

MARKET CONDITIONS FOR
EUROPEAN PUBLICATION PRINTING
A TWENTY YEAR SURVEY 1985-2005

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Abstract

This paper deals with an important part of an ongoing survey of the European Publication Printing Industry – and highlights the present market conditions and product specifications in relation to the conditions which prevailed twenty years ago. In 1985-86, one of the most comprehensive studies of the publication printing industry was carried out by the European Rotogravure Association in Munich. This study was the first of its kind, and no comparable study has, to the author's knowledge, ever been reported. The objective of the present paper is to determine what factors are important when the choice of a particular printing method is made, and to consider whether this process was fundamentally different in 1985 than it is today. The hypothesis now being formulated is that the determining factors in 1985 were the economy of scale, the speed (lead-time) and finally the quality of the printing process to be chosen. In order to make the two studies comparable, the same questionnaire has been used today as twenty years ago, with only one minor amendment concerning what digital format that present customers prefer.

In the present investigation, a qualitative approach has complemented the quantitative study, and most questionnaires have been answered during rather extensive personal interviews. The recent investigation includes in-depth interviews with the leading managers in various sectors in the industry, and this time not only printers but also the most important suppliers – printing press manufacturers, paper and ink manufacturers, plate processing equipment suppliers, cylinder processing equipment manufacturers and other important contributors to the printing process, were interrogated. This approach has also given the author the possibility of explaining some of the issues in greater detail,

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and this will give the reader a deeper understanding of the current European market situation.

The extremely fast progress of digital technology in the 1990's had a great impact on the printing industry, particularly in the prepress area. New and affordable software packages for editorial and image manipulation were quickly accepted by the printing industry, and within a short time the previous analogue technology was abandoned. During the recent interviews, it became clear that most prepress work is now done outside the printing companies (outsourced). Even the integrated publisher/printer prepress work has moved from the printing to the publishing division. These new techniques created a dramatic change from the way in which the industry had previously worked. Suddenly, the customer gained complete control of the work flow, mostly based on PDF technology (a subset of Postscript) and of the prepress work, previously created and controlled by the printing industry. Digital advertising materials are today centrally produced according to the new ISO standards for publication printing (gravure or web-offset). Larger multi-European campaigns can be produced by one agency, whilst the different language versions are later distributed via the Internet.

This paper shows that the changes in the market conditions and product requirements have been dramatic in Europe during the last 20 years, and that further changes are about to happen. These new developments in both prepress and press for web-offset have put the gravure industry under immense pressure, and it has become very clear during the interviews that the mid-size gravure concept has fallen between two stools. Most efforts have gone into the development of the super-wide presses, today 3.8 m or wider, whilst little effort has been put into the lower end of the market. A new approach to defend the mid-size markets in Europe may be needed.

1. Introduction

This paper deals with an important part of an ongoing survey of the European publication printing industry – and highlights the present market conditions and product specifications in relation to the conditions which prevailed twenty years ago. In 1985-86, one of the most comprehensive studies of the publication printing industry was carried out by the European Rotogravure Association in Munich. This study was the first of its kind, and no comparable study has, to the author's knowledge, ever been reported. The objective of the present paper is to determine those factors which are important when the choice of a particular printing method is made, and to discuss whether if this process was fundamentally different in 1985 than today. The hypothesis is that there were some determining factors in 1985 such as the economy of scale, the speed (lead-time) and finally the quality of the printing process to be chosen.

In order to make the two studies comparable, the same questionnaire has been used today as twenty years ago, with only one minor amendment concerning what digital format that the present customers prefer. The methodology in 1985 took a quantitative approach. The questionnaire was distributed to the respondents and their individual responses were later analysed. In the present investigation, a qualitative approach has complemented the quantitative, and most questionnaires have been answered during rather extensive personal interviews. This approach has also given the author the possibility of explaining some of the issues in greater detail, as this will give the reader a deeper understanding of the current European market situation

2. Methodology

The area of research is an investigation of the European publication printing markets, and how these have changed during a period of twenty years. The hypothesis is that due to new technology the market conditions in publication printing have changed. The research target is clearly the European publication printers and to some extent those publishers who are still maintaining the printing facilities. In this case the survey technique has been used, and a group of companies and/or executives have been asked to participate. With a survey it is possible to collect in depth information about some very important questions in the industry.

