

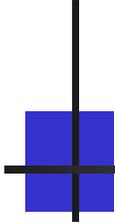


Technologies and Services in Support of Virtual Work

Morell D. Boone, Ph.D.

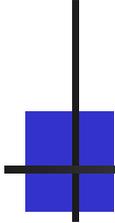
Professor and Dean, College of Technology
Eastern Michigan University

Berlin Library Colloquium- November 25, 2008



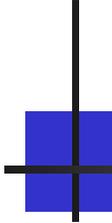
Agenda

- Economic drivers for virtual work
 - Virtual workers, virtual enterprises, virtual workforce
- Virtual work challenges
 - physical space, connectedness, enterprise systems, global infrastructure
- Classes of virtual work tools and the virtual work tool market
- Virtual work management issues
- A Virtual Work Services Management Framework
 - Technology Assessment
 - Organizational Assessment
- Future Trends and opportunities
- Discussion



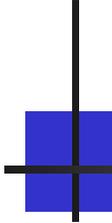
How Is Our Economy Changing?

- Industrial economy increasingly stressed
 - “Tragedy of the Commons” (Hardin, 1968)
- Information economy is different
 - FROM physical capital TO intellectual capital
 - Information is “free” and cannot be stressed
 - User-centered innovation
- New models for competitive advantage
 - “IT Doesn’t Matter” (Carr, 2003)
 - “Wikinomics” (Tapscott, 2006)
 - “The Big Switch” (Carr, 2008)



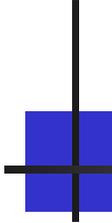
Enterprise Challenges

- Technological and managerial issues
 - Global & enterprise IT context
 - Nature of virtual work tools
 - Best practices for managing virtual work
- Computer supported cooperative work
 - "... combines understanding of [how] people work in groups with enabling technologies of computer networking, hardware, software, services and techniques."
 - (Wilson 1991)



Virtual Work

- Virtual worker
 - Dislocated from co-workers / supervisors
 - Teleworkers, isolates, nomads
- Changing workforce
 - ~90% of US workers perform some work away from office
 - >44M of US workers perform some work from home
 - Globalization, pervasive IT, M&As drive virtuality
 - >40% of jobs now involve tacit work
 - Social networking and “networked individualism”
- Changing technologies
 - Short innovation & adoption cycles
 - Consumerization “leapfrogs” technologies



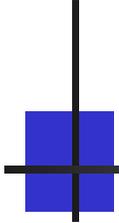
Virtual Work Drivers

- Work = Complex + Tacit + Asynch + Distant
- Emergence of standards
 - SIMPLE (instant messaging, presence awareness)
 - CPIM (common profile for IM)
 - Human ML (human markup language)
 - xCAL (calendar management)
 - iTIP (free-busy time)
 - VideoML (video markup language)
 - SMIL (synchronized multimedia integration)
- Employee experience with IM, file sharing, blogging
- Gap between “efficiency” & “effectiveness”

Virtual Work Challenges

- Physical space “comfort”
 - Hearing each others’ voices
 - Seeing each others’ faces
 - Routine “look and feel” of workplace
- “Connectedness”
 - Time & space
 - Ease of idea exchange
 - Network effects
- Immature and “lumpy” technologies





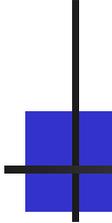
Book Chapter

- McCord, S.A. & Boone, M.D. (2008). Technologies and Services in Support of Virtual Workplaces. In Zemliansky & St. Amant (Eds.). *Handbook of Research on Virtual workplaces and the New Nature of Business* (346-363). New York: IGI Global.

Classes of Virtual Work Tools

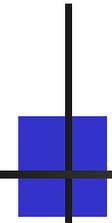
- Communication Tools
 - Telephony, VM, EM, office tools, browsers, search engines
 - VM notification, revision tracking, listservs, message boards
- Conferencing Tools
 - Audio/Video/Web conferencing, webcasting
 - Surveys and polls, whiteboards, app sharing
- Collaboration Tools
 - Document development, team workspaces, PM, PLCM, design, engineering
 - Federated contacts, repositories, KM, presence, dashboards, personalization, agents





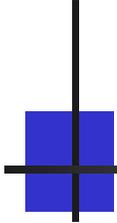
Virtual Work Tools Market

- Mainstream providers
 - IBM, MS, Oracle, Novell, Vignette, WebEx, Groove, A(MM)
 - On-site & hosted services
- Open sources options
 - TikiWiki, WebCollab
- Social networking entrants
 - Google, Yahoo!, MS, AOL, Skype
- Challenges
 - Cross-cultural/language, context-nuance, social networking, usability, A&R
 - Balance “networked individualism” w/ “one size fits all” architecture



