

*Jürgen Schönhut Memorial
CIP4 International Print Production Innovation Award*

Vögeli AG Druckzentrum

First Place Winner

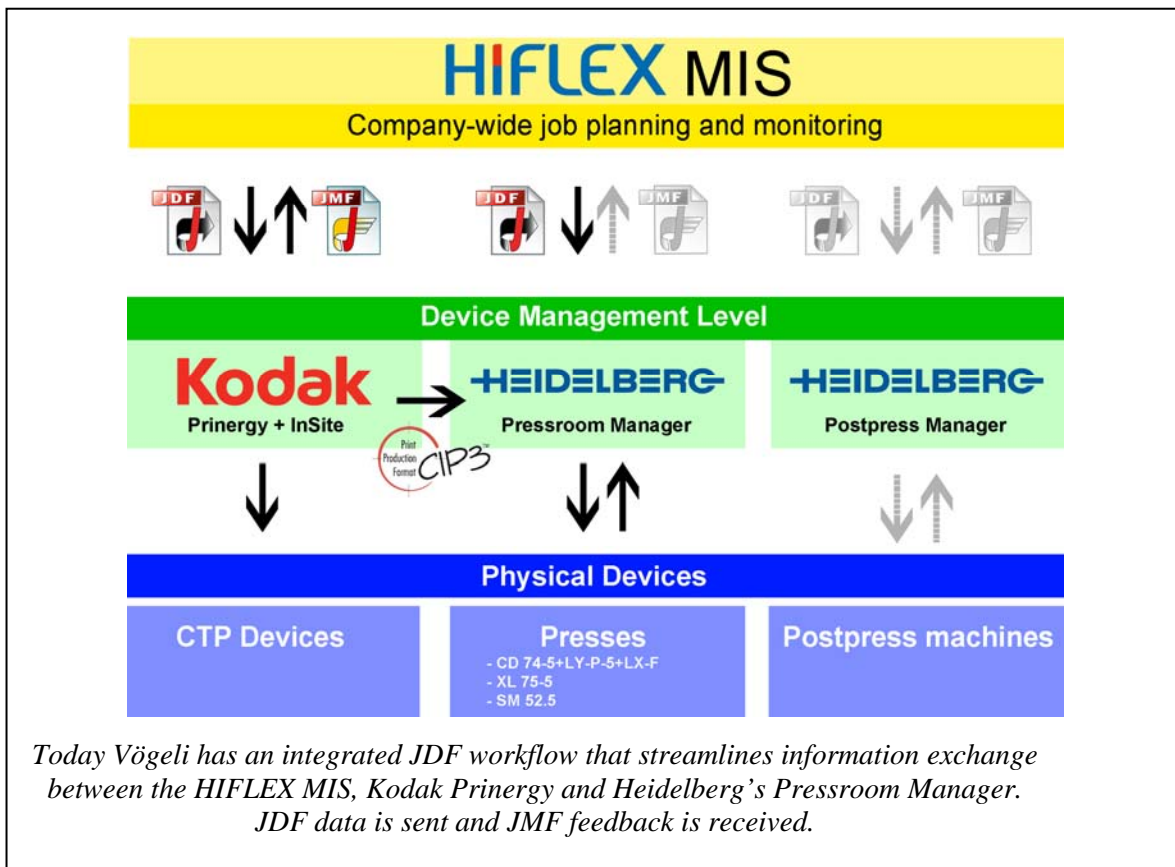
Best cost/benefit realization and improvement in efficiency as a result of process automation implementation

Executive Summary — Vögeli is a fourth generation, family-run company that was the first Swiss printing company to use a frequency-modulated screen with a dot size of 10 µm for photorealistic reproduction on coated papers. With a turnover of 9.5 million Swiss Francs (just over 8 million US dollar) Vögeli employs approx. 50 staff members. Their products portfolio includes brochures, annual reports, postcards, catalogs and invitations.

Vögeli has an obligation to their customers to invest in the latest and leading technology. They began to implement JDF in their workflow in 2004. Step-by-step the old workflow was replaced with a high-end bidirectional JDF/JMF workflow with links from the MIS to the prepress and the press system.

Now they have an automated JDF/JMF workflow that includes HIFLEX (MIS), Kodak (Prinerger) and InSite as well as Heidelberg (Pressroom Manager).

The net present value (NPV) of our project is SFr. 2,517,247. Based on a five year period the Return on Investment is 657.3% and the Internal Rate of Return (IRR) is 252.0%.



Section I. Background — The hilly landscape of the Emmental Region in Switzerland (worldwide well-known for its “Swiss Cheese”) is the home of the printing company Vögeli, which was founded in 1911 by Friedrich Vögeli. Six family members are working in the company today.