In 1985/86 the survey was conducted by mailing the questionnaire to all the printing companies (and/or their contact persons and managers) which were members of the European Rotogravure Association (ERA). In this context, about 20 of the leading companies in Europe were approached, and the answering rate was close to 75%. It has been possible to retrieve most of the empirical basic data from the archives; both my own personal as well as those of the ERA. The content and structure of the questionnaire were discussed and decided by a project group which consisted of managers from the leading European publication printers at the time. Some of the basic data and findings were also discussed in this group, and as a result in 1985 and 1986 two separate reports were published by the ERA. These are available today. The survey in 1985 can be regarded as a quantitative analysis, which was supported to a lesser degree by direct interviews.

In 2005/2006, the survey has a broader audience, and the main emphasis is a qualitative approach with personal interviews. The interviewees have been selected among the most important publication printers companies in Europe, but the target group has been enlarged to include also the supplying industry. In this context, there are about 12-15 important suppliers to the industry; paper and ink manufacturers, printing press manufacturers and prepress (plate and printing cylinder manufacturers). It was decided to include the supplying industry this time because today most of the research in developing new technology and/or

production processes has now become concentrated to the suppliers. In the past, some important work in this area was done by the publication printers (=users). The number of respondents answering the questionnaire is about the same, although there have been some very important changes in the industry:

- Many companies in the first study have been merged, changed ownership or gone out of business
- Many of the leading managers are no longer in the business; they left the industry, retired or are no longer available
- New structures have emerged in the industry – particularly in France, the Netherlands, Germany, Italy and Sweden

The main emphasis has been to interview these managers personally, and so far none has declined to participate. One major challenge is that some of companies interviewed are not members (or have previously been members) of the ERA, and this could have a significant impact on the quality of the answers.

In the literature, methods are described for assessing different sources, or for using different methods to assess the same source, such as triangulation of methods or data – “...the most important advantage presented by using multiple sources of evidence is the development of converging lines of inquiry, a process of triangulation..... “ (Yin cited in Östbye et al 2003). Media research literature covering the two major research approaches in the media field such as quantitative or qualitative analysis are both covered by Östbye et al (Östbye et al 2003) and Bruhn Jensen (Bruhn Jensen 2002).

By using different sources - from both users and suppliers - in the recent survey some of the results deduced may be stronger than if they were coming from one source only. Another important issue in a survey concerns how the generality of the answers. Are the answers also valid for those not taking part in the survey? Since it is not possible to ask all companies and/or executives in the European markets. Is it possible to generalize the results from the survey and state that these are the common perception of the market in Europe? The members of the ERA are the most influential companies in each European country – 2-4 companies in each country, depending on the size of the market. As these companies are dominating their individual markets, it could be deduced that their answers are quite general and are valid for the purpose of this particular research study.

The content of the questionnaire has not been changed, but one additional question has been added. This question may appear rather trivial but behind the simple nature of the question lies a revolution in the prepress work and, hence, a huge structural change in the industry during the last decade. The additional question concerns how advertising and editorial material is delivered to the printer. In the past there were only two possibilities, the material was either delivered as “raw” (in this context; text as typed or written manuscripts and images etc. as colour

transparencies or reflection copies) or “ready to process” pages (in this context; a set of screened separations for four-colour printing). When the material was delivered as “raw”, the printer was contracted to make it “ready to process”, and this would normally take a couple of weeks or more to complete.

With the technical developments during the last decade, all this work has become digital and the task of completion the pages “ready to process” has moved to the originator (or in some cases another subcontractor). Hence, the logical additional question concerns the digital format in which this material is delivered (=supplied). In order to ensure a smooth internal process, all publication printers publish (either as a brochure or on the Internet) the colour profiles and other traits which the supplied material must have.

The method of doing most of the second survey as a qualitative study is of course more time-consuming and more expensive. On the other hand, some of the more important issues may be easier to discuss face-to-face rather than in a more anonymous questionnaire distributed by mail. The notion of using more depth and time during the interview gives the interviewer more time to reflect and the possibility of adding supplementary questions. Hence, the interviewer gains not only a personal contact but also a more in-depth knowledge of the conditions on different markets in Europe.

