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Law Office Automation Approaching the Millenium

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The impending millennium has already spawned its share of retrospective essays and we can be assured of an endless parade of articles about the twenty-first century as 1999 approaches.[2] There will be a plethora of predictions about the new century, especially predictions about technology and how it will change the world, society, our profession and litigation. Despite the danger of being trite, we review here the technology developments of the late 1980s and early 1990s and project into the future the changes that these developments describe, using 2000 as the working target of our descriptive prediction.

In our attempt to describe the changes since 1985, we have the distinct advantage of access to a large amount of data. Since 1985, the Chicago-Kent College of Law at the Illinois Institute of Technology has conducted a survey of the use of computer technology by the lawyers in the

[1] This article is based on R. Staudt and J. Keane, *Litigation Support Systems 2d: An Attorney's Guide* (Clark Boardman Callaghan, 199) Chapter 1, §1:09-1:21.

[2] See Cetron, *Trends Shaping the World*, THE FUTURIST, Sept. 1991, at 11; Gilder, *Into the Telecosm*, HARV. BUS. REV., March 1991, at 152; Libey, *The DM Future: Trends of the New Century*, DM NEWS, Nov 4, 1991, at 67; Sheldon, *Micro 2000*, BYTE, April 1991, at 132; Stelzer, *The Shape of Things to Come*, NAT'L REV., July 8, 1991, at 26; Willard, *Forecasting, Planning and Strategy for the 21st Century*, WORLD FUTURE SOC'Y, July 1991, at 4; Yourdon, *A Decade Ends, A Millennium Looms Ahead*, COMPUTER LANGUAGE, Dec. 1989, at 101.

largest 500 law firms in the United States.[3] We have explored a veritable sea of information looking for relationships and connections. We have thousands of answers to hundreds of questions gathered in a journalistic fashion rather than in a tight scientific study.

In the end, much of what we draw from the information is derived intuitively, rather than deduced. It is even more obvious that our predictions about the next seven years are only our opinions. The safest projections based on conservative estimates of growth rates can be completely wrong because of changes in technology, business or the attitudes of professionals and their clients. In 1984, Professor Rick Rodgers at Campbell University School of Law in North Carolina wrote a short essay criticising doom and gloom predictions for the law profession in which he exaggerated estimates of the lawyer glut.[4] He stated that by the year 2100, three out of every two people in the United States will be a lawyer.[5] We could match that prediction by estimating that a straight line increase would have 212% of the lawyers in large firms with computers on their desks by the year 2000.

Just as there are examples of technology enthusiasts blithely projecting massive growth, there are examples of staggeringly low estimates of the acceptance and use of technology. A 19th-century law firm 'debated whether to introduce fantastical technology of dubious value to the attorney: Alexander Graham Bell's telephone.' IBM grossly underestimated the market for personal computers when it introduced the IBM-PC in 1982. Perhaps in the year 2000 every lawyer will have two or three computers on the desk, one in the car and several at home.

In Part 1 we will describe the growing acceptance of computers in the

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[3] See B. Roper, *Computers in the Law*, forthcoming; Gaudreau, *Database Software Package Grows in Popularity*, NAT'L LAW J., March 6, 1989, at 25; Kerr, *Is the Computer Fostering a More Just Justice System?*, DATAMATION, July 15, 1988, at 45 Manus, *More Lawyers Use Computers Than Ever Before*, THE J.A. LEGAL ADMIN., May/June 1991, at 7; Reidinger, *The Business of Law* A.B.A. J., Mar. 1991, at 63; Shuey, *Fifth Annual Technology in the Law Practice Conference Set for Chicago*, LAW PRACTICE MGMT. SECTION, Vol. 1, No. 2, at 6; Slind-Flor, *Document Exchange by Disk*, NAT'L LAW J., Nov. 18, 1991, at 1; Staudt, *1988 IIT Chicago-Kent Large Firm Survey: Automation is the Name of the Game*, NAT'L LAW J., Nov. 21, 1988, at 19; Staudt & Fribley-Mayer, *Annual Study Tracks Computer Use Trends*, NAT'L LAW J., Apr. 1, 1991, at 21 (reprinted Apr. 15, 1991, at 52); Staudt & Hwang, *Computer Use by Lawyers in Firms Still Increasing*, NAT'L LAW J., Dec. 4, 1989, at 36; Vreeland, *Survey Shows Small-Practice Automation on Upswing*, NAT'L LAW J., July 13, 1988, at 20; Weinberg, *Software Programs Let Computers Do the Drafting*, ILL. LEGAL TIMES, Oct. 1991, at 18; Morris, *Computers Gain With Attorneys*, CHI. TRIBUNE, March 16, 1991, Business Section, at 1; *Technology May Be a Lifesaver for Law Firms*, MICH. LAW. WEEKLY, Oct. 28, 1991, at S13B (reprinted Oct. 22, 1991, at 4); *More Lawyers Using Computers Says ABA*, MICH. LAW WEEKLY, Mar. 18, 1991, at 3; *Cost Effective Investment Demands Strategic Planning*, ILL, LEGAL TIMES, March 1991, at 26; *Robert Borgmeyer Named President and Chief Executive Officer*, PR NEWSWIRE, Aug. 23, 1988; *Wang to Acquire Informatics Legal Systems Division of Convergent*, Inc., BUS. WIRE, Feb. 1, 1988; *Case for Microcomputers Being Won in Large Firms*, COMPUTER & SOFTWARE NEWS, July 18, 1988, at 40; *Upcoming Events*, NAT'L LAW J., Sept. 21, 1987, at 4.

[4] Rodgers, *Is the Sky Really Falling on the Legal Profession?*, THE LAWYER'S PC, Nov. 15, 1984, at 5.

