# From printed matters to information distribution
# New strategies in the Graphic Arts industry

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Abstract: Since the start of digitalization and the introduction of electronic medias suitable for publishing, i.e., the Internet, the printing industry has been struggling to find business models that can survive under these new conditions. Their main strategy up until now has been to find the niches where traditional printing matter is still unthreatened. Another strategy has been to approach the interactive electronic medias and personalize the printed matter with the help of digital printing presses, e.g., print-on-demand and personalized printing. However, long-term survival will demand a broader perspective. Far-sighted printing companies are therefore developing strategies that radically redefine their business. This paper discusses the reasoning behind the new strategies and presents a case study of a printing company that is transforming its activities from traditional printing into multi-channel production and information distribution.

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Introduction

Printing companies have faced developmental challenges since the latter part of the 1990's. This paper discusses the industry from the perspective of a changing environment. The questions addressed are the reasons for these changes, what the changes imply for the affected industries and what survival strategies are available.

The actual developments are mostly a result of ongoing technological developments including such phenomena as information digitalization, media convergence and the development of the Internet. Another challenging factor is the globalization of the printing industry. While printed matter was once the main source for mass information distribution, the Internet with "worldwide web" and electronic mail, mobile telephones with SMS and interactive digital television now challenge this role. The effects of these technological challenges are increased by the structure of the printing industry, which is characterized by a fragmentation with many small, local companies. The rapid technological development, which naturally means large investments in new equipment, puts great pressure on many printing companies. It is also hard to cope with the increased need for knowledge that is inherent with the technological development and its effects. However, necessary adjustments must be made if these companies want to compete on today's market. Technological advancements are putting pressure on most business segments, but because the graphic arts industry plays an important role at the very center of the information industry, it will be more affected by new information technology than most other industries.

The current situation for the printing industry can be summed up in the following way:

- Number of print jobs is reduced and print runs take less time due to lower volumes.

- Time-to-market is important and everyone is searching for faster medias.

- Environmental concerns and sustainability are becoming stronger driving forces.

These factors have put much pressure on the printing industry with the following consequences:

- There is an ever-growing production overcapacity on the market.

- Selling price is kept low due to overcapacity and competition from other media.

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- Profitability is low due to low prices and large amounts of capital locked into machine investments.

- The slow growth and problematic economy results in a growing number of bankruptcies; the demand for consolidation is obvious.

According to consult company Jaakko Pöyry (Meinander 2003), the following situation characterizes the traditional printing market:

- The difference between market development and expectations has forced many printers to change their strategy.

- Competition over ever-diminishing print jobs has generated a price war.

- Reducing prices is easy; bringing them back up again is almost impossible.

- The low prices will be permanent and the industry has to adapt to them. The Swedish printing company Edita expects prices will fall approximately 5% per year during the coming years.

### Possible strategies

Because the service function is more prevalent than before, the printing company can choose to establish itself in relation to the opportunities the new media technology implies. For example, when the same information can be distributed through many different media channels, the service parameters offered by the different channels will be what influences the customer decision.

The printing company can also choose to try to survive on a traditional production-oriented strategy where the production costs are the basic parameters for the produced value. This strategy can be successful if the company manages to establish itself as a cost leader, i.e., more efficient than others in the production process and hence able to keep their prices lower than their market competitors. This provides room for a couple of companies in a certain product and/or geographical area. Another strategy is to act on a very local market where close customer relations and understanding have been established or where the company can offer unique products to the market. This opportunity will also be limited to a few actors in each market.

### Important factors towards an information distribution strategy

Several important factors have been identified in connection with the development towards a multi-channel information distribution strategy with an

extensive use of electronic medias in close cooperation with printing technology.

## Digitalization of the information flow

A great flexibility in the distribution and publication process has been achieved with the shift to a digital representation of the information. In a digital information process, all data is converted into numbers. This data is the representation of text and pictures. The content is stored and processed as numbers and can be presented directly as digital documents by online sources like screen displays and digital discs or it can be published as printed matter. The digital media divides in relation to analog media where the information is converted into other physical objects (Lister, Dovey, Giddings, Grant, Kelly 2002). The concept of analog refers to processes in which one set of physical properties can be stored in another physical form. Each of these transcriptions involves the creation of a new object that is settled by the laws of physics and chemistry.

