01.

graphic print production

Who actually does what in graphic print production today? What is prepress? What affects the price of a printed product? What should you think about when getting a price quote? How do you avoid additional costs? Who is responsible for what parts of the production?

GRAPHIC PRINT PRODUCTION IS a broad concept these days. It covers all the steps that are taken to produce a printed product. Of course it includes printing, finishing, and binding, but it also includes all the steps that precede these, such as outline and execution of a design, photographing and editing images, producing text and layout, and prepress production, which includes creating PDF files, adjusting images for printing, proofing, and preparing printing plates.

In this chapter we will go over the graphic print production flow, giving an introduction to the different steps and providing examples of the roles various participants play. Before we begin, we will present a number of basic questions; the answers to these determine to a large degree how you are going to set up your project.

Graphic print production is more difficult than you might think, since there are many people involved and you are dependent on a functioning partnership with all of them. It is not easy to predict costs, either; it's important to know what kind of information you will have to provide to get an accurate price and avoid the additional costs that are so common in the graphics industry. We will therefore look at the underlying factors that influence the costs of printed products, and review a checklist of what should be included in the price quote. We will also go over how to evaluate and choose suppliers as well as how to plan the graphic print production.

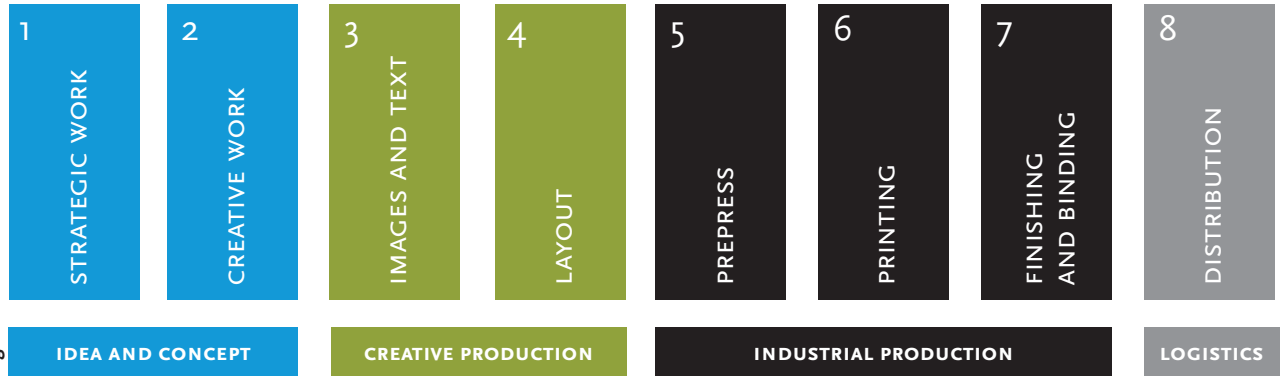


Figure 1.1

THE EIGHT STEPS OF GRAPHIC PRINT PRODUCTION

Graphic print production can be divided into eight steps and four phases. The first phase deals with strategic and creative work; the final result consists of idea, concept, and sketches of graphic design. The following phase could be labeled as creative production–here the product is still being designed and changed. The third phase, which consists of prepress, printing, and finishing and binding, is primarily industrial, with a goal of carrying out what has been decided on and formed in the previous steps. The last step deals with distributing the finished printed product.

1.1 The Graphic Print Production Flow

The technology in graphic print production has become cheaper and more accessible in the last fifteen to twenty years, and as a consequence, many specialized jobs have disappeared. Today, the same person can carry out work that previously required a number of different specialists. The boundaries that traditionally existed between different kinds of graphic print production companies have blurred, and the distribution of roles has been changed; it is no longer entirely clear who does what. There are advertising agencies that edit images and printing houses that arrange layouts; there are prepress companies that do photography and purchasers of printed products who do a large part of the production themselves. Materials, production, and information flows have also changed, which has led to a certain amount of ambiguity as to who is responsible for what.

One way to sort out the areas of responsibility is to break down the graphic print production flow into eight basic steps:

- *Strategic work*
- *Creative work*
- *Images and text*
- *Layout work*
- *Prepress*
- *Printing*
- *Finishing and binding*
- *Distribution*

The first two deal with ideas and with concept and outline work. These initial steps are the time to consider the project as a whole and determine if a printed product is what is really needed. Ideas, sketch work, and graphic design are a separate field, and we will cover these steps briefly. We will, however, go over the following two steps—image and text, and layout—more thoroughly; in these creative phases the product is still being formed and changed. The last four steps are mainly industrial, and their aim is to carry out what has been decided and formulated during the previous steps. We will take a closer look at these last steps, except for the final one, distribution, which we will only touch upon.

The same company can carry out many of these functions. The important thing is that you know who is responsible for what, and what information and competence each function requires. Although the technology is more accessible today, it still demands special competence within many areas if you want to present a high-quality printed product. Different productions set different demands, which means that roles and responsibilities, as well as production and information flows, look different from project to project.

1.1.1 **Strategic Work**

In the first step you should ask questions that will help define more clearly the product you want to create. What are the goals of this project? For whom is this product intended? What will this product be used for? In this phase you also determine if a printed product is really needed. The typical participants in this phase are the marketing and information departments, but it may also include advertising and design departments as well as media advisors.

1.1.2 **Creative Work**

The creative step is about developing the design—determining the message of the work and how best to communicate with the audience for whom the message is intended. More questions bring the project into focus: What type of printed product should be created? What should this product say? What should this product look like?

1.1.3 **Images and Text**

Nowadays digital images may be created and edited by just about anybody, with help from digital cameras, scanners, cell phones with cameras, and widely available image editing programs that run on ordinary computers. As a result, traditional reproduction companies, which previously did most of the image editing, have almost disappeared.

Those who work with digital images today are not always as knowledgeable as their predecessors, since they often have other work responsibilities. At the same time greater demands are being placed on image editing when the only existing original is digital and you don't have the opportunity to go back to a negative or slide.

The fact that an image is digital doesn't mean, unfortunately, that the image is technically of high enough quality to be used in print. Therefore, you always need to check and adjust digital images before they are printed, even images that originally come from a professional supplier.

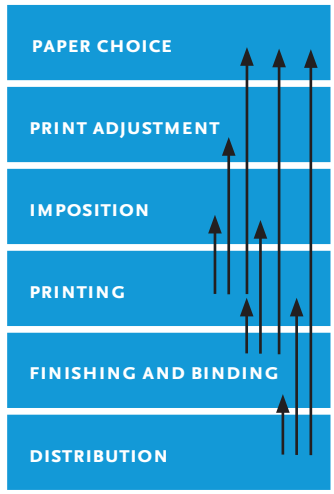


Figure 1.2

CHOICES ARE MADE IN REVERSE ORDER

In each production phase, you need to know what the following steps will require, and adjust your work accordingly. Distribution can account for a large part of a printed product's costs, and it is common to choose a paper with a lower weight to reduce costs. This can affect finishing and binding as well as printing. The requirements of finishing and binding can determine the choice of paper; at the same time, the choice of paper and printing methods determines how the image will be prepared for printing, and so on.

THE GRAPHIC PRODUCTION FLOW

The graphic print production process consists of eight steps. In this book we focus on steps three through seven. The flow in these phases is illustrated at right.