[5] Id. He stated that although 'numbers don't lie,' they 'merely distort,' and 'if we can overcome the mathematic impossibility of this prediction, perhaps we can handle each other's malpractice suits.'

offices of lawyers and the types of equipment and software that lawyers themselves have adopted in the late 1980s and early 1990s. We offer some guesses about the trends in the use of computers by lawyers as we approach the millennium.

In Part 2 we describe in greater detail the evolution of two types of software applications that are particularly important for litigators: automated practice systems and litigation support systems. We will try to tease out some signs that point to the state of the art in these two areas in the year 2000.

1 Law Firm Technology Overview

Every year since 1985, the Chicago-Kent College of Law has conducted a survey of lawyers' use of computers. The survey population has included the 500 largest law firms in the United States as identified by the Legal Times in 1985 with updates made annually. Since 1989 we have included those firms identified by the National Law Journal's Annual Survey of the largest 250 firms in the United States.

We have always received more than 100 responses. Over the six years of the survey beginning in 1986 (excluding the first attempt in 1985), we have received an average of 145 responses, peaking at 188 responses in 1987.

The survey has been tracking the increases in numbers of personnel in law firms, including lawyers, secretaries, paralegals and computer staff. Since 1985, the number of all law firm employees in our sample has been rising. The average number of lawyers per firm has risen steadily from 96 lawyers in 1985 to an average of 185 lawyers per firm in 1991.

The survey results offer a longitudinal insight into technology at more than 100 large firms.[6] Thousands of lawyers practice in these firms. We acknowledge that the sampling is not random. The respondents may be more advanced technologically than are large firms as a whole because there may be some greater incentive to participate if a firm is actively engaged in using computers. On the other hand, it is much easier to fill out the questionnaire if there is little computer activity at the firm and a completed questionnaire is a ticket to an early report on the competition. In any event, the sheer number of the responding firms make their cumulative self-description important. The changes over time in the responses are significant because the deficiencies in the data collection methods were reasonably consistent from year to year. While different

[6] The cumulated studies are not a true longitudinal study because the firms responding each year are different. While it might be instructive to sort out only those firms that have responded each year and analyse the change in technology profile in that consistent group, we have not completed that study here.

cohorts of firms responded each year, the questionnaire and the resulting data sets have enough in common to allow year to year comparisons.

1.1 Back office automation

From the beginning, we have been most interested in the use of computers by lawyers themselves. When we began asking questions, a very small minority of lawyers touched a computer. Even LEXIS and WESTLAW were in their early ascendancy in 1985. Computer-assisted legal research was frequently the exclusive province of the firm librarian. Word processing, which was to become the most common lawyer application by the late 1980s, was reserved for word processing departments and an occasional secretary.[7]

The surveys have tracked the move of computers from the back office to the secretaries' and attorneys' desks. Word processing became more distributed to secretaries and attorneys themselves, rather than confined to back-office word processing departments. Each year, a small percentage of firms report a separate back office word processing department. This decline is exceeded by the corresponding increases in both attorney and secretary use of word processing.[8]

On the other hand, by 1985 the back offices of large firms were no strangers to computers. In most large firms, computers were first used for timekeeping (time recording) and billing. To help set the stage for inquiries about lawyers' use of computers, our survey gathered information about automation of back-office functions like timekeeping, billing, accounting, personnel and payroll.[9] We assumed that if lawyers themselves would ultimately use computers, their machines must coordinate

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[7] While lawyers are frequently criticised for shunning technology, law firms were always eager customers of new word processing advances. Lawyers bought each succeeding version of the word processor as it became available: mag-card and mag-tape machines, memory typewriters, distributed mini-computer word processing and stand alone word processors. For the most part these early word processors were concentrated in back office departments while the lawyers' secretaries used electronic typewriters.

[8] The decline may be more dramatic than these numbers suggest – we do not have figures on the number of operators in back office departments, only the number of reported departments.

[9] For timekeeping and accounting, minicomputers are still leading the hardware platform; in 1990, 82 per cent. Wang computers continue to hold the lead at 31 per cent, with personal computer clones and compatibles following at 14 per cent. This statistic follows the general trend of an increase in personal computers (only 2 firms reported them in both 1988 and 1989), while the use of minicomputers in the back office is slightly decreasing each year, from 98 per cent in 1988 to 83 per cent in 1989.

For personal and payroll, minicomputers represented only 25 per cent of the hardware used in 1990, down from 27 per cent in 1989. Personal computer use for this function has remained the same for the two years, at 27 per cent. Over 45 per cent of firms use an outside service for payroll.

We also asked about 'other' applications in the back office. Since 1988, the top three 'other' back office applications were conflicts (72, 68 and 73 firms respectively), litigation support (25, 34 and 23 firms) and docket control (51, 28 and 19 firms). Some of the other popular applications include files management, mailing lists, calendar and time management, and desktop publishing.

and communicate with the timekeeping system and the word processing equipment used by their assistants.

1.2 Use of computers by attorneys

We have always asked each firm whether any of its lawyers used computers to practice law. Even in 1985, more than 73 per cent of the law firms responding reported that at least one lawyer was using computers in some way to practice law. Only seven per cent of attorneys had a computer or terminal on their desks in that year. For the most part, in the early years the computers available for attorneys were stand-alone personal computers, often located in the library of the firm, and were mainly used for word processing and spreadsheets. As the following graph demonstrates, the gross number of attorneys who used computers grew significantly each year from 2,767 in 1986 to 15,132 in 1991. As the percentage of lawyers using computers exceeded single digits, almost every firm seemed to have at least one 'user'.

