

## Association for Information Systems AIS Electronic Library (AISeL)

---

AMCIS 1996 Proceedings

Americas Conference on Information Systems  
(AMCIS)

---

8-16-1996

# Impact of Fax Technology on Business Processes

Mihir A. Parikh  
*Georgia State University*

Karen D. Loch  
*Georgia State University*

Houston H. Carr  
*Arburn University*

Follow this and additional works at: <http://aisel.aisnet.org/amcis1996>

---

### Recommended Citation

Parikh, Mihir A.; Loch, Karen D.; and Carr, Houston H., "Impact of Fax Technology on Business Processes" (1996). *AMCIS 1996 Proceedings*. 159.  
<http://aisel.aisnet.org/amcis1996/159>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 1996 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# Impact of Fax Technology on Business Processes

Mihir A. Parikh & Karen D. Loch, Georgia State University

Houston H. Carr, Auburn University

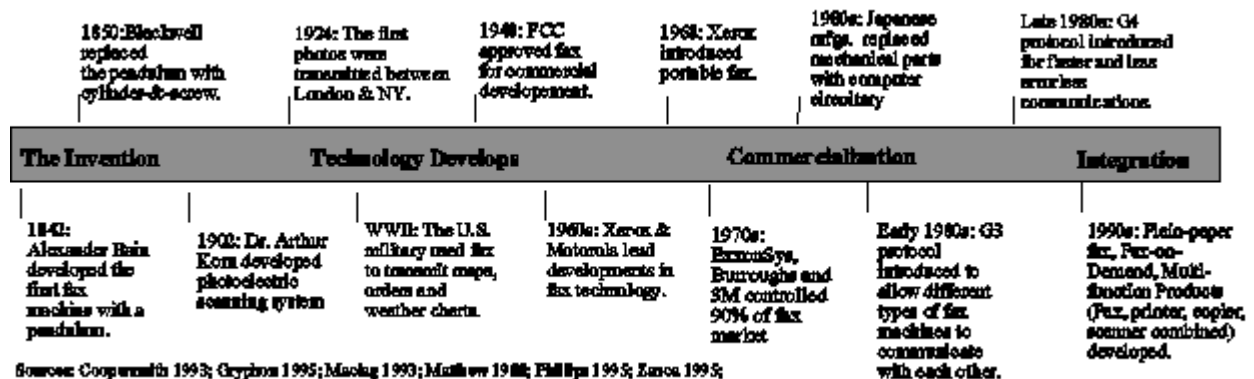
## Introduction

Facsimile (fax) technology has quietly permeated modern organizations and has become standard office equipment for communications [Whitman 1995]. As of today, the revolution of the technology may be over, but the evolution continues. As business communications become more complex, the demand to provide transmission of cost-effective, error-free, and time-critical information continues to grow. Fax technology directly addresses these issues.

The purpose of this study is to first review the role of fax technology as a media for communications and then examine the impact of fax technology on business processes. As the fax has become a necessary equipment to support office operations, we want to investigate organizations' perception of its importance and its impacts the way they do business. The paper first reviews the past literature to identify relevant theories that could explain evolution of the fax technology and its position with respect to other medias of communications. Then, it describes the survey design to empirically investigate the benefits and impact of fax technology on the organizations. The result of the survey is presented and discussed in the following sections. Finally, limitations of the study and future direction of research is presented.

## Background

Fax technology is over 100 year old. However, fax did not become commercially successful until 1980s when Japanese manufacturers developed smaller and faster fax machines [Matthew 1988]. Figure 1 shows the evolution of fax technology.



0: Evolution of Fax Technology

Evolution and penetration of fax technology into the business world can be explained by two theories in communication media: media richness theory and critical mass theory. Daft and Lengel [1984, 1986] first proposed information richness theory for the selection of appropriate media for communications. Richness of a medium is based upon four criteria: feedback, multiple cues, language variety and personal focus. Along these four criteria of richness, a hierarchy of media is formed where face-to-face communication has the highest level of richness, while unaddressed documents (fliers, bulletins, etc.) have the lowest level of richness [Daft and Lengel 1987]. Fax technology belongs to written/addressed documents category (with personal letter, memos, and e-mail) which is higher than unaddressed documents but lower than face-to-face communications in the hierarchy. Apart from the richness, there are other criteria important in selection of a medium [Sproull 1991, Markus 1994].

