

TELECOMMUNICATIONS TRENDS

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1 INCREASING ROLE OF INFORMATION

In addition to the basic factors: capital and labor, information is becoming a factor of increasing importance. Following many others we claim that the role of information - more closely its share of the value products create - has been increasing rapidly during the past decades. In our terminology we say that information has become a product element. Information can be considered to be present in products in three major roles, information of markets and technology (know how), information as embedded elements in products (software) and information as a product itself (media products). When information is created and processed in digital form, it can also be transferred via digital networks. During the next ten or twenty years remarkable changes in industries and in the society will take place, these changes being a result of the increasing value of digital information and its new infrastructure: the modern broadband networks (Figure 1).

2 GROWTH IN MOBILE AND VALUE ADDED SERVICES

The distribution of value in the value chain will also change. In Figure 2 there are two basic types of value chains, a generic one and a differentiated one. In the left hand side of a value chain we can see the accumulated value of raw materials and technology, in the middle the product itself, and in the right is the value which customer pay for the product. Basic telephony products have a generic nature: They are based on expensive high quality technology, and there is little customer oriented value from differentiation; there are only local, long distance and international calls. Their value chain resembles the value chain of air traffic: high technology production with little differentiation, only business, tourist and charter flights. In value

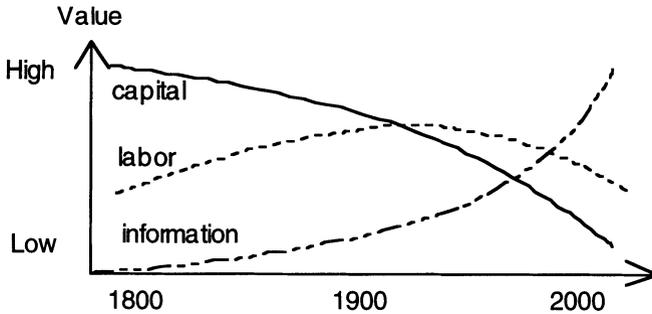


Figure 1 Relative value of Capital, Labor and Information.

added products there are more customer oriented value and often the basic technology has become more cost effective thus enabling more value adding capability. What can we say about the value added telecommunications products with low cost broadband infrastructure. To continue our traffic analogy, in the road traffic it is free to use the roads, there are hundreds of thousands of service providers transporting goods and people, and then there is the expensive terminal equipment which people are willing to buy: the private car. The concept Information Superhighway clearly represents the similar development in telecommunications, the mobile terminal being the private car.

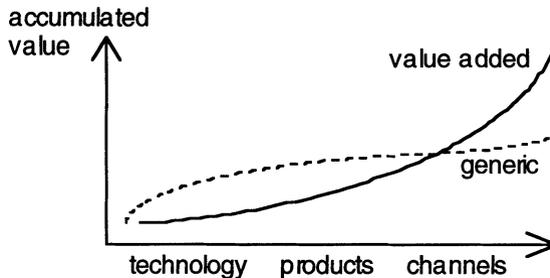


Figure 2 Accumulated value in Generic and Value Added value chains.

The changes created by the modern broadband networks will be as profound as those caused by the development of physical traffic networks during this century. The transition from trains and railways to roads and motorcars changed the structures of society and industries. The competing network operators will merge or build alliances, a comprehensive broadband infrastructure will be built, thousands value added service providers will be established with lots of

added value from mobile and intelligent services. The multimedia products will be available via the broadband networks, the content often being more valuable than the container.

3 NEW NETWORKS WILL BE BROADBAND AND INTELLIGENT

In telecommunications technology substantial new breakthroughs are going on. The introduction of cellular radio networks and mobility is probably the most influential one in the next few years. The broadband transmission and switching technology is also maturing and will provide a cost effective platform for service provision. The shift from basic telephony to mobile and value added services, and the increasing value of digital multimedia services, is depicted in Figure 3.

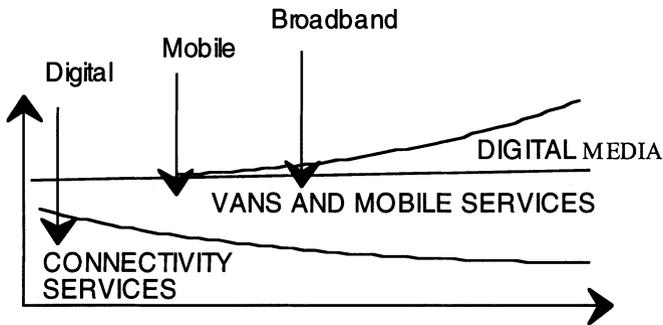


Figure 3 Telecom services value shift to Mobile, VANS and Digital Media.

When the broadband customer access will be available, interactive business and consumer services based on video and multimedia will become possible. The increasing role of service logics and multimedia software represents the computer controlled structure of modern telecommunications, where protocols, application technology and resource management are key factors. In modern telephony the most promising computer control and management concept is the Intelligent Network (*IN*). It facilitates the development and management of new services by service providers. Intelligent networks can be considered as the bridging technology between the customer based service management, the service application execution and the connection control in the digital voice services. Considering the mobile and broadband technologies it is a natural question, how this concept of intelligence will develop. It seems to be clear that the service applications will be distributed over terminals and different service control and provider nodes. Examples of distributed intelligence can be found in Internet services (*WWW*) and in the specifications of Universal Mobile Telecommunications Services (*UMTS*).

4 INTELLIGENT, CUSTOMER ORIENTED SERVICES

Modern computer controlled service creation is capable in customer oriented mass tailoring. It may even be so that the user will be able to configure the communications environment in the way she or he likes it most. This could be called the personal sphere or the information and communications landscape. It will be the user that makes the choices between services. The coming standards will be so called dominant designs which are evaluated and chosen by the market. Several experts currently believe that the dominant design for multimedia services will grow from Internet services and that the value added voice services integrated to them will evolve from Intelligent Networks.

We are entering into an era of competitive telecommunication services market, where the competencies available in the companies will be of the most important value creating factors. By developing competencies and new technology the research and development activities (R&D) have an increasing role in modern telecommunications. R&D has also an important mission in providing education and skill building for young professionals. New technology experts are of great value to business units. Enthusiastic teams of experts in relevant technology areas form the best basis of new technology applications and innovations.

5 BIOGRAPHY

Olli Martikainen, Ph.D., from Helsinki University and M.Sc. from Helsinki University of Technology. He has been doing research in several positions in Helsinki University of Technology (1976 - 1982), Oxford University (1980 - 1981) and Technical Research Centre of Finland (1982 - 1985). Later he has been R&D manager at Nokia Electronics (1985 - 1986), department manager at Nokia Research Centre (1986 - 1988), professor and head of Data-communications Institute at Lappeenranta University of Technology (1988 - 1989) and professor at Technical Research Centre (1989 - 1991). Since 1991 he has been research director at Telecom Finland. Currently he is vice president, R&D, at Telecom Finland Ltd., and professor at Helsinki University of Technology. His main areas of interest are telecommunication software methods and tools, network architectures, performance analysis and new industrial and economic structures in telecommunications.