1.3 Attorneys' desktop workstations

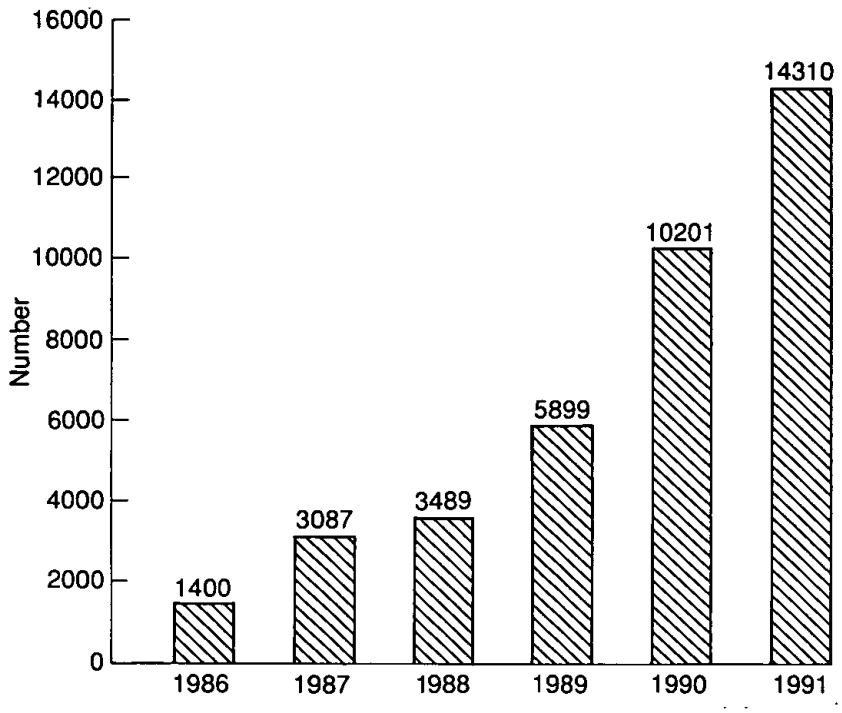
Over the years of the survey, we have come to rely more upon the physical location of a computer workstation in a lawyer's office as the key measure of the increase of lawyers' use of computers. In part, we have faith in the accuracy of the reports by the respondents that there is, or is not, a piece of equipment in their lawyers' offices. People may disagree about the definition of a minicomputer or be mistaken about whether a particular lawyer uses a library computer, but there is no confusion about the existence of a workstation in an office.

Each year, more lawyers in the firms responding to our survey have had a computer workstation on or near their desks: in 1991, 14,310 lawyers had workstations on their desks, representing 61% of all lawyers in the responding firms. This is an incredible increase from 7% in 1986 to 61% in just five years.

Originally, we hypothesised that firms began to purchase a few computers for lawyers to share before making more expensive decisions to buy computers for individual attorneys. Firms put these shared computers on carts or set up attorney workstations in the corridor or library. The statistics in the first two years of the survey supported this theory.

By 1986, 83 per cent of firms reported that at least one of their attorneys used computers in some way to practice law. About seven per cent of these lawyers had a computer or terminal in their own office, and another seven per cent shared a machine. Almost half of the responding firms indicated they had at least one IBM microcomputer.

By 1987, the number of firms reporting that they had lawyers who used a computer had increased to 89 per cent. Thirteen per cent had a computer on or near their desk, and 12 per cent shared a computer with



Number of attorneys who use a computer.

others. Sixty-two per cent of the workstations on lawyers' desks were personal computers, with 80 per cent of the PCs being IBM or compatible. Of the terminals, about 39 per cent were Wang.

In 1988, for the first time, the percentage of lawyers who shared computers declined to under ten per cent. The percentage of lawyers who had workstations on or near their desks increased to 19 per cent. This marked increase was probably due to the greater commitment to the technology, since many firms had passed the tentative stage and had begun to buy workstations for individual lawyers.

Of the individual workstations on lawyers' desks in 1988, the numbers were divided about evenly between terminals and personal computers. However, if the measure is by firm, almost twice as many firms had an installed base of personal computers rather than terminals: 71 per cent of the terminals were located in five firms. Essentially, five very large law firms had installed an abundance of terminals on lawyers' desks. Twenty-five per cent of the firms had installed a local area network connecting their PCs by 1988, and another 28 per cent planned to install a LAN in the next year.

In 1989, 33 per cent of lawyers had a workstation in their own office. Shared computers had levelled off at around ten per cent. Our interpretation is that some lawyers occasionally used the computer in the library or at a secretary's desk. As in 1988, the total number of personal com-

puters reported in the 1989 survey was nearly equivalent to the number of terminals. The data showed that a few of the largest firms provided terminals for all their attorneys. While some firms installed hundreds of PCs, the use of microcomputers was more widespread and less concentrated. Of the terminals, 21 per cent were Wang and 63 per cent of those were clustered at two firms. Firms committed to installing minicomputer or mainframe terminals either installed a terminal for most of their attorneys or for very few.

The predominant choice for personal computers continued to be IBM or IBM compatible. In 1989, nearly every firm where lawyers used PCs had at least one IBM compatible/clone on a lawyer's desk. The largest share of the PC market was captured by compatibles/clones with 45 per cent. IBM PCs and PC/2s made up another 28 per cent of the workstations. Only 3.5 per cent of the PCs were Apple or Macintosh computers. Thirty-five per cent of all PCs were hooked up to a local area network.

In 1990, 52 per cent of lawyers in the firms responding had a computer workstation in their office. Law firms reported nearly three times as many microcomputers on lawyers' desks as minicomputer or mainframe terminals. All but fifteen firms reported having some personal computers on lawyers desks. Fifty-four per cent of all PCs on lawyers desks were IBM or compatibles. IBM PCs and PC/2s captured 33 per cent, with PC/2s comprising more than 84 per cent of the total IBM machines. Only 3.7 per cent of the PCs were Apple or Macintosh, virtually unchanged from the previous year.

