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Analysis

New HP Inkjets Change the Game for Small Business: Colour up to Half the Cost of Laser

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Abstract

InfoTrends conducted a *Total Cost of Printing* study and product comparison on the competitive value of Hewlett Packard's latest inkjet printers, the Officejet Pro 8000/8500 series, against comparable colour laser printers. This report includes a cost per page and total cost of printing analysis.

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Introduction

Over the years, colour inkjet printers have become an established device in U.S. households and small offices. Nevertheless, inkjet printers and All-in-Ones (AIOs) have been slow to migrate to the general office environment. Inkjet devices have been viewed as too slow or too expensive for everyday office output. For some time, InfoTrends has forecasted the wide deployment of inkjet technology to address a broad range of printing requirements. This technology is currently widely-deployed at the low end of the market; in specialty markets such as wide format; and among high-speed, high-priced page printers, such as the Kodak Versamark. Nevertheless, InfoTrends believes inkjet offers many important attributes that could help spur the use of colour in general office and business applications. Our interest is based on some basic principles: ink costs less than toner, inkjet printheads have relatively few moving parts, and the quality that can be delivered is high.

To date, inkjet technology has not been broadly deployed in the mid-market. We have yet to see an inkjet implementation that combines all of the technology attributes into one solution—at least one metric typically suffers. For example, faster speeds are typically associated with products that produce lower quality, while unmatched print quality is typically implemented in less robust consumer products with slower speeds. Current inkjet implementations provide net page costs that range from very expensive to the lowest-cost digital pages. Over the last several years, there have been numerous improvements in throughput speed and print quality of colour inkjet printers. It has been high cost of ownership, the high cost of inkjet replacement cartridges, and the corresponding per-page printing costs, however, that have been the strongest barriers for many to accept these devices as an alternative to laser-based technology for general business applications.

Hewlett-Packard is one company that has consistently pushed its inkjet technology into the business environment. In 2005, HP introduced its Scalable Printing Technology (SPT), a photolithographic process for developing thermal inkjet printheads. The first product to leverage HP's SPT architecture was the Officejet Pro K550, which was unveiled in 2005. Since that time, the firm has continually advanced the K550 imaging platform with new product introductions that offer faster performance and lower operating costs. In March 2009, HP introduced a series of inkjet products based on its SPT architecture that promised to set new standards for lower operating costs of business inkjet printers. Among other claims, HP states that its newer Officejet Pro 8000/8500 series of printers and MFPs can reduce total cost of ownership by as much as 50% when compared with colour lasers at similar price points.

The purpose of this report is to further understand and test Hewlett-Packard's claim of lower total printing costs for its new inkjet colour printers in relation to laser technology and comparable colour laser printer models in this class. InfoTrends developed a comparative based on certain criteria with regard to printing costs for small-business environments. The criteria for yearly page volumes and monochrome and colour coverage were defined by several InfoTrends market research studies.

Product Comparison

InfoTrends chose several competitive colour printer models (single function *and* multi-function) to compare with the Officejet Pro 8000/8500 series to validate or refute HP's claim of lower total printing costs. The competitive models were chosen based on comparable specifications including average selling price¹, colour and monochrome print speeds, as well as duty cycles. All the competitive models are based on laser imaging technology and are listed in the Table below.

Table 1: Competitive Laser-based SF & MFP - Comparison List

Single Function Laser-based Printers	Laser-based MFP
Dell 2230	Brother MFC-9320CW
Samsung CLP 315W	Samsung CLX-3175FN
Brother HL-3040CN	

¹ Printer acquisition cost based on ASPs from NPD Group - Retail Scorecard and E-Commerce Scorecard

Product Comparison – Single Function Printers

The HP Officejet Pro 8000 single function printer has a colour print speed of 11 ppm and a monochrome print speed of 15 ppm. The model supports up to a 250 sheet input capacity, PCL 3 Page Description Language, and up to 8.5" x 14" (legal) size paper output. The Officejet Pro 8000 colour printer has a suggested retail price of €149.

Competitive Product Matrix – Single Function Printers

Table 2: Single Function Printers - Competitive Matrix

	HP	Brother	Samsung	Dell
				
Specifications	HP Officejet Pro 8000	HL 3040CN	CLP-315W	2230
Price – euro (€)	€ 149	€ 220	€ 152	€ 179
Technology	4 individual ink	LED	4-pass laser	in-line laser
Colour PPM	11	17	4	12
Mono PPM	15	17	16	16
Input capacity	250 sheets	250 sheets	150 sheets	250 sheets
Duty Cycle	15,000	7,000	20,000	35,000
Ink/Toner capacity	1,400 CMY 2,200 K	2,200K 1,400 CMYK	1,000 CMY 1,500 K	2,000 CMYK
	in the box: 900 CMY 1,000 K	in the box: 1,500 CMY 2,500 K	in the box: 700 CMY 1,000 K	in the box: 1,000 CMYK
Cost per page (€) K/CMYK	€0.014/€0.055	€0.028/€0.162	€0.031/€0.159	€0.023/€0.104
Replacement parts (beyond print cartridges)	None	Waste Unit - 29,375/ Transfer Main. Kit - 50,000/ CMYK Drum - 15,000	Imaging Kit - 14,100K/ Waste Toner - 5,875K	None

Product Comparison – MFP Printers

HP’s Officejet Pro 8500A e-All-in-One colour inkjet MFP has a print speed of 11 ppm full colour and 15 ppm monochrome with a maximum colour resolution of 4,800 dpi. It has built-in Ethernet network capability with a duty cycle of 15,000 pages. Paper input capacity includes a 250-sheet tray and a 50-sheet automatic document feeder (ADF).