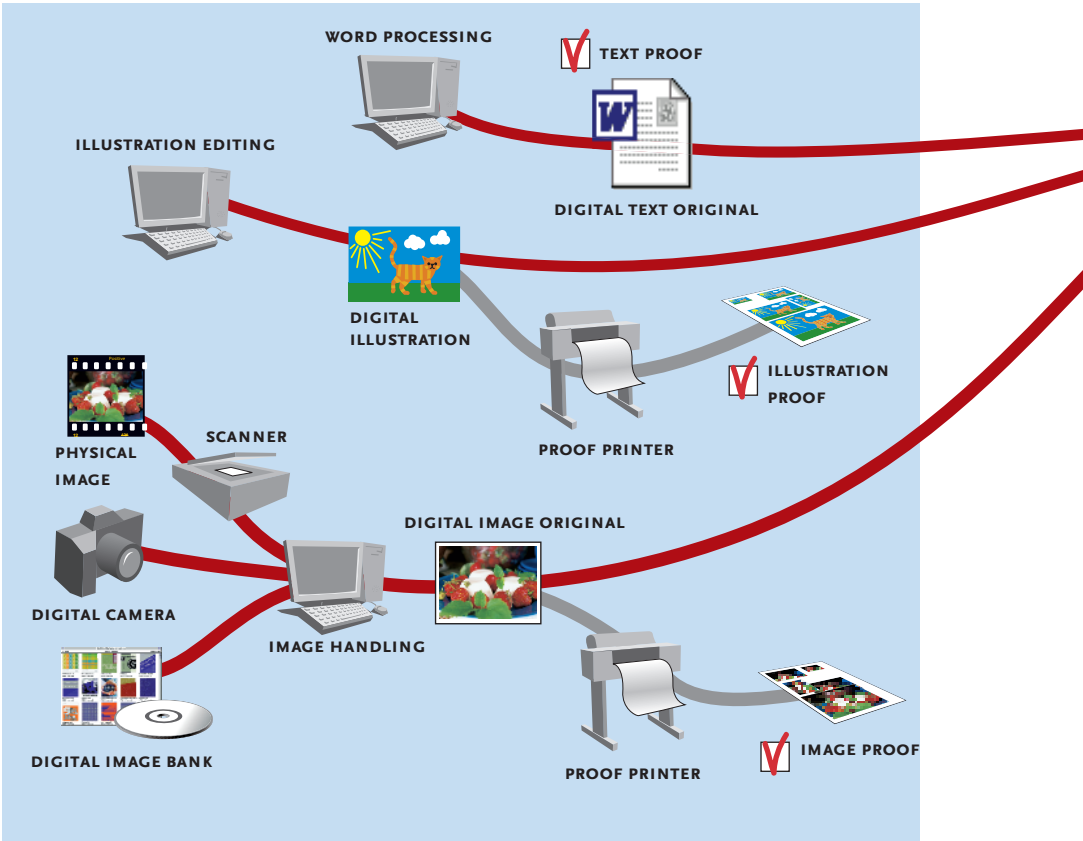


Figure 1.3

IMAGE AND TEXT

In this step the images are produced. They are scanned, digitally photographed, or obtained from image banks or CDs. They are checked, adjusted, and retouched; usually you work in Adobe Photoshop. This is when illustrations are drawn, most typically in Adobe Illustrator. In addition, texts are written, edited, and checked in a word processing program, usually Microsoft Word.

CHECKING AND PROOFS

There are a number of checkpoints in the graphic print production process. It is important that these controls be made as early as possible so that errors do not occur later on. Errors identified late cost more to correct and risk causing delays, sometimes even the entire delivery. On the right we see which controls have to be done and when, how they are done, who approves them, and what should be checked.

Text proofing is done by the customer on a laser printout or directly in the word processing program. Language, spelling, content, and facts are checked as well as the text's technical structure–for example, text intended to be a heading should be formatted as a heading.

The customer also does an *illustration proof* by checking details, colors, and text in the illustrations. This is done on a high-resolution laser printer.

Colors, sharpness, touch-ups, and quality of *photographic images* are also checked by the customer on an image proof done on a high-resolution laser printer.

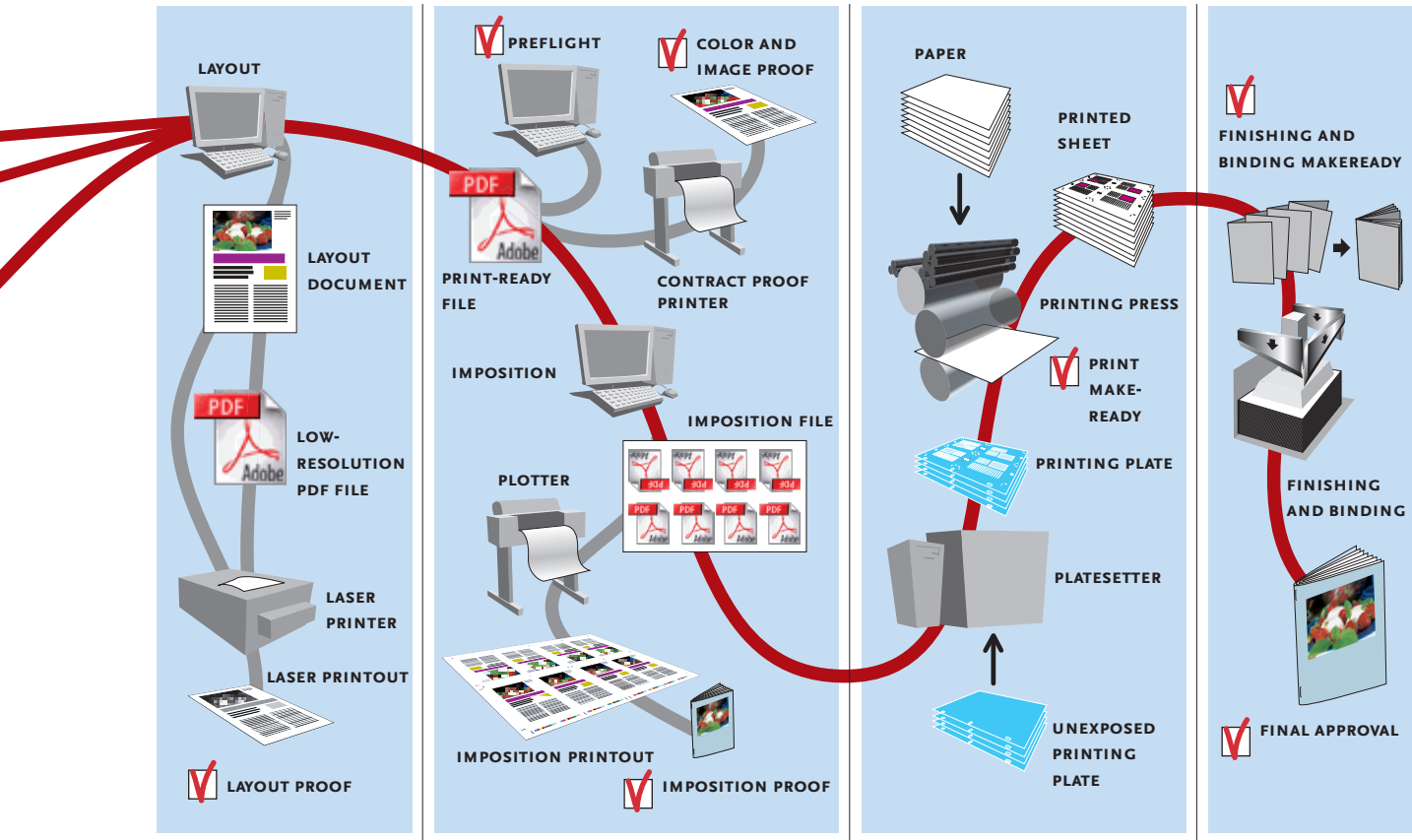


Figure 1.4

LAYOUT

Images, illustrations, and text are placed together in QuarkXpress or Adobe InDesign. The text is typed and a layout created. A low-resolution PDF file of the layout is often created for examination. The layout document or PDF file is printed for proofing.