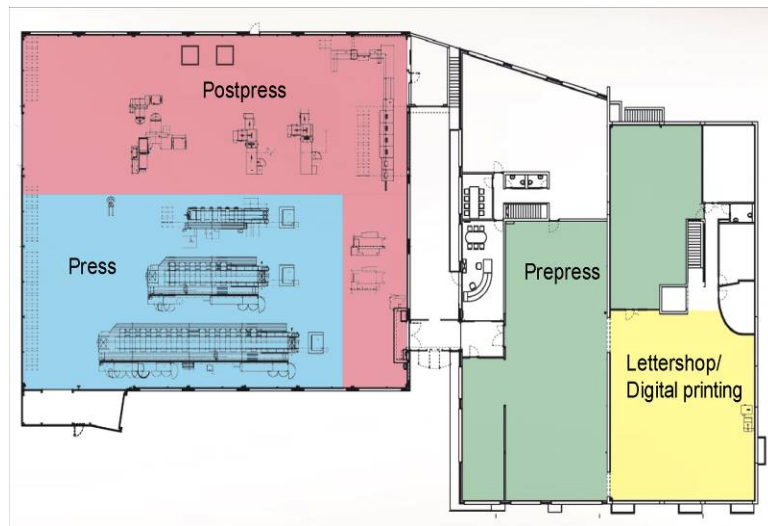


Pure Heidelberg in press and postpress

Today Vögeli is one of the most innovative printing companies of Switzerland. "Customer orientation is most important for us," emphasizes the chief executive Markus Vögeli, therefore they are continuously investing in the latest technology. Since the end of last year, the long perfecting



press Speedmaster CD-74-5+LY-P-5+LX-F, the very first press of this type worldwide – is successfully in production at Vögeli's. "We can now print four colors plus a special color and coating in one pass and exactly the same again after the perfecting unit providing a completely finished printing sheet. Our overall productivity has doubled with this press," says Mr. Vögeli who is very satisfied. For many weeks the press has run in three shifts and produces 1.7 million sheets per month and is run by only one operator per shift.



Furthermore, Vögeli has several printing machines from Heidelberg in use: Speedmaster 52 with Anicolor (5-color, 32 x 52 cm), Speedmaster XL 75 (51 x 74 cm), GTO 52 (36 x 52 cm) and Quickmaster (34 x 46 cm).

The production is located in one hall of 1,200 square meters (13,000 S/F) which allows for a smooth process of printing, finishing and dispatch. With its approx. 50 employees, the printing company has generated a turnover of 9.5 million Swiss Francs (just over 8 million US dollars) last year.

Range of services

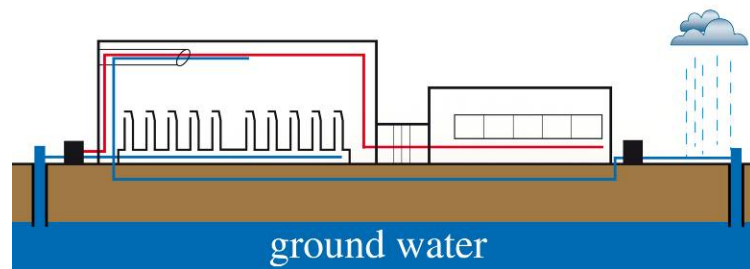
The printing company offers a complete service – from the digital photo studio and prepress to press, postpress and logistics services. The products portfolio includes brochures, annual reports, postcards, catalogs or invitations. There is ongoing investment in cutting-edge technologies to provide customers with target-oriented solutions. Vögeli, for example, was the first Swiss printing company to use a frequency-modulated screen with a dot size of 10 µm for photorealistic reproduction on coated papers. A dot size of 20 µm is used for uncoated papers. Finishing operations benefit from one of Switzerland's first Stitchmaster ST 400 saddlestitchers.

Services

40 percent of the customers are Swiss advertising agencies, the rest are customers from the pharmaceutical and medical industry, the watch and jewelry as well as the food industry. The printed products cover brochures, business reports and all different types of commercial work. A specialty is high-quality prints for artists and art galleries such as books, post cards, catalogues and invitations. "It's only been a year that we have done real marketing. Before we have always been recommended by word-of-mouth – most of all by the agencies, where people have come and gone in but we stayed the print shop of their choice."