Competitive Product Matrix – MFP Printers

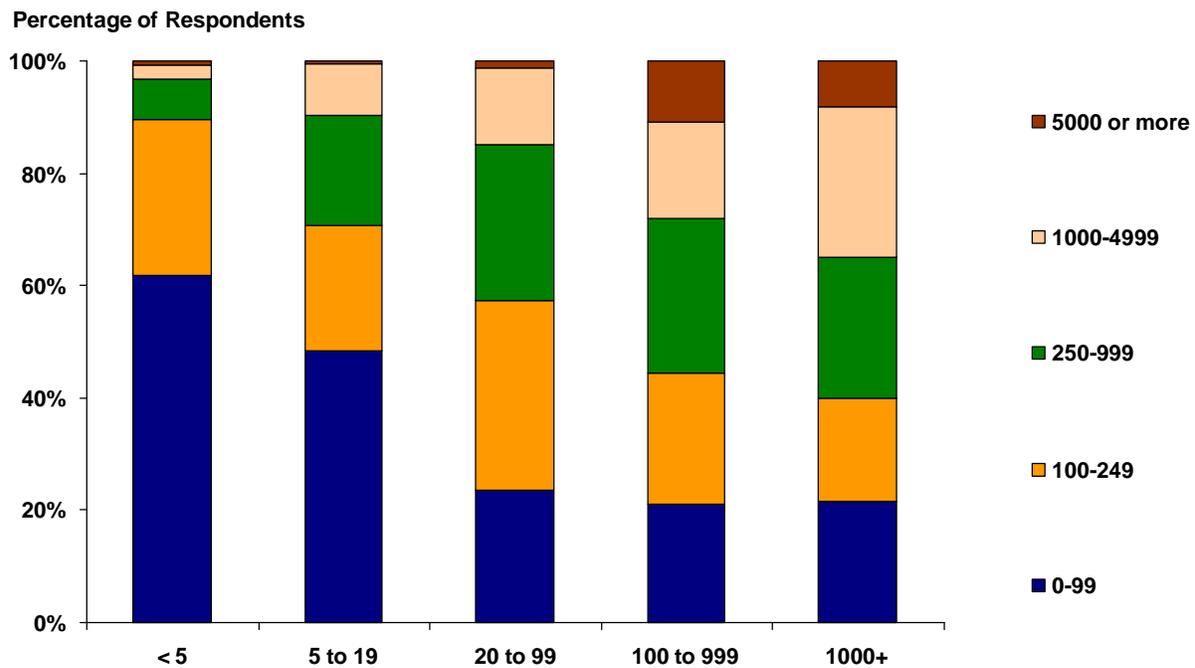
Table 3: Multifunctional Printers - Competitive Matrix Assumptions

	HP	Brother	Samsung
			
Specifications	HP Officejet Pro 8500 A e-All-in-One	MFC-9320CW	CLX-3175FN
Price – euro (€)	€ 269	€ 509	€ 398
Technology	4 individual ink	in-line laser	4-pass laser
Colour PPM	11	17	4
Mono PPM	15	17	17
Input capacity	250 sheets	250 sheets	150 sheets
Duty Cycle	50	35	15
Ink/Toner capacity	15,000	25,000	20,000
Ink/Toner capacity	1,400 CMY 2,200 K	1,400 CMY 2,200 K	1,000 CMY 1,500 K
	in the box: 900 CMY 1,000 K	in the box: 1,000 CMY 1,000K	in the box: 700 CMY 1,000K
Cost per page (€) K/CMYK	€0.014/€0.055	€0.028/€0.162	€0.031/€0.159
Replacement parts (beyond print cartridges)	None	Waste Unit - 29,375, Transfer Main. Kit - 50,000/ CMYK Drum 15,000	Imaging Kit 14,100 pages, Waste Toner - 5,875K

Page Volumes

InfoTrends utilised an internal multi-client market research study to determine typical yearly page volumes for small business environments. The business size was determined by an InfoTrends Primary Market Research Study entitled *Office Color: Accelerating Demand and Maximizing Profits*. The mean survey research results were applied to determine the average prints per week for calculating yearly page volumes. InfoTrends utilised the North American mean of 149 pages to determine the yearly prints for less than five employees and 288 pages per week for companies that had between 5 to 19 employees (see Figure 1 below). Respondents were split evenly between company sizes and all major vertical industries were represented in this study.

