

# “Digital Finishing” — The Strategic Bottle-Neck of DPP

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## Abstract

Digital printing press manufactures normally do not focus on the needs of finishing processes. But unfortunately, the usability of a printed paper is highly defined by the way it is finally finished. And for the future, the features for using the printed matter will become more important in the competition with other electronic media.

This paper will discuss several ways out of this strategic bottle-neck for different production segments, having in mind either the synergy with existing solutions but is also looking for possibilities of totally new approaches. Nevertheless, a kind of pure mechanical flavor will stay with the words "digital finishing".

## Introduction

In the fore of the discussion about the production technologies of print media by means of new digital printing methods are not only the methods themselves but also questions concerning data preparation of the contents to be printed. Hereby particularly the new possibilities of "Database Publishing" are to be used to provide individually compiled print products in the future.<sup>1</sup> This results in new demands on the organization of production processes that should preferably generate the individual products automatically. With this potential group of completely new print products it is expected to meet the demands on the media market according to precise information offers also via print media.

Although DDP processes (Digital Production Printing) have been on the market for 15 years and although the term PoD (Print-on-Demand) is of the same age, this technology has not really gained acceptance. Additionally, it was determined that the use of DDP, except for computer center prints and copy centers, is only found in selected conventional printing market segments (cf. Fig.1). The reasons for this are diverse. These are especially the absence of adequate finishing, the high printing costs, compared to offset printing, as well as high overhead costs (e.g. authors) that influence the cost comparison within many print product segments negatively. Therefore, today's largest DDP application is found in those fields, in which finishing is insignificant and further process steps after the printing are not necessary. (Fig.1). Even though in the meantime integrated solutions for single process steps are offered, as in simple cutting and gluing tasks (e.g. for the production of booklets) and as in other fields, first approaches for technical

solutions are known, finishing is still an open issue that questions most of the imaginable DDP applications.

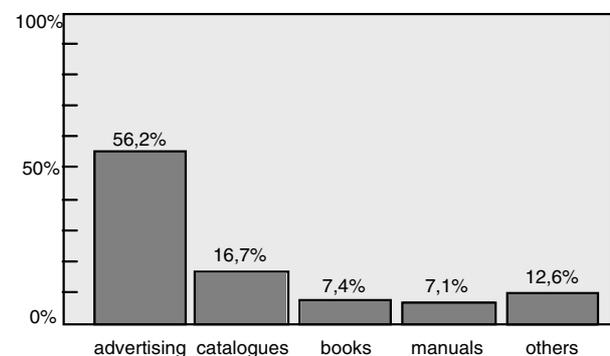


Figure 1. Allocation of Market Segments in Digital Printing Production (assembled according to Ref. 2)

## The Strategic Problem

Paper media differ from electronic media particularly because of their diverse design that is adjusted to an individual use. In future this advantage, as the unique selling point, will determine the market share of print media even stronger. This is because the advantages of the electronic media in the individual access to flexible contents will increase with the expansion of mobile communication. The design of the print product is mainly defined by the finishing of the printed paper. Herein printing will increasingly become implicitness, also regarding the quality level demanded by the human eye, while finishing will lead to the respectively typical product specification. In so far, finishing will increasingly receive the strategic significance for the market growth of the print products, which will finally be reflected in the demands for creative mechanical process solutions.

Compared to classic printing methods, DDP technologies have the major advantage that they facilitate the economic production of shortest runs and even a run of "1" by replacing all intermediate steps of image reproduction with digital electronics, so that only the final process step of the ink transfer onto the printing material goes off mechanically/physically/chemically. This cannot be extended to finishing, because here the elementary processes of the material conversion are not replaceable electronically. Thus for DDP in particular finishing will

become a development problem and therefore the crucial bottle-neck in the future digital production chain of print products.

For the time being, three variants as a way out of the conflict are discussed:

1. Focusing on product fields in which the finishing problem does not or only secondarily appear due to the user habits developed there.
2. Standardization of the design of the print products, so that the desired individualization affects the content in printing, but not the mechanical-physical design. There will still be longer runs in finishing.
3. The development of new technical concepts that allow an economic made-to-order production in finishing.