## New media and printed matters

There are many possibilities today to publish information as electronic documents - information that could only be distributed as printed matter before. The spread of the Internet and the development of the worldwide web have dramatically influenced this shift.

The development of the Internet is the single most important factor in the development of publishing information as electronic documents. The Internet plays at least two roles in this connection. One role is as a carrier for graphic arts material to a printing press or from one database to another. Another role is as a user interface where the information user can establish access to the electronic document online.

Even though the volume of electronic documents is quickly developing, the paperless office has never been put into practice. Instead, there is a continuous growth in office paper consumption. The consumption in North America and Western Europe is estimated to be about 2% for the upcoming ten years and about 4-5% in Asia during the same period. However, produced volumes are decreasing for most other types of paper. For example, the production volume of printed forms and computer forms especially is falling by 3.2% a year (Forsebäck 2000). The reason for this is that printed forms are being replaced by electronic documents. Some current trends (4th quarter 2003) in the Swedish printing market indicate that number of produced volumes is slowly increasing but the prices still are falling. The overcapacity is around 30%. Profitability is

increasing due to efficiency improvements. The production capacity is expected to be in pace with the market demand in the future (GFF 2004).

Media convergence

Media convergence is another important factor related to the shift in direction of an information distribution strategy. The concept of media convergence was made popular by Nicolas Negroponte in his attempt to establish MIT Media Lab (Fidler 1997). Negroponte stated, "all communication technologies are suffering a joint metamorphosis, which can only be understood properly if treated as a single subject" (Brand 1987). Negroponte illustrated the convergence by drawing three overlapping circles labeled "broadcast and motion picture industry," "computer industry" and "print and publishing industry." This illustrates that the graphic arts industry has been one of the cornerstones in the convergence discussion from the very beginning even if the concept has mainly been connected with the phenomenon called "new media," i.e., computer mediated medias. Convergence is defined as two lines heading towards the same point. In other words, the term describes different phenomena that have bridged together and established unification.

There are two main factors behind the development of convergence in medias. One is the digitalization of the content and the equipment we use to receive the content as well as the distributions systems, i.e., the different communication nets where the information is transmitted. Another main factor is the integration of the computer with the telecom system that makes it possible to carry media information in digital form all over the world.

The cause of the convergence phenomenon is manifold. The social and cultural causes are of great importance, such as political decisions on infrastructure investments and a changing lifestyle among the media consumers. There are also important economical causes, among them the need to be more competitive on the media market by being able to offer the content in any way the customer asks. Of course, there are technological causes as well - the introduction of digital technology, the establishment of the Internet and the strong development of compression algorithms. All of these factors have been built upon a foundation of deeper fundamental structural changes in the whole society. Sometimes these changes are referred to as the transition from the information society to the knowledge society.

The main reason behind the push to integrate different medias and media distribution systems is often described as the desire to gain synergy effects. (Rasmussen 2000) The synergy effects can be reached both on the production level and on the consumer level. On the production level, it will be possible to produce the content on one occasion and then place it in a database. It will be