Figure 1: Average number of Pages Printed per Week on Inkjet Printer or MFP device



Page Coverage

The assumptions for page coverage were based on an InfoTrends study entitled *Buying Habits in the Retail Channel Study*, which was a Web-based survey deployed across the U.S. in late 2007. The respondents represented a variety of vertical markets, income levels, and ages. The question was based on the end-users' main application for printing on their single function and multi-function colour inkjet printers. Survey results were averaged out to obtain a standard for colour and monochrome page coverage (see Figures 2 & 3 below). Usage period or length of ownership was determined to be one year, two years, or three years for this total cost of printing comparison.

Figure 2: Page Coverage Assumptions – SF Inkjet Printers

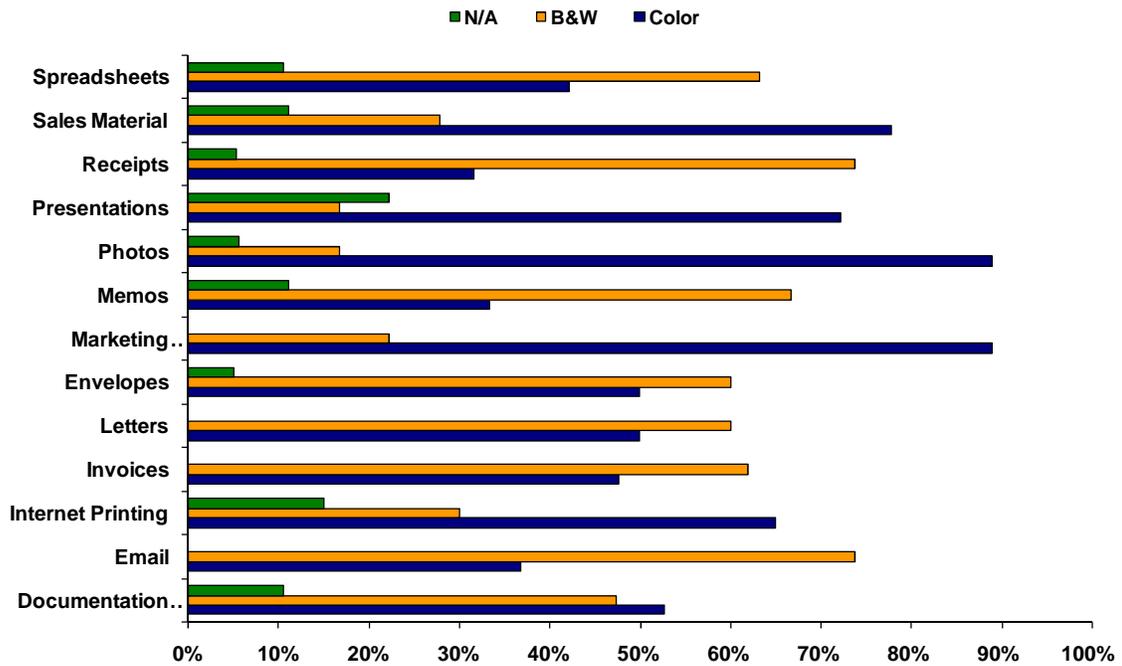


Figure 3: Page Coverage Assumptions – MFP Inkjet

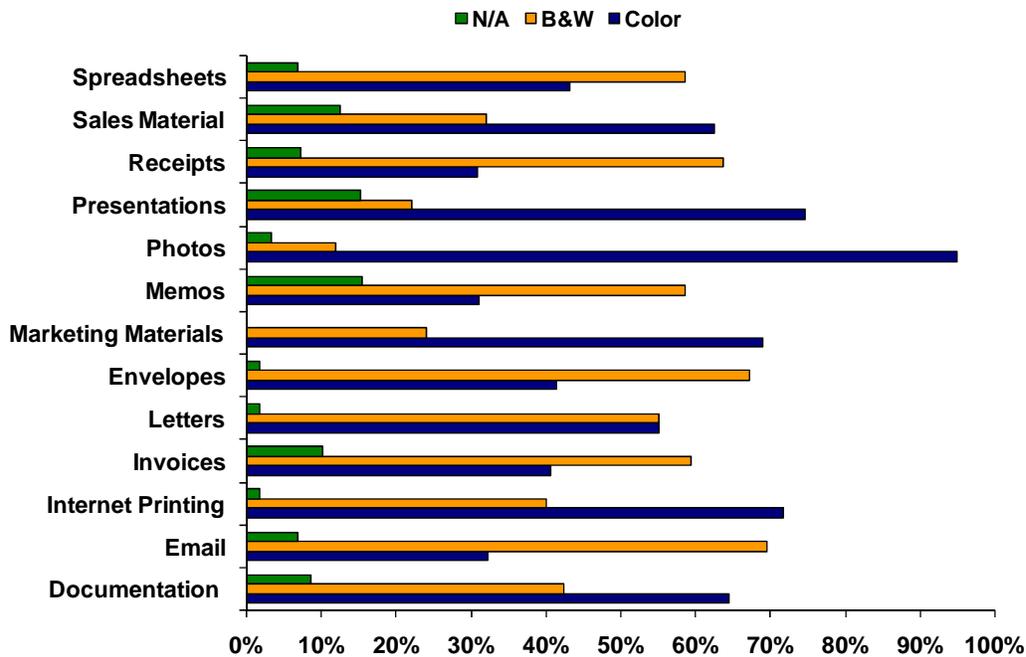


Table 4: Location Size, Percentage of Page Coverage, & Length of Ownership for TCO

