

In Paper we trust...

Why Paper has endured the Digital Age:

An investigation into the business, psychological and technological aspects of paper use



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Foreword...

The cliché of the paperless office has cropped up on numerous occasions over the last 25 years, usually accompanying a new aspect of technology that promises - in theory at least - to eliminate the need for paper in business. Early calculators, desktop PCs, notebook computers, palmtop computers, mobile phones and 'electronic paper' technologies have all been touted as the new alternative to paper. Yet paper endures. More than that, it proliferates; paper use in business is increasing.

The purpose of this report is to investigate and discuss the reasons behind the endurance of paper in those business environments that are gradually moving towards a more digital way of working. We invited leading specialists in the areas of European business culture, psychology and technology to give their views on what has turned out to be a complex yet intriguing insight into the current prevalence of paper as a business medium, and an informed glimpse into the future. The contributors site some interesting explanations for paper's endurance including the psychology of touch and high expectations generated from technology-focused anxiety, and how 'Power Distance' (relating to highly structured business hierarchy) can increase workers' reliance on paper.

This report details viewpoints from only three professions but attempts to capture informed, mainstream explanations for the endurance of paper in business. There are additional arguments to consider that too, are valid and intriguing. However, this report goes some way towards stimulating debate and interest in the unexpected turn that paper has taken during the early stages of the digital age.

Yours sincerely,

Jane Cronin
SMB Director

Introduction

According to the Gartner Group, in 1982 organisations worldwide used three trillion sheets of paper. By 1999 this figure rose to nine trillion and it is predicted that future paper consumption will increase by 20% each year. And according to Price Waterhouse Cooper's Technology Forecast 1999, paper volume rises by 40% whenever e-mail is introduced to an office.

This report investigates the reasons behind the continued use of paper in business; why such an ancient, relatively bulky and unwieldy medium should remain so popular. There is no single clear-cut answer, which is why this report consists of three chapters. Each of these deals with a different aspect of the influences, effects, benefits and disadvantages of paper, to provide a clearer understanding of exactly why a medium that is effectively compressed wood pulp is such an essential part of modern business.

The first chapter, entitled 'The life of paper in business processes' (by Dr. Terence Jackson, ESCP-EAP European School of Management) asks what practical, business-related obstacles are restricting the uptake of paper-replacement technologies and how these vary from country to country within Europe. This helps to explain the apparent desire to move towards the paperless office and the reasons why such a move has so far failed to occur.

The second chapter, entitled 'Can I have that in writing? The psychology of paper trust' (by Dr. Peter J. Clough and Fiona Earle, Department of Psychology, University of Hull), looks at the psychological aspects of paper use. It discusses the reasons for humans' preference for paper over less tangible media such as electronic documents. In doing so, the report considers theories of the development of sensory perception, why touch is so important to people and why electronic media may be associated with an inaccurate perception of the risks of data loss.

The third chapter, entitled 'The Technology of paper trust' (by Jean-Louis de la Salle, Lexmark Europe), investigates the pros and cons of paper compared with other methods of information storage, retrieval and dissemination, before looking at a range

of new technologies in turn and asking whether any of these has the potential to either increase or decrease the use of paper in business environments.

The conclusion sums up the findings of the three main chapters. Individually, these three chapters can only provide part of the picture. Together, however, they cover all aspects of the use of paper in business today. From the information contained within the three chapters, it becomes clear that no other medium has such a psychological, technological or business-oriented suitability to its intended task. However, there is scope for more intelligent use of paper; several options are discussed in this report.

Appendix A: Lexmark's View of the Future of Printing - The Growth of Distributed Output, provides information on practical ways in which companies can cut costs and improve efficiency by moving to a distributed model of document management.

Appendix B: The Business Reasons Behind the Endurance of Hard Copy Across European Cultures, looks in greater detail at the business practices described in the first chapter, The Business of Paper Trust. Here, statistics gathered from research questionnaires are used to provide in-depth information about the results gathered from each country and sector.

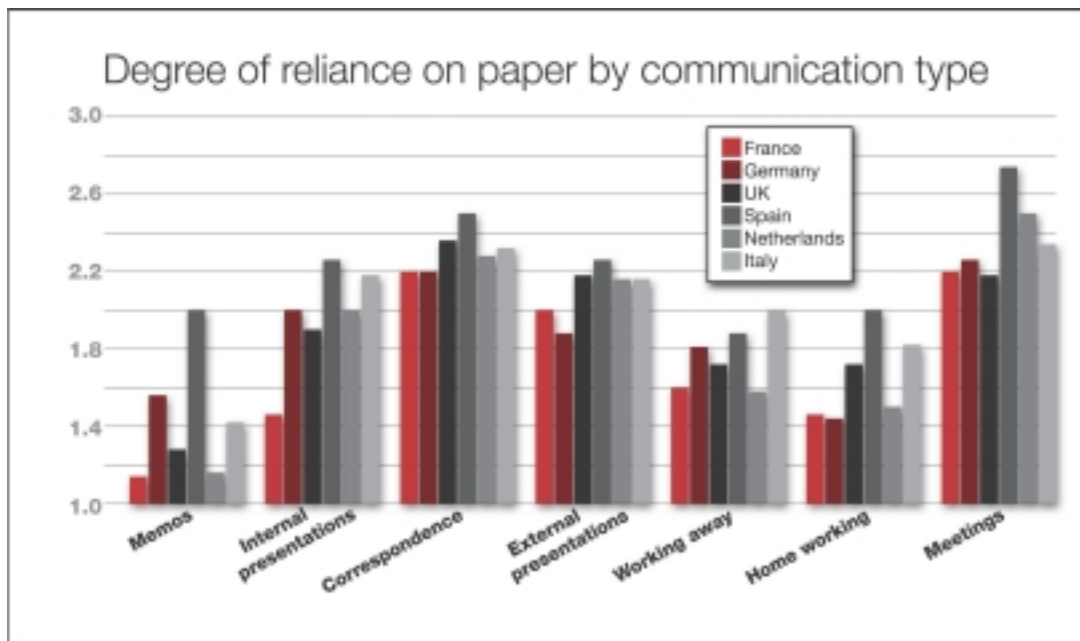
The life of paper in business processes

Dr. Terence Jackson – ESCP-EAP European School of Management

This chapter of the report summarises the results of a study into the use of paper in business across European companies. The full details of the study are included as an Appendix to this report, entitled 'The Business Reasons behind the endurance of hard copy across European cultures'. A detailed explanation of the operation of the study, including the participants, the questions asked and the statistical results, is described in that document.

To investigate the business use of paper, a questionnaire was sent to a selection of professional, technically-aware business people across Europe. The questions related to the way in which paper was being used, asking whether its use in particular areas was increasing or decreasing. The participants were also asked for their own opinions on why particular growth or reduction in paper use appeared to be taking place. See Fig.1 for breakdown of paper use per activity.

Fig. 1: Graph illustrating the degree of reliance on paper, by communication type



Paper dependency

The sample sizes involved in the study were relatively small, so care must be taken when interpreting the findings or attempting to extrapolate them to larger populations. However, some consistent results did emerge from the study. Most notable was the fact that the perceived importance of paper in relation to electronic documents varied considerably across the countries involved in the study.

This variation appears to depend on issues such as the legal status of electronic documents compared to paper, in conjunction with the general risk aversion of the country concerned. Some countries' business structures require highly detailed legal documents covering all transactions, while others are less strict.

For example, according to the study, Spanish companies have a generally greater reliance on paper in business than many other countries, due to a high 'Power Distance' (i.e. having a highly-structured business hierarchy) and a high 'Uncertainty Avoidance' (in other words, there's a requirement for all business transactions to be spelled out in detail, to avoid mistakes). Such detailed documentation is not necessarily required in other countries except in specific legal transactions.

Although there are other countries with high Uncertainty Avoidance and Power Distance ratings, such as Italy and France, the conclusion of the study is that technological developments may be slightly lagging in Spain by comparison, hence the higher dependence on paper.

This finding ties in strongly with the perceived or actual formality of paper documents versus electronic ones. The participants noted that legally-binding documents were nearly always physically stored on paper, something that is not surprising given the intangible nature of electronic documents and their variable legal status across the world.

The European-wide aim for a paperless office

Moves towards the 'English and US' method of doing business have also increased the amount of paper used, since these two countries' business systems are seen as being legally 'heavier' than those in France, Italy, Spain, the Netherlands and Germany.

Another trend to emerge from the study is that there was a generally strong expression of intent to move towards the 'paperless office', by replacing paper documents with electronic ones. But that intent seems to be far ahead of the reality, as many of the participants noted. In several countries, it was found that the printing of e-mails, so that they could be archived for future reference, was commonplace. Since e-mail increases the number of business communications, it's not hard to see how this increases the use of paper.

The permanence issue cropped up several times. Even when the business benefits of e-mail (speed, wide distribution, low cost) are taken into account, its lack of permanence is a real problem for businesses across Europe. Coupled with a low perceived take-up of technology among customers, the result is a reliance on paper communication for marketing, transactional and customer relationship purposes.

Practical concerns were common among the participants, notably the difficulty of reading and editing a complex document on screen. Many of the comments noted that electronic documents had probably been printed out and edited many times during their brief lives; presentations in particular were likely to have been printed several times so that they could be compared and edited. This appears to contradict the idea that word-processors and other office software should make the editing process less time-consuming.

Convenience and cash flow

One factor to bear in mind here is the increased ease and low cost of printing. As one participant noted, it's now so easy to print off draft copies for examination and editing that there's no need to work on-screen all the time. The beneficial effects of this were found to be particularly worthwhile with complex documents containing many numbers.

In addition to comments relating to the portability of paper (it's easier to read on the train or 'plane, for example), one interesting result from the study showed that the increase in the amount of information available has actually made paper more valuable.

E-mails are easily ignored, but a paper document 'waved under the nose' is much more likely to be treated as important.

Finally, it was noted that differences in age and familiarity might affect the use of paper in business, with senior managers in some countries preferring traditional paper documents and their more junior colleagues being happy to rely on electronic documents.