possible to derive different parts of the content from there and publish it on appropriate medias in accordance with the market demands. This is often referred to as multi-channel publishing in the graphic arts industry. On the consumer level, the synergy effect will be achieved when one media device can represent different medias. The consumer can gain access to different media categories with the same media device, e.g., a mobile phone will give access to talk, text, pictures and video in the new 3G mobile standard.
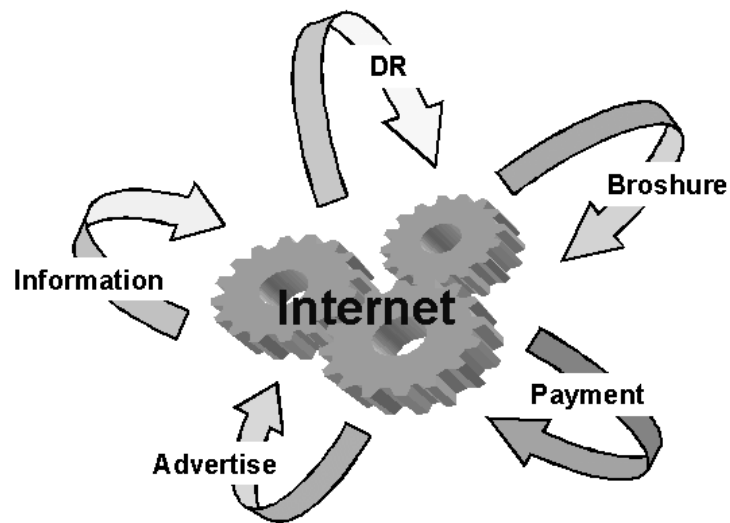


Figure 1, Internet and convergence

The most important phenomenon among the media convergence is the Internet. With the introduction of the Internet, it became possible to establish presence for text, sound, pictures and video through the same media system. The Internet is also a media system that provides an opportunity for interaction, i.e., the media consumers' ability to interact with the distributed content and to choose and activate preferred parts of it. With the introduction of the Internet, the direction of the information flow has turned from a traditional push perspective to a partial pull perspective.

| | **Printed medias** | **Radio** | **TV** | **WWW** |
|---|---|---|---|---|
| **Content** | Limited space<br><br>Daily updating<br><br>Fixed size | Limited time<br><br>Updating in real-time<br><br>Fixed size | Limited time<br><br>Updating in real time<br><br>Fixed size | No limits<br><br>Updating in real-time<br><br>Push & Pull<br><br>Adjustable |
| **Advertisements** | Full size<br><br>Heading<br><br>Retail | 30-60 sec.<br><br>Audio | 30-60 sec.<br><br>Audio/video | Banner<br><br>Heading |
| **Distribution** | Physical<br><br>Daily | Broadcast | Broadcast | All time<br><br>Push & Pull<br><br>Adjustable |
| **Business model** | Subscription<br><br>Advertising | Advertising<br><br>Public service | Advertising<br><br>Subscription<br><br>(Cable and satellite) | Advertising<br><br>Limited subscription<br><br>Archives<br><br>Market coordinator |

Table 1, A comparison of different information distribution systems from Palmer & Eriksen 1999

Five shapes of convergence

Kabel and Sparre (1999) have identified five different shapes of convergence.
1. *The first convergence is that of the medias*. The digitalization of the various medias establishes the platform for convergence. The digitalization process of data and the subsequent changes to the work process within the mass media companies, graphic arts companies and publishing houses give the prerequisites for a merger between different products, distribution and branches.

2.  *The second shape of convergence is that of data.* The content is produced in a general form and consists of different media types, such as text, audio, photo and video. The content is then stored in databases. From here, the material can be published through different medias. This is especially notable in the newspaper industry where most media channels are used as output channels.

3.  *The third shape of convergence is that of the distribution systems.* Physical distribution of content using books, newspapers, radio and TV is exchanged with common digital information distribution systems such as the telephone net, cable network, the Internet or via satellite. One example is text content that was once distributed as printed matter but can now be accessed as an electronic document on a web page.

4.  *The fourth shape of convergence is that of merging branches and operations.* There have been many fusions within the media market and its associated markets, i.e., the computer industry, network and telecom industries. There is often a desire to control more of the information value chain. One example of this is the merger between America On-Line and Time-Warner.

5.  *The fifth shape of convergence is that of technology.* The radio, TV and computer will become integrated into one single device in the future. This evolution can already be seen in some of the integrated media terminals that are offered to the market.

New strategies in a changing environment

Technological developments and especially the development of the Internet have established new conditions for the printing company and its ability to compete. It is evident today that all information is electronically generated and the Internet is the first choice of distribution method. Printing is becoming a sub-set of the Internet and a secondary channel. A discussion has arisen within the graphic arts industry on how to deal with this new situation. These thoughts have been compiled in a project called E-Gutenberg (GFF 2001). A conclusion that has emerged is that the relative impact of the printed matter as part of the information process is decreasing. Instead, the ability to offer service in connection with the printed matter is what will generate value to the customers and to the graphic arts companies themselves in the future.