Location Size	Average Page Volume (weekly)	Percentage of Pages Colour & B&W	Length Of Ownership
< 5 employees	149 pages	Colour Coverage 55% B&W Coverage 45%	1 year, 2 year and 3 year
5 to 19 employees	288 pages	Colour Coverage 55% B&W Coverage 45%	1 year, 2 year and 3 year

Methodology

Cost-Per-Page

Supplies yield assumptions were based on the industry standard measurements of using the specified yields for black and colour under standard ISO/IEC 24712 testing coverage with continuous printing and highest-capacity cartridges (for a normal colour and normal black text page). The cost-per-page calculations for the HP Officejet series and competitive colour laser printers were determined utilising supplies pricing and yields from data supplied by the NPD Group. InfoTrends chose to use third-party figures for supplies yields and pricing to remain objective and to eliminate any potential for skewed results by using figures reported by vendors.

To calculate total cost-per-page, InfoTrends included all replaceable supplies for each model. One of the advantages of inkjet technology is that it typically requires fewer replaceable supplies compared with laser-based imaging. For example, the only replaceable supplies used in the new HP Officejet Pro series products are the individual colour ink cartridges. In fact, the new HP models utilise separate printheads and ink tanks, and the printheads actually last the lifetime of the product. This is an important benefit because it reduces the cost of the replacement ink cartridges, which leads to lower overall printing costs.

On the other hand, many of the colour laser products in our comparison grid require other replaceable components, such as fuser units, OPC belts, and waste toner kits. These additional supplies components add to the total cost of printing and are often overlooked when users consider total operating costs. Whenever possible, InfoTrends selected high-capacity toner cartridges to achieve the most economical cost-per-page for competitive laser devices. A complete listing of all the supplies components included in our total cost of printing calculations for each model can be found in Table 5.

Total Printing Costs

To calculate total printing costs, InfoTrends included the acquisition cost of the hardware plus the cost of the consumable supplies based on yearly page totals. This shows the total cost of printing, but it is not intended to show total cost of operation, which might include other variables, such as the cost of paper, maintenance costs, and any extended warranties.

To ensure accurate printing costs for the first year of usage, InfoTrends calculated the amount of pages that each competitive model could print before starter supplies (supplies that ship with the device) are consumed. Yields for starter supplies varied for each model and were calculated individually based on page coverage and

yield assumptions. As a result, annual supplies costs may be different for each year of usage depending upon the number of pages that could be printed with the starter supplies.

Figure 4: Total cost of printing calculation assumptions were based on the following formula:

$$\left\{ \frac{\text{Cost of Supplies}}{\text{Supplies Yield}} \times \text{Printed Pages Per Year} \times \text{Length of Use} + \text{Hardware Acquisition Cost} \right\}$$

Table 5: Cost-Per-Page Comparison Grid by Model - Cost of Printing Analysis

Model	Technology	Consumables	Price	Yield	Total CCPP
Brother	Black Laser	TN210BK - Toner Black	€ 60.50	2,200	€ 0.028
MFC 9320CW, 9010CN	Colour Laser	TN210C - Toner Cyan	€ 58.82	1,400	€ 0.042
MFC9120CN	Colour Laser	TN210M - Toner Magenta	€ 58.82	1,400	€ 0.042
HL 3040CN, 3070 CW	Colour Laser	TN210Y - Toner Yellow	€ 58.82	1,400	€ 0.042
	Special Laser	WT200CL - Waste Unit	€ 16.80	29,375	€ 0.001
	Special Laser	BU200CL - Transfer Maint. Kit	€ 85.71	50,000	€ 0.002
	Special Laser	DR210CL - CMYK Drum	€ 89.91	15,000	€ 0.006
					€ 0.162
Dell	Black Laser	593-10258 - High Yield Toner- Black	€ 52.00	2,000	€ 0.026
1320C	Colour Laser	593-10259 - High Yield Toner - Cyan	€ 69.00	2,000	€ 0.035
High Capacity	Colour Laser	593-10260 - High Yield Toner - Yellow	€ 69.00	2,000	€ 0.035
	Colour Laser	593-10261 - High Yield Toner - Magenta	€ 69.00	2,000	€ 0.035
					€ 0.130
Dell	Black Laser	593-10312 - Toner - Blk. High Capacity	€ 57.00	2,500	€ 0.023
2230	Colour Laser	593-10313 - Toner - Cyan High Capacity	€ 68.00	2,500	€ 0.027
High Capacity	Colour Laser	593-10314 - Toner - Yellow High Capacity	€ 68.00	2,500	€ 0.027
	Colour Laser	593-10315 - Toner - Magenta High Capacity	€ 68.00	2,500	€ 0.027
					€ 0.104
Samsung	Black Laser	CLT-K4092S - Toner Black	€ 46.13	1,500	€ 0.031
CLP-315/CLP-315W	Colour Laser	CLT-C4092S - Toner Cyan	€ 39.41	1,000	€ 0.039
CLX3175 (AIO)	Colour Laser	CLT-M4092S - Toner Magenta	€ 39.41	1,000	€ 0.039
	Colour Laser	CLT-Y4092S - Toner Yellow	€ 39.41	1,000	€ 0.039
	Special Laser	CLT-R409 - Imaging Kit	€ 117.56	14,100	€ 0.008
	Special Laser	CLT-W409 - Waste Toner	€ 10.84	5,875	€ 0.002
					€ 0.159

