FORRESTER BIG IDEA

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The Information Workplace Will Redefine The World Of Work — At Last!

by Connie Moore and Erica Rugullies

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This is the first document in the "Information Workplace" series.

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EXECUTIVE SUMMARY

Today's information worker relies on a disjointed set of office productivity, content, collaboration, and portal tools. The information workplace (IW) will be much simpler, yet richer than today's tools by incorporating contextual, role-based information from business systems, applications and processes; delivering voice, documents, rich media, process models, business intelligence, and real-time analytics; integrating just-in-time eLearning; and fostering collaboration. Using a service-oriented architecture, the IW will be rich with presence awareness, information rights, and personalization, and it will provide offline and online support to a plethora of devices. As this unfolds, information work will expand beyond traditional knowledge workers.

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NOTES & RESOURCES

Forrester interviewed 11 vendor and user companies, including: Adobe Systems, EMC, IBM, Microsoft, Novell, Oracle, Visanti, Vizible, a global energy company, and a federal government agency.

Related Research Documents

"Integrated Communications: A Business Necessity"
April 27, 2005, Trends

"Trends 2005: Collaboration"
December 10, 2004, Trends

"Trends 2005: Enterprise Content Management"
October 28, 2004, Trends

"The Interaction Platform"
October 4, 2004, Trends

TODAY'S TOOLS ARE DISJOINTED, OUT OF CONTEXT, AND SINGLE MODE ONLY

While today's knowledge worker tools are vast improvements over the tools used 20 years ago, they are still profoundly deficient. Today's tools don't help users manage the barrage of inputs from communication and information channels and don't help people organize or communicate their thoughts in a natural way. The user manually ties all the information work tools together because context is lacking. Often, tools don't exist for what information workers need to do. And virtually all the tools don't model the way people think, leading to distraction, frustration, and loss of productivity. Today's tools:

- **Are disjointed, fragmented, and stove-piped.** Information workers use separate tools for emailing, instant messaging (IM), looking up contacts, scheduling meetings, participating in meetings, creating and editing documents, securing documents, participating in business processes, learning to use new software, and communicating via voice. They manually transfer documents or convey conclusions, questions, conditions, or recommendations from one tool or environment to another.

- **Require users to continually step outside their business processes.** Users must exit their business process (e.g., reordering parts from a supplier or solving a customer service problem) to look for information or help and to use the tools they need. The result: a fragile, hard to support environment that strains users and drives up help desk costs as IT attempts to support all these unintegrated tools.

- **Are single mode only.** Most communication and collaboration devices are separate. To make a call, users pick up a telephone handset or mobile phone. Then, to email or IM, they launch software on another device. Workers are barraged with IMs and email while on the phone and receive phone calls while emailing. Voicemails pile up without the user knowing that calls have come in. When trying to reach someone urgently, a worker must take several redundant steps: check IM, call office phone and cell phone numbers, and send email.

The Information Workplace Must Address A Broader Range Of Workers

Although most traditional knowledge workers in offices have access to portals, collaboration, content, and office productivity software, not all job dimensions are well-served by today's tools (see Figure 1-1). For example:

- **Dreamers lack tools for brainstorming and idea management.** People in a "dreamer" job dimension (e.g., developing ad campaigns, strategizing about company direction) lack tools for brainstorming, strategic planning, and figuring out which ideas have the greatest payoff and highest likelihood of success. They can't easily visualize the status of the business or the competitive and market landscape.

- **Problem-solvers lack tools for sharing best practices and managing work.** People in the "problem-solver" job dimension are tasked with implementing the ideas generated by the dreamers and addressing problems or exceptions raised by people on the frontlines (i.e., "doers"). Problem-solvers lack tools for easily sharing best practices and reusing work, managing business processes, and accessing detailed information they need to make business decisions.[1] Problem-solvers also lack tools for measuring the value of work.

- **Doers need tools to automate exception handling.** People who are in the "doer" job dimension are best served by today's tools — if they are knowledge workers — but even they lack tools for automating and streamlining exceptions like nonavailability of resources or people. Doers that are not knowledge workers (e.g., line cooks, loading-dock workers, ironworkers) are sorely underserved by today's tools.

Collaboration and office productivity tools, as well as content and portal tools, are targeted at knowledge workers in offices (e.g., accountants, administrative assistants, architects, graphic designers, insurance underwriters, software developers, stockbrokers). But information work will expand to include people who work most of the time with other people (e.g., educators, field salespeople, physicians, police officers, real-estate agents, retail floor workers, security guards, social workers) or the physical world (airline pilots, biologists, construction workers, electrical engineers, factory workers, farmers, mechanics).

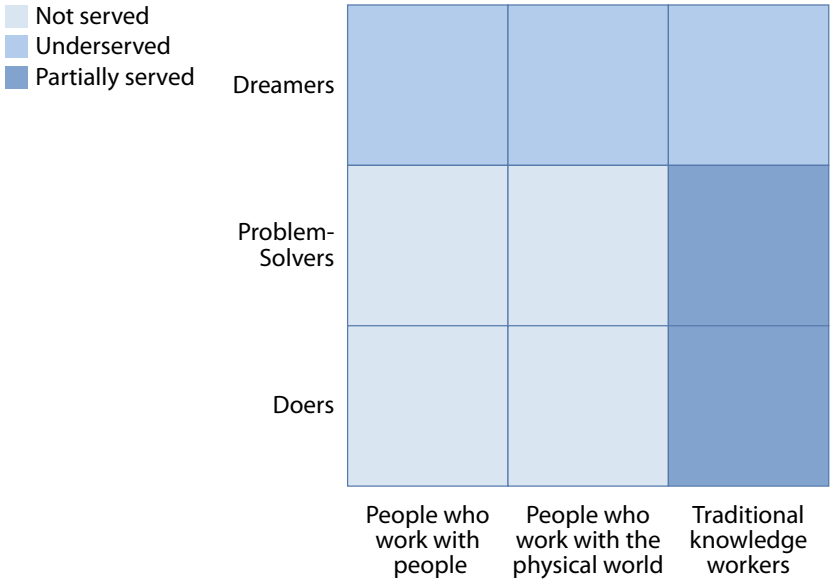
Today, package deliverers carry logistics information in custom tablet devices. Appliance repair people are connected with customer and replacement part information via specialized handheld devices. And home, wearable, and implantable monitoring technologies are entering the healthcare market (Forrester refers to this as "healthcare unbound") for medical professionals' use.[2] But highly mobile workers like these need devices that are aware of the user's location, availability, business process context, and the device's health status, and that, based on the user's role, can provide the user with access to the business information and collaboration tools they need.