Knowledge about the customers' information needs and the solutions that will meet these needs will be worth more than the actual production of the information material. This will also lead to a change in the pricing principles on the market. The value the services can generate on the consumer side will become the important factor in contrast to the traditional price principle where the price is determined by the produced volume. The services associated with

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the printing jobs will be the most valuable product produced. This shows a movement away from a production-based economy and over to a service- and knowledge- based economy.

The project identified three different factors that characterize the new value-generating principles in the graphic arts industry. These are customer value, principles and competitive tools.

The *Customer* value factor is characterized by the new competitive situation. The new conditions demand that the information be deliverable on all media platforms. The customer associates 90% of the value with the service processes, while only 10% is generated in the form of traditional print jobs. The media decision process has moved over to the customer side in pace with the increase in feasible medias.

The *Principle* factor is characterized by knowledge of the customers' value generating processes in the graphic arts products. It will be necessary to use those medias that best suit the customers' needs even if it implies priority of electronic medias over printed information. This indicates that the graphic arts industry has to take responsibility for the entire information process.

The *Competitive tool* factor is characterized by an understanding of where the graphic arts industries competitive strengths are placed. One such strength is knowledge about the visualization principles of information. These are typography, design and readability. Another competitive tool is the unique close relation that many graphic arts companies have to their customers. In the future, it will be necessary to be available 24 hours a day, 365 days a year.

### Examples of media convergence in the graphic arts industry

One of the best examples of media convergence in the graphic arts industry is the implementation of digital printing technology and its functions for individualized services like print-on-demand and personalized printing.

### Digital printing

The graphic arts industry was one of the first businesses to be seriously affected by the digitalization development. Already during the 70's, desktop publishing systems started to make their way into the editorial departments. Since then the digital workflow with prepress, CTP digital pictures, etc., has fully digitalized the printing environment. The last stage in the printing production flow, the actual printing, is also the last component to become part of the digitalization development. The development of the digital printing press is an important

technology innovation in the digitalization process. It enables completion of an unbroken digital flow from the content provider to the finished personalized printing matter.

The technology to produce printed matter with the possibility to print different content on each sheet has been possible for some decades now. However, the first digital color printing presses were first presented in 1995. When Xerox and Indigo introduced their first digital printing press with color ability at the Drupa exhibition in 1995, most of the graphic arts industry was moderate in their expectations for the new technology (Lundin 2003).

Today both the industry and its customers have accepted digital printing technology. Another important factor is that the industry and the market are starting to realize that digital printing offers unique business opportunities and is not just a complement to offset printing. Three main driving forces in the printing industry can be said to have contributed to the use of digital printing. One is the request for smaller editions. Digital printing is therefore especially suitable for manuals, small editions of books, catalogs, etc. However, the development of offset printers and a workflow with an integrated prepress and CTP have moved the break-even point for number of editions down to about 250 copies. With numbers smaller than this, digital printing technology is cheaper than offset technology. For print jobs between 250-1500 copies, the production costs of digital printing and offset printing are comparable. Another driving force is the demand for faster delivery of the editions. A third is the desire to establish a dialog with each customer through personalized content.

### Digital printing as a means to media convergence

Digital printing is in its very heart a production tool that works in conjunction with the concept of media convergence. A very large amount of information materials is produced and distributed as printed matter. Up until now, printed matter has to a limited degree been personalized for a single product or for a customer's individual preferences (Lundin 2003). Personalized prints have, for example, been used for address labels and bank account information where the information is individual. The production and the delivery strategy of printed information have normally been a mass production and mass distribution process.