Model	Technology	Consumables	Price	Yield	Total CCPP
HP	Black ink	C4906A - black	€ 29.99	2,200	€ 0.014
Officejet Pro	Colour ink	C4907A - Cyan	€ 19.49	1,400	€ 0.014
8000 series	Colour ink	C4908A - magenta	€ 19.49	1,400	€ 0.014
8500 AIO series	Colour ink	C4909A - yellow	€ 19.49	1,400	€ 0.014
					€ 0.055

*TCPP determined using the industry standard ISO/IEC 24712 for color CMYK pages

Single Function Printers

InfoTrends compared HP's Officejet Pro 8000 single function printer against single function colour laser printers with similar print speeds and specifications, and found a significant difference in colour printing costs and total cost of printing. The competitive models chosen for this comparison were the Samsung CLP-315W and the Dell 2130CN.

Micro-business (<5 Employees), 1–3 Year Ownership

InfoTrends prepared a total cost of printing analysis for the single function printers over a one-, two-, and three-year usage period with an annual page volume of 7,748 pages. The scenario depicts a typical micro-business environment with an office staff of less than five employees and their associated output print volumes. The total cost of printing analysis showcases the overall cost savings of the HP inkjet printers versus competitive colour laser printers from an initial acquisition cost, total cost per page, and total cost of ownership.

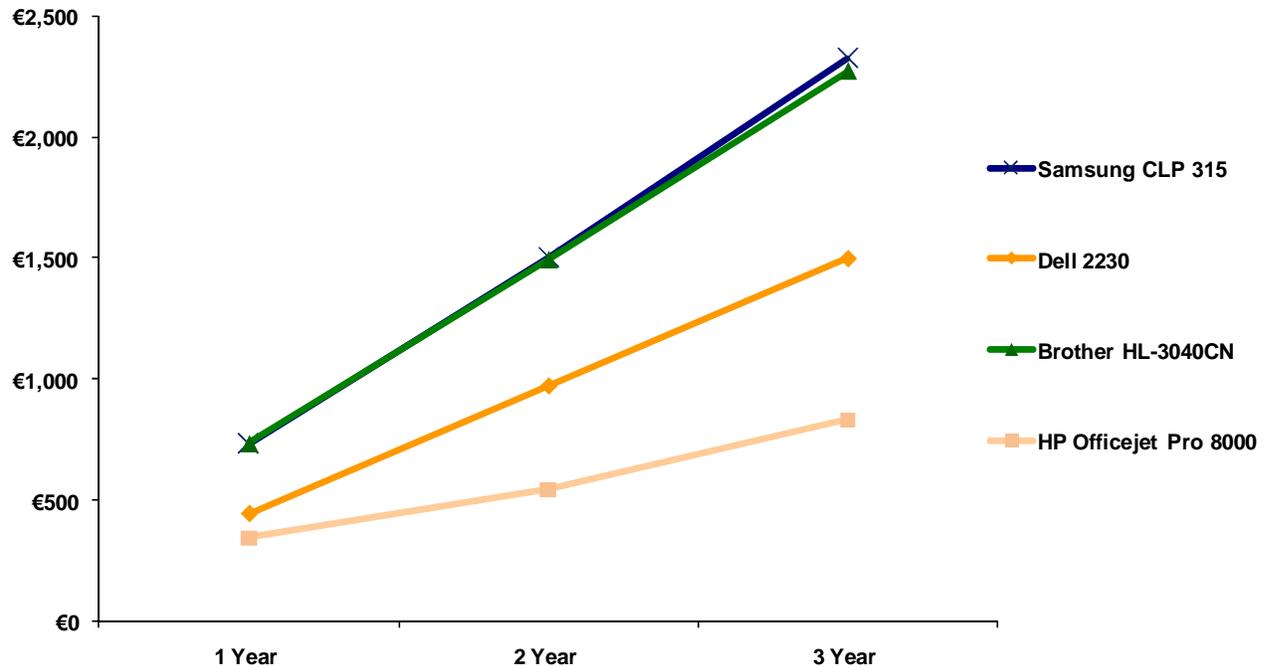
For the micro-business environment, InfoTrends chose to compare HP's Officejet Pro 8000 against competitive models because it is the less expensive model of the two new HP products and it could easily handle the page volumes defined by our assumptions. According to our findings, HP's Officejet Pro 8000 is the most economic device among the three products in our comparison. The total cost of printing for the HP Officejet 8000 over a 1-year period would be €346.83, including the cost of hardware and supplies. In contrast, Brother's HL-3040CN colour laser printer is the most expensive, with total printing costs of €735.83. Compared with the HL-3040CN, HP's Officejet 8000 would provide customers with roughly a 53% savings, or a total cost savings of €389.00 over the one-year period.