People in all three job types (knowledge workers, people who work with people, and people who work with the physical world) and all three job dimensions (dreamers, problem-solvers, and doers) will be better served by software tools in five to eight years than they are with today's knowledge worker tools (see Figure 1-2). This will be made possible by innovations in contextual collaboration and content, presence, connectivity, and mobility and will be delivered through the information workplace. Forrester defines the information workplace as:

> *A software platform now emerging to support all types of information workers by providing seamless, multimodal, contextual, mobile, right-time access to content, data, voice, processes, expertise, business intelligence, eLearning content, and other information through the use of portals, collaboration tools, business process management, content repositories, content analytics, taxonomies, search, information rights management, and other emerging technologies.*

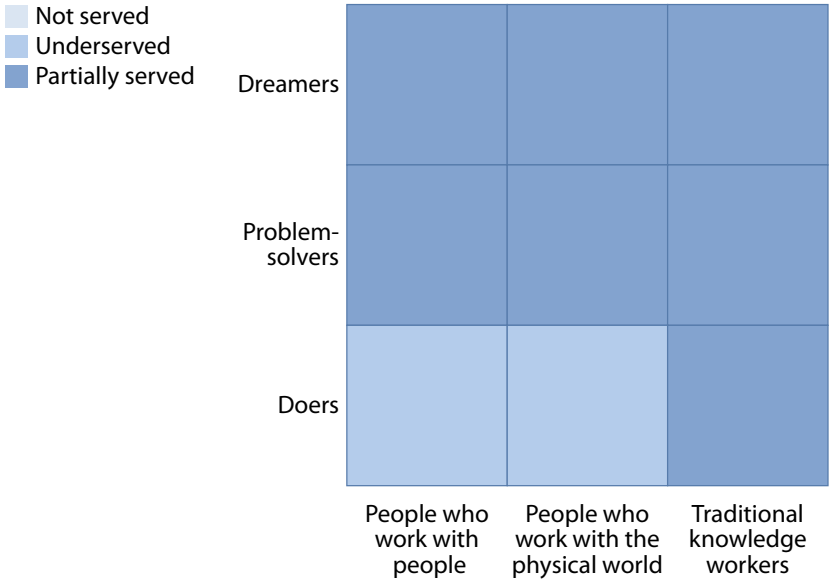
Figure 1 The Information Workplace Will Address A Broader Range Of Workers

1-1 Most workers are underserved by today's knowledge worker tools



1-2 Today's underserved users will be served by the information workplace in five to eight years

Innovations in contextual collaboration and content, presence, connectivity, and mobility will make this possible.



Source: Forrester Research, Inc.

Users Don't Know What They're Missing

It's ironic that knowledge workers express such a high level of satisfaction with current tools. In October 2004, Forrester surveyed 2,138 IT users in US organizations that have 500 or more employees.[3] The majority of knowledge worker respondents (e.g., administrators, professionals, managers, executives, technology or operations staff, individual contributors, and others) are more satisfied than not. Almost all of them (94%) are at least somewhat satisfied with their desktop technologies, and 90% are at least somewhat satisfied with their enterprise or employee portal. Why? Most workers compare today's tools against yesterday's rather than envisioning what is possible. Some visionary companies are impatient with the constraints and limitations of today's tools and are stitching together nascent technologies — like expertise location, content analytics, and visualization — to develop bespoke information workplaces. But the majority of companies are passively waiting for vendors to lead the charge.

There's A Better Way To Do Information Work

Although the information workplace of tomorrow does not yet exist, startups with emerging technologies can give us glimpses into what it looks like. For example, emergency-preparedness workers in a US city currently use an information workplace similar to the highly visual, contextual and information-rich tool from Vizible (see Figure 2). The 3-D user interface mimics the real world, can be rotated 360 degrees, and shows a wall of contextualized information that helps users quickly scan and access data, news feeds, geographical information, intranet content, collaboration tools, and other information sources.

The information workplace will dramatically change the way people work (see Figure 3 and see Figure 4). And as the information workplace changes, jobs will also change: They will get smarter.[4]

ECONOMIC AND BUSINESS SHIFTS WILL DRIVE MAJOR CHANGE IN WORK AND IT

In the years ahead, more workers will need to communicate effectively with more people, both inside and outside the organization, who are in different buildings, transportation modes, time zones, or countries. An integrated, contextual, multimodal workplace will become critical as:

- **Business boundaries blur.** Outsourcing — both on- and offshore — will continue to grow as companies continue to focus on their core competencies and rely on outsource partners for other business needs. Businesses already rely on third parties for key business services (e.g., legal, accounting, public relations), have been outsourcing various business processes (e.g., payroll, recruitment, staffing, billing, and IT functions), and are even starting to use Innovation Networks with other companies for new product identification and creation.[5] The information workplace will facilitate the flow of information among knowledge workers in partner companies that have to work together to achieve business objectives. [6]

Figure 2 Information Workplace For Emergency Preparedness

Source: Forrester Research, Inc.

