REMOTE WORKING, OFFICE SPACE, AND THE BUSINESS CASE FOR ECM

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Since its inception, the business case for enterprise content management (ECM) has been based on faster document retrieval when compared to paper-based recordkeeping or on workflow process automation, which expedites the completion of document-dependent transactions when compared to manual methods. While those factors remain important, the closure of offices in response to the COVID-19 pandemic has highlighted another parameter for cost-justification of an ECM implementation:

- With many offices empty or underutilized, organizations are reevaluating the suitability and cost of their physical workplaces.

- If remote working continues, an organization can dispose of unneeded office space or avoid the cost to reconfigure or expand its existing space to comply with public health requirements.

- For this to occur, remote workers must have reliable online access to the documents they need to do their jobs. An ECM implementation provides that capability.

As explained in the following sections, ECM is an enabling technology for remote working and a cost-effective investment for organizations that want to reduce their office footprints.

What is Remote Working?

Broadly defined, remote working encompasses any work that is performed at a location other than an employer's office. Working at home is the most frequently cited example, but it is not necessarily synonymous with remote working. Working at home includes self-employed individuals who operate home-based businesses and employees who bring work home to complete after office hours. Other types of remote working, sometimes described as "third place working," include working at a branch location or satellite office, working at customer sites, working while traveling, working at a commercial co-working site, working in temporary rental space, and working in the field to collect data, conduct research, perform inspections, or for other purposes.[1]

Depending on the circumstances of employment, remote working may be a permanent or temporary arrangement. Some remote workers are expected to come to their employer's office regularly or occasionally for meetings or other purpose.

While the COVID-19 pandemic has focused attention on working from home, remote working is neither a new idea nor a temporary response to a public health crisis. The possibility of "telecommuting" or "teleworking" has been widely discussed for decades. In the 1970s and 1980s, futurists, public policy analysts, urban planners, and transportation engineers viewed telecommuting as a way to reduce energy consumption, traffic congestion, and air pollution.[2]

Occupational psychologists and social scientists have praised remote working as a way for employees to attain greater job satisfaction and achieve a reasonable work-life balance. Human resource specialists have promoted it as a way of attracting and keeping qualified workers with dependent-care responsibilities, mobility impairments, or other special requirements and constraints.[3] Environmentalists have applauded its impact on sustainability.[4]

Early enthusiasts for remote working were overly optimistic about the time frame for its adoption. Some predicted that perhaps half of the white collar workforce could work from home by the late 1970s, but few did. In the 1980 census, less than 2.5 percent of workers reported their homes as their primary place of employment, and most of those were home-based businesses.[5] A decade later, however, management expert Peter Drucker characterized commuting to office work as obsolete.[6] By the late 1990s, remote working was increasingly accepted by employers and employees, with one widely cited source reporting that at least 11 million U.S. workers were participating at some level.[7] A 2002 survey found that 17.3 percent of full-time employees in the U.S. were teleworking at least part of the time, but 50.5 percent of survey respondents indicated an interest in a permanent remote working arrangement.[8]

Many employees have jobs that allow them to work remotely at least part of the time if they care to do so,[9] but the COVID-19 pandemic made remote workers' preferences a non-issue, at least at its outset. In order to contain the virus, many national and local governments enacted stay-at-home orders that included office closures. By early May 2020, at least one-third of employees who previously commuted to offices were reportedly working from home. In the Northeastern U.S., over 40 percent of office workers reported that they were working from home.[10]

This does not appear to be a short-term development. In late July, less than 10 percent of employees had returned to office buildings in Manhattan even though work-at-home orders had been lifted, and few companies have required or permitted their employees to do so.[11] A survey of 40,000 employees by the IBM Institute for Business Value found that 58 percent of respondents preferred to continue working from home as their primary work arrangement post-pandemic, and 80 percent indicated that they would like to work away from the office at least occasionally.[12] A Gallup survey of U.S. remote workers found that half of the respondents preferred to continue working at home indefinitely.[13] Recognizing this, some organizations are allowing their employees to continue working from home for a year or longer if they care do so.[14]

The Document Problem

From the start, proponents of teleworking understood that remote workers need information to do their jobs. Online access to computer databases partially filled that need, but the rapid progress of office automation that led to the replacement of typewriting by word processing and internal memoranda by email had little impact on filing cabinets filled with paper records. Remote workers had to go to their offices from time to time to consult or make copies of

transaction-related documents, customer records, case files, contract files, technical specifications, project records, and other documentation.[15] Electronic document imaging systems were introduced in the early 1980s, but the technology's high cost initially limited its adoption to large organizations, and the lack of affordable broadband connections precluded access by most remote workers. Lower priced PC-based imaging systems became available in the 1990s, but they were slow to realize their market potential. In the late 1990s, most business records were still maintained in physical form on paper or, less commonly, on microfilm. Even documents that originated in electronic form were routinely printed for filing.