Environment protection

High priority is given to protecting the natural environment and the scenic landscape. Vögeli is one of the few printing companies in Switzerland to have removed absolutely all alcohol from its production process – as far back as 1998. With its extensive know-how, Vögeli plays a pioneering role in this field. "In addition to environmental considerations, there are also high duties and taxes on VOCs (volatile organic compounds). Alcohol is subject to the highest duties so we also use VOC-free wash-up solutions," explains Markus. Energy is recycled too using a water heat pump circuit.



The effect is enormous: Every year we save more than 3'700 liters of heating oil and we also reduced our CO₂ emissions by more than 12 tones. In sum the energy consumption was reduced down to one twenty-fifth percent. We are also using for 100% green electricity.

SITUATION PRIOR TO THE IMPLEMENTATION OF JDF

We strive for and are viewed to be one most innovative printing companies in Switzerland, therefore we have an obligation to our customers to invest in the latest and leading technology. We recognized in 2003 that we had to gear our production processes more towards the future through standardization. An investment into a fully integrated JDF workflow was the logical choice for us. Prior to implementation nearly every process was done manually. We had to re-enter all data several time in several systems.

Section II. Objectives — We want to realize a company-wide, integrated solution, where the selected supplier system from administration (MIS), prepress, press and postpress communicate seamlessly with each other. Data, which are only entered once, should automatically be available across the system borders.

In sum our objectives were:

- Reduce error risk related to incorrect or missing information
- Time savings for investigating, checking and/or providing already given data again
- Improve efficiency in the whole workflow
- Automation of processes so that we can offer best prices to our customers at secured quality standards
- Improve customer service and responsiveness
- Enhance transparency and flexibility in our administration (MIS)

We recognized as key-factor to achieving our objectives a bi-directional JDF communication between all systems, especially between our administrative MIS and Kodak's prepress system.

Section III. Methodology — In our press room we only use Heidelberg machines; also our postpress department uses several Heidelberg machines. Being a Heidelberg equipped company it was a logical choice for us to implement the Prinance MIS from Heidelberg. That was in 2003.

In middle of 2009 we made the decision to invest in the HIFLEX MIS. We have been watching and reviewing HIFLEX solutions since we were first introduced to them in 2003. During a demonstration we experienced the flexible JDF interface between HIFLEX and Kodak. We were very inspired by the possibilities, in which HIFLEX and Kodak Prinergy are able to bidirectionally communicate via JDF and JMF. We were certain after this demonstration that this software would help us reach the next step in the area of JDF connectivity and we made the decision to implement HIFLEX MIS in our company.

Section IV. Implementation Story — We initially started to implement JDF in 2004. Almost all press and post press machines we use are from Heidelberg. So it was an easy decision for us to replace our outdated MIS "WinPress" System with Heidelberg's "Prinance" MIS System. The links between Prinance and Heidelberg's presses were easier achieved but we had major challenges with integrating the Prinance with our prepress system from Kodak. Prinance was able to send data via JDF to Kodak, but unable to receive JMF feedback from Kodak. With this unidirectional workflow we could not achieve our goals that we ultimately found we were able to achieve with HIFLEX – we have proven that this was the right tool to meet our needs and objectives.

Step 1 in 2000: CIP3

CIP3 link was set between Kodak prepress system and Heidelberg presses.

Step 2 in 2004: Installation of Prinance MIS

In 2004 Prinance MIS from Heidelberg was installed and configured replacing our outdated "Winpress" MIS. Then the Heidelberg press machines were linked to Prinance.

Step 3 in 2007: Implementation of JDF connectivity to Kodak Prinergy

The implementation of the JDF link between Prinance MIS and Kodak Prinergy was set in 2007. Prinance sent relevant JDF data to Kodak. But Prinance was unable to receive JMF feedback and we hence had no bi-directional JDF/JMF workflow from our MIS to the prepress system.

Step 4 in 2009: Installation of HIFLEX MIS (new links to prepress and press were set)

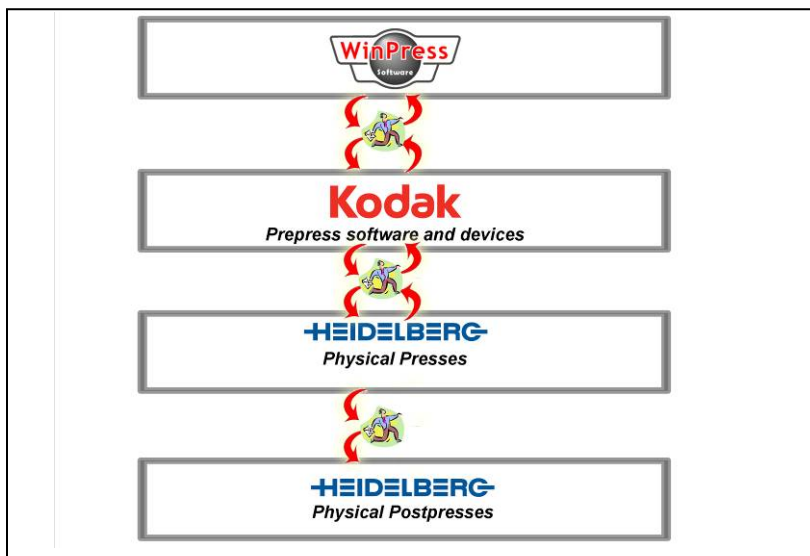
Implementation of HIFLEX MIS started in November 2009 with HIFLEX Estimate and HIFLEX Order Book, including job ticket, order confirmation, quotation, delivery notes and invoice.