Figure 3 The Nature Of Work Will Change

Scenario: An editor works on a chapter of a book and has questions for the author.

Today

- To communicate with the author, the editor must leave the chapter in question and go to an email or IM screen, launching the email or IM application if it is not already open.
- Additional steps are required to make a phone call.
- The editor and author communicate about the chapter outside the immediate context of the document.
- They email attachments back and forth, being careful to rename them to keep track of version changes.

In the information workplace

- Editor uses his pointing device to hover over the author's user name, which is listed (alongside other metadata) with the electronic file.
- Editor can see via object awareness that the author already has the file open and is working on it. Editor clicks to initiate an IM session.
- The two agree to talk on the phone.
- The editor clicks to initiate an IP-based call to the author's single number, which forwards to whichever device (e.g., office phone, cell phone, BlackBerry) she has set up in her profile.
- Editor reaches the author at her desk, which is outside the corporate boundaries of the publishing house.
- Editor shares his screen with the author and the two jointly edit the document. Each sees changes the other makes. All changes are attributed to the person who made them.
- The new version is saved into a virtual team workspace dedicated to the book. Files are stored in a universal content repository.

Scenario: A drug researcher pulls together findings.

Today

- To prepare a report about drug research findings, the researcher combines lab data with information from Web sites, internal and external databases, and files stored in various folder structures in file and document management systems.
- He uses multiple search tools to find and assemble needed information.
- He uses multiple authoring tools (e.g., word processing, graphics, spreadsheets) to create a report.
- Document drafts, handwritten notes, lab results, screen shots, and emails about the project are retained in various locations, which erodes the ability of team members to backtrack and view decision history.
- Some more fleeting communications (e.g., voicemails, instant messages) may be lost altogether.

In the information workplace

- Researcher uses sophisticated pattern-matching tools to comb through all project-related information and communications, which are organized into a virtual workspace for his part of the drug development project.
- To get an answer to a question, he emails an expert on marketing drugs to consumers who works for another division of the company and is located in Asia. He finds this person via integrated expertise location tools.
- Researcher uses a composite application to integrate lab data, information from external prescription trend Web services, and project cost information into a high-level results view.
- A new module of the composite app has been released and the first time the researcher logs in, the application walks him through a "how to use this software" training process.
- Researcher uses report authoring tools that are specific to his role and are tightly integrated with the composite application and the researcher's communication and collaboration tools.

Source: Forrester Research, Inc.

Figure 4 The Nature Of Work Will Change (Cont.)

Scenario: A sales team develops a proposal for a prospective customer

Today	In the information workplace
• A sales manager schedules a conference call with her distributed team to discuss ideas for a proposal. • One of the sales reps sketches out a complex graphic that depicts the solution the team will propose. • The sales rep hastily turns the sketch into a slide while the rest of the team waits or someone runs down the hall to fax the drawing to remote team members. • In the meantime, another sales rep describes a way to pitch the sales proposal, but his ideas get lost in the shuffle because no one captured the details of the discussion, which was not recorded.	• Sales manager is in the CRM system viewing an account record. She hovers over "regional sales team" field. • She right-clicks on the group name of the regional account team, and selects "schedule meeting." • Sales manager selects the next 1-hour slot when the whole team is available. System reserves a meeting room for local participants and sends email notifications to all participants. • At time of scheduled meeting, remote participants' phones or softphones ring. An online meeting site launches automatically and logs the users in. • All participants who are not in the office are connected in via high-quality IP-based videoconferencing, with each other and those in the conference room. • During the meeting, presence awareness shows who is speaking. • Participants in the room sketch out the proposed solution for the customer on a full-size electronic whiteboard, which is transmitted in real time to remote participants' screens. • Participants note their ideas in a discussion thread colocated with the online whiteboard in the virtual team workspace. • A sales admin saves the whiteboarding session as a cleaned-up electronic graphic.

Source: Forrester Research, Inc.

- **The traditional office disappears.** Mobile information workers use airplanes, airports, and coffee shops to set up temporary offices. More than 40% of IBM's employees don't work in traditional offices — they work from home or on the road.[7] And the Regus Group — a fast-growing company founded in Belgium — provides network access, offices, meeting rooms, video conferencing, publishing services, and virtual offices to more than 100,000 clients a day in 750 business centers in 60 countries — many of whom are home-office workers, independent professionals, mobile professionals, and small businesses.

- **The workforce retires.** In North America and Europe, baby boomers are now facing retirement — especially in the US and Canadian government, where retirement ages are lower than in the private sector.[8] For example, 20% of all US air-traffic controllers will be eligible to retire by October 2006, and 73% in the next 10 years.[9] As employers face a knowledge and expertise drain, partially retired workers will be enticed to work part-time or as consultants who work from home and they will need better tools to get their jobs done.[10]

- **The next generation enters the workforce with sky-high expectations.** Youth today research book reports on the Web and compose them in Microsoft Office. They play video games that provide rich virtual-reality experiences. A 16-year-old told us, "My friends and I text-message

and IM constantly to do homework and get assignments. We send photos of the chalkboard in class to capture notes. I can't imagine getting anything done without these things."[11] The next generation of information workers will expect a highly visual, connected, contextual information workplace they can take anywhere.

WHY NOW? A CONFLUENCE OF TECHNOLOGY EVENTS MAKES IT POSSIBLE

Pundits have talked about next-generation information worker tools for years. What makes the impending wave of technology change any different now? A confluence of technology events like:

- **Evolution of the digital business architecture.** SOA is not the be-all and end-all of IT architecture. Forrester's vision for the future of IT architecture is digital business architecture, which centers around the visible, digital implementation of the core business processes and applications that drive a firm's business. The digital business architecture has four domains that recast how to build and deliver IT architecture: digital business, the information workplace, organic IT, and right-time communications.

