calculating the true cost of printing

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factors influencing the total cost of ownership of hardcopy resources in the enterprise

calculating and cutting the cost of enterprise printing

Printing has become a costly area of IT operations for today's large enterprise. According to Gartner, "Printers, the supplies associated with them and the support required to keep them operating represent 5 percent of the typical IT budget."[†] Furthermore, printers combined with other output devices – copiers, faxes and scanners – represent a significant portion of not just IT budgets, but also total annual revenues. Gartner estimates that "These output equipment fleets can cost an enterprise between 1 percent and 3 percent of revenue."[††] Many professionals in large enterprises may find this surprising, because few realize just how much they spend on printing or, even more important, what they can do to reduce these costs.

A study by Lyra Research indicates that few network managers and IT departments track printing costs at all.[‡] But, an accurate assessment of costs is essential to reducing them. By carefully evaluating the total cost of owning printers and other hardcopy solutions – the cost to buy them, plus the cost for supplies and support over the life of the devices – the large enterprise can establish a solid foundation for a plan to significantly reduce costs. CAP Ventures goes further, concluding that, "It is those companies that cannot consider hardcopy to be a core asset, but nevertheless produce large volumes of hardcopy, that are in the greatest danger of wasting money by not considering a total cost of ownership model in relation to their hardcopy output devices."[‡‡]

Total cost of ownership (TCO) is the subject of a study of large enterprises undertaken by Gartner Consulting for Hewlett-Packard (HP) in September 2001; the study was conducted "to understand and interpret the various factors that affect the TCO of printing."[¥] In this study, Gartner Consulting identified a number of cost categories that contributed to TCO for printers and other hardcopy resources in the companies surveyed. (The resources covered in Gartner's research included laser and inkjet printers, multifunction products (MFPs), print servers and printer server appliances, associated administration software and stand alone copiers.) In addition, HP has compiled extensive information about these cost categories based on its own studies of more than 100 HP customers (primarily large enterprises).

This paper will:

- create a context for understanding Gartner Consulting's cost categories by detailing the issues that affect hardcopy TCO in large enterprises today
- review the cost categories and related cost elements defined by Gartner Consulting, as well as related information gathered by HP from its own customer studies
- explore the potential for reducing TCO by outsourcing

issues that affect hardcopy TCO

A number of trends drive hardcopy costs in today's large enterprise. Understanding these trends can help an enterprise determine what contributes to high costs in its specific environment. To assist in this endeavor, HP has identified the top five drivers of hardcopy costs based on research by Gartner and other industry observers and on HP's own studies of more than 100 companies.

1. ratio of printers to users

According to HP's studies, large enterprises tend to have far more printers than they need, with an average ratio of printers to users of one printer for every 4.4 people.[¥¥] This may be to some extent because the purchase price of personal desktop printers has become extremely attractive, which could be causing more printers to find their way to more individual desktops. Or it may be because, as Gartner points out, "One of the major problems enterprises encounter in trying to dispose of older printers is that employees sometimes reinstall them in their own offices."[†] The problem in either case is that the more printers an enterprise operates, the greater its costs for supplies, maintenance, support and management of them.

2. use of desktop vs. departmental printers

This issue is closely related to the ratio of printers to users. As individual desktop printers have dropped in price, many employees have begun to use them instead of using departmental or workgroup printers. It is easy to attempt to justify this by citing the low cost of personal printers. Some may even argue that individual printers increase productivity because users do not waste time walking to a shared printer. These are fallacies. The purchase price of individual desktop printers can easily be outweighed over time by the cost of consumables; toner cartridges or ink cartridges for personal printers tend to cost more per page than those used for workgroup printers.[§] And shared printers can be strategically located to eliminate the potential for any detrimental effect on productivity. While personal printers have their place – for bank tellers working at individual customer windows, for example – shared printers more often lead to lower costs at minimal inconvenience to users.[§]

