

Technology and New Service Creation

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Abstract

This paper is an attempt to capture the impacts that technology can have in creating new service entities as well as improving existing ones. The deployment of new technology for service creation, delivery and marketing can have planned as well as serendipitous consequences. The latter can grow steadily in importance and impact on a firm's revenues. This is especially true when the new enabling technology is an information technology.

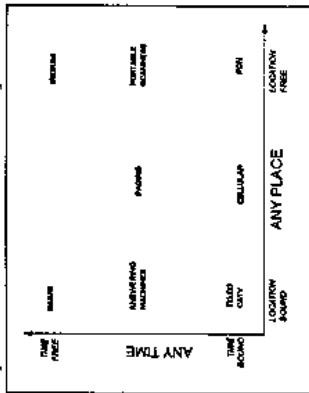
1. INTRODUCTION

This paper addresses the creation of new services through the deployment of technology. Though many new services have been created in the past with non-technological means, it is increasingly difficult to do so. In order to grow, service firms must understand how to creatively harness the new capabilities provided by emerging technologies. The availability of a fast-growing set of technological capabilities has made new service definition more of an art form, limited primarily by the imagination and vision of the service provider.

Technological change has occurred with increasing rapidity in recent decades. New technologies have enabled companies to create new commercial services through the efficient substitution of technology-based solutions for manual and personal tasks. Consumers in much of the developed world may be increasingly characterized as relatively time-poor and resource-rich. Any new services which are able to offer customers a trade-off between time and resources are likely to be successful—provided they can do so in a highly efficient manner. Technology-based resources are becoming increasingly affordable, even as human resources become more costly. This is especially true of information technologies, now at the core of many service businesses. Moreover, such technologies, applied judiciously, offer increases in functionality that cannot be matched through any amount of manual work.

In this paper, we first discuss what we mean by new services. We then provide a framework for the "generic" impacts of new technologies. Since information technologies, more than any other kind, are germane to the services context, we discuss the

Figure 1 "Teletime" Technologies



unique properties of such technologies. Information handling power has become the most abundant resource of the present age, and any company which does not maximize its use of this resource is bound to be at a serious disadvantage in the market.

Next, we provide a discussion of the types of new service activities that can be created through the application of technology. Most such new service activities provide greater time and place utility to customers, and several provide important new functionalities.

2. NEW SERVICES

We define two types of "new" technology-enabled services:

1. Services that expand the market.
2. Technology-based innovations which add a differentiating, value-adding element to an existing service; this allows a company to obtain a higher market share, charge a higher price or both.

New technology can unearth latent customer needs which existed but had no means of expression until the technology became viable. For example, the need for customers to enjoy home-based video entertainment existed in a latent sense prior to the popularization of video players. The need was imperfectly met through broadcast presentations of movies; this "solution" imposed both a time as well as a place constraint on the customer. With the advent of VCRs, the time constraint was largely removed, though the place constraint remains a substantial one. Customers must still make two trips to a video outlet to watch one movie. This constraint will be eased through the provision of "video-on-demand" services later in this decade, requiring only that customers remain tethered to the cable which brings the entertainment to them. Eventually, the rising tide of technology will lift that constraint as well, through interactive broadband wireless communications.

Table 1 The Generic Impacts of Technology

	Changes due to technology innovation within industry	Changes due to technology innovation across industries
Incremental	Speed Larger hard drives based on magnetic technology	Functionality Improvements in automobile performance due to electronic trionics
Breakthrough	Memory chips improving from 100ns to 70ns Move from 486 leading to Pentium Five-fold increase in MIPS	Cost Lowering of breakdown performance of feasible manufacturing systems Move from mechanical to electronic-optoelectronic switches

3. WHAT TECHNOLOGY CAN DO

Historically, the role of technology has primarily been in creating form, utility, or products well as processing. The focus of competition has now shifted towards the creation of time and place utilities. In this paper, we will therefore address opportunities to create new services, through the removal of location-based and time-based constraints on customers. We label the technologies used to create such "anytime, anyplace" services "teletime" technologies. Figure 1 presents several communication technologies using this classification.

In a generic sense, the impacts of new technology can be described in a limited number of ways. Technology enables either incremental or breakthrough improvements in speed, capacity, functionality, or cost (see Table 1). Most speed and capacity improvements have been technological developments within an industry; on the other hand, most functionality and cost breakthroughs occur due to the fusing of technological streams across industries (Kodama, 1992).

4. INFORMATION TECHNOLOGY AND SERVICES

The primary technological enablers of service innovation are informational technologies, especially computing and telecommunications. While computing technologies continue to advance at a breakneck pace, their future trajectories appear fairly predictable; the rates of improvement in both processing power and storage technologies have tended to steady, albeit slower, exponential curves. The telecommunications industry, on the other hand, is poised for discontinuous change. In the next several years, we will witness a dramatic shift from narrowband to broadband transmission, from dialline to increasingly wireless transmission, from voice, data and image transmission to multimedia transmission, complete with full motion televi-

tion-quality video (and in the next stage, high definition video). It has been estimated that the combined information technology industry will over \$1 trillion a year already, will by the year 2000 generate roughly \$3.5 trillion in global revenues annually—equal to the GNP of the United States in the early 1980s. It will transform all commerce in ways we are just beginning to comprehend today.