The customer creates a layout proof on a laser printer, often in color, to check that the placement, typography and design, sample point, etc. are correct. Colors and image quality cannot, however, be checked in this phase.

PREPRESS

From the layout, a print original (a high-resolution PDF file) is created. In preflight, it is proofed with the help of Adobe Acrobat or Enfocus PitStop. Then the pages are placed as they are going to be printed on the sheet of paper, an imposition, in a program such as Preps or INposition. When the imposition is done you can produce printing forms–in offset printing these are printing plates.

Preflight checking of the PDF file is done by the printer. The technical quality of the PDF file is checked for things such as fonts, image resolution, color saturation, and printing colors.

The customer makes a *color and image proof* on a high-resolution laser printer or dye sublimation printer. Now you check that everything looks the way you want before it goes to print.

The *imposition proof* is made by the printer. It is a large laser printout on which they check that all the pages are laid the right way.

PRINTING

Printing occurs with the help of a printer or a printing press. Printing forms are necessary for printing presses, while a printer can print directly from digital information. Different printers and printing techniques require different papers, which means that you have to choose a paper that fits the production technique you have chosen.

The *first approved printed sheet* is approved by the customer or the printer. On it everything should look like the color and image proof and the registration of the type should be good.

FINISHING AND BINDING

Here is when the printed product is finished by treating the surface of the printed sheets, folding and cropping them, and then finally binding them. They are packed, stamped, addressed, etc., in preparation for distribution.

The *first approved printed product* is approved by the printer or the bookbinder together with the finishing and binding makeready. Technical errors and registration are looked for here.

Final approval of the finished printed product and its packaging is done by the customer.

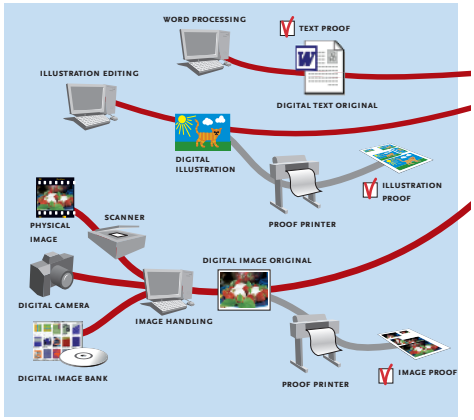


Figure 1.5

IMAGE AND TEXT

In this step the digital original images, illustrations, and text that are going to be used in the printed product are produced. Involved in this stage may be photographers, illustrators, journalists, authors, retouch specialists, prepress companies, and printing houses. In this phase the customer approves all text, illustrations, and image proofs.

In order to carry out these controls and adjustments in the right way, you need knowledge, good methods, and a goal for your image editing. What are the elements of a digital image that make it of good quality? This is when a technical image standard—that is, specifications regarding the technical requirements for an image—can be useful in order to effectively produce high-quality color prints. Image editing does not only involve ensuring technical quality; it also involves achieving creative goals. There are few images published today that have not been retouched to a greater or lesser degree. One of the most common image editing steps, for example, is to select the image in order to transfer it to a white or transparent background.

When we talk about digital images, we usually divide them into pixel-based images and object graphics. Pixel-based images are photographic images, while object graphics are illustrations, logotypes, and other graphics of various kinds. Pixel-based images are constructed of a number of small image elements in the computer, called pixels, while object graphics are made up of mathematical curves and objects. Object graphics, in principle, can be enlarged endlessly, while pixel-based images, in principle, cannot be enlarged at all. The program most often used for editing pixel-based images is Adobe Photoshop, while Adobe Illustrator is usually used for object graphics.

It is important that pixel-based images have a high enough resolution to be able to be reproduced in print with high quality. A simple rule of thumb is that pixel-based images should have a resolution of 300 pixels per inch. TIFF and EPS are typical image formats for printed production, but PDF and PSD are also becoming common image formats. Object graphics are generally saved in EPS or PDF format, but the AI format is also increasingly commonly used.

The number of digital images these days has created the need to store images in different kinds of archives and image banks. To then be able to find the images requires that they be named in a standardized way, and labeled with key words, image descriptions, and copyright information. This area has been developed much more recently, and now Adobe Photoshop has integrated support for labeling images according to the International Press Telecommunications Council (IPTC) standard. There are also several simple and inexpensive image bank programs, such as Cumulus from Canto or Portfolio from Extensis.

At the same time as you produce images you usually compose text, which is generally produced in Microsoft Word. We advise against using any of Word's layout features to create the printed materials. The program is excellent for producing and editing text, but it is not suitable for print production.

1.1.4 Layout

Working with layouts involves putting together text and images to create finished original pages. Whoever prepares the layout document for printed products has to be conscious of the fact that creating an attractive layout isn't enough. It is just as important that the document works well both as a printout and for preparing a printing plate. Documents that are not properly produced can increase costs, delay production, or have unintended final results. The most common programs for professional layout work are Adobe InDesign and QuarkXPress.

Some important areas within layout work are typography, manuscript, image editing, and logotypes, as well as the choice of colors and color combinations. In this book we will not deal with typography from the point of view of aesthetics, but instead will discuss the handling of fonts as well as how they are made, which are important when creating a layout. When you create your layout you also need to know something about the printing process; we will discuss some common terms such as *overprint* and *bleeds* [*see 6.11.4 and 6.11.1*].

When you work with color you will encounter different color systems, such as RGB, CMYK, and Pantone. RGB (red, green, blue) is the color system of computers and monitors, while CMYK (cyan, magenta, yellow, black) is that of printing. Pantone is a system for special printed colors that are used as complements to the four print colors since they are difficult to reproduce in CMYK. Gold, silver, Reflex Blue, and bright orange are examples of shades for which Pantone colors are often used.

When you work with layout you often handle a number of different files, especially images. It is important to organize your work and have a good basic structure for naming your files and where they are saved so that it is easy to find the right file. Previously, low-resolution images were often used during layout work, since software and computers were not powerful enough to handle high-resolution images, but this is rarely a problem today. If you want to have well-structured document files, it is possible to automate the layout work using templates or plug-ins for layout programs. This works when you are producing a printed product with a rather simple layout, such as novels or catalogues, and you can save a lot of time this way.

During layout work it is often necessary for several proofs to be sent to different interested parties for examination and approval before a final product is prepared. The PDF format has become a standard for distributing proofs, and the Acrobat program from Adobe also has a number of practical functions that allow you to attach comments and instructions about changes you want carried out.

1.1.5 **Prepress**

Prepress is a rather clumsy collective name for all the work steps that you carry out before you begin the actual printing. *Repro* is an older term that has often been used as a synonym for *prepress*. The boundaries between prepress, layout, and image editing are unclear and can create a lot of problems and misunderstandings, practically speaking, as to who is responsible for what. There used to be prepress companies that dealt with prepress, layout, and image editing, something that leads to even greater confusion as to what prepress really is.

Today layout is generally done by advertising agencies or in-house departments. Image editing has begun to be done by photographers or specialized image retouch companies. So, what is prepress? In this book we have chosen to define *prepress* as those work steps and techniques required to create print-adjusted digital files that can be the foundation for the production of a printing form. In practice this includes work steps such as creating high-resolution PDF files, print adjustment of images and documents, proofing, imposition, and rasterizing, as well as technologies such as PostScript, PDF, JDF, and different kinds of printed proofs.