3. number of printer models and technologies used for printing

The absence of a coordinated strategy for managing hardcopy resources, along with the reluctance to dispose of aged equipment, inevitably results in a hodgepodge of printer types, models and technologies in the enterprise. This in turn leads to money and time wasted on having many different types of supplies in inventory, operating under multiple maintenance contracts, keeping up with a variety of printer driver updates and coping with increased help-desk demands. In one instance documented by HP, a company had 559 different models of printers from four manufacturers, requiring help-desk personnel to know how to troubleshoot for hundreds of types of printers. In another case, the existence of multiple types of printers and the failure to manage printers resulted in an entire group of printers from one manufacturer continuing to be serviced on a contract basis – even though the printers had actually been disconnected and placed in storage.

4. age of printer fleet

Gartner estimates that, "For most enterprises, more than half of their printer fleet is over five years old."[†] Like any piece of equipment, a printer is more likely to break down more often if it is an older model. Consequently, service costs go up due to the number of breakdowns that occur, and productivity goes down every time a printer is out of commission. In addition, older printers tend to be inefficient; it is not unusual to find printers tucked away in the enterprise somewhere that print no more than eight pages a minute. Finally, the cost of supplies for older devices tends to be higher; ink cartridges for older models, for example, often have lower yields and therefore need to be replaced more frequently, adding to the cost per page for printing. For all these reasons, eliminating older printers helps to reduce hardcopy costs. The older devices may be phased out altogether if the ratio of printers to users is unnecessarily high. Or, they may be replaced by reliable, efficient new printers or by MFPs, which consolidate print, copy, fax and even scan functions into a single device.

5. inefficient supply chain

Typically, the payer, supplier and user of hardcopy devices operate completely independently of each other in the large enterprise today. (This must have been the case in the example described earlier, in which a company continued to pay for a service contract on printers that were no longer in use.) One example of supply chain inefficiency resulting from this disjuncture is the tendency for the purchasing department to stock up unnecessarily on toner, paper and other supplies, in some cases perhaps even for devices which are no longer being used. Another is the problem of individuals bringing in personal printers without telling anyone and using general funds to pay for supplies. Not only that, individuals may also keep personal printers without authorization and then stock up on supplies on their own at an office-supply store and charge the cost to the enterprise.

TCO cost categories and cost elements

Gartner has determined from its research that when calculating TCO, a number of cost factors must be considered beyond the direct costs of purchasing equipment; HP's experience with its enterprise customers bears this out. It is these cost factors considered together that determine the TCO, or, as CAP Ventures describes it, the "entire costs surrounding the ownership and operation of an office equipment hardcopy output device over a specified, extended period of use."[‡‡] As the chart below shows, Gartner Consulting's cost categories and cost elements include not only direct costs, but also management, maintenance and other indirect costs.

cost categories and cost elements[¥]

cost category	cost elements
Hardware	Acquisition cost (lease or purchase), hardware upgrades (such as finishing products, memory, hard disks, high capacity input trays, legal trays and print servers)
Software	License costs, support licenses, upgrades, customization of printing systems software or print-enabling software
Consumables	Paper, toner, drum units, ink cartridges, maintenance kits
Network management / administration	Management of the network, network costs (allocated on a percentage of use), administration, asset management, installation and configuration
Infrastructure	Planning the deployment of hardcopy devices, physical space (costs for space for equipment, property taxes, heating, cooling, energy consumption, etc.), upgrade costs
End-user operations / lack of availability	User training (training users how to use device), user-required maintenance (clearing jams, loading paper, adding toner / ink cartridges, etc.), document delivery (manipulating document before being used such as stapling, collating, etc.), human interaction (retrieving and waiting for document to be produced), installation and configuration, downtime, business cost of lack of availability, cost of using alternate hardcopy solution, cost of poor hardcopy device performance (speed, response time problems, old technology, poor print quality, reprinting, calling help desk, etc.)
Maintenance / support costs	Maintenance contract costs, warranty / support costs, costs of unused assets, help-desk costs, hardcopy device maintenance, facility management, disaster backup and recovery

Source: Gartner, November 2001.