Early in 1993, the IREX issued a report entitled *Portfolio of Emerging Technologies*. Contained in the report is a vision of the future of electrotechnology. Three of the "seven grand challenges" are related to information technology (Bell, 1993):

- People will be reachable anytime anywhere through global personal communication networks and wireless communications
- People will have instant access to all information through databases, high speed links and flat panel displays and interfaces
- A person may be present at anytime, anywhere through virtual presence and reality.

George Gilder has written that economies periodically go through a technological "winger," a major new invention which greatly reduces the cost of an important factor of production and in the process triggers an industrial revolution (Gilder, 1992). Those companies and industries which fail to rapidly eliminate the supplanted technology and replace it with the new one face imminent demise. For example, the steam engine freed humans from many forms of physical labor, and greatly lowered the price of physical force. Thereafter, those companies and nations prospered which maximized the deployment of this newly cheap resource. Over the past three decades, the integrated circuit has been putting economies through a similar winger; it has caused the price of electronic circuitry to drop by a factor of a million over that time, with no letup in sight.

Since more and more of the enabling technologies for new service creation are clearly information technologies, it is useful to consider the unique properties of such technologies:

Equalitarian: Once exclusive services can be made accessible to broader markets. The costs of any product or service that is primarily based on electronics drop by a third with each doubling of accumulated sales. Any ubiquitous electronics-based product thus has to be cheap.

Convergent: The electronics age recognizes few boundaries between previously form-dominated industries. This property enables service providers to offer "one stop" solutions to customers.

Borderless: Information technology is inherently location free—it allows customers "any time, any place" access. It thus will allow for services like global bridal registries and global

shopping services.

Versatile: Information technology exhibits the properties of plasticity and customization: once standardized services can be easily made unique. A major impact of technology in creating new services is the ability to virtualize some elements (something that is not there, but the customer perceives it to be) while making others transparent (invisible to the customer, even though they exist).

5. TYPES OF NEW SERVICE ENTITIES CREATED THROUGH TECHNOLOGY

a. **Quick response:** These services provide time utility through speed and any time access. For example, fax technology is now being combined with computing and storage technologies to create new ranges of "information-on-demand" services. Applications are being stream-lined up daily, from real estate to help wanted to advertising literature to services manuals. Eventually, we will have multimedia information on demand. Many companies have staked their future on this technological vector. For example, Microsoft has articulated a vision of "information at your fingertips."

b. **Electronic sourcing and distribution systems:** The primary thrust of such services is to enhance place utility. Geography is becoming largely irrelevant in the information age. Thus, global companies can compete with the response times and personalized attentions provided by local ones. Some companies accomplish this through decentralized facilities. Other companies have entered into logistics outsourcing arrangements with companies such as Federal Express to provide worldwide rapid response.

c. **Decentralized services:** These services provide time as well as place utility. Some years ago, Theodore Levitt of Harvard Business School coined the expression "factories in the field" to describe service production facilities. Such an orientation is necessary for many services because of their intangibility and the lack of physical inventories to put into a distribution system.

d. **Value-added through mass customization:** Creating "mass customized" services and operating in "real time" will soon become competitive necessities in more and more industries. For example, some telecommunication companies now send customers disks to design their own package of services. Using graphical visualization techniques, home designers can now offer customers photorealistic views of future additions or renovations.

e. **Intermediary replacement:** Any time existing intermediaries or market makers do not add a high degree of value (relative to their cost), they can readily be supplanted by technology. Travel agents, real estate agents, and stock brokers who continue to do business in traditional ways are thus endangered.

This is especially true in industries where de facto cartels exist to control prices.

f. *Creating "virtual goods"*: Technology can allow service companies to create products whose properties resemble those of goods, i.e. they can be inventoried, production can be stabilized, etc. Examples include Professor DOS, Lotus SmartHelp, Microsoft Wizards, home design packages, legal software kits and so on. These "virtual goods" enable a company to obtain the advantages of tangibility (production economies, wide distribution, inventory buffers, etc.) out of services.

6. DISCUSSION

As we move towards a digital, multimedia future, what will be the impact on new service creation? A lot of it will be serendipitous: "build it and they (the applications) will come." myriad new services will inevitably arise and will (more so than the displacement of existing services) justify the large investments needed upfront.

An example of the role played by serendipity is provided by MCI's billing system. The system permits MCI to identify both the originator as well as the recipient of each call, and has enabled the company to design its wildly successful "Friends and Family" promotional campaign, boosting its market share by four points in two years, from 13 per cent to 17 per cent.

The role of serendipity in the process of unearthing commercially viable new service propositions as byproducts of new technologies calls for the marketers of these services to acquire a new set of skills as well as a new vocabulary. For instance, marketers need to become adept at "demand articulation" (Kodama, 1992). "beta testing" and so forth, when they are in an arena in which customers lack the ability to clearly identify what they are looking for in new services. Often, the solution becomes a radically different kind of market research with an emphasis on rapid market iterations and "learning by doing" rather than on extensive pre-launch analysis.

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SPECIAL SESSION 2

Service Design/Action Research