WINNER: Best Cost/Benefit Realization as a Result of Process Automation Implementation

Druckerei und Repro GmbH

Druckpunkt

Wrangelstr. 100
10997 Berlin
Germany
CASE STUDY CONTENTS

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**Methodology** — Alternatives, selection criteria and decision-making process

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**Best cost/benefit realization as a result of process automation implementation** — A quantitative analysis of the hard and soft ROI factors expected and realized, to include either breakeven analysis, IRR or NPV determination of hard factors and testimonial evidence from users or customers as to the realization of soft benefits

**Quantitative analysis/ROI and qualitative results**

**ROI calculation and conclusion**

**Conclusion** – What did we gain with our project “The networked printing house”?
BACKGROUND

A description of the subject workflow environment and conditions prior to implementation:

For more than 13 years, druckpunkt has provided all services of the graphic arts industry to advertising agencies, publishing houses, big businesses and the public sector. We have succeeded in establishing druckpunkt as a powerful and reliable partner of the advertising industry.

We place great value on good consulting and satisfy our customers through quality and on-schedule delivery. The flexibility expected by the customers of our customers is also a matter of course for us. As competent partner, we offer support right from the planning phase, enabling our customers to profit from the extensive experience and specialized knowledge of our professional team.

CONDITIONS PRIOR TO INTEGRATION

• Management:
  - Unix-based costing software ProSys
  - No product costing analysis (impossible due to missing data)
  - No assignment of external services to stored jobs possible
  - No integration of purchasing (external services could not be identified automatically)
  - No individual forms and evaluations
  - Business analysis and other evaluations only possible with a tax advisor
  - No real-time analyses possible
  - No liquidity planning

• Prepress:
  - 1-shift production with 13 employees
  - Full-page film production with Scitex Dolev and Brisque workflow
  - Manual platemaking
  - Long RIP times leading to long waiting times for the employees
  - Error potential due to different screening processes for proof and final output
  - Complicated data preparation and many manual steps in data processing (files, images, texts had to be handled individually)
  - No performance measurement
• **Press:**
  - 3-shift, flexible production, depending on the order situation
  - No performance measurement, only record of presence (coming and going)
  - Long setup times and high spoilage due to manual color adjustment during makeready
  - Only manual color adjustment, including for repeat jobs and changes of press
  - No re-imaging of plates possible if prepress department was not staffed
  - Many complaints about color quality

• **Finishing:**
  - No in-house finishing facility
  - Many complaints regarding outsourced finishing services
  - No volume measurement, hence excessive delivery volumes by outsourcers

• **Infrastructure:**
  - Production area too small at 800 sqm
  - Material flow not optimal
  - Too much paper in stock
  - Outdated heterogeneous network structure

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**Workflow before the implementation of the JDF workflow with Prinect Printready**
OBJECTIVES: GOALS AND MOTIVATION

Quantitative Goals:

Business goals:
- Increasing sales volume through automation and integration of the various systems for optimized working processes

• Management:
  - Realizing reports and statistic, e.g. financial statements, internally
  - Implementing product costing analysis for evaluation

• Prepress:
  - Automating plate production
  - Increasing productivity and the rate of use of equipment
  - Decreasing the error rate
  - Implementing a performance measurement system
  - Automating manual steps in data processing

• Press:
  - Increasing productivity and the rate of use of equipment
  - Implementing a performance measurement system
  - Minimizing processing times

• Finishing:
  - Building up an in-house finishing department
  - Decreasing the number of complaints
  - Minimizing processing times
  - Implementing a performance measurement system

• Infrastructure:
  - Optimizing the material flow
  - Consolidating and modernizing the network for the integration

Qualitative Goals:

• Management
  - Realizing real-time business analyses
  - Implementing a quality management system

• Prepress:
  - Improving plate quality
  - Implementing a color management system

• Press:
  - Implementing an inking standard
  - Improving printing quality
  - Implementing a color management system
• **Finishing:**
  - Expanding our range of services

**METHODOLOGY**

**Alternatives, selection criteria and decision-making process**

Decision criteria for the introduction of an MIS system
- Costing system under Windows (then)
- Forms assistant to permit a modular costing structure incl. an individual record of hourly rates
- Price of the MIS system
- Product costing analysis must be possible
- System must be compatible with other Windows programs, e.g. MS Office (for e-mail correspondence etc.)

The following MIS systems were evaluated using these criteria:
- Prinance
- prologic
- Lector

At the time the decision was made, Prinance was the only system of the three to run under Windows. It also fulfilled all other criteria.

