Concept Development for LCD-Applied Products

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Abstract

There is the Demand-Creation-Model Marketing Strategy, which presents new life-style and new business-style in order to create new demand, in the core of all our LCD-applied products.
Through the development of individual LCD-applied product, new usage that even users themselves can't imagine has been developed. The problems for LCD development become clear from this usage.
This paper describes the concept development for LCD-applied products through the cases from the Viewcam and the Zaurus.

Introduction

New usage has been developed through the development of individual LCD-applied product as there is no prepared concept or guideline for such products. Thanks to this development process, the applying concepts and the requirements for the LCD development has become clear enough to be identified.

This paper will review the applying concepts that enforce the LC, one of our core techniques to become competitive in the product market. ViewCam and Pen-Com <Zaurus> will be given as the examples.

1. Application Development with Full Advantage of Core Competence

Core competence is defined hereafter as a strategy that builds up competitiveness by identifying a center technology of the company and investing its business resource into the center technology in order to apply to a variety of new products.

It takes some time the core competence to bring the product or business developments. If we see the LC technology as our core competence, we need to suggest its concrete applications that allow the actual life and business to be more convenient and prosperous.
Through these suggestions, the product's potential demand will be more specified to create a new market.

2. Application of the LCD to ViewCam

Demand is often created when an entirely new product type is born while one certain element technology is persistently being developed. SHARP ViewCam is a good example which holds of this truth. Its marketing strategy is, what we call, the Demand-Creation-Model MarketingStrategy. The concept is that a new demand is to be created while a new style of life or business is offered through new products after a close study of users' potential needs.

2•1 LCD-Applied Products before the ViewCam

The challenge to use the liquid crystal for display applications is derived in 1968 when a US company, RCA developed the material. The LC's actual application to word processors and TVs has been mainly performed by SHARP ever since we launched the world's first calculator with an LC display in 1973. It can be said that SHARP has been leading this industrial field.

As general technologies were developed, the LCDs showed remarkable improvement in high-definition, wide-viewing-angle, large-sized display performance. This advancement brought a wide range of new LCD-applied products, such as direct-viewing type of color TVs with a color TFT-LCD and LC projectors with a 100-inch screen.

More applications of the liquid crystal were encouraged by a strategy to situate the liquid crystal in a core position of future display devices, based on the opto-electronics technology. In this trend, there emerged a project to employ the liquid crystal for video camera monitors.

2•2 Market Trend of Video Cameras before the ViewCam

Before SHARP ViewCam was launched into the market in November, 1992, the video camera sales were keeping gradual growth until the statistics showed 1,800,000-unit sales in 1990.
The sales in 1992 showed 1,130,000 units, which is 78%, compared to that of the previous year.

The use of movie cameras was limited in such occasions as school events to keep track of children's growth, and often used by fathers. These facts did not contribute to increase the LCD applications or the demand volume.

Although efforts were made to improve performance of movie cameras, reducing size and hand-trembling, it was not enough to boost the demand.

2•3 New Product Presentation to Meet the Consumer Needs

The first step to develop a demand-create product is to discover consumers' potential dissatisfactions with a product. Users might not have noticed those inconvenience about the product, or even if they have, they might be making themselves believe that this is what it should be. Thus, it is essential to provide a new product and its circumstances of benefit for the consumers, making them notice the inconvenience that the existing products have.

For example, here are main claims from users of movie cameras:

- Complex operation
- Connecting the device to a TV is troublesome, thus cannot get a chance to watch what they have recorded.
- Cannot check the recorded scenes on the spot, thus not sure if their operational procedures are correct.

One suggestion was proposed to apply the liquid crystal to a movie camera, which has underlined the concept of the SHARP ViewCam. Focused were how the application of the liquid crystal would work effectively for convenience issue and in what way the enjoyment could be expanded.

In order to respond to the claims from the users as mentioned in the above, it is necessary to realize one certain style of application. That is to combine three different kinds of recreational amusement into one; "Record," "Check what was recorded" and "Enjoy it all together."

Applying this concept to the practical method, first we removed a finder from a movie camera, and then replaced it with an LC monitor. Because the user had to look into a finder, that largely limited to movie camera performance.Employment of an LC monitor expanded performance. It was made possible to record scenery while checking with the monitor and to watch later on the spot what was recorded or to enjoy these operations with many people, for example, in a car heading for a certain destination.
Furthermore, the easy recording operation, looking at the monitor, allows the users to take the image of themselves simply by rotating the camera.

All this specified a concept of new products to present a new life/business style.

Photo 1 View Cam VL-HL1.

2•4 User's Reaction to the New Application

The new product image was specified by the development of a thin, lightweight LC panel, which offered high quality of visibility even under the daytime sun light and the wide-

viewing angle without the monitor angle limit in recording.

The first SHARP ViewCam VL-HL1 **(Photo 1)** was launched in November, 1992, to receive a good reputation from the users. It was highly noted as a product which would continue to offer a new style of image-recording device to develop a new market.

SHARP ViewCam also received a favorable reaction from its users:

- "It used to be a real hustle to record the school sports because I had to concentrate on recording through the small viewfinder. I had never felt that I was really at the event. Thanks to ViewCam, I enjoy the event even while I am recording!"
- "Conventional viewfinders made recording pretty awkward for people who wore glasses, but SHARP ViewCam finally solved that problem!"