Go-live of the system took place on the 8th of February. At the same time we linked HIFLEX MIS with Kodak Prinergy. The implementation of the bi-directional JDF/JMF link between HIFLEX MIS and Kodak Prinergy prepress system belongs to the key points and was directly installed with the Go-live of the MIS in February 2010. Not less than 29 JDF parameters are transferred from HIFLEX MIS into our prepress system. With Kodak Prinergy’s Rules-Based Automation feature (RBA), the JDF parameters are interpreted and manual workflow steps are turned into programmed actions. We have configured almost hundred events and actions with this workflow automation system. Apart from this advanced job creation, Kodak sends feedback to our HIFLEX MIS upon approval status, processes and consumables (plates and proofs).

Then the JDF link from HIFLEX MIS to Heidelberg’s Pressroom Manager was set. The system receives job information (e.g. customer name, job number, product designation) and relevant print parameters (printing machine, format, paper, run length, number of plates) via JDF from the HIFLEX Scheduling system (part of our MIS installation).

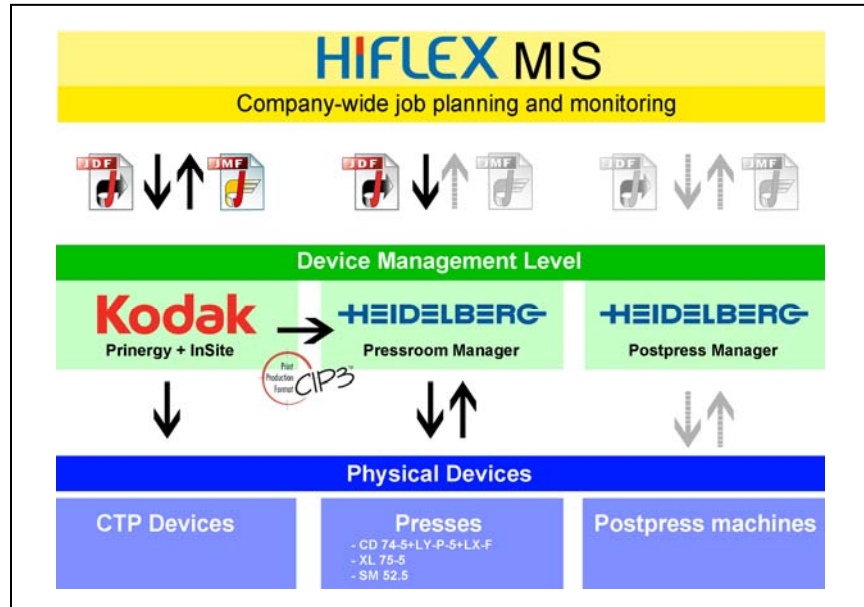
Section V. Resulting Workflow/Processes —

Workflow prior to JDF implementation 2004



The administration system from (order management), the application used for production planning and the production system were not connected to each other. This resulted in time consuming and error prone manual re-work in the area of processing data, and in delayed communication of actual job status. Consequently, we lost valuable production time.

Final Workflow



Today we have an integrated JDF workflow that streamlines information exchange between the HIFLEX MIS, Kodak Prinergy and Heidelberg's Pressroom Manager. JDF data is sent and JMF feedback is received.

The JDF/JMF link between HIFLEX and Heidelberg's Postpress Manager will be set in the future.

Final workflow in more detail

Today, the information flow from our HIFLEX MIS as administration system into Kodak Prinergy and Heidelberg Pressroom Manager is an integrated cross-vendor solution. We now have an increased level of automation due to JDF-connectivity of our systems.

HIFLEX MIS

The entire process of networking is coordinated and managed by HIFLEX MIS that is functioning as a JDF controller. Data relevant for production only has to be entered once into HIFLEX MIS and is then transferred via JDF to the prepress, press and postpress systems.