- **Adoption of composite applications.** Composite apps are a collection of Web services that execute in a specified sequence for carrying out multiple operations on a shared resource. Composite apps break down the barriers that operational apps impose, and they enable cross-functional and interorganizational processes, leveraging enterprise data, content, and business intelligence in collaboration with broader workgroups and external constituents to allow more strategic decision-making.[12]

- **Increased prevalence of XML-based self-describing documents and data streams.** XML allows Web services to find and interact with each other, enabling loosely coupled software components to function as applications. Widespread XML adoption will also change the nature of documents by decomposing unstructured content into semistructured fragments that exist within a container, rather than as monolithic entities of unstructured information. In the future, a legal contract, for example, will be an eForm populated with real-time data, electronically signed and dated and protected with information rights management.[13]

- **Mobility improvements.** Information workers can be much more mobile today than in the past because mobile devices are prevalent and connections are ubiquitous. Almost half (47%) of enterprises Forrester surveyed in May 2004 expect to deploy mobile and wireless applications before mid-2005.[14]

- **Materialization of interaction platforms.** Firms have struggled for years to deliver a consistent experience to customers, partners, and employees across multiple interaction channels: Web, retail stores, contact centers, ATMs/kiosks, mobile devices, and voice systems. Through an interaction platform, IT can apply the principles of SOA to deliver a set of common services to

support a coordinated experience across interaction channels.[15] The information workplace will be the information worker's tool for accessing the interaction platform.

- **Convergence of rich content, collaboration, portal, and office productivity.** ECM vendors have made many acquisitions to provide customers with integrated collaboration and diverse content capabilities.[16] Portal vendors have added team collaboration to increase the interactivity and context-based work they offer users.[17] Portals are typically implemented alongside document management and Web content management systems.[18] And these capabilities are usually integrated with office productivity tools.

- **Arrival of the X Internet.** The X Internet connects firms' IT systems to physical products, assets, and devices using networks, sensors, and services.[19] Innovative organizations use the X Internet to transform operations and processes and even their business models. Over the next decade, more firms will use the Internet to connect assets of all types, including industrial machinery, home appliances, pallets and cases, individual supply chain units, and even people and animals.

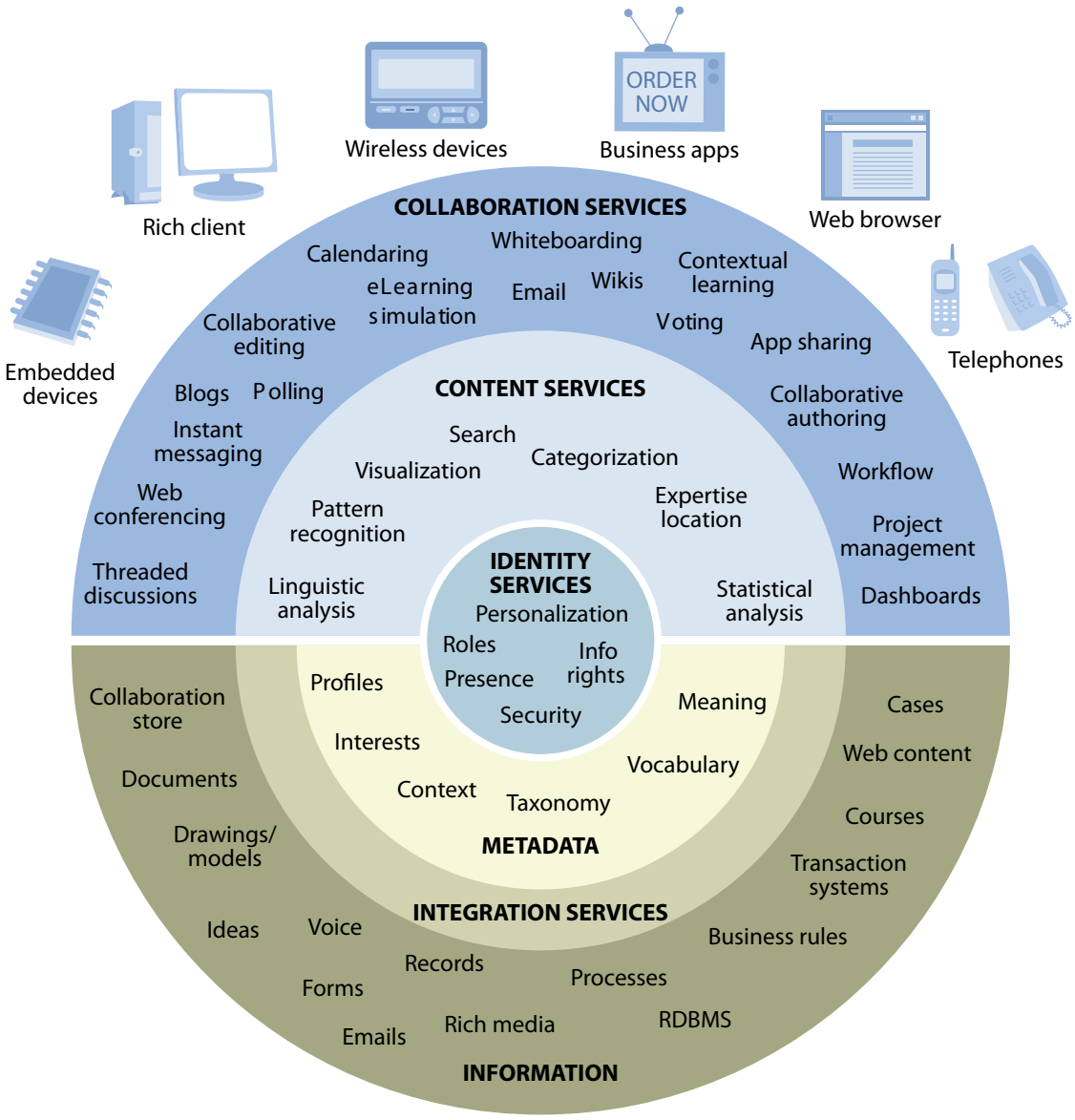
- **Maturation of right-time communications.** IP multimodal integrated communication platforms are transforming business communications. Application suites based on the session initiation protocol (SIP), which Forrester calls right-time communications, integrate and provide a common user interface for communications and collaboration applications. Right-time communications will significantly improve employee access to information and coworkers and are core to the information workplace.[20]

