In the early days of CAN, CAN in Automation (CiA) counted the number of annually installed CAN nodes. This was easy to do: Just a few CAN controller manufacturers were asked to provide their sales figures. CiA accumulated them and published only the total number. This was double-checked with the number of sold CAN transceiver chips. In those days, there were just two respectively three suppliers. But times have changed. Today, there are many chipmakers providing CAN controllers embedded in their micro-controllers. The number of CAN transceiver suppliers is also much higher. Nowadays, the chipmakers do not know anymore, how many CAN interfaces they have sold. Still they may count micro-controllers, but the number of MCUs does not match with the number of CAN modules implemented. Additionally, a significant number of customized ASICs implement the CAN protocol. This is why CiA stopped counting CAN node installations beginning of the millennium.

Still you can estimate the number of annually installed CAN nodes by a simple calculation. There are quite good market figures for produced cars: about 76,86 million in 2016. High-end cars have about 50 to 100 nodes, and even the very low-end cars comprise five nodes. In average each vehicle is equipped with 12 CAN nodes. Of course, this is a conservative estimation. This results in about 922 millions of CAN nodes used in passenger cars. Using the 80/20 rule (also known as the Pareto principle), the total available market is about 1,15 billion nodes. However, the figure of 20 percent for non-automotive nodes seems fairly high. Let us be conservative and assume that the non-automotive market is just half of this general estimation. Even then, the total number of installed CAN nodes is still about one billion. Double-checking this amount with the sales figures of CAN transceivers, CiA comes nearly to the same result: In 2016, about one billion CAN nodes have been installed. Of course, there is some uncertainty of ±10 percent.

Interpretation is necessary

Any market research not just counting nodes needs some interpretation. Most of the published studies provide figures based on revenue in US dollars or any other currency. But what is counted: The price for the entire electronic control unit (ECU) or device, just the price for the CAN interface hardware with or without the communication-related software. More critical: It seems that some studies are double-counting things. They count the price for the chips and for the board-level products. Any market research study needs to disclose the counting method in detail, so that the reader can interpret correctly the results.

A typical example is the study on in-vehicle networks (IVN) by Markets-and-Markets. The research company has published a global forecast to 2022 about IVN. The study...
reports IVN figures by vehicle type, network technology, application, and geography. It identifies and analyzes the market dynamics such as drivers, restraints, opportunities, and industry-specific challenges for the market. It also profiles the key players operating in the market. The demand for IVN in automobiles is expected to increase owing to the increasing vehicle production and rising trend of vehicle electrification.

The base year considered for the study is 2015, and forecast period is from 2016 to 2022. It values the IVN market at US-$ 836.6 million in 2015 and expects to reach US-$ 1,366 billion by 2022, at a CAGR of 7.14% between 2016 and 2022. The value comprises just the hardware costs for network controllers and transceivers, said the authors in a telephone conversion. It was not clear, how the price per node for the CAN controllers were evaluated, when they were integrated in a micro-controller: With or without partial costs for the housing.

The market share for CAN as shown in the figure is surprisingly low. On the opposite, the Flexray revenue looks quite high. According to CiA, in 2016, there have been installed about 1 billion CAN nodes. Each CAN port comprises a CAN controller and a CAN transceiver. The prices for these high-volume applications are not publicly available. But even with conservative estimations, they sum up to more than US-$ 500 million including the price for enclosures. Just the one billion of CAN transceivers costs more than US-$ 200 million.

The research methodology used to estimate and forecast the in-vehicle networking market began with capturing data on key vendor revenues through secondary research. Some of the secondary sources include associations such as Organisation Internationale des Constructeurs d’Automobiles (OICA), International Council on Clean Transportation, and International Organization of Motor Vehicle Manufacturers, among others. The vendor offerings have also been taken into consideration to determine the market segmentation. Primary source were interviews with OEMs and automotive suppliers. The Flexray figures given for 2016 are questionable – in particular, because just a few high-end and medium cars implement Flexray nodes today. The only explanation is that the costs for Flexray controllers are more than ten-times higher as for CAN.
Another Market-and-Market study on data busses estimated the revenue in 2021 to about US-$ 19.5 billion. One year before, the researchers predicted the revenue in 2020 to just US-$ 8.5 billion. Could be that prices have increased within one year. Just counting the number of node respectively interfaces, makes market research studies more comparable.

Transparency Market Research (TMR) has also released an in-vehicle network survey. TMR estimated the revenue on transceiver chips from 2016 to 2025. But no detailed results have been given to the editors of the CAN Newsletter.

Studies on dedicated regional markets should be questioned, too. What has been considered: the micro-controller with CAN on-chip produced in Malaysia, the ECU produced in USA, installed in a car made in Germany, and sold in Egypt. The risk of double counting and comparing of apples to oranges are very high. Just count the number of interfaces on the chip level and you avoid double counting.

Absolute Reports has published recently the “United States CAN Market Report 2017”. This 99-pages report provides expected revenues, annual growth rates, etc. for different CAN markets including automotive electronics, industrial control, and healthcare. The companies interviewed include some market-leading chipmakers, but not all of them. Surprisingly, two board-level manufacturers have also been consulted: ESD (Germany) and National Instruments (USA). Both are CiA members. Detailed results are not available publically. The study covers the time from 2012 to 2022 (forecast). For all three evaluated markets, a further increase is predicted.

Spotlights on dedicated markets

Detailed CAN market figures for non-automotive markets do not exist with some exceptions. You can estimate from some market-leading companies to the overall market of a specific application field. An example: Bromma, a brand of Cargotec, has a market share of about 70 percent in spreaders used for cranes. The spreaders are equipped with embedded CAN networks. Just count the spreaders sold by the Swedish company (2000 per year) multiplied with the average number of CAN nodes (six to ten) used in the embedded network and you have a figure for this market. You may add a seventh for competitors also implementing CAN-based networks in their products. This should be done for each sub-market in which CAN networks are used. This is a Sisyphean task. So-to-say, it is a never-ending story, because CAN is implemented in countless applications.

HMS (Sweden) has published recently figures on market shares of industrial networks. The good news: The market share figures are based on number of nodes, not on revenue. In a very first glance, it looks like CAN would play a minor role in industrial networking (just 5 % for CAN/CANopen and 4 % for Devicenet). But the study covers according to the authors only the factory automation market in which CAN is really not one of the mainstream communication technologies. The study doesn’t cover embedded machine control networks, the high-volume application in industrial automation. It also doesn’t include the captive factory automation applications – in those the products are made by the OEMs. The captive markets are normally not visible and hard to count.

Summary

Trust only statistics that you have falsified by yourself. Counting just the absolute numbers of the total available market (TAM) is not statistics. When you are evaluating sub-markets, you need to specify clearly the scope. Most of the market research studies are questionable. Nevertheless, some of them may contain valuable figures. But the price is normally too high. It is always good to ask, who initiated the study. Often one customer has requested a market research study. To share the price with others, those reports are made public. Of course, the initiator will never be blamed or fall into bad light. He should be always satisfied with research results.

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