This situation has changed in recent years. While paper records have not disappeared, the increased capacity and decreased cost of computer storage have made electronic recordkeeping practical and commonplace. Rather than being printed for filing, word processing files, spreadsheets, and other documents that are created or received in digital form are saved in their native formats or as PDF files in electronic folders on shared drives. Paper documents received from external sources are often scanned and added to the same folders. VPN connections give remote workers online access to these shared resources.

While these recordkeeping practices make documents available to remote workers, they have significant limitations:

- In most organizations, shared drives are ungoverned repositories. Individual employees decide how and where digital documents will be saved. Few organizations have enterprise-wide rules for naming files and folders or well defined procedures for the types of documents to be included in specific folders. Many shared drives contain vaguely titled folders and files that were created and saved by former employees. In some organizations, shared drives contain folders that are merely identified by a former employee's name without any indication of their contents.

- Within a given shared drive, folders that contain official records may be co-mingled with work in progress, drafts, superseded documents, duplicate records, personal files, material downloaded from web sites, and other unrelated or transitory content that does not warrant continued retention. Very little housekeeping is typically done to remove these obsolete and redundant files and folders, which complicate the organization and retrieval of important documents.

- Shared drives are decentralized repositories. Documents pertaining to a given matter may be scattered in multiple locations. This dispersal impedes interdepartmental information sharing and promotes duplicate scanning and storage of digital documents. This decentralized approach contrasts sharply with database management practices, which emphasize the creation of enterprise-wide information resources that are shared by multiple departments.

- Shared drives provide limited indexing and retrieval functionality. Many documents are saved on a shared drive without metadata other than a file name, which may not

accurately represent a document's purpose or contents. To retrieve a given document, an employee must browse through folders and files, which may not be well organized or appropriately labeled to identify their contents. This is particularly difficult when an employee is looking for documents that were filed by others. Complicated directory structures with subfolders nested to multiple levels can be confusing and time-consuming to navigate. The Windows indexing feature can find documents on a shared drive that contain specific words, but it can be slow and does not support Boolean operators, relational expressions, or other advanced retrieval functionality.

- Shared drives provide limited safeguards against unauthorized access to documents. Access privileges are defined by individual employees rather than by a central authority as the outcome of a coherent planning process. Even where access to files and folders is limited, documents can be accidentally or intentionally deleted or modified by anyone who has full access to a given folder.

- Share drives do not provide effective mechanisms for tracking access to and use of documents, and there is no accountability for unauthorized viewing, printing, downloading, deletion, or modification of records. Shared drives do not maintain an audit trail that identifies employees who have accessed specific folders or files, and they do not track failed access attempts by unauthorized persons. These security lapses are particularly significant for documents that contain trade secrets, proprietary business plans and financial information, personally identifiable information, protected health information, payment card information, or any information that was given to an organization in confidence or with a reasonable expectation of non-disclosure.

- Document storage on shared drives is not compatible with workflow processes in which digital documents are automatically routed among authorized participants in a prescribed sequence for review, comment, signed approval, or other action. With employees working in multiple locations, automated routing combined with electronic signing is essential to expedite transaction processing and other business operations.

These limitations also apply to the use of shared drives by office-based employees, but some of them can be mitigated in an office context. An office worker can ask support staff or colleagues for assistance in locating documents that are saved on shared drives. Remote working, by contrast, is a self-service environment. Similarly, an office worker can physically trace the routing path of a document that is delayed or misplaced in the review and approval cycle. That is not easily done by a remote worker. Remote access to shared drives poses cybersecurity issues that may not apply in an office context.

