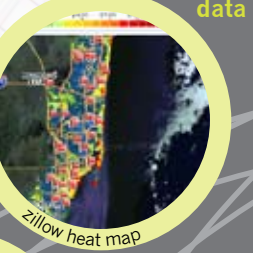
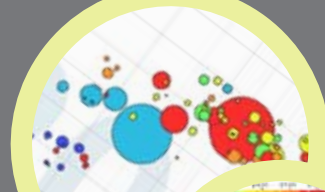
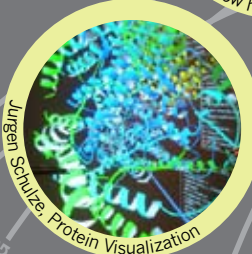


SEEING
self-documenting work and workers

KNOWING
people and machines making sense together



diversity redefined
from political correctness to innovation imperative

visible world
from information opacity to ubiquitous transparency

amplified individual
from individual to social, collective, improvisational, and augmented

sustainable enterprise
from financial burden to opportunity

health as a workplace value
from institutional responsibility to strategic asset

collaboration trails
biometric trails
people training machines

networked memories
visibility
privacy
social web
networked memories

neuroplasticity: teaching old brains new tricks
remembering
envisioning the future
neuro-future planning
new literacy of simulations
analysis
intuition

neuroscience gets a job
decoding mental processes

[We have begun to understand how the brain prepares for creative insight. This will hopefully lead to techniques for facilitating it.]
John Kounios, Drexel University, 2006



networked memories
knowing
people and machines making sense together

remembering
envisioning the future
neuro-future planning
new literacy of simulations
analysis
intuition

science at work
from experience and intuition to data and design

new literacy of simulations

collective intelligence at work:
internal wikis
prediction markets
"crowdsourcing"

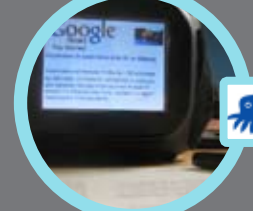
hiring algorithms
biodata surveys
mathematics of work & workers
planning to hiring
soft mathematics": math applied to individuals
brain fitness centers
everything designed
process and personal optimization
workflow optimizations
Monte Carlo simulations
"Last buffer, first served"
Markov chains

everything designed
process and personal optimization

new literacy of simulations

social filtering:
bookmarks
categorizations
signals
rankings

highly social
provide social filters of information



pollution is uneconomical
no such thing as waste

knowledge
action
sustainability moves to the core
evolution of industrial ecology
lifecycle responsibility
better measurement tools
making sustainability visible

visualization tools
ambient devices



pollution is uneconomical
no such thing as waste

knowledge
action
sustainability moves to the core
evolution of industrial ecology
lifecycle responsibility
better measurement tools
making sustainability visible

highly collaborative
participate in crowd intelligence



highly improvisational
create ad hoc resources and infrastructures

highly augmented
use enhancement tools and hacks

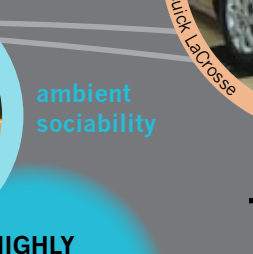


rise of personal sustainability
sustainable careers, company support, and sustainable workplaces

supply-chain optimization modeling
EPEAT
SEAT
DJSI

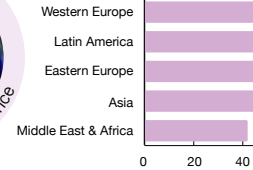


ubiquitous displays
teamwork in virtual environments



highly improvisational
create ad hoc resources and infrastructures

highly augmented
use enhancement tools and hacks



rise of personal sustainability
sustainable careers, company support, and sustainable workplaces

supply-chain optimization modeling
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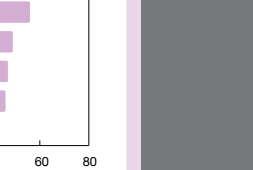


ubiquitous displays
teamwork in virtual environments



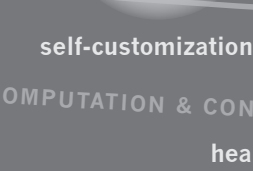
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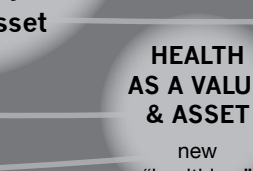
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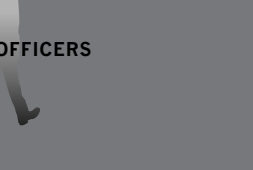


ubiquitous displays
teamwork in virtual environments



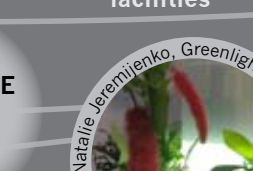
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4. RECRUITMENT: ATTRACTING— BUT NOT NECESSARILY HIRING—THE BEST