**To 1:** So far, the focusing on product fields with minimum demands on finishing has been practiced as the simplest solution (Fig.1). The potentials for this seem to be limited, however. Fig.2 shows the multifaceted spectrum of print products and its demands on finishing. That part of the shown segments with fewer demands on finishing that is not served by DDP systems is mainly the newspaper segment. Here, as for printing, however, the currently feasible production speed and productivity of DDP systems will further on be strongly limited by the realistic applications.<sup>3</sup> Besides, there are still a few special markets to be entered without any great impulses for the DDP technology.

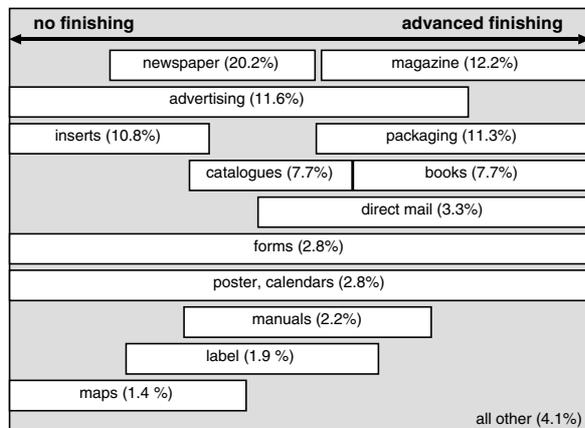


Figure 2. Finishing demands of different printing categories (market share in brackets, Source: MAN Roland)

**To 2:** the system manufacturers particularly recommend a far-reaching standardization of shortest run print products. At more than 120 newspaper and 300 book formats in Germany alone, a large bandwidth of used paper qualities, folding layout and binding types as well as an immense range of envelope designs, this approach is natural. It seems that in the USA increasing format standardization is establishing itself.

Admittedly, on the customer's side it is hard to procure a far-reaching standardization of the design since most of the print products are mainly sold because of

their design. Therefore, for many customers the outer diversity of products is a relevant success factor. Thus a standardization of products will only be enforceable in the market as long as for both, publisher and customer, a functional value added by Print-on-Demand is noticeable. Particularly, by means of PoD prints a more individual and structured access to new information sources will be possible. Those DDP productions that are to replace conventional printing only will not mean a regress to products uniform in design.

**To 3:** Ultimately, the industry will not be able to avoid putting new technical concepts for a shortest run finishing on the market. Other than the suppliers for prepress as well as for DDP systems, the producer of finishing aggregates often has a middleclass organization. Large industrial concerns are scarcely found in the field of conventional finishing technology. So, many producers are mostly lacking the necessary asset for an absolutely risky new product development in the market for shortest and single run finishing. Up to now, long-established enterprises, from the copy and office sector or from classic print production, have only moved in small steps from conventional mass finishing technology to the ability of shortest runs, while new conceptual approaches have been merely sporadically presented by outsiders without having reached a breakthrough. With the exception of the Heidelberger Druckmaschinen Company, the DDP system producers have not ventured yet to start their own production of new finishing systems. This signifies a current stagnation.

## Technical Concepts for the Bindery

As for the production of books, the known technical concepts for a single- and short run finishing can be divided into three groups:

- A. Automation of the known mass binderies
- B. Point-of-Sales printing and bindery
- C. Point-of-Sales printing ("Rochade")

**To A:** The automation of single process steps in conventional mass binding, in connection with an inline coupling of process steps and a possibly automated workflow management, is the obvious approach that is pursued by many places. Particularly, for the hardcover production a very complex process chain needs to be automated.<sup>4</sup> Hereby, among other things, very different production variants have to be taken into consideration:

- The productivity has to be adjusted in each process step for an over all optimum. But, for some steps there are different parameters important (e.g. number of books vs. book thickness).
- The reliability of the total system becomes the result of each single process together. This means, each system has to meet higher demands to achieve an acceptable common reliability.
- The open system interconnectivity becomes an important topic. Because of the very different product demands, no single provider of bindery technology

could cover all varieties. The combination of different machinery in an integrated production line needs a lot of standardization for the interfaces.

Often, the calculation of costs for a short-run job shows a cheaper production with a highly automated system, compared with the traditional bindery. But finally on the market, it is necessary to meet the common price level of the products, which is normally given by the price of mass printing products. It is not enough to be relatively cheaper than the conventional production way if it is absolutely more expensive than the typical level.

To speed up the technological development in the bindery and paper-converting sector, we have not only to look for the workflow management and for a digital production control. We need also to find new ways in mechanical engineering, using real high-tech approaches like micro mechanical systems etc. Otherwise the traditional technology will be improved not quickly enough, as DDP technologies need it for their success.