Kodak Prinergy

The link between HIFLEX MIS and Kodak Prinergy enables automatic cost booking: Transfer of time and material costs (marked as included, extra chargeable, error etc.) from Prinergy to HIFLEX. Prepress events and approvals are translated to cost center and material data in HIFLEX (no manual entry of prepress production data and shop floor data collection is now required).

Not less than 29 parameters in relationship to job, surface, separation, signature and imposition are sent from HIFLEX MIS to Kodak Prinergy with so called "custom fields". These custom fields allow us to add specific information, which are relevant only for us. The improvements result in greater JDF support, more flexibility and control, in the production of a jobs, for our customers and on a system level. We can better customize, track, control and automate activities in prepress with these new defined custom fields. In our case, the custom fields contain information such as the associated agency involved in the job, paper-type, names of colors and product sizes (in order to compare planned and used specs), expected milestone dates for data delivery, outgoing approvals to customers, printing dates (in order to automate plate output and drive the prepress dashboard), to name a just a few.

Our Kodak Prinergy configuration also includes their Kodak InSite Internet page submission portal. More than 30% of all jobs are done with InSite. The system is used for job submission, job-status tracking and remote proofing or approval by authorized customers. Information about up-

loaded files, proofs and approvals are transferred from Kodak to HIFLEX MIS via JDF. Feedback from InSite is then fed back to Prinergy which again delivers feedback to HIFLEX via JMF which includes:

- Author and proof reader corrections, as well as information whether the correction is chargeable or not are passed together with explanatory comments to the HIFLEX order book, where chargeable items are automatically marked in red in order to make them prominent.
- This information is viewable in HIFLEX by CSRs, sales, production and everyone in the company.
- Time, material, and error costs are now marked as included or extra chargeable and never missed.
- Information on subsequent activities, i.e. about processing and output tasks during actual production are now also revealed automatically, insuring transparency and costing accuracy.

Kodak Prinergy sends JMF feedback to HIFLEX regarding the number of plates consumed and other additional information regarding materials usage is also sent back to HIFLEX MIS. This information is relevant and crucial for the automated post cost calculations.

All orders are automatically displayed in the HIFLEX scheduling system, which is steadily updated. Job scheduling is automated down to single signatures or sheets, and carried out for each cost center according to deadline or priorities. Our daily production meetings have become no longer necessary.

The screenshot shows the main order management interface. Key sections include:

- Auftrag ändern:** Order number 100762, date 10.02.2010, product 'Einladung Basel 25.3.', and customer 'Eli Lilly (Suisse) SA'.
- Kunde:** Customer details for Eli Lilly (Suisse) SA, partner 'Frau Rothenbühler Lore', and agent 'Casalini Werbeagentur AG'.
- Preis:** Quantity 840, price per unit 2'181.40, total price 1'832.38.
- Termin:** Delivery date 24.02.2010, printing date 22.02.2010.
- Rechnung an:** Invoice details for Eli Lilly (Suisse) SA.
- Mein Hiflex:** A section for HIFLEX with a logo and image.

This screenshots show the mapping between HIFLEX and the specified “custom Fields”.

This window displays the technical specifications and production process for the order. It includes:

- Produkt Definition:** Table with columns for product type, name, format, and quantity.
- AutoPilot:** A flowchart showing the sequence of production steps like 'Umschlag', 'EP anlegen', 'EP kopieren', etc.
- Druckbogen:** A table listing different print sheets with their dimensions and quantities.

ID	English	
	Front Side	Back Side
1-1	coated brilliant	coated brilliant
2-2	coated matt	coated matt
4-4	uncoated white	uncoated white
5-5	uncoated yellow-white	uncoated yellow-white
1-4	coated brilliant	uncoated white
2-4	coated matt	uncoated white
9-9	Unknown	Unknown

This window provides a detailed cost breakdown for the order. Key sections include:

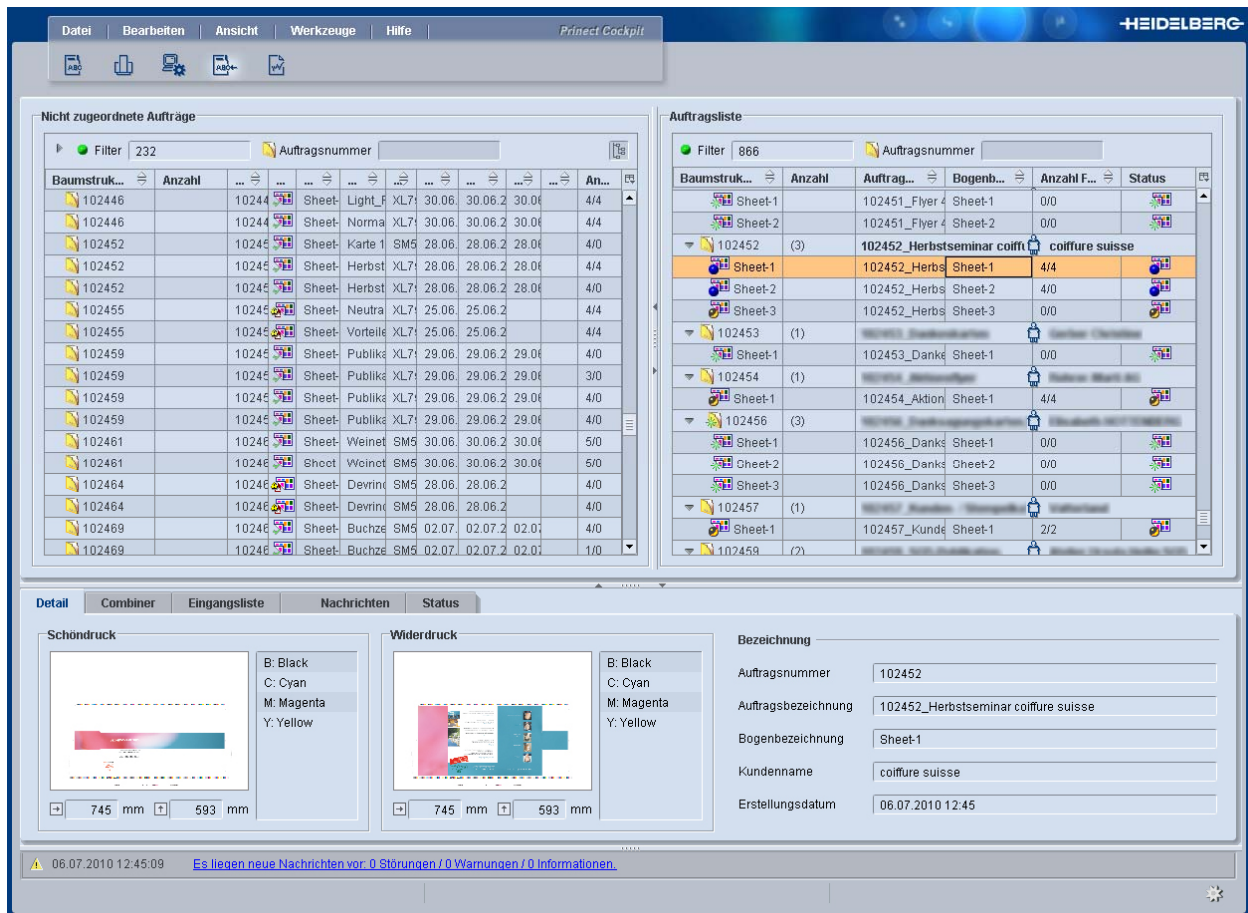
- Seitenarbeiten:** Table showing costs for 'dig. Seitenmontage' (32 DTP) and 'Datenverarbeitung' (8 DTP).
- Form-Erstellung:** Table showing costs for 'dig. Ausschliessen' (112) and 'Farbproof' (19).
- Platten-Herstellung:** Table showing costs for 'Plattenbelicht'.

This window details the color and material specifications for the order. It includes:

- Farben:** Table with columns for color (Skala, Bunt, Bronze, Lack) and material specifications (VSD, RSD, Preis DB, etc.).
- Details:** Table listing material groups for 'Schwarz', 'Cyan', 'Magenta', and 'Gelb' with their respective prices and quantities.

Heidelberg Presses

The Pressroom Manager communicates information intelligently so that print jobs are automatically available at the right press at the right time. This automation ensures that productivity increases substantially in our company. Thanks to the efficient use of preset data, there is a considerable reduction in make-ready times and waste at the press. The Pressroom Manager receives CIP4 color files directly from Prinergy and merged with the JDF file which comes from HIFLEX MIS. This file is then distributed as a complete JDF package including all of the color and technical information directly from the order, contained with-in the JDF file directly to the cost center by HIFLEX Scheduling. The new file is sent to Heidelberg's press machines.