Achieving the diversity required to amplify organizations means tapping into multiple intelligences, work styles, media choices, and geographies. The products of collective intelligence are successful because each person makes contributions in the area she chooses and in the manner that suits her best. For an organization to amplify itself, it must tap the external network of non-employees and entice them to contribute in the areas of their expertise. Beyond hiring, the goal must be to attract, engage, and connect amplified individuals to the organization so that they view it as the most important and powerful node in their highly networked and distributed career paths. Organizations need to think in ways that suit these individuals rather than traditional promotions and compensation packages—increased freedom, ability to choose particular projects, ability to publish outside, etc.

5. SKILLS: TRAINING IN VISUAL LITERACY

Organizations and individuals will have to use new types of highly sensory-rich interfaces—artistic visualizations, simulations, and ambient and other interfaces utilizing sound, movement, colors, etc.—to take advantage of massive amounts of data flooding the workplace. The next generations of workers will need to possess visual literacy and have the ability to present, analyze, and interact with visual information. Visual acumen is a survival skill in the future workplace. Younger workers who have grown up in the world of video games and virtual reality will naturally be more adept at this, but just because someone is younger doesn't mean they will automatically possess such skills. Think about how to promote visual literacy standards for your organization, how to identify those with the best visual skills, and how to train employees to become proficient in dynamic, image-moderated collaborative explorations of data.

6. HUMAN RESOURCES: MATHEMATICIANS AND NEUROSCIENTISTS?

Hiring practices, training, and management will draw from a deeper understanding of neuroscience and complex behavioral algorithms. Already, startups have emerged that promise to train individuals to increase their mental acuity, focus, and efficiency based on brain science. Company-specific algorithms will be developed for software that vets new applicants based on detailed questionnaires. As science comes to work, human resource managers will need to become versed in these new sciences. While most HR personnel will likely not be scientists, they will need to be able to understand the language of these disciplines and collaborate with scientists in order to assess and implement some of the new tools. A manager may not know how to design Monte Carlo simulations to optimize workflow, but he must be able to speak the language of mathematicians to understand the theory behind suggested methods.

7. LEADERSHIP: GIVING VOICE TO THE COMMONS

The world of amplified individuals calls for a different type of leader—not ones who dictate and make pronouncements, and not necessarily those with the most charisma and unitary vision. Rather than assuming absolute authority, effective leaders in amplified organizations must work to understand the values and opinions of their employees to enable a productive dialogue about what the group embodies, what it stands for, and, thus, how it should act. Good leaders will increasingly need to see themselves as “speakers for the commons”—those who are able to give voice to what the commons members, including non-employees, want, and to provide the infrastructure and resources for accomplishing this. It doesn't mean the end of vision; the vision of amplified organizations is not enforced from the top but emerges in dialogue and conversations from the bottom up, dependent upon cooperation and support of constituents.

HOW TO USE THIS MAP

The Technology Horizons Future of Work research intends to prepare you for disruptive changes at the intersections of work and technology over the next decade. This map works together with two companion pieces, [Future of Work Perspectives](#) (SR-1092A) and [Technology Foundations for the Future of Work](#) (SR-1092B). Use this map as a big picture ‘first look’ at the research. Look for connections across the forecasts. Highlight the stories and signals of most interest to your organization, processes, and challenges. When you're ready to learn more, all of the ideas on the map are examined in more detail in the *Perspectives*. The underlying technologies driving these big stories are explored in the *Foundations* report. The foresight presented on the map is designed to inspire insights that will help you identify the action steps to prepare you and your organization for the future.



key themes



dilemmas



signals



technologies

This map is organized around six **key themes**. These are big stories that will define the intersection of work and technology. Each key theme is comprised of three or four forecast clusters—important shifts in their early stages now that will grow over the next decade.

With new tools, structures, and skills come new **dilemmas**—tensions within the workplace and organizations that won't be easily solved. Dilemmas require strategies and leadership that go beyond “either-or” thinking.

Around each cluster are smaller **signals**: the details that add up to the big stories and forecasts. These are the early indicators, tools, technologies, and processes that together point to major shifts for the future of work.

