Chapter 10
Disruption in the ICT-Sector: Will Former Telecommunications Monopolists Stumble across VoIP?

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ABSTRACT
In this chapter, the authors discuss innovations associated with the transition from the circuit-switched public telephone network to IP packet-switched networks for the provision of voice services by focusing on research findings in the area of quality of service (QoS). To give a meaningful answer on how this transition affects the telecommunications industry, we elaborate on the frequently-cited concept of disruptive innovations, pioneered by Harvard Professor Clayton M. Christensen.

INTRODUCTION
In the context of the European wire-line telecommunication industry this work elaborates on the popular claim that the data-oriented voice transmission technology Voice-over-Internet-Protocol (VoIP) does constitute a disruptive technology or innovation. The inability to anticipate new technologies, which emerge from below, has often been put forward as the main reason for the failure of established firms and the advantage for the attacker, namely the new entrant. Previously, the most dominant view in technology strategy was that the displacement of established firms and technologies by new firms and their technologies is driven by the superior performance characteristics offered by newcomers and the incumbents’ difficulties in matching their performance and capabilities. Clayton M. Christensen calls all new technologies that exhibit improved performance characteristics sustaining technologies. They can be incremental, radical or discontinuous, but what they all have in common is that they improve the performance with respect to the technology used before (Christensen, 1997). However, by identifying the possibility that technologies with inferior performance can displace
established players and their technology in a certain industry, the way in which managers and scholars alike approach technology competition has fundamentally changed, prompting a reassessment of innovation strategies in general. These technologies that, at least in the short-term, result in worse product performance are what Christensen terms disruptive technologies. They are inferior to the established products measured along the dimensions of certain performance attributes in mainstream markets.

The corresponding research identifies QoS as the most important performance attribute for telephony services in general. The comparison of VoIP to traditional telephony QoS levels and their corresponding performance development has revealed that QoS of Internet Telephony was intolerably low when first introduced, compared to the standards set by the traditional telephony. However, these shortcomings were largely factored out and optimized through numerous QoS enhancing methods, meaningful traffic engineering and network planning. This chapter will show that QoS of today’s VoIP solutions is, however, absolutely satisfactory to customers.

The underlying and deductive reasoning of what Christensen calls “performance oversupply” in traditional telecommunication services, is the possibility that what does not satisfy customer needs today may be fully performance-competitive in the same market tomorrow. This performance oversupply in the mainstream market can clearly be identified on the basis of an extended QoS-comparison of both VoIP and traditional telephony by a graphical depiction of VoIP QoS performance trajectories, which represent the performance supplied by the technology and the one demanded by the mainstream market. This chapter will therefore compare the QoS levels for both transmission technologies in a way similar to Christensen’s “Trajectory Performance Diagrams”.

Due to the fact that QoS is a dependent variable of numerous different factors with each one having a different impact on either one of the two transmission technologies of interest, the comparison is considerably more complex and extensive than those known from Christensen’s works. This research thus provides an integrated, recapitulating and straightforward depiction of QoS-differences between the transmission techniques, which ultimately show that VoIP proves to be a disruptive technology. The trend towards data-oriented networks and therefore VoIP might therefore eventually lead to the failure of former telecommunications monopolist’s wireline business; following the universal claim of Christensen’s theory.

THE “INNOVATORS DILEMMA”: FAILURE FRAMEWORK BY CHRISTENSEN

Why might firms be regarded as well managed, yet subsequently lose their leadership position in an industry when faced with disruptive change? Management researchers have studied the commercial potential of disruptive technologies for nearly a century. Kondratief was among the early researchers in the field, suggesting the potential of long waves of technological change caused by new technologies and new skill sets in either creating or redefining firms and existing markets (Kondratief, November 1935). Creative destruction, a term coined by Joseph Schumpeter (1942) to denote a “process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one,” was the basis for several follow-up studies that tried to explain why innovative entrepreneurship destroys established enterprises and simultaneously yields new ones (Schumpeter, 1942). The key hypothesis of Schumpeter’s work is that large firms not only innovate more intensively than small firms do (Scherer, 1992), but are also better suited to innovations (Schumpeter, 1942).
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