- **Applied learning from gaming software.** The rich visual environments supported in gaming software will be a source of inspiration for software engineers developing the information workplace. Some software companies have already hired artists and game developers to build next-generation user interfaces for business software products, emphasizing features like 3-D representation and 360-degree views.

THE INFORMATION WORKPLACE WILL ECLIPSE KNOWLEDGE WORKER TOOLS

The information workplace, which will begin to emerge in two years and will evolve radically during the next five to eight years, includes a wide range of technologies and capabilities not available in today's tools (see Figure 5). Core elements of the information workplace are enterprise information, metadata, integration services, identity services, content services, and collaboration services. Internal and external users will be able to access all enterprise information to which they have privileges (not just the unstructured content from ECM systems) using a variety of devices, not just laptops and PDAs.[21] To support this, the information workplace will embody new notions of trust, openness, mobility, and context. For that reason, privacy and security will be key concerns.

Figure 5 Elements Of The Information Workplace



Source: Forrester Research, Inc.

It's A Seamless, Contextual, Visual, And Multimodal World

To support new ways of working, the information workplace will provide a holistic environment that is:

- **Seamless.** Users get the information they need at the right time with minimal manual effort, using advanced content services like search, linguistic analysis, pattern recognition, expertise location, statistical analysis, and categorization. Users will access a single interface via multiple devices and contextual commands will perform multiple tasks.[22] To enable this, collaboration integration software will emerge to link heterogeneous collaboration environments in much the same way that content integration software links repositories from multiple vendors.[23] Also, formal or de facto collaboration standards will emerge to define elements of work like tasks, discussion threads, and group calendaring.

- **Contextual.** Functionality will be based on what information workers are doing, where they are located, and at which step in a business processes they are at that moment. The environment will adapt content and collaboration functionality to the device being used. Metadata will play a key role and user profiles, interests, and competencies will combine with user context, physical context, taxonomies, and vocabularies to bring the right information in the right format to the user at the specific time when it is needed.

- **Guided.** Just in time, contextual learning and embedded work simulation will be delivered to the user when workers are performing new tasks or running into problems. Embedded learning will guide workers through software, as well as through business activities. As a user changes roles within an organization and needs access to new capabilities (e.g., customer contract data or employee salary information) the system will guide the worker through the first few uses.[24]

- **Visual — and even auditory**. Users will get updates on process status and business metrics via visual interfaces. Earlier in this report, we described the 3-D operations center view within Vizible's software. Expertise location vendor Visanti enables users to discover relationships among people and between people and objects (e.g., projects, documents) by dragging and dropping from a photo of a user onto another part of a screen. And auditory display software vendor Accentus offers software to help traders on Wall Street identify market events and shifts audibly — orchestra instrument sounds and pitch indicate specific market events, allowing traders to further increase their multitasking without having to monitor additional computer displays.

- **Multimodal.** Users will access the information workplace via multiple access points, including desktop and laptop computers (through both browser and rich-client access), PDAs, landline and cell phones, tablet PCs, wearable computers, or embedded devices in cars, factory machines, and radio frequency ID (RFID) systems. Figuring out which communication channel to use will no longer be a user operation because business communications will no longer be location- and device-specific. Instead, users will have a single contact address and profile for setting preferences for how and when they are contacted.

- **Role-based.** Information workers will access content, data, business processes, and tools based on their role in the organization or role within a specific activity. Every organization will have its own schema for defining roles, but in general a role will be a factor of job type, job dimension, job level, and competency. Identity services and products that integrate with the enterprise directory (e.g., document management) will be core to delivering role-based workspaces, work instances, content, security, information rights management, personalization, and presence awareness.

New Technologies Will Be Absorbed Into The Information Workplace

In the next five to eight years, technologies for information workers will go through three stages as they get pulled into the orbit of large vendors that are gearing up to deliver information workplace solutions (see Figure 6 and see Figure 7). These stages are:

- **Emerging technologies.** Some technologies, like dashboards, blog and wiki software, content analytics and taxonomy tools, information rights management, idea management, visualization, and object awareness, are still nascent. Creative, innovative startups typically develop these emergent, niche technologies. Over time, many of these products evolve into established markets. As this cycle occurs, new technologies will emerge, like intelligent devices, semantic Web, context-aware computing, augmented reality, automatic presence awareness, "busy awareness," holo-video conferencing, and speech interfaces.

- **Established technologies.** Over time, emerging technologies move from being implemented by visionary and early-adopter companies to becoming established technologies that are bought by mainstream customers. Today's established technologies that support information workers include search, Web conferencing, document management, records management, business process management, business intelligence, eLearning, and project management. Some of these technologies, like search, will be pulled into the information workplace, while others (such as business intelligence, document management, business process management, and eLearning) will divide into high-end products that remain separate and lower-end mass market products that get absorbed into the information workplace.[25]

- **Absorbed technologies.** As standards emerge and products mature, some established technologies are becoming commoditized, such as document management, portals, collaboration software, and workflow.[26] Technologies for information work will succumb to the gravitational pull of the information workplace as the leading information workplace vendors try to differentiate their offerings. Technologies that have already been absorbed into the information workplace include messaging (email, calendaring, and contacts), threaded discussions, application and desktop sharing, IM and presence awareness, office productivity, project management (general purpose), basic workflow, and lightweight document management. Additional technologies that will be absorbed within five to eight years include right-time communications, business process management, content analysis/visualization, idea management, and competency discovery.