Table 1 compares the written/addressed media by seven criteria. The first four criteria relate to richness. There is no other media with similar characteristics as those of fax. This has allowed fax to penetrate the business processes by filling the void created by need for communication with high speed and high natural language variety. This likely contributed to the rapid commercialization of the technology.

Critical mass theory [Allen 1988, Markus 1994] suggests that the use of many communication media involves more than one person behaving interdependently. A person cannot complete the communication unless the intended recipient also use the same medium. As most businesses domestic and international have now accepted fax as a medium for communications, fax has become a *universal access medium* which everyone within an organization and across the organizations agrees to use on a regular basis.

	Letter/Memo	E-mail	Fax
Feedback	Low	High	High
Cues	Medium	Low	Medium
Variety	Medium	Low	Medium
Focus	High	High	High
Convenience of use	Medium	High	Medium
Speed	Low	High	High
Geographic reach	High	High	High

Table1 : Written/Addressed media

Past research categorizes benefits of fax technology on two constructs: efficiency and effectiveness. Efficiency relates to the economies of speed and competitive advantage of timely distribution of information whereas effectiveness relates to increased productivity and improvement in performance. Efficiency is measured along several dimensions such as instant information, sales incentive and crisis management. Effectiveness of the technology has been measured on dimensions such as role of fax as a marketing support tool, an alternative to traditional means of information transmission, a tool to strengthen communication, increase office efficiency, support computer operations, or downsize operations by providing remote access. Although the benefits are well-defined in the literature, they have not been investigated in terms of how organizations' perceive their relative importance nor how they impact the business processes [Whitman 1995].

## Methodology

A random sample of seventy organizations was drawn from *American Business Directories* and *A Marketing Guide for the Business Leaders and Companies: Atlanta's Top Decision Makers*. Approximately three officers from each organization were then randomly selected. The resulting database included 195 executives and senior officials from Atlanta-based public, private, non-profit and government organizations. The survey questionnaire, based on the literature and a previous study conducted in an academic setting, was mailed to the 195 participants. Participation was voluntary and anonymous with no reward for participation. Four weeks after initial mailing, a follow-up letter along with the questionnaire were sent again to the non-respondents to increase participation.

### *Instrument development & Measures*

The instrument is based on a questionnaire used in a earlier pilot study [Whitman, 1995]. Coupled with an updated literature review, the instrument was revised and extended. The survey was given to fax users in

the local business community who commented on wording and survey content. A debriefing followed survey completion to review questions and further validate the instrument [Straub, 1989]. The final instrument included a demographics section for the organization and individual, and general fax usage, and two main sections focusing (1) on the benefits of fax technology and its relative importance to the respondent (17 questions), and (2) the impact of fax technology as perceived by the respondent (15 questions + 10 open ended). Each questionnaire item contained a seven point Likert-like scale of responses, ranging from (1) strongly disagree to (7) strongly agree. Additionally, the respondents were given the opportunity to provide free-form examples of the impacts of the fax technology. Basic descriptive statistics were run on all the items. Statistical methods used in analysis of the benefits and impact measures included factor analysis, correlations, and Cronbach's alpha.

## Findings

### *Demographics/descriptive*

Thirty-four of seventy organizations (49% response rate) are represented in the respondents' pool, with a total of 54 individuals (28% response rate). Non-response may be explained in part by the organization submitting only one response. One chairman attached a letter explaining that his response would represent the company's participation, and therefore the other company participants would not be responding. Incomplete questionnaires were discarded, leaving 51 usable responses. As Table 2 shows, the distribution of responses by sector was reflective of the original sample.