From this study, it's apparent that any attempt to generalise the business use of paper across Europe is doomed to failure. Different countries operate in very different ways, and it's likely that a similar discrepancy would appear on a company-by-company comparison study. But one conclusion that can safely be drawn is that although paper use is decreasing in some areas of business, new technology is actually increasing the number of printed documents overall, rather than decreasing it. This is an important message for anyone who considers that technology holds the key to reducing the business use of paper.

References

See Appendix B for detailed statistics and references.

Can I have that in writing? The psychology of paper trust

**Dr. Peter J. Clough & Fiona Earle – Department of Psychology,
University of Hull**

Despite the growing reliance on business technology and electronic communication, the international business community continues to use vast quantities of paper. What is perhaps more surprising is the finding that paper consumption actually increases when e-mail is introduced into an office (Price Waterhouse Cooper, 1999). *How* this happens may be fairly straightforward, as e-mail undeniably facilitates wider communication.

More information, less effort

First, the effort involved in circulating documents is now so minimal that more people are being 'copied in', and second, the use of e-mail address books within large organisations encourages the widespread dissemination of information which may be of only vague interest to the majority of the recipients. This increased communication then leads to greater consumption of paper. There are simply more documents in circulation, along with a strong tendency for any relevant documents to be printed out. But the question of *why* people continue to print electronic information in this technologically advanced age remains more complex.

There are several obvious reasons for printing documents. These include the portability of physical documents and the ease of reading from paper as opposed to reading from a screen. However, more complex is the fact that people seem to simply 'trust' paper. This sense of trust operates on two levels. First, there is a feeling of security from having a paper copy of a document. Second, people are more inclined to have confidence in the authenticity of paper documents received from other people. This report outlines a number of psychological theories which could explain these phenomena.

The security of paper documents

a) Haptic perception - the importance of touch

The most obvious distinction between a paper copy of a document and electronic version is the fact that the former is a physical entity that can be touched and held.

This distinction may play some part in differing attitudes towards paper and electronic documents.

The sense of touch plays an essential part in human development. From the moment a baby is born, it will exhibit touch reflexes. This touch sensitivity increases substantially over the first few days of life (Lipsitt & Levy, 1959) and then continues to play an important role in child development. Touching is undoubtedly important in social development, as human contact can provide comfort to babies, children and adults alike. However, more relevant here is the fact that humans develop an understanding of the world through physical exploration. The exploratory use of touch, known as *haptic perception*, continues throughout life. Even adults are motivated to reach out and touch unfamiliar or desirable objects. This sense is used to assess physical attributes such weight and quality, which are difficult to evaluate without touch.

Therefore, the sense of touch represents an important medium through which humans can explore, investigate and understand their environment.

Considering the importance of this sense, it is plausible that people feel less comfortable and less secure with electronic documents because of the heavy reliance on a sense of touch in their interactions with the world. As such, electronic documents do not provide the opportunity for physical contact and exploration.

b) Object permanence - when is a document not a document?

An alternative or perhaps complementary explanation for the sense of security provided by paper documents also relates to the physical presence of paper, but is associated with the storage properties of paper as opposed to those of electronic information. During early cognitive development, humans achieve what is known as '*object permanence*' (Piaget, 1954). This is the knowledge that an object has a permanent existence which is independent of any perceptual contact with it (Vasta et al, 1992). It is widely accepted that before this stage of development, children typically believe that objects, such as toys or even people, cease to exist when they can no longer see or touch them.

By the end of their first year, most infants can successfully search for objects that have 'disappeared', indicating an important advance in their understanding of the

world. They can now be confident that objects or people continue to exist even when they are removed from view. This ability or understanding is clearly taken for granted once it has developed. However, people may not have developed the same level of 'object permanence' with documents that are electronically created and saved. Human familiarity with paper documents reinforces the belief that they will continue to exist, except in the event of an unlikely catastrophe. But the storage of electronic documents is undeniably more complex. The vast majority of computer users could not even attempt to explain how electronic information is stored, nor the nature of its existence once it is no longer present on the screen.

Therefore, because most people do not understand the complexities of electronic file storage, they may prefer to rely on the physical documents, for which well-developed mental models exist.

Many people may even remember their first experience of saving a document and the considerable anxiety associated with checking that it still 'exists'. This level of anxiety obviously decreases quickly, as new (but limited) mental models of computer storage are developed. Knowledge of directories, drives and intricate filing systems is developed over time. However, it is arguable that because people do not understand the physical nature of stored documents, they do not achieve the same level of object permanence that exist for physical entities such as paper. This may play some part in the feelings of security associated with paper.

c) Faulty memory - the catastrophe of crashing

In addition to the possible explanations provided by the above psychological theories, memory research may offer an explanation for the general lack of trust in electronic storage of information. The vast majority of computer users are likely to have experienced, at some time, a catastrophic loss of electronic information, such as an important file which seems to vanish and is never seen again. However, such people are also likely to have experienced the catastrophic loss of a paper document; an important report, a passport or a driving licence. What is interesting is that, for some reason, the loss of computer-based information is more memorable. This influences human perception of the likelihood that a problem will occur when using computers.

Why are computer catastrophes more memorable? To answer this, consider the differences between losing physical, paper documents as opposed to electronic documents.

One fundamental difference is that when a paper file is lost, it still logically exists 'somewhere'. Although it may not be possible to lay hands on it immediately, it is expected to turn up at some point. However, when this experience occurs with computer-based documents, it is possible that the document really does no longer exist, that all trace of it has been erased.

This experience is associated with considerable anxiety; arguably more acute anxiety than the experience of misplacing a paper document. Although there is a complex relationship between emotion and memory, it is widely accepted that memory can be biased or distorted by emotion. Furthermore, the main effect of anxiety is recognised to be the distortion of the individuals' perception of future threats (Baddeley, 1999). Therefore, it is possible that this increased state of anxiety can lead to people overestimating the likelihood of computer failure. This provides another factor which may underlie human trust in paper; many people simply expect their computers to lose their data at some point.

The authenticity of paper documents

Having considered a range of explanations which could account for the sense of security associated with having paper copies of documents, it's also worth considering the sense of trust that is conferred upon documents received from other people.

a) Psychological schema for official communication: In paper we trust...

The association between paper and 'official' communication is continuously reinforced from an early age.

At school, important communications are typically delivered in the form of letters, such as doctors' notes, report cards and notes which pass between teacher and parent. The learned response is that this method of communication can be 'trusted' and relied upon.

This reliance continues into adulthood, since intellectual, sporting and academic achievements are celebrated with paper certificates which provide a formal assurance of skills and abilities. Furthermore, job offers, bank statements, solicitors' letters and marriage documents are all presented on paper. Thus, life experience leads people to develop a *schema* of what constitutes official communication, i.e. a mental model of what official communication is expected to be.

In Western culture, such a schema would typically involve a posted document which arrives in a sealed envelope and contains typed print followed by a handwritten signature. So pervasive is this schema for official communication that it is common for any tentative deal to be followed by the phrase "Can I have that in writing...?", to enhance the perceived legitimacy of the communication.

Although such schemata can develop and change (such as when new experiences provide information which goes beyond current understanding) they tend to be fairly enduring. They serve to help interpret the world from within the person's frame of reference, rather than attempting to understand each new experience without the benefit of prior learning. The use of an electronic medium to communicate important documents goes beyond the schema developed by most individuals and, irrespective of the actual security of electronic documents, this method of communication does not provide people with the same *sense* of security.

However, as time progresses, some people are becoming more comfortable with formal communication such as Internet banking and high-cost Web-based purchases. Therefore, providing their experience is not negative, they will already be adapting their schema of what constitutes official, legitimate and reliable communication. However, the Western world as a whole is still resistant to these changes and will probably continue to have more faith in a document which is well presented and arrives courtesy of the conventional postal system.

b) Faulty reasoning: Poor risk assessment?

The explanation above suggests that irrespective of the actual level of risk associated with electronic transfer of information, people are more likely to trust paper because of resistance to change and because they have not yet fully developed a schema for official communication which incorporates electronic delivery. However, further confounding the relationship between paper and trust is the existence of 'real' security risks associated with receiving electronic documents.

There is an enduring perception that electronic documents, particularly those delivered via the Internet, are not secure and carry a high risk of corruption. This obviously impacts on the recipients' confidence in the legitimacy of such documents. However, it is highly likely that the perception of this risk is distorted, in the same

way that prediction of future computer catastrophes is distorted. It is widely recognised that people are often unable to accurately assess risk and probability. Consider, as an example, the general approach to national lotteries, in which players consistently fail to correctly evaluate their chances of winning. In short, humans are masters of self-delusion where powers of analysis and insight are concerned. Arguably, the majority of decisions made by people are actually based on an amalgamation of inconsistencies, guesswork and bias rather than rational reasoning.

Not only are people conditioned to associate official and trustworthy documents with paper, but there is also a lack of understanding of the real risk level associated with electronic communication.

Again, it is plausible that these psychological phenomena may enhance people's trust in paper and hence diminish any willingness to rely on electronic communication.

Better the devil you know...

Even in this technologically-advanced age, people's enduring fondness for paper is undeniable. Rather than relying on electronic storage, documents are routinely printed. Paper continues to be associated with authenticity, legitimacy and authority, despite increased familiarity with electronic communication. The psychological factors which underlie people's relationship with paper are complex.

It is possible that this dependence on paper may reduce a little as familiarity with electronic information increases, since such familiarity is likely to reduce the skewed perception of risk associated with electronic storage.

In addition, the continuing development of reliable security and backup systems is likely to lead to a small increase in such trust. However, it is unlikely that electronic information will be perceived as being as 'safe' as paper in the short to medium term. This is because some of the psychological factors discussed above are less dependent on learning, but arise from more fundamental human characteristics such as the importance of touch when interacting with the world. What is clear is that as long as people continue to trust physical documents, they will continue to use paper in vast quantities, satisfying a basic need for security.

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Technology of Paper Trust

Jean Louis de la Salle – Lexmark Europe

This Chapter will explore some of the technological reasons behind the continued popularity of paper as a business medium, investigating existing and forthcoming technologies that may impact the trend of ever-growing paper consumption.