3. The ERA Survey of 1985

In 1985, the production methods in the prepress area were mainly manual with the extensive use of graphic films and, since the introduction of the offset/gravure conversion, both processes were using halftone separations for cylinder- and plate-making (Bruno 1986). However, some of the more advanced gravure printers were already using digital technology outputting screened separations from colour page make-up systems producing ready-to-engrave pages, and a few gravure printers were using direct digital interfaces with electro-mechanical engraving units. However, most gravure printers were operating the prepress in-house, whilst many web-offset printers received finished pages from their customers as screened separations ready to be stripped (planning), followed by plate processing.

Press configurations

The format for publication printing being used in the industry was DIN A4 size or close to this (A4 is 210 x 290 mm or about 8 ¼ x 11 7/16). However, the untrimmed press format was smaller in gravure because all gravure folders used grippers rather than pins. The majority of the gravure presses were running landscape-size products (or short grain). The recently established standard for publication gravure presses of the time – first introduced by the large German

publisher/printer Axel Springer AG in the beginning of the 1980s - had the following specifications:

- Number of units = 8
- Web width = 245 – 260 cm
- Cylinder circumference – from 840 to 1120 mm - 4 page around – short grain
- Cylinder circumference – from 1260 to 1680 mm – 6 pages around – short grain
- Variable folder – 4U – 64 pages (or 2 x 32 pages) and 6U - 96 pages (or 2 x 48 pages with a split folder) maximum – signatures could be produced in increments of 8 pages (12 pages – 6U)
- Web speed – about 10-12 m/s

All commercial web-offset presses in the investigation were equipped with pin-folders which caused almost 4% more trim waste than in gravure. There were however, some installations in the UK with a narrower cut-off of 1220 mm. At the time of the investigation, there were only two sizes of commercial web-offset presses available; 16pp or 32pp presses. Both were single width – max 98 cm – and with single or double round plate/blanket cylinders respectively:

- 4 units - blanket to blanket
- Web – width = 98 cm
- One dryer (hot air with catalytic afterburner)
- Cut-off 630 mm (a few with 620 mm)
- A fixed sized pin folder with a cross fold – long grain
- Web speed – about 5-6 m/s

The long grain concept had some obvious drawbacks with, because it was considered to limit the possible press speed to about 7-8 m/s. Cross-fold (or chopper folding) techniques had been used for a long time in narrow gravure presses, but were abandoned for that very reason in the end of 1970s.

Some attempts were made to design short grain web-offset presses to overcome the speed limitations, but short grain presses in web-offset had another problem; in the post-press operation of perfect binding with hot-melt glue.

The low moisture content in the paper made the spine prone to wrinkles causing customers to complain, particularly when printing low grammage papers (this phenomenon was not present in gravure). Short grain products were, however, very suitable for stitched magazines.

Paper grades and paper quality

Publication gravure had for a long time enjoyed the privilege of printing high quality on Super Calendered (SC) paper qualities, which gave a print quality comparable to that of coated stock in commercial web-offset, albeit at a much lower cost in gravure. This economic disadvantage prompted some publishers in the UK to contact their leading paper suppliers - the Finnapp sales organization in Finland - to develop an SC paper for commercial web-offset. (Finnapp was the joint sales department of all Finnish paper-mills until the beginning of the 1990s)

The new paper quality – HSWOP papers - became very popular among publishers in the UK and Scandinavia because it offered an adequate print quality at a reasonable price. The manufacturing costs of HSWOP paper were still higher than the SC for gravure, hence a small price difference (about 3-5%) was noticeable in the market, which in any case was much less than the difference between SC and LWC.

Feeling stronger competition on many markets, publication gravure printers were complaining about the limited offer of gravure printing papers. In the survey of 1985, some of the comments were:

- A stiffer sheet would be needed, particularly LWC seems to be flimsy
- A higher whiteness on uncoated stock and a larger selection of grammage
- Standard offset reels may often be found on the open paper market, to a very competitive price

Some German publishers wanted an even cheaper grade than SC mechanical paper, and urged its printers to test newsprint, which is bulky, rough and normally not suitable for gravure printing. These publishers had already tested commercial web-offset but they were not pleased with the print quality in the very competitive domestic advertising market.

