Measuring the Potential for IT Convergence at Macro Level

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WHAT IS CONVERGENCE?

Convergence describes a process change in industry structures that combines markets through technological and economic dimensions to meet merging consumer needs.

It occurs either through competitive substitution or through the complementary merging of products or services, or both at once (Greenstein & Khanna, 1997).

The main issues in the process of convergence have been investigated in the literature (Bradley, Hausman and Nolan, 1993; Collins, Bane and Bradley, 1997; Yoffie, 1997; Valdani, 1997, 2000; Ancarani, 1999; Pagani, 2000).

The numerous innovations that could lead to convergence between TV and online services occur in various dimensions.

The *technology dimension* refers to the diffusion of technological innovations into various industries. The growing integration of functions into formerly separate products or services, or the emergence of hybrid products with new functions is enabled primarily through digitization and data compression. Customers and media companies are confronted with technology-driven innovations in the area of transport media as well as new devices. Typical characteristics of these technologies are digital storage and transmission of content, and a higher degree of interactivity (Schreiber, 1997; Rawolle & Hess, 2000).

The *needs dimension* refers to the functional basis of convergence: Functions fulfill needs of customers, which can also merge and develop from different areas. This depends on the customers' willingness to accept new forms of need fulfillment or new products to fulfill old needs.

This dimension in the process of convergence refers to the formation of integrated and convergent 'cluster of needs' (Ancarani, 1999) that is the ten-dency of customers to favour a single supplier for a set of related needs (Vicari, 1989).

The *competitive dimension* refers to mergers, acquisitions, alliances and other forms of cooperation – often made possible by deregulation – among operators at different levels of the multimedia value chain. Competitive dynamics influence the structures of industries just as it does the typical managerial creativity of the single factory in originating products and services, combining know-how to create new solutions and removing the barriers among different users' segments.

A strategic intent is at play on the part of enterprises to use the leverage of their own resources within a framework of incremental strategic management in order to deploy them over an ever-increasing number of sectors.

One thinks, in this regard, of Hamel's (1996, 2000) concept of 'driving convergence'. This concept places the firm and its own competitive strategies at the control of the process of industry convergence.

Figure 1. A summary of dimensions and basic forms of convergence
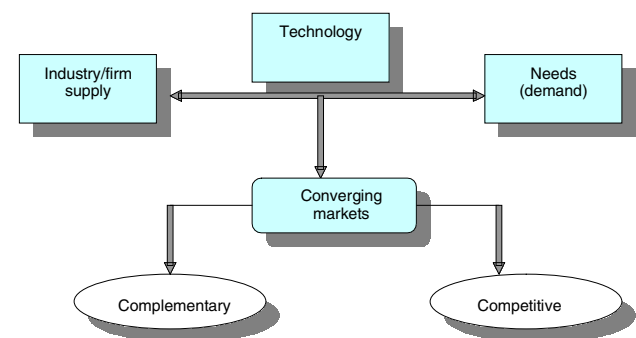
Source: Adapted from Dowling, Lechner, & Thielmann, 2000

In general, the concept of digital convergence is used to refer to three possible axes of alignment (Flynn, 2000).

- convergence of devices
- convergence of networks
- convergence of content

Although there is evidence in digital environments of limited alignment in some of these areas, there are considerable physical, technical, and consumer barriers in all three areas.

CONSTRAINTS TO CONVERGENCE

There are three different types of constraints on the convergence of the devices that are used to access the three digital platforms (digital TV, personal computers and mobile devices). These constraints can be summed up in the form of the three following questions.

1. Is it physically possible to merge the two devices?
2. Is it technically possible to merge the two devices?
3. Will consumers want to use the merged device?

Given that we are talking about three different types of network-access devices here (TV, PCs, and mobile devices), there are three potential areas of convergence: PC and TV (web TV or Internet access from digital TV), PC and mobile phones (mobile television), and TV and mobile phone.

In the physical domain, the barriers to PC and TV convergence lie principally with respect to the size of the input device and its portability. The barriers to PC and mobile phone convergence in the physical domain are rather more acute, and there is a diver-gence along every physical measure (size of display device, size of input device, and portability).

Technical requirements either affect the available transport media, the addressed end device, or both. Three important aspects dominate in this area.

- the access mechanism
- the number of simultaneous recipients
- the support of feedback channels in the case of transmission media

With regard to the access mechanism, a distinction between push and pull mechanisms must be made. Pull-oriented access is characterized by the data transmission being triggered by the end user (which is typical for Web applications or video on demand), whereas push-oriented transmission is triggered by the sender. Push services can be time scheduled (e.g., television broadcast).

Device-specific requirements mainly affect reproduction, storage capabilities, and input facilities. Displaying and synchronizing different kinds of media types is a basic demand with regard to reproduction. A distinction between static (time invariant as text, graphics, and pictures) and dynamic (time variant as video and audio) media types has to be made (Grauer & Merten, 1996). Next, storage capabilities enable synchronous download and consumption of contents in the case of online media usage. Typically, end devices with roots in information technology (like PCs, PDAs [personal digital assistants], and notebooks) possess sufficient, persistent storage capacity. In contrast, most of the entertainment electronics lack comparable characteristics.

Another important aspect of end devices is input facilities. Typically, PC-based end devices possess the most advanced mechanisms for user input (keyboard, mouse, joystick, etc.). In contrast, mobile or TV-based devices usually lack sophisticated input facilities.

Table 1. A summary of physical characteristics of consumer devices

Characteristic	TV	PC	Mobile phone
Size of display device	Large	Large	Small
Size of input device	Small	Large (keyboard)	Small (keypad)
Portability	Low	Medium	High

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