**To B:** One idea, discussed in the last years, is to bring the printing, binding and converting directly to the Point-of-Sale (PoS). For simple print products like business cards and passport photographs small fully automated production systems are on the market, located directly at a PoS and operated by the final customer itself. For these systems, only a simple cutting device is necessary behind the printing. IBM has announced a system for newspapers (PEPC), which enables the reader to chose a title from 30 newspapers and prints it immediately at the PoS terminal. Also an Israeli Company is working at a system for booklets, where the printing is combined with an integrated softcover binding unit.

All production systems in this field will face the general problems of point 1. and 2. of the previous section very hard. Because the technical solution must be small and cheap, but also fully automated to produce economically, PoS Printing is only useful in small market segments with a high degree of standardization. These systems will never offer a lot of physically different products, but have to offer functionality regarding the content. So these PoS terminals will address a separate market and do not really compete with traditional print products.

**To C:** At the Institute for Print and Media Technology of Chemnitz Technical University a new concept, called "Rochade", was developed.<sup>5</sup> While today's PoD maintains the process order of printing and binding and only places the conventional printing before the distribution, the "Rochade" concept assumes that binding comes first and then, as the final step, the information is printed into the pre-bound book (Fig.3). The advantage of this entirely new type of the book production would be a completely digital selection loop customer-information-production within the shortest period of time. The mechanical binding of a book block before the actual printing process would permit long runs and working with the used, productive methods of binding. At the end of the

production chain, the reader would even have the choice to select not only the content freely and individually but also the appearance of his book: He could chose which content is printed into which bound book block. Technically, such an approach resolves only the individual imprinting into a pre-bound book block. Even though there are currently no finished machines for this, the approaches have been published.<sup>6</sup> Beside this technical task it seems more crucial to find a way of enforcing such a type of book production in the existing markets.

Especially new distribution channels for this new type of empty but bounded books are necessary, bringing them directly to the Point-of-Print. The vision: A lot of different book types with various designs and price levels will be produced in industrial binderies. Because of the high run lengths it becomes much cheaper than a comparable book of today. In a super store, the reader selects one of this book types (fitting to the design of his home) and put it in a pagewise imprint system. He selects a content file and, within the framework of the number of pages in his individual book, an own layout (font size and type). After 3 minutes ripping and printing his totally customized book is ready to take it away.

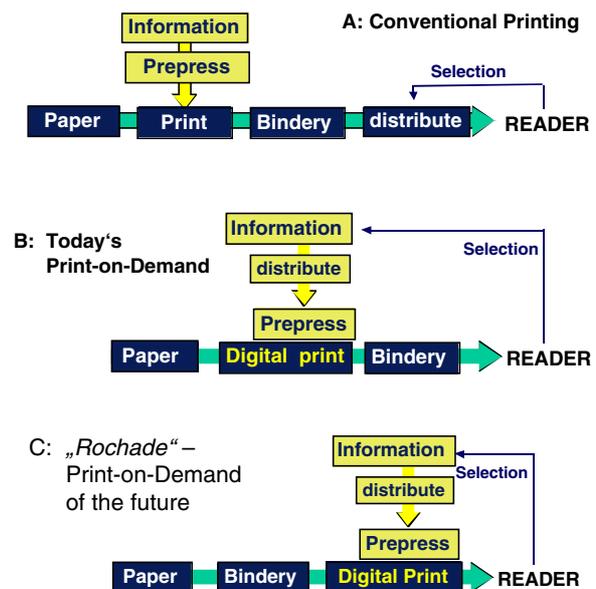


Figure 3. Three conceptual ways for the book production.

## Conclusion

The post press becomes more and more one of the technical bottle-necks in the whole DDP production. Because of the specific structure of the industry, there is no strong development in the market. So it seems that the other players in the production chain may push the binding and converting technology to support their own business. Developing new solutions in this field is more a question of money and the take over of risks than a problem by missing new technological ideas.

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## Biography

Arved C. Hübler, born in 1960, studied Physics in Heidelberg and received his Doctor Degree in Berlin. He worked for the Bertelsmann Group in Gütersloh, finally as Technical Director at their largest printing house.

Since 1997 Arved Hübler has been Professor at the Chemnitz Technical University. There he is head of the new Institute for Print and Media Technology. He is a member of the IS&T and several other societies.