In the US market, many Sunday supplements were being printed by gravure on Roto News; a paper grade which is very close to ordinary newsprint. Electrostatic Assist (an electrostatic device is used to improve the printability reducing the missing dots) was first developed and patented by GRI (Gravure Research Institute) in 1966 (Gravure 2003), to overcome the major quality problem in gravure – the missing dots.

The US quality level on Roto News was considered to be unsatisfactory on the very competitive German markets, and there were many obstacles to overcome in order to obtain the necessary print quality, improved printability, improved ink hold-out (too high a porosity in the sheet) and colour gamut (poor shadow detail).

In the end, further developed and improved ESA (Electro Assist) systems in the printing units gave the necessary printability, and a combined effort from ink makers and engravers achieved substantial improvements in the colour gamut and ink hold-out.

The new paper grade was called “improved newsprint”, because it was slightly brighter and smoother than conventional newsprint. Some of the early adopters were the weekly magazines – the Bild der Frau (Image of a Woman) and the Auto Bild (a car magazine) – both published by Axel Springer Verlag AG in Germany which quickly gained substantial success on the market. Reasonably priced to a reasonable quality!

Another advantage of the improved versions of ESA was the ability to print not only on improved newsprint but also on normal offset papers with an acceptable printability.

Run length

In the final report from 1985/86, it was clearly stated that the run length in publication gravure printing was indeed very market-dependent:

- Scandinavian and Swiss markets 150 000 copies
- French and German markets 500 000 copies
- UK market about 1 million copies

In commercial web-offset, however, the print runs were more homogeneous:

- Most markets in Europe 100 – 200 000 copies
- UK market up to 1 million copies

But, very small runs were also reported for commercial web-offset; even down to 20 000 copies.

Advertising material

One of the major issues in publication printing at the time was the handling of advertising material. In some countries, the centralized reproduction of advertising materials was already the state of the art, and in those cases no distinction was made between gravure and web-offset printing despite, their different colour gamuts.

In the major European markets, however, centrally processed materials were not used at all, forcing the advertising agencies to produce colour duplicates and to send those to all printers concerned when a particular advertisement was to be printed (Bjurstedt 2005). A statistical analysis showing the different conditions in

the European markets for publication gravure is shown in Diagram 1 - ERA 1985). (The lead-time is calculated from the latest date for the acceptance of artwork/ film prior to press start).

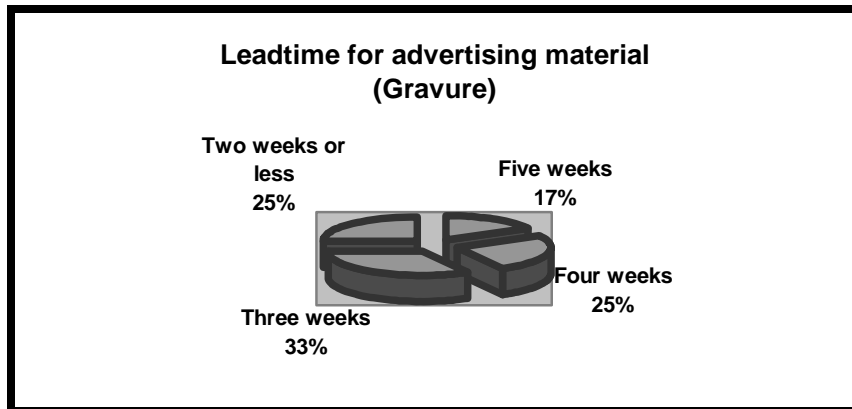


Diagram 1

The shorter lead-time (2 weeks or less) was applicable for those gravure printers accepting films from the agencies (screened halftone separations), which was the market condition in the Nordic countries and in Switzerland.