A well-planned ECM implementation can address these issues.[16] An ECM application creates and maintains organized, searchable repositories that combine topical folders with in-depth indexing, access mechanisms, and workflow functionality for storage and retrieval of digital content needed by remote workers. A properly implemented ECM repository is a managed resource with a defined scope. Unlike a shared drives it is not an undifferentiated aggregation

of electronic content. The documents to be included are determined by policies and procedures. Access to specific digital content is limited to authorized employees on a need-to-know basis as determined by their work responsibilities. An ECM application can track the retrieval, viewing, printing, downloading,, modification, and replacement of electronic content. Unauthorized access attempts will be monitored.

The Office Space Problem

Office space is a strategic but expensive organizational asset. Office space costs are an important component of an organization's operating costs. Facility and property managers are responsible for planning, acquiring, designing, evaluating, renovating, furnishing, maintaining, and ultimately disposing of an organization's physical workplace. Efficient utilization of office space is an important part of that responsibility.

Facility managers and real estate specialists have long recognized that many organizations have more office space than they need. Unused space, which the real estate industry characterizes as "shadow space," is a wasted resource. Initiatives to reduce an organization's office footprint accord with "lean thinking, " a management approach that focuses on elimination of waste.[17] In addition to lower lease costs, smaller offices have lower utility costs, lower janitorial costs, lower renovation costs, lower costs for equipment and furniture, and possibly lower insurance costs. In recent years, some organizations have adopted a policy of "spaceless growth" to accommodate an expanded workforce within available office space.[18] To accomplish this, an organization may reduce the square footage allocated to each employee, implement desk sharing and other non-territorial workspace policies, or encourage or require certain employees to work remotely.

The beneficial impact of remote working on office space requirements and costs has been discussed for decades,[19] but forced closure of offices during the COVID-19 pandemic has made cost-effective space utilization a critical business issue:

- With a high percentage of employees working at home, much office space sits idle. Organizations are typically willing to accept this unused space during periods of economic uncertainty, and they may be forced to do so by lease obligations. If remote working continues, however, organizations will look for ways downsize their offices to reduce costs, in which case the pandemic will have had the same impact on commercial office space as online shopping did on brick and mortar retail. Some companies have already announced their intention to reduce their office operations through permanent remote working, and a post-pandemic recession may force others to do so.[20]

- it is not clear, however, whether facility and property managers will need to get rid of office space previously occupied by remote workers or acquire more space in anticipation of their return. If offices are reoccupied before the pandemic ends, social distancing requirements will increase the square footage allocated to individual

employees and reduce the number of employees that an existing office can accommodate. Because of cleanliness concerns, employees who work remotely most of the time but come to the office occasionally may resist desk-sharing and other non-dedicated workspace arrangements. Depending on the number of employees who return to the office, an organization may need to construct or lease additional space.

- While facilities management practices vary, organizations typically allocate about 90 to 300 usable square feet per office employee, with more space allocated to executive offices and less to clerical and support staff workstations.[21] The cost of office space depends on a building's location and physical characteristics. Office costs are typically higher in urban business districts than they are in suburban office parks.

- According to CBRE Research, the average annual gross rental rate for Class A office space in 10 major U.S. metropolitan areas was $35.54 per square foot in July 2020. Downtown locations averaged $52.14 per square foot while suburban locations averaged $27.42 per square foot.[22] Based on the average rental rate for the 10 metropolitan areas, the basic cost of office space per employee will range from about $3,200 per year for clerical workstations to $10,600 per year for executive offices. Assuming an average space allocation of 125 square feet across all employee classifications, the basic cost of office space is $4,440 per employee per year.

- This is not a complete estimate of office occupancy costs. Gross rental rates may not include utilities, janitorial services, insurance, and other operating costs. When these costs are added, the total cost of occupancy may be 1.5 times the gross rental rate or higher, in which case the average annual cost of office space per employee will exceed $6,200. For an office with 100 employees, for example, the total cost of occupancy will be $620,000 per year.[23]

- These calculations do not include the cost of pandemic-related modifications needed to safely reopen offices. Those modifications include air sanitation improvements, enhanced cleaning services, space reconfiguration, and Installation of thermal sensors and other health metric devices. In addition, physical distancing requirements specified by state or local government as a condition of reopening may increase the average space needed per employee by 50 percent or more. This will raise the average annual cost of office space per returning employee to $9,300 or $930,000 for an office with 100 returning employees.