The digital printing process eliminates several steps in the traditional printing process. The most important elimination is the need to make printing plates with the help of a photographic reproduction process. Instead, laser or LED technology exposes the content to be printed directly to the printing engine. The information can be distributed as a digital file directly to the digital press. The digital information is then kept throughout the entire production flow. In this

respect, the digital press is comparable to a copying machine or laser printer. The printing engine can also be continuously re-exposed during the printing job to allow different content to be printed on each sheet. With help of XML (eXtensible Markup Language) is it possible to mark, separate and store different types of content and later on extract desired parts from its storage in a database.

Digital printing is also taking advantage of network systems for digital information transmission, i.e., the Internet. The information to be printed can be transmitted from a database via the Internet and then printed at any location. The customer can order the print job via the web and have it printed on a digital printer at a chosen location. This is often referred to as a web-to-print capacity. The information to be printed can be stored in a separate location from where the print order was given. The actual printing can in turn take place at a third location or at many different locations around the world. The distributed printing process is not a unique result of the introduction of digital printing presses, but with this tool, the digital printing workflow has been completed.

### Personalized printing and print on demand

The most unique characteristic of digital printing presses is their ability to use variable data as input for a printed document. This implies that every document can be unique and custom-made. The digital information flow has given the user the tool to have printed matter produced instantly, in a small number and with variable content: print-on-demand. The prints can also be adapted to individual desires, often called personalization.

Printed matter that is produced on the concept of variable data can be the foundation for personalized information, DM and offers to the customers. It can also be used in the production of custom-made product manuals and books.

### Digital printing, interactivity and one-to-one marketing

One of the most interesting qualities of digital printing is its ability to be part of an interactive information process. The printing technology process has reached a level where it is possible to produce personalized direct marketing and information with the help of ordinary printed matter. Peppers and Rogers (1993) call the potential this ability gives to digital printing one-to-one marketing.

The ability to create and mediate information with different content aimed at different individuals has been a vision in market communication for a long time. With the introduction of the Internet, the interactive potential has been focused on mainly in connection with e-commerce, where it was suddenly possible to enable customized content for each customer. The vision of one-to-one marketing is not new and not tied to the Internet. However, the Internet has

functioned as a catalyst to the one-to-one concept, especially in connection with e-business development.

Digital printing presses enable printed matter to be produced and distributed on an individual basis, rendering the situation on the Internet. In this respect, digital printing has made the concept of mass customization possible. Instead of being a tool for mass production, distribution and communication, printed matter can now serve as part of a dialog, establishing relationship marketing. Digital printing is then not just an optimization of the traditional printing process in terms of fewer manual steps, but in reality gives printed matter a new role in the value chain for the production of information materials. Individualized printed matters can in this way be a tool in an interaction chain between customers and companies, comparable to what the Internet offers on a screen.

<center>New services in the Graphics arts industry, case studies</center>

As we have seen, digitalization of information has changed the conditions for medias and the printing industry has been heavily affected by this development. The convergence phenomenon is making its way into the industry and new strategic thoughts are needed. In the following section some examples are given on how new services that combine print technology with electronic document distribution can be designed. The printing and communication company Edita, active in the Nordic market, is introducing a process where their traditional printing business is supplemented by the development of new products and services following new business models.

The idea behind the new business models is that the company shall not only produce traditional printed matter, but also provide overall solutions to their customers' information and distribution needs. The goal is to establish the company as an information distribution company and not act only as a printing company. Central to the information distribution system is a web-based database structure, EDD - Edita Digital Distribution. Information is distributed electronically between the system and customers. The output from the system is an electronic document. This document can be distributed via the Internet or via some other digital channel, such as the mobile telephone network. The information can also be distributed to the end user as a printed document produced either in a digital printing press or traditional offset press. Edita has added logistics warehousing and distribution to its services in order to fulfill customers' demands and add more value to its offerings. These services are integrated within the database structure, which means that both Edita and its customers have total control over the processes.
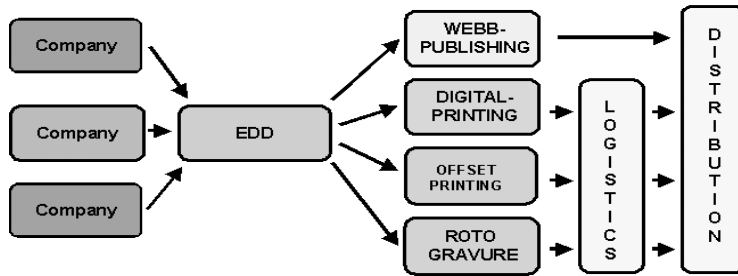
<center>633</center>

Figure 2, Principal information flow in the EDD system

Some of the new service concepts are described and discussed in the following chapter.

