment solutions that take account of the environment. I learned a lot from today's discussion. Thank you for your time.

### Mitsuo Okamoto

President & CEO  
Amada Co., Ltd.

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Joined Amada Co., Ltd. in 1972. Joined Sonoike Mfg. Co., Ltd. in 1978. Appointed Factory Director of Odawara Factory in 1988. Made a Director in 1997, and made a Managing Director in 1999. Appointed President & CEO in 2000 and appointed to his current position in 2003.

### Nobuo Mochida

Representative Executive Officer, Executive Vice President and Executive Officer,  
Hitachi, Ltd. and Director, Chairman of the Board, Hitachi Metals, Ltd.

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Joined Hitachi Metals, Ltd. in 1970. Appointed manager of Kumagaya Works in 1999. Appointed President of Magnetic Materials Company in 2001. Appointed Executive Officer in 2002. Appointed Executive Director of NEOMAX Co., Ltd. in 2004. Appointed Executive Officer of Hitachi Metals, Ltd. in 2005. Appointed Executive Officer and President in 2006 and appointed to his current position in 2010.

### Masahiro Kitano

Vice President and Executive Officer  
General Manager, Environmental Strategy Office and MONOZUKURI Group, Hitachi, Ltd.

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Joined Hitachi, Ltd. in 1980. Appointed General Manager of the Server Development, Internet Platform Division, Ubiquitous Platform Group in 2002. Appointed General Manager of the Enterprise Server Division, Information & Telecommunication Systems Group in 2004. Appointed Chief Strategy Officer and General Manager of the Strategy Planning & Development Office of the Information & Telecommunication Systems Group in 2007. Appointed Vice President and Executive Officer and made Chief Executive Officer of the Platform Business, Information & Telecommunication Systems Group in 2009. Appointed to his current position in 2010.