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ITU Young Minds in Telecom Application  
Essay Portion

*The main benefits arising from and the biggest challenges  
brought about by technological convergence in the ICT sector:*

## **1 The Benefits and Challenges of Convergence**

The impact of technological convergence within the information and communication technologies (ICTs) sector has implications far beyond the technologies themselves. Lower-costs, increased accessibility, and enhanced capabilities for innovation will be among the most prominent benefits arising from this trend. However, market disruption, regulatory arbitrage, and the exacerbation of the digital divide are among its potential challenges.

## **2 The Pressures of Convergence**

ICTs are converging in the sense that a single protocol for transmission, a single infrastructure for delivery, and a single device for reception of vital communications, information, and media are possible. However, this trend has many market, industry, and socio-economic implications that should be the concern of regulators, politicians, and citizens alike as we try to meet the challenges and reap the benefits of technological convergence.

### **2.1 Parsing Convergence**

As wide ranging components of ICT merge, it becomes useful to parse the different areas in which technological convergence is taking place so that we can better analyze benefits and challenges. Three distinct components of ICT appear to be undergoing significant convergence:

#### **2.1.1 Content**

The TCP/IP protocol that once defined the way in which only data and information was transmitted in 'packets' over the Internet is being utilized to transmit voice, video, and audio communications.

#### **2.1.2 Infrastructure**

The shift to TCP/IP for transmission of multiple forms of data has enhanced the value of broadband infrastructure capable of its delivery. A single broadband network can now deliver varied forms of communications that once required multiple networks.

#### **2.1.3 Equipment**

Convergence also reduces the number of physical devices required for transmission and reception of communications and media, whereby a broadband-connected computer could serve as a user's television, telephone, and portal to the World Wide Web.

## **2.2 The Convergence Environment**

These components of technological convergence subsequently place new pressures on the ICT industry. Television broadcasters, for example, may no longer be broadcasting to a television and Voice Over IP (VoIP) services threaten traditional telecommunications operators as users move to a single infrastructure.

## **3 The Benefits of Convergence**

While the path towards convergence is by no means certain, the trends of confluence and merger within the ICT sector that are cited above are distinct and deserve attention for their many potential benefits. I consider lower-costs, increased accessibility, and enhanced capabilities for innovation to be the most prominent benefits arising from technological convergence in the ICT sector.

### **3.1 Lower Costs and Increased Access**

Convergence is in many ways defined by the increased technological efficiencies that enable it. As user adoption reaches a critical mass, these efficiencies could manifest in lower-costs and increased access for users. User benefits will result from equipment convergence, whereby a single device for receiving and transmitting content reduces cost by eliminating ancillary devices. The convenience of equipment convergence also offers productivity gains for both individuals and businesses. In addition, advancements in wireless technology will make these devices more mobile and accessibility less of an issue for previously excluded users.

### **3.2 Enhanced Capability for Innovation**

Convergence to TCP/IP and broadband could also have a positive impact on innovations within the ICT sector because of its decentralizing effects. Whereas traditional telecommunications innovations were inherently centralized due to the nature of the networks and relevant technologies, a converged medium that transmits generic content stimulates innovation at the ends and places it in the hands of the users. As a result, more highly customized devices, services, and applications become possible. Additionally, more user-generated content can be transmitted via enhanced broadband and a single protocol (TCP/IP), and two-way communications can be facilitated in media that were traditionally one-way.

### **3.3 Positive Impact on Society**

Lower-costs, increased access, and decentralization of innovation via convergence could have a positive impact on users and their societies. All of these benefits could likewise enhance political participation, civil society engagement, and pose positive impacts for those previously excluded from the ICT sector. However, the degree to which these benefits are achieved will depend greatly on how well policy makers and regulators respond to the challenges of convergence.

## **4 The Challenges of Convergence**

### **4.1 Market Disruption**

One glaring result of convergence that is revealed in the benefits I described will be market disruption. As formerly distinct sub-sectors of ICT converge, so do certain components of the value chain for communications transmission and media broadcasting. One example is the merger of data and video, whereby the nature of film distribution is severely altered. Further disruption is possible because of the prevalence of broadband and TCP/IP, whereby ownership of infrastructure could allow for a greater influence on content distribution. From a broader perspective, we see that convergence forces a redefinition of these sub-sectors that may allow for regulatory arbitrage.

### **4.2 Digital Divide**

Beyond market disruptions, convergence will pose specific challenges to developing nations whose citizens risk being harmed in a converged ICT environment where the digital divide is exacerbated. The risks of such a result are high because developed nations will be advantaged first-movers on convergence as their wealthier users and highly endowed ICT industry reaches critical mass absorption rates prior to less-developed nations. Nations who are already disadvantaged within the global ICT sector will then face new resource demands required of the convergence environment in order to reap its benefits.

### **4.3 Regulatory Demands**

Policy makers will be challenged by this convergence environment as they attempt to distribute the gains from these advances and prevent market inefficiencies. Regulatory responses may require increased harmonization across formerly distinct sectors in a number of issue areas:

- \*Licensing
- \*Price Regulation
- \*Spectrum Management
- \*Security
- \*Universal Service

The regulatory mechanisms and tools formerly employed to achieve policy objectives will be altered by technological convergence and may require convergence on the part of regulators as well. While it is vital that policy makers react quickly to disruptions, they also need to be well informed and ask key questions that will determine their approach.

#### **4.3.1 Questions For Policy Makers**

- \*Exactly what ICT sub-sectors or industries are converging?
- \*Will more technologically neutral licensing schemes meet the demands of this convergence?
- \*Does convergence require additional regulation to prevent new opportunities for market inefficiencies?

\*Is additional international cooperation of policy makers required to prevent exacerbation of the digital divide?

\*Are there concerns with skipping a step in regulation in responding too quickly to convergence?

## **5 Meeting The Challenges**

In order to reap the benefits of lower-costs, accessibility, and enhanced capabilities for innovation offered by technological convenience, policy makers must also meet the challenges of market disruption, industry realignment, and regulatory arbitrage that the trend poses. Of particular concern will be the potential for convergence to exacerbate the global digital divide that is characteristic of the ICT sector. Regulators in developing nations will be advantaged by the lessons learned in first-mover nations in their efforts to meet this challenge, but vigorous research and cooperation will be vital. Thus, reaping the benefits of technological convergence requires timely and well-informed action by national, regional, and international policy makers.