The technical benefits of paper

Paper is the baseline medium for information representation. The idea of displaying text or images on a physical medium has been around for thousands, even millions of years. From cave paintings to carved stone tablets to papyrus to paper, the purpose is the same; to create a long-lasting, easily legible record of an event, concept, artwork or transaction.

Contrast this with the technologies that would supplant paper, most of which are less than twenty years old, and it's clear that paper has a technological head start. It has been evaluated by billions of people over thousands of generations, so it seems likely that the simple white sheet of A4/Letter is the best technical fit for the market. The would-be competitors to paper have a lot of catching up to do in terms of development, market research and feedback.

Regardless of the technical merits of any new technology, history tells us that if it isn't in some way compatible with what's gone before, it's likely to run into difficulties.

Since paper is the dominant technology in its sector, any potential replacement has to maintain compatibility with it. Failure to do so would confuse customers and limit potential markets.

Paper versus electronic media

At this point it's worth exploring exactly what features paper offers in comparison with its would-be competitors. Among others, these include the fact that it requires no power supply, no boot-up time and no training to use (other than the basic education supplied by most nation states). Paper is universally compatible. Languages may vary, but the method of information retrieval from paper remains the same; simply reading what's on the page.

Paper is robust. It may not cope well with fire or flood, but neither will a PDA (personal digital assistant) or PC, and a piece of paper will survive the sort of rough handling, drops and extremes of temperature that would destroy most electronic equipment.

Paper can survive intense magnetic and electromagnetic fields without damage or interference, it is proof against damage by electronic viruses and it is largely secure; any alterations to a printed page can be detected with suitable equipment, whereas electronic documents can be manipulated and edited with no tell-tale signs. It's true that some forms of electronic data transfer can be made as secure as paper-based transactions, but high-profile security breaches and excessive complexity have set back the acceptance of digital signatures in the business world.

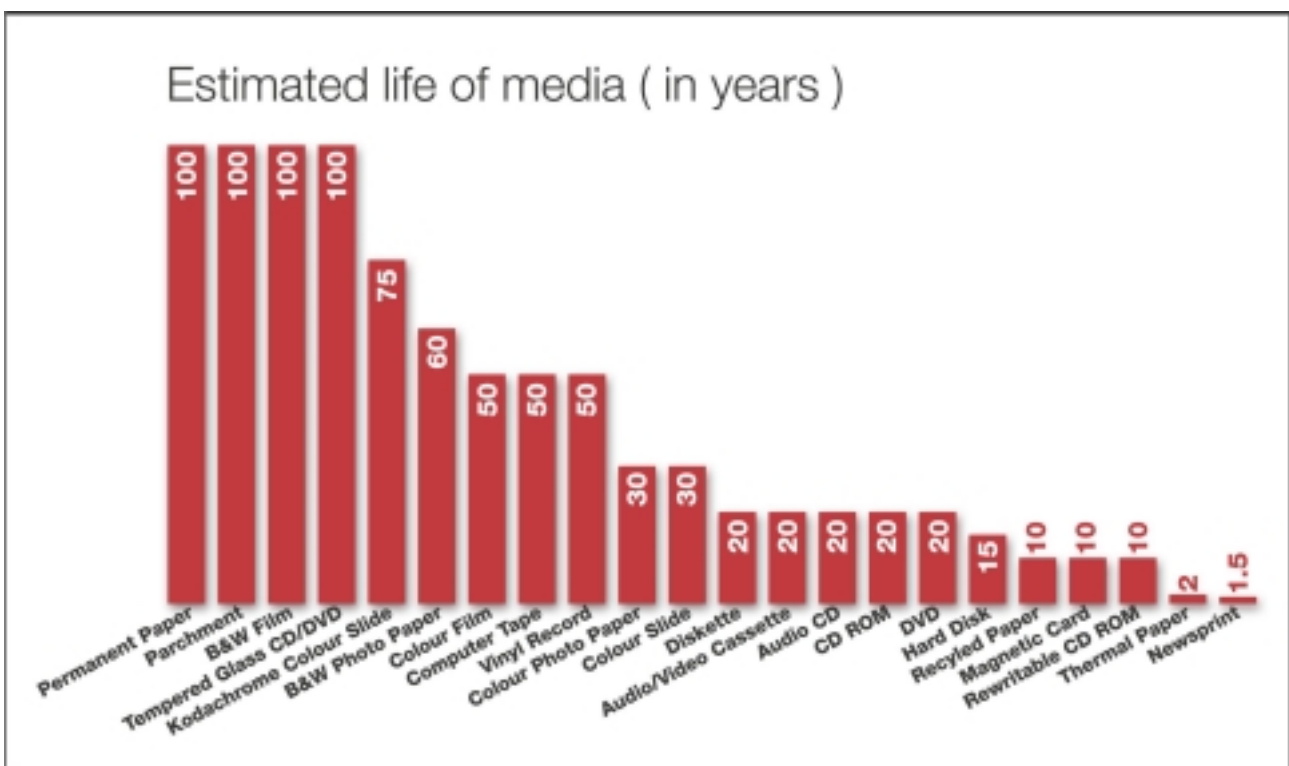
Expanding on these points, consider a direct comparison between a sheet of paper and an electronic medium such as a PDA or palmtop computer. Information on the sheet of paper is immediately accessible without the need for external power or batteries, while the PDA requires electricity and will take a few seconds to switch on. The sheet of paper can be accessed almost anywhere, while use of the PDA is restricted to certain areas; it can't be used on aircraft, in hospitals or in other areas where sensitive electronic equipment is in use. There's no learning curve with the piece of paper; once they've learned to read, nobody has to be told how to use a piece of paper, yet PDA use is restricted to a small percentage of the global population.

This is an important point. Technically-aware people have little trouble accessing the information on PDAs or desktop and notebook computers, but technically-aware people are in the minority in the world, even the business world, and will continue to be so for the foreseeable future.

Barring a dramatic change in political thinking in the developed world, lack of education and the high cost of technology will conspire to keep potential paper replacements out of local businesses in developing countries. In any event, the robustness of paper is hard to challenge in such environments. Extreme heat and cold, dust, humidity, strong electromagnetic fields and air-borne contaminants will quickly damage any unprotected electronics equipment, leaving paper intact.

Returning to the comparison, let's assume the PDA in question lasts for a decade or two. By then, the chances are that its operating system and applications will be completely obsolete, rendering the data stored on it inaccessible. For evidence of this, consider the fact that data stored on the computers of 15 years ago (such as the popular Amstrad PC1512 3-inch disk format, for example) can't easily be retrieved. Yet parchments written thousands of years ago are still legible today. In countries such as France, where payslips must be kept for life as proof of rights to pension payments, paper is the only practical, widely-available choice, as shown by the graph in Fig 2.

Fig. 2: Graph illustrating the estimated lifespan of various media types



Perhaps most important of all, paper doesn't crash. A single erroneous keystroke, computer virus or hardware failure can be catastrophic for archived electronic documents, but paper is not subject to such immediate and total destruction. Stationery companies don't sell document folders on the basis of their ability to protect the documents within - that's taken for granted - yet IT departments spend fortunes on multiple-level backup and security systems to prevent the loss of electronic data. The difference is striking; with electronic document storage some level of data loss is actually expected, while the durability of paper is taken for granted.

In addition, paper has little or no intrinsic value, so it can be distributed without worry about cost. Few people would write directions to a restaurant on their PDA and give it away to a friend or colleague, but parting with a piece of paper is of no financial consequence.

Yet the comparison is not entirely one-sided.

Electronic media have their benefits, of which capacity is one of the most important. It's possible to store the information contained in an entire library of books on a single hard drive that can be carried in a coat pocket.

This data can be accessed almost immediately, it can be encrypted to keep out all but the most determined hackers and it can be transmitted at great speed to almost any destination around the globe.

Electronic media allow businesses to disseminate information extremely quickly and with the minimum of expense. Lexmark's document management solutions, for example, allow a scanned document to be e-mailed, faxed or copied to multiple recipients automatically at the touch of a button. A newsletter can be sent to 10,000 customers in a matter of minutes via e-mail, and for very little cost, whereas a paper-based mailshot of that magnitude would cost thousands of pounds to produce, package and post. And while paper can be used to reproduce high quality photographic images, those images can't move; only electronic media are capable of producing and transmitting moving pictures.

Technology driving paper use

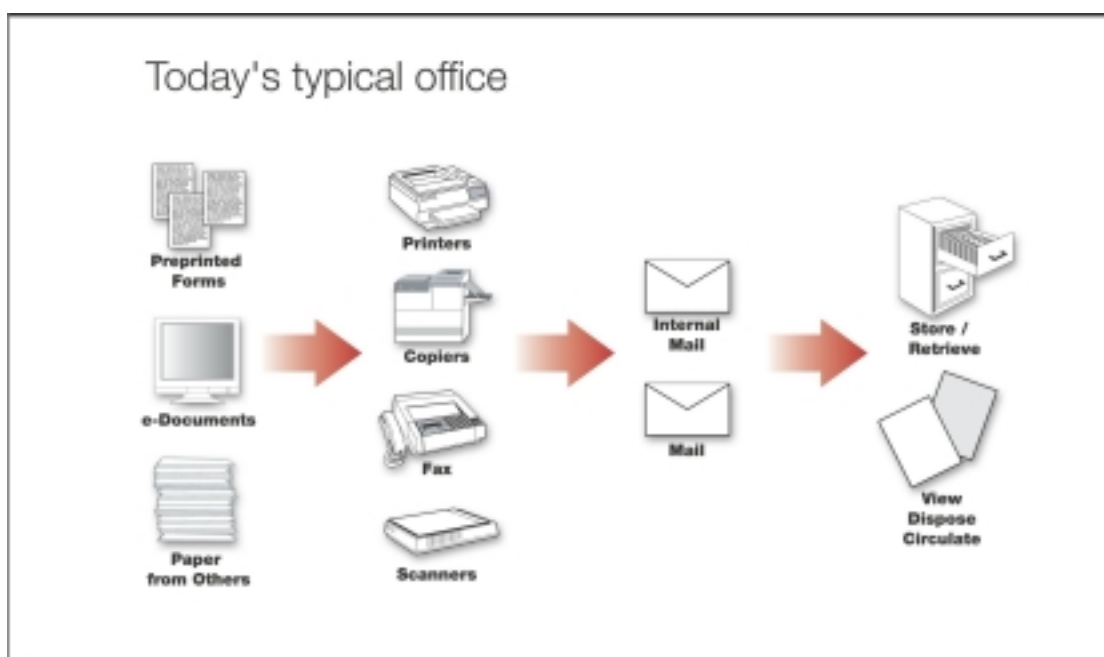
Do any new technologies increase the use of paper? It appears that those technologies which, at first glance, seem to have the potential to reduce paper usage are actually likely to increase it.

