

TECHNOLOGY

Japan gambles on displays

Consortium of three big brands gains government backing to spur mobile technologies.

BY KATHERINE BOURZAC

With ever more beautiful and addictive smartphones and tablets captivating consumers, the market for mobile display screens is booming. Yet Japanese display makers Hitachi, Sony and Toshiba, once industry giants, have languished. Now the three companies have merged their mobile-display subsidiaries to form Japan Display Incorporated, launched on 1 April. With ¥150 billion (US\$1.85 billion) in research and development funding over the next five years, the Tokyo-based endeavour aims to launch technologies that will help its members to recapture the display market.

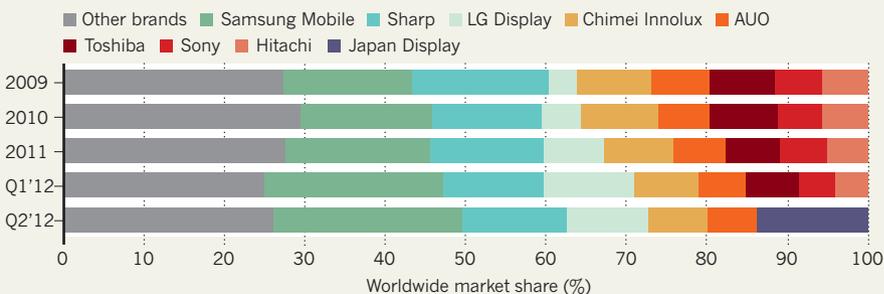
“We expect this company will be driven by research and development,” says Hiroyuki Oshima, Japan Display’s deputy chief technology officer. Many of the features that sell tablets and smartphones are based on display innovations, such as the super-high-resolution screens of Apple’s iconic iPad and iPhone devices. Now the race is on to lengthen battery life, make gadgets thinner and lighter, and provide rich colours that can be seen from wide angles for watching videos with a friend. “The display technologies that have the slickest stuff command the biggest market,” says Nick Colaneri, head of the Flexible Display Center at Arizona State University in Tempe.

Japan Display’s bid is mainly financed by a government-backed investment fund, the Innovation Network Corporation of Japan, which has contributed ¥200 billion and holds a 70% share in the company. A particular area of focus, Oshima says, will be organic light-emitting diodes (OLEDs), which the company will begin producing by the end of next year. OLEDs, which use polymers or smaller carbon- and metal-based molecules, provide

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A DISPLAY OF UNITY

Toshiba, Sony and Hitachi hope to reverse a steady decline in their share of the mobile display-screen market by combining forces to form ‘Japan Display’, with a market share that will be the second largest worldwide.



SOURCE: DISPLAYSEARCH

richer colour than conventional liquid-crystal displays (LCDs), and use less power.

Stephen Forrest, vice-president of research at the University of Michigan in Ann Arbor, notes that OLEDs are a speciality of South Korea’s Samsung Mobile Display, the world leader with 23.3% of the mobile-display market. Yet, he adds, there is still room for innovation. “Some things about OLED technology are not settled,” he says. For example, researchers are still figuring out the most cost-effective design for the electronics that drives the displays. Low-cost ‘amorphous-silicon’ transistors are adequate for conventional LCD screens, whose pixels change their light-transmitting properties depending on an applied voltage. By contrast, OLED pixels are driven by changes in current, and amorphous-silicon transistors cannot provide enough. One solution is to subject amorphous silicon to a laser treatment that upgrades it to better-quality polysilicon. But this is an expensive process.

The leading alternative to polysilicon for OLEDs is a new class of transistor material, based on metal oxides. These materials promise good performance at lower manufacturing costs than polysilicon. Before the merger, the three companies were all developing metal oxides, and Oshima says that he is

now trying to get the research teams to work together. However, Japan Display may have some catching up to do: on 13 April, Sharp, another Japanese maker, announced that it will become the first to bring metal oxides into production.

In other areas, Oshima says, the research strengths of the three merged companies are more complementary. For example, Sony has developed a technology for embedding touch-screen sensors, typically a separate element sold by another company, into the display itself. If it can be made to work, this ‘embedded’ touch should make phones thinner and lighter, and reduce costs.

Analysts at DisplaySearch, a market research company headquartered in Santa Clara, California, predict that Japan Display will become a big player, starting with a projected 13.8% market share in its first quarter (see ‘A display of unity’). Prior to their joint effort, the three companies didn’t invest enough resources in innovation in the mobile-display market, says Oshima. Now, Japan Display will put all its research efforts there. Colaneri thinks that the more focused approach could help the company to grow further. “Aggressive investment in research and development could make a difference,” he says. ■



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