Figure 6 Converged Content, Collaboration, And Portals Are Just The Beginning

Established technologies

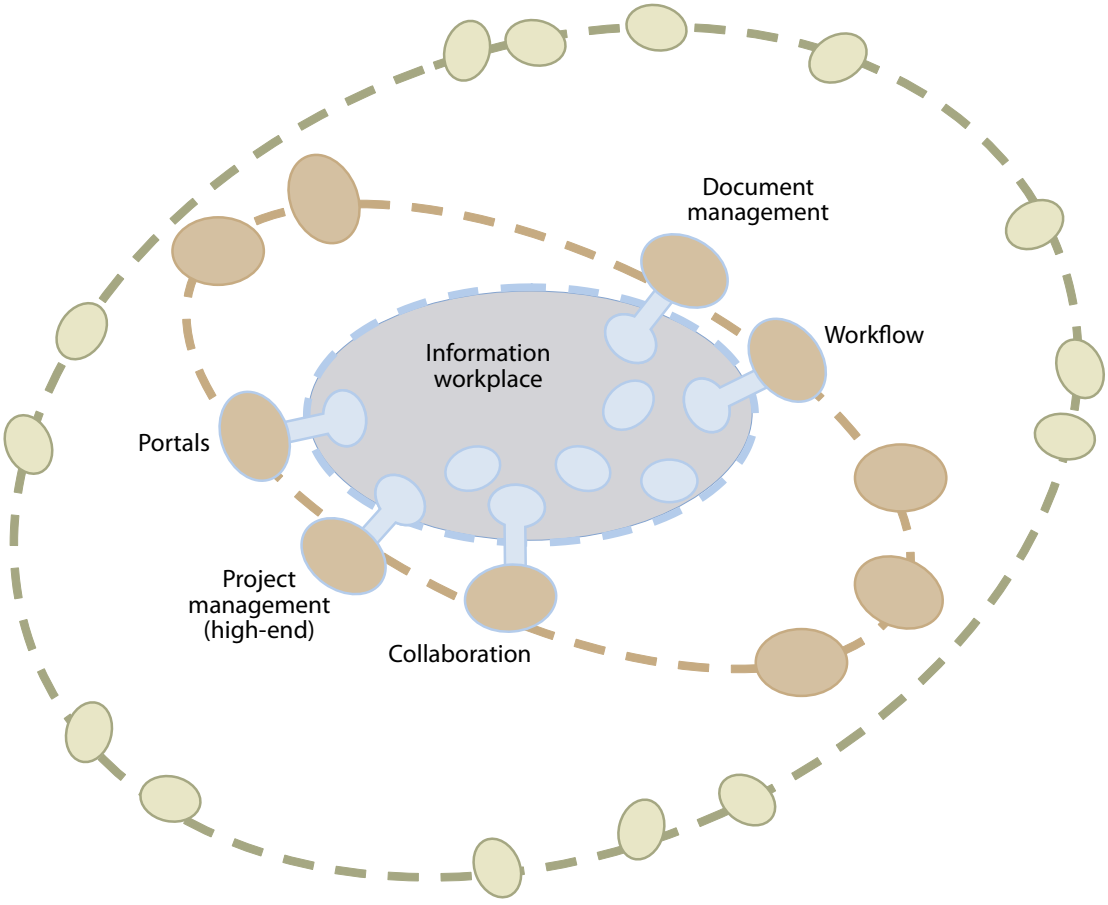
- Search
- Web conferencing
- Records management
- Workflow
- Business intelligence
- eLearning
- Document management (high-end)
- Project management (high-end)

Emerging technologies

- Dashboards
- Blogs and wikis
- Content analysis
- Taxonomy tools
- Information rights management
- Idea management
- Object awareness

Absorbed technologies

- Email/calendaring/contacts
- Threaded discussions
- App and desktop sharing
- Instant messaging and presence
- Office productivity
- Project management (general purpose)
- Document management (general purpose)



Source: Forrester Research, Inc.