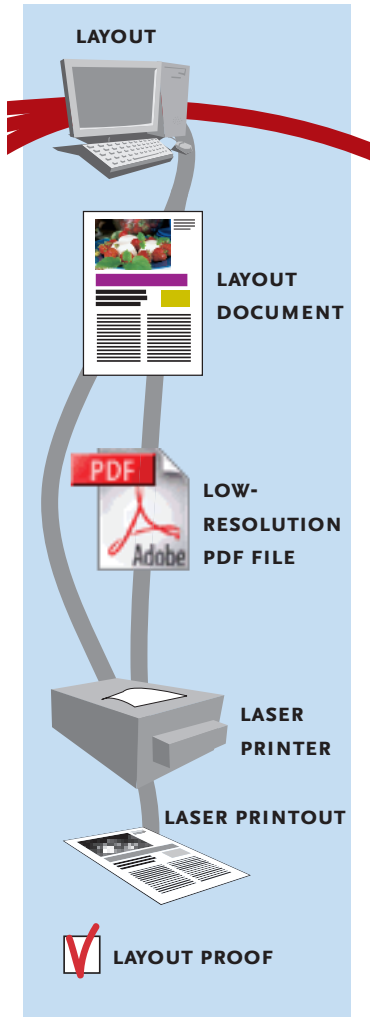


Figure 1.6

LAYOUT

Layout work deals with putting together text and images to make finished original pages. Some important areas within layout work are manuscript, typography, handling images and logotypes, and choice of colors and color combinations.

Layout work is done in advertising bureaus, design studios, printing houses, marketing departments, and publishing companies. In this step the customer approves the finished layout.

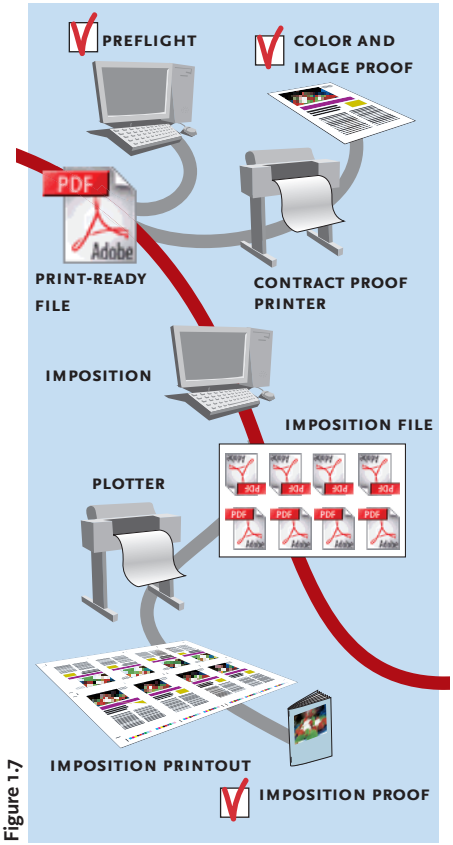


Figure 1.7

PREPRESS

Prepress is a rather general catchall name for all the work steps that are carried out before you begin with the actual printing. In actuality prepress is the phases involving the creation of high-resolution PDF files, making images and documents print-ready, controlling imposition and screen frequency, and technologies such as PostScript, PDF, JDF, and different types of contract proofs. A large part of the prepress work is automated today and often done at the printer's.

There are three proofing steps during the prepress stage:

- Checking the print-ready PDF files using preflight at the printing house
- Checking the printer's proof, done by the customer
- Checking the imposition proof, something normally done at the printer's

Most prepress steps are automated today and are to a large degree contracted out to printing houses. All printing houses accept PDF files as the printed original, and international standards have been developed for the production of PDF files for printing (PDF/X).

Adjusting images for printing is done with the help of an ICC profile for different situations. For the most common printing techniques there are standardized ICC profiles.

Rasterizing occurs automatically when producing the printing plates. During the process, the raster dots are created, which determine the different colors and tones that are going to be generated in print. There are several kinds of raster techniques, each with different advantages and disadvantages.

The contract proof is a very important step in the prepress phase. It is a high-quality color printout that simulates what the printed product will look like. It is given to the customer for official approval, and it is also used to show the printing house what the customer expects as a final result. Without the contract proof it would be very difficult to reject a printed result you weren't satisfied with.

Since the bounderies around prepress work are unclear, sometimes certain work steps are carried out by people working in layout or image editing. The important thing is not how the different work steps are labeled, but rather who is to do the steps that have been defined. Also essential is that you understand what work steps are required and what kind of competence is necessary in order to take responsibility for them.

1.1.6 Printing

The printing method you choose for a particular project is usually determined by the quality requirements, the size of the print run, the printing material, and the format and type of printed product you are creating. You can create printed products with both printers and printing presses, and the boundaries between them are somewhat fluid. In this chapter, we will cover all the different printing methods and their characteristics.

The basic difference between printing press technique and printer technique is that the former always uses some sort of printing plates, or printing blocks for flexographic printing. Printing plates are static, which means that every printed product made from the same plates will look alike.

Printing press techniques generally lend themselves best to large print runs. The most common printing press techniques are offset printing, gravure printing, flexographic printing, and screen printing. By contrast, printers don't use any printing plates, which means that every printout can be unique. Printer technology is better suited for smaller print runs, from approximately 500 copies down to single examples, and the most common techniques are xerographic, inkjet, and dye sublimation.

When we talk about digital printing, we mean in general that the machine that is used is based on the technique of printers, but it has such high capacity that it can compete with a traditional printing press. The advantages of digital printing are that the contents can vary from sheet to sheet and that the start-up costs are low, since it does not require extensive makereadies and you don't have to develop film or printing plates. Traditional printing presses require print-

ing plates and take a longer time to set up. They have higher start-up costs, but in general they have a higher capacity, which means that they are more cost-effective with large print runs. Paper is the most usual printing material, but you can also print on most other materials, such as plastic or cloth.

1.1.7 **Finishing and Binding**

Though it is the final phase of the graphic print production process, finishing and binding have an impact on a project from the very beginning, and should be taken into account when the product is being designed. For example, some types of paper are more appropriate for different finishing and binding processes than others. The imposition of the pages (how they are arranged on the printed sheets) is also determined partly by the finishing and binding desired for the product. Therefore, it is important to decide early on in the planning stages what type of finishing and binding procedures your product will need. Finishing and binding can be divided into three areas: surface processing, cropping and trimming, and binding.

Surface processing includes different stages that affect the surface of the printed product. There are many reasons why printed sheets have to be given a finish. It gives you the opportunity to create raised areas on the paper, emphasize a picture with partial varnishing, or create metal effects with foiling. Often you apply a finish to a printed product to protect it against wear and tear, or laminate it to increase its folding endurance. It is also common today to varnish printed sheets in order to be able to finish and bind them more quickly, without waiting for the printing ink to dry.

Cropping and trimming are the stages of book finishing in which the paper is physically shaped. The specific processes include cropping (the printed product is cut and trimmed to get the right format and even edges), die-cutting (the printed product is die-cut into another shape or is given perforations), punching (the printed product has holes punched in it so it can be put into binders), folding (used to form pages from the printed sheets), and creasing (the printed product is creased to mark a fold).

Binding is the joining of a number of individual printed sheets into a single entity, be it metal-stitched brochures, spiral-bound manuals, softcover books, or hardcover books. The term refers to how the insert is put together: metal stitching, spiral binding, thread sealing, thread sewing, or glue binding. In metal stitching and spiral binding, the cover is attached during the actual binding process. In thread sealing and thread sewing, the spine of the insert is sewn together, then attached to the cover. There are two ways of attaching, or casing, the cover. In the first version (for softcovers), the cover is glued to the spine of the bound material and is put on during stitching. In the second (for hardcovers), the first and last pages of the material, called the endpapers, are glued to the insides of the covers, in a step separate from stitching.