Statistics showed that 35% of the ViewCam purchasers belonged to an age group of over 50 years old, while it had once showed more percentage to a younger family group.

This means that our ViewCam succeeded in breaking through a new demand.As for the operating hours per year, the number had once indicated about 30 hours during which people used a conventional camera for recording. It skyrocked to 156 hours regarding ViewCam users, which was more than five times as much as the number that the conventional types had once showed.

2•5 Further Development of LC Applications

Compensation was made for the poor performance of a movie camera after the concept of employing an LC for monitor use.

Making full use of our expertised technologies to increase quality of LC performance, an idea emerged, which is to utilize an LC panel as an operating touch-panel.

Here are some examples of its functions suggested:

- Point Zoom by touching a certain object on the screen to be zoomed up while recording - never misses a timing to magnify an object even located at the corner of the screen.
- Focus Lock by touching a targeted object - keeps focusing on the object in a distance even when a passer-by crosses the lens.
- Opposing-Light Compensation - allows for brightening up the dark parts of the object, such as a face of a person who is at the window or against the setting sun.
- Segment Free-Zoom - allows images to be differently zoomed, according to segments that need closing up, while recording such occasions as a group picture on a trip.

These functions are now incorporated into the ViewCam VL-PD1, which is to be launched for sale on November 28, 1998.

3. Application of the LC to Zaurus

The liquid crystal performance has been expanded as an input device to enter word text and visual image, while the conventional display devices such as the CRT performed as an output device only to show data on the screen. This significant difference turned out to contribute to further LC applications.

SHARP's development of Pen-Com "Zaurus" inspired a new style of handwritten character input, and received good standings.

3•1 Merchandisation of the Electronic Memorandum Book

Paper-made memorandum books had been used by people in business field. It was in January, 1987 when our first electronic memorandum book, Pen-Com "Zaurus PA-7000" was launched for sale.

The PA-7000 is in an ordinary pocketbook size with display and an IC card in left, and in addition, with the inputting board in right. Input operation is carried out with the original alignment of alphanumerics, converting from roman letters to Chinese characters via Kana, the Japanese syllabaries.

In spite of this simple method, compared with input operation with the keyboard, some middle-aged users in management position are not very willing to use the electronic memorandum book. Another disadvantage that hindered a larger demand was that the screen size was not capable of displaying the adequate number of characters.

3•2 Zaurus & Precursor Models of Personal Management Electronic Memorandum Book during the Pre-Zaurus Period

The PV-F1 was developed as a personal information management electronic memorandum book under the pursuit of its real reason to exist. The PV-F1 had a 5-inch large LCD with a function of handwritten character recognition. It was launched into the market in July,1992 at the price of ¥128,000. However, the product was only accepted by special users of interest and did not break through a new demand.

If given, the challenges that the PV-F1 should have overcome were:

- Cost performance
- Performance in weight & size
- Capability of printing out handwritten notes.

SHARP Pen-Com Zaurus PI-3000 was developed after solving those problems.

It was launched into the market at the standard price of ¥65,000 in October, 1993 **(Photo 2)**.

Photo 2 Personal information tool "Zaurus".

3･3 Pursuit for "Substitution for Paper & Pen"

"Pen-Com" is an invented word, which means both COMmunication and COMputing with a PEN tool.

It is also comprehended that the combined usage of an "LCD" and a "pen" is to bring a significant change in communications and information processing.

It is not only because we attempted to ease some users' unwillingness towards the keyboard operation that we pursued the operation with a pen tool. The underlining concept of the Zaurus is "an enhanced information tool that excels paper and pen in performance to bring a significant change in business procedures."As more word processors and personal computers have come into a wide use for these decades, a new trend has emerged as a general practice, converting keyboard-input data into electronic data for display and storage use. However, communications have been done for centuries through papers on which letters and pictures were written with a pen or a writing brush.

We believed that keyboard had been one of the solutions only to compensate for incomplete technologies that could not let go on our most familiar communication practice for centuries.

That was when we came up to one idea: The information processing capability will make a great advancement if the data input is done via the familiar pen procedure and the information processing is followed by digital computing.

3･4 New Product Style based in the Everyday Life

"Pi²T" is a concept for information devices in general, which reads "Personal Information & Intelligent Tool". The idea is meant for further development of information tools that benefit individuals with human-friendly software, centering the computing technology.

A new product development surely suggests one new life/business style. However, it will fail to come into a wide use unless it suits the actual life/business environment. Zaurus has succeeded in fitting those requirements and now the total number of units sold has reached 1,000,000 in Japan. We firmly believe that this owes much to one of Zaurus' enhanced functions: Handwritten Data Input Method.

Conclusion

This paper has reviewed two main case studies of ViewCam and Zaurus. The former was developed, applying the liquid crystal to a monitor. ViewCam replaced the conventional viewfinders on movie cameras to provide a new style of image-taking. The latter, on the other hand, was developed, implementing the liquid crystal as a input device. It emerged as a familiar style to input handwritten data with a pen tool, superseding the conventional inputting method by keyboard.

Both of the two examples illustrates how the LC-applied concepts enhance a product competitiveness in markets. Here are some core devices expected for the future LC technologies:

- Low temperature poly-silicon LC
- PALC (Plasma Addressed LC)
- Super-mobile LC (High-Reflection LC)

Although these devices are still under development, they should be noted for their potential applications. What kind of new life/business style these core devices will present depends on future development of their concrete applications and identification of technological challenges to overcome.

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