- In some locations, the cost of reconfigured office space for returning employees will be higher than the average amounts cited above. According to CBRE Research, the average annual rental rates in midtown Manhattan, San Francisco, and Cambridge, Massachusetts exceed $80 per square foot. In those locations, the annual cost of floor space per returning employee will exceed $22,000 when physical distancing requirements and total occupancy costs are considered. Office costs in some other countries are even higher.

The ECM Alternative

To minimize these costs, some employees must continue to work remotely, assuming that they are able to do so efficiently and effectively. If employees can work at home rather than returning to the office, an organization can dispose of excess office space when its leases expire or sooner if it is able to terminate its lease before expiration or sublease the excess space. The organization will also avoid the cost of acquiring additional space or modifying existing space to comply with physical distancing requirements for returning employees while the pandemic is ongoing. The resulting savings can be substantial.

In this context, an ECM implementation that enables remote workers to complete document-dependent transactions and tasks as reliably and productively as office-based employees is a cost-effective business investment. Cost effectiveness analysis compares two competing methods of accomplishing a specified objective—usually, an existing system and one or more alternative. The cost-effective method is the one that achieves the specified objective at the lowest cost. In this case, the specified objective is accurate and efficient completion of document-dependent transactions and tasks, the existing system provides office space for employees who are responsible for completing such transactions and tasks, and the alternative is an ECM implementation that will allow such employees to complete the transactions and tasks remotely with the same degree of efficiency and effectiveness as they would in an office. To be considered cost-effective, the per-user cost of an ECM implementation to support remote workers must be lower than the per-employee cost of the office space such workers would otherwise occupy:

- While the actual cost of an ECM implementation can only be determined by obtaining a firm quotation from a qualified supplier, a range of likely costs can be reasonably estimated. ECM applications with equivalent functionality are available for on-premises installation or as a cloud-based subscription service. For a cloud-based ECM implementation, typical per-user costs range from about $100 to $300 per month, or $1,200 to $3,600 per user per year, depending on the product, the number of users, the desired features, the amount of document storage required, and other factors. The annual subscription cost of a 100-user cloud-based ECM implementation will range from $120,000 to $360,000.

- These costs may be increased by up-front expenditures for database set-up, user training, and other implementation services, which may be provided by the ECM software developer, an authorized reseller, or a qualified consultant. An on-premises ECM installation involves an initial capital investment for software and implementation services with continuing annual payments for technical support. Over a 5-year period, the resulting per-user costs are similar to those of a cloud-based implementation.

- Whether an on-premises installation or cloud-based service is involved, the per-user cost of an ECM implementation will be lower than the average annual cost of office space per employee as calculated in the preceding section. The cost difference ranges from $2,600 to $5,000 per employee per year. If 100 employees continue to work remotely rather returning to the office when permitted to do so, the potential annual savings will range from $260,000 to $500,000. In the most expensive geographic locations, ECM costs will be a small fraction of office space costs and the resulting annual savings will be much greater.

Carrying the analysis further, the return on investment for an in-office vs. ECM-supported remote working comparison can be estimated using the accounting rate of return (ARR), an easily calculated ROI measure. The formula for the accounting rate of return is:

ARR = (C/I) * 100

where:

ARR = the accounting rate of return as a percentage value.
C = the net annual cash inflows, in the form of revenues or savings, associated with an investment. Net annual cash inflows are the annual revenues or savings after all expenses are considered.
I = the investment amount.

Assuming a 100-user cloud-based ECM implementation at a cost of $3,600 per user per year, an estimate at the top of the range discussed above, the investment amount is $360,000 per year. At $6,200 per employee per year, which is the average total occupancy cost for office space in 10 major metropolitan areas, the annual value of office space that is no longer needed is $620,000. This is the annual cash inflow in the form of savings. Further assume that an organization must pay a one-time penalty of $200,000 to terminate its lease for the excess space. The annual savings minus the penalty amount equals $420,000, which represents the net annual cash inflow (savings) for the year in which the lease is terminated.

Thus, if an investment (I) of $360,000 in an ECM implementation will yield a net annual cash inflow (C) of $620,000, the annual rate of return for the first year would be:

ARR = ($420,000/$360,000) * 100
ARR = 1.17*100
ARR = 117 percent

After the first year, the net cash inflow (savings) will equal $620,000, which represents the lease payments that the organization will avoid if remote working continues.

