

## Telephone

The telephone was invented in 187X. Although there has been considerable debate about the particular events surrounding the telephone's initial commercialization, we identified the following important characteristics for our assessment of the risk of speculation associated with the telephone.

## Uncertainty

The nature of technological development

How will the technology evolve to solve a useful problem? Where will the bottlenecks be in a technology's subcomponents?

Technological uncertainty was initially high, especially during the first days of the CONAME. John and others have written about the early competition with Elisha Gray and the threat posed by Western Union (Fischer 2015; John 2010). However, once Western Union agreed to settle in late 1879, Bell found itself in early 1880 in possession of "about 60,000 subscribers in exchanges scattered about the country and a monopoly on the telephone business (Fischer, 144)." As the technology came into use, the Bell interests were able to establish a controlling position with respect to the \*use\* of the technology. Christopher Beauchamp argues convincingly that the telephone is the first technology where IP-related legal stratagems were integral to both the success of the Bell enterprise and to the resulting industry structure (Beauchamp 2010, 2015).

The speed of technological development

How quickly will a common design be established and margins eroded?

Telephone technology evolved relatively quickly. However, during the patent era only Bell licensees were allowed to sell telephone service. Consistent with predictions of the theory of monopoly, multiple studies have found that prices were higher and technology diffusion slower than would have been the case under a more competitive market structure. MacDougall argues that the slow pace of development led to charges of elitism against the so-called Boston phone (MacDougall 2013). Notwithstanding, strong patent enforcement limited opportunities for competitors to erode Bell's position and preserved margins for the duration of the patent.

Competitive uncertainty

Potential entrants

How many firms will enter the market and what will their capabilities be? Should we expect pricing pressure?

See above. Entry was limited to Bell licensees during the patent era.

#### Business model and value chain uncertainty

The telephone was initially seen through the same lens as the telegraph. Bell thought that the telephone would be a user-friendly telegraph that would allow more direct, point-to-point coordination between, say, a business owner and his manufacturing plant. This application proved relatively unattractive. Demand was modest at best. During the period of independent telephony and following, the telephone emerged as a technology for sociability, especially among women (Fischer 1994). Here, it created an entirely new mode of value creation. Previously, socializing in this way required face-to-face communication -- i.e., at church, in town on market day, or over the fence.

#### Monetization

How will the solution be monetized? Are there many different bets in the market?

The number of potential “bets” was limited by the patent enforcement actions of the Bell interests. A small number of companies raised money to try to sell telephone service outside the Bell umbrella. Dolbear, People’s, Molecular, and Overland were sufficiently well capitalized to participate in their patent infringement cases going to the Supreme court (Casson 1910).

#### The boundaries of the firm

If the product is complex and built from many components, how will the market be vertically structured?

The settlement with Western Union in late 1879 (see above) established a provisional truce that allowed Bell to develop the telephone system relatively unencumbered.

#### Future market structure and power

Can current players effectively restrict entry through intellectual property rights or other means? Will product differentiation matter and firms have pricing power, or not? Which parts of the value chain will profit? Which part of the value chain will capture the most rents?

See above. Entry was tightly restricted. Competition would have likely led to the introduction of different service offerings, but didn’t occur to any meaningful extent in the U.S. until after the expiration of the Bell Patent.

#### Regulatory uncertainty

#### Government actions

Will government regulation slow down the market and determine winners and losers? Will safety or other fairness considerations force the government to intervene?

Beyond the role of the courts in adjudicating the limits of the Bell patent, government regulation played a relatively minor role in the early history of the telephone industry.

Demand uncertainty

Market demand

How quickly will demand develop? Will technological convergence accelerate or retard demand?

See above.

## **Narratives**

### *Coordinating Event*

**Is there a collectively-experienced introduction of the technology, i.e. Was there some event that happened that focused the public's attention on this technology? Was there a public demonstration of value?**

There was not one single, noteworthy demonstration of the telephone. Instead, there many small demonstrations, and they were newsworthy: "Bell and his associates spent much of the next year or so [1876-1877] giving demonstrations around the country of this 'wonder', sometimes borrowing telegraph wires for long-distance calls (and sometimes failing).... These stunts garnered considerable publicity and awe as journalists relayed the news around the world (Fischer, 143-4).

**Is the coordinating event a single event or a series of demonstrations over time of the technology's value?**

See quote above. Bell and associates made numerous demonstrations. Charged admittance of \$.025 for public (at least in NYC in 1877).

**Does the technology have crossover appeal? Is there evidence that excitement about the technology was not solely limited to industry press, i.e. did the popular press also cover this technology?**

Evidence from secondary sources suggests that public was indeed fascinated by the "speaking and singing telephone" and that the technology was covered in the mainstream press (Fischer 2015).

## **Did the technology create a paradigm shift in fundamental assumptions of how things should be done?**

The telephone represented an entirely new mode of person-to-person communication; it is hard to grasp in retrospect how fundamental a change this was. Even so, Bell had to market benefits of telepresence, especially in the early years when it was poorly understood. Most people involved with industry came from background in telegraphy and therefore saw telephone through that prism.

## **Does the technology have a “wow” factor?**

Observers couldn't believe it. Looked for tube in the wire.

[end]

(Rhodes 1929)

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