SmartStore

SmartStore is an information distribution service concept developed to meet the information needs of small- to middle-sized retail chains. In this business category, an average of 4-6% of the turnover is used for marketing purposes. Half of this is spent on different forms of printed advertising materials aimed at promotional activities in the shops. However, examination of the use of the printed materials has shown that only about 20% is used in accordance with the plans. The rest is used either in connection with products other than those planned, for a different time period than planned, at the wrong place in the shops or not at all. The SmartStore system is web-based and consists of a central server at the EDD platform and local servers at every shop.

The main idea behind the SmartStore concept is to establish a two-fold electronic information system common for all member shops in the retail chain. One is an administrative back office system with the capacity to serve all local shops on economy, logistics and purchase. The other is a marketing information services system that gives new possibilities to the local shops.
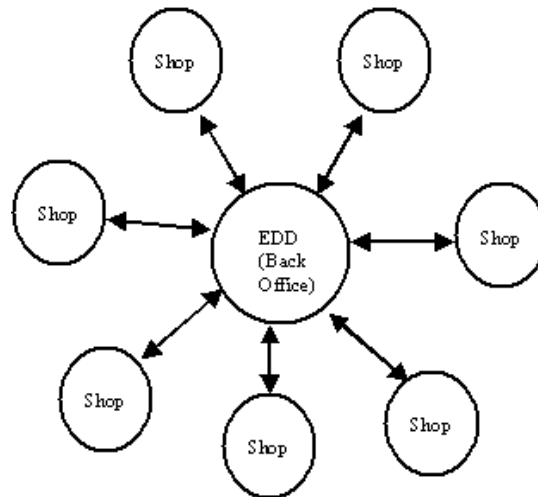
Figure 3, The SmartStore model

The marketing information system in the SmartStore concept aims at increasing the experience and activity level in the shops. This is done through distribution of advertising information, e.g., brochures, posters, commercials, web-based information and other types of marketing and promotional materials, to each shop. The principle visualizing system consists of large plasma screens, small LCD screens and small color printing equipment - inkjet or laser printers. All information is electronically received on-demand, can be customized to fit the needs of the local shop and is mediated as printed information or electronically distributed information. The electronic-based information is presented on large plasma screens in the shops. The system allows each individual shop to decide what information material to use and in what shape, digital or printed. The information can be printed on-site or at a nearby print shop. The electronic information on the plasma screens can represent everything from posters to commercials. The plasma screens can also be customized to present different content throughout the day aimed at different target groups. The small LCD screens are a sales support system where detailed product information can be presented. This information will in most cases build on product information already available on the web.

The SmartStore concept provides several advantages to the retail chains. Among the most important are the dynamic information distribution, the on-demand access of the information, the cost reduction because of the back office concept and the web interface, which makes it easy to control and distribute the information.

Book on demand

The *Book on demand* service uses the EDD - Edita Digital Distribution system as a technical platform. The idea behind the service is to provide an easy way to produce semi-professional books. A set of pre-designed book layouts from novels to picture books has been developed which can be personalized. The service was especially designed with travelers' needs in mind. Travelers experience new and fascinating things and often document their experiences with the help of photos. However, the experience is not always easy to share with other people. A personalized book can be a way to physically present the travel experience.

*Book on demand* is a web-based service. The user can choose between five different layouts on the web page. There is also service support on the web page where the author can get assistance. Through the web interface, it is possible to actually write the book while traveling if an Internet connection can be established. The photos can be transferred directly via the computer to the website if a digital camera has been used or with the help of a local photo service like those Fuji and Kodak provide to their customers. The final print is made on-demand by a digital color printing press connected with the EDD platform.