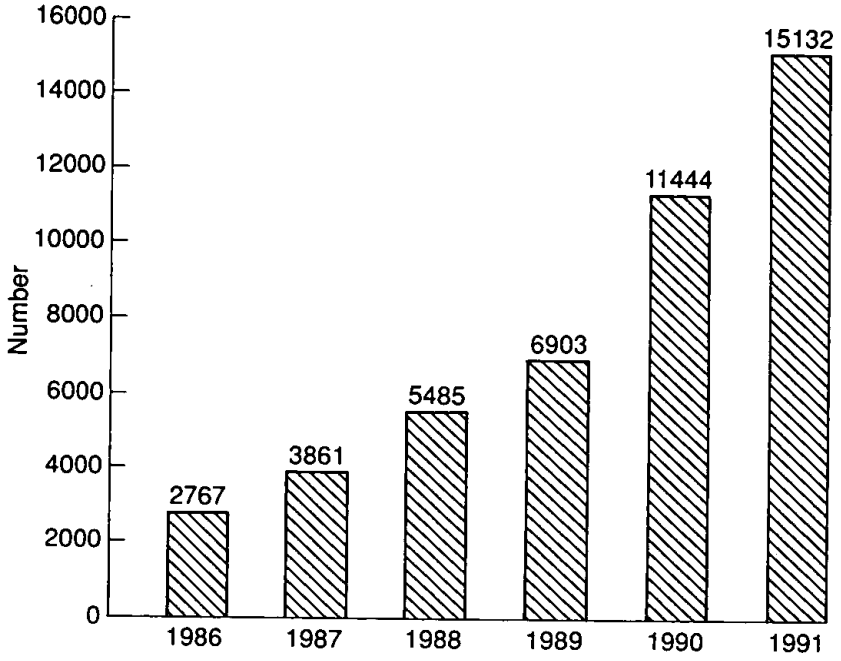
For the first time, in 1990 we asked each firm to give detailed information about the personal computers used by lawyers, including CPU, monitor, RAM and peripheral information. The firm indicated that the PCs on lawyers' desks are very powerful machines. The vast majority (86 per cent) were 80286 or 80386 computers with most of these having 640K of RAM or more.

The number of terminals on lawyers' desks fell to 23 per cent in 1990. Terminals continued to be more heavily concentrated. In the 41 'terminal' firms Wang still was the top choice, with 85 per cent of its terminals clustered in four firms.

By 1991, 61% of the attorneys had a workstation on their desks. Most of the workstations were 80286 or 80386 computers with colour graphics monitors and extra memory. In 1991, 83 per cent of the firms (106 of 127) reported use of one or more local area networks. Novell was the leading network software with 62 per cent of the 117 LANs reported.

1.4 Law office automation trends

When viewed as a whole, the surveys show several pronounced trends. More and more lawyers are themselves using computers in their day to day practice. As measured by workstations on the desks of attorneys,



Attorneys with workstations on desk.

the seven-year progression is from 7% to 61%. Early reliance on shared computers has been virtually eliminated as a significant component of equipment support for lawyers.

In the early years of the surveys, there was a heavy reliance on terminals tied to minicomputers as the workstation of choice for aggressive installations. In more recent years, large law firms are abandoning the distributed minicomputer model and buying personal computers tied to each other and to shared resources with local area networks.

The personal computer used by lawyers is almost always an IBM or IBM compatible microcomputer. Apple computers have never been accepted by this group of professionals. When terminals are the workstation selected by the firm for lawyers, Wang has been the most frequent choice, but the Wang installed base has been steadily eroded.

Since most of the computers on lawyers desks have been purchased recently, most of the machines are very powerful. More than half of the personal computers in 1991 used the high-end 80386 processor with extra random access memory and a high resolution (VGA) colour display. We expect the power of lawyers' machines to continue to increase as computer prices go down.

PREDICTION – BY THE YEAR 2000 nearly every lawyer in large firms will have a computer on or near the desk and will use it every day.

There are dozens of hardware and software predictions that might be

offered here. Larger more readable screens, image technology and cheap mass storage will help computers replace paper as the primary source of textual information in law. Smaller computers with increased power, storage, and probably slate-like displays with both keyboards and pen-based operations will make this textual information available everywhere. These little electronic libraries of text and productivity will be linked to the online databases (LEXIS and WESTLAW, etc.) using some form of wireless communications. The same communications channel will link us to the office and our clients wherever we are. The improvements in size, readability and connectivity will make computers more accessible and convenient for lawyers. But the most important changes needed to achieve the prediction of pervasive computerisation are changes in attitudes.

By the year 2000 there will be a quarter of a million new young attorneys admitted to practice who are now in law school or will later enter law school. In 1990, the Mead Data Corp. and West Publishing Company both extended unlimited 24 hour access to their respective law and news databases to all law students in the US. If for no other reason than the convenience and value of LEXIS, NEXIS and WESTLAW from home or dorm room, all of the 300,000 or more new US lawyers entering the profession in the 1990s will be immersed in computer technology from the first year in law school. Even if the trend of increasing use of computers by lawyers already practising in large firms ends today, these new graduates will fuel a continuing trend toward more use of computers by lawyers.

We can confidently estimate that more than 60% of the lawyers now in large firms have a computer on their desks. Adding the new lawyers to the mix, the percentage will easily approach 85-90% without any new incentives. But there are plenty of new incentives, even today. Graphical user interfaces like WINDOWS and OS/2 have lowered the training costs for new users. Large firms are moving to computers on the desk of every lawyer to facilitate timekeeping, electronic mail communications and work product retrieval from multiple offices. Litigation support and automated practice systems can also be more effective if every lawyer in a firm can access large central databases of documents and expertise.