Like other ROI measures, the accounting rate of return is a screening mechanism for acceptable investments. The calculated ARR is compared to a minimum acceptable rate of return, which is

defined by an organization's financial officers and investment analysts. The minimum acceptable rate is usually based on an organization's cost of capital or its borrowing rate. An ARR of 117 percent would exceed both of those measures by a wide margin. In this example, the cost savings offered by ECM-enabled remote working are so great that an organization could pay a lease-termination penalty up to $450,000 and still achieve an ARR of 20 percent in the first year.[24]

Caveats

Caveats apply to all cost analysis, and this one is no exception:

- The analysis assumes that remote working is compatible with an organization's strategic objectives and with an employee's duties and responsibilities apart from those for which an ECM implementation is relevant.

- The analysis assumes that a sufficient number of employees will be required or allowed to work remotely for a long enough period of time to warrant disposing of the office space they would otherwise occupy.

- The analysis assumes that an organization is able to dispose of unneeded office space within a reasonable period of time. This may be possible for office space acquired through commercial lease or rental arrangements, but it does not apply to organizations that own the buildings they occupy unless they are able to sell those buildings or have an alternative use for the unneeded space—to house a business operation that currently occupies leased office space elsewhere, for example. Cost avoidance associated with modification of existing space or acquisition of additional space to accommodate physical distancing requirements for returning employees is equally applicable to organizations that own, lease, or rent office space.

- The analysis assumes that an ECM implementation will be based on a thorough analysis of user's requirements for document indexing, retrieval, viewing, printing, and downloading and that remote workers are willing and able to access and use the ECM application efficiently and effectively. The analysis further assumes that the ECM implementation will provide a managed repository of documents that remote workers need and that it will not be cluttered with transitory documents, miscellaneous material, and personal items that will impair its usability. If that occurs, an ECM implementation will offer little advantage over online access to documents saved on shared drives.

- Remote working shifts office costs from an organization to its employees. While an employer may provide laptop computers or other mobile devices, remote workers must provide heated, lighted, and appropriately furnished office space in their own homes, and they may also be expected to supply their own broadband network connections and

Internet access. The cost calculations assume that an organization will not compensate its employees for home office space or telecommunications arrangements by paying a portion of their monthly rent or mortgage, reimbursing them for office equipment and furniture they purchase, and paying for all or part of their monthly utility bills and Internet charges. If an employer does reimburse these costs, the compensation must be deducted from the anticipated savings.[25]

- The analysis assumes that an ECM implementation will become fully operational within a reasonable time frame. The anticipated savings will not begin until that occurs. For rapid implementation, a cloud-based ECM application may be preferable to on-premises installation.

Notes

[1] On the terminology and varieties of remote working, see P. Jackson and J. van der Wielen, eds., *Teleworking: international Perspectives from Telecommuting to the Virtual Organization* (London, Routledge, 1998), especially 1-36; Y. Baruch, "The status of research on teleworking and an agenda for future research," *International Journal of Management Reviews* 3 (2): 113-129 (2001), https://doi.org/10.1111/1468-2370.00058; D. Bailey and N. Kurland, "A review of telework research: findings, new directions, and lessons for the study of modern work," *Journal of Organizational Behavior* 23 (4): 283-300 (2002), https://doi.org/10.1002/job.144.

[2] In a March 8, 1990 statement, President George H.W. Bush endorsed telecommuting as an aspect of national transportation policy. Examples of the many publications that discuss the relationship between telecommunications and energy savings include C. Lathey and J. Bewick, *Selected Abstracts of Documents Related to Energy Conservation through Telecommunications,* OT Special Publication 75-5. Washington, D.C.: U.S. Department of Commerce, August 1975; J. Nilles, *The Telecommunications Transportation Tradeoff: Options for Tomorrow*. New York: Wiley, 1976; K. Friedman and R. Obermann, "Transportation and telecommunications: the energy implications," *Annual Review of Energy* 4 (1979), 123-45, https://doi.org/10.1146/annurev.eg.04.110179.001011; F. Schiff, "Flexiplace: an idea whose time has come," *IEEE Transactions on Engineering Management EM-30* (1): 26-30 (1983), https://doi.org/10.1109/TEM.1983.6448641; J. Nilles, "Traffic reduction by telecommuting: a status review and selected bibliography," *Transportation Research Part A: General* 22 (4): 301-317 (1988); J. Yen and H. Mahmassani, "Telecommuting adoption: conceptual framework and model estimation," *Transportation Research Record: Journal of the Transportation Research Board* 1606 (1): 95-102 (1997), https://doi.org/10.3141/1606-12; B. Shin et al., "Telework: existing research and future directions," *Journal of Organizational Computing and Electronic Commerce* 10 (2): 85-101 (2000), https://doi.org/10.1207/S15327744JOCE1002_2; A. Chen et al., "Information systems and ecological sustainability," *Journal of Systems and Information Technology* 10 (3): 186-201 (2008), https://doi.org/10.1108/13287260810916907; J. Fuhr and S. Pociask, "Broadband and telecommuting: Helping the U.S. environment and the economy," *Low Carbon Economy* 2 (1), 41-47 (2011), https://doi.org/10.4236/lce.2011.21007.