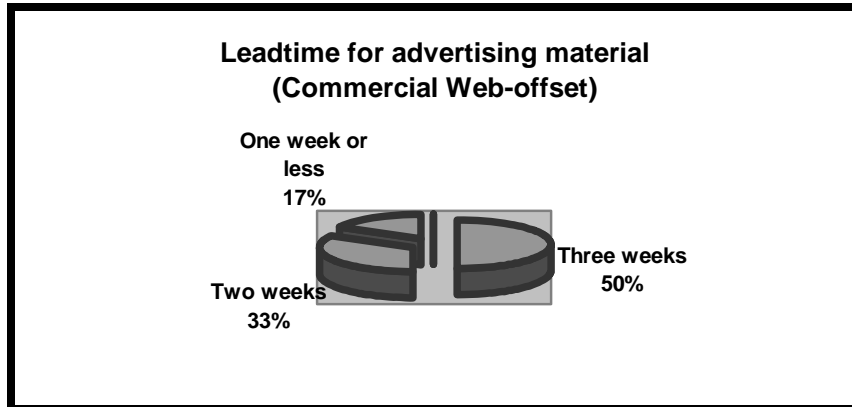


Diagram 2

Some gravure printers in the UK, Italy and Finland also accepted films, but in all other markets original artwork was delivered to the printers. The conditions for commercial web-offset were quite different, see Diagram 2. In particular, all advertising material was delivered as halftone separations with or without a relevant preproof. From these diagrams it is clear that the advertising agencies had a more favourable attitude towards web-offset as it was easier and probably cheaper to support their customers. Only in Germany, where gravure has always

enjoyed a large share of the market, did the situation seem to be different, and the German publishers/printers did not accept anything other than original artwork.

The fast acceptance of the use of halftone separations in publication gravure in the beginning of the 1980s made life somewhat easier for both printer and customer. Preproofing methods were soon developed which could simulate the more extended colour gamut in gravure. The development of new and relatively cheap colour preproofing concepts, such as Cromalin™ or Matchprint™, had made the evaluation and control of customer (or outsourced) pages and separations much easier than before. Already at the time of the 1985 survey, more than 80% of the gravure printers were using one of the two suppliers, which in turn meant that the use of gravure proofs was no longer required in the advertising market. Only the German printers were supplying gravure proofs to their advertising customers (agencies).

Quality assessment

The continental printers showed more self confidence in the quality assessment of their own publication gravure production. In general, it was suggested that gravure print quality was superior to commercial web-offset with one exception – the UK - although the perceived quality difference in the Scandinavian market was quite small.

Anticipated future trends in 1985

An interesting issue in the questionnaire concerned future trends, and many believed that within the next 3-5 years advertising and commercial material would be delivered in digitized form to publication gravure printers. This would not, however, apply to commercial web-offset, where film would be used for considerable time, because there were no signs of a digital solution for offset at that time. In gravure, a number of printers were already using direct digital engraving systems, and at least three vendors were offering digital interfaces to the most common mechanical engraver, the Hell Helioklischographs.

Another major issue in the investigation was how to improve the competitiveness of publication gravure, particularly in Scandinavia and in the UK. The major problems were considered to be cylinder proofing and corrections. These techniques had originally been developed to improve the image quality and please the customers, but now they had become extremely expensive and time-consuming operations. If a magazine could be printed without corrections and proofing, lead times and costs could be greatly reduced. Hence, a lot of development effort was directed towards these areas, as well as to improve the entire cylinder-making process and press make-ready.

4. Results from the 2005 survey

The investigation conducted in 2005 included in-depth interviews with the leading managers in various sectors of the industry, and this time not only printers but also the most important suppliers – printing press manufacturers, paper and ink manufacturers, plate processing equipment suppliers, cylinder processing equipment manufacturers and other important contributors to the printing process - were interrogated. The views were given to the investigator under a non-disclosure agreement similar to that established twenty years ago.

During the recent interviews it became obvious, that, consistent with some of the recommendations from the 1984 survey, all publication gravure printers had decided to engrave cylinders directly from digital data. However, not until around 1994-95 had this become the standard procedure in the industry. By doing so, they eliminated the use of graphic film, and this greatly reduced costs, improved the quality of the final printed product and shortened the lead times. The cylinders were delivered to the press room without being proofed.