Another related service is the electronic postcard. It is built on the same platform as the book on demand service and has a predefined layout. This service allows the user to create a postcard from a photo and write a greeting on the back. The electronic postcard is then delivered through the EDD system, printed on a digital printer, and posted the traditional way. This service is a complement to electronic services like MMS aimed at those customers who prefer a paper-based postcard made with one of their own snapshots.
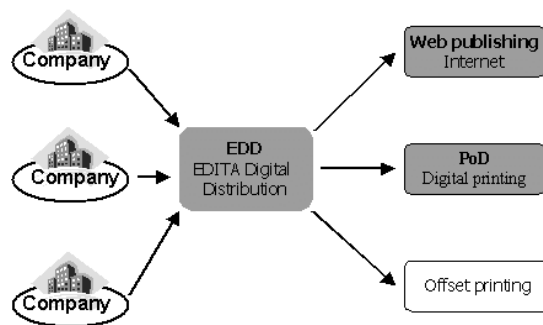


Figure 4, The EDD system on the Book on Demand application

iPost

iPost is a service designed to rationalize the handling and distribution of industrial post from company-to-company or company-to-household. Industrial post can consist of invoices, contracts and wage statements. The service is developed on the EDD platform and is distributed from the company to a database on the EDD system. The iPost system also offers its customers an opportunity to store information in a web archive. The information is sorted by zip code and stored in the iPost database. The sorting process for the different types of information is implemented at the same time for all iPost customers and not through a company-by-company sorting structure. This type of sorting makes it possible to achieve large-scale effects on the distribution side. Costs can hence be reduced. Using the iPost service, distribution of printed consignments is reduced by an average of 2,00 SEK per mail.

The iPost system enables industry post to be distributed as printed information produced by digital printers or as electronic information distributed via the Internet. The cost reduction is in the range of 2,00 SEK per electronic mail compared with traditional mail post when distributed by the Internet.

Today, iPost is the fastest growing product at Edita. The volume of the consignments as of March 2004 is 20 million per year and is expected to reach 30 million before of the end of the calendar year. The majority of the industrial post in the iPost system is distributed as printed information; only 2% is distributed as electronic information. The goal is to reach a 35% volume on electronic distribution within three years.

Conclusions to be drawn from the case studies

The above referenced cases are all representative of the convergence between digitally distributed information with an information output of either digital documents or printed matter. The type of output is a customer decision. The system can deliver the form the customer wants. The key is the EDD platform, which enables a high level of flexibility in the production and distribution flow. The EDD structure focuses on customer value as the most important parameter. The value that is generated is not automatically linked to a printing process but rather to an information distribution process where the customer can decide on what substrate the information will be presented -- an electronic one, a printed one or both. With the EDD structure, Edita has taken a new role in the value chain. This role is no longer linked solely to printing skills but focuses instead on finding solutions for the customers' information handling problems independent of any reproduction technology. The business model the EDD platform represents makes it possible to continue to meet customers' needs when new demands on the information distribution process occur. The media

convergence process described generates value to all participants in the process. Value is generated through the production of new services that were not possible before. It is also possible in many cases to generate value through a reduction in production and distribution cost compared with a traditional production and distribution flow. Another important factor is the environmental effect. Through a reduction in printed matter volumes, physical transportation needs will be reduced. The transportation that takes place will be more relevant and necessary than that in the traditional distribution situation.

## Discussion

A brief presentation has been made in this paper on the situation within the media industry and especially that within the graphic arts industry. This situation is characterized by fast technological developments through the digitalization of information. The resulting media convergence influences all actors on the media market. The traditional printing company is one area that was influenced very early on by this development. As discussed earlier, it is possible in this situation to try and keep to the traditional business model where the actual printing and production of printed matter are the main activities. This can be a successful strategy under the right circumstances. However, only a few of the graphic arts companies on the market can count on a profitable business from this strategy. For the great majority of printers, it will be important to develop the offered services in accordance with the technological development, the media convergence, and the new ways of communication that characterize the customers and the market both now and in the future.

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