The printed product's intended use affects which finishing and binding processes you choose. A manual that will be used in a garage has to be able to withstand oil and dirt, while a computer manual should be able to lie flat on a table. The choice is affected at the same time by economics and the number of copies printed. For materials that are not expected to last long, you would choose

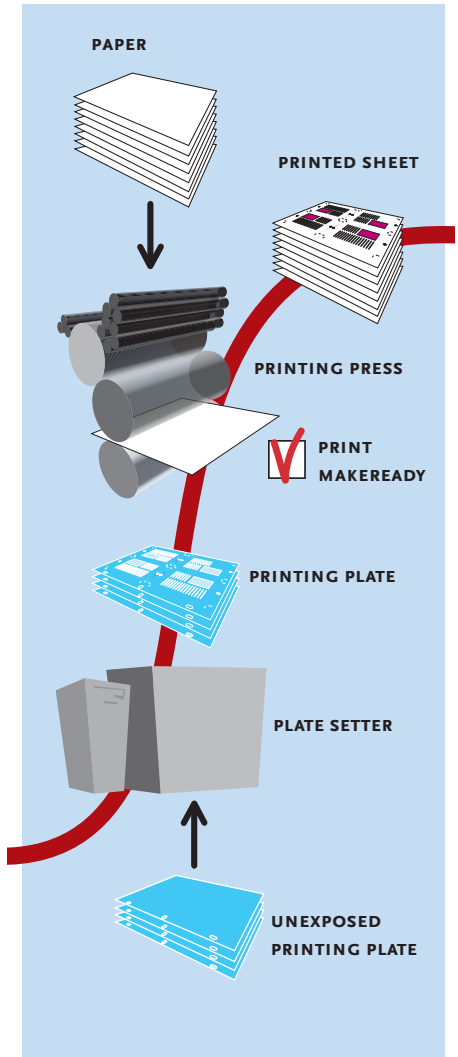


Figure 1.8

PRINTING

Traditional printing requires you to create a printing form for each color in the print: clichés for flexographic printing, plates for offset printing, engraved printing cylinders for gravure printing, and screens for screen printing. Digital printing technology requires no printing forms, but instead prints directly from digital information.

In this phase you approve the final printing quality in conjunction with the makeready, before the print run begins. Approval can be given either by the customer or by someone at the printing house.

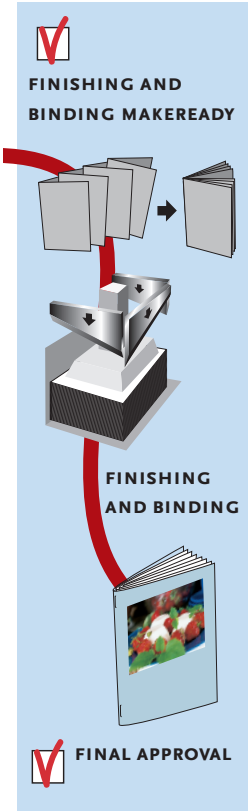


Figure 1.9

FINISHING AND BINDING

Finishing and binding happens at the printer's or at a special finishing and binding company, and can be divided into three areas: surface processing (varnishing, laminating, embossing, etc.), cropping and trimming (cropping, stamping, creasing, etc.), and binding (stitching, covering, and casing).

The approval that is given at this stage is for the final finishing and binding quality. It is given by someone in the company carrying out the finishing and binding process, and is an approval of the first correct copy before you produce the whole edition.

DISTRIBUTION

Distribution is often handled by the printer or, when it is on a large scale, by companies specializing in it. The costs of distribution often surpass the printing costs.

Normally the customer approves the final quality of the printed product before it is distributed.

a cheap and simple finishing and binding process. With larger print runs, you sometimes have to choose a cheaper binding to keep within a budget. If you print with web-fed offset printers or intaglio printing, as is usually done with larger runs, the finishing and binding processes are usually connected directly with the printing press, so you will have to select from among the finishing processes that are available with that system.

Finishing and binding are done at printing houses and bookbinderies. If you are working with a sheet-fed offset printer, you will often have to take the printed sheets to a separate bookbindery. Bookbinders often specialize in certain kinds of binding, so for different types of finishing and binding processes you may have to resort to different bookbinderies. It is even common for the sheet-fed printers themselves to offer some of the simpler off-press services. Printing houses that do not have their own finishing equipment usually have close ties with a bookbinder.

1.1.8 Distribution

The printed product is now ready to be distributed to the final user. The costs of distribution often surpass the printing costs. Distribution is frequently done by companies that specialize in it, and in this book we will only take a general look at distribution.

1.2 What Affects Costs?

When you request quotes from graphic print production companies, you need to include all the information that will affect the final price. We will go through the main parameters that influence production costs and discuss things that are important to consider when you are planning your printed product and soliciting offers.

Pricing in graphic print production is far from standardized and can vary greatly from service provider to service provider. Some service providers have standard price lists, while others have differentiated pricing. It is important to talk about what you want to have included and not included in the price you will be quoted. You should also consider if taxes will be added later on and under what conditions they would apply.

Different printing presses fit different types of production, and printing houses are often limited in terms of equipment. This means that most printing houses specialize in the type of production that is best suited to their printing equipment. It is important to choose a service provider who normally works with the same type of production that you are seeking. A printing house may be able to deliver what you're looking for even if it doesn't usually produce that type of item, but you may have to pay an unnecessarily high price. If, for example, you want to print a catalogue, you will most likely get the best price with a printing house that specializes in such products.

Above and beyond the actual costs of printing, there may be costs for the advertising agency that develops the concept, writes the text, and prepares the design. In addition, there are costs for distribution of the printed product. If you work with a small print run, the advertising agency's fees will make up a

PARTICIPANTS IN THE GRAPHIC PRINT PRODUCTION PROCESS

STRATEGIC PHASE

- Marketing departments
- Communications departments
- Advertising agencies
- Media advisors

CREATIVE PHASE

- Marketing and communications departments
- Advertising and PR agencies
- Design bureaus

IMAGES AND TEXT

- Photographers
- Photo labs
- Production companies
- Prepress bureaus
- Printers with own prepress
- Image bureaus
- Writers
- Editors

LAYOUT

- Advertising and design bureaus
- Production companies
- Prepress companies
- Printers
- In-house bureaus

PREPRESS

- Prepress bureaus
- Copying companies
- Printers
- Production companies
- In-house bureaus

PRINTING

- Copying companies
- Prepress companies
- Printers

FINISHING AND BINDING

- Printers
- Bookbinder

DISTRIBUTION

- Printers
- Bookbinders
- Distributors

large portion of the total production costs. If you work with a large print run, the advertising agency's costs will decrease proportionately and distribution will make up the largest part of the total cost.

Paper costs are usually calculated into the printing price and make up a very small part of the total cost when the print run is small (approximately 10,000 copies or fewer). With larger print runs (approximately 100,000 copies or more), on the other hand, the paper can account for up to 50 percent of the printing cost. In principle, for a small print run the choice of paper is unimportant from the cost angle, while it can be of the greatest importance when you have a large edition.

1.2.1 Makeready and Start-up Costs

When printing houses set prices for printed products, in general their prices correlate with what the printing press costs and how much time they expect to have it available on average during one year. Since printing presses are very expensive, their cost per hour is high, anywhere between $300 and $900 per hour.

The total printing price is affected by the start-up cost and the time it takes to print the print run. The start-up cost is affected by what is called a makeready, as well as the cost of materials such as printing plates and paper that are required for a makeready. The makeready serves to prepare the printing press and make the settings and adjustments that are required to get the first approved printed sheet. The costs of printing the run itself lie in direct relation to the number of sheets to be printed. The number of printed sheets is influenced by the size of the print run and the format and volume of the printed product.