Virtual Work Management

- Challenges
 - Isolation from colleagues – build community
 - Inadequate coordination – promote clarity
- Virtual work should reflect business strategy
 - Value chain, location of work units, reliance on technology
 - Virtual groups may interact at a deeper level, provide easier access, promote empowerment
- Managing Virtual Teams
 - Proactive leadership, project mgt, personal attention, clear objectives and language, frequent communication, context setting, constructive discourse

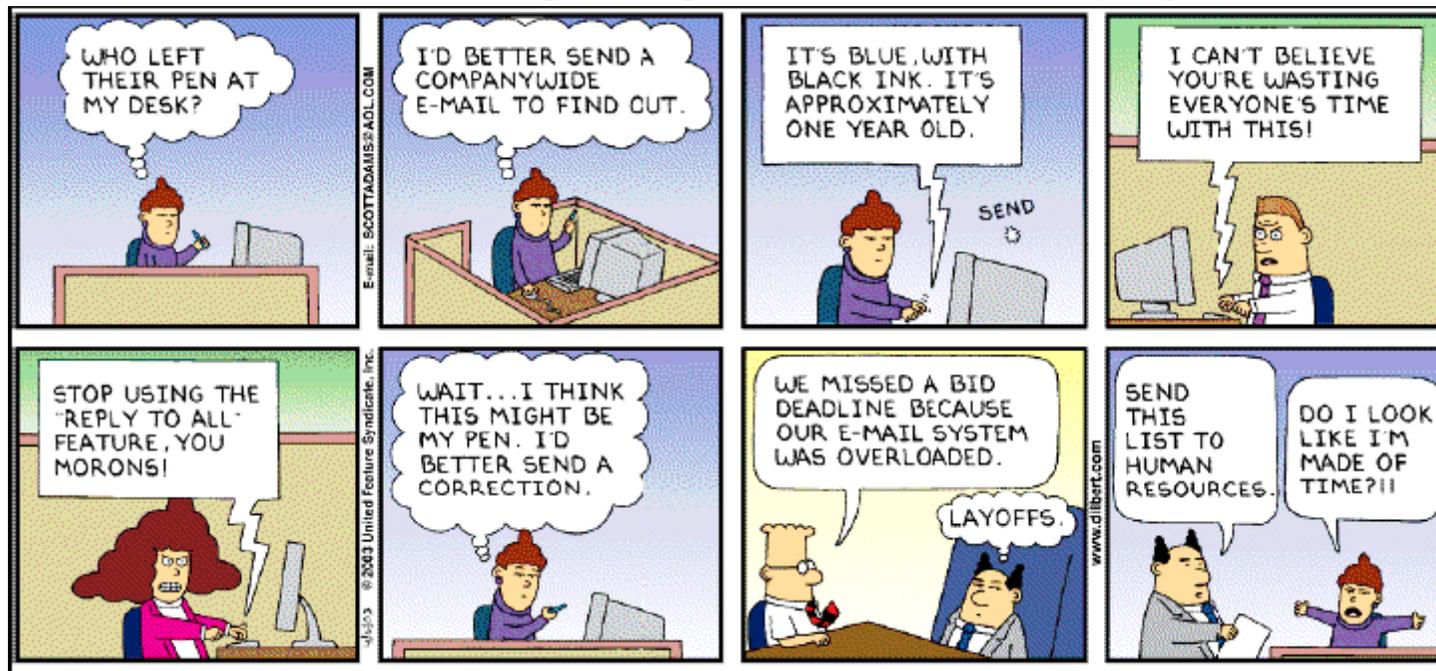


Virtual Work Management

- Team members from different companies
 - Group formation & norming, personal networking, task-related & social interaction
- Team members from different countries
 - More task communication, initial FTF meetings, facilitated & documented meetings, time zone awareness, tracking
- Team members from different cultures
 - Discuss cultural diversity, values, communication differences
- Team members who speak different languages
 - Pre-project training & practice, translation, comprehensive written communication, time to interpret context

Organizational Readiness

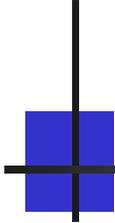
- "E-mail is not to be used to pass on information or data. It should be used only for company business."
 - Accounting Manager, Electric Boat Company



Analytic Frameworks

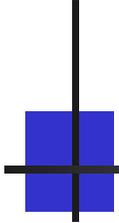
■ Technology and collaboration readiness