One obvious contender is e-mail. As stated in the introduction to this document, it has been shown that when e-mail systems are installed in an organisation, the amount of paper generated rises considerably. There are several contributing factors to this rise, but one of the most important is that e-mail facilitates communication. It makes it much easier for businesses to communicate instantaneously, sending not just text but graphs, spreadsheets, images and other documents.

Such communication is likely to have a positive impact on a company's business, by opening up new markets that previously would have been practically inaccessible either due to time differences or problems associated with conventional mail. This new business, coupled with the ability to transfer information more effectively within the company, will lead to greater use of paper, since a legally-binding paper trial covering all transactions is required by the majority of countries' governments and usually by the companies themselves too. In addition, employees are likely to want to print out the new information they receive and read it at their leisure or discuss it with others.

Continuing the communications theme, the popularity of mobile phones and their gradual convergence with PDAs has led to increasing numbers of businesses making use of such devices to transmit data rather than just voice calls. The barriers to entry are not inconsiderable; regardless of the manufacturers' claims, such devices are expensive, relatively hard to use and unreliable. Even if those problems are overcome, the fact remains that the screens on these devices are small; too small to comfortably read a long e-mail or business document. And so, once again, any documents transmitted via such devices are likely to be printed out at some point. The technology for printing from PDAs is still primitive, usually requiring the use of a PC as an intermediary, but assuming this situation improves, PDAs can only increase the amount of paper used by businesses (see Fig.3).

Fig. 3: Diagram illustrating the working of today's typical office environment



This, then, is an important and recurring theme; any technology that increases the ability of businesses to communicate efficiently is likely, at least in the short term, to increase the use of paper. This state of affairs is unlikely to change until such time as all governments accept fully-electronic accounts and audit trails, and technologies exist that can vie with paper in terms of longevity and information integrity.

Technology that could reduce paper use

Accepting that some business practices can increase the use of paper, are there any areas in which paper consumption is actually being reduced? The answer is a qualified 'Yes'.

Although existing technologies appear to be driving paper use, there is scope for paper reduction in the near future.

Some industry watchers believed that the growth of multimedia might help to reduce the use of paper, by encouraging businesses to distribute video and audio files - arguably much richer forms of information exchange - rather than plain text and graphics. But as businesses quickly discovered, creating content-rich video and audio files is a lot more expensive and time-consuming than typing a page of text. In any case, bandwidth considerations mean that text is still the most efficient form of electronic medium. A picture may paint a thousand words, but it takes a lot longer to download, by which time the message may have been lost.

One of the oldest office technologies, the fax machine, has survived so long not because of its convenience or image resolution, but because it can provide a physical, proven record to act as a receipt for legally-binding documents.

Without getting into complex Public Key Infrastructure (PKI) arrangements, there's little that electronic documents can do to compete with that integrity. Despite various governments' enthusiasm about digital signatures, few businesses feel the urge to make this transition, and so another technology that could potentially reduce paper use is failing to do so.

Colour office printing has the potential to increase the amount of paper used, but in practice it seems that this isn't happening. Documents that were printed in monochrome are now being printed in colour, which is improving the transfer of information, but there's no evidence that additional pages are being printed specifically because business colour printing is now available. One reason for this is

that IT departments tend to keep tight control of colour workgroup printers, so this situation may change as the cost of colour printing continues to fall.

Digital photography has the potential to reduce the amount of expensive, coated paper used by development labs worldwide, by replacing standard photography. Yet consumers have been slow to move towards the idea of viewing their photographs on a monitor or TV set.

Most people want to print their digital photos and share them with friends, not store them electronically. And so digital cameras, far from reducing the amount of paper being used, are actually increasing it.

There have been moves, mainly within the IT industry, towards eliminating paper documentation from packaging and replacing it with electronic manuals stored on CD. This practice, which has been encouraged by Lexmark for many years, generally works well for computer software and hardware, assuming the target user group is sufficiently knowledgeable to access the information. But it's not appropriate for white goods, home entertainment equipment, cars and other items, so its impact on the overall consumption of paper is relatively small.

Forthcoming technologies

In the longer term, however, there are more encouraging signs. The two emerging technologies that might clearly have the potential to reduce the amount of paper used by businesses and consumers are 'electronic paper' and 'electronic document management.'

Electronic paper (such as Light Emitting Polymers and similar rewritable film) could significantly reduce the need for conventional paper. Several companies are investing heavily in these technologies, and although they are currently at the development stage and are therefore expensive, low yield and inflexible, that looks likely to change as the economies of scale begin to take effect.

Electronic paper has the potential to be almost as thin as conventional paper and yet display fixed or moving images, often in colour, with very low power requirements. It could be nearly as flexible as paper is today, and may eventually replace books,

newspapers, magazines and various signs and labels, cutting down considerably on the amount of paper that is both used and discarded on a daily basis.

Even so, it is likely to be at least a decade before electronic paper is in common use in developed countries, and it's debatable whether costs will ever be comparable to those of conventional paper. But this is one type of technology that appears to have the potential to reduce the use of paper.

A more immediate means of reducing paper-related costs is being championed by Lexmark and other document companies. Electronic Document Management Systems (EDMS) have the potential to dramatically modify paper use and associated drawbacks, and they are available today.

With an estimated 80% of all documents now created digitally, and with twice as many business documents being created this year as there were five years ago, it makes sense to bridge the gap between paper and digital documents. EDMS does this, by turning the conventional approach to printing on its head. Instead of printing and then distributing documents, EDMS allows businesses to distribute and then print. The data is kept electronic until the last minute and then only printed when required.

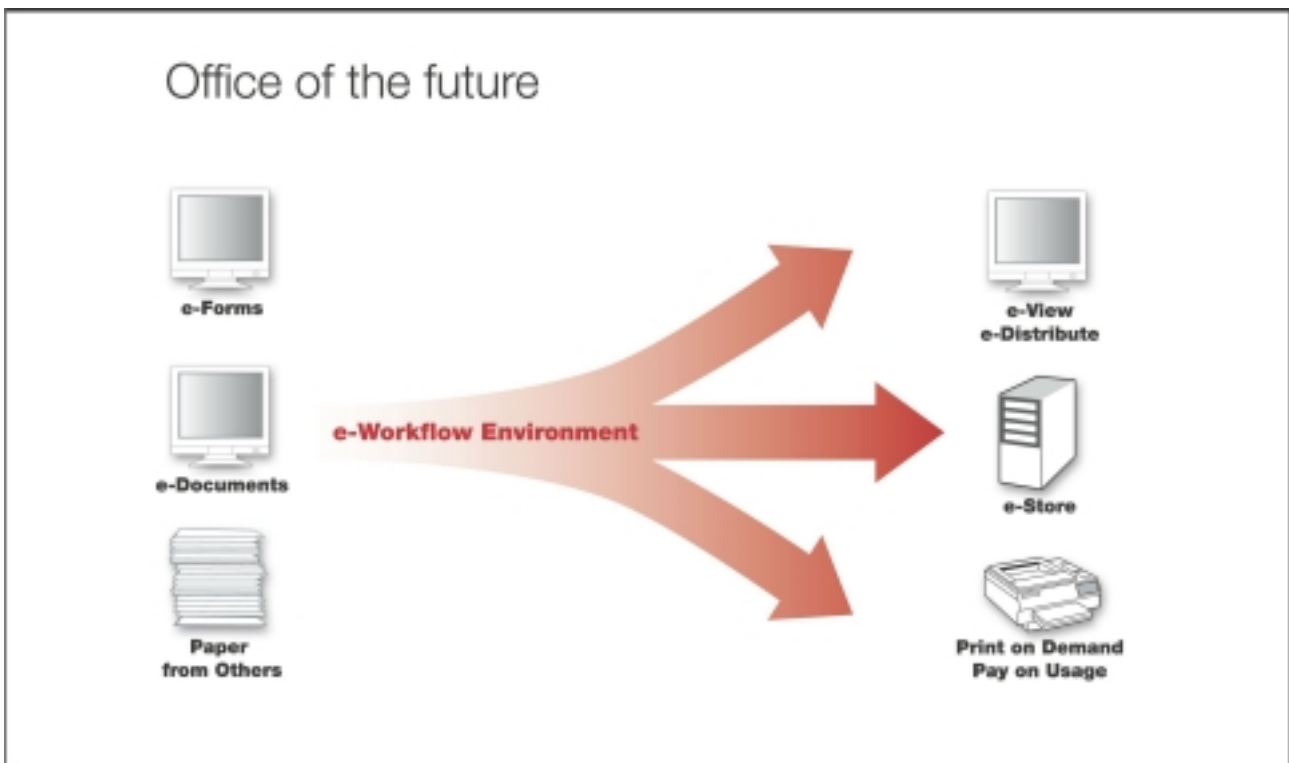
The technology to manage this involves products such as Lexmark's Document Distributor. Using this tool, scanned documents can be automatically routed to e-mail in-boxes, databases, Web sites, remote printers or any other recipient device. Scripts can be used to determine which documents go where, with additional software handling larger processes to many more recipient systems.

The EDMS approach extends to smaller organisations too. The number of pages being photocopied by businesses has dropped significantly over the last five years, as office printers and in particular MFPs (Multi-Function Printers, which combine scanning, printing, faxing and document management features) become more advanced and less expensive. Lexmark's MFPs help to eliminate some of the physical drawbacks of paper such as transportation costs and lack of instant availability, by distributing scanned documents electronically. We see paper remaining pervasive for its psychological and cultural attributes (as outlined in the two other articles). At Lexmark, we want to clearly outline the functionality of paper and offer new and better functionality. This makes sense both by reducing the cost of doing business, and being accepted by the users.