Figure 7 New Technologies Will Be Absorbed Into The Information Workplace

Established technologies

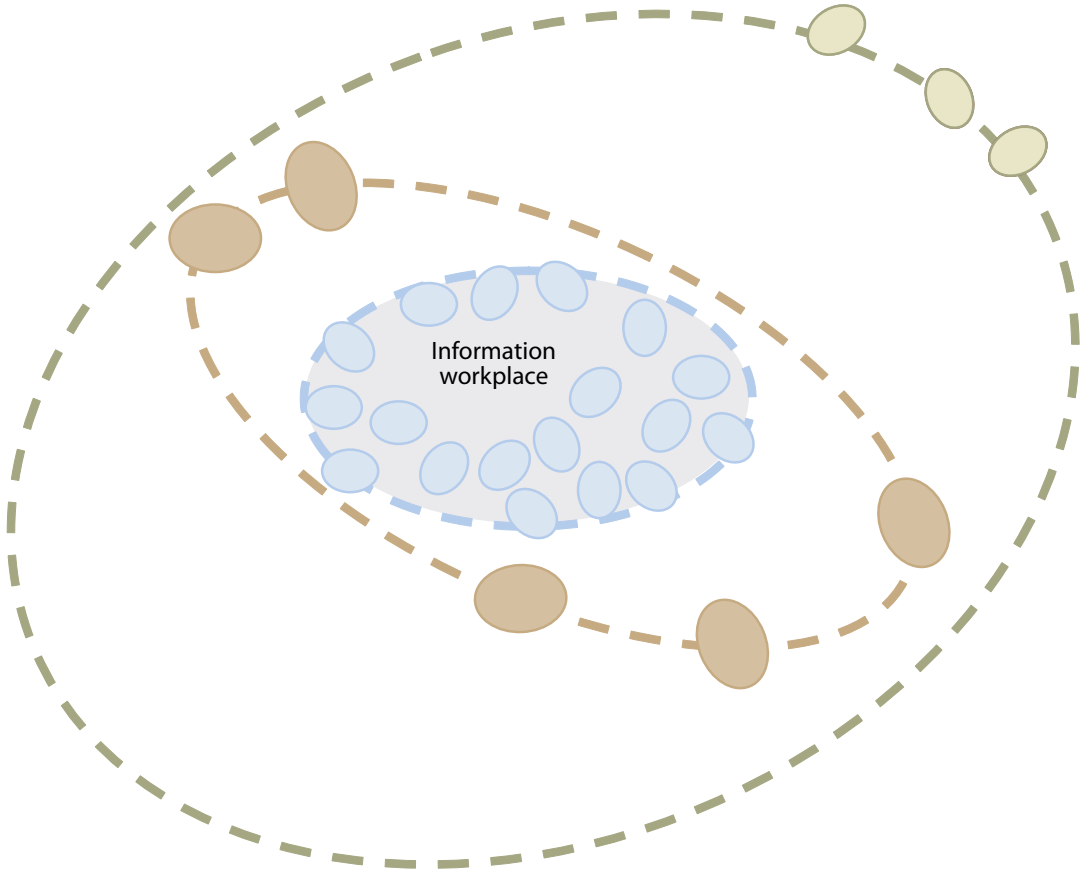
- Universal content repositories
- Business process management
- Business intelligence
- eLearning

Emerging technologies

- Intelligent devices
- Semantic Web
- Augmented reality
- "Busy awareness"
- Automatic presence awareness
- Context-aware computing
- Holo-video conferencing
- Speech interfaces

Absorbed technologies

- Enterprise messaging
- Team collaboration
- Real-time collaboration
- Portals
- Right-time communications
- Office productivity
- Content analysis/visualization
- Project management
- Enterprise content management
- Idea management
- Expertise locations



Source: Forrester Research, Inc.

RECOMMENDATIONS

BUILD AN INFORMATION WORKPLACE STRATEGY, STARTING WITH THE BASICS

- **Incorporate the information workplace into business and IT strategies.** These include collaboration, content, and portal strategies, as well as strategies for application development, deploying the interaction platform, business process outsourcing, security, privacy, office design, and telecommuting.
- **Work on the basics.** Clean up enterprise content. Get unstructured content under management and rationalize repositories. Standardize on an enterprise collaboration platform. Adopt business process management for automating human-centric work. Look at how eLearning can be used to support organizational learning. Work toward a digital business architecture.
- **Do the cultural work.** Induce a shift toward an organizational culture where information workers have skills in time management, IM, and email etiquette, and virtual meeting best practices. Part of this will be fixed in the future by a contextual user interface, but start working on it now. Train for the technology of the future. Designate a role somewhere between HR and IT as the "czar of cultural change." Have the person in this role teach people how to apply and benefit from information workplace technology.
- **Put the building blocks in place.** Rethink and monitor point products and eliminate them wherever possible. Look for software products that incorporate information workplace concepts.
- **Experiment with emerging information workplace technologies.** These technologies could include expertise location, content and data visualization, idea management, and simulation software, but the list is long and the choices are many.

WHAT IT MEANS

BIG CHANGES AHEAD IN THE WORLD OF WORK

- **Prepare for the long haul.** The information workplace requires a gradual transition. It is not a wholesale technology replacement. What about the myriad artifacts — word processing documents, spreadsheets, project plans, presentations, and correspondence — that currently exist? How will these fit in into the new world?
- **Expect negative productivity implications as users change the way they work.** People need time to learn to use new tools and to get used to replacing human interactions (e.g., classroom-based training) with electronic interactions (e.g., contextual learning).

SUPPLEMENTAL MATERIAL

Companies Interviewed For This Document

Adobe Systems	Oracle
EMC	Visanti
IBM	Vizible
Microsoft	A global energy company
Novell	A federal government agency

ENDNOTES

[1] Business process management provides managers with tools for managing work resources and monitoring work in process, and it helps workers make sure all work tasks get done. See the July 6, 2004, Quick Take "How Business Process Management Can Improve The Process Life Cycle."

[2] Technologies in, on, and around the body that free care from formal institutions — what Forrester calls "healthcare unbound" — have moved beyond the lab and are vying to enter the mass market. See the July 8, 2004, Forrester Big Idea "Who Pays For Healthcare Unbound."

[3] In general, corporate IT users are satisfied with desktop technologies, the corporate intranet, and the business apps they use. See the April 8, 2005, Data Overview "How Do Users Feel About Technology?: Business Technographics® United States."

[4] One example is a system that a global energy company is implementing. Currently, equipment operators visit remote sites to inspect equipment. If there's a problem, such as a faulty valve on a pump, the operator makes notes on a clipboard and then submits these to the maintenance team. A maintenance engineer then travels to the site to make the needed repair. In the new environment, plant equipment is self-monitoring via embedded devices so that problems are automatically reported. Maintenance engineers are dispatched when needed. Workers who were once doing rounds looking for problems can now be put to task solving those problems.

[5] Business process outsourcing and applications outsourcing have both been popular in the past two years — dueling for attention and business. Most clients view them as separate services, yet BPO often includes an apps outsourcing component, and in fact the two offerings can be substitutes for each other depending on the process and the app. See the June 10, 2004, Tech Choices "The BPO/Apps Outsourcing Tug Of War."