Decision criteria for the introduction of a workflow system
- Offer a high degree of automation
- Be integratable into the complete workflow by means of JDF with:
  - Prepress products and options
  - Integration of printing presses
  - Integration of the postpress stage
  - Connection to the management information system
- Be capable of development (integration of new equipment etc. into the workflow)
- Offer good value for money

The following workflow systems were evaluated using these criteria:
- Prinect Printready System
- Agfa Apogee
- Fuji Celebra NT

Since only Prinect Printready met all requirements at the time, we decided in favor of this system.

Decision criteria for the introduction of presetting software in the press and post-press stage
For each piece of equipment, the presetting software must:
• Permit faster setup times
• Use as much data as possible from the MIS and the pre-press stage for presetting (multiple use of data) \( \hat{=} \) permit networking and integration
• Be compatible with the existing press and postpress equipment

Since the communication of the systems calculating the presetting data is very critical to the uptime of the machines in the pressroom and the bindery, we decided to pursue only Heidelberg Systems to ensure we know who is responsible in case of system failures:
• Prinect Prepress Interface for ink presetting at the printing presses
• Compucut (FCS 100) for preliminary computation of the cutting program at the cutter

These products meet all requirements listed above for the respective equipment.

To ensure consistent quality, we also introduced the Prinect Image Control color measuring system in order to achieve the required reduction of setup times and be able to check and ensure color consistency during the entire print run.

**IMPLEMENTATION STORY**

**Training and tests**
In the first few weeks after installation, HDD (Heidelberg Germany) supervised our production. The switch to the new system was abrupt: The old system was switched off, the new system switched on. The implementation of the new system was accompanied by business consulting and seminars by PRIMECO consulting, Prof. Walter.

**OBSTACLES**

A lack of acceptance among the staff can represent a major obstacle to the introduction of new technology. Hence, our experience was, the stability and user-friendliness of the new solutions is an important prerequisite for us for a successful networking of production. Productivity is increased if the users receive the required qualification during the introduction, and good support afterwards, which was ensured by the Heidelberg support.

Other factors influencing acceptance of a new workflow system, especially in view of the complete performance measurement using JDF, are a tradition of independent working and permanent internal communication in the company,
favor of a purely electronic performance measuring system.

2004-Q1
Strategic decision to expand production. New production facilities are required to permit further growth. A saddlestitcher is installed for flexible finishing independent of outsourcers. Networking becomes an integral part of the operating concept.

2004-Q2
Implementation of shop floor data collection at the Speedmaster CD 102-5+L and Speedmaster SM 74-6-P presses. Installation of Stratos-i.Point terminals in prepress and postpress. Daily production reports can now be entered directly at the control station of the press / the data terminal.

PHASE 3
Expansion of the JDF workflow into Prepress and Finishing

2004-Q2
In-depth examination of JDF at drupa 2004, where more than 80 companies present JDF products. Evaluation of a workflow system for prepress that could replace the existent computer-to-film system.

2004-Q2
Decision for the JDF-based PDF workflow Prinect Printready System and for a fully automatic platesetter Prosetter 102 with single cassette loader.

2004-Q3
Decision for the JDF-based Prinect FCS 100 workflow module in finishing, and for the Polar 115 XT cutter, 2 Stahlfolder KH-78 folder and Stitchmaster ST 350 saddlestitcher, which can be integrated into the workflow with that module. A new Speedmaster CD 74-5+L is to

where we put our focus on – also or especially coming from the management.

RESULTING WORKFLOW/PROCESSES

Situation after the integration:

- **Administration:**
  - Implementation of Prinance
  - Integration into the Windows Office environment
  - JDF integration Prinance – Printready System
  - JDF integration Prinance - CP2000 press control system
  - Daily product costing analysis with current PDC data
  - Reliable control of the suppliers’ invoices using the documented volumes
  - Monthly internal discussion of complaints using documented evaluations; a quick and clear analysis makes the production process more transparent
  - With the MIS, jobs can be structured more effectively

- **Prepress:**
  - 1-shift production with 3 employees
  - CtP production with the Heidelberg Prosetter and Printready System workflow
  - No waiting times or prolonged searches due to centralized record keeping and automated workflow
  - Job data from Prinance are made available at Stratos-i.Point terminals
  - Proof via PDF with digital approval form.
  - Electronic performance measurement with Stratos-i.Point

- **Press:**
  - Flexible 2-shift production
  - Job data from Prinance are made available at the CP2000
  - Inking unit settings from the PrepressInterface are transmitted to the press via PPF.
  - Reduction of waste sheets
  - Performance recording at the press with CP2000
  - Quality management with Heidelberg Image Control
  - Quality management and analysis with Prinect Press Reporting

