Episode 1

Encounter with Semiconductors

It was in 1955 when I decided to choose semiconductor as my lifetime job. It was more than half a century ago, but since then until today, my life has literally been “semiconductor life”.
I would like to ride on a time machine to look at today’s situation from the world at that time, and review the history of the past half century once again to help “Onko-Chishin” which means to understand the new things by studying the old things. In this article, I will describe the history of semiconductors in a vivid and lively manner based on my own experiences in the midst of the dynamic industry.

I graduated from La Salle High School in Kagoshima in March of 1955, and entered the Faculty of Liberal Arts (Science and Engineering Course) of the University of Tokyo. In the summer of this year, transistor radio (TR-55) was released from Sony (then Tokyo Tushin Kogyo) which took away the breath of the world market. It also influenced my course determination.
The picture below is Japan’s first transistor radio (TR-55) and the development leader Masaru Ibuka.

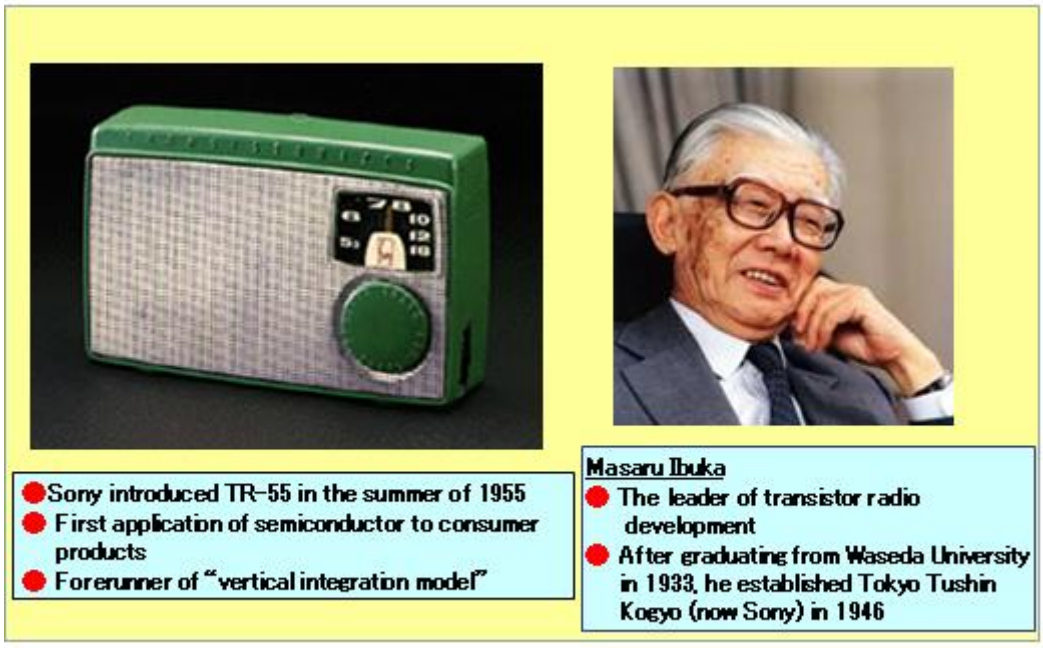

Fig. 1.1 First transistor radio commercialized in Japan [1]

Radios at the time were in vacuum tube types. With its big size, generally one radio in each house was in a family room. The price of TR-55 was 18,900 yen. It was rather expensive, considering that the starting salary of college graduates was between 7 and 8 thousand yen. However, the name of Sony leaped to fame in the world by the explosive hit of the product inside and outside of the country.

To tell the truth, I did not know anything about either semiconductors or transistors until I heard about the news on this transistor radio. In the second semester of this year, I learned in the physics

class that Sony's radio was made by semiconductor technology, and my curiosity was greatly stimulated. I decided in my mind, "Semiconductors must be interesting, and I will work in this area". At the University of Tokyo, the course system was to proceed to the specialized courses based on the individual choices and scholastic records after two years of liberal arts education at Komaba Campus. I chose the course of Applied Physics Department without hesitation. This was because fundamental research on semiconductors was being carried out here. The acceptance of students to this course was limited to 12, rather narrow gate, but I could successfully advance to this course.

The theme of my graduation study was "Research on semiconductor properties of intermetallic compounds" under the guidance of Prof. Masaharu Aoki. Dr. Aoki was eagerly engaged in the research on thermoelectric cooling using the Peltier effect, and he would talk as his dream; "In the future, household refrigerators will be replaced with those using semiconductor Peltier effect". Although refrigerators have not been replaced to Peltier semiconductor systems yet, a few years ago, I found a small sized wine cellar using Peltier effect, and I bought one as soon as I found it. The control precision of the inside temperature is good, and there is no noise at all which wine dislikes. It matches the atmosphere in the room very well with its space efficient slim design. As might be expected, products using semiconductors are really refined. I felt deep emotion with the thought that the dream of my teacher, Dr. Aoki is just coming true.

Now the time machine flies to October of 2000. I got a request directly from Sony's president Nobuyuki Idei (then), and I decided to transfer from Hitachi to Sony. There, I was able to know the detailed circumstances of birth of Sony's transistor radio, TR-55, which had a big influence on my life course decision, and how it came to the market.
Sony was established by two geniuses, Ibuka and Morita in 1946 after the World War II ended. They both had outstanding talents; Ibuka in terms of technology and Morita in terms of sales. It was in 1952 when Ibuka decided to "do the work of transistors", when Sony was still a company toddling with only about 200 employees. At that time the performance of the transistor was poor, and it had not yet reached the level that could be used for radios. Ibuka made up his mind, "Let's make transistors that can be used for radios with our own hands". For the small company, it was an extremely big risk to deal with semiconductors that needed large investments and many engineers, but Ibuka dared to choose this path.

When I look back from today's perspective, this decision of Ibuka seems to pierce the essence of "vertical integration model". Originally, Sony was a company that made sets of equipment such as tape recorders, so it also had an option "to assemble radios with transistors they purchased from other companies", but his thinking must have been that they could only do just like others do by that way.
Culture of doing what others do not do is inherited inside Sony even today as an important culture. "Like no others" has long been a symbol of Sony spirit.

Actually, Sony's TR-55 was not the first transistor radio in the world. "World first" had been sold by Regency of the United States about half a year before.

However, it was a product made by “horizontal division model”, and the transistors were manufactured by TI.

When Morita himself went to the United States for sales of the radio, it is said that the first reactions from the customers were severe. Typical comment was like this; “Vacuum tubes are used in our radios, and sound quality is good and powerful. We are not interested in such a small radio.”
Regency had pulled back on such customer reactions and withdrew from this business.
Sony, on the other hand, opened up a new front for sales here. The campaign was strengthened with a new concept catchphrase, “From one radio for one family to one radio for each person”. This strategy wonderfully hit the mark and Sony would then make a leap as a global player.
In addition, other companies in Japan were stimulated by the success of Sony and started large volume production of transistor radios. Such momentum developed into many products in the height of Japan, from radios to televisions, and from televisions to VCRs, and more.
It must be said that the lead role played by Sony’s TR-55 in the process of post-war Japan reconstruction was truly great. I can say that my semiconductor life started from here.

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