The following section examines Gartner Consulting's cost categories and cost elements and how they contribute to TCO. It also makes suggestions, frequently based on HP's experience with its own customers, about factors it may be helpful to consider when using these categories as a basis for calculating TCO.

1. hardware

While hardware costs comprise just one of several cost categories associated with TCO, they are nevertheless important to consider in evaluating an enterprise's hardcopy TCO. When attempting to determine specific costs associated with this category, HP's experience indicates that it is important to take into account the mix of devices in the enterprise (such as how many color and how many monochrome printers, or how many networked and how many personal printers), as well as the percentage of the fleet that is purchased or replaced each year.

2. software

For purposes of calculating cost of ownership, license costs are defined as those software license costs associated specifically with hardcopy output. Customization costs are the costs for custom software applications related to output.

3. consumables

These costs are growing rapidly; Gartner notes that "Budgets for supplies are growing by 20 percent to 40 percent per year due to increased graphics printing (e.g., Microsoft® PowerPoint and web pages), the costs of the four separate consumables required by color printers, and because most inkjet printers are now color-capable."[†] Gartner also estimates that, in reference to desktop inkjet and laser printers, "Over the life of these printers, supply expenditures can total two to three times the actual acquisition cost of the printer."[†]

4. network management/administration

Network management and administration costs are among the indirect costs of hardcopy output. HP's experience suggests that to calculate them accurately, the following enterprise-specific information about print network management, installation and configuration costs must be taken into account. (If it is difficult or impossible to determine specific costs within an enterprise for some of these categories, the enterprise may consider using the default amounts based on HP's experience with large enterprises.)

- number of printers per each server that is used for file, print and application services, as well as number of printers per each server that is dedicated to print services only
- percentage of costs related to printing in any general-purpose server (i.e., one that is also running other applications)
- printer-to-user ratio
- average acquisition costs, or the cost per printer based on the weighted annual total print server cost
- Windows NT® server licensing based on the number of seats required

The following installation and configuration costs should also be taken into account.

- estimated time and cost-per-hour for installation, handling, de-installation and asset administration, as well as the estimated cost of disposal per printer (estimated by HP to be $120)
- cost to process a purchase order (for printers, supplies, maintenance, etc.), which HP calculates to be about $110, and cost to pay an invoice, which HP estimates at $28
- number of devices covered by each purchase order and each invoice

5. infrastructure

While the cost per square foot for space devoted to output devices and supplies will vary from enterprise to enterprise, HP suggests that certain assumptions can be made about the amount of physical space these devices and supplies require. Based on HP's studies of enterprise-level customers, the space requirement for a printer can be assumed to be approximately nine square feet, while the requirement for a print server is approximately 30 square feet. The estimated amount of space required to store paper is about four square feet, and the estimated space required for supplies is about six square feet.

In considering space costs, it is important to keep in mind that the more printers and other devices an enterprise operates, the more space it must lease (or the less space it will have available for more valuable use). Therefore, the more older models the enterprise retires, or the more of the fleet it replaces with MFPs, the more significant the impact of this cost category on TCO.

6. end-user operations/lack of availability

As Cap Ventures succinctly sums it up, "Time wasted is money wasted."[‡‡] Gartner has identified specific areas where time is wasted and productivity is lost to inadequate, inappropriate or poorly functioning printing equipment; these are described in detail in the list of cost elements that comprise this cost category. HP's assumptions about the productivity costs associated with these areas are that estimated productivity costs equal approximately 10 percent of other costs such as direct costs and management costs.