Our prediction that lawyers will use their computers every day is based on our own observations of the use patterns of law professors when networks are installed and electronic mail is available linking professors, students and staff in an urban law school. Once a network is pervasively available as a communications channel, even the most resistant professors use the technology to communicate with their colleagues through electronic mail. Electronic mail accelerates the speed of collegial transactions. Deals are suggested, criticised and consummated on electronic mail before the first paper memorandum reaches the copy centre.

Electronic mail is also fun. Electronic mail is the first computer innovation that has been embraced by non-technical knowledge workers with enthusiasm and affection.

This warmth for a new technology in our non-technical profession opens the door to a wide range of computer productivity tools. The two most important computer productivity tools likely to blossom in the 1990s are automated practice systems (including both expert systems and sophisticated work product retrieval tools like hypertext) and litigation support systems that give litigators control over the documents, testimony and visual tools needed to explain and persuade. Automated practice systems and litigation support systems are the topic considered next.

2 Two Software Technologies for the Future

As computers became part of the furniture of the lawyer's office, the emphasis of our study evolved from hardware questions to software issues. Reviewing the reports of the early surveys, we find that word processing was the most common software tool used by attorneys.[10] In the first few years, when LEXIS and WESTLAW were most frequently called from a dedicated UBIC or WALT terminal, spreadsheets and databases were the second and third most common lawyer computer applications.[11] Lotus 1-2-3 was the single most popular computer program in 1985 because the word processing market in large firms was fragmented: Displaywriters from IBM, Wang word processing using terminals linked to a minicomputer and Wordstar on a personal computer.

Over time, spreadsheets became less central as computers became more prevalent. While spreadsheets were the versatile wonders of the personal computer in the middle of the 80s, the work of a practising lawyer is not dominated by numbers. Lawyers' work is dominated by words. Spreadsheets may be the tools of destiny for managers and accountants. For lawyers, the professional work station is a text proces-

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[10] Each year more attorneys ignored the stigma and used word processing themselves. However, the actual number in recent years is still lower than might be expected, given the number of attorneys with a computer on their desks. The number of lawyers using this tool grew from seven per cent in 1986 (the same as had a computer on their desk that year), to 12 per cent in 1987 (one per cent less than the per cent with computers on desks), 20 per cent in 1988 (plus one per cent), 29 per cent in 1989 (less four per cent), and in 1990, 43 per cent (where 52 per cent have a computer on their desks).

[11] The surveys have followed the rise in the use of on-line research tools. Over the past six years, LEXIS has been the leader in this market, measured by firms. Each year the gap has closed, but again in 1991, LEXIS remained the top on-line research service with 99 per cent of the firms. Westlaw continued as a close second with 97 per cent rating. Competition between LEXIS and WESTLAW remains intense. To avoid any misinterpretation, please note that our results from past years do not report on the use of either service by individual lawyers.

sor able to do traditional word processing, document assembly, work product retrieval and computer assisted research. For lawyers who try cases, the text that the computer must process includes summaries and abstracts of documents and transcripts produced in discovery and trial.

2.1 Automated document assembly systems

The automated practice system, software that automatically produces drafts of legal documents, may be the ultimate law-specific tool. Before 1988 we did not ask specific questions about document assembly systems. Answers to general questions about the use of databases by law firms in 1986 and 1987 revealed that 18% of the responding firms used databases for automated document assembly systems. In 1988, 24 per cent of the firms reported that lawyers used computers to produce client documents automatically or otherwise automate lawyer practice. Most of the software used to build these systems was general purpose software, usually word processors or databases. In 1989, 31 per cent of the firms reported that attorneys were using some kind of automated document assembly system. By 1990, 51 per cent stated that attorneys used computers to produce client documents automatically.

In 1990 we asked a detailed series of questions about document assembly in law firms. More than half of the firms reported using some kind of fill-in-the-blank program. Seventy-one per cent used word processing macros, glossaries or merge functions to incorporate prior work product into new client services. About 20 per cent used a more sophisticated document generator, whether it was developed in-house or purchased commercially.

We asked firms to provide the details of document assembly for various practice areas. Wills, tax returns, incorporations, securities offerings and corporate loans are the most common document assembly practice areas. Our data shows 50 systems developed by firms in 1990 to produce client documents automatically; some firms developed multiple systems. More firms purchased completed systems to automate client documents; firms bought 70 such systems in 1990. This shows growth in the use of the tools and a strong start on construction by law firms of their own practice systems.

Firms reported an extraordinarily diverse array of software as the tools used to build these systems. In the late 1980s and early 1990s five document assembly engines were offered commercially as systems builders for law firms use in developing systems from scratch.[12] These document assembly engines were featured at the ABA TechShow in

[12] The five packages are CAPS/Author from Capsoft Development Corporation, ExperTEXT from SimLaw Systems, Ltd., FlexPractice from Clark Boardman Callaghan and Integrated Concepts, Scrivener from Dianoetic Development Company, and ShortWork (part of the WorkForm System) from Analytic Legal Programs, Inc.

1991 and the same five software packages were the subjects of a document assembly 'shoot out' in the 1992 ABA Tech Show, co-sponsored by Chicago-Kent College of Law. In the survey results, firms mentioned three of these engines, WorkForm, FlexPractice and CAPS as expected, but also word processors like WordPerfect and Wang WP and generic tools like dBase, Lotus 1-2-3, HyperPAD and INMagic.