The screenshot displays the Heidelberg Pressroom Manager interface, which is used for job tracking and scheduling. It features a menu bar at the top with options like 'Datei', 'Bearbeiten', 'Ansicht', 'Werkzeuge', and 'Hilfe'. The main area is divided into several sections:

- Nicht zugeordnete Aufträge (Filter: 232):** A table listing various print jobs with columns for 'Baumstruk...', 'Anzahl', 'Auftragsnummer', 'Sheet', 'Light', 'Normal', 'Karte', 'Herbst', 'Neutra', 'Vorteile', 'Publik', 'Weinet', 'Weinot', 'Devrin', 'Buchze', and 'An...'. Each row includes a small thumbnail of the job's content.
- Auftragsliste (Filter: 866):** A detailed view of a specific job, showing columns for 'Baumstruk...', 'Anzahl', 'Auftrag...', 'Bogen...', 'Anzahl F...', and 'Status'. It lists multiple sheets for different orders, such as '102451_Flyer', '102452_Herbstseminar coiffure suisse', and '102457_Kunde'.
- Detail View:** A section at the bottom showing 'Schondruck' and 'Widerdruck' color calibration charts, along with 'Bezeichnung' (job name) and 'Erstellungsdatum' (creation date).

A status bar at the bottom indicates the current time and date: '06.07.2010 12:45:09' and provides a message: 'Es liegen neue Nachrichten vor: 0 Störungen / 0 Warnungen / 0 Informationen.'

Job tracking in HIFLEX scheduling

HIFLEX Scheduling receives JMF feedback from the Kodak Prinergy. Now we can directly monitor the status of prepress like approval and plate exposure and the status of production via the connected shop floor data collection terminals.

This service pays off for both the customers and for us. On the one hand our daily meeting, which took 7 minutes per day, became needles. On the other hand customer's inquiries can directly be answered.

Section VI. Optional Detail — Vögeli has been using JDF technology since the early days in 2004. The transition to the JDF workflow that we have today was achieved by a lot of small steps and since 2004 the company has changed with customer demands and exchange of produc-

tion equipment. Compared to 2004 our productivity has been more than doubled. However, it would be not correct to credit all improvement to JDF project alone.

In order to provide a ROI analysis that can help other printer's to judge the value of our JDF workflow we asked ourselves one key question: what would happen if everything connected to the JDF project would be switched off tomorrow? The delta within this scenario is how we value the JDF workflow currently in place.

Following this approach, we have also investigated all costs taken to put the current workflow in place. However, money spent for systems that are no longer part of today's solution are not accounted for.

**The Return on Investment (ROI) of the JDF integration at Vögeli Druckzentrum
accounts to 657.3% within the following five years.
The Net Present Value (NPV) is SFr. (Swiss Francs) 2,517,247 which
equals an Internal Rate of Return (IRR) of 252.0%**

The Benefits:

Effect on sold press production

The JDF implementation has a productivity share of 25% on the connected devices. This adds up to SFr. 378,000 per year (effect on added value minus direct costs).

Reduced work in prepress

We would need at least three additional employees if work would have to be done without JDF. This is accounted with SFr. 202,500 per year.

Eliminated production meetings

Prior to JDF implementation the production overview was not as good as today and daily production meetings were held. The effect through JDF is a saving of SFr. 13,500 per year.

Effect on production waste

Conservative calculations are pointing to avoided production waste of SFr. 94,500 per year thanks to JDF/PPF technology used today.

The Costs:

Non-Recurring costs

Investments listed are for licenses, implementation, training and equipment for Heidelberg, Kodak and HIFLEX. Also internal start-up costs and a better IT infrastructure belong to the one-time costs. In total this is SFr. 239,085.

Recurring costs

The recurring costs add up to SFr. 170,700 for the next years and include:

- Continuous license and maintenance fees of Heidelberg, Kodak and HIFLEX (SFr. 27,000 per year)
- External services (SFr. 2,700 per year)
- Internal IT maintenance (SFr. 5,000 per year)