7. maintenance/support costs

HP's experience with large enterprises suggests that the following factors should be taken into account when calculating maintenance and support costs: the number of printer-related help-desk calls per year, the percentage of help-desk calls related to printing, and the average cost of a help-desk call. (The cost of a help-desk call will vary from enterprise to enterprise; HP estimates based on its own experience and research that the average cost per call is $35.)

8. cost of capital

Gartner does not list financial costs among the specific cost categories that must be determined to calculate hardcopy TCO. However, HP has identified financial costs as a category that is likely to contribute to TCO. This is especially apparent in light of the recent trend against capital purchases, as financial pressures push customers toward a contract approach instead.[‡‡] Outsourcing eliminates the financial costs associated with capital investments in printers and other hardcopy devices.

how outsourcing can reduce TCO

Gartner has suggested on several occasions that the total cost of owning and operating printers may be controlled through outsourcing on a cost-per-page basis instead of purchasing and managing printers and other hardcopy assets internally:

> "Using output outsourcing, in which services are procured in lieu of purchasing equipment and service contracts, can lead to lower costs and higher service levels."[§§]

> "By developing a comprehensive approach that includes rightsizing, procurement based on cost per page and ongoing management of the fleets, enterprises can reap significant savings."[††]

> "The practice of buying printers outright must be weighed against the benefits of a selective outsourcing contract."[†]

Outsourcing involves contracting to pay a set amount per page for a given number of pages per month, instead of buying devices outright. This alternative can reduce TCO by enabling enterprises to reduce costs, redirect resources more strategically, eliminate the need for capital investment, raise cost visibility and improve productivity.

Recognizing the potential savings and other benefits of outsourcing, more and more companies are electing to pursue this alternative to outright purchasing of printers and other hardcopy solutions.

> "By year-end 2003, 50 percent of networked-printer procurements by Fortune 1000 companies will involve purchasing pages rather than devices (0.7 probability)."† – Gartner

The key benefits of outsourcing are summarized in the following section.

cost reduction

Contracting to pay a specific fixed amount per page locks in costs for the buyer. This eliminates the risk of cost overruns and budget surprises for the entire term of the contract.

strategic redeployment of internal resources

Outsourcing relieves internal IT personnel of the burden of purchasing and managing equipment and supplies. It also eliminates the need for end-user support personnel to spend a disproportionate amount of time support for printers and other hardcopy devices. These groups can then be redeployed to work on more strategic priorities.

elimination of capital investment

The per-page pricing model eliminates the enterprise's capital requirements for equipment, boosting cash flow and freeing capital for other purposes.

cost visibility

Enterprises that outsource no longer have to calculate hardcopy costs themselves; instead, they receive regular statements detailing these costs. They can then use this information as a basis for decision-making. For example, rather than attempting to evaluate printing fleet uptime, the company will be provided with a report of break/fix incidents, amount of downtime experienced by the printer fleet and other information about downtime-related costs.

improved productivity

The enterprise that outsources maintenance and management of its hardcopy assets is assured of having a carefully planned fleet of well-maintained, up-to-date equipment. This can help to improve productivity through:

- elimination of unreliable older devices
- reduced demand on help-desk resources
- strategic placement of equipment for more efficient use
- incorporation of MFPs
- access to the latest features and functions associated with new equipment

conclusion

The cost of printing in today's large enterprise is likely to be far more than the enterprise estimates or realizes. To accurately calculate hardcopy TCO, the enterprise must take into account a variety of factors that represent both direct and indirect costs. Gartner has defined these factors in terms of specific cost categories and cost elements. In addition, HP has garnered information about these cost categories through years of study of more than 100 customers. A calculation of TCO based on these cost categories can serve as a sound basis for a plan to reduce hardcopy costs in that enterprise. Outsourcing is one viable alternative for reducing hardcopy costs, and an increasing number of enterprises are choosing to outsource.

notes

†Gartner, "Managing Office Document Output in the Digital Era," J. Lundy, October 2000.

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¥Gartner, custom research commissioned by HP, March 2002.

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