The respondents categorized their primary business in 18 different types. The top three categories are Manufacturing (26%), Healthcare/Medical (20%), and Retail/Wholesale (16%). Sixty-seven percent of the respondents held executive positions within their respective organization. All the responding organizations use fax. Average years of fax usage by the organizations is 9.6 years. Thirty-seven percent of the respondents use fax from home and fifty-five percent are considering to use fax from home. Seventy-three percent of the respondents send and sixty-three percent of the respondents receive fax when they travel.

### *Factors Analysis:*

Tables 3 to 6 show the factor analysis results and the benefits and impact considered of most important by the respondents. The factors are listed in the same order as they were extracted.

### *Factors Analysis:*

<b>Total Mailing Respondents</b>	
<i>For-profit public firms</i>	88 (45.1%) 21 (41.2%)
<i>For-profit private firms</i>	52 (26.7%) 17 (33.3%)
<i>Non-profit firms</i>	16 (8.2%) 2 (3.9%)
<i>Government org.</i>	39 (20.0%) 11 (21.6%)
<b>TOTAL</b>	<b>195 (100%) 51 (100%)</b>

Table 2. Response by sector

<b>Factors</b>	<b>Reliability Coefficient -</b>
Office efficiency	0.8147
<b>Cost effectiveness</b>	0.7472
<b>Access to information</b>	0.7865
Marketing tool	0.7597

Table 3: Factors for benefits.

<b>Factors</b>	<b>Reliability Coefficient -</b>
<b>Internal communications</b>	0.7935
Media of communication	0.3196
Alternate mean of comm.	0.6926
<b>External communications</b>	0.6714
Communication problems	0.8118

Table 4: Factors for impacts.

<b>Benefits</b>	<b>Mean</b>
1. Provide instant information	6.44
2. Provides immediate delivery of messages	6.04
3. Increases office efficiency	5.58
4. Improves communications with other businesses/offices	5.42
5. Improves personnel productivity, time and cost savings	5.18

Table 5: Five most important benefits

<b>Impact</b>	<b>Mean</b>
1. Fax is used extensively for domestic communications by my firm	5.24
2. Fax enhances the productivity of my office	5.10
3. Fax saves my office a great deal of time and effort	5.06
4. Fax is used extensively for communications within my firm	4.94
5. Fax minimizes communication problems within my firm	4.22

Table 6: Five most important impacts

## Discussion

The results confirm that some of the benefits described in the literature do exist, and furthermore, organizations perceive that these benefits are important. The most important benefit of the fax is to provide instant information. This corresponds to feedback criteria for information richness. Factor analysis of the benefits categorizes the 15 benefits into four factors. The analysis of the factors with respect to important benefits suggests that cost effectiveness and access to information are two important benefits of having fax technology. Fax reduces cost of communication and increases access to information. Use of fax as a marketing tool is not an important benefit.

The impacts' findings suggest that fax is an ubiquitous and necessary tool for business as suggested by critical mass theory. Its major impact is on communications, both internal and external. It is not perceived as a competitive advantage tool as it available to and used by everyone. It may be that fax is sufficiently diffused into the organizations' business processes and that its perceived benefits are acknowledged as being important. However its perceived impact seems to be less well identified, perhaps due to the fact that it has become a necessary and expected way of conducting business.

## Conclusion

### *Limitations*

There are two major limitations for this current study that affect our ability to generalize results. They are a small sample and a limited geographic representation. One might argue, however, that the geographic limitation is mitigated by the fact that Atlanta's business community is sufficiently diverse to include organizations whether classified by size, industry or sector as would be found in any large city in the United States. The value of conducting a pilot study such as this is two-fold. One, it permits further validation and possible revision of the instrument. Two, it provides some indication of the interest of the study to the general populace. An almost 50% response rate by organization indicates significant interest in the study, further supported by the fact that most of the respondents requested the study's results. While a larger sample is always considered better, the current sample was sufficiently large to permit us to conduct our analysis with acceptable reliability. Future plans are to replicate this study on a national scale.

We acknowledge this interpretation is limited to a domestic view of fax technology. We know from other studies that culture affects the diffusion of information technology [Straub, 1994]. The cultural factor is not considered in this study.

## **References**

References available upon request from the authors.