[3] See, for example, M. Moss and J. Carey, "Telecommuting for individuals and organizations," *Journal of Urban Technology* 2 (1): 17-29 (2007), https://doi.org/10.1080/10630739408724486.

[4] A. Chen et al., "Information systems and ecological sustainability," *Journal of Systems and Information Technology* 10 (3): 186-201 (2008), https://doi.org/10.1108/13287260810916907.

[5] H. Dordick, "The prospects for telecommuting," *Computer/Law Journal* 6, no. 2 (1985): 333-348, https://repository.jmls.edu/cgi/viewcontent.cgi?article=1506&context=jitpl.

[6] P. Drucker, *The Ecological Vision: Reflections on the American Condition.* New York: Routledge, 1993, 340.

[7] G. Gordon, "Telecommuters by the millions—11 million to be exact." *Telecommuting Review: the Gordon Report* 14 (8), 14-16 (1997). On the difficulty of obtaining accurate estimates of remote workers, see P. Mokhtarian et al., "Measuring the measurable: Why can't we agree on the number of telecommuters in the U.S.?," *Quality and Quantity* 39: 423-452 (2005), https://escholarship.org/uc/item/7mb104c1.

[8] In the EU, by contrast, the number was 7.4 percent of full-time employees in the EU reported teleworking at least part of the time, but 40 percent indicated an interest in a permanent teleworking arrangement. K. Gareis, *The Intensity of Telework in 2002 in the EU, Switzerland and the USA.* Paper presented at the workshop of the ITF, Badajoz, August 2002. Bonn: Empirica, 2002, https://pdfs.semanticscholar.org/a552/1960616d3e5e93ee00930c7333cf5c784145.pdf?_ga=2.100627479.803080922.1595086444-1616480029.1532633155. See also R. Batenburg and P. Peters, "The diffusion and deployment of telework in organizations," in H. van Oostendorp et al., eds., *Creation, Use, and Deployment of Digital Information*. Mahwah, NJ: Lawrence Erlbaum Associates, 2005, 263-279.

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[12] https://www.ibm.com/thought-leadership/institute-business-value/report/covid-19-trilemma.

[13] https://news.gallup.com/poll/311375/reviewing-remote-work-covid.aspx.

[14] Reuters, "Google extends work from home through June next year," July 27, 2020, https://www.reuters.com/article/us-health-coronavirus-alphabet-google/google-extends-work-from-home-through-june-next-year-idUSKCN24S1M8; M. O'Mara, "Twitter could end the office as we know it," *New York Times*, May 19, 2020, https://www.nytimes.com/2020/05/19/opinion/twitter-work-from-home.html; K. Conger, "Facebook starts planning for permanent remote workers," *New York Times*, May 21, 2020, https://www.nytimes.com/2020/05/21/technology/facebook-remote-work-coronavirus.html; P. Davidson, "Work from home: More companies are letting new hires work anywhere permanently amid COVID-19 pandemic," *USA Today*, July 21, 2020, https://www.usatoday.com/story/money/2020/07/21/new-jobs-remote-work-growing-work-anywhere-coronavirus/5448032002/.