Also included in our analysis was Samsung's CLP-315W, a laser printer that operates at 4 ppm colour and 16 ppm monochrome. Based on our assumptions for micro-businesses, Samsung's CLP-315W has a total printing cost of €735.83 over the one-year period—only slightly lower than that of the Brother HL-3040CN. Compared with the Samsung CLP-315, HP's Officejet 8000 would offer customers a cost savings of roughly 52.7%, which equals a total cost savings of €387.12 over the one-year period.

It is also interesting to see how total printing costs would change for micro-businesses as usage rates are extended. InfoTrends further analysed the data over a two- and three-year period, and noticed a considerable cost savings for the HP Officejet 8000 printer versus competitive colour laser printers.

Figure 5 depicts a total cost of printing for micro-businesses through a one-, two-, and three-year period using a print volume of 7,748 pages per year. As the chart clearly shows, HP's Officejet 8000 series printer offers substantial savings compared with the competitive colour laser printers. The most expensive colour laser printer to operate and maintain during the three-year period was the Samsung CLP-315W. Compared to the CLP-315W, the HP Officejet Pro 8000 would save micro-business customers approximately €1,492.68 over a three-year period.

Figure 5: 1-3 Year Total Printing Cost Overview for Micro-Business (<5 Employees) - Single Function Printers



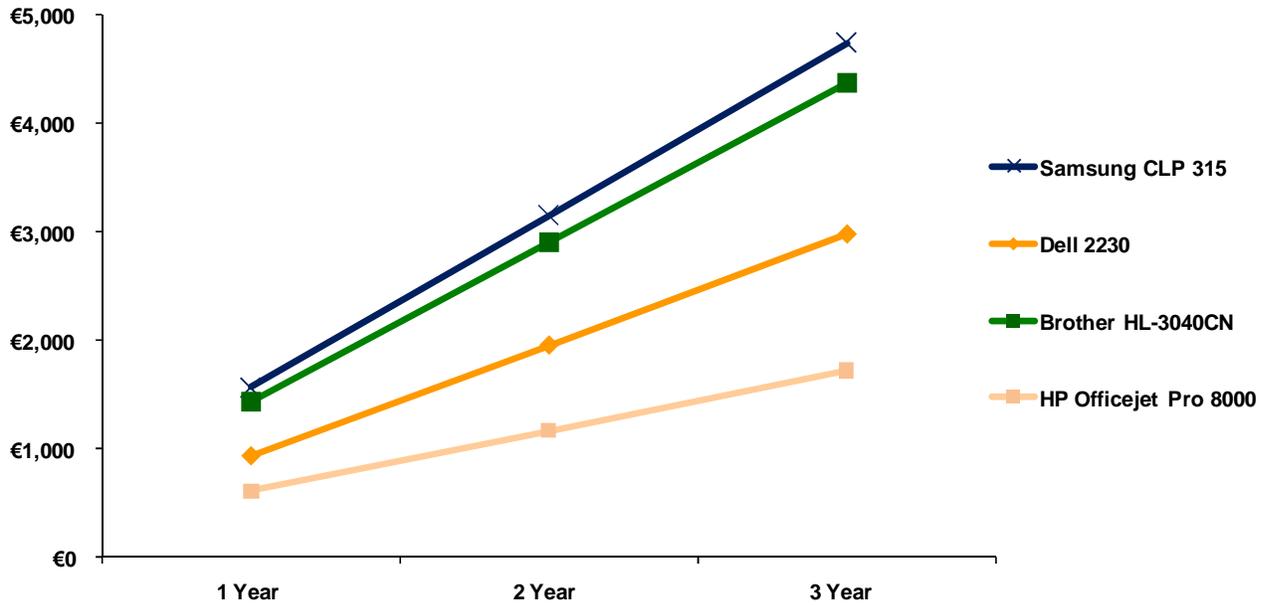
Small Business (5-19 Employees), 1–3 Year Ownership

InfoTrends wanted to represent a typical small business printing environment as closely as possible. Therefore, we also analysed the single function printer data based on a yearly page volume of 14,976 pages, which matches our assumptions for print volumes of small businesses with 5-19 employees. For the small business environment, InfoTrends chose to compare HP's Officejet Pro 8000 with the competitive colour laser models. InfoTrends calculated the total cost of printing and cost savings for the HP OfficeJet Pro 8000 printer over a one year period and found, when compared with colour laser printers with similar specifications, the HP OfficeJet Pro 8000 offered a considerable cost savings over the length of ownership.