[6] Innovation Networks are emerging to match global demand for innovation with worldwide supply by letting firms fluidly weave internally and externally available invention and innovation services to optimize the profitability of their products, services, and business models. See the December 6, 2004, Trends "Fortune 500 CEOs Embrace Innovation Networks," and see the June 17, 2004, Forrester Big Idea, "Innovation Networks."

[7] On IBM's Web site, the firm's senior VP, Linda Sanford, discusses technologies that play a role in connecting mobile workers. http://www-306.ibm.com/e-business/ondemand/us/teamperformance/ross/ross_flat.shtml.

[8] Other industry sectors already feeling the pinch are oil and gas, utilities, transportation, education, healthcare providers, pharmaceuticals, and regulated manufacturers.

[9] The National Air Traffic Controllers Association and the FAA distributed press releases discussing this issue: http://www.natcadc.org/mediacenter/pressreleasedetail.asp?id=323 and http://www.faa.gov/apa/pr/pr.cfm?id=1904.

[10] The high number of senior employees now reaching retirement age is a serious concern to many organizations with highly skilled workers who have built their expertise through years of on-the-job training. Industries now facing this problem are government, oil and gas, utilities, transportation, pharmaceuticals, manufacturing, education, and healthcare. See the May 20, 2005, Quick Take, "The Retiring Workforce Is Creating A Knowledge Void In Government And Regulated Industries."

[11] According to the Forrester CIO Group research project, major societal, business, and technological forces at work today will push IT organizations to deal with a technology-familiar population, and do business in and with highly interconnected firms with ubiquitous technologies.

[12] In late 2004, Forrester asked 145 business and IT managers to identify their key challenges with today's packaged enterprise apps. Around 60% of respondents are developing composite apps to connect these silos. At the same time, vendors like Microsoft and SAP are moving toward delivering composite apps to the information workplace. Specifically, SAP and Microsoft have agreed to integrate key products through a joint development partnership which will add data and process context from mySAP enterprise applications to Outlook, Excel, and other Office applications. See the December 2, 2004, Trends "Packaged Apps Lag Business Requirements," and see the May 6, 2005, Quick Take "Mendocino: SAP Ties Up With Microsoft."

[13] Information rights management for business content will be absorbed into the information workplace and cease to exist as an independent market. See the October 21, 2003, IdeaByte "Infrastructure Vendors Will Dominate Digital Rights Management For Business Content."

[14] In 2004, Forrester surveyed IT decision-makers at North American enterprises with 1,000 or more employees. Almost half of the companies indicated they would deploy mobile applications into production within a year. See the June 14, 2004, Trends "The Mobile Enterprise Is Mainstream," and see the March 30, 2005, Best Practices "The Mobile Enterprise: Defining Your Strategy."

[15] Because an interaction platform delivers services that can be used by any channel, it avoids the problems of incompatible services that plague multichannel integration today. See the October 4, 2004, Trends "The Interaction Platform."

[16] ECM vendors have added collaboration features to their document management offerings. See the January 23, 2003, Planning Assumption "Managing The Document Life Cycle Starts With Collaboration."

[17] As service orientation makes integration easier, smart firms will turn their back on the scaled-down ECM and collaboration features that came with their portal servers and integrate the superior, enterprise-class features from their ECM suites and enterprise collaboration platforms instead. See the April 14, 2003, Planning Assumption "Portal Or Team Collaboration: Make The Right Technology Choice," and see the March 24, 2005, Trends "Say Goodbye To Portal Servers."

[18] Organizations using portals for intranets should integrate with content systems if collaborative authoring/workflow, formal repositories and dynamic delivery are needed. Organizations using WCM for intranets should integrate with portals if they need to aggregate and display content from multiple repositories or require an easy-to-use, customizable user interface to the content system. See the September 19, 2002, Planning Assumption "Portals And Web Content Management: Key Differences And Choices For Intranet Implementations."

[19] The X Internet will allow the information workplace to be aware of the physical world. See the December 15, 2003, Report "The X Internet And Business Profitability," and see the December 18, 2003, Report "Deploying X Internet Technology."

[20] Convergence between communications and collaboration technologies will radically change the way people communicate in the next decade. Right-time communications combines myriad technologies and devices in a single platform, streamlining management of communication channels and reducing end user complexity. See the February 24, 2004, Trends "Unified Synchronized Communications Arrives," and see the October 15, 2004, Trends "Integrated IP Applications Emerge In Europe."

[21] To deliver the information workplace, designers of mobile devices must craft profiles of specific users with unique needs and build a device that will allow the user to most efficiently and easily accomplish his or her goals. See the August 25, 2004, Trends "The Next Wave Of Mobile Devices."

[22] Early examples of this are IBM's Workplace Client Technology and Microsoft's announcement of plans to offer a Live Communications Server 2005 Communicator client for Windows Mobile and BlackBerry devices.

[23] CASAHL ecKnowledge is one of the first collaboration integration software products to emerge. It is a wizard-based tool for collaborative application integration, extension, and migration across heterogeneous environments.

[24] Simulations are now embedded in help modules for packaged software apps like CRM and ERP, and by 2008 simulation will be a mainstream eLearning tool. See the March 29, 2005, Trends "Simulations: An Emerging Technology For Building Employee Skills," and see the March 29, 2005, Tech Choices "Learning Simulations: From Simple Tools To Custom Solutions."

[25] One example is high-end DM systems that pharmas use for the drug approvals process or law firms use for matter management. Another is the rich collaborative product development software that engineering departments use in manufacturing firms. Yet another is business process management for automating complex, human-centric processes like underwriting, and loan origination. Workgroup or general purpose versions of these products will be pulled into the information workplace, while higher-end, more complex product offerings will remain independent markets.

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