

PATRICK HAGGERTY'S FORECAST (1964)

The following paragraphs are reproduced from the book by Patrick E. Haggerty, *Management Philosophies and Practices of Texas Instruments* (Dallas: Texas Instruments, 1965).



Patrick E. Haggerty (President of TI)

BARRIERS TO OVERCOME IN ACHIEVING PERVASIVENESS

Yet, in spite of the pertinence of the knowledge and tools, there have been very fundamental limitations to our applying this knowledge and these tools as broadly as they justify and realizing the inherent power and full pervasiveness of electronics. Some of the most harassing have been:

1. The limitation of reliability
2. The limitation of cost
3. The limitation of complexity
4. The limitation imposed by the specialized character of and relative sophistication of the science, engineering and art of electronics.

BASIC REQUIREMENTS FOR FUTURE SUCCESS

The basic requirements to ensure that electronics enters this terminal phase of pervasiveness, I believe, are threefold:

1. A relatively concentrated, highly automated industrial complex which supplies integrated circuitry and closely related compatible discrete componentry to the rest of the electronics industry and to industry in general must exist. Only a few organizations (perhaps five) will supply 90 percent or more of total industry needs, for this will be a heavily capitalized industry with elaborate computer-controlled processing plants necessary to provide the great flexibility essential to produce the wide variety of integrated circuits needed to fulfill 50 percent or more of all electronic function requirements. In essence, this will be a basic materials segment of the electronics industry with the integrated circuits it produces as the basic materials used by the much larger total electronics industry to satisfy the needs of its customers. In a very real sense (although one must not pursue the analog too far), the integrated circuit producers will be to the rest of the industry as the producers of steel are to the automotive industry, the producers of copper are to the electrical industry, or the producers of aluminum to the myriad of organizations which use that material as a basis for their products.

2. This integrated circuits industry must have established a common language for the input and output parameters which specify its products. It will have created a wide variety of computer programs, which will have replaced conventional engineering handbooks as we know them today and truly allow the user of these basic electronic materials, integrated circuits and compatible discrete components, to design the required electronic functions by the input and output parameters available and specified.

3. A very large number of organizations, probably many more than today, will utilize these basic electronic materials to solve their own and their customers' problems. These organizations will exist in all sectors of our society and will be able to utilize the highly specialized and highly concentrated integrated circuits industry as a substitute for the kind of sophisticated electronics skill described above as the fourth limitation. This will have been made possible by the myriad of computer programs which will allow design by computer through the specification via common language of input and output parameters. A much larger proportion than today of our highly talented electronics engineers will be able to devote their time to the application of electronics to meet the needs of our society rather than to looking inward at electronics itself.