Technology Services Framework			Virtual Services Management Framework
<i>TCP/IP Model</i>	<i>Web Services Model</i>	<i>Virtual Work Tools</i>	
---	Discovery	---	Enterprise Knowledge Practices Virtual Group Management Practices Enterprise Workgroup Practices Business Process Decisions Intellectual Property & Security Policies Enterprise Architecture Decisions Business Practice Decisions Strategic Technology Assessment --- --- Business Strategy Decisions
---	Business Services	Collaboration Tools	
---	Applications	Conferencing Tools	
---	---	---	
---	---	---	
Application	Technologies	Communication Tools	
---	---	---	
Transport	---	---	
Internet	---	---	
Network Interface	---	---	
---	---	---	



Virtual Services Mgt Framework

- Enterprise Architecture Decisions
 - Network / OS / DB / Apps supporting strategy & practices
 - Interoperability – enterprise / technical / group / process
- Intellectual Property and Security Policies
 - “Collaboration life cycle”
 - Exploration / joint development / commercialization
 - NDAs, JDAs, TAs, SLAs, licensing agreements
 - IP policies drive security policies, shorter life cycles
- Business Process Decisions
 - Detailed spec for carrying out business tasks
 - Requirements for virtual work tools

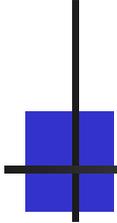


Technology Assessment

- Frequency of use of business apps & virtual tools
- Match frequency of use with employee skills
- Employee use versus perceived importance of business apps and virtual tools
- Employee use versus perceived utility of business apps and virtual tools
- External expert assessment of infrastructure, business apps, & virtual tools

Technology Framework

Stages	Enterprise Technology Infrastructure	Predominant Business Applications	Predominant Virtual Work Tools
Traditional	<ul style="list-style-type: none"> ● Server focus ● Desktop focus 	<ul style="list-style-type: none"> ● ERP ● Web-enabled processes 	<ul style="list-style-type: none"> ● Telephone ● Fax ● E-mail ● Voicemail
Mobile	<ul style="list-style-type: none"> ● Mobile devices for field personnel 	<ul style="list-style-type: none"> ● Customer Relationship Management (CRM) ● Supply Chain Management (SCM) 	<ul style="list-style-type: none"> ● Cellular telephony ● E-mail with attachments ● Audio conferencing
Integrated	<ul style="list-style-type: none"> ● Wireless LANs ● Ubiquitous communication ● Personalization 	<ul style="list-style-type: none"> ● Real-time CRM ● Real-time SCM 	<ul style="list-style-type: none"> ● Videoconferencing ● Webcasts ● Information repositories ● Shared calendaring
Pervasive	<ul style="list-style-type: none"> ● Ubiquitous access ● Enterprise integration ● Content management ● Infrastructure abstraction 	<ul style="list-style-type: none"> ● Automated CRM ● Automated SCM ● Automated Workflow ● Knowledge management 	<ul style="list-style-type: none"> ● Web collaboration ● Document tracking ● Knowledge management

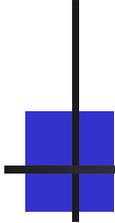


Organizational Assessment

- “Dimensions of virtuality”
 - (Chudoba et al., 2005)
- *Team distribution* – teams distributed over different geographies and time zones
- *Workplace mobility* – people work in environments other than regular offices
- *Variety of practices* – people experience cultural & work process diversity

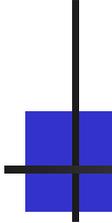
Organizational Framework

Stages	Characteristic Organizational Practices	Predominant Team Distribution	Predominant Workplace Mobility	Predominant Work Practices
Traditional	<ul style="list-style-type: none"> ●ERP focus ●Individual and group communication 	Centralized	Immobile	Homogeneous
Mobile	<ul style="list-style-type: none"> ●Mobile workers ●Customer relationship management (CRM) 			
Integrated	<ul style="list-style-type: none"> ●Mobile workforce ●Frequent collaboration ●Real-time management 			
Pervasive	<ul style="list-style-type: none"> ●Routine collaboration ●Process automation ●Real-time operation ●Flexible processes 	Collaborative	Mobile/Distributed	Heterogeneous



Future Trends

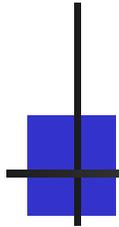
- Pervasive IT driven by
 - IP-based unified communications
 - Ubiquitous / consumerized wireless services & devices
- Emergence of context tools
 - Workers / tasks / projects
 - Who / when / what / how?
 - Agents to manage tasks, communications, repositories
- Virtual work portals
- Video integration into virtual work
- Knowledge ontologies and multimedia KM
- Discontinuous change impacts investment life cycles



Future Opportunities

- “Consider a future device for individual use ... a sort of mechanized private file and library.”
- “... a device in which an individual stores all his books, records, and communications ...”
- “... an enlarged intimate supplement to his memory.”
- “Wholly new forms of encyclopedias ... with a mesh of associative trails running through them ...”

Vannevar Bush, *Atlantic Monthly*, 1945



Discussion...

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