- **Postpress:**
  - Production with a Polar 115 XT cutter, 2 Stahlfolder KH-78 folders and Stitchmaster ST 350 saddlestitcher by Heidelberg
  - Job data from Prinance are made available at Stratos-i.Point terminals
  - Presetting data is made available to cutters and folders via the FCS100 postpress software
**PHASE 4**
Integration of the remaining areas into the JDF workflow

**2005-Q1**
Installation of the Prinect Printready System and the Prosetter 102. Connection to the Prinance MIS. Job and pre-setting data can now be loaded directly into the workflow system. Imposition layouts generated by the Signa Station can be used in Prinance to prepare a job.

**2005-Q3**
Planning and modification of the new production rooms with the unique chance of consolidating and optimizing the physical network.

**2005-Q4**
Move into the new rooms. The production area now covers 3,000 sqm.

**2005-Q4**
Installation of the Polar 115 XT cutter, the 2 Stahlfolder KH78 folders and of the Stitchmaster ST 350, initially in connection with Stratos-i.Point terminals. The Speedmaster CD 102-5 L and Speedmaster CD 74-5 LX presses are integrated completely into the JDF workflow.

**2006-Q2**
Network integration of the Polar 115 XT cutter, the 2 Stahlfolder KH78 folders and of the Stitchmaster ST 350 via the JDF interface Prinect FCS 100 (Compucut and Compufold for presetting).

- Electronic performance recording with Stratos-i.Point
- Infrastructure
- Optimum and expandable 3,000 sqm production area
- Optimum material flow
- Less paper in stock (just-in-time paper delivery)
- Consolidated Cat.5 network structure

**WORKFLOW AFTER THE IMPLEMENTATION OF PRINECT PRINTREADY SYSTEM AND THE INTEGRATION OF DEVICES USING JDF**

Best cost/benefit realization as a result of process automation implementation

(A quantitative analysis of the hard and soft ROI factors expected and realized, to include either breakeven analysis, IRR or NPV determination of hard factors and testimonial evidence from users or customers as to the realization of soft benefits.)

**QUANTITATIVE ANALYSIS/ROI AND QUALITATIVE RESULTS**

- **Administration:**
  - Monthly financial statement is generated in Prinance 10 days after the end of the month by ourselves
  - Extra services and costs can be made transparent for the customer and invoiced
  - Larger delivery volumes by the suppliers are stopped
  - Quick and clear overview of the rate of use of the equipment
  - Production can be planned
  - Ad hoc information on production is available
  - Structuring of the job flow, e.g. "no job without job number"
  - Obligation to exercise discipline
  - Documented processes increase customer confidence
  - Greater transparency through evaluation of the order structure ‡ this analysis has helped us, over time, to optimize our equipment: from a six-color Speedmaster press to a 5-color press plus coating press, which is better suited to our current order structure
  - Update of Stratos classic to Stratos i.Point in 2004 (cost of the update: 3,500 euros)
  - The checking of suppliers’ invoices alone (which has now become very easy) has made the update pay off in only 4 months
  - Product costing analysis used to be very complex and require a lot of work; every single calculation had to be
checked manually, which can now be done in minutes automatically

• **Production:**
  - Higher productivity through shorter makeready times, thanks to Prepress Interface. The rate of use in the late shift could be increased from 60% to 70%.
  - Plates for individual jobs can be imaged by the printers (PDF arrives by e-mail, is loaded into the workflow by the printer; plates are imaged by means of an easy-to-use and automated workflow in repeating sequences)
  - The percentage of outsourced work has decreased from 10% to 4%; product costing analysis has shown that post-press equipment is more suitable, incl. an in-house book-binding machine; as a result, outsourcing could be reduced to 3-4%
  - Continuous improvement of quality – more specific search and detection of error sources.
  - Faults by outsourcers are reduced; this has a positive effect on the total fault rate
  - Tidiness and cleanliness on the premises increase customer confidence

**Example of the new, optimized coordination of press and prepress:**
Each Sunday evening, we produce a display board (size DIN A3) for a Berlin daily newspaper. The editorial office sends the complete PDF via e-mail to druckpunkt, the printer has received his instructions and lets the PDF run through the sequences in Printready (check, integration of the data in the template, check, transfer to RIP; plate production)

- Advantage and Savings in this example: Due to the automation, no additional employee is needed on Sunday for the repetitive job in the prepress department, the job can be done by the printer himself; the cost for the prepress employee can be saved (estimated 2 hrs per Sunday, 52 Sundays per year) = 6,480 euros per year

**Faster and more efficient approval process with the Printready workflow**
The customer receives PDFs via e-mail to approve the contents; approval is granted within a day; this saves time and money compared to sending the customer a proof printout by courier. Hence; printed proofs are hardly made any more, only in cases if the customer demands color consistency, proofs are printed out. Still, there is made one form proof per job just for the printer at the press.