The most troublesome characteristics of automated document assembly systems is the need to invest significant amounts of lawyer time to prepare a useful system. To address this problem, many systems are sold as complete packages with all the forms and alternate clauses for popular areas of law prepared in advance. These forms systems are the 1990s equivalent of the traditional paper form book. The difference is that electronic forms can assemble themselves into customised client documents. With the exception of tax returns, large firms do not admit to extensive purchases of these 'canned' systems. In 1990, large firms built almost as many automated practice systems (50) as they bought (70).

PREDICTION – BY THE YEAR 2000 Automated document assembly systems, expert systems and work product retrieval will be coordinated in wide area network systems to organise and automate client services in large law firms.

Looking to the future, the most important technology development for the legal profession is the capability of the computer to store and reuse lawyers' expertise.[13] This is not merely the capability of an automated system to store forms or to store texts created for one client and then reuse them, although this is certainly a step in the proper direction. More sophisticated software offers the capacity to build an expert system that contains some of the decision-making skills of the lawyer. With such power, attorneys could use a program to formulate arguments to be delivered in a case or to provide legal solutions to client problems more quickly, efficiently and in a more error-free manner than in the past.[14]

These new systems go beyond word processing to enhance the ability

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[13] We know this is an aggressive statement. The only real competition from a profession-wide perspective is the communication capabilities of the computer. David Johnson, a partner at Wilmer, Cutler and Pickering, has written several short articles suggesting that electronic connections between lawyers in the large firms might offer tremendous new efficiencies and market opportunities for clients. This electronic interconnectivity is a digital extension of the telephonic and fax connections that now link businesses and their lawyers. Acknowledging the importance of the electronic connections, it seems to us that the links will be revolutionary only if the computational and retrieval functions of computers continue to improve and facilitate improved efficiencies for the lawyer and increased automation of client services. Our prediction here hedges the bet by including the computational advances of mature expert systems within sophisticated networks that can provide the connectivity referred to by David Johnson.

[14] See generally, K. Ashley, *Modelling Legal Argument* (1990); P. Capper & R. Susskind, *Latent Damage Law: the Expert System*, (1988); A. Gardner, *An Artificial Intelligence Approach to Legal Reasoning* (1987); T. McCarty, *A Language for Legal Discourse*, in PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE ON ARTIFICIAL INTELLIGENCE AND LAW (Vancouver, B.C. 1989); R. Susskind, *Expert Systems in Law: a Jurisprudential Inquiry* (1987).

of lawyers to serve their clients more professionally. Expert systems and automated practice systems will play a central role for lawyers in the future if they can produce significant efficiencies in the delivery of legal services. Where precision and exacting detail are needed in repetitive document production, automated practice systems can produce important efficiencies and simultaneously increase the quality of legal services.

Progress between now and the year 2000 will bring a seamless merger of the automated practice system and the work product retrieval system.[15] Firms will use hypertext tools and full text retrieval systems that will help lawyers find connections between the problems faced today by their clients and the solutions developed yesterday for prior clients. If enough clients face the same type of problem, the firm will invest in aggressive systematisation of the solution. If the problem is too varied or rare to justify an automated system, subsequent clients will still benefit from the prior work product because their lawyers will easily clip and reuse applicable parts of past solutions.

Computers can store a wide range of information that lawyers use to provide services to their clients: knowledge about the law, know-how about clients, details of typical transactions or historical data about interest rates. To the extent the computer captures expertise about law itself, as distinguished from information about client preferences, expert witnesses or the like, the stored information can be called an electronic model of the law. These models may teach lessons about the specific legal domain that they model. Expert systems may also offer insight into the nature of law itself. It is this last idea that is so attractive about the research in legal expert systems.[16]

2.2 Automated litigation support systems

When we inquired about the use of databases and spreadsheets by lawyers in 1986, the leading use of databases was for litigation support. After tax-related applications, lawyers in the large firms in 1986 used spreadsheets more frequently for litigation support. We designed the

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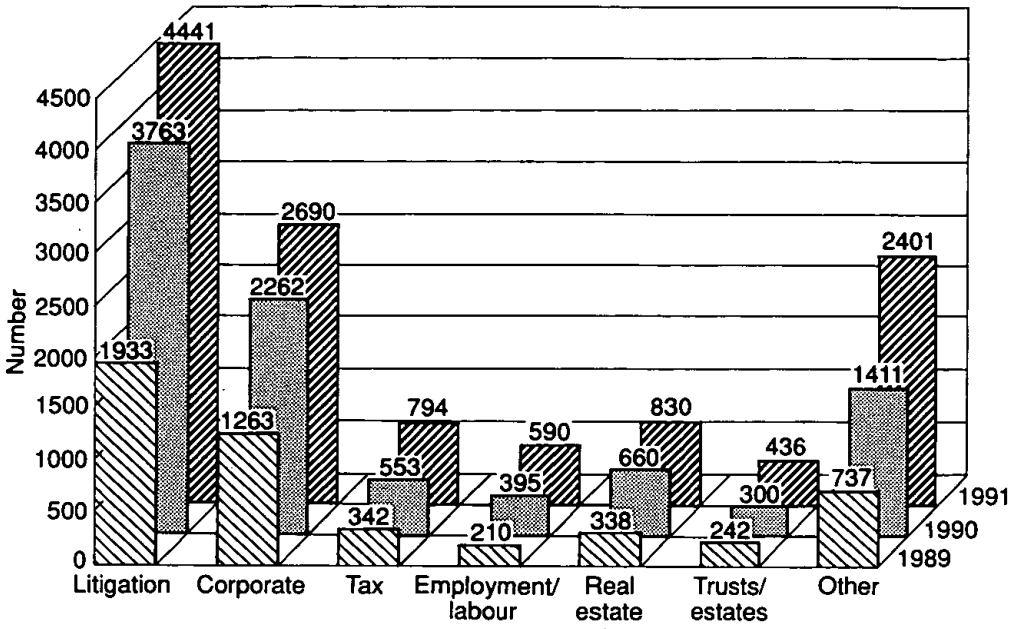
[15] The survey has been tracking the existence of firm-wide databases of documents, briefs, memoranda of law and other work product since 1987. In 1987, 35 firms reported maintaining such a database, with 38 firms in 1988. In 1989, while 49 firms reported having departmental work product databases, only 35 firms had a firm-wide database. We found a small increase in firm-wide databases in 1990, with 50 firms reporting a firm-wide database. However, the departmental work product fell back to 33. In 1991, departmental databases rebounded to 51 firms, while firm wide systems grew slightly to 53 firms.