Press configurations in 2005

The format for publication printing now being used in the industry is still DIN A4 size or close to it. The untrimmed press format has been further reduced in web-offset, since new designs of commercial web-offset presses have been brought to the market. The trend in publication gravure presses has gone from 64 pages in the middle of the 1980s to 96 pages; although there is one installation in Germany with two super-wide presses running 112 pages in A4 (two other printers will be installing presses of this size later this year).

- Number of units = 8
- Web width = 370 – 390 cm
- Cylinder circumference – from 840 to 1120 mm - 4 page around – short grain
- Cylinder circumference – from 1260 to 1680 mm – 6 pages around – short grain
- Variable folder – 4U – 96 pages (or 2 x 48 pages) and 6U - 144 pages (or 2 x 72 pages with a split folder) maximum
- Web speed – about 14-16 m/s depending on cut-off

The present standard for publication gravure presses in the European market (Kipphan 2000) has the above specifications.

Commercial web-offset presses were redesigned in the middle of the 1990s incorporated two features which are necessary for high speed printing, namely a smaller overlap (a precise overlap is mandatory for all post-press operations) using gripper folders (as in the gravure) and the mini-gap on blanket and plate

cylinders. Some manufacturers are using a sleeve type of blanket to reduce the vibrations in the units, but these have not yet gained wide acceptance in Europe. There are many alternative press configurations available for the potential buyer, and the average format is today 48 (either landscape or portrait) or 64 pages (portrait) (Kipphan 2000).

One may add that there is no standard configuration in commercial web-offset operations; because the configuration depends very much on the market the printer is present. The maximum web-width is presently about 195 cm for the 64 page alternative in portrait size, although there are a few presses running 72 pages, but a smaller size than A4 size.

- 4 units - blanket to blanket
- Web – width = up to 195 cm
- One dryer (hot air with catalytic afterburner)
- Cut-off 620 mm (portrait) or 890 mm (landscape)
- A fixed sized gripper folder with two cross folders – long grain
- Web speed – about 14-16 m/s

The former drawback using cross folders (Kipphan 2000) has been overcome, and the commercial web-offset presses can operate flat out also in portrait size, even though there are some limitations concerning grammage vs. page count.

Paper grades and paper quality

For a number of years, the European paper mills have responded to the complaints from the first survey regarding the number of available publication gravure papers. Super Calendared (SC) has now been divided into several subgroups, from SC C quality up to SC A++ differentiating in smoothness, brightness, opacity and price. Unfortunately for the gravure printers these grades are also available for commercial web-offset.

The emerging lower quality grade in 1985 – MF Paper or Improved Newsprint – has gained significant popularity among some publishers during recent years. A number of publication gravure printers have mastered the technique and have learned how to produce excellent print quality on these paper grades. For the publishers it has meant significantly lower costs in using a lower grammage and quality as well as a reduction in the distribution costs. One distinct advantage in publication gravure printing is the possibility to frequently change of paper grades in the press without too much disruption in terms of cleaning and downtime. Linting is still perceived to be a serious problem in commercial web-offset printing.

Run length

In the present investigation, print runs in publication gravure are still very market-dependent:

- Scandinavian and Swiss markets 200- 300 000 copies
- French and German markets > 500 000 copies
- UK market > 500 000 copies

In commercial web-offset, however, the print runs were more homogeneous:

- Most markets in Europe 100 – 300 000 copies
- UK market up to 1 million copies

But, even if the average run in commercial web-offset has increased, very small runs were also reported for commercial web-offset; less than 20 000 copies for some very special high quality magazines.

Advertising material in 2005

In the major European markets, however, centrally processed advertising material is accepted, and there are no longer any geographical markets but only one European market. Digitally distributed materials have been standard procedure for quite some time, although most printers would like to apply their own colour profiles (ICC profiles) when the files are being processed. It is typically possible to download these profiles from the Internet from each printer, but there is a European standard (see ISO standard from 2004 in the list of references).