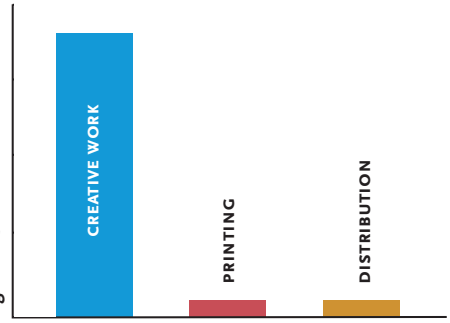


Figure 1.10

Costs for small editions and small volume.

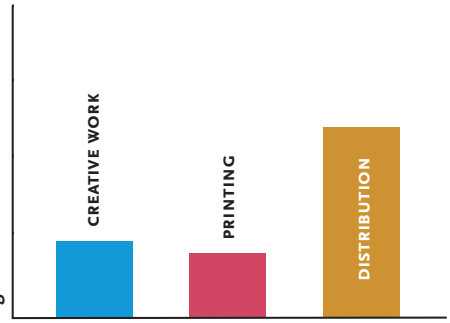


Figure 1.11

Costs for large editions and large volume.

THE COSTS OF A PRINTED PRODUCT

The relative costs when you produce a printed product are divided up differently depending on the size of the edition. With small editions the creative costs, such as images, text, and design, have a great effect on the total cost, while with large editions and large volume the distribution costs dominate.

1.2.2 Print Run, Format, and Volume

The print run is the number of copies you want, the format is the size of the actual printed product, and the volume is the number of pages. These three parameters define the printed product and also mainly determine the costs.

The size of the print run of course affects the total printing cost. Because of start-up costs the printed product will be cheaper per copy with a larger print run. Therefore it can sometimes be worthwhile to print more copies than originally planned, since the extra copies don't cost that much. You can ask the printing house to supply this price on the quote—for example, the cost of printing an additional 1,000 copies. The size of the print run is often a guideline for determining what type of printing technique is most suitable to use. Runs of fewer than 1,000 copies are usually digitally printed; runs over this size most often are printed using sheet-fed offset printing. Web-fed offset printing is called for if you're producing more than 50,000 copies, while gravure printing is used for runs of 300,0000 copies and above. These guidelines can vary depending on the format and volume of the printed product.

The format affects the costs of printing to a large degree since it determines how many pages you will get from one printed sheet. When you select the format, it can be worthwhile to stay close to the ANSI standard sizes to utilize the paper and the printing press as effectively as possible. If you halve the format, you can count on diminishing the printing costs significantly since you only have to print half as many sheets. The start-up costs are not halved, however; they will remain the same. With large runs you can almost halve the printing costs, since the start-up costs account for a very small amount of the total price in this case.

The volume is also an important factor that affects the printing cost. The more pages the printed product has, the more expensive the printing will be. Since sheet-fed offset printing in general is suited for several commonly used trim sizes, this means that you should plan your printed product with a number of pages that is evenly divisible by 4, 8, or 16. In practice there is a direct link between print run, format, and volume, since all three factors affect the number of printed sheets necessary for a specific printed product.

1.2.3 Colors

Black and white printed products are cheaper to produce than products in four colors. If you want to add special colors, such as one or two Pantone colors, the printing cost is increased further, to cover the costs of changing the ink and cleaning the printing press. The number of colors that can be printed on a given printing press has to do with how many ink ducts it has. Many of today's modern sheet-fed offset presses have five or six ink ducts, which means that it isn't considerably more expensive to print with one or two extra colors. However, if you want to have three or more extra colors, it can become a lot more expensive, since it involves changing inks, cleaning the printing press, preparing a new makeready, and doing the extra colors separately.

With web-fed offset printing and digital printing you are often limited to printing in four colors since the printing presses used with this technique rarely have more than four ink ducts. Flexographic printing presses often have more

than four ink ducts, which means that, as in sheet-fed offset printing, you can print additional colors without any great extra cost.

1.2.4 **Image Editing**

Image editing deals basically with retouching, selections, proofing, and different types of adjustments. Such work is often charged by the hour; the price generally starts around $65 per hour and can go up to $300 per hour, depending on the complexity and size of the task. Advanced retouching usually costs more than simpler image editing, and it is not necessarily true that the same person or the same company should carry out both the simpler image editing and the more advanced tasks. Printing houses are often good at simple image editing, while advanced retouching should perhaps be done by retouching specialists. It is a question not only of quality but also of costs, since an experienced photo editor works considerably more quickly than one with less experience.

If you have greater volume, you can demand a price per picture. Such a pricing structure can make it easier to estimate the cost of your printed product. You may then need to describe the extractions or retouching desired, so the service provider can estimate the time that will be required. For example, it takes considerably longer to extract a pine tree than a ball. One simple way is to furnish the service provider with examples of previous image editing.

When you are going to scan or photograph images, you often get a price per image. It is important to talk about desired size and resolution of the images even if these days it seldom affects the price. If there are many images, you can often get a lower price per image.

1.2.5 **Layout Work**

Layout work can include everything from simple template-based work to advanced design from a sketch or even just an idea. Simpler layout work may use proofs of an available document or the typography from an existing document, or may involve fitting advertising into a given format or fitting text into existing templates. More advanced layout work might involve developing an original layout from a sketch, or starting completely from the beginning, including design.

Layout work is most often billed per hour, but it is sometimes billed per page on larger projects. Hourly and per-page pricing varies depending on the complexity and size of the task. Advanced layout work usually costs more than simpler layout work, and the same person or company should not necessarily carry out both the simpler layout jobs and the more advanced ones.

If you have larger volumes, you can demand a price per page. The advantage is that it can be easier to estimate the costs in advance. You may then need to describe the layout work so the service provider can estimate the time that will be required. One easy way is to supply the service provider with an example of similar layout work. Sometimes you can even work with a price per page that includes scanning of images, image editing, and creating a print-ready file and a contract print.

1.2.6 **Prepress**

Prepress work can include creating and/or checking PDF files or QuarkXPress, Adobe InDesign, or Adobe Illustrator files. It may involve adjusting documents and images for printing as well as producing printer's proofs. Finally, it can include impositions and setting up printing forms. Sometimes it is appropriate to consider the costs of archiving digital material as well. Pricing for prepress tasks is not at all standardized; today this work is more or less automated, and prices can vary enormously depending on whom you talk to.

In general, prepress work is billed by the hour and can vary from $65 per hour up to $250 per hour. The hourly rate is determined by the complexity and size of the task. Printer's proofs and printing forms are usually billed by the piece and usually cost somewhere between $40 and $150 per printer's proof or printing form, respectively; sometimes companies specify how many proofing rounds will be included in the price and charge extra for additional proofing.

It is important to define how the work with proofs will be carried out and what should be approved at which stage. It is easy to underestimate the amount of time needed for proofing; be sure to set aside adequate time for checking proofs when planning your production.

1.2.7 **Finishing and Binding**

Finishing and binding can include treatment of the paper surface (varnishing, laminating, foiling, stamping), different ways of handling the printed sheet of paper (cropping, hole punching, perforating, or creasing), or bindings of different types (for example, spiral binding, glue binding, or thread sewing).

Varnishing adds no great cost in general since it is often done directly in the printing press. Laminating, foiling, and stamping, on the other hand, can cost more, since these are more labor-intensive processes. Different types of binding have different costs; generally, spiral binding and thread-sewn binding are significantly more expensive than simple stapled binding or glue binding.

Prices for finishing and binding are based on the start-up costs (the makeready) and the cost per piece of the finishing and binding of the printed product. The number of pages and the imposition of the printed sheet affect the number of makereadies in the finishing and binding machine. The fewer pages the printed sheet has room for and the more pages there are in the printed product, the more makereadies. The size of the print run determines the price per piece.