**Reduction of makeready times and spoiled sheets through presetting with the Prinect Prepress Interface**
Workflow after the implementation of Prinect Printready System and the integration of devices using JDF
• Through the use of Prinect Prepress Interface for Presetting, our make ready times have been cut by half, they used to be 30 min. longer (5 color job).

• The total material consumption has decreased, since the part of the production costs for a job taken up by materials has been reduced from 23% to 20% within a year, while the waste accounts are about 5% of the total costs.

Optimization of processes through analysis of print jobs using Prinect Press Reporting
With the “Press status” display in the Prinance MIS and the analysis application Prinect Press Reporting, problems become visible more quickly and we can react more speedily to eliminate them.

For instance, by analyzing the print jobs using Prinect Press Reporting and consequently by optimizing the press processes we could increase the rate of use in the second shift (= late shift until 10 p.m.; 8h-shift) from 60% to 70%.

Another analysis with Prinect Press Reporting showed that with 2 shifts of 12 hours each (that are agreed on as needed) the rates of use are the same in both shifts. That means, all planned jobs can be processed, so in this case no further optimization was necessary.

Reliability of production and print quality control with Prinect Image Control
The advantage of a spectrophotometric measurement with Prinect Image Control lies in the increased reliability of production – for the printer, who achieves the OK sheet more quickly, to the customer, who has fewer complaints about quality when he inspects the prints during production. The customer is shown the OK sheet, and if he approves of it, he knows that the rest of the prints will have the same quality, because they are regularly checked with Image Control.

‡ This saves us time and money, because it eliminates unnecessary interruptions and long discussions during the acceptance process. Moreover, we print out an evaluation report about Prinect Image Control for each job. This report shows that we are printing in the standard. Our production becomes more reliable, and in case of complaints, we can prove to our customers how the job was actually printed.

SAVINGS

The savings described on the following page are factored into the NPV and ROI calculation provided above add up to a NPV of 3.303402.49 € for the 5 years period and a ROI of 1827 % for the same period. The numbers are calculated based on the phased approach of the implementation project and the associated learning curve of the staff at Druckpunkt.
Meaning for the years 2004 – 2006 we factored a lower annual benefit into the calculation. Since the project was executed very well and we are ahead of schedule the actual benefit is higher and in 2006 we will already reach full leverage of all systems.

CONCLUSION

What did we gain with our project “The networked printing house”?

Our strategy for optimizing our production was clear, we had a great need to restructure and optimize all areas and let the others participate from it.

With the implementation of an automated workflow based on JDF we were able to drastically automate our prepress workflow and at the same time we were able to reduce resources to handle prepress data. On top of that, with JDF as a standard format, we could integrate our prepress workflow to other departments (administration, press, Postpress) helping us to gain transparency in the workflow and reacting faster to any process until it would go into wrong direction as JDF-data being transferred forth and back in our whole workflow, from administration to Postpress.

We achieved our goals with implementation of this workflow. We gained more free capacity which can be filled now and in the future. And, what is more, we see our networked printing house is ready for the future expansion.
### ROI Calculation and Conclusion

<table>
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<tr>
<th>Periods</th>
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#### Benefits (in savings)

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#### Total annual savings

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Cumulative savings:

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#### Disocunted annual savings

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#### Total investment

**External investment (products)**

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**Internal investment (internal training)**

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**Maintenance costs (recurring)**

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#### Total annual costs

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Cumulative costs:

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Discounted costs:

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Net benefit:

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Cum. net benefit:

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<tr>
<td>Cum. net benefit</td>
<td>-180.820.00</td>
<td>130.030.00</td>
<td>688.113.33</td>
<td>1.740.663.33</td>
<td>2.916.830.00</td>
</tr>
</tbody>
</table>

Disc. net benefit:

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disc. net benefit</td>
<td>-180.820.00</td>
<td>293.254.72</td>
<td>496.692.18</td>
<td>883.741.28</td>
<td>931.634.16</td>
</tr>
</tbody>
</table>

NPV (Net Present Value in €)   3.303.402.49

ROI (Return on Investment) in %   1826,90