Based on this data, we can predict that the ability to browse the work product of a major firm and selectively use the information generated by those collective professionals will become so obviously valuable that firms will find the technology to nurture this capability.

[16] For a different perspective on the use of computers to model or map legal domains see, R. Staudt, *Legal Mindstorms, Lawyers, Computers and Powerful Ideas*, 31 Jurimetrics 171 (1991). See also: M. Ethan Katsh, *The Electronic Media and the Transformation of Law* (1989); Collins & Skover, *Paratexts* STAN. L. REV. (forthcoming); Bothman, *Hypertext: An Informational Voyage*, NAT'L LAW J., Mar. 19, 1991 at 4.



Attorneys using computers 1989–1991 by practice area.

last few surveys to assemble data on the various brands of hardware and software used by lawyers for the many different tasks involved in litigation, including the following litigation support activities: document databases, transcript databases, lawyers notes databases, project planning, exhibits and graphics, calculation of damages, document assembly, case and client management, and decision tree/risk analysis.

In 1986 50 per cent of the firms, in 1987 76 per cent of responding firms, and in 1988 85 per cent indicated that the firm's litigators used computers for litigation support. In 1989, the survey indicated that 83 per cent of the firms had litigators who used computers to support litigation. By 1990, that had risen to 87 per cent and in 1991 was 91 per cent. This strong response is consistent with the high percentage of litigators among the lawyers who use computers themselves.[17]

The most frequently reported computer application for litigation

[17] We asked firms to classify attorneys in the firm under a particular specialty, and then tell us how many attorneys in each specialty use computers. For the last three years of the survey, litigation and corporate attorneys were the most numerous computer users; however, each year brought a new percentage leader.

support was the document database. In 1989 ninety firms, and in 1990 ninety-five firms listed hardware used to maintain document databases. Nearly two-thirds of the firms in 1990 used IBM or compatible personal computers for this task. The firms identified more than 45 different software packages used for document databases. In 1991 even larger numbers of firms used computers to keep track of documents in litigation. Transcript databases also showed a significant increase in use from 1989 to 1991. The firms identified dozens of software packages used for this activity.

Law firms used computers for a wide range of litigation support activities in addition to document and transcript control. There were a few firms using graphics software, and a few using risk analysis. The numbers have always been small, and the only clear favourite was the repeated mention of IBM and compatible hardware.

PREDICTION – In the year 2000 automated litigation support will be pervasive in all lawsuits and it will be indistinguishable from the in-house retrieval systems used by large firms for work product and legal research

This is an aggressive prediction and might be criticised for its generality and optimism. In part, the prediction is based on those that precede it. In one view, we are simply saying that lawyers who try cases will use information technology just as much as lawyers who handle transactions. Our data comparing computer use by specialities over six years makes this prediction conservative. Litigators have been in the vanguard of lawyers adopting computer technology. In part, this prediction simply recognises that the software techniques that make prior work product available conveniently to transaction lawyers will do exactly the same thing for litigators.

At its core, the software problem of finding the right contract clause from the thousands of options stored in the firm's files, is the same as the problem of finding the right *ad damnum* paragraph for a new pleading from prior samples, the same as finding all of the cases that support an argument for punitive damages, and is the same as finding all the memoranda and letters that might show that the defendants colluded in setting prices. Therefore, it would make sense for the user — the lawyer — to be able to find and view all of these types of information in a similar, if not identical way. Computer assisted research, litigation support and work product retrieval should merge in the lawyer's desktop computer. The merger may be illusory in that specialised database products have been developed to handle each of these types of information. But the lawyer, for the most part, should not be too concerned about how the information is delivered to the desktop as long as it gets there in a useful form.

Several potential developments could make our prediction extremely conservative. Image technology and artificial intelligence in full text retrieval may improve the capabilities of litigation support *and* lower its

price by reducing the number and sophistication of the people needed to prepare litigation support databases. If political barriers and financial constraints can be overcome, a massive computerisation of court systems could occur before the new millennium. The National Center for State Courts states that in 22 of the United States, most trial courts that serve populations of more than 50,000 have access to some level of statewide automation or judicial information system.[18] If lawyers are empowered to use computers to interact with judges, opposing counsel, court clerks and the sheriff's office as well as the Recorder of Deeds and the Secretary of State, then acceptance and adoption of the technology will quickly become universal.[19]

Beginning in the late 1980s the National Shorthand Reporter's Association (U.S.) has sponsored and publicised computer equipped courtrooms. In the early years of the experiment they were called 'Courtrooms of the Future'. The new label emphasises that the technology is here and available today: 'Computer Integrated Courtrooms.' These working courtrooms in both federal and state trial courts are equipped to allow court reporters to provide an instantaneous electronic transcript.[20] The court reporter's transcription machine is wired to a computer that translates the keystrokes into a rough, but reasonably full transcript of the proceedings. This full text transcript is then communicated to computers on the judge's bench and the lawyers' tables. The judge and lawyers can see the transcript of the hearing on their computer screens only seconds after the words are spoken. In the newest versions of this technology, the paper tape streaming out of the court reporter's equipment is full text rather than stenographic code.

