

Corporate Success – the SEMI View

By Haim Albalak and Kevin Murphy

How Stanley T. Myers, President and CEO of the SEMI organization, perceives the future of the semiconductors market and the responsibility of businesses within the economic eco-system



Introducing SEMI and its President & CEO

SEMI is a global industry association serving those companies that supply the equipment, materials and services used to manufacture semiconductors, displays, nano-scaled structures, micro-electromechanical systems (MEMS) and related technologies.

According to Stanley T. Myers, President and CEO of the organization, SEMI dedicates its efforts to the following 3 main areas of business:

- a) Semiconductors, which have been SEMI's mainstay for 40 years. The association runs 14 offices around the world, which focus on boosting the value of companies involved in semiconductor-based processing.
- b) Adjacent markets – portable techs which include LEDs, solid state lighting, MEMS, and new technologies such as flexible electronics, flexible displays, flexible reading paper etc.
- c) Photovoltaic technology used to provide clean, renewable solar energy SEMI also represents the industries it serves in terms of market statistics, publications, special studies etc.

Prior to his appointment as SEMI President in 1996, Myers worked for 17 years at Siltec Silicon, a manufacturer of silicon wafers, based in Salem, Oregon. He served as president and CEO from 1985, and in 1986 he completed negotiations for the acquisition of Siltec by Mitsubishi Materials Corporation. Prior to Siltec, Myers worked for Monsanto Corporation for 18 years.

Myers continues to serve on the SEMI board of directors, a post to which he was elected in 1988. He sits on the boards of Ecosol, SKW Corporation, NCT Corp. and MATEC (Maricopa Advanced Technology Education Center). Myers is also a member of the Engineering Advisory Board to the School of Engineering, San Jose State University. He was inducted in the Silicon Valley Engineering Hall of Fame in 2008.

Global Trends

From a general to a more specialized focus

Myers begins by stating that SEMI is now venturing into new fields. "SEMI started out as a semiconductor representative for the whole industry but is now changing towards a more segmented approach for business unit applications." He revealed that the board had just recently approved his strategic plans to reorganize SEMI and reflect specific interest groups within the various semiconductor-related segments. For example, the needs of solar-based technologies are different to those of classic semiconductors, although they coincide in adjacent areas such as energy conservation (solid state lighting, use of LEDs etc.) as well as the collection and reuse of solar energy. "SEMI will be moving towards a more specialized focus rather than the general attitude taken in the past. We have to change to keep pace with how the world around us is changing."

The demand for Moore

Reflecting on global trends, Myers explains: "I think that we are going to see people demanding what we call 'more of Moore' (relating to Moore's law) from the Intels, Samsungs and TSMCs of the industry. The consumer wants more content on a chip – double the speed, double the performance, take it to its limits." There is actually a whole area in semiconductors known as "more than Moore", dealing with applications which will penetrate portable techs, logics, analog and other devices. A major example of this is MEMS, a silicon-based technology

which is fundamental to many electronic devices. When you tilt your iPhone to different angles and it reacts accordingly, that is a MEMS application. "It won't be long before we see more and more of this feature, as technologies start to fan out to cover other functions."

"Within the next five years we'll be witnessing a greater emphasis on flexible displays like those used in flat panels and with LEDs." MEMS fit into this category. Myers is convinced that technologies will increasingly merge to enhance their common value. "You don't buy a flat panel without first asking about back lighting. That's how closely displays and LEDs have already joined forces to boost value." So we're seeing the beginning of a trend in which adjacent technologies are working together to create a better product.

"We've come a long way since the times of my first cell phone. The size of a brick, I could hardly hold it to my ear and just look at them today – you simply slip them into your pocket. Although still called a mobile phone, the devices we now use have already become our substitute computers."

The speed of change

Back in 1987, when Myers first joined the SEMI board, there was great concern about the SEMI membership, which had dropped from 1200 to 800 companies. "We humans are blessed with a very limited vision because at that time it looked like doomsday had arrived, the sky was falling in and there were many recessions between 1989 and 1991. But what happened? The internet came around, PCs came on big time, followed by mobile phones. The progress of technology over the past 15-20 years has been breathtaking." Myers speculates that we will be amazed at the changes which will take place during the next 15-20 years. In his vision, the semiconductor industry will gain much greater significance in the fields of medical equipment and sensing devices. "I think we're going to see some staggering breakthroughs in these areas." According to Myers, the main industry driver these days is

the consumer desire for more and more information. "It's going to be an interesting time over the next decade or so and the industry will be transformed to the same extent as it has been over the past 15-20 years."