[15] M. Olson, "Work at home for computer professionals: current attitudes and future prospects," *ACM Transactions on Information Systems* 7 (4), 317-38 (1989), https://dl.acm.org/doi/pdf/10.1145/76158.76891; H. Lee et al., "Telework vs. central work: a comparative view of knowledge accessibility," *Decision Support Systems* 43 (3), 687-700 (2007), https://doi.org/10.1016/j.dss.2006.11.007; L. Tung and E. Turban, "Information technology as an enabler of telecommuting," *International Journal of Information Management* 16 (2): 103-117 (1996), https://doi.org/10.1016/0268-4012(95)00072-0

[16] An enterprise content management system is sometimes characterized as an electronic document management system (EDMS), but ECM functionality is not limited to document organization and retrieval. Subject to product-specific variations, ECM systems also support the incorporation of digital content into web pages, version control for website content, preparation of presentation aids with media content, and management of rights and permissions for video presentations, conference call recordings, artworks, and audio-visual media. On the relationship between ECM and EDMS, see ISO/TR 14105:2011, *Document Management—Change Management for Successful Electronic Document Management System (EDMS) Implementation* https://www.iso.org/obp/ui - iso:std:iso:tr:14105:ed-2:v1:en:term:2.3. While this discussion focuses on the impact of ECM on remote working, some points may be relevant for other software that manages digital content, including digital asset management applications, records management applications, and email archiving systems.

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[20] S. Jain, "Imagining the workspace of the future," in A. Ratho and P. John, *Rethinking Cities in a Post COVID19 World*. Durham, UK: Global Policy, 2020, 74-80, https://www.orfonline.org/wp-content/uploads/2020/06/Rethinking-Cities-ORF1.pdf.

[21] N. Miller, *Estimating Office Space per Worker*. San Diego: Burnham-Moores Center for Real Estate, University of San Diego, 2012, http://www.normmiller.net/wp-content/uploads/2012/08/Estimating-Office-Space-Requirements-Sept-12-2012.pdf. Usable square footage excludes lobbies, shared hallways, restrooms, and other common areas of a building.

[22] http://cbre.vo.llnwd.net/grgservices/secure/US Office Figures Q2 2020.pdf?e=1597069341&h=a569cfd23d7d7e595dc23a8dde72ef50. The Building Owners and Managers Association (BOMA) International defines three classes of office space based on building finishes, amenities, neighborhood, market perception, and other factors. Class A buildings offer the highest quality office space available in a given area. They may be new properties or prestigious older buildings with significant renovations. Class B buildings offer fair-to-good office space at lower rental rates. Class B buildings are a varied group. The best properties are only slightly less expensive than Class A buildings. Given the geographic variations in office rents, a Class B building in one location may be more expensive than a Class

A building elsewhere. Class C buildings, which offer functional space with minimal amenities, have the lowest rental rates. Class C buildings are generally unacceptable for a headquarters office. On these building classifications, see https://www.boma.org/BOMA/Research-Resources/Industry_Resources/BuildingClassDefinitions.aspx.

[23] Examples of publications on the total occupancy cost of office space include C. Stoy and S. Kytzia, "Occupancy costs: a method for their estimation," *Facilities* 24 (13), 476-489 (2006), https://doi.org/10.1108/02632770610705266; W. Hughes et al., Exposing the myth of the 1:5:200 ratio relating to initial cost, maintenance, and staffing costs of office buildings," in *Proceedings of the Twentieth Annual ARCOM Conference.* Edinburgh: Heriot-Watt University, 2004, 373-381, http://centaur.reading.ac.uk/12142/; P. Smith, "Occupancy cost analysis," in R. Best and G. De Valance, eds., *Building in Value: Pre-Design Issues.* London: Routledge, 1999, 326-342. G. Ive, "Re-examining the costs and value ratios of owning and occupying buildings," *Building Research & Information* 34 (3), 230-245 (2006), https://doi.org/10.1080/09613210600635192.

[24] Payback period calculation, another simple ROI measure, confirms that an ECM implementation is a cost-effective investment for an organization that wants to reduce its office footprint. The payback period is the amount of time required to recapture an investment through accumulated revenue or savings associated with the investment. In this case, an annual investment of $360,000 for an ECM implementation will yield savings of 35,000 per month in the first year. The payback period is 10.3 months.

[25] In April 2019, the Swiss Federal Supreme Court ruled that an employer must reimburse the costs of a private room used by an employee who works from home, but the circumstances have limited application to pandemic-related remote working arrangements. The Swiss employee was forced to work from home because no space was available at the employer's office location, and the private room was used as an archive by the employer. https://www.lexology.com/library/detail.aspx?g=4f013949-a9dc-47fe-bdf5-a5773c9c85c6.

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