Lawyers are using sophisticated electronic tools to illustrate evidence and to prepare evidence in trials. For example, the court reporter's electronic transcript can be indexed and retrieved on the same lawyers' computer in the Computer Integrated Courtroom. Emerging computer tools can connect a video version of prior testimony to the indexed full text of the transcript. Cross examination can be devastatingly effective if the witness is impeached by a video image of himself making a contradictory statement.

The most impressive demonstration of this technology is an illustrative case that James Keane has demonstrated at American Bar Associa-

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[18] *NCSC Survey, Automation in Courts on the Rise*, NAT'L LAW J., DEC. 2, 1991, AT 39, 41.

[19] 'Wyoming, for example, has installed a statewide lower court information system for which each court in the network has at least a personal computer, printer and modem. Each court is also linked electronically to the state capital, thus forming – in terms of square miles – the largest electronic judicial wide-area network in the nation.' Id. at 39.

[20] Judge Roger Strand of the U.S. District Court in Phoenix and U.S. District Court Judge Prentice Marshall in Chicago were two of the first installations.

tion meetings in Chicago and elsewhere.[21] The wall-sized screen shows the court reporter's transcript with line and page numbers. The lawyer asks the system to display every reference in the transcript to the words 'head injury.' The computer software locates these 'hits' and highlights the search terms on the screen. When the lawyer finds the specific part of the transcript he seeks, he presses a key and a window opens on top of the screen that displays the words of the transcript. In the window, the witness appears and testifies in full motion video saying the words that were displayed!

The demonstration continues. In the full motion video window, the witness testifies about a movie of the football game where the head injury occurred. The window fills with the movie that was shown to the witness at the former hearing. (Keep this all straight: we are viewing a computer database of the transcript of a trial. Simultaneously, the computer screen is displaying both the text and a video of the testimony and the video within the video of the injury.) The movie of the football game was grainy and the angle was not perfect for viewing the impact that caused the injury. The lawyers for the plaintiff had prepared a computer simulation of the incident that overlaid the movie frames. The simulation then rotates the figures to illustrate the head position before impact and at the time of impact. This is a stunning demonstration of a range of powerful trial tools.

Richard Leighton, a Washington, D. C. lawyer, made a revolutionary suggestion prompted by the technology. He argues that civil trials are wasteful and ineffective. He compares a trial to an American football game that takes three hours of time on the clock to complete only ten or fifteen minutes of actual play. Leighton suggests that jury trials be prepared like a movie with only the relevant testimony included. Juries would never hear a judge instruct them to disregard testimony or hear objectionable comments from counsel. All of the irrelevant and prejudicial histrionics would be edited out. No side bars, no evidence arguments, no offers of proof, none of the time consuming process would be included on the tape. All of these matters would be taken care of while the video was being made. He suggests that juries would pay better attention to a more interesting presentation of the factual issues and that

[21] These demonstrations were presented in the Litigation Technology Playground at the annual meeting of the ABA Litigation Section, October 25-26, 1991, Fairmont Hotel, Chicago, Illinois and again at the ABA/Chicago-Kent Tech Show 1992 at the Hyatt Regency in Chicago on March 12-14, 1992. Jim has presented variations of the illustrative case to lawyers around the world.

the loss of the sweat and smell and non-testimonial demeanour would be offset by the increase in efficiency.[22]

More modest innovations are already showing some likelihood of being adopted. William A. Fenwick of Fenwick & West in Palo Alto, California is campaigning for an agreed set of standards for exchanging litigation information on disk as well as on paper:

> The goal is for lawyers to use computers to save time and their clients' money. A side effect, Mr. Fenwick said, would be to help level the playing field for smaller firms. All documents could easily be put into a firm's computer without having to be retyped or scanned, and with indexing software, key sections could be more easily and rapidly located.[23]

Mr. Fenwick has circulated his proposal to 35 firms, most of which are involved in a series of California rate-setting hearings that affect almost 400 insurance companies.[24]

3 Conclusion

It is increasingly important for lawyers to keep abreast of the rapid changes in technology. Competitive pressures are making it critical that firms use the technology available to increase efficiency and profitability in both daily law firm management and in the practice of law itself.

Computers are growing more powerful and are linked into vast networks. The power of these networks will offer the ability to build increasingly intelligent computer-based law advisers. This connectivity opens the profession to new opportunities for collaboration with colleagues and clients.

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[22] This suggestion is more aggressive in its implications than the speculative essay by Collins & Skover called *Paratexts*, forthcoming STAN. L. REV. There the authors suggest that video technology has changed the nature of text and that text is frequently supplanted or supplemented with video. They predict deep changes in the law arising out of this evolution in our information technology. Leighton's proposal is an extension of their predictions to one possible logical conclusion. Other commentators have urged that the traditional format of live witness testimony be modified to meet other problems of the judicial system. See e.g., C. A. Roach, *It's Time to Change the Rule Compelling Witness Appearance at Trial: Proposed Revisions to Federal Rule of Civil Procedure 45 (e)*, 79 Geo. L. J. 81 (1990) (advocating a new rule to address the problems of multidistrict trials), and G. F. Lang, *To See or Not to See the Defendant: Expanding the Use of Florida's Special Procedures for Taking the Testimony of Witnesses*, 18 Fla. St. U.L. Rev. 321 (1991) (reporting more frequent use of video testimony in cases involving child witnesses).

[23] Slind-flor, *Document Exchange by Disk Floppy-swapping may soon become the norm*, NAT'L LAW J., Nov 18, 1991, at 1.

[24] Id.