HP's Officejet Pro 8000 provides the most economical option, even with the higher print volumes. In fact, the data indicates that, in some cases, the percentage of savings achieved with HP's Officejet Pro 8000 increases as print volumes rise. The most expensive model to own based on our assumptions is the Samsung CLP-315W. Over a one-year period, small businesses could save 61% in total printing costs, or a total of €1,565.83 with the Officejet Pro 8000 compared to the Samsung CLP-315W.

Figure 6 provides a competitive overview of total printing costs for small businesses (5-19 employees) over a one-, two-, and three-year period. In this case, the HP Officejet Pro 8000 inkjet printer again provides the lowest total printing costs compared with the competitive colour laser printers.

Figure 6: 1-3 Year Total Printing Costs for Small Business (5-19 Employees) - Single Function Printers



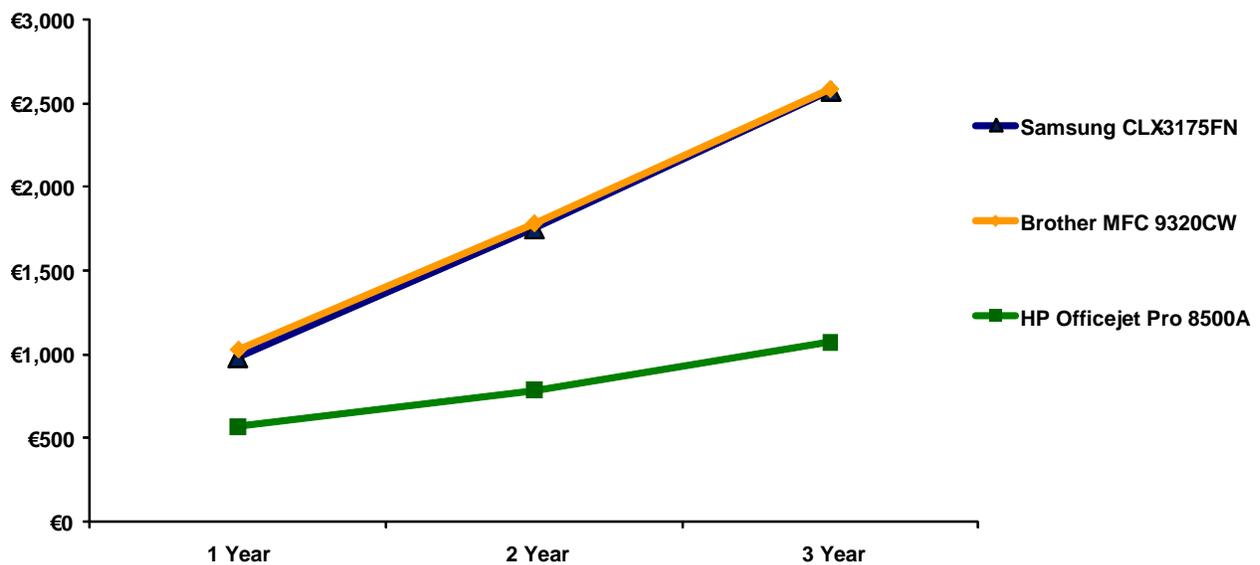
Multifunctional Devices

InfoTrends also compared HP’s new inkjet All-in-Ones, the Officejet Pro 8500A e-All-in-One, against competitive colour laser-based MFPs. The assumptions for page volumes by company size are the same as those outlined above for single function printers.

Micro-business (<5 Employees), 1–3 Year Ownership

InfoTrends compared the Officejet 8500A e-All-in-One with the Brother MFC-9320CW to provide a total cost of printing analysis for micro-business environments. The Officejet 8500A e-All-in-One offers considerable cost savings during the one-year period over this competitive colour laser model. For example, the HP Officejet 8500A offers a one-year cost savings of 45% versus the Brother MFC-9320CW. In fact, micro-business customers could realise a total cost savings of €456.83 over the Brother MFC-9320CW.

