Can IOT Make Semiconductor Great Again?

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The global semiconductor business over the past thirty years shows an encouraging trend of growth in general, with only a few glitches that did not hinder the long-term trend. The growing trend, however, slows down in recent years, along with the global economy. Meanwhile, the Internet-of-Things (IOT) has long been identified, or expected, as the main driving force of growth for many industries in the future, if not now. Unfortunately, so far there is not much evidence that IOT will likely give a great boost to the semiconductor industry (that we are all concerned here) in the near future, due to limitations in global economy and energy consumption. What, then, are the specific problems and challenges to semiconductors? If IOT is going to give a boost to the stagnant semiconductor industry, what will be the key factors of its success? In my speech, I will try to address these issues, and propose the Symbiotic System Model (SSM) for developing IOT devices and systems. Especially for device and system test, the Symbiosis-Based Test (SBT) will also be proposed. A Symbiotic Relationship (SR) is a relationship of mutual dependence between two different (biological or electronic) systems, where (part of) one system's input is from the other's output, and vice versa. A Symbiotic System (SS) is a twin system comprising the primary (functional) system and secondary (test) system, with SR. A couple of cases of SSMs for existing and/or future applications will be demonstrated. This speech is meant for triggering more research activities regarding establishing a sound IOT platform that allows heterogeneous integration of technologies and partners to migrate certain industries based on the notion of IOT.

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