1.2.8 **Paper**

When you choose paper you should also think about the cost. A ground rule is that the larger the print run, the larger the paper's share of the production cost. With a print run of 100,000 copies or more, for example, a relatively small price difference between two different qualities of paper can make a large difference in the total production cost. With just a few thousand copies, the cost of paper makes up such a small amount of the total production cost that smaller price differences can be viewed as insignificant. The fact is that most ordinary qualities of paper do not differ more than 15 percent in price from one another. Certain specialty papers can cost significantly more, however.

DIFFERENT PAPERS ARE DIFFERENT PRICES

- Sheet paper is more expensive than paper on a roll.
- Glossy paper is more expensive than matte or silk-finish paper.
- Wood-free paper is more expensive than wood-pulp paper.
- Colored paper is more expensive than white paper.
- Rag paper is more expensive than non-rag paper.

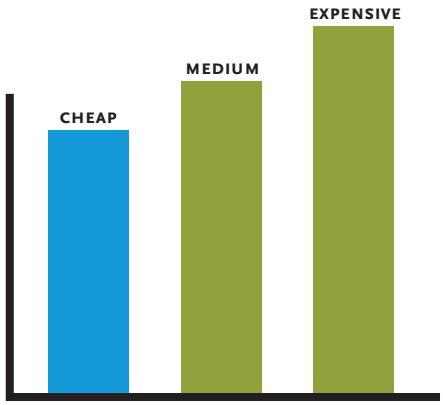


Figure 1.12

PRICE DIFFERENCE BETWEEN PAPER QUALITIES

Most ordinary qualities of paper do not differ more than +/-15% in price among themselves. Certain specialty papers can cost considerably more, however.

CHECKLIST FOR REQUESTING AN ESTIMATE

PROJECT

- Project name and number
- Short description of the task
- Quality requirements
- Partners involved

TIME FRAME

- Delivery of materials
- Delivery of proofs
- Delivery of printer's proof
- Delivery of printed product

DELIVERY OF MATERIALS

- Layout
- Images
- Text
- Sketches
- Open files or PDF files

EDITION, VOLUME, AND FORMAT

- Edition
- Volume (body and cover)
- Format

COLORS

- Four-color on front and back covers
- Spot colors
- Varnish

IMAGE EDITING

- Extractions
- Retouches
- Shadows
- Color correction

LAYOUT PRODUCTION

- Layout from sketch
- Layout from template
- Adapting or adjustments of existing original
- Software
- Proofs (PDF, printouts, etc.)

PREPRESS

- Screen frequency
- Raster type
- Contract proof

FINISHING AND BINDING

- Varnishing, laminating
- Foiling, embossing
- Cropping, stamping, perforating
- Folding, creasing
- Type of stitching (metal, spiral, glue, thread stitched, thread sealed)

PAPER

- Coated or uncoated
- Matte or glossy
- Surface weight
- Quality
- Body and cover

PACKAGING AND DISTRIBUTION

- Delivery method (order, post, digitally)
- Delivery address
- Packaging
- Placing in envelopes
- Addressing
- Marking

OTHER

- Handling of reference copies
- Archiving of material

The basis weight of paper stock has a nearly proportional effect on cost. If the weight is halved, the paper will cost approximately half as much. It is therefore usual that with large print runs, you choose a lower-weight paper. If thickness is important, you can choose a high-bulk paper, which will feel thicker but still have a lower weight.

When we talk about print runs it is also important to think about the volume of the printed product—that is, the number of pages. A book with many pages can require quite a lot of paper despite its being printed in a very small number of copies. The format of the printed product is important here, too. Certain odd formats make it difficult to utilize the printed sheet optimally, which means that a lot of the paper goes to waste. Small changes in the format can make big differences in the use of paper. The printing house can help with advice on formatting.

You usually buy paper through the printing house you are using. Therefore it is important to remember that the price of paper is affected by the agreements the printing house has with various paper suppliers and by the quantity you buy of a certain paper. This means that the price of the same paper can vary from printer to printer. You can ask the printing house to give you prices for two or three different paper alternatives.

1.2.9 **Packing and Distribution**

Specify if delivery is included in the quote; otherwise you will have to bear the costs of delivery. Most printing houses have services such as packing, placing in envelopes, addressing, and distribution. With large print runs the cost of distribution makes up a very large part of the total cost. In that case it is important to consider factors such as paper, format, and volume to see if you can compromise somewhere to save on costs. It can be difficult to reduce the distribution cost, but often you can get rates by weight from the post office or some other distributor.

1.2.10 **Archiving**

Some companies offer digital archiving of documents and images for future use. Remember that not all service providers automatically file a job digitally. It is a service that many will offer for a fee, and if you want to be sure that the material remains with the printing house, you must stipulate it. Often it doesn't cost very much. A common way to pay for archiving involves some kind of monthly fee that varies according to the amount of archived material. Also, reusing the material usually costs something, often determined by how long it takes to retrieve the old material.

1.2.11 **Environmental Concerns**

To reduce the environmental effects of graphic print production, stay up-to-date on how production processes (printing, finishing and binding, manufacturing of paper and other materials) affect the environment, and make thoughtful decisions regarding paper and other materials, ink, and so on. This is an area that is continually changing, so it is important to keep informed as to what alternatives are available.

You should also remember that environmental concerns are linked to the whole process, from the idea to the finished product (the product's life expectancy, how and where it will be used, how it will be disposed of, and whether it can be recycled). Being environmentally conscious means opting for energy-saving processes, reducing use of materials, taking advantage of recycling opportunities, and avoiding toxic and nonrecyclable materials.

Some typical questions to ask might be:

- How are the raw materials needed for paper and other materials sourced, and how are the materials produced?
- What types of printing inks are used? Do they contain dangerous metals or are they plant-based? Are the leftovers recycled?
- How much transport is required, and what can be done to minimize it?
- Is recycled paper an option?
- Which chemicals have been used for bleaching?
- How are chemicals handled in the process?
- In what way do the finishing and binding affect the possibility of recycling the printed product?
- Are the toner cartridges from printers and digital printing presses recycled?
- Is the printing house environmentally certified?

1.3 Choosing a Service Provider

To be successful with graphic print production you need to have a close and good working relationship with a number of service providers. It is wise to consider the choice of working partners carefully.

When you compare different service providers, first think through what kinds of demands you will be placing on them. It is also important to consider what phases of the production you want to do yourself and which ones you will need help with. If you do large parts of the production yourself, it can be cheaper, but at the same time you take greater responsibility for the end result.

Remember that one service provider may be better than another for certain types of production, often because of the equipment needed. Below we will go through some different factors to consider when you choose service providers.

1.3.1 Quality and Competence

Competence and quality are often among the most important factors when you are choosing a service provider. You have to know what kind of assignment you will need help with, and what kind of competence is needed from the service provider to achieve the quality you want.

Service providers' competence and level of quality are often difficult to judge before you have actually worked with them, but there are some things that can give indications. One way is to ask the service provider if you can see some jobs done for other customers.

You can find out if the company has certain areas of specialization. A company that specializes in image editing should be reasonably proficient in this

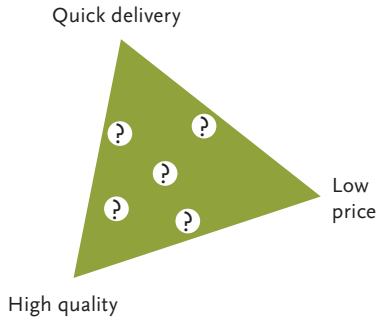


Figure 1.13

PRIORITIZE IN PRODUCTION

Printers often have different strengths. It is hard to combine low price, quick delivery, and the highest quality. You have to decide where in the triangle you want to place your printed product according to what you prioritize in the project.