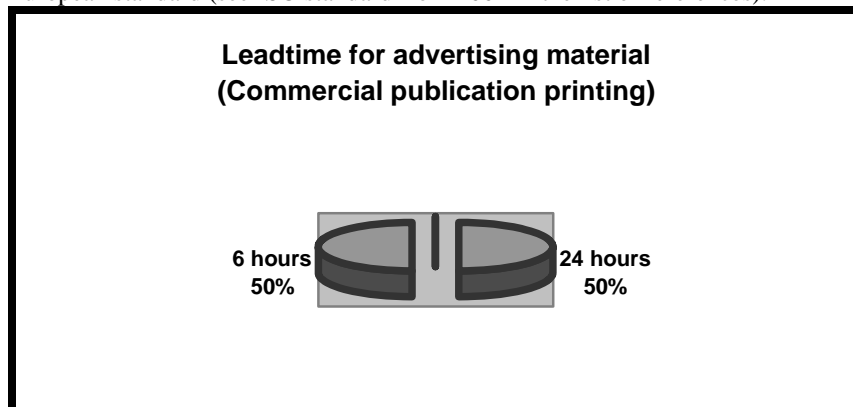


Diagram 3

The digital revolution has meant that the lead-time from receiving the data to press start has been dramatically shortened. The time is now counted in hours rather than days; there is no practical difference between the two printing

processes. It is possible to suggest even shorter lead-times than above, but it is of course dependent on a very close cooperation between printer, publisher and advertising agency.

The only additional question in the questionnaire concerned the digital formats being used in supplying advertising materials. All the printers who responded say that PDF (Portable Document Format from Adobe Inc.) is the standard file format, even though a few still say that they are also receiving CT/LW files (former Scitex standard). It seems, however, that the current standard for advertising material, PDF 1.4 (PDF/X-3), is not yet quite well-known in the industry.

All parties involved in the advertising business are using standard preproofs. The most common are now standard inkjet printers, such as Epson™ equipped with specialized software emulating precisely the print process, whether it be gravure or commercial web-offset, on almost any paper. The former preferred suppliers of preproofing systems (DuPont Cromalin™ and 3M Matchprint™) have lost substantial market shares to the providers of the cheaper inkjet systems.

Quality assessment

In general, the continental printers have more self confidence in the quality assessment of their own publication gravure production. Most of the respondents suggest, nevertheless, that gravure print quality on uncoated mechanical stock is still considered to be superior to that achieved by commercial web-offset. Web-offset would have to use coated stock (LWC) to compete in print quality, which of course has some financial ramifications. The “good enough” quality concept, introduced in the early 1990s, has made customers less sensitive to image quality and appearance.

Nevertheless, press room deficiencies are not of course accepted by the customer, and one of the major defects in commercial web-offset is waviness in the finished products. This defect is probably caused by the extremely fast drying process in modern presses, and considerable efforts are now being made by paper, press and ink manufacturers to overcome this serious quality defect.

The most serious complaint in publication gravure is the jaggedness of text and LW (line work). Most publication gravure printers are using a fine screening for the K cylinder, but it is often not sufficient. New engraving techniques to overcome this problem (“hinting” etc.) have been developed, but they have not yet penetrated the gravure market. When editors are using headlines or negative text in the primary colours, jaggedness is very obvious and this causes complaints from time to time.

Anticipated future trends in 2005

The basic worry in the recent answers to the questionnaire concerns over-capacity, and the dominance of the print buyer. Some respondents are also concerned by the perceived increase in print capacity in Eastern Europe. Most printers are not concerned about future trends in technology but are more worried about the development of their own markets.

The issue of competitiveness of publication gravure is still considered to be important. The old problems of cylinder corrections and proofing have been solved, because the cylinder process has to a large extent been digitized, automated and fully controlled. Nevertheless, CTP technology and the new, fast and wide commercial web-offset presses have had a great success in all European markets. Hence, web-offset technology is very much more visible and is perceived to be more advanced than gravure. The overall opinion is that there still room for many improvements in the cylinder processing area. Investments in new engraving and galvanic departments are still high in comparison to contemporary CTP technology for commercial web-offset.

Finally, the new ISO standard for publication printing in Europe was issued in 2004, and it will probably be fully accepted in the next few years. If the new standards be successful or not depends very much on the acceptance of print buyers, and whether they will demand that the standards must be used by the publication printers.