Equipment and Material vendors

Myers sees the fundamental challenge faced by equipment vendors as the ability to align materials processing with equipment performance and design to support the industry needs. We are seeing a consolidation but also a contraction of the time and requirements for transforming materials, gases and chemicals – indeed anything required to react with the substrate on which the device is built – into a product which satisfies consumer demands. In future, the product companies will become more closely involved with the materials and equipment suppliers in an attempt to optimize the production chain. The fact that we are now using increasingly higher volumes of materials does not simplify matters. Only 20-30 years ago, we probably applied half a dozen to a dozen materials and elements while today we are jumping all over the periodic chart. One specific challenge lies in overcoming the so-called redbrick walls e.g. in 3D IC, the ability to stack die, the interconnects, lithography and advanced materials. Also, the necessity of EDA (electronic design automation) will play a major role in the overall process. It is becoming much more complicated and costly to make a chip. "You want your cell phone smaller but also smarter so how does this all fit together?"

Solar systems

To achieve results on a par with Moore's Law, it becomes apparent that the solar industry needs a defining roadmap to drive standards which can reduce industry-wide costs. Reducing costs will allow more resources to be spent on creativity and innovation. "Roadmap activities are happening around the world, including German-based group within SEMI identifying crystalline silicon requirements for solar cells. We will be applying this approach on the global stage once it has

been developed. This roadmap will provide guidance for standards which, in turn, will save money that can be fed back into nourishing creativity and innovation in that segment." Costs need to be driven down to a point at which the consumer can afford to use the product, at which it can be commercially applied and at which it is possible to make money and a return on investment.

Myers claims that costs will fall with the help of subsidies and manufacturing efficiencies. "There are more subsidies available to farmers and petroleum companies than for power generation and solar. Subsidies do not need to have negative connotations and will be necessary in this field if producers are to compete with the other methods of making power."

Beyond Semiconductors

Political view

SEMI uses its globalization to collect best practices from around the world and share them with its members. "Although we should not let politics get in the way of best practices, we still need functioning governments and regulations. If we spend more time on improving these, rather than trying to get re-elected, we would probably be better off."

One of the main trends over the last decade which Myers highlighted has been the continual movement of manufacturing industries to Asia. In the semiconductors sector, the primary reason for this move has apparently not been the cheap labor but the tax incentives given by the local community to build the factories. "Today people demand a level playing field. My personal opinion is that the field is level but that some participants are playing and some not. Right now, the US is not competing here and, as long as you are not competing, manufacturing will continue to move to where the competition is located. I don't see anything stopping a region in the US from getting into direct competition with China or Taiwan. The real risk is that the relocation of manufacturing

will bring on the relocation of R&D. Although we currently enjoy creativity and innovation in Silicon Valley, this will eventually go to where the 'state of the art' plants are operating."

Social view

The innovation and technology involved in the semiconductors industry has had a profound influence on human society in the past. As SEMI shifts its focus to related industries, the effect of its members and on society is diversifying and expanding.

Solar has a wide effect in Europe and specifically in Germany. The solar industry has been encouraged to grow rapidly there and to employ people. Myers expects to see this trend duplicated in other regions.

There are already signs of a turning trend in California, where the significance of capturing solar energy will play a major role in energy conservation programs. Myers is aware of pilot schemes in which parking lots are lit with LED solid state lighting. "With the current lighting that we use around the world, a big percentage of the energy is being emitted into the atmosphere and lost. So I think we're going to see more emphasis in specific applications of technology, aimed at overall energy conservation or collection of clean

energy-renewal. It has to happen to improve the environment, I'm no expert on global warming but my particular feeling is that I want my environment better for my five grandchildren, and so there's a driving force improving the environment. Some people think that global warming has probably been more influenced by the tilt of the earth than it is by what we're putting in the atmosphere, but what our grandchildren, our children will be breathing in the air – that's something we can do something about." Myers believes that these feelings, shared by the majority of the industry, are the impetus for change.

Myers concludes by telling us that he believes in the old rule of thumb – if you want to be successful then help others to be successful. "If I'm going to be successful I'm sure going to do my best to make all my employees and members successful. Success is not a personal ego trip. However, if I make my customers more successful, this has a knock-on effect by boosting my success and creating a win-win situation. As time goes by, success in any industry will increasingly require the recognition and co-operation of the whole eco-system."

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