SOME IMPORTANT FACTORS WHEN CHOOSING A SERVICE PROVIDER

- Quality and competence
- Delivery times and delivery guarantees
- Capacity and resources
- Organization and working together
- Proximity and availability
- References and communication
- Standard practices and conditions
- Quality and environmental work
- Economy and future

area but probably is expensive. If you don't need especially high image quality, you may be able to work with a service provider who doesn't specialize in this area. Otherwise you will be paying a relatively large amount for your images despite the fact that the quality is not especially important.

You can also ask the service provider to describe what factors and work steps they deem critical for good results, how they plan to work with you, and in what way they can ensure quality in the work flow.

1.3.2 Delivery Times and Delivery Guarantees

Delivery time and delivery guarantees may be decisive factors when you are choosing a service provider. Even these areas can be hard to judge beforehand. In principle it is a question of how quickly the service provider can complete particular tasks and how dependable the provider is.

You can ask the service provider how the delivery time can be guaranteed. Guaranteed deliveries can in some cases be absolutely essential, such as with the production and delivery of advertising. Sometimes it may be necessary to insert some sort of clause in the agreement covering the possibility of delayed delivery. If you need a quick turnaround, it can also affect the price.

1.3.3 Capacity and Resources

If you need to produce large volumes of product in a short time, it is important to find out if the service provider is used to such demands and has the machinery and personnel capacity. It is also wise to find out whether the service provider can handle both your job and projects for other customers at the same time. It is important that there be many people who can do the same things, so that not all the work rests on the shoulders of a few individuals.

1.3.4 Organization and Working Together

Find out what the company's organization looks like and how it works with customers. How important will you, as a customer, be to the service provider, and will you receive the service you expect? Are there designated contact personnel? Will the contact person always be the same, or will it vary depending on the type of task?

1.3.5 Proximity and Availability

It can often be an advantage to be geographically close to your service provider, especially if fast delivery times are important and you have high quality demands. If delivery time is not of the greatest importance, there may be economic reasons to turn to a service provider located farther away. Some of the drawbacks of distant service providers are that it can be hard to be on hand for the makereadies and it may not be easy to make quick decisions if there is a problem.

Another important question may be service level and availability outside of regular work hours. Find out what the hours of operation are and when and how the contact personnel are available. Printing houses and prepress companies often work in shifts or have some form of twenty-four-hour system. Companies that work in shifts can often produce more and offer shorter delivery times than companies that don't.

1.3.6 **References and Communication**

Ask to see samples of typical jobs the company has done. Are they similar to the type of project you are inquiring about? Request the names of previous clients, and find out how their jobs went.

Graphic print production to a large extent involves working together and communicating. Talk at length with the service providers and make sure you get to know each other. Choosing work partners for graphic print production often means that you are beginning a relationship that will last for years. Changing service providers may mean you have to start all over again to build a well-functioning working relationship, and this can lead to unforeseen costs.

1.3.7 **Standard Practices and Conditions**

Find out what specific agreements are to be made between you and the service provider. Most service providers use ALG2, which is a contract that has been worked out by representatives of both graphic print production customers and service providers. Find out both your responsibilities as the customer and what the service provider is responsible for. Service provider conditions, quality guarantees, and copyrights are areas where it may be especially important to have detailed knowledge of what each side expects and will provide. Even details about payment procedures and accounting methods are important.

1.3.8 **Quality and Environmental Work**

Sometimes you can have special requirements in regard to environmental impact issues. In this case you should find out what standards and procedures the service provider has in place, and whether the provider is certified according to ISO 14001 [*see 9.12*]. The same applies to quality issues. There are also standards here, ISO 9000, but it can be important to remember that these standards apply to quality management procedures, not to the final product. Find out what the service providers do to ensure quality and how they work on steadily improving in that area.

1.3.9 **Economy and Future**

The graphic print production industry is in constant flux, and many companies in the field have a hard time staying in business. For this reason it is important to assess a company's economic stability and ownership. It can also be interesting to find out what the service provider's plans are for future projects and direction as well as business strategies to guarantee the company's long-term survival.

1.4 **Planning Graphic Print Production**

Once you have received offers and chosen service providers, it is time to plan your production. Graphic print production can be very difficult to plan, since in most cases there are many participants involved and you are dependent on a good working relationship with all parties. Unexpected incidents often pop up, and there are few objective measures as to what is right or wrong. Much of the production is based on checking proofs until all parties are satis-

fied. Communication is essential for a successful working partnership. It is to everyone's great advantage if the parties involved know each other well and are familiar with each other's expectations.

The fact that it can be hard to plan graphic print production doesn't mean that you should just let things happen as they may. In fact, the exact opposite is true: it is important to take the time to prepare and plan. There are a number of important subjects to take a position on when you are beginning to set up a project:

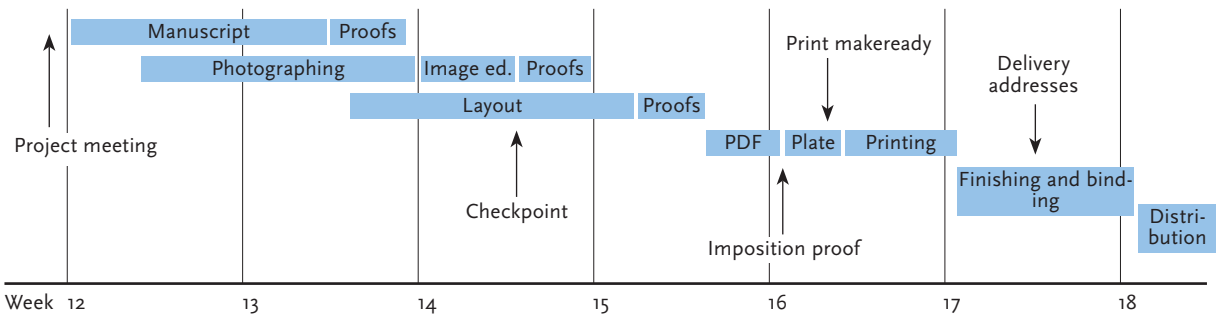
- Who is going to be in charge of the project? Do you have enough knowledge yourself or should someone else do it?
- Who is included in the project team? Who is responsible for what?
- Who should check the proofs for text, images, and design?
- Who will give final approval of the project before it goes to print?
- Which working partners are needed to carry out the project?
- How much and what should you do yourself and what do you need help with? What demands will you place on your work partners?
- Do you already have established contacts in all relevant areas or do you have to get these first?
- Which people should be kept informed during the course of the project?
- How will you guarantee quality and time frames?

For disseminating information and coordinating a project so that all works well, it is important to have a project leader. A project leader has to have a good overview of the entire job and a solid understanding of all the stages of production. Each step affects how and when the next step can be carried out, and failures in the flow of information lead directly to poorer quality and longer delivery times. Therefore the right information is a prerequisite for a good final result.

In general, begin planning backward from when everything must be finished. Find out how long every phase of production will take. Make sure you've allowed enough time for proofing. And remember to build in a little time for contingencies, as they will almost certainly arise. Consider whether the printed product may be repeated in the future—new versions, new editions, new numbers?

It is important to plan for everything properly, with time allowed for checking everything. The later in production you discover an error, the higher the cost of fixing the error. If you aren't careful enough with checkpoints during production, the entire job can be unnecessarily expensive.

PRODUCTION PLAN



Production plans are helpful for keeping track of the project. Don't forget to plan for checkpoints at every step.

Figure 1.14