Figure 7: 1-3 Year Total Printing Cost Overview for Micro-Businesses (<5 Employees) - Multifunctional Products



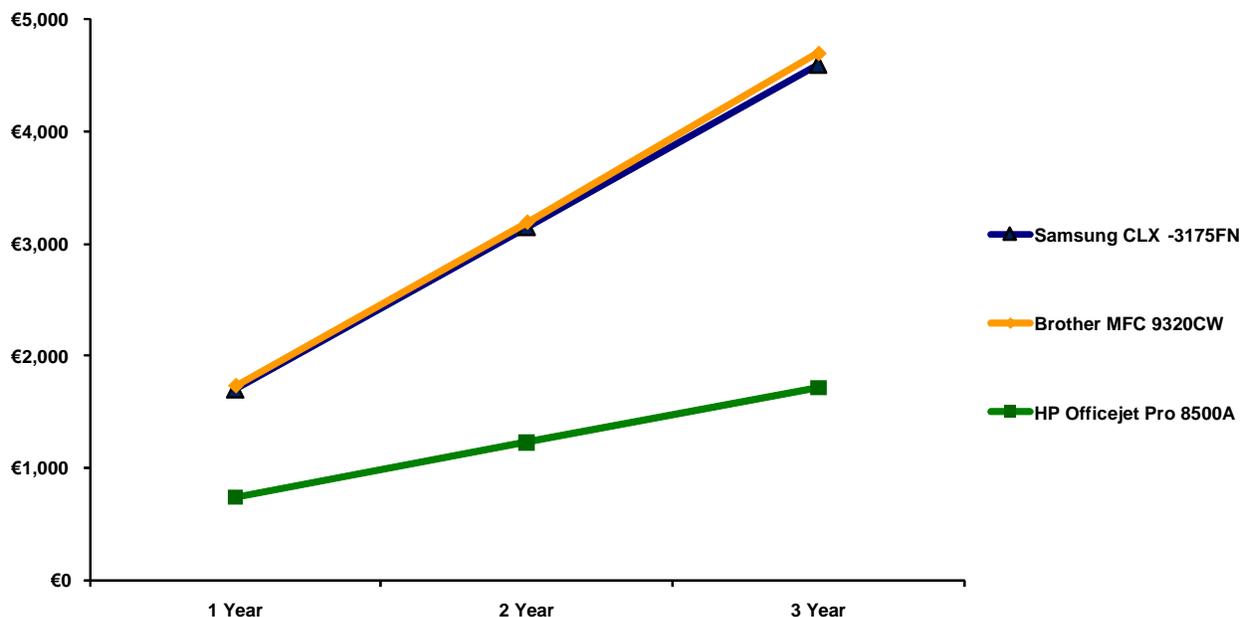
Small Business (5-19 Employees), 1–3 Year Ownership

As with our single function printer analysis, InfoTrends wanted to calculate printing costs for multifunctional devices based on typical usage in a small business environment. Therefore, we also analysed the MFP data based on a yearly page volume of 14,976 pages, which matches our assumptions for print volumes of small businesses with 5-19 employees. At these volumes, HP's Officejet Pro 8500 All-in-One demonstrates substantial cost savings compared with competitive laser-based models.

Based on our assumptions, the Officejet Pro 8500 is again the most economical device, with a total cost of ownership of €739.58 over a one-year period. In contrast, Brother's MFC 9320CW had a total operating cost of €1,728.19. It should be noted that while the higher equipment cost for laser products contributes to increased total operating costs, it is clear from our calculations that HP's inkjet-based AIOs are less expensive to operate based on the on-going supplies costs.

Figure 8 provides a competitive overview of total cost of printing for small business customers (5-19 employees) over a one, two, and three-year period. As the chart shows, HP is the only vendor to hold total printing costs under €4,000 for a three-year period. In fact, the Officejet Pro 8500 has a total printing cost of just €1,714.54 for three years. This represents a cost savings of 63%, or €2,882.16 over the three-year period, compared with the Samsung CLX-3175FN, which has a total cost of ownership of €4,596.98.

Figure 8: 1-3 Year Total Printing Cost Overview for Small Businesses (5-19 Employees)
Multifunctional Products



Conclusion

As previously mentioned, the purpose of this report was to further evaluate HP's total printing cost claims with regard to its new inkjet devices. Based on our assumptions and methodology, InfoTrends has concluded that HP's inkjet products can not only deliver colour printing at 50% the cost of competitive laser products, but the cost savings can be substantially greater in certain cases. Of course, there are many variables that impact total operating costs, and there is certainly a strong case to be made for laser technology at higher page volumes.

Nevertheless, InfoTrends' assumptions are based on primary research conducted with smaller companies, and we believe that our page volume assumptions represent typical usage in micro- and small-business environments. Some argue that while inkjet products might offer a more economical option, the technology is not robust enough to withstand the everyday use of an office environment. Nevertheless, the duty cycle ratings of HP's new inkjet products are substantially greater than the monthly print volumes suggested in this study. Productivity is also a concern, but HP has consistently improved the performance of its inkjet products, and the Officejet Pro 8000/8500 series offers print speeds that are comparable to the laser-based devices included in this study.

As a result, InfoTrends believes that HP's new Officejet Pro 8000 series represents a strong alternative to laser for smaller businesses—especially those looking to take advantage of the value of colour. InfoTrends has long predicted an increased penetration of inkjet technology into traditional business applications, and we believe that HP's latest products are a strong example of the value that inkjet technology can bring to the office market.

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