The key themes and forecasts will be driven by seven **underlying technologies**—Proactive Computing, Amplified Collaboration Tools, Sensemaking and Visualization, Device Webs and Sensor Webs, Ubiquitous Displays, Abundant Computing and Connectivity, and 3D Graphical Interfaces. More information on these can be found in the accompanying *Foundations* report.

the future
of work **AMPLIFIED
INDIVIDUALS
AMPLIFIED
ORGANIZATIONS**

THE FUTURE OF WORK **map**

Welcome to the IFTF Technology Horizon's Future of Work Map. As a society we face compelling forces at the intersection of work and technology—forces that are changing the very essence of measuring and valuing work. Our investigations of these forces, including what we see as a new world of visual literacy, led us to map the complex inter-related themes shaping work, workers, organizations, and leadership.

This year's Technology Horizons Program research on the Future of Work starts with the underlying technologies that have become integrated into virtually every aspect of work. And because we spend so much time working, work really is the place where we most directly feel the impact of developing technologies. From collaboration to productivity; from new ways of approaching workspace design to the increasing ability to work from virtually anywhere; and from hiring and recruitment to new skill sets—it is a time of experimentation for companies and organizations as social, economic, and technology trends converge to change what it means to work.

It is not possible to map out the Future of Work without reflecting on your own organization and work experience. In many ways, this map is a product of a new way we work at IFTF and the dilemmas we try to navigate daily. The six themes we highlight—Amplified Individual, Visible World, Diversity Redefined, Science at Work, Sustainable Enterprise, Health as a Workplace Value—emerged as a result of IFTF's Signals Process—a highly collaborative methodology that brings together IFTF researchers and world-class experts who contribute developments, events, and observations. We call these contributions “signals,” and they are identified as weak indicators of larger future trends. The process of tagging and clustering these signals allowed us to build on each other's ideas and synthesize them into larger themes. We used highly social, collective, improvisational, and augmented behaviors to produce a deeper result. It is our hope that you use this map to reflect on your organizational processes to better prepare for the future.



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IMPLICATIONS

For every forecast there exists a litany of potential implications. By drawing out the most crucial implications from each of our six main themes, we attempt to address the complexity of the future with a set of pointers that will help organizations better prepare for what's to come. For this research, we gathered a small group of experts, clients, and IFTF researchers to draw out potential implications. The following seven implications are a result of that work, and we thank the participants for their insight. Even though they are embedded within the narratives of *The Future of Work Perspectives* (SR-1092A) and are part of each story we tell in this set of forecasts, we've included the implications here on this map as well because recognizing them is instrumental to getting there early. These are by no means the only implications, so take some time to reflect on them and add to them as you plan your action steps to prepare for the future of work.

1. ORGANIZATIONAL CULTURE AND DESIGN: PLAN FOR TRANSPARENCY

The evolution of technologies for ubiquitous, detailed, real-time reporting on everything means that almost every aspect of organizational life can be exquisitely documented and tracked. Organizations should plan for transparency from the outset in order to stay ahead; concealing anything will become increasingly difficult. Avoiding accountability will also get harder, and moving operations somewhere else in order to avoid accountability will not be a viable long-term solution. Companies that have tried to hide pollution by “outsourcing” polluting activities to subcontractors are likely to have to account for them. Organizations should err on the side of transparency, resorting to secrecy only when absolutely necessary and as a last resort. Now is the time to examine all aspects of your operations—from human resources to manufacturing and distribution—through the transparency lens.

2. TOOLS: PHYSICAL PLACE IS A PART OF THE TOOLKIT

An important outcome of the visible world will be the convergence of computational tools and the physical workplace. Organizations need to think about how to use the physical place itself as a part of the information toolkit along with laptops, mobile phones, and printers. The need to manage large volumes of complex visual information will lead to workplace design needs that expand the size and scope of digital displays, while also spreading access to “windows” on data into non-traditional spaces for computing—hallways, social spaces like water coolers, and outdoors. Plan for workplaces that enable “progressive disclosure,” i.e., the ability to reveal higher-level functionality, as users are ready for them.

3. PHYSICAL SPACE: DESIGNING FOR HEALTH

Healthy workplaces are no longer just about a lack of harmful toxins—fluorescent lights and cubicles are giving way to green spaces and sunlight. Biocitizens will expect workplaces that reflect their understanding of health as a value. Successful future workplace design will bring together large-scale architectural understanding of the workplace community, healthy spaces, anthropological understanding of small group dynamics, and information science. Ergonomic consultations will go from optional to mandatory as employers strive to ensure that their employees are healthy and, as a result, productive. Sensors and other advanced technologies will help to make the “healthiness” of the work environment visible. Offering incentives for healthy behavior could prove a good way to attract biocitizens, but watch out for making such incentives coercive and, thus, perceived as paternalistic and intrusive.