Periods	Investment	2010	2011	2012	2013	2014
1 - DISCOUNT RATE						
A Discount rate (expected Rate of Return)	5%					
B Discount factor	1.000	0.952	0.907	0.864	0.823	0.784
2 - BENEFITS						
C Increased added value						
1. Effect on sold press production (Effect on added value minus direct costs)		378,000	378,000	378,000	378,000	378,000
D Avoided costs						
1. Eliminated work in prepress due to auto- mated job creation and bookings		202,500	202,500	202,500	202,500	202,500
2. Reduced production meetings		13,500	13,500	13,500	13,500	13,500
3. Effect on production waste		94,500	94,500	94,500	94,500	94,500
E Annual benefits (C+D)		688,500	688,500	688,500	688,500	688,500
F Cumulative benefits		688,500	1,377,000	2,065,500	2,754,000	3,442,500
G Discounted annual benefits = PV(F)		655,714	624,490	594,752	566,431	539,458
3 - COSTS						
H Non-recurring costs						
License Pressroom Manager	94,500					
Implementation from Heidelberg	13,500					
Training from Heidelberg	6,750					
Computer Equipment Heidelberg	6,750					
License HIFLEX MIS	19,035					
Implementation from HIFLEX	40,500					
Training from HIFLEX	13,500					
Computer Equipment HIFLEX	13,500					
License Kodak Business Link	6,750					
Implementation from Kodak	2,700					
Training Kodak	2,700					
Internal Startup-costs (1 month)	13,500					
IT ancillary infrastructure costs	5,400					
I Recurring costs						
Recurring fees on license and maintenance		27,000	27,000	27,000	27,000	27,000
External Services		2,700	2,000	2,000	2,000	2,000
Internal IT maintenance		5,000	5,000	5,000	5,000	5,000
J Annual costs = (H+I)	239'085	34,700	34,000	34,000	34,000	34,000
K Cumulative costs	239'085	273,785	307,785	341,785	375,785	409,785
L Discounted annual costs = PV(J)	239'085	33,048	30,839	29,370	27,972	26,640
NET VALUE						
M Annual net value = (E-J)	-239,085	653,800	654,500	654,500	654,500	654,500
N Cumulative total	-239,085	414,715	1,069,215	1,723,715	2,378,215	3,032,715
O Discounted annual value = PV(M)	-239,085	622,667	593,651	565,382	538,459	512,818
ROI per Year = E/J	-100.0%	1884,1%	1925,0%	1925,0%	1925,0%	1925,0%
ROI Present Value = SUM(G)/SUM(L)	670.3%					
NET PRESENT VALUE						
P Net Present Value (SUM(O))	SFr. 2,593,891					
INTERNAL RATE OF RETURN						
Q IRR (Internal Rate of Return)	255.4%					

About project financial analyses

Return on Investment

The term Return on Investment (ROI) is frequently used in different ways. In financial circles, the strict meaning of Return on Investment (ROI) is Return on Invested Capital, a measure of company performance. The company's total capital is divided into the company's income (before interest, taxes, or dividends are subtracted).

Most business people use "ROI" simply to mean the "Return" (incremental gain) from an action, divided by the cost of that action. In this sense, an investment that costs SFr. 100 and pays back SFr. 150 after a short period of time has a 50% ROI. This is exactly how it is used in the financial analysis of Vögeli's JDF implementation.

All Periods are discounted with a rate of return of 5%. The rate of return is the expected reward that investor's demand for investing in the project rather than carrying the alternative investment. The rate of return is often referred to as the discount, hurdle rate or company cost of capital. Without this consideration the ROI would be even higher.

Net Cash Flow (can be found in the line 'Annual Net Value' (M))

Cash flow, like income, focuses on the difference between money coming in and money going out over a time period. (Net Cash Flow = Cash Inflows - Cash Outflows). Cash flow results do not include some items found in the income statement, such as depreciation expense. Depreciation expense, for example, does not represent an actual cash payment during the reporting period, but rather an accounting charge against earnings. As a result, depreciation expense is not a "cash outflow" in the above financial analysis.

Discounted Cash Flow (DCF) (can be found in the line 'Discounted annual value' (O))

The DCF is a cash flow summary that has been adjusted to reflect the time value of money. It is an important criterion in evaluating or comparing investments or purchases. All things being equal, the purchase or investment associated with the larger DCF is the better decision. DCF makes use of the Present Value concept, the idea that money you have now should be valued more than an identical amount you would receive in the future. Why? The money you have now could (in principle) be invested now and gain return or interest, between now and the future time (interest rate used in the above financial analysis is 8%, (A)). Money you will not have until some future time cannot be used now. Therefore, the future money's value is discounted in financial evaluation, to reflect its lesser value. What that future money is worth today is called its "Present Value".

Net Present Value (can be found in the line ' Net Present Value ' (P))

The net present value is a form of calculating discounted cash flow. It encompasses the process of calculating the discount of a series of amounts of cash at future dates, and summing them. Therefore, the height of the net present value is dependant on the length of the period for the project financial analysis. The period which we have chosen for the financial analysis of Vögeli's JDF project is five years.

Internal Rate of Return (IRR)

The IRR for an investment is the discount rate for which the total present value of future cash flows equals the cost of the investment. It is the interest rate that produces a 0 NPV. Another way to think of IRR is this: IRR tells you just how high interest rates would have to go in order to "wipe out" the value of this investment. Like DCF, the IRR is a cash flow summary that has been adjusted to reflect the time value of money. The IRR view of the cash flow stream is essentially an investment view: money will be paid out in order to bring in gains. The higher an investment's IRR, the better the investments return relative to its cost and the lower the risk.