5. Comparison between the surveys in 1985 and in 2005

The answers collected in the questionnaire show there is a number of changes. It is doubtful, whether so many changes have ever happened before in the industry in such a short time:

Prepress

- Going from analogue to digital in the prepress – PDF technology is dominating the market
- Direct digital interfaces in cylinder engraving (gravure)
- CTP technology in web-offset and new screening algorithms
- No gravure proofs and/or corrections for publication gravure; preproofing with inkjet with suitable professional drivers has achieved full market acceptance

Press configuration

- Press configuration in gravure – page count > 50%, press speed > 40%
- Press configuration in web-offset – page count 50-100%, press speed > 100%

Paper grades

- Quality assessment – web-offset has substantially improved print quality but is struggling with waviness
- Quality assessment – gravure has improved print quality on MF papers
- Paper grades – paper mills have expanded their available product range; the choice of uncoated mechanical papers for paper buyers is large

Run length

- Run length – about 50% longer in gravure than before, web-offset has a pattern similar to that in 1985 except in the UK

Advertising materials

- Dramatic reductions in lead-time for advertising materials, particularly in gravure – from average 3-4 weeks to less than 24 hours

General trends on the market

- Cylinder processing has improved in 20 years, but there is still room for further improvements in productivity, economy and technology
- Recent ISO standards for advertising and publication printing (both processes) are slowly gaining market acceptance
- New players from East Europe will probably increase their competitiveness; may pose a threat for publication printers in West Europe, because technology is no longer an entry barrier. Print is going global, but outsourcing of print jobs further than to the East Europe is not feasible

6. Conclusions

The extremely fast progress of digital technology in the 1990's had a great impact on the printing industry, particularly in the prepress area. During the recent interviews, it became very clear that most prepress work is now done outside the printing companies (outsourced). Even the integrated publisher/printer prepress work has moved from the printing to the publishing division. These new techniques created a dramatic change from way in which the industry previously worked.

Suddenly, the customer gained complete control of the work flow, mostly based on PDF technology (a subset of Postscript), and of much of the prepress work previously created and controlled by the printing industry. Digital advertising materials are today centrally produced according to the new ISO standards for publication printing (gravure or web-offset). Larger multi-European campaigns

can be produced by one agency, with the different language versions later being distributed via the Internet.

Standardized preproofing has become an extremely important issue for both customer and printer to ensure that the final printed copy meets the expectations of the customer. The main difference today is that previous technologies have been replaced by digital methods using ink-jet, made by companies like Epson and HP. However, these ink-jet printers are driven by third-party software packages developed by colour specialists. Hence, it is reasonably simple for the customer-printer to create common preproof standards, which are both repeatable and consistent with the final print. The use of generic preproofing systems is one of the most important steps in creating a digital workflow, where the lead-times can be extremely short, some times only a few hours prior to press start.

Many publication gravure printing companies have been struggling with these dramatic changes during the last decade, as they have been forced to disinvest their previous prepress operations and make their staff redundant. Most web-offset printers, however, have been totally unaffected and have benefited from the new digital workflow systems available on the market, because they decided very early to outsource all prepress work (except plate-making) to third parties. Furthermore the common opinion in the industry is that plate-making for web-offset has made dramatic progress during the last few years, and the process has been greatly simplified. The number of companies competing in this particular area is large, and several advanced technical solutions have been developed for Computer-to-Plate (CTP) technology.

These new technologies have probably led to changes in the previous break-even levels. Very few gravure printers are producing signatures or products with a print run shorter than 250-300 000 copies, unless the pagination is above 64 pages. Web-offset printers, on the other hand, with present plate technology may easily print up to a million copies without having to change the plates, and hence there have been huge investments in larger (48-64 pages) web-offset presses during the last few years.

Hence, it can be clearly stated that the hypotheses presented in the introduction to this paper have been supported by the analysis of the answers from the respondents. This paper also clearly shows that the changes in the market conditions and product requirements have been quite dramatic in Europe during the last 20 years, and that further changes are about to happen. These new developments in both the prepress and press for web-offset have put the gravure industry under immense pressure, and it has become very clear during the interviews that the mid-size gravure concept has fallen between two stools. Most effort has been devoted to the development of the super-wide presses, today 3.8 m or wider, while little efforts has been put into the lower end of the market. A new approach to defend also the mid-size markets in Europe may also be needed.

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