By keeping documents in electronic format as long as possible, organisations can reduce cycle times, improve productivity, improve customer service, enhance financial performance and gain strategic advantage by reducing total operating costs and accelerating the delivery of new products and services to customers.

As this message sinks in, intelligent paper management is likely to increase (see Fig.4).

Fig. 4: Diagram illustrating the workings of the typical future office environment



The forecast

Numerous studies, notably by EDSF and Xplor, have been carried out worldwide investigating the use of all types of paper, even including wallpaper. In most cases, the purpose is to discover whether new markets are appearing and old ones disappearing. While there is evidence of some fluctuation - the use of newsprint, for example, has declined as more people get their news from the Internet - there is no evidence of new markets emerging.

The growth in the use of paper is generally perceived to be tied to the growth of business in general. When the economy is healthy, paper use goes up. When the economy suffers, paper use goes down.

Ultimately, then, it appears that paper is unlikely to be supplanted in the near future. While there are some types of technology that help businesses to use paper more efficiently, the majority merely encourage communication and so lead to the creation of more documents. No existing or predicted technology can offer all the benefits of paper - robustness, integrity, simplicity, portability and compatibility - at such a low cost.

However, paper use can be reduced in specific areas. Electronic Document Management Systems, distributed printing and, in the future, electronic paper technologies, all have the potential to manage information exchange more efficiently, only using paper as the final link in the data chain. This fact could help keep the balance, ensuring that the amount of paper used remains constant rather than continuing to grow.

References

All statistics, except where otherwise stated, are based on research by Lexmark. **The Electronic Document Systems Foundation (EDSF) and Xplor** (2002), *Documents of the 21st Century*. www.xplor.org

In summary...

The three chapters of this report have described different aspects of paper use - business, psychology and technology. None of these is complete on its own; all must be taken into account if the full picture is to be revealed. Some previous attempts to explain the continuing business use of paper have foundered because they've only considered one or two of these three aspects.

However, there's a lot of information to assimilate from the three chapters, so it's helpful to reiterate the conclusions of each in turn. At the same time, it's useful to attempt to extrapolate these conclusions and predict future trends, drawing on Lexmark's considerable experience in business printing markets.

Business considerations towards paper are not consistent across Europe. On the contrary, companies in different countries can have very different attitudes towards the role that paper has to play in the office. Variations occur even within companies, with some people being far more comfortable with non-paper documents than others.

Given the interconnection of European businesses, any changes to the Europe-wide paper infrastructure will have to progress at the pace of the 'slowest' technological mover, which will hamper the replacement of paper as a fundamental business tool.

Not that there's much development in this direction anyway, as is shown by the buoyant Europe-wide sales of printers and MFPs (multi-function printers) and the ever-growing demand for paper.

From the psychological perspective, some potential reasons for this reticence to remove paper from the business environment can be found. If theories of evolutionary psychology are to be believed, humans have had millions of years with which to become comfortable with tangible, touchable documents - our haptic perception is of extreme importance to us. Intangible documents are simply not as 'real' to our minds, while our risk assessment is perhaps a little awry when it comes to trusting 'virtual' documents not to disappear at a moment's notice. Only a significant amount of time is likely to change these perceptions. In addition, electronic documents will have to become far less prone to loss, destruction and alteration if they are to be accepted by people as being worthy replacements to paper. Lexmark's

attempts to reduce paper use - by encouraging multi-up and distributed printing, for example - can help to strike a balance between paper consumption and psychological necessity, but only a true change in the reliability of technology will make a major difference to our perception of electronic documents.

This brings us to the technicalities of paper. Are there any reliable paper-replacement technologies either available or on the horizon? The message here is mixed. Various technologies are practical within their own niches - PDAs, mobile phones, laptops and so on - but none is as durable, long-lasting or easy to use as paper. Perhaps the best evidence of this is that whenever computers, PDAs, e-mail systems or laptops are introduced into an environment, printers are not far behind. Furthermore, technologies such as electronic paper are some years away from being practical, although they do have the potential to be beneficial. On a shorter time-scale, EDMS and distributed printing can introduce more sensible paper use into an organisation and could reduce the overall requirement for paper.

Applying Lexmark's experience to the conclusions of the three chapters in this report, it is clear that the market for paper-oriented devices is going to remain strong for the foreseeable future. There is as yet no single replacement for paper that combines all of its business, psychological and technological benefits in such a low-cost package. As long as worldwide economies remain strong, so paper use is likely to continue to grow. However, companies such as Lexmark are leading the way in attempting to rationalise the use of paper by encouraging more intelligent printing through EDMS, distributed printing and electronic paper.

More information about Lexmark's intelligent printing concepts is detailed in Appendix A, **Lexmark's View of the Future of Printing - The Growth of Distributed Output**. For details on the full range of Lexmark business printing products, please contact <insert local contact details> or visit www.lexmark.co.uk

APPENDICES

- **Appendix A** – The Future of Printing – The growth of distributed output
- **Appendix B** – The Business reasons behind the endurance of hard copy across European cultures
- **Appendix C** – Biographies for Prof. Terence Jackson, Dr. Peter Clough and Jean Louis de la Salle



Lexmark's View of the Future of Printing – The Growth of Distributed Output

The impact of technology on printing

Printing costs more than you think. New technology and electronic communication is quietly adding millions of dollars to the operating expense and capital spending of the world's businesses. Companies and consumers spend more than \$75 billion a year on printers, copiers and fax machines. That's more than is spent on enterprise storage, servers, or even notebook PCs.

The \$75 billion figure is surprisingly high to some, until they learn that last year about three trillion pages were printed in the home and office. If each one of those pages were placed end to end, they would circle the distance between the earth and moon more than 1,000 times. And this volume is still growing.

While the three trillion pages printed in the home and office may be a staggering amount, it's only 5 percent of the total paper usage around the world, which includes such staples as books, magazines, newspapers, government reports and customer statements.

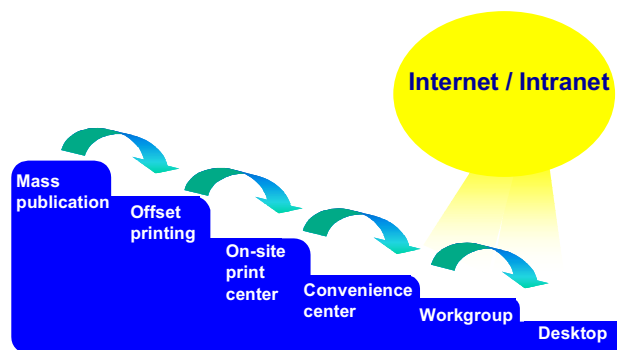
Total paper usage has been steadily growing from about 55 trillion pages in 1995 to about 60 trillion in 2000. Lexmark's view is that the world's total paper consumption may have peaked and that by 2010 levels may be back to 1995 levels. This will be driven by the phenomenon we call "the waterfall of pages."

Waterfall of pages

As increasing amounts of information move online and the Internet becomes more ubiquitous, content can be electronically transported to end users. As a result, information that once was printed in centralized environments is now bypassing mass production and being transported directly to users. Those users can then decide to print that information, but they will do so only when and where they need

This flow of information down the "waterfall" toward distributed printing environments results in the user having a greater role in deciding what gets printed and when. This phenomenon does not portend the demise of newspapers magazines, but many of those pages will be reduced and shifted down the waterfall where they will be printed on demand.

Waterfall of Pages



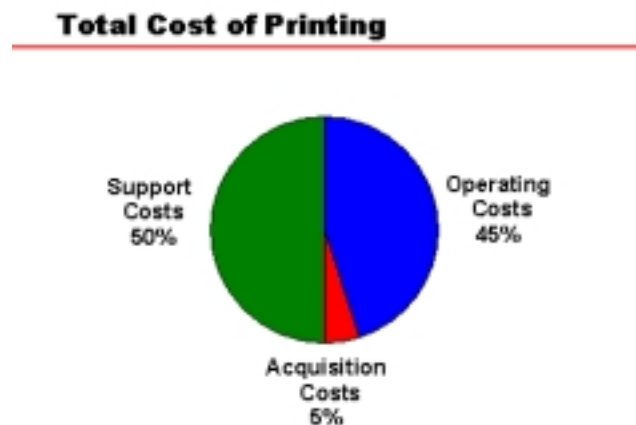
do
it.
end
and
be

So, even though overall paper usage is coming down, the distributed printing in the home and office will significantly increase. Instead of being 5 percent of total paper usage, distributed printing could represent 10 to 15 percent or more of total paper usage by 2010. That would mean an increase from the three trillion pages being printed now to possibly eight trillion pages by 2010. So the Internet is driving a significant increase in distributed printing, the vast majority of which (95%) will be printed in the office, "on that corporation's nickel."

The Internet is not the only factor that will contribute to the rise in distributed printing. The creation of business documents is increasing. Paper documents still exist and are growing. The number of digital documents is increasing so rapidly that it has now surpassed paper documents. Users often read documents on the screen and delete them. However, much of the time, users prefer to print the copy for flexibility, archivability and portability.

Total cost of printing

Since it is clear that networking technology is actually increasing office output, there are implications of that trend that businesses must contend with — chief among them are printing costs. Over the life of a printer, its acquisition accounts for only 5 percent of the total cost of ownership. Forty-five percent will be spent on operating costs and 50 percent on support costs. However, the majority of businesses focus on the initial cost versus the post-acquisition expenses. In fact, most companies do not know how many printers they have, how many pages they print or what the utilization level of the devices are. The reason is because it's not that easy to track if you do not have any tools. For companies, it's impossible to manage costs if they cannot be tracked.



At least 30 to 50 percent of printers are underutilized with 20 to 30 percent of the equipment being over utilized — all of which affects service levels and user satisfaction. There's also a lot of duplication between personal printers, network printers, departmental copiers and central reproduction. A lot of print jobs are also being sent to outside companies. Usually, it's clear that 20 to 30 percent of equipment could be removed and the overall service levels improved. The key is to match the right equipment to the right workload.

Gartner has reported that on the average, companies spend 1 percent or more of revenue on hard copy output, and that the savings opportunity is 10 to 30 percent of that. Lexmark has found that typically distributed output represents 20 percent of corporate output and has significant savings opportunities. However the opportunity is more than just cutting cost. There is opportunity to improve paper intensive processes, which will cut process cycle times and improve user productivity.

Today's company

Most companies are investing internally in e-business initiatives by installing infrastructure first and then looking at how to leverage the capability. The office of today is overflowing with paper that flows in from other people or from electronically transmitted documents. There's also the endless use of forms to run a business.



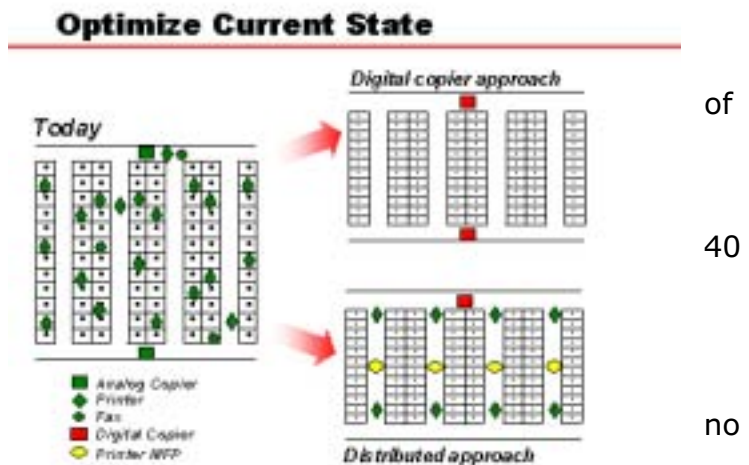
Today's office is filled with devices to handle all of this paper. The paper is usually read and then filed, thrown away or sent to someone else for the cycle to continue. By leveraging e-technologies, companies can significantly streamline processes, thus changing the way the office works. In this office of the future, content will move electronically. Information recipients will either view it, store it, pass it on electronically or print it, but users will only print it on demand when and where they need it. In every case, it will be very close to the user to

maximize productivity.

Most companies are a long way from this office of the future. They have an abundance of paper and equipment. Even though companies are investing in e-business infrastructure, there are hundreds, sometimes thousands, of paper-based processes. Companies are spending a significant amount of money on just supporting equipment, some of which is already past its end of life. It's hard for companies to improve or manage this because they don't have the data they need nor the tools to measure or collect the information. It's also hard for some to envision the future state. In most companies, information technology, facilities and purchasing all share some of the responsibility, but none have enough time or the resources to focus on a cross-functional responsibility.

Moving to the office of the future

In order to move toward the office of the future, companies need to assign the task to one organization or empower a small cross-functional team. That organization should review all of the company's printers, copiers, fax machines, equipment, supplies and service. They must look at the total cost ownership in each of these cases, including support for each of these devices. Print-related issues can often account for 20 to percent of the calls received by a company's help desk. The assigned team should have a clear objective of quickly reducing cost. There should be additional cost, rather an immediate cost reduction.



The second step is to start collecting information. Print statistics, utilization levels and a view of the total cost of printing are needed. Network software is available to assist in this data gathering.

Once a company has the data, it's ready to cut cost. The data will show there is too much equipment and where that equipment is. Most offices are overflowing with equipment, but the users are content with the proximity of the printing devices and the convenience. It's easy to consolidate and cut cost by replacing all of the devices with big digital copiers/printers, but user satisfaction and productivity may suffer. A better alternative is to mix distributed workgroup printers with printer-based, multifunction products and fewer digital copiers. The significant difference is user satisfaction with a user/device ratio of 7 to 1 versus 50 to 1 and companies still receive the same cost savings.

The electronic evolution

The next step is to focus on moving all information inside the business electronically. This will cut costs, cut cycle times and, more importantly, improve productivity. Electronic forms is one way businesses can move into the future. Preprinted forms can be eliminated and information can be moved electronically. Processes are sped up, millions of dollars are saved – all by printing only if needed and at the end of the process. Electronic on-ramps give businesses the ability to move from paper to electronic. Repetitive paper processes can be alleviated by electronic routing. Besides just moving documents to digital form, businesses can scan a document once and with the touch of a button electronically route it within the business and even use a predetermined distribution list. The routing can be completed by either typing in a person's name or e-mail address on the printer's touch screen keyboard. The document is then sent electronically and the paper can be thrown away.



It comes down to saving money

Companies have the option of ignoring the potential savings, looking internally for resources to manage it or look externally for someone to provide managed print services. If they choose the route of increased productivity, the company should expect to reduce cost by at least 20 percent. Companies should also have a dedicated resource to continuously analyze data and evolving needs in order to continue to drive cost savings. They should also expect to have an improved level of service and productivity and a strategy to integrate paper intensive processes. Working with an expert who can manage this important business function is often the most effective way to reduce the total cost of printing and streamline document processes. Lexmark has the tools, equipment and expertise to take any business to this future state of printing.

The Business Reasons Behind the Endurance of Hard Copy Across European Cultures

Dr. Terence Jackson

ESCP-EAP European School of Management

Introduction

The objective of this study is to provide an indication of common trends across European countries, and differences among them in the business use of hard copy within the 'paperless office'. In particular a small-scale empirical study was undertaken across Italy, Netherlands, Spain, UK, Germany and France. Although this articulated among respondents a general motivation to move towards the paperless office, there were identifiable dimensions within business practices that posed paradoxes in the use of paper versus electronic media. These were:

- Formality versus informality in communication
- Speed versus permanence in documentation
- Content versus form in presentations
- High versus low intricacy in nature of information work
- On-screen versus off-screen draft and revision processes
- Too little versus too much in the volume of information
- High portability versus low portability of information
- To use versus not to use technology in the organizational hierarchy

There were differences among countries in the reliance on papers (Tables 1 and 2: although caution is urged in interpreting these differences because of relatively low sample sizes):

- France, Germany and UK were generally less reliant on paper than Spain, Italy and the Netherlands
- Spain and Germany were more reliant than the other countries on paper for internal memo communication, although the general trend was for less paper and more electronic communication
- Italy and Spain took more paper away from the office than the other countries in terms of working at home and on the move
- Germany and France were less reliant on paper than the other countries when making external presentations, but German reliance on paper rose in internal presentations, and France's decreased.
- Meetings generally consumed more paper than other activities, but such use in Spain and the Netherlands was particularly high.

The Study

Alumni of the European School of Management (EAP)¹ were emailed with the request to return the email after completing a short questionnaire. This followed a pilot longer questionnaire to a smaller number of alumni that only elicited a limited response. This heralded a generally low response rate with the final emailed questionnaires that is not uncommon in email surveys². Indeed, the Alumni Association officer in Berlin

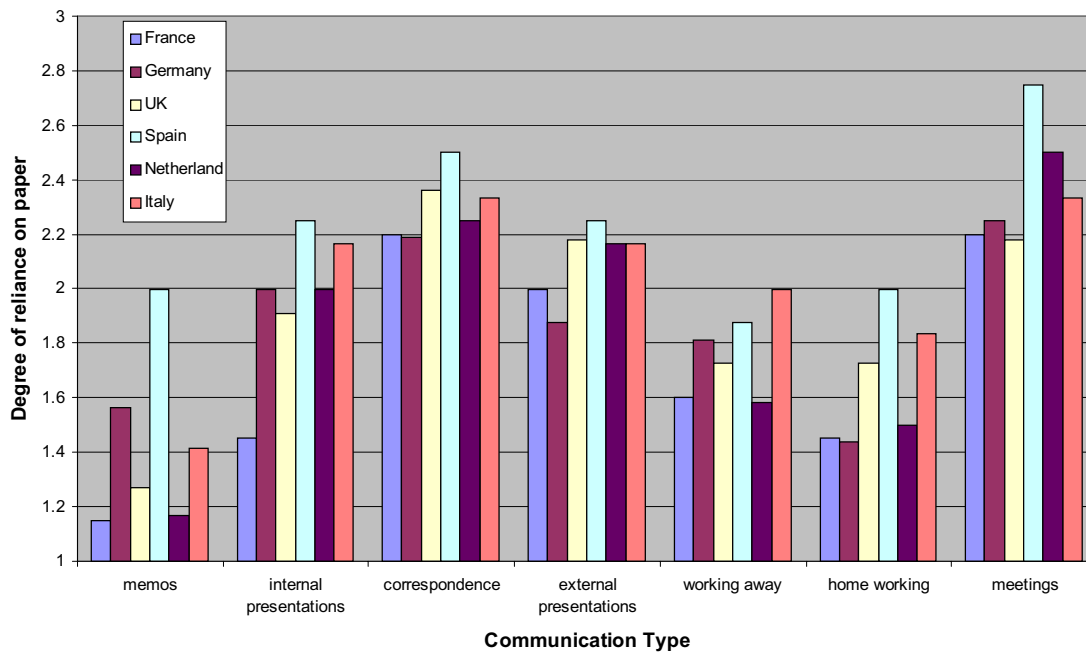
¹ A four country graduate management school whose main programme of a three-country, three-language masters is now merged into ESCP-EAP European School of Management.

² In the current study the response rate was around 15% as a crude average with as low as 11% from France where no follow-up was made; although after follow-up, and asking respondents to contact colleagues in other companies high return rates were obtained from Italy and the Netherlands, whereas the lowest in real terms was from Spain with only

suggested that the normally low response rate that they experience among EAP graduates is probably due to the large volumes of emails that people have to handle in any one day. It is likely that EAP graduates work in offices that are at the forefront in terms of high technological developments, and that they are abreast of such developments. Many work in financial institutions, consultancies and IT related industries, although a full range of industries was represented in the samples obtained. The management of high volumes of electronic information is one of the themes that has emerged from the current study.

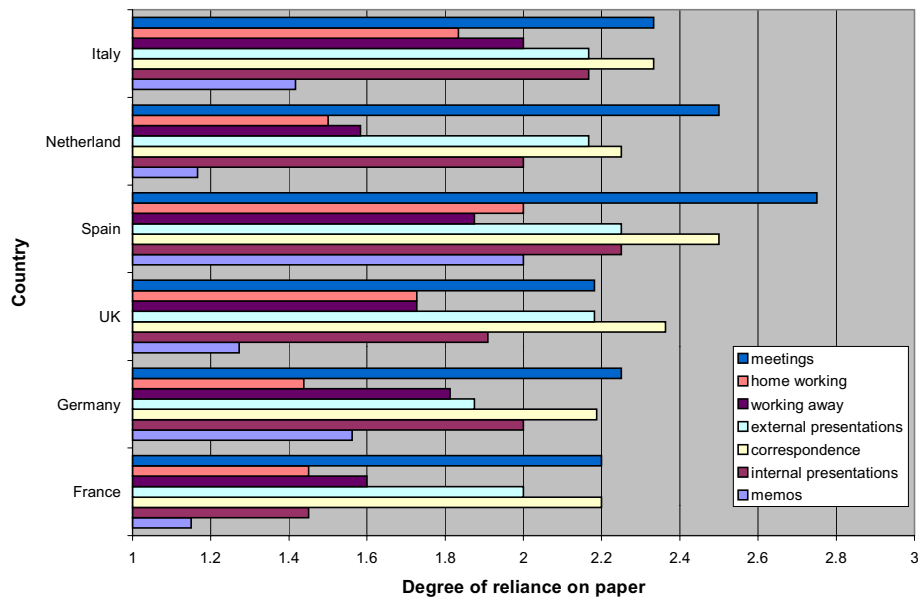
The questionnaire asked respondents to indicate in their office in which circumstances do people rely more on a printed document rather than an electronic version, in the following areas: sending internal messages and memos; doing presentations within the organization; corresponding with customers, clients and suppliers; doing presentations to clients; working away from the office; working at home; and, going to meetings. Possible responses were: a lot, a little, and not at all. These were subsequently scored 3, 2 and 1 respectively. Results from this part of the survey are shown in Tables 1 and 2. The questionnaire further asked respondents to give their free responses to the questions: In what specific use or areas have paper hard copies increased the most? In which specific areas have they decreased the most? What do you think are the specific reasons for these trends?

Table 1: Degree of Reliance on Paper by Communication Type



17% of the original numbers being returned after intense follow-up procedures were followed. This provided the following samples: France 20; Germany 16; Italy 12; Netherlands 12; UK 11; Spain 8

Table 2: Degree of Reliance on Paper by Country



Towards The Paperless Office?

Business intentions may not be the same as business practices. Specific denials that the use of paper has increased, and assertions that this has in fact decreased, were obtained from respondents in Italy, Netherlands, France, Germany and Britain. In fact when asked in which areas has paper decreased one Spanish respondent said 'Paper has not decreased', although other Spanish respondents indicated that it had in fact decreased in internal communications. In cross-cultural studies, Spain is perceived as having a relatively high 'power distance', representing a bigger dependency on hierarchy, and a relatively higher 'uncertainty avoidance' or need to avoid ambiguity and uncertainty³. This may help to explain a greater persistence of the dependency on paper copies in the office. Paper may represent a higher level of formality within organizational processes. There is also the possibility that developments in technology infrastructure may be slightly lagging behind in Spain than the other high power distance and uncertainty avoidance countries of Italy and France, which again may in part explain why the paperless office may be seen as a more distant reality in some Spanish companies. Certainly a wider scale study is suggested in order to provide a greater understanding of trends in Spain.

In the other countries: 'Paper hard copies have diminished, but emails have increased a lot' (Italy); 'In my working environment the use of paper hard copies tends to decrease not increase' (Netherlands); 'I do not know an area where this has increased' and 'I haven't noticed any increase' and 'None - we are driving the paperless office' (Germany); 'I am not aware of a single area where the usage of paper copies has increased' and 'If anything our use of hard copies has decreased' and 'I think it has decreased everywhere' (UK); and in France five respondents said quite categorically that there have been no areas of increase. So there is a general expression of the intention to move towards a paperless office. This may be driven in

³ Geert Hofstede (1992) Cultures and Organization: Software of the Mind, London: McGraw-Hill. Uncertainty Avoidance is an aversion to ambiguity and uncertainty, and a need for rules, regulation and formality. Later mentioned is Power Distance, which indicates the levels of acceptable inequalities, and the distance between hierarchical levels in organizations. Long versus Short Term is another dimension referred to later which contrasts the long-term perspective of, for example the Japanese, and the short-termism of American business.

part by cost savings, but also practical implications: 'We are working towards a paperless office so that our archiving is more efficient and so we use less space in the office and our filing is easier' (UK). But there are also dilemmas and choices in business practices that may on the whole work against the ambition of a paperless office. Furthermore, these choices may be seen differently in different countries in Europe.

Formality versus Informality in Communication

One of the strongest themes to come out of this study is the difference that the perceived formality or informality of a communication has on the use of paper. This was discussed above in connection with the apparent higher dependency on paper in Spain. In the study as a whole this is most noticeable in the assertion that the use of emails has generally increased, and paper memos generally decreased in the more informal internal situation of the organization; and, that paper is still generally used when corresponding with external clients and customers (see Table 1). Yet there still appears to be a higher use of paper in internal communications in Spain and (to a lesser extent) in Germany. Germany is another European country that was found by Hofstede to be higher in uncertainty avoidance than the UK and Netherlands (yet lower than Spain) and therefore may be expected to favour a higher formality in business dealings⁴.

Although most of our respondents from Spain said that this was the area that paper had decreased the most, one respondent said that paper had increased the most in 'print-outs of emails which are kept as hard copies' and another from Spain said this is used in a 'library for the next generations of executives'. This was also mentioned by a respondent in France. More significantly a respondent from Germany said that paper had increased the most through 'printing out tons of emails'. So, although it is likely that internal communication has seen a reduction in paper, archiving is important, and this is discussed in the second theme below. In external communication, a criterion for use of paper appears to be the need for legal considerations as one might expect. This was mentioned by a number of respondents, and there appears not to be differences in the general use of paper for external correspondence among the countries (Table 1). However, one respondent from the Netherlands indicated a growing trend: 'In my job we rely a lot on legal documents (credit agreements, assignments, pledges and so on) and as the business world is moving more and more towards US or English law in documentation for international deals, so the use of paper increases (US and English law documents are much 'heavier' than French, Italian, Spanish, Dutch and German law documents)'.

Speed versus Permanence in Documentation

One of the main reasons given for the increase use of electronic versus paper internal communication was speed and convenience. Yet this is countered by the lack of permanence of electronic media, although different respondents saw this differently. For example, by contrast to the respondents from Spain and Germany above whose offices kept hard copies of emails, a respondent from France said that 'paper copies of internal emails are made, although e-versions remain for archives', and one from the UK told us that 'there is an effort to decrease the use and storage of paper copies all over the place'. One Italian respondent also said that paper had decreased the most in 'archives of customers and prospects-customers'. This may be a result of an 'increased computer storage capacity' as one respondent from France suggested, but

⁴ This is also supported in the general cross-cultural literature on management in Germany, as can be seen in Jackson, Terence (2002), *International HRM: A Cross-cultural Approach*, London: Sage, chapter 9.

a related issue concerning speed versus permanence, is that of the reliability of electronic media. One respondent in France told us: 'I think commercial communication is still done on paper in parallel to electronic means, as there is a risk of not reaching the customer through online means'. The fact that paper copies of emails are kept, and that paper copies are sent to customers just in case they do not receive the emailed copy may be a function of a 'belt and braces' way of doing business that may be more typical of those cultures described by Hofstede⁵ as high in Uncertainty Avoidance on which dimension France, Italy, Spain and Germany are said to be high, and UK and Netherlands low. This may also relate to the perceived formality versus informality of the situation as discussed above. Yet one respondent from Spain told us: 'employees are not yet used to finding electronically stored information due to poor filing standards for information that should be available to all: people prefer print-outs in old-fashioned files'. This may well be a function of high uncertainty avoidance, or simply a reflection on the level of take-up of technology.

Content versus Form in Presentation

Hard copies appear to be relied upon more where the appearance of the communication form is important, such as in presentations and sometimes meetings. Even alongside on-screen presentations, paper copies are seen as an important supplement. For example, a respondent from France said that paper had increased most in the area of 'presentations to customers, especially in professional brochures and copies of Powerpoint documents'. A respondent from Germany put it more succinctly when saying that reliance on paper had increased in the area of 'reports, project presentations – everything that is "final"'. Yet others (from Italy, Netherlands, France, Germany, and UK) said that paper had decreased in these areas, and there was a bigger emphasis on on-screen presentational media.

Some respondents were concerned that because of the increased sophistication of word-processing and presentational software, form is seen as more important than content in communication. Hence technology creates paper documents that may be lacking in content, but are good looking. This from a respondent from Germany: 'Form seems to be something more important than content. In this way the percentage of time spent on form is increasing. Other aspects like content but also personal aspects like relationships with clients are often underestimated'. But this could apply equally to electronic media as well as the sophistication of paper presentations. In cross-cultural studies UK managers have consistently been seen as placing an emphasis on form rather than content in communication. For example, in contrast to French and German managers Adler said that British companies aim to recruit manager who are able to create the right image and get noticed. Communication skills are seen as far more important than in France and in Germany. In the former, managers are labelled as high potential because of their prior education and what they are assumed to know. In the latter managers are technical experts, and again focus on what is known, rather than making a good impression⁶. This may provide some explanation for a German concern that form is overtaking content in communication.

If form takes over from content presentation, the level of detail and intricacy of the information content seems also to be an opposing factor in influencing the production of paper.

⁵ Hofstede (1992)

⁶ Adler, N. J. (1991), *International Dimensions of Organizational Behaviour*, 2nd edition, Boston: PWS-Kent.

High versus Low Intricacy of Information

In the responses obtain from our survey there appears to be an association between the level of detail and intricacy, and the need to print out a hard copy. Put simply by a respondent from Italy 'It is easier to read a document when printed', and from Spain: 'paper has increased the most when there are figures to be analysed'. In fact this was a general theme from many of the respondents from Spain. Where there are listings, data reports, and detailed documents of any sort, paper increases correspondingly. As well as the one respondent from Italy, also referring to this aspect was one from France, and one from Germany. Again, it could be suggested that this may be related to a 'comfort zone' within a low tolerance of uncertainty (Italy, Spain, Germany and France), as this aspect is not mentioned explicitly by respondents in Britain and the Netherlands (said to be low uncertainty avoidance cultures). In fact one respondent from the UK says that this is an area in which paper copies have decreased. Two respondents from the Netherlands mentioned that it is the availability of better computer screens that encourage more intricate work on screen. Yet there is another factor, mentioned among others by a respondent in the Netherlands, that encourages the printing out of a document.

On-screen versus Off-screen Draft and Revision Processes

This respondent tells us: 'overall I would say that the use of computers has made it easier to exchange information on a paperless basis, but perversely this has led to a huge increase in the use of paper, because it is easier to make alterations on a document on a screen and print it every time there is a change rather than work on a paper document and make several amendments to the paper version before modifying it on screen and then printing it again. So it is the very simplicity of making changes on screen and then printing the document that has led to an increase use of paper'. Similarly a respondent from Italy said that 'thanks to printing performance it gets easier and easier to print drafts, which you then throw away', and one from the UK told us that paper copies have increased for 'drafting, as prepared documents can be redrafted over and over again: mark-ups are still mostly done on paper'. This aspect, and its relationship to final presentation quality, is explained by a respondent from Germany: 'in order to create professional presentations, the presentations are printed out before hand multiple times to review quality and make changes accordingly. Review cycles can become very long, depending on the situation (importance and time available)'. This way of working does not appear to be one that varies across countries.

Too Little versus Too Much in the Volume of Information

There is no doubt that information technology has increased the volume of information. Indeed, we mentioned at the beginning that response rates to email surveys are not good because of the constant bombardment of emails. One respondent from the Netherlands said: 'if you really want to make sure someone sees it, print it out and stick it under their nose'. It may be that people are more and more suffering from information overload. In France, one respondent said that 'there is a situation of over-communication, without simplifying the content to allow for this increase'. But the converse of this is that the thirst for information is in part fuelled by the amount of information available. Hence another respondent from France told us that paper has increased from 'company reports and information provided by online databases and research'. Again, all this information., through ease of reading, level of intricacy and the need for portability, is being printed out. This appears to be a trend that is consistent across the countries surveyed in this study.

High Portability versus Low Portability of Information

This has two aspects. Paper is generally more portable than computers, but laptops and notebooks are getting more portable, and better quality. Hence one respondent from Italy said that 'in going to meetings, working away from the office and working at home, the problem [of not using paper copies] is more related to the lack of equipment such as portable computers and projectors'. And from Spain 'investments in high-tech are still very expensive: palm-tops, conference rooms, etc'. One respondent from France said that there is still an advantage of paper over laptop when travelling: 'it is easier to read and amend paper documents during business travel than on a PC with low capacity of batteries'. But from the Netherlands 'the development of mobile PC, notebooks and laptops allows a lot of flexibility'. There appears to be differences among countries in the perceived portability of PCs that may simply be a reflection of the investment in technology, and variations from North to South. Table 2 indicates a higher reliance on paper for home working and working away from the office for Spain and Italy than the other European countries included in the study.

To Use versus Not to Use Technology in the Organizational Hierarchy

There is an indication that, at least in Germany, the higher up the hierarchy ones goes, the least likely it is that managers use computer technology, and insist on paper copies. Hence one respondent from Germany told us: 'there is no office without a PC any more in Germany, but the Germans do not fully use the technology given'. Another said 'reporting is often for the top management that does not use the electronic way, because of the age of the management (the modernity of the tools and personal barriers for using technology and one's own PC – which is mostly used by the secretaries)'. This is a situation that has only been mentioned of Germany. It could be that this is a function of age, or of hierarchy. If the later it may be related to what Hofstede calls the cultural dimension of Power Distance. Yet Germany is reckoned to have a low power distance, but there is often formality in modes of address and working practices in German companies that may be a function more of Uncertainty Avoidance (mentioned above). If connected to the age of senior managers, this may well be a decreasing trend, where less paper will be used to communicate upwards in the organization in the future.

Cultural Differences

It can be seen therefore that there are differences among European countries in the way paper hard copies are used in contrast to electronic media, even though the intention to reduce the amount of paper may be general, and many practices are held in common across Europe. Some of the differences indicated in Tables 1 and 2 and outlined in the Introduction may be a function of Uncertainty Avoidance, Power Distance or even Long-term/short-term orientation (see Table 3). For example, there appears to be more reliance on paper in Spain, Italy and Germany where Hofstede found uncertainty avoidance to be higher.

	Uncertainty Avoidance	Power Distance	Long-term Orientation
France	86	68	-
Spain	86	57	-
Italy	75	50	-
Germany	65	35	31
Netherland	53	38	44

S			
UK	35	35	25

Scores are out of 100, so that the lower the score the less that a culture emphasises this orientation. Uncertainty Avoidance describes a preference for structured situation versus unstructured situations. Power distance refers to the extent to which inequalities among people are seen as normal, and a high power distance stresses a steep hierarchy. Long-term orientation contrasts the longer-term view of East Asian cultures with the short-term view of many Western societies. Out of the six countries in the present study, only three were included in Hofstede's study of this cultural orientation.

Table 3. Cross-cultural Dimension (Hofstede, 1991)

The level of Power Distance and traditional ways of working may explain why more paper is taken away from the office in Italy and Spain. Formality in status in German companies may explain why top managers may prefer paper copies rather than using on-screen technology themselves. Other differences cannot be directly explained in this way. For example, Spain and the Netherlands appear to share a high use of paper in meetings. It is argued above that there are opposing factors that either encourage or discourage the use of paper copies. Some of the differences may well be a function of the conflicting influences of these factors. Formality may be stronger than informality in high Power Distance and Uncertainty Avoidance cultures. Speed may be more important than permanence in cultures that are more short-term oriented (another cultural dimension explored by Hofstede), but the need for permanence may also be a function of Uncertainty Avoidance. The form of communication, and the way one presents oneself has always been more important in the UK than in Germany as was mentioned above⁷. The sensitivity to this issue by a respondent in Germany may be a reflection of the importance of content rather than form within the German culture. These, and the other factors discussed above are all aspects that may well need far more investigation and a more extensive survey than the current study has provided.

⁷ Terence Jackson (2002) *International HRM: A Cross-cultural Approach*, London: Sage, chapters 6 and 9.



Contributor biography

Jean Louis de la Salle ~ EMEA Marketing Manager, Lexmark Europe

Jean-Louis de la Salle is responsible for the research as well as the deployment of Lexmark Solutions, focusing on major business printing issues and industry developments. These include trends such as TCOP (Total Cost of Printing) and the Digital Office that have become mainstream elements of the industry. Current issues include topics such as technology convergence, document automation and workplace productivity as well as waste reduction and sustainable development in document processes.

Jean-Louis is a member of the Board of the French Chapter of XPlor, the worldwide electronic document association.

Since joining Lexmark in 1992, Jean-Louis has occupied various operational and product management positions within Lexmark EMEA. Before joining Lexmark, Jean Louis ran his own company trading computer equipment. Prior to that role, he had held various positions within Thomson Multimedia, the French consumer electronics giant with international responsibilities.

Jean-Louis was born in London, holds a MA from Paris Dauphine University and is a regular presenter in French, English and German.



Contributor biography

**Dr. Peter Clough B.Sc., M.A., PhD., C.Psychol., BASES ~
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Dr. Peter Clough is a chartered occupational psychologist and a BASES accredited sport psychologist. He has achieved Level A and Full level B competence in occupational testing. Dr. Peter Clough specialises in applying psychology to real life performance problems, an area that enabled him to contribute knowledgeably to the Paper Trust report, providing a report on psychological explanations for the endurance of paper in business environments.

He is currently leading a project, funded by TCA Consultants (Chester), to investigate the impact of mental toughness within the workplace. He is also working with the Hull University Institute of Rehabilitation to investigate the impact of lower limb problems on psychological health. He is also a member of staff in the Department of Sport Sciences here at Hull and work closely with them in a number of applied research projects.

He is interested in the appliance of psychology to real life performance problems, focusing on three broad areas:

- Risk-taking
- Psychological impact of exercise
- Mental toughness

The risk taking research is focused on the impact of moods/emotion on risk taking behaviour. He is particularly interested in the impact of failure/success on subsequent risk taking behaviour. Finally, his interest in mental toughness stems from working with professional athletes. The term is often used but little understood. We have operationalised the concept and have found that mental toughness can be used to predict performance in both sporting and occupational settings.



Contributor biography

Professor Terence Jackson ~ ESCP-EAP European School of Management

Prof. Terence Jackson holds a bachelors degree in Social Anthropology (University of Wales, Swansea, 1974), a masters in Education (University of Keele, UK, 1983), and a PhD in Management Psychology (Henley Management College/Brunel University, UK, 1993).

He is Director of the Centre for Cross Cultural Management Research at ESCP-EAP European School of Management (Oxford-Paris-Berlin-Madrid). He edits, with Dr Zeynep Aycan, the *International Journal of Cross Cultural Management* (Sage Publications) and his most recent book (his sixth) *International HRM: A Cross Cultural Approach* has received international pre-publication accolades.

He has published numerous articles on cross-cultural management ethics, management learning and management in developing countries in such journals as *Human Relations*, *Journal of Management Studies*, and *Asian Pacific Journal of Management*. He is currently directing a major research project on Management and Change in Sub-Saharan Africa, and plans two major publications at the end of 2002: a textbook, *Management and Change in Africa: A Cross-Cultural Perspective*, and *Managing People and Change in a Multicultural Context: Cases from South Africa*, as well as building hypermedia educational support material for developing managers in Africa.

He has both academic and practical experience. Prior to joining EAP, he was Manager, Group Training Consultancy, Personnel Division, National Westminster Bank Group. He has also worked in the UK Civil Service, and in colleges of further education specialising in management training. He has consulted to a number of international organisations including Oxfam, 3Com, ABB and Thomson. He has received funding from *inter alia*, the Danish International Development Agency, Paris Chamber of Commerce, British Council, English Speaking Union and Commonwealth Secretariat/UNDP, for his work on cross-cultural management issues in developing countries.