

## Chapter 7 The Care and Feeding of Strategy— The Technology Food Chain

Today, success in the global marketplace means creating and applying new knowledge—which is to say new technology—faster than one’s competitors. That is the fundamental law in this competitive world.  
—Erich Bloch, Distinguished Fellow, Council on Competitiveness

The Technology Food Chain (TFC) uses the food chain metaphor to explain the role of added value know-how (technology) as one moves from basic science to products, to systems, and finally to services. A simplified technology food chain for the computer and information services industry is shown in Figure 6. Also shown is an analogous chain for the simpler matter of fish, fishing, and eating fish. At each stage of the chain, beyond basic science, know-how is applied to pre-existing technology in the form of products, processes, and tools to fashion a new class of products that meet a higher order need. Thus, each step in this food chain “feeds on” the technology that has been employed to create the predecessor products, processes, and tools. Services represent the final step in the TFC.

The Technology Food Chain is not to be confused with the “value chain” concept that is common in business. The value chain concept

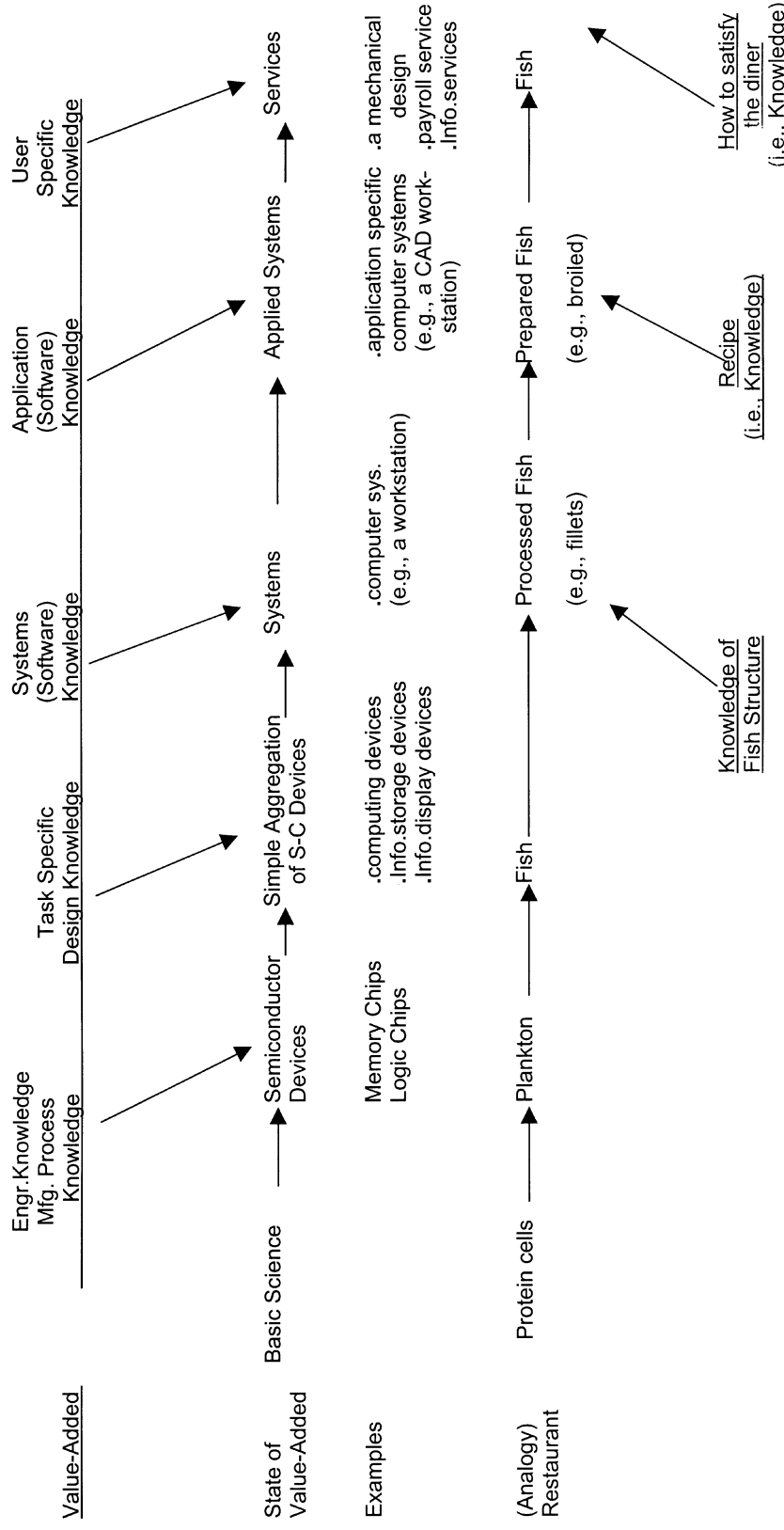


Figure 6. Technology Food Chain—computer and information services industry

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is used in two different ways. One is to describe the sequential steps by which a company converts inputs into its product or service, such as the steps of design, manufacturing, marketing, and distribution. The second is the “supply chain” concept that is used to depict the sequence and types of companies that provide *inputs* to a company (referred to as “upstream” elements of the supply chain) and the sequence and types of businesses that buy the company’s *outputs* and either add additional value or sell it directly to the ultimate consumer (referred to as “downstream” elements of the supply chain).

A Technology Food Chain is another matter. It depicts for an industry or subindustry the stages from basic science to the ultimate stage by which some need is met. At each stage technology (know-how) is added to the output of the previous stages. Each stage is dependent on *all* of the stages that precede it.

The TFC for the computer and information services industry shown in Figure 6 demonstrates these dependencies. In the early days of the industry, companies operated at multiple stages or, in some cases, *all* stages of the TFC, for they had no alternative to meet their dependence on them. As the industry matured this would change, but whether they operated at more than one stage, that is, were more or less vertically integrated, was a matter of economic choice.

A key difference of the Technology Food Chain, when compared with the value or supply chain, is the perspective it provides in understanding the types of know-how required at each stage. This is essential to determining what kind of know-how is merely a requisite to a product or service—in other words, *necessary* know-how (technology)—and what kind of know-how provides a distinctive advantage—in other words, *sufficient* know-how (technology). It also is helpful to anticipate how know-how may evolve over time and thus *change the source of competitive advantage* in the future.

Again in Figure 6 we can see that as more and more *applications* of computers and microelectronics are devised, the demand for components, subsystems, and systems rapidly increases, and those stages of the TFC become more and more commoditylike. The source of competitive advantage in those stages—the sufficient technology for strategic success—becomes that which yields low cost. At the same time, however, it is necessary to continue expenditures to enhance product features and performance.

The Technology Food Chain metaphor, then, is a useful heuristic in several ways. It makes clear the basic technological forces at work in an industry and how they change as an industry matures. It also clearly shows the potential sources of competitive advantage at all stages of industry